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**INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION**

**APPRAISAL OF
NAIROBI AIRPORT PROJECT
KENYA**

May 16, 1972

Transportation Projects Department

Fiscal Year = Ends June 30

Currency Equivalents

Kenya Pounds (K£)1 = US\$2.80

Units

Units are in the Metric System

Length

Kilometers (km)	1.0 = 0.6214 miles
Meters (m)	1.0 = 3.281 feet

Area

Square Meter (m²) 1.0 = 1.196 sq yd

Abbreviations

MPC	-	Ministry of Power and Communications
MOW	-	Ministry of Works
ICAO	-	International Civil Aviation Organization
IATA	-	International Air Transport Association
ILS	-	Instrument Landing System
VASIS	-	Visual Approach Slope Indicator System
FIC	-	Flight Information Center
R/W 06	-	Runway and Magnetic Heading
T/W	-	Taxiway
LCN	-	Load Classification Number
NAVAID	-	Navigational Aid
EAA	-	East African Airways
EAHC	-	East African Harbor Corporation
EARC	-	East African Railways Corporation
EAC	-	East African Community

KENYA

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KENYA

APPRAISAL OF THE NAIROBI AIRPORT PROJECT

SUMMARY AND CONCLUSIONS

i. With the great majority of tourists arriving in Kenya dependent upon international air transport and 12% of all foreign exchange earned by Kenya coming from its tourists, the Government considers the development of Nairobi Airport to be among its highest investment priorities. Kenya, located along the east coast of Africa, lies on the equator and variations in altitude provide a wide range of climatic conditions and topography. Its wild game reserves and beautiful white beaches are extremely attractive to visitors. The city of Nairobi is not only the center for surface transportation within the area and general aviation within East Africa but Nairobi Airport is a major intersection and transit point for international air routes. Traffic at the airport is expected to reach saturation levels by 1975 and the airport needs to be expanded. The Government engaged the consulting firms Sir Alexander Gibb and Partners (Africa) and Gibb, Petermuller and Partners to develop traffic forecasts and prepare a master plan for airport development, to be followed by detailed engineering for the first stage construction. Their report forms the basis for the proposed project.

ii. This will be the Bank Group's ninth transportation project in Kenya and the first for aviation. It will consist of the first stage development of the airport and the strengthening of the new Aerodromes Department of the Ministry of Power and Communications. A new international and domestic terminal building and apron will be constructed, a parallel taxiway will be provided, a freight complex, fire and police stations, canteen, State Pavilion and Control Tower will be constructed, taxiway, apron and approach lighting will be installed, and access roads and other support facilities will be provided. Technical assistance in the form of experts and specialized consulting firms will be provided to the Department along with training for selected personnel of the Department.

iii. The project will allow the airport to grow in orderly stages toward its ultimate development without restraints to traffic growth and will assist in the formation of a strong organization capable of an efficient and cost-conscious operation of the airport. Execution of the project would be the responsibility of the Aerodromes Department. Consultants employed to carry out the final design and supervision of construction have almost completed the design work upon which the cost estimates are based. Construction is expected to be carried out under five separate contracts, to be awarded through international competitive bidding.

iv. Of the total project cost, estimated at US\$46.3 million equivalent, the proposed Bank loan of US\$29.0 million would finance the foreign exchange component of approximately 63%. The loan would be to the Government of Kenya. The local cost component would be provided by the Government.

v. The airport has been financially profitable and a dependable source of revenue to the Government. The present level of user charges at the airport is high and reflects Nairobi's present strong competitive position, but the charges are not directly related to the various costs incurred. New charges based on costs of facilities and services involved will be devised and implemented to assure the continuing profitability of Nairobi Airport against increasing competition.

vi. The financial forecasts through fiscal 1984 indicate that the airport should be able to generate a net inflow of funds of over K£ 10 million to the Government Treasury after completion of the project in fiscal 1976. The annual rate of return on its net fixed assets will rise from about 9% in fiscal 1976 to 13% in fiscal 1980 and 18% in fiscal 1984, which is considered satisfactory.

vii. The project will result in time savings to aircraft and passengers through more efficient aircraft ground handling and shorter passenger processing time which reduce operating costs of aircraft and avoid the potential loss of visitors to Kenya. The economic return to Kenya is estimated at 15%.

viii. The project is suitable for a loan to the Republic of Kenya in the amount of US\$29,000,000 for a term of 20 years including a five year grace period.

KENYA

APPRAISAL OF THE NAIROBI AIRPORT PROJECT

1. INTRODUCTION

1.01 The Government of Kenya approached the Bank in early 1969 to assist in financing the development of Nairobi Airport. The project which has emerged after two years of Bank involvement (See Annex 1) is estimated to cost KE 16.5 million (US\$46.3 million equivalent), of which the Bank is requested to finance the foreign exchange component of 63% amounting to KE 10.4 million (US\$29.0 million).

1.02 The loan would be made to the Republic of Kenya. The project would be administered by the Department of Aerodromes, located within the Ministry of Power and Communications.

1.03 In 1967, the Government retained the consulting firms of Sir Alexander Gibb and Partners (Africa) and Gibb, Petermuller and Partners - Athens to prepare a feasibility study for the expansion of the airport. The consultants presented their final report in June 1971.

1.04 The capacities of the present terminal, apron and taxiway at Nairobi Airport will be at their saturation points by 1975. The proposed project which will relieve this congestion consists of the construction of a new terminal building and all ancillary landside and airside facilities. The project will be completed in 1975 and will provide initial capacity sufficient to meet needs up to 1982. The new facilities will provide more efficient service and faster turnaround times for aircraft, and faster and more comfortable service for travelers. The benefits of the project will directly accrue to the Kenyan economy by allowing the unrestrained growth of tourism, maintaining and improving Nairobi's position as a major international airport and reducing the costs of Kenya's own air services.

1.05 The project is the first phase of a master plan of airport development for Nairobi which provides for integrated future expansion of terminal building and runway capacity when required. The second phase, involving extension of the first phase terminal building, apron and other facilities is planned for completion in 1982 with capacity sufficient to meet demands until 1988. Further expansion will involve additional terminal buildings and ultimately a second runway to the southeast of the present runway.

1.06 Previous Bank/IDA lending for the transportation sector has involved two loans and six credits to Kenya totalling approximately \$87 million for road projects. In addition, Kenya has also been a beneficiary of four loans totalling \$139 million made to the common service organizations of the East African Community for the development of railways and ports.

1.07 This report is based on the findings of an appraisal mission which visited Kenya in August 1971. The appraisal team consisted of Messrs. W.B.R. Zetterstrom (aviation engineer and mission chief), B. Bostrom (economist), P.O. Cheryan (financial analyst), D.D. Singh (economist) and P.R. Nichols (financial analyst) all of whom contributed to the writing of this report.

2. BACKGROUND

A. General

2.01 The Republic of Kenya, covering an area of 585,000 sq km, is bounded on the south by Tanzania, on the west by Lake Victoria and Uganda, on the north by Sudan and Ethiopia and on the east by Somalia and the Indian Ocean. It lies ~~on the~~ equator but variations in elevation provide a wide range of climatic conditions. More than half of the country, in the north and east, is arid and sparsely populated. About three quarters of Kenya's population of 11 million live along the coast and in the highlands in the southwest between Mount Kenya and Lake Victoria and are adequately served by surface transportation modes (road and rail). The wide scattering of game reserves and lodges outside of this area has stimulated the growth of light aircraft charter traffic.

B. Tourism

2.02 One of the largest single sources of foreign exchange for Kenya is tourism which brought in about 12% of all earnings from exports of goods and services in 1970. The 1970-74 Development Plan estimates that this proportion will rise to 19% by 1974. Such a growth rate is considered reasonable in view of the multiple tourist attractions in Kenya. The implied increase in traffic will require large investments in tourism and transport infrastructure, of which the expansion of Nairobi Airport will be an important component. Investment in hotels and game lodges has recently increased and is expected to continue creating employment initially in construction and later in the hotel and tourist serving industries.

C. The Transportation Sector

2.03 Rail, air and road transport facilities in Kenya are concentrated along the 965 km corridor from the Uganda border to the Indian Ocean port of Mombasa which is the principal outlet to the sea for Uganda and Kenya, as well as for Rwanda and the northeastern part of Zaire.

2.04 The roadway system in Kenya consists of about 40,230 km of trunk, primary, secondary and minor roads and about 8,850 km of unclassified roads, of which a total of only 2,410 km are paved. Road transport, including both freight and passengers, accounted for 29% of Kenya's total revenues from

sales of transport services in 1970. About KE 41.5 million (US\$116.2 million) was spent by the central government on roads in 1959-68 and a further expenditure of KE 43 million (US\$120.4 million) is anticipated in the 1970-74 Development Plan. This rate of expenditure is reasonable and may be expected to continue.

2.05 There are three East African Community (EAC) corporations; Railways (EARC), Harbors (EAHC) and Airways (EAA). The main railway line through Kenya, together with the subsidiary lines feeding into it, accounts for about 1,610 km of the 5,950 km system of EARC. Rail transport contributed about 26% of the total value of sales of transport services in 1970. Development expenditures of KE 21 million (US\$58.8 million) are planned for railways during the current Plan period. As the principal seaport under the EAHC, Mombasa accommodates about 1,100 ocean going vessels each year and accounted for 25% of total transport sales revenues in 1970. The Development Plan allocates KE 11.6 million (US\$32.5 million) for further development of this sector up to 1974.

2.06 A study of the economic coordination of transport within the community was carried out in 1969. It focused upon transport policies which would promote the economic distribution of traffic among modes, particularly between rail and road. These recommendations are now being implemented in accordance with a time-phased program under the Third East African Railway Project (Loan 674-EA).

2.07 East African Airways (EAA), which was formed in 1946, provides services over a network of 86,900 route kms, of which 14% are domestic routes within the three EAC countries. In addition to its domestic and regional services to 29 points in Kenya, Tanzania and Uganda, the airline provides international services to eight other countries in Africa and to Hong Kong, Thailand, India, West Pakistan, Southern Yemen, Greece, Italy, Switzerland, France, Germany, Denmark and the UK. In 1969 with a fleet of eight jet, four turbo-prop and ten piston aircraft, the airline carried 294,000 passengers on domestic and EAC services and 157,000 passengers on international services.

2.08 In addition to EAA and international charter operators, some 22 foreign airlines provide scheduled international services to Kenya. A total of 20 foreign centers are linked directly to Nairobi by air. The largest of these in terms of frequency of service are Johannesburg, Rome and Addis Ababa. The heaviest travelled routes are those connecting Nairobi to Johannesburg, Rome, Athens, Zurich and Addis Ababa.

2.09 Air transport was responsible for 20% of Kenya's total revenues from sales of transport services in 1970. The majority of all passenger departures from the country are made by air transport, including local residents going to other East African countries. As an essential element

in facilitating tourism and business travel to and from Europe, Asia and North America, for which there are no practical alternative means of transportation, air transport plays a key role in Kenya's development.

2.10 Kenya has five main commercial airports. Two of these, Nairobi and Wilson Airports (see Map 1), are located in Nairobi; the others are in Mombasa, Malindi and Kisumu. All of these airports receive scheduled service except Wilson which is the hub of the general aviation charter business. Nairobi and Mombasa Airports are the only airports authorized for scheduled international service from points outside the East African Community and, to date, all such services have been operated only to Nairobi.

2.11 The Development Plan provides for a total expenditure of KE 13.7 million (US\$38.4 million) on air transport in the five-year period 1969/70 - 1973/74. Of this KE 6.3 million (US\$17.6 million) will be invested in EAA, primarily for purchase of new aircraft and modifications to existing aircraft. The remaining KE 7.4 million (US\$20.7 million) is allocated for airports. The latest estimates are that actual expenditures on airports will rise substantially above the Plan target, possibly as high as KE 15 million (US\$42 million). Approximately KE 10.8 million (US\$30.2 million) of this is expected to be incurred for the Nairobi Airport project during this Plan period. In addition to the Nairobi Airport project, the Government is planning to expand the capacity of Mombasa Airport. The terminal building at this airport is inadequate for present passenger traffic and the runway is too short to handle DC-8 or Boeing 707 aircraft on direct flights to Europe.

3. NAIROBI AIRPORT

A. Existing Airport

3.01 The present airport was opened to traffic in 1958 and is now the third busiest international airport in Africa, after Cairo and Johannesburg. In 1970 it handled 876,000 passengers of which 464,000 were international non-transit passengers and 184,000 were domestic or internal East African Community passengers. In terms of international non-transit passenger traffic, Nairobi compares to airports such as Shannon and Rotterdam. Total aircraft movements at the airport in 1970 were 38,000 of which 21,500 were commercial air transport movements.

3.02 The Nairobi Airport is located approximately five miles southeast of the center of the city. The existing 4,200 m runway was built in stages and is in very good condition. It has a magnetic alignment of 06/24 and wind conditions are such that 95% of the total operations are on the 06 heading.

3.03 Approaches to the airport in either direction are good. There is an ILS (Instrument Landing System) operating on Runway 06, and VASIS (Visual Approach Slope Indicator System) are installed at both ends of the runway. A parallel taxiway system extends from the 06 threshold to the passenger terminal apron located approximately halfway down the runway on the city side. There is a turning loop at the three-quarter point of the runway and a turning circle at the 24 end. Low intensity runway lights and approach lights exist.

3.04 The terminal building has been expanded to its practical limit and is expected to be saturated with traffic by 1975. This is true also of the terminal building apron. An additional constraint to traffic is the lack of a taxiway link between the terminal apron and the turning circle which often causes aircraft delays because of conflicts between arriving or departing traffic and runway traffic.

B. Master Plan (See Map 2)

3.05 With increasing delays being experienced, the Government's Consultants developed forecasts of anticipated traffic over the next ten to twenty years and established a phased master plan for airport development staged in economically sound construction increments.

3.06 In the evolution of the Master Plan in which the Bank has assisted since 1969, it was determined that the existing terminal area would have to be abandoned to permit the proper long range development of the airport because of the forecast requirement for a parallel runway to meet future traffic demands. This conclusion was dictated by the operational requirement of placing the new terminal area between the future parallel runways. It requires the construction of a new parallel taxiway, a new airport access road, a new freight facility, a new control tower, and all of their support facilities. If the necessary development were to take place in the existing terminal area, the future parallel runway would have to be constructed on the city side of the terminal area. This would force the relocation of Embakasi Village (the home of 90% of airport employees), would force the relocation of Wilson Airport (the heaviest used general aviation airport in Africa), possibly would force the relocation of Eastleigh Airport (the military airport), would cause disturbance of game in the National Game Park and would increase noise on the outskirts of the city of Nairobi (see Annex 1 for additional details). In addition to these substantial revisions in the physical Master Plan, the Bank's involvement in the preparation of the Master Plan resulted in a major rephrasing of the investment program, including the postponement by three years of the construction of a new terminal building.

C. Existing Organization

3.07 At present, no one single organization is fully responsible for the management of Kenyan airports. This is especially noticeable at Nairobi Airport. Excluding entry and exit formalities, the functions at Nairobi are

divided chiefly among (i) The Ministry of Power and Communications -- responsible for general administration and safety; (ii) The Ministry of Works -- responsible for construction and maintenance of aircraft operating areas and terminal building; and (iii) The East African Community -- charged with operating the air traffic control and and nav aids systems (see Chart 1 for details). This division of responsibility and the accompanying lack of coordination, particularly between operations and maintenance, have resulted in operational inefficiencies, inadequate maintenance and poor levels of service. Under present conditions, a total operational and financial review of the airport's activities is difficult to accomplish since it involves piecing together often incomplete information from many sources. Vital planning information such as operating results, funds flow, value of investments, etc., is simply not available on a current and consistent basis.

3.08 Each Ministry having responsibilities at the airport performs its own administrative and accounting functions on the basis of its own estimates of annual expenses as approved by the National Assembly. Landing fees, parking fees, passenger departure taxes and ground rent collections go directly to the Government Treasury Department. All other airport revenues, such as ground handling charges, concessions and building rents are netted against the operating expenditures of the Ministry concerned.

3.09 Effective technical planning and operating standards are non-existent. The accounting system follows the governmental practice of recording only cash receipts and disbursements. It does not incorporate accounting of accruals and provisions. Financial management and controls are therefore weak, and the accounting staff is inadequately trained.

D. Proposed Organization

3.10 To overcome existing deficiencies, the Government has established an Aerodromes Department (the Department) within the Ministry of Power and Communications to concentrate all the Government's efforts regarding airports in one office. The Department will be managed by a Director who will report directly to the Permanent Secretary of the Ministry and will have three division chiefs reporting to the Director: (i) Deputy Director (Administration) in charge of Operations and Safety, (ii) Chief Aerodromes Engineer in charge of Engineering and Maintenance and (iii) Financial Manager in charge of Financial Management (see Chart 2 for details). Firm plans for the staffing at lower levels and their pay scales will be developed by the Director and his three Division Chiefs in consultation with the Bank. The staffing plan will be finalized by 1973 and implemented in accordance with an agreed timetable. Agreement on these points was obtained during negotiations. In addition, during negotiations the Government provided assurances that the Department would be adequately staffed and that the final selection of candidates for the four top positions in the new Department; namely Director, Chief of the Operations and Safety Division; Chief Aerodromes Engineer and Financial Manager would be made in consultation with the Bank by September 1, 1972. The Chief Aerodromes Engineer has been selected and has reported for duty in Nairobi. The Financial Manager has also been selected and is expected to take up his position in Nairobi by the end of July 1972.

3.11 One of the major tasks of the Department will be to establish a unified commercial accounting system, to introduce cost accounting methods and put them in operation. A firm of accounting consultants will be hired to assist in establishing a new system and to train accounting staff. Agreement on the appointment of accounting consultants acceptable to the Bank upon terms and conditions satisfactory to the Bank and the establishment of this system by July 1, 1973 was reached during negotiations.

3.12 As the Department begins to operate, the need for training will become more evident in all aspects of airport financial management and airport engineering, maintenance and operation at various staff levels. Agreement on the general nature of the training program and the timetable for its implementation including the selection and training of counterparts for the senior positions of Financial Manager and Chief Aerodromes Engineer, was reached during negotiations. It was further agreed that a comprehensive training plan would be prepared by December 31, 1972.

3.13 With the introduction of commercial and cost accounting systems, an independent audit will be required as from July 1972. It was agreed during negotiations that the Controller and Auditor General of Kenya would perform this audit and that a copy of the audited financial statements would be provided to the Bank no later than five months after the end of each fiscal year.

E. Present Airport Traffic

3.14 During the past ten years the average annual growth in passenger traffic has been over 13%, accelerating to 14-1/2% in the past five years. Aircraft movements have increased at an annual average rate of 7% over the last five years.

3.15 The majority of the 876,000 passengers in 1970 were traveling on international scheduled services beyond the three East African countries. They consist of 320,000 arrivals, 328,000 departures and 228,000 passengers in transit. There is a seasonal variation with higher traffic levels in the first and third quarters of the year. In August 1970 the number of passengers was some 15% higher than the annual monthly average and in May 1970, 14% lower. This is typical of the variations over the past five-year period. Of the 38,000 total aircraft movements in 1970, 12,000 were international scheduled services, 7,800 were internal services to East Africa and the rest local, military, test or training flights. The test and training activity for that year was abnormally large because of the introduction of new aircraft types by East African Airways.

F. Traffic Forecasts

3.16 Forecasts of passenger, cargo and aircraft traffic were prepared by the Consultant based on past air traffic trends, the Government Development Plan (1970-74) and forecasts prepared by some international air car-

riers and international organizations. These forecasts have been adjusted to reflect recent developments; they cover a period from 1970 to 1985 and are considered reasonable.

a. Passenger Forecast

3.17 For projection purposes the passengers were divided into five categories, with different past growth characteristics. The numbers of foreign tourists and businessmen have grown at a yearly rate between 18 and 22% over the last ten years while the numbers of local residents traveling outside of East Africa have increased at a yearly average of only 2% over the same period. Traffic within East Africa, on the other hand, grew at a yearly average of 13% for the first part of the decade but recently this growth rate has diminished considerably. Transit traffic has been growing at a relatively constant yearly rate of 11%. These rates will be slightly lower for the next ten years. Tourist traffic is expected to grow at up to 15% per year, foreign business traffic at 13%, local resident traffic at about 3%, transit traffic at 9%, while traffic within East Africa will probably grow at 5%. For the second 10-year period, because of the uncertainty of such long-term forecasts, an 11.5% growth rate for the combined categories and 5% for traffic within East Africa has been assumed. The detailed development of forecast growth rates for each category is given in Annex 2.

b. Cargo Forecast

3.18 The air cargo forecasts are based on the growth tendencies of different commodity groups and their probable use of air transportation. The most important of these are some types of agricultural products, in particular horticultural exports which are expected to grow very rapidly. Studies of general tendencies in air cargo growth worldwide and in Africa have also been considered. The rate of growth has been an overall 16% annual average in most recent years while that used for the forecast is 9% to 17% per year for inbound cargo and 13.5% to 17% per year for outbound cargo. The yearly rate for mail was an average of 9.5% during 1966 to 1970 and is expected to be about 7.5% per year up to 1975 and 6% thereafter.

c. Aircraft Movements

3.19 The commercial aircraft movement forecast is based upon the passenger forecasts, projections as to the seat load factors expected and projections as to likely aircraft mixes in the future. Forecasts of test and training, military, freight and other movements are based upon past trends. The aircraft movements had an average annual increase of 7.5% between 1966 and 1970. It is expected that they will increase at 1% annually to 1975 and 3% to 3.5% thereafter. The introduction of larger aircraft and fewer test and training flights are the main reason for these lower growth rates.

3.20 The following table summarizes past and projected traffic:

AIR TRAFFIC PROJECTIONS					
NAIROBI INTERNATIONAL AIRPORT					
	Actual		Forecast		
	1966	1970	1975	1980	1985
<u>Annual Passengers</u> (000's)					
International	256 (16.0)	464 (11.0)	772 (13.5)	1,464 (11.5)	2,524
Community	142 (6.5)	184 (4.5)	232 (5.0)	296 (5.0)	380
Transit	108 (20.5)	228 (8.5)	342 (9.0)	528 (9.0)	815
<u>Annual Aircraft</u> <u>Movements</u>					
Passenger	15,270 (8.5)	21,168 (3.0)	24,300 (2.5)	27,600 (2.0)	30,500
Freight	170 (20.0)	350 (7.5)	500 (7.0)	700 (6.0)	1,000
Test & Training	7,565 (18.0)	14,821 (--)	11,800 (4.5)	14,800 (4.5)	18,600
Military	4,783 (--)	889 (16.0)	1,900 (4.5)	2,400 (4.0)	2,900
Other	571 (10.0)	825 (8.0)	1,200 (6.0)	1,600 (3.5)	1,900
<u>Peak Hour Aircraft</u> <u>Movements</u>					
	--	15 (3.0)	18 (6.0)	24 (4.5)	30
<u>Annual Air Freight</u> (tons)					
Inbound	2,856 (16.0)	5,127 (9.0)	7,900 (17.0)	17,200 (12.0)	30,200
Outbound	5,532 (16.5)	10,223 (15.5)	20,900 (17.0)	45,600 (13.5)	85,500
<u>Mail Total (tons)</u>	1,248 (9.5)	1,797 (7.5)	2,600 (6.0)	3,500 (5.5)	4,000

Note: Annual average growth rate between years listed shown in parentheses.

4. THE INVESTMENT PROGRAM AND THE PROJECT

4.01 The proposed project will be the first stage development of an airport Master Plan dictated by the environment (see para. 3.06) and the need to protect existing resources and future development areas. (See Annex

1) The total planned investment in the Nairobi Airport for the period 1971-1984 amounts to K£ 22.8 million (US\$64.0 million). The proposed project will constitute the first five years of the program. Details of the program are given in Table 1. Investment in all other Kenyan airports during this five year period will be K£ 7.0 million (US\$ 19.6 million).

A. Description of the Project

4.02 The project consists of the construction of a new international and domestic terminal building (See Maps 3 and 4), freight building, associated aprons, taxiways, roads, car parks, main parallel taxiway, holding apron, maintenance apron, combined control tower/area control center, State Pavilion, police station, fire station, other ancillary buildings, airfield and roadway lighting, approach lighting, fire hydrant system, water, electrical and sewage systems, freight access road, a dual carriageway passenger access road, and the provision of technical services and training.

B. Special Implications of the Project

a. Airport Access Road

4.03 A dual carriageway will be provided from its connection with the Nairobi/Mombasa highway to the terminal building. An assurance was obtained from the Government during negotiations that the intersection of the Nairobi/Mombasa road and the airport access road will be constructed by December 31, 1975 and that the Nairobi/Mombasa road between London Road roundabout and the intersection will be constructed by December 31, 1976 both as dual carriageways and on alignments and with geometries approved by the Bank.

b. Water Supply

4.04 An expansion of the Nairobi water system has been planned. The first stage of this system is being constructed under a Bank financed project (714-KE). The connecting link to the airport was planned to be constructed in 1976. An assurance was obtained from the Government during negotiations that the construction of this link will be rephased so that it will be ready for the terminal building opening at the end of 1975.

c. Fueling System

4.05 A consortium of fuel companies will lease land from the airport to construct a fuel farm and underground hydrant system to provide jet fuel to the terminal and freight aprons. Gasoline deliveries will be made by apron tank trucks.

d. Ecology

4.06 The ecological and environmental effects of the development of the airport were major factors influencing the decision to develop the new terminal area on the far side of the existing runway, since such development would tend to remove aircraft noise and exhaust gases further away from the city of Nairobi. The airport sewerage system will be connected to the city system partly to remove possible sources of odors and insect breeding grounds from within the airport boundaries and partly to avoid the introduction of the effluent from the airport system into a normally dry stream bed. The effect of the airport on the animals in the National Game Park was investigated and found to be very small, since little drinking water is located in the area near the airport and, therefore, relatively few animals are involved. In the future, when the parallel runway is constructed, the effect will be further reduced because the center of potentially disturbing factors will move further away from the major concentration of game.

e. Technical Personnel

4.07 The new Aerodromes Department (see para. 3.10) will require technical assistance in the form of two aviation experts in executive positions. The first year's financing for these positions has been provided by UNDP. However, to safeguard against the possibility that the Government might be unsuccessful in continuing to obtain financing for these positions through either the UNDP or bilateral aid, the project includes a sum for the salary, benefits, and support for these two men for four years. Funds to cover the cost of hiring the accountant consultant as well as the cost of the training recommended in paras. 3.11 and 3.12 are included in the project estimates.

C. Design and Supervision

4.08 The Government consultants, Sir Alexander Gibb and Partners (Africa) and Gibb, Petermuller and Partners are preparing the architectural and engineering final design plans and specifications. This work is well advanced and will be substantially completed by the time the loan is signed. The consultants are competent and the quality of their work is good. There will be a requirement for contract management and construction supervision through mid-1976. The present project architects and engineers have been engaged by the Government for this purpose and the costs of this service have been included in the project.

D. Cost Estimate

4.09 It is estimated that the total cost of the project would be KE 16.5 million (US\$46.3 million equivalent) of which KE 10.4 million (US\$29.0 million) would be the foreign exchange component forming the basis for the proposed loan.

4.10 The cost estimates shown below are broken down by actual contract packages as proposed by the Consultant. A detailed itemization of these contracts is given in Annex 3.

Item or Contract No.	Kenyan Pounds (000)			U.S. \$ (000)			Percentage
	Local	Foreign	Total	Local	Foreign	Total	
1. Steel Supply	-	506	506	-	1,417	1,417	3.06
2. Airbridges	39	349	388	109	977	1,086	2.35
3. Passenger Terminal and Control Block	1,855	2,517	4,372	5,194	7,047	12,241	26.45
4. Civil Works	2,037	3,244	5,281	5,704	9,084	14,788	31.96
5. Freight Bldg., State Pavilion and Other Ancillary Bldgs.	549	704	1,253	1,538	1,971	3,509	7.58
Contingencies							
Price (14%)	859	1,356	2,215	2,405	3,798	6,203	13.40
Physical (5%)	267	412	679	747	1,154	1,901	4.11
Engineering	429	1,034	1,463	1,201	2,894	4,095	8.85
Sub Total	6,035	10,122	16,157	16,898	28,342	45,240	97.75
Admin. Support & Training	129	186	315	362	521	883	1.91
Account. Consult.	18	36	54	50	101	151	0.33
Sub Total	147	222	369	412	622	1,034	2.24
TOTAL	6,182	10,344	16,526	17,310	28,964	46,274	100.00

4.11 The cost estimates were developed by the engineering consultants based on civil and architectural work recently awarded in Kenya and are considered reasonable. Land required for this project is already owned by the Government.

4.12 An item for price contingencies, based on recent historical data, amounting to 7% per year for the civil construction contracts and 10% per year for the architectural construction contracts for a total of 14% of the total project construction costs (excluding physical contingencies) over the construction period has been included to allow for anticipated increases in labor and material costs. Since engineering is almost complete, only an additional 5% of the total construction costs has been included to allow for changes in design and scope of work.

E. Construction Employment

4.13 It is estimated that during the construction phases of the project, on the average approximately 500 men, ranging from common laborers to highly skilled artisans will be employed. The greater proportion of these will be engaged in the construction of the terminal, freight, etc. building portions of the project because of the labor intensive character of building construction.

F. Procurement

4.14 The five contracts in which the project is divided will be awarded through international competitive bidding procedures following the Bank's "Guidelines for Procurement" after contractor prequalification. Local contractors are generally not financially able to engage in projects over K£ 1,000,000. Since only two of the contracts are expected to fall in this price range and both of these are procurement contracts for foreign made material, it is unlikely that local contractors will win the award for any of the contracts. It is possible, however, that a number of sub-contracts would be carried out by local contractors. The estimated foreign exchange component is based on this premise. The bidding processes under the procurement arrangements are not affected by preferential import duties.

G. Disbursement

4.15 Disbursement of the proposed loan would be made on the basis of:

- (a) 100% of Contract No. 1
- (b) 90% of Contract No. 2
- (c) 60% of Contract Nos. 3 through 5
- (d) 70% of the architectural and engineering consultant's fee
- (e) 60% of the costs for the financial manager, airport engineer, accounting consultant and training

These percentages are estimated to represent the foreign exchange components of the various items.

4.16 Disbursements are expected to take place over a 5-year period from the second quarter of 1972 to the fourth quarter of 1976. A schedule of the disbursed quarterly payments of the proposed loan is shown in Table 2. Since this is a self-contained project, any surplus loan amounts should be cancelled.

4.17 The cost estimate includes US\$4,095,000 for the estimated architectural and engineering cost of the project. It is recommended that the foreign component of the part of these services carried out prior to signing of the loan, i.e., from April 1, 1970, should be financed retroactively from the proposed loan. It is estimated that this would amount to approximately US\$1,350,000 or 70% of US\$1,930,000 equivalent.

5. Economic Evaluation

A. General

5.01 The existing functional areas at Nairobi Airport, both in the airfield and terminal systems, are undersized for the growing demands that are being placed upon them and hence are rapidly becoming congested. The project is designed to expand the capacity of the airport so that it may accommodate the substantial growth in demand that is predicted. The project's most important impact on Kenyan economic development is in helping the growth of Tourism, which is one of the country's principal sources of foreign exchange and which plays a large and rapidly growing role in the domestic product of Kenya. The project will also help Nairobi to maintain its position as an important commercial centre with good communications. Finally it will encourage the growth of certain types of agricultural exports, for example, horticultural products which rely heavily on air transport. These exports, although comparatively small in relation to Kenya's total foreign trade, are expected to grow rapidly in the future.

5.02 These consequences of the project occur because increasing the capacity of the airport simultaneously removes two related but separate sources of delay which act upon each other. First, the existing terminal building is inadequate for the projected growth in traffic. Its use would not only cause increasing delays to the passengers within it, but to the ground operations of aircraft and would thus generate further delays to passengers. Second, the ground facilities for aircraft are inadequate for the anticipated growth of aircraft movements. The project will directly reduce delays to aircraft by providing more apron space and taxiing facilities. The new full length taxiway will avoid the need to use the runway itself for taxiing which causes delays; it will also reduce the actual taxiing distances for large aircraft.

5.03 The congestion at Nairobi airport does not occur at all times but is concentrated in certain specific peak periods of high demand. Before measuring the benefits of the project, the scope for spreading these peaks was examined. The peak pattern of demand at Nairobi is determined by such factors as restrictions at European airports, particularly the night flying restrictions at London, and by the fact that Nairobi is an intermediate point on the South African - European air routes; there is therefore very little flexibility in the peaking pattern. Moreover, the peak periods at Nairobi are made up almost exclusively of international scheduled air passenger services. These services necessarily have route patterns which are determined by a complex set of factors, including fleet utilization considerations, and are therefore only partly determined by the cost and pricing conditions at each point they serve. Thus, despite an existing 50% night surcharge on landing fees at Nairobi, one of the two major peak periods at present occurs late at night. The effective scope for peak spreading, without incurring substantial traffic losses, by the use of differential pricing is therefore extremely limited, and any effects of a differential pricing policy on the peak pattern is likely to be insignificant.

5.04 Three types of benefit have been directly evaluated and taken into account in calculating the return of the investment: benefits to Kenya arising from the direct expenditure of visitors who would otherwise not visit Kenya (about 42% of the total benefits in 1985), savings in the operating costs of Kenyan aircraft (about 15%), and increased airport revenues generated by the project (about 43%). Benefits from increased freight traffic were not evaluated, because of their relative unimportance.

B. Effects on Passenger Traffic

5.05 If the project is not carried out the congestion at Nairobi will soon reach such levels that the growth of demand for journeys, particularly by tourists, to Kenya will be retarded. This will happen because tourism is a highly competitive industry. Tourists themselves would seek to avoid congested conditions, but perhaps a more important consideration is that the long and unforeseen delays that congestion produces have very serious consequences on the profitability and pricing of tour operators, who increasingly control the flow of tourists. In addition, airport congestion has serious effects on the cost of airline operations. The congestion at Nairobi, if the project were not implemented, would not only mean that the airport would be incapable of accommodating all the aircraft, particularly large aircraft, that would wish to use it, it would also give rise to substantial increases in the costs of aircraft operations. These factors, given the processes of international air fare determination, are more likely to adversely affect the frequency and quality of service of foreign airlines serving Nairobi rather than the price of air travel to Nairobi. In either case, a dampening of passenger demand would result.

5.06 The volume of passenger traffic arriving at Nairobi that would be suppressed if the project were not carried out has been estimated at about 10,000 passengers per annum by 1980, rising to over 40,000 by 1985. Details of the methods used in arriving at these estimates are given in Annex 4.

5.07 The impact on the Kenyan economy of such losses of foreign visitors arriving at Nairobi has been assessed conservatively. It has been assumed that half of these passengers would travel to Kenya by other routes or modes, e.g. via Tanzania or Uganda, and that the durations of their stays and their expenditures in Kenya would not be affected by this diversion. An estimate was made of the direct net contribution to Kenya's GNP of an average foreign visitor's stay in the country. The direct gross expenditure per tourist for the average length of stay in Kenya was derived from the Nairobi Airport Tourist Survey and from the Kenya Development Plan. This gross figure, after price level adjustments, was reduced by an estimate of its import content and by an estimate of the local resource costs involved in the average tourist expenditure. The resulting net contribution to GNP per visitor per visit was assessed to be KSh80 rising to KSh100 by 1985. Applying this unit contribution to half of the tourists lost at Nairobi Airport results in project benefits which reach a level of over KSh2 million per annum by 1985.

C. Aircraft Operating Cost Savings

5.08 Aircraft operating on the ground and in the air will save time as a result of the new taxiway, the new terminal aprons and the more efficient operations in the new terminal buildings. The operating time of aircraft in the with-project situation was compared by simulation models to the without-project situation, making allowances for the traffic which would be suppressed if the project was not undertaken. The hourly costs for different aircraft types were obtained from published sources and allowances were made for the growth of these costs until 1985 arising from the gradual introduction of larger and more expensive aircraft. Although these delay costs would be incurred by all the airlines using the airport, the project has only been credited with the aircraft operating cost savings which directly accrue to Kenya. Since Kenya does not independently run a major airline but shares equally in the ownership of East African Airways with Tanzania and Uganda, it has been assumed that 1/3 of the cost savings to E.A.A. aircraft would accrue to the Kenyan economy. These savings to Kenya amount to over K£700,000 per annum by 1985. The project would also produce substantial additional aircraft operating cost savings (over five times as great as those that accrue directly to Kenya) which would in the first instance benefit foreign aircraft operators. These savings have been estimated but have not been credited to the project in the rate of return calculation.

D. Project Induced Incremental Airport Revenues

5.09 The project will also provide direct benefits to the Kenyan economy in the form of additional revenue at the airport which would be lost if the project was not implemented. Firstly, the project by allowing the airport to accommodate not only more but larger aircraft would enable it to earn additional landing fee revenue from foreign airlines. The difference in such revenues that would be obtained under the with and without project situations were estimated and credited to the project.

5.10 Secondly, the provision of the new terminal building will significantly reduce the processing time of passengers and will in aggregate save a very substantial amount of passenger time. A large proportion of these time savings would accrue to foreign passengers and thus may not directly benefit the Kenyan economy. It has been agreed with the Kenyan Government that a study of user charges at Nairobi airport would be undertaken to develop new rates which would take effect when the new airport facilities were available. In the absence of the results of this study, it has been assumed, in line with the financial projections made in Chapter 6 of this report, that an additional passenger charge equivalent to 5K. sh. per departing passenger would be levied at the airport upon completion of the new terminal building. The incremental revenue generated by this charge, which amounts to only a part of the value of the time savings to the 'normal traffic' passengers (valued on the basis of the principles outlined in Annex 2 of the paper "Bank Lending for Aviation Projects" - R72-88), would be available directly to Kenya as a result of the project and has therefore been treated as an economic benefit of the project.

5.11 Thirdly, the project will generate incremental revenues in the form of additional rentals (net of increased operating costs) for the increased terminal space provided to airlines. This net incremental revenue has been credited to the project.

5.12 The incremental airport revenue that the project generates in the three ways described above amounts to over Ksh2.1 million per annum by 1985.

E. Project Return

5.13 The estimated capital costs of the project at 1971 prices have been used in calculating the economic rate of return on the project. In addition the costs of the second phase (see para. 1.05), which is due for completion in 1982 and will provide sufficient capacity to meet demands until 1988, have been treated as economic costs of the project in calculating the project return. Since additional investment is expected to be necessary to process the growth of traffic at the airport beyond 1988, the project benefits have been assumed to increase only until 1988 and to maintain a constant level over the remainder of the project period. On the basis of these costs and the benefits described above, the economic return of the project over the life of the investment is 15%. It should be noted that this calculation only takes into account those benefits that accrue directly to the Kenyan economy. If the savings on "normal traffic" to passengers and to foreign aircraft which have not been subjected to charges are also taken into account the rate of return would be substantially higher.

5.14 An assessment of the optimum timing for the implementation of the project was made by means of first year return analysis. The first year return resulting from the completion of the project as proposed compared to completing it one year later is slightly higher than the 10% assumed opportunity cost of capital.

5.15 The sensitivity of the rate of return to possible variations in costs and benefits has been tested with the following results. A 15% increase in the estimated construction cost of the project and delaying all benefits by one year, would reduce the economic return from 15% to about 12%. If all benefits were decreased by 25%, either by a 25% lower traffic forecast or by a 25% reduction in the unit benefits, the economic return would be over 12%. If the value of benefits were increased by 25%, the economic return would be 17.5%.

6. FINANCIAL EVALUATION

A. Existing Situation

6.01 In spite of the existing organizational and accounting shortcomings (see paras. 3.08 and 3.09), it has been possible to assemble pertinent historical financial data on Nairobi Airport for fiscal 1969 through 1971, including items presently unaccounted for such as depreciation, pension bene-

fits, etc., and the values of existing fixed assets. Estimated past operating results shown in Table 3, have been satisfactory and the airport has been a dependable source of revenues for the Government.

B. Financial Objectives

6.02 The proposed Department will be responsible for developing and recommending airport user charges to the Government, and for accounting of all investment, revenues and expenditures under its own separate annual capital and operating budgets. Although all cash generated by the airport will go into the National Treasury and the expenditures met from budget allocations, it is the Government's intention to set up a commercial accounting system for the Department reflecting, on an accrual basis, all transactions relating to the investment in and operation of airports, and in particular of Nairobi Airport, including operating revenues and expenses, current assets, fixed assets, and related depreciation, current liabilities, long-term debt and capital (Government investment and surpluses appropriated and retained). Agreement on the establishment of this system by July 1, 1973 was obtained during negotiations.

6.03 The existing user charges are given in Annex 5. They are not related to costs and are heavily weighted against the aircraft maneuvering areas in favor of the passenger and freight handling areas (terminals). In order to maintain the airport's competitive position, cost controls and user charges related to costs must be developed by identifying the cost/profit centers and instituting appropriate allocation procedures. The Department and its new Financial Manager and accounting consultants (see paras. 3.10 and 3.11) will study the question of user charges at Nairobi Airport and in consultation with the Bank will develop rates related to costs to be in effect for the opening of the new terminal. Such rates should produce sufficient net operating income to ensure agreed minimum rates of return. It was agreed during negotiations that a scale of user charges would be prepared by December 31, 1974, that the Bank would review this scale of charges by June 30, 1975 and that the new charges would be implemented before the new facilities were opened for operation.

C. Financing Plan

6.04 The summary given below shows the funds required and their sources during the 5 year construction period covered by fiscal years 1972 through 1977.

<u>Funds Required</u>	<u>K£ Million</u>	<u>US\$ Million</u>	<u>%</u>
Proposed IBRD project	16.5	46.3	97.1
Other capital expenditures	0.4	1.0	2.3
Additions to working capital	<u>0.1</u>	<u>0.3</u>	<u>0.6</u>
	<u>17.0</u>	<u>47.6</u>	<u>100.0</u>
<u>Sources of Funds</u>			
Internally generated by airport	10.1	28.3	59.4
Less: Debt service	<u>2.3</u>	<u>6.5</u>	<u>13.5</u>
Net internally generated by airport	7.8	21.8	45.9
Less: Cash to Government	<u>7.3</u>	<u>20.5</u>	<u>42.9</u>
	0.5	1.3	3.0
Government contribution	6.2	17.3	36.4
Proposed IBRD loan	<u>10.3</u>	<u>29.0</u>	<u>60.6</u>
Total sources	<u>17.0</u>	<u>47.6</u>	<u>100.0</u>

6.05 The Government's contribution is shown in the proforma balance sheets as equity (invested capital). To ensure that the execution of the project will not be jeopardized because of shortage of funds, agreement was reached during negotiations that the Government will make all necessary funds available, and will finance all project cost overruns.

6.06 The projections assume that the proposed Bank loan would bear interest at 7-1/4% p.a., and would be repayable over 20 years including a 5-year grace period. Details of the financial assumptions are shown in Annex 6.

D. Future Earnings and Proforma Financial Position of Nairobi Airport

6.07 Projected operating results through 1984 are shown in Table 3. Operating revenues are based on the forecast traffic growth and the space occupancy and related rate structure of the new terminal complex. The critical point is the burden on airlines of the combined effect of landing fees and space user charges in the building. The projections assume

that the landing fee rates will continue as they are and that the space usage charges will gradually increase in relation to the numbers of passengers handled. This is considered reasonable (see projected user charges details in Annex 5).

6.08 Operating expenses, estimated on a global basis and making ample allowances for cost increases, include an annual outlay of 2% of the investment in the various operating areas for recurrent repair and preventive maintenance programs. Agreement was reached during negotiations that the Department will expend amounts sufficient for this purpose on a current and continuous basis. Such sums will be shown in the income and expenditure accounts of the airport.

6.09 The projected cash flow (see Table 4) prepared on a proforma basis through fiscal 1984, shows that the airport should be able to cover its cash operating requirements, service its debt, finance a major investment of K£ 5 million and generate a net inflow of funds of over K£ 10 million to the National Treasury after completion of the project.

6.10 Proforma balance sheets are given in Table 5. Except for a small cash revolving fund (K£ 30,000), all cash generated reverts to the Government. After completion of the project, a major investment of approximately K£ 5 million from internally generated funds will take place in fiscal 1981 and 1982 for the construction of an additional segment to the terminal building complex.

6.11 The rate of return on net fixed assets reflects satisfactory levels throughout. During negotiations agreement was obtained from the Government that the Department will take all necessary measures, including adjustments in rates, to achieve a rate of return for Nairobi Airport of at least 5% through the 1977 fiscal year, 8.0% in the 1978 and 1979 fiscal years and 10.0% thereafter. Since projected revenues are such that, after 1979, the rate of return would far exceed 10%, care should be taken to keep costs under control. To assure this, agreement was obtained during negotiations that annual operating ratios will be maintained as low as possible but at least below 72% through 1979 and below 60% thereafter. Financial ratios are shown in Table 6.

6.12 The projections were developed by the Bank staff on the basis of information available and reflect the financial situation of Nairobi Airport on a proforma basis. The Government agrees with these projections.

7. AGREEMENTS REACHED AND RECOMMENDATION

7.01 During negotiations, agreements were reached on the following principal points:

- a. Appointment of suitably qualified and experienced persons for the top positions in the Aerodromes Department by September 1, 1972 (para 3.10).
- b. Implementation of an agreed staffing and training plan for the Department (paras 3.10 and 3.12).
- c. Hiring of accounting consultants on agreed terms of reference to assist in establishing by July 1973 a commercial accounting system for the Department (para 3.11).
- d. Construction of a dual carriageway connecting the airport to the main highway (para 4.03).
- e. Maintenance by the Department of complete accounting records to reflect all transactions affecting the airport operation under budgetary control and commercial accounting systems (para 6.02).
- f. Development, in consultation with the Bank, of a cost related user charges system and its implementation no later than the opening of the facilities (para 6.03).
- g. Setting aside of adequate funds for recurrent repair and preventative maintenance programs and the expending of these funds on a current and continuous basis (para 6.08).
- h. Taking all necessary measures to achieve annual rates of return for Nairobi Airport of at least 5% through 1977 fiscal year, 8% in 1978 and 1979 fiscal years and 10% thereafter (para 6.11).
- i. Maintenance of annual operating ratios at the lowest possible levels but of at least below 72% through 1979 fiscal year and below 60% thereafter (para 6.11).

7.02 It is recommended that the foreign exchange cost of design and engineering services performed before the signing of the loan, i.e. from April 1, 1970, in an amount not exceeding US\$1,350,000 should be financed retroactively (para 4.17).

7.03 The proposed project constitutes a suitable basis for a Bank loan of US\$29.0 million for a term of 20 years including a 5-year grace period.

KENYA

NAIROBI AIRPORT PROJECT

The Project

A. Master Plan

The project that has now evolved after approximately four years of study is the result of the application of accepted principles of airport master planning. The existing airport at Nairobi consists of a single runway on a heading of 06/24, with the terminal building, apron, freight and maintenance facilities located on the northwest side of the runway. This is the area that is closest to Nairobi. On a line perpendicular to the runway passing through the terminal building, is the village "Embakasi," approximately 2,000 meters from the runway. Approximately 90% of the employees of the airport reside in this village. Almost on the same perpendicular line but a little more to the north and about four miles from the airport is the military airport of Eastleigh. Approximately six miles to the southwest of Eastleigh, lies Wilson Airport and beyond it the high area called Ngong Hills. Wilson Airport is the busiest general aviation airport in Africa. Its major activity involves the transporting of tourists in small aircraft -- four to six passengers -- from Nairobi to game lodges located in East Africa, each of which has a landing strip nearby.

The center of Nairobi is to the northwest of the main runway at the international airport and is approximately five miles away. Between the build-up section of the city and Embakasi village there is a drainage swale or dry river also named Ngong. To the southwest of Nairobi Airport is the National Game Park. This park has a fence around the northern perimeter but is completely open to the south for the free passage of game. It is a major attraction for tourists in Nairobi.

The consultants' study determined that the existing airport and its facilities would be saturated by the traffic that was envisioned to build up by 1975. This saturation would occur at two major points on the airport. One point was the runway itself because of the lack of a taxiway between the apron and the turning loop, approximately 3,000 meters from the approach or 06, end of the runway. With 95% of operations on Runway 06, aircraft, after landing, have to use the runway as a taxiway which severely restricts the number of movements possible. Even now (1971) there are sometimes three aircraft held in this loop waiting for additional aircraft to land or take off. The second point of congestion is the terminal building and its apron. The existing terminal was originally a hangar and has been added to repeatedly to try to cope with new traffic demands. In 1970 the latest

expansion project was undertaken. With its completion the terminal has reached its ultimate expansion capabilities and, as expanded, can only cope with the traffic anticipated by 1974/75. The apron adjacent to the terminal has thirteen positions available for aircraft to park. Even now all positions are full at times. By 1975, after the introduction this year of two B-747 arrivals within the same hour and in 1973/74 the acquisition by East African Airways of the first of its two anticipated wide-body transports (possibly DC-10), the apron will be hopelessly overcrowded and will cause critical delays.

To overcome these congestions it was decided that the terminal had to be replaced and the taxiway expanded. The original thought was to build a new international terminal building and apron adjacent to the existing terminal and plan for the addition of a second runway, parallel to the first, northwest of the existing runway, to have the terminal buildings between the two runways. From an airport point of view this was sensible because a terminal between two runways can serve either runway without restricting traffic on the other. However, if the plan as presented were to be followed there would be several extremely costly adverse affects.

- (i) Embakasi village would have to be abandoned and relocated because the runway would pass directly through it.
- (ii) Wilson Airport would have to be closed and rebuilt in another location because approaches to the future Nairobi runway would pass within three miles of Wilson Airport and traffic to Wilson would have to pass over the Ngong Hills and under the instrument approach to Nairobi, a very restrictive procedure. Upon investigation the only site that could be found aeronautically suitable for development as a general aviation airport was approximately 25 miles south of Nairobi beyond the Athi River plains. Such location would tend to dampen, if not kill, the growth of general aviation in this area.
- (iii) Eastleigh Airport would similarly have to be closed. However, in this case, its existence within the boundaries of the City of Nairobi is questionable and it may ultimately have to be relocated for other reasons.
- (iv) The anticipated growth of the City of Nairobi toward the airport would be greatly affected by the noise generated by a runway located approximately 1-1/4 miles closer to the city.
- (v) The centerline of the new runway would fall directly over the largest concentration of game in the National Game Park and might possibly have the effect of driving that game away.

Because of these conditions it was decided that the existing terminal area would be abandoned, the building itself would be used as office space and aviation-oriented use but would no longer serve as a terminal. The urgently required new terminal would be located on the far, or southeast side of the existing runway, away from the city center. The future parallel runway would be built 1-1/4 miles to the southeast of the existing runway and farther from Nairobi. This location would still place the terminal building between the two runways but there would be none of the problems mentioned above. The two airports, Wilson and Eastleigh, would be less affected than at present because it would be envisioned that the future parallel runway would, in general, be the landing runway, thus moving the approach or misapproach paths farther away from Wilson and Eastleigh. The center of noise would also be further away from the city center. The development of the city could take place to the Ngong River as planned with no adverse effects. The urgently required enlargement of Embakasi village to suit the needs of the airport employees could take place as planned. By utilizing the future parallel runway as the landing runway, the effect on the National Game Park would be lessened because the approach path would be another 1-1/4 miles southeast of the existing path and, therefore, farther by that amount from the center of gravity of game concentration.

The effects of this decision on the proposed project were immediate and costly. A new parallel taxiway had to be planned for installation at the same time as the terminal building or else the capacity constraint on the runway would not have been improved at all, in fact, would probably have been reinforced. Since the terminal was being located in an entirely new area, an access road had to be planned to serve it. The existing access road could not be used for this purpose. The future location of the aircraft operating areas and parallel runway dictated the location of the control tower. The high percentage of freight being carried on passenger aircraft, so-called "top up" freight, required the location of the freight terminal to be adjacent to the passenger terminal. This meant that the existing freight facility as expanded had to be abandoned. In addition to these major facilities, new utilities for them had to be provided. In all, out of a project estimated at about KE 16 million close to KE 4 million are in this type of facility replacement required by the decision to locate the future parallel runway away from the center of Nairobi. On the other hand, the decision on the relocation of the terminal has also in effect resulted in a major rephasing of the investment program and a postponement of the planned construction date for the new terminal by 3 years.

B. Description of the Project (First Stage)

a. Terminal Building

A combined international and domestic terminal building will be constructed on the southeast side of the existing runway. It will consist of two international departure units, a domestic arrival and departure unit and one international arrivals unit. The building is designed for power-in push-out aircraft operations and will ultimately have nine airbridges for

transfer of passengers between the building and aircraft. In the original stage only four bridges will be provided. Space has been provided between the original departure units for the future addition of three more departure units. The addition of baggage conveyors and Customs inspection counters within the framework of the first stage arrivals unit would allow it to function satisfactorily under the increased demands of the future.

b. Freight Building

A freight shed to provide space to make-up and break-down both passenger aircraft top-up pallets and freight aircraft containerized shipping units will be provided adjacent to the terminal building. Attached to this general cargo shed will be a cold storage shed for agricultural, horticultural, meat and dairy products. The livestock units will be enlarged slightly but will remain where they are on the northwest side of the runway.

c. Control Tower and Area Control Center

A new control tower for airport control will be constructed at a point nearly equidistant from the ends of the existing and future parallel runways. Attached to the base of the control tower will be the operational offices of the area control center. While this function does not necessarily have to be located on an airport, in this case it will allow better utilization of scarce operations and maintenance personnel.

d. Ancillary Buildings

A new eight bay fire station will be constructed near the terminal building. This station will double the equipment of the existing facilities and raise the airport fire protection to that recommended by ICAO for an airport serving aircraft types and fuel capacities as those at Nairobi.

A Pavilion in which political dignitaries will be greeted with ceremonies appropriate to their rank will be constructed near the new terminal building. Without this unit the airport would have to be closed for security purposes during such arrivals or departures.

A new police station will be constructed within the new terminal building complex. Adjacent to it will be facilities for telephone equipment, water pumping equipment, electrical transformation and standby power generation equipment. Near the freight complex will be a staff canteen. This facility will provide low cost lunches for approximately 500 airport employees per day.

e. Aircraft Operating Areas

A new 2500 x 25 m parallel taxiway will be constructed to serve the existing runway and the new freight and terminal building complex. A holding apron near the runway threshold will be provided as well as aprons for the freight building, terminal building, and aircraft maintenance area. Interconnecting taxiways will be provided as necessary.

f. A fire hydrant system will be provided for the major building areas, the freight and terminal building aprons and at the mid-point of the runway.

g. Lighting

A new high intensity approach light system will be provided. This will be controlled by a five step transformer. Only the threshold lights and inner 170 m of approach lights will be flush mounted. New high intensity (five step) runway edge lights will be installed along with medium intensity (three step) taxiway and apron edge lights. Street lighting will be provided in front of the terminal building, around the parking lot and unloading areas of the freight building and for short distances beyond street intersections.

h. Access Roads

A new dual carriageway will be provided from the Nairobi/Mombasa highway along the spine of the new terminal complex to the terminal. A single carriageway road from the existing airport access road to the new freight complex will be provided to serve freight traffic from the new Nairobi industrial area now under development and also the employee traffic from their homes in Embakasi Village.

i. Utilities

Engineering has been completed and a cost included in the estimates to provide for the necessary expansion of the existing electrical supply system to accommodate the anticipated requirements of the expanded airport.

The potable water requirements for the airport have been estimated and included in the demand forecasts for the present Bank financed water project. A connecting link from this new main to the airport must be constructed earlier than originally planned to assure the airport of receiving the necessary supply when the new terminal opens in mid-1975. The quantity of water required during construction could exceed the amount available from the Nairobi system at that time, but plans are being made to supplement the potable supply with water from existing boreholes within the construction area and the lack of water is not expected to be a problem.

It was originally intended to build a new airport sewage treatment plant on the airport property consisting of open oxidation ponds. However,

since the city of Nairobi will have completed a new sewage treatment plant of sufficient capacity to serve the airport by the time the airport will require it and since the main trunk for this system will pass close by the northern boundaries of the airport, it was decided to include a connection to this main in the project rather than construct a separate sewage disposal system for the airport. The results of this decision are twofold; first, the capital costs of the project have been lowered by approximately K£ 15,000, and second, the airport environment will not be subjected to the effects of a large sewage lagoon in the vicinity. In addition, it was estimated that by the year 1990 the connection to the city system would be required anyway because of increased airport population.

KENYA

NAIROBI AIRPORT PROJECT

Forecasts

A. Present Airport Traffic

Nairobi Airport is the center of commercial aviation activity in Kenya as well as in East Africa. During the past ten years the average annual growth in passengers has been over 13%, accelerating to about 14-1/2% in the past five years. The growth in aircraft movements has been a 7% annual average in the past five years. In 1970 there were 876,000 passengers and 38,000 aircraft movements.

B. Passenger Forecasts

The forecasts for passenger and cargo traffic prepared by the Consultants have been adjusted to reflect recent developments and cover a period from 1970 to 1990.

For projection purposes, the passengers were divided into the following five categories: foreign tourists, foreign businessmen, local residents, travelers within East Africa and direct transit passengers. The numbers of holiday visitors have grown at a rate of 20% during the past 10 years. While economic growth in the major generating countries and the likelihood of reductions in air fares suggest a strong tendency for this growth rate to continue well into the future, several factors are likely to exert some downward pressure on this trend, the most important of which are expected to be the diversionary effects of the new airport at Kilimanjaro and the enlarged airport proposed for Mombasa. It has been estimated that there would be a 5% diversion of traffic to Kilimanjaro in 1972 and that by 1980 both airports would divert a combined total of 20%. On these bases an annual growth rate of 12% has been assumed for tourist traffic at Nairobi for the period up to 1975 and 15% from 1975 to 1980.

Foreign business traffic has grown at 22% annually during the past decade. Considering that this growth was applied to a very small base figure (4,000 passengers in 1960) and taking into account the diversionary effect of Kilimanjaro and Mombasa Airports, it has been assumed that this traffic will grow at a somewhat slower 13% per year during the current decade.

The numbers of local residents traveling outside East Africa have increased by about 2% per annum over the last 10 years. Although this traffic is considered fairly inelastic to changes in air transport factors,

it is expected that the effect of Kenya's increasing rate of economic growth in stimulating travel by Kenyan businessmen and tourists will more than offset the diversionary effect of Kilimanjaro and Mombasa, resulting in a growth rate of 2.7% up to 1980.

While traffic within Kenya and between Kenya, Uganda and Tanzania, has grown at an average of 12.9% per year between 1960-68, growth has slowed considerably in the past few years. This decline in growth rate is probably due to the reduced economic dependence upon Kenya of the other two East African countries and the slow growth rate of domestic traffic. It is considered likely that both these tendencies will continue. The East African Community traffic will probably grow very slowly or even decline in the early years while the diversionary effect of the new Mombasa Airport upon international traffic after its opening in 1975 will produce a low domestic traffic growth rate.

Transit passenger traffic has been growing at a rate of 13% per year. A lower growth rate of 9% has been assumed up to 1980, taking into consideration the general development of traffic in Africa projected by ICAO and also taking into account the diversion, after the upgrading of Mombasa, of inclusive tour traffic which now transits at Nairobi.

Forecasts for the second 10-year period, 1980-90, have been based on a qualitative consideration of the continued rapid economic development of Kenya, the continued importance of transportation and specifically air transportation in this development, and the continued, although perhaps less rapid, growth in tourism to Kenya. Although no major constraints to the development of passenger traffic are foreseen, the extreme uncertainty of such long-term forecasting has prompted the assumption of a conservative 11.5% growth rate for the combined categories, foreign tourists, foreign businessmen and local residents, and 5% for traffic within East Africa.

AIR TRAFFIC PROJECTIONS AND GROWTH RATES

NAIROBI INTERNATIONAL AIRPORT

	<u>Actual</u>				<u>Projected</u>			
	<u>1966</u>		<u>1970</u>		<u>1975</u>		<u>1980</u>	<u>1985</u>
	(Average annual percentage growth rate between years listed is shown in parentheses)							
<u>Passengers</u> (000)								
<u>Arriving</u>								
Local residents	33	(3)	37	(1.5)	40	(3.5)	48	(2.5) 54
Foreign Businessmen	14	(21)	30	(13)	55	(13)	100	(10) 160
Foreign Tourists	76	(21.5)	165	(12)	291	(15)	584	(12.5) 1048
Intra-Community	71	(6.5)	92	(4.5)	116	(5)	148	(5) 190
<u>Transit</u>	108	(20.5)	228	(8.5)	342	(9)	528	(9) 815
<u>Cargo (tonnes)</u>								
Inbound	2856	(16)	5127	(9)	7900	(17)	17200	(12) 30200
Outbound	5532	(16.5)	10223	(15.5)	20900	(17)	45600	(13.5) 85500
<u>Mail (tonnes)</u>	1248	(9.5)	1797	(7.5)	2600	(6)	3500	(5.5) 4600
<u>Aircraft</u> (movements)								
Passenger	15270	(8.5)	21168	(3)	24300	(2.5)	27600	(2) 30500
Freight	170	(20)	350	(7.5)	500	(7)	700	(6) 1000
Other	1 919	(6.5)	16535	(-2)	14900	(5)	18800	(4.5) 23400

KENYA

NAIROBI AIRPORT PROJECT

DETAILED COST ESTIMATES (INCLUDE ESCALATION)

	<u>KE</u>
1. <u>Supply of Structural Steel</u>	542,954
(a) Passenger Terminal	<u>542,954</u>
	542,954
2. <u>Construction of Passenger Terminal</u>	4,776,167
(a) Structure	1,839,294
(b) Architecture	529,570
(c) Services & Equipment	1,980,598
(d) External Works	378,805
(e) Furniture to Government Offices	47,900
	<u>4,776,167</u>
3. <u>Supply and Installation of Airbridges</u>	469,643
(a) Passenger Terminal	<u>469,643</u>
	469,643
4. <u>Civil Works</u>	5,885,541
(a) Passenger Terminal	116,694
(b) Passenger Apron	1,915,154
(c) Freight Building	55,022
(d) Freight Apron	251,426
(e) Taxiways	928,691
(f) Control Block	7,016
(g) Police Station	8,337
(h) Roadworks	812,655
(i) Airfield Lighting	213,655
(j) Electrical Power Supply and Distribution	675,446
(k) Telephone Services	164,464
(l) Domestic and Fire Water Supply and Distribution	258,394
(m) Sewage Disposal	151,483
(n) Surface Water Main Drainage	144,427
(o) Fencing	21,213
(p) State Pavilion	37,900
(q) EAA Maintenance Apron	95,228
(r) Staff Canteen	12,693
(s) Airline Equipment Storage and Maintenance	15,821
	<u>5,885,541</u>

5.	<u>Construction of Freight Building</u>	<u>1,086,793</u>
	(a) Structure	509,705
	(b) Architecture	118,460
	(c) Services & Equipment	458,628
		<u>1,086,793</u>
6.	<u>Construction of Control Block</u>	<u>394,403</u>
	(a) Structure	212,978
	(b) Architecture	10,570
	(c) Services & Equipment	170,855
		<u>394,403</u>
7.	<u>Construction of State Pavilion</u>	<u>234,155</u>
	(a) Structure	107,009
	(b) Architecture	16,391
	(c) Services & Equipment	47,065
	(d) External Works	63,690
		<u>234,155</u>
8.	<u>Construction of Ancillary Buildings</u>	<u>194,677</u>
	(a) Police Station	20,445
	(b) Telephone Exchange	11,396
	(c) Animal Unit Modifications	10,211
	(d) Crash, Fire and Rescue Station	51,930
	(e) Staff Canteen	70,336
	(f) Airline Equipment Storage and Maintenance	30,359
		<u>194,677</u>

NAIROBI AIRPORT PROJECT

The Evaluation of Economic Benefits of the Project

1. This Annex describes, in further detail some of the methods by which the project benefits were estimated.

Aircraft Benefits

2. In order to estimate the reduction in aircraft operating costs that the project would produce, the ground movement of aircraft in the with and without project situations were compared by the use of simulation models. An allowance was made for the changes in the fleet size and composition serving Nairobi in the without project situation. Forecasts of the type of aircraft likely to use Nairobi Airport in 1975 and 1985 were made and estimates of direct full operating costs per unit of time were obtained from the best sources available including the U.S. Civil Aeronautics Board. These costs were adjusted to reflect the gradual increases in aircraft size over time. The resulting operating cost per large aircraft was K£530 in 1975, rising to K£900 in 1985. A separate estimate of cost was made for other aircraft categories. These unit costs were then applied to the average delay per movement for the appropriate category of aircraft and the project benefits in avoiding delays to aircraft were thus estimated. These total aircraft benefits amount to K£775,000 per annum in 1976 and rise to about K£4,750,000 per annum by 1985, of which just over K£4 million relate to the movement of large aircraft. The aircraft benefits estimated would accrue initially to the operators of the aircraft including foreign airlines. It has been estimated that of these savings, one third of those accruing to E.A.A., amounting to K£116,000 in 1976 and K£713,000 in 1985, would accrue directly to the Kenyan economy.

The Loss of Foreign Visitors Arriving at Nairobi Airport

3. The project is expected to affect the growth of passenger traffic in two separate ways. First, the congestion without the project would reach such levels that it would adversely affect the demand of tourists and other passengers and second, the reduced capacity and increased costs of using a congested airport would adversely influence the frequency and quality of service provided by foreign airlines serving Nairobi. The estimated effects on traffic of passenger and aircraft operator reactions to inadequate capacity are described separately below.

a) Passenger Reaction to Inadequate Capacity

4. Arriving and departing passengers will directly benefit from the project principally through the improvement in processing times and comfort in the new terminal building. Passenger delays were measured by the use of models developed by the consultants, which simulated the

processing of passengers during peak and off-peak hours in the with and without project situations. On the basis of these simulations it has been estimated that in the absence of the project the overall average additional delay per passenger would be 5.4 minutes in 1975 and it would rise to over 26 minutes by 1985. The average delay per passenger in peak hours is only marginally higher than the overall average in 1975 but by 1985 it is nearly 10 minutes more. The estimated delays to passengers mentioned above are average overall delays which include a significant number of extremely long delays. The simulations carried out show that, without the project, of all international passengers using the airport in 1985, at least 12% would experience excess delays of $1\frac{1}{2}$ hours, more than 4% would incur excess delays of $2\frac{3}{4}$ hours and over 20,000 passengers would have to endure excess delays of more than 6 hours.

5. Congestion involving delays of the magnitudes described above, the occurrences of which are unpredictable by passengers, will deter a significant number of foreign nationals from visiting Kenya. The dampening effect of congestion on travel demand applies particularly to tourists, since they face an increasingly wide and varied choice of routes to highly competitive destinations. It is well known that tourist attractions similar to those in Kenya exist and are being developed in neighboring countries. Although many individual tourists will not have personal experience of the recent conditions at airports, these conditions, if bad, soon obtain a public notoriety. Tourists are also increasingly guided in their decisions by travel agents and the travel services industry which are generally well informed about current conditions at specific airports. Moreover, an increasing proportion of tourists travel on package tours and are influenced in their choice of destinations by tour operators, whose operations and profitability are directly affected by congestion at airports and the unforeseen delays that it produces.

6. A number of attempts have been made, in the field of air traffic forecasting, to measure the elasticity of passenger demand relative to time in order to predict the changes in passenger volumes that could arise from changes in total journey times. A recently concluded study^{1/} has specifically examined the sensitivity of passengers to changes in journey times on one of the international air routes serving Nairobi, the London-Nairobi route. On this route, which at present carries more passengers than any other route serving Nairobi, the study estimated the time elasticity of demand factor to be -0.04, i.e. a 10% change in travelling time would result in 0.4% change in travel volume. Other studies of air travel patterns in Europe and in the U.S., where journey times are generally shorter and where competing modes of travel are more important than they are for international journeys to Nairobi, have estimated time elasticities

^{1/}

"Air transport demand elasticities for U.K. Domestic and International routes", A. P. Ellison, London, 1971.

of demand which are much higher, ranging from -0.4 for leisure passengers to -1.5 for business travellers. London-Nairobi is one of the longest direct air routes serving Nairobi and it is very likely that on some of the shorter Nairobi air routes the time elasticity of demand would be much higher than the -0.04 estimated for London-Nairobi. However, in the absence of direct estimates of time elasticities on other Nairobi routes the low factor of -0.04 has been assumed, in this analysis, to apply to all routes serving Nairobi and has been used to assess the passenger losses arising from delays at the airport. As the incidence of these delays is unknown, the time elasticity factor has been applied to the proportionate time change of the average overall delay to the weighted average of the total journey times to Nairobi from all destinations. Only foreign travellers arriving at Nairobi from outside the East African Community have been considered. This calculation, a recognised underestimate on several counts, indicates that the project would prevent a loss of foreign passengers at Nairobi that would reach an accumulated level of some 15,000 by 1985.

b) Aircraft Operators Reaction to Inadequate Capacity

7. The congestion at Nairobi, if the project were not implemented, would not only give rise to substantial direct costs to foreign aircraft, it would also mean that the airport would be incapable of accommodating all the aircraft movements, particularly of large aircraft, that would wish to use it at specified times. The inability of Nairobi to accept all the aircraft movement demand at desirable times would thus involve the total rejection of some potential flights while a number of other flights would have to change to smaller, less economic and less attractive aircraft if they were to continue to serve Nairobi. Such changes in the size and composition of the foreign fleet serving Nairobi would have detrimental effects on the effective demand for passenger journeys to Nairobi.

8. Estimates were made of the reduction in the seats available on scheduled international flights to Nairobi that the capacity limitations at the airport would bring about. Since scheduled passenger services dominate the peak periods at Nairobi, it was assumed that such reductions in available seats would only occur on these scheduled services. The use of smaller aircraft on some flights and lower frequencies of flights necessitated by congestion would reduce available seats on international scheduled flights by 13% (about 170,000 seats) in 1980 and by 21% (about 500,000 seats) in 1985. It has conservatively been assumed that all the projected business passengers, who would have travelled on these lost seats, will, given the nature of business journeys, be accommodated on alternative flights with low load factors serving Nairobi. Some 53,000 of the projected tourist passengers on scheduled services in 1980, and 167,000 in 1985, will also lose the seats on which they would have travelled. There are a number of reasons why not all of these tourists could be expected to be accommodated on other existing flights. Firstly, the assumed accommodation of all the affected business passengers on

other flights would raise the load factors on international scheduled flights from all destinations to Nairobi to an annual average approaching 65%, which in the light of the seasonal variations in demand at Nairobi implies an average load factor in the high seasons of nearly 75%. This is a very high overall average, which could only be achieved with a large proportion of flights from particular points of origin being fully occupied in the high seasons: the scope for raising it further by accommodating additional passengers is therefore limited. Secondly, much of the tourist demand for travel arises at specific times on specific days and the timing of such demand is determined by the pattern of holidays and the leave from work. Alternative capacity on other existing flights will not always match demand in time, and if airline seats to Nairobi are not available at these times, tourists may well choose alternative vacation destinations. Thus, the demands of a large proportion of the tourists affected by the reduction in seats would not be met on alternative flights. Nevertheless, in this analysis, it has been assumed, very conservatively, that only 15% of the affected tourists would be unable to find suitable alternative seats to Nairobi and would therefore travel to different locations. This gives rise to an annual loss of some 26,000 arriving tourists at Nairobi Airport by 1985.

9. The losses of passengers arriving at Nairobi, arising from the two effects described above, amount to over 40,000 per annum by 1985. These losses will basically involve two types of passengers. Firstly, there will be suppressed traffic, i.e. those passengers who, given the congestion at Nairobi, will decide to make trips to alternative destinations outside Kenya and not visit Kenya at all. As Nairobi Airport is the principal international gateway to Kenya, most of the passengers that the delays will deter are likely to fall in this category. Secondly, there will be some diverted traffic, i.e. passengers who, given the congestion at Nairobi, will switch to other modes of travel to Kenya. This might mean that some passengers will travel by air to Mombasa Airport when it is able to accept direct scheduled international services, and then make journeys to Nairobi or travel to other locations in Kenya. It might also, and more probably would, mean that passengers would travel to international airports in nearby adjoining countries, from where they might make short trips into Kenya as a part of a package trip to East Africa. As a reliable objective way of differentiating between the suppressed and diverted traffic does not exist, it has conservatively been assumed that the passenger traffic loss at Nairobi would be equally distributed between these two categories. It has further been assumed that the diverted passengers would not give rise to any losses to the Kenyan economy despite the fact that such diversion would probably involve shorter stays in Kenya and visits to parts of the country where consumption expenditure opportunities are less than they are in Nairobi. Thus, only one half of the estimated foreign passengers lost at Nairobi were taken as causing losses to the Kenyan economy.

Loss of Airport Revenues

10. The airport landing fee revenue earned from foreign airlines in the with project situation was compared with the revenues that would be

earned in the without project situation. The difference in revenue, which arises from the reduced number and size of aircraft, produces project benefits that rise to over K£1.6 million per annum by 1985. The incremental passenger charges attributable to the project and the incremental rentals from airlines (net of increased operating costs) amount to K£300,000 and K£210,000 per annum respectively by 1985.

KENYA

NAIROBI AIRPORT PROJECT

User Charges

A. Introudction

Nairobi Airport plays a key role in Kenya's overall development effort. It is not only an important gateway for tourism which is a major and rapidly growing source of foreign exchange for the country; the airport itself is also a significant contributor to the national development budget. Estimated net income from the airport has amounted to over K£ 3.3 million (US\$9.2 million) in the past three years. This is the result of a specific objective on the part of the Government that user charges at the airport should contribute as much as possible to the National Treasury for use in other sectors of the economy.

a. Historical Development

When the airport opened in 1958 user charges consisted only of landing and parking fees, ground handling charges and terminal space rentals. With the promulgation of the East Africa Air Navigation Regulations in 1965, two new charges were introduced; a housing or hangar fee and a fueling service fee. The housing fees are still in effect although they have never been charged due to the lack of suitable hangar facilities at the airport. The fueling service fee, which was assessed directly on the airlines, was withdrawn in 1966 at the insistence of ICAO which found the charges to be in violation of Article 24 of the Chicago Convention.

In 1967 the Government increased landing fees by about 25% which was estimated to provide about the same revenue as would have been provided by the fueling service fee.

Terminal space rentals have been revised twice, once in 1966 with an increase of about 45%, and again in 1969 with a further increase of about 17%. The original rentals and all revisions, as set by the Senior Valuer of Government, have been based on the rentals charged for comparable spaces in the central part of Nairobi.

Concession fees have also been introduced for all shops with annual rent greater than K£ 500 (US\$1,400). The concession fees are usually determined in the bid process for the particular concession and may be either a flat fee, a percentage of gross takings, or a combination. A number of other small charges have also been introduced for livestock holding, the waving base, advertising, toilets, etc.

The most recent user charge introduced has been the passenger departure tax, passed by Parliament in November 1970. This charge had been proposed several years earlier but had been turned aside by the objections of the Ministry of Tourism. Its final introduction was the result of a strong request by the Ministry of Finance for additional revenue from the airport. No particular criterion was applied in determining the level of the tax. The original proposal was 20 sh per departing passenger but, with Uganda charging 7.50 sh and Tanzania charging 15.00 sh, the tax was set at 100.000 sh.

b. User Charge Collection and Disposition

Landing fees, parking fees and the passenger departure tax are considered as direct revenue to the Government Treasury. They are collected by the airport, on behalf of the Permanent Secretary of the Ministry of Power and Communications.

Income from ground handling fees, concession royalties, the livestock holding charge, advertising charges and other miscellaneous charges are considered as "appropriations-in-aid", and are collected by the airport and netted from that part of aerodromes' operating expenditures controlled by the Ministry of Power and Communications.

Terminal space rentals are collected by the Ministry of Works as "appropriations-in-aid" netted from its expenditure on the maintenance of aerodromes. Ground rents are collected by the Commissioner of Lands who passes them directly to the Treasury.

c. The Present Situation and Future Development

The main impact of user charges is on the airlines who pay the landing fees and rentals for space at the airport. The landing fees produce by far the largest part of the revenue.

Landing Fees

For a number of airlines the main reason for landing at Nairobi is not its traffic generation but rather its function as a technical stop for fueling and other en-route services on flights between Europe and points further south, primarily Johannesburg. Nairobi is situated on the flight path for transcontinental services. Nairobi's runway, fueling system, and crash, fire and rescue system are recognized as being better than those at other airports in the region that might generate possible competition. The presence of East African Airways' major maintenance facility is also considered an advantage. As neighboring airports such as Kilimanjaro, Entebbe and Mombasa, come into competition with Nairobi and as traffic and the airlines' frequency of operations increase, the Government will have to study the user charges system and more particularly its effect on the airlines.

Space Usage in the Terminal Buildings

With the low present level of operations of individual airlines, there is no active demand from them for their own individual ticket or check-in counters at the airport. Such services are being contracted from East African Airways. With the projected build-up of traffic at Nairobi, it is likely that most airlines will require their own facilities at the airport. The project makes provision for this anticipated demand.

The financial projections envisage that the Government should be able to institute a user charges scheme related to the operating costs of the terminal buildings. The development of a user charges system related to costs and geared to maintain Nairobi's pre-eminent position among the airports of the region is a requirement under the proposed lending arrangements.

KENYA

NAIROBI AIRPORT PROJECT

ANNEX 5
Page 4B. Existing User ChargesSchedule of User Charges at Nairobi Airport
Existing - August 1971

<u>TYPE OF CHARGE</u>	<u>EXISTING SCHEDULE AND AMOUNT</u>	<u>MEANS OF COLLECTION & DISPOSITION</u>	<u>HISTORICAL DEVELOPMENT</u>
1. <u>Landing Fees</u>	Graduated scale based on maximum permissible weight authorized by aircraft's certificate or airworthiness. International Flights under 40,000 lbs - sh 6/90 per 1000 lbs 40,000 - 200,000 lbs - sh 8/10 per 1000 lbs over 200,000 lbs - sh 10/60 per 1000 lbs all calculated to nearest 1000 lbs Intra-East Africa Flights In lieu of single flight fees, either annual fee - 50 times single landing fee, or monthly fee - 6 times single landing fee. Helicopters Half rate for fixed wing aircraft. Private or Training Aircraft Under 4500 lbs - half normal rate for single landing; annual and monthly fees sh 400 and sh 40 respectively. Runway Lighting Surcharge On single landing - 50% of single landing fee On annual or monthly landing fee - $\frac{1}{2}$ times single landing fee. Same surcharge for takeoffs with exemption when takeoff within 70 minutes of landing in respect of which lighting charges paid. Reductions Series of landings for training during normal hours within a period of one hour charged as for one landing. Exemptions Aircraft landing solely for customs, immigration or air traffic control purposes with no load or fuel embarked or disembarked. Test flights during normal hours. Emergency return landings. Aircraft of EAC Governments or used for Government ceremonial purposes. Aircraft chartered by Kenya police. Aircraft belonging to United Nations Organizations.	Collected directly by airport and deposited to the credit of the Government Treasury Department. Collected directly by the airport and deposited as above. Not presently active as no hangar facilities. Collected directly by the airport as above. Part of appropriations-in-aid which are netted from that part of Aerodromes operating expenditure controlled by the Ministry of Power and Communications. Collected directly by the airport and deposited to the credit of the Government Treasury Department.	Original landing fees were established in 1958 when Kenya was a British colony. Landing fees have been changed only once since 1958. This involved a 25% increase in 1967 which was intended to replace, in revenue terms, the fuel throughput charge which was withdrawn in 1966 due to its violation of Article 24 of the Chicago Convention. Introduced in April 1970. This charge had been considered earlier but not introduced due to the objections of the Ministry of Tourism and Wildlife. In 1970 these objections were set aside by the Treasury in a strong request for additional revenue from the airport.
2. <u>Parking and Hangar Charges</u>	Based on area measured by wingspan x length. Parking Rates Beyond first six hours, each day or part thereof charged at sh 1/25 per 500 sq ft or part thereof; exempt where no landing fee applicable. Hangar Rates Daily - sh 2/50 per 500 sq ft or part thereof. Monthly - sh 55 per 500 sq ft or part thereof.		
3. <u>Ground Handling Service Fees</u>	Graduated scale based on maximum permissible weight authorized by aircraft's certificate of airworthiness. Under 35,000 lbs - sh 5 per 5000 lbs or part thereof. 35,000 - 75,000 lbs - sh 6/25 per 5000 lbs or part thereof. Over 75,000 lbs - sh 31/25 per 25,000 lbs or part thereof. Same fees levied on each originating, terminating and transit aircraft with transit aircraft charged as both terminating and originating aircraft if parked in excess of three hours.		
4. <u>Departure Tax</u>	Sh 10 per passenger. Domestic Kenya passengers exempt.		

TYPE OF CHARGE	EXISTING SCHEDULE AND AMOUNT	MEANS OF COLLECTION & DISPOSITION	HISTORICAL DEVELOPMENT																										
5. <u>Terminal Space Rental</u>	Responsibility of the Ministry of Works. Rates fixed by Commissioner of Lands on basis of comparable spaces in central Nairobi. Ministry of Power and Communications allocates space and occupancy. Rental contracts negotiated every 2 years.	Rents collected by Ministry of Works directly from users and netted from expenditures as part of its appropriations-in-aid.	Space rental charges historically based on a single criteria, i.e. the rents paid in comparable spaces in Government buildings in the central ("prestige") part of Nairobi. The rent on an example area has increased in the following manner since the airport was opened:																										
Terminal Building	<table><tr><td>(i) <u>Offices</u></td><td>per sq ft per annum</td></tr><tr><td>Prestige areas</td><td>sh 42</td></tr><tr><td>Less prestige areas</td><td>sh 30</td></tr><tr><td>Other areas</td><td>sh 24</td></tr><tr><td>(ii) <u>Shops</u></td><td></td></tr><tr><td>Curios, trophies, paintings, etc.</td><td>sh 60</td></tr><tr><td>Books, magazines and tobacco</td><td>sh 42</td></tr><tr><td>Medicines, cosmetics, photo, equipment</td><td>sh 30</td></tr><tr><td>Hair dresser</td><td>sh 20</td></tr></table>	(i) <u>Offices</u>	per sq ft per annum	Prestige areas	sh 42	Less prestige areas	sh 30	Other areas	sh 24	(ii) <u>Shops</u>		Curios, trophies, paintings, etc.	sh 60	Books, magazines and tobacco	sh 42	Medicines, cosmetics, photo, equipment	sh 30	Hair dresser	sh 20		<table><tr><td></td><td>rate per sq ft</td></tr><tr><td>1958</td><td>sh 25</td></tr><tr><td>1966</td><td>sh 36</td></tr><tr><td>1969</td><td>sh 42</td></tr></table>		rate per sq ft	1958	sh 25	1966	sh 36	1969	sh 42
(i) <u>Offices</u>	per sq ft per annum																												
Prestige areas	sh 42																												
Less prestige areas	sh 30																												
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1966	sh 36																												
1969	sh 42																												
Engineering Stores	<table><tr><td>(i) Office accommodation</td><td>sh 12</td></tr><tr><td>(ii) New engineering stores</td><td>sh 10</td></tr><tr><td>(iii) Old engineering stores</td><td>sh 8</td></tr><tr><td>(iv) Open storage areas</td><td>sh 5</td></tr></table>	(i) Office accommodation	sh 12	(ii) New engineering stores	sh 10	(iii) Old engineering stores	sh 8	(iv) Open storage areas	sh 5																				
(i) Office accommodation	sh 12																												
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(iii) Old engineering stores	sh 8																												
(iv) Open storage areas	sh 5																												
Freight Shed	<table><tr><td>(i) Office accommodation</td><td>sh 20</td></tr><tr><td>(ii) Storage in bonded stores</td><td>sh 8</td></tr><tr><td>(iii) Storage and handling</td><td>sh 5</td></tr></table>	(i) Office accommodation	sh 20	(ii) Storage in bonded stores	sh 8	(iii) Storage and handling	sh 5																						
(i) Office accommodation	sh 20																												
(ii) Storage in bonded stores	sh 8																												
(iii) Storage and handling	sh 5																												
6. <u>Concession Royalties</u>	Responsibility of Ministry of Power and Communications. If rental charge is over K£ 500, Ministry of Power and Communications advertises inviting tenders with rent as fixed above and additional payment (either flat payment or royalty on concession income) to be quoted. Ministry of Power and Communications recommends selected bids to Central Tender Board for decision. Rental contracts negotiated every 5 years. <u>Example</u> <u>Agreement with Nairobi Airport Services - Catering</u> (i) Flat K£ 12,000 (ii) Further 10% of gross takings above the first K£ 200,000 and 12½% of gross takings above K£ 1 million.	Collected directly by airport as above; is an appropriation-in-aid.																											
7. <u>Livestock Holding Charge</u>	Sh 10 per head. Is not an import/export charge but rather a storage charge.	Collected directly by the airport as above; is an appropriation-in-aid.																											
8. <u>Ground Rent</u>	Responsibility of the Ministry of Lands and Settlement acting through the Commissioner of Lands, who fixes the rates for grounds occupied by East African Airways, catering concessionaire and oil companies.	Rents collected by the Ministry of Lands and Settlement directly from the users and deposited to the credit of the Government Treasury Department.																											
9. <u>Other Charges</u> (i.e. telephone, electricity, water, waving base, toilet, advertising, etc.)	Responsibility of Ministry of Power and Communications.	Collected directly by the airport as above; are appropriations-in-aid.																											

Notes: The airport is a collector of revenue through the Permanent Secretary of the Ministry of Power and Communications. The Ministry of Works, through its Chief Accountant, is the Government accounting unit covering the Ministry of Power and Communications. The buildings and space occupied by DCA, Meteorological Department, Ministry of Health, Ministry of Home Affairs (Immigration and National Police), Customs Department and the Ministry of Agriculture are rent free. This includes electricity and water facilities etc., except telephone.

September 28, 1971

C. Projected User Charges System (effective January 1, 1976, i.e. mid fiscal 1976)

1. Landing Fees: To continue at the same rates/basis as are existing at present. Applied to estimated growth in traffic. Clearly the highest income producing and the most profitable area.

2. Parking Fees: To continue at the same rates/basis as are now existing with nominal increase.

3. Ground Handling Fees: To continue at the same rates/basis as are existing at present. Applied to estimated growth in traffic.

4. Passenger Departure Tax: To continue at the same rate of Ksh 10 per passenger through December, 1975. On completion of the terminal building this rate is assumed to increase to Ksh 15 to provide the contribution towards annual cost recovery (see para. 5 below). The rates are applied to estimated growth in traffic.

5. Passenger Terminal Building - Occupancy

	<u>Area</u> <u>m²</u>	<u>Rental Unit</u>	<u>Estimated</u> <u>Annual Cost</u> <u>Recovery</u> <u>KE</u>
Non-rentable space (airport administration and Government for entry and exist formalities)	16,387	23,779	337,000
Airlines space (offices, lounges etc.)	16,585	44,633	632,000
Concession space	<u>3,173</u>	<u>9,022</u>	<u>128,000</u>
Total	36,144	77,454	1,097,000

Estimated rate per unit per annum $\frac{1,097,000}{77,454} = \text{KE } 14.16$

Factors have been introduced for converting areas into rental units so as to reflect not only the cost differences among various parts of the building, but also their attractiveness. For example, baggage processing areas and waving bay are graded with a factor of 1, whereas administration offices and public lounges are factorized by 3.

Nonrentable Space: The passenger departure tax above provides for the cost recovery pertaining to this space.

Airlines Space: Directly rentable space to individual airlines would cover 6,960 units producing an annual income of K£ 60,000 to 75,000 in stepped increases. There would be a balance still remaining to be recovered, and relating directly to general passenger handling facilities. A fair division of cost among airlines would therefore appear to be a rental charge based on the number of passengers carried by each airline. At the same time it is not considered equitable to attempt a full recovery at least while the airlines are bearing the full burden of paying the landing fees which bring in about 2/3rds of the total revenue. However, until a full study of the user charges system is undertaken by the Government and the Department (referred to earlier in para. 6.03 of this report), the increase of Ksh 5 per departing passenger discussed in para. 4 above is included as an interim measure of contribution towards cost recovery pertaining to this space.

Concession Space: Fully and directly rentable space covering 9,022 units (3,173 sq m) producing an annual income of K£ 50,000 to 60,000 in stepped increase. The foregoing and concession rights income for catering and shops more than cover the cost recovery pertaining to this space.

6. Terminals - Airside - Airbridges, Fixed Ramps, Aprons, etc. Estimated annual cost to be recovered would be K£ 493,000 for passenger and K£ 110,000 for freight terminals. However, this is presumed to be offset against the landing fee.

7. Rentals - Freight Terminal: Estimated annual cost to be recovered would be K£ 150,000 covering 11,564 sq m or 21,866 rental units, producing an annual income of K£ 120,000 to 150,000 in stepped increases.

8. Terminals - Landside - Parking: The annual cost to be recovered would be K£ 67,000 and this would be collected as follows.

<u>Parking-Type</u>	<u>Estimated Charges per Use Ksh</u>	<u>Estimated Annual Cost Recovery K£</u>
Taxi Rank	-	795
Bus Slots	3/-	1,205
Short Term		
- Passenger Terminal	1/50	39,858
- Freight Terminal	1/50	14,000
Long Term	-/75	6,542
Staff (say, £ 46 p.a. for 100 spaces)		<u>4,600</u>
Total		<u>67,000</u>

9. Old Terminal Lease: It is assumed that it would be used for aviation-oriented activities such as training classrooms, producing an annual income of K£ 27,000.

10. Ground Leases: Based on stepped increase from the existing income of K£ 6,000 per annum to K£ 10,000.

11. Concession Rights - Catering and Shops: Based on estimated annual growth with an increase in fiscal 1977 as a result of newly negotiated terms.

12. General: It should be understood that the above-mentioned rates have been evolved strictly for purposes of the financial projections forming part of this report. The ultimate responsibility for developing and negotiating the level and structure of user charges policies, systems and rates designed to increase revenues, cover costs and leave sufficient net incomes to ensure reasonable rates of return on the net average fixed assets in use and to justify future additional investment, would rest with the Government and the Department and its financial management (see para. 6.02 of this report establishing financial objectives for the airport).

KENYA

NAIROBI AIRPORT PROJECT

Assumptions Used in Financial Projections

1. Operating Revenues: Calculations based on projected user charges discussed in section C of Annex 5.
2. Personnel Costs and Benefits: Based on present costs of Ministry of Power and Communications and Ministry of Works (including costs of non-established positions, i.e., labor) plus a housing allowance of 10% and terminal benefit of 20% on the base salary costs. Annual increase 5%. Additional staff 5% increase in 1972 and 10% increase in 1976. Administration support costs at the rate of KE 30,000 per annum included for years 1977, 1978 and 1979.
3. Ground Handling Services: Increase on the same basis of growth as ground handling services fees.
4. Repair and Maintenance: 2% of investment costs for annual repair and maintenance with an annual increase of 7%.
5. Utilities: Include electricity, water and sewage treatment system less collections from users.
6. Communications: Include postage, telegrams and telephones, less collection from users of telephone installations.
7. Depreciation: Annual depreciation of fixed assets is calculated on the straightline basis, and the following rates apply:

Land	none
Runway, taxiways, and aprons	5%
Roads and utilities	5%
Buildings	5%
Equipment	10%
Old terminal complex	5%

The new terminal building facilities will become operational as of January 1, 1976, i.e. mid-fiscal 1976.

8. Write-Offs: The cost of current work in the amount of KE 800,000 for expanding the existing terminal building is written off in equal amounts of KE 200,000 in the years 1972 through 1975.

The cost of experts, accounting consultants and training in the amount of KE 384,000 incurred during the construction period is written off in equal amounts of KE 48,000 in the years 1977 through 1984.

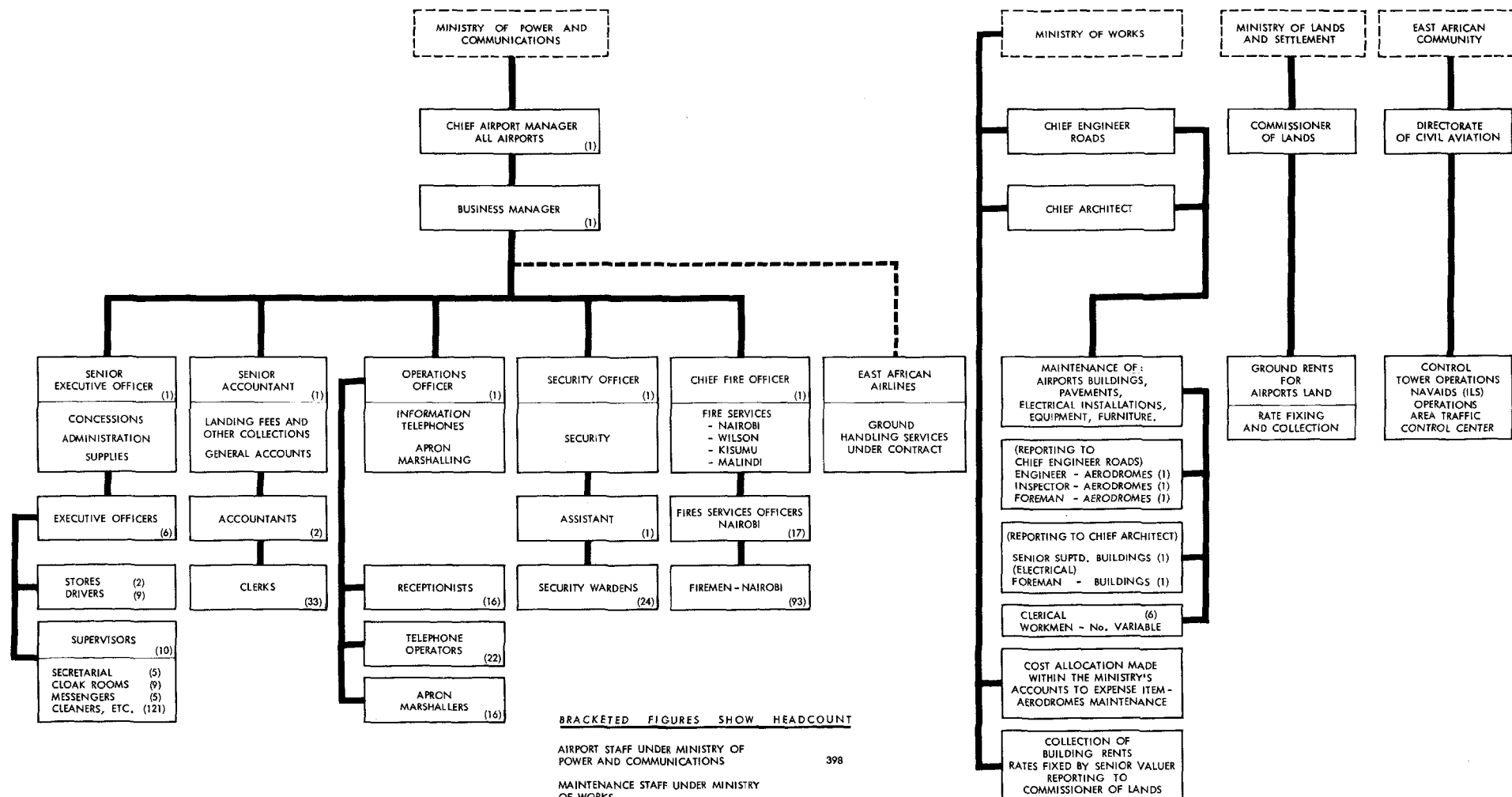
9. Interest: The proposed Bank loan would bear interest at 7-1/4% p.a. and would be repayable in approximately equal semi-annual installments over 20 years, including a 5-year grace period.

Interest and commitment charges during the construction period and interest thereafter are treated as current non-operating expenses and included in the projected operating results.

10. Accounts Receivable: Are calculated on the basis that approximately one month's operating revenues of a given year would be outstanding as at the end of the year.

11. Accounts Payable and Accruals: Are calculated on the basis that approximately one month's cash operating expenses excluding personnel costs and benefits of a given year would remain unsettled as at the end of the year.

KENYA
NAIROBI AIRPORT PROJECT
EXISTING ORGANIZATION OF THE AIRPORT OPERATIONS - 1971

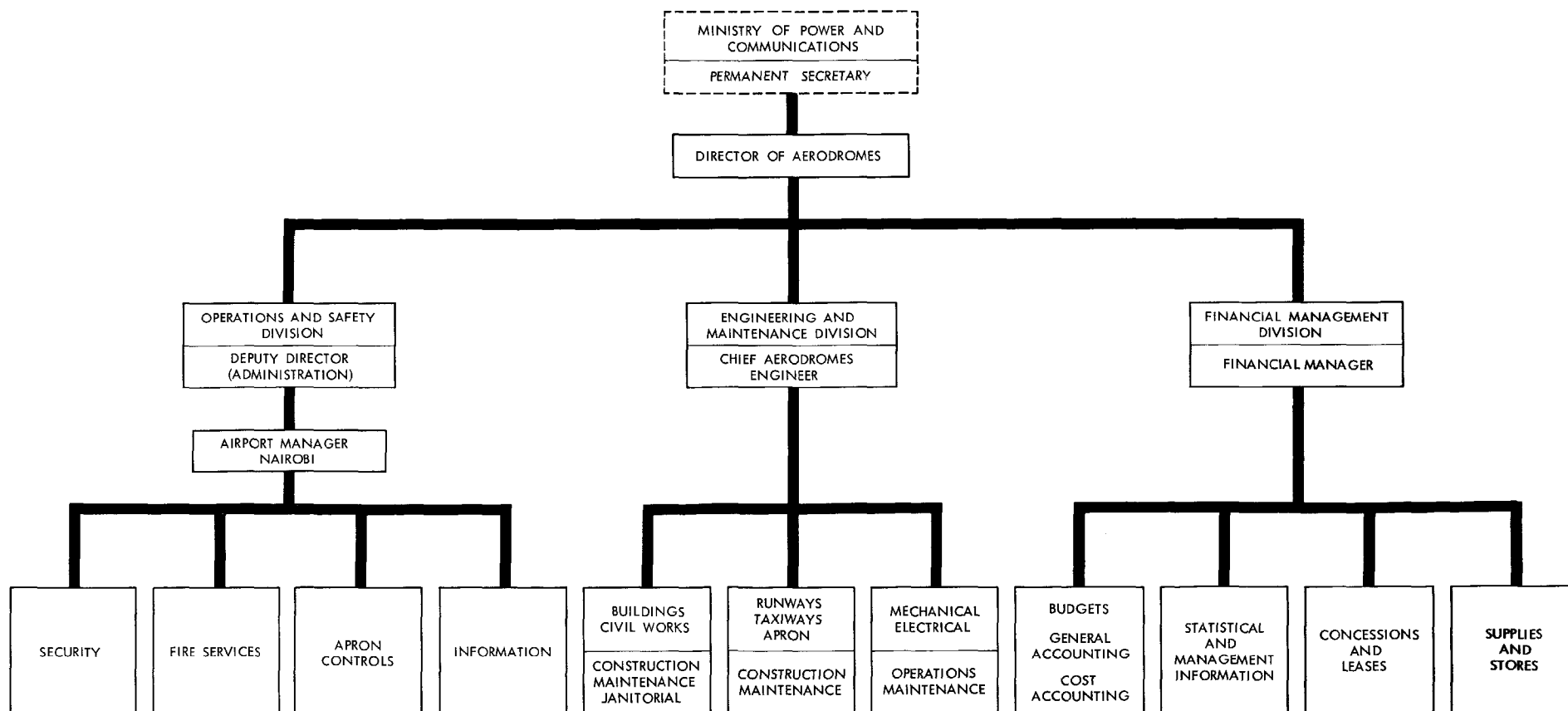


BRACKETED FIGURES SHOW HEADCOUNT

AIRPORT STAFF UNDER MINISTRY OF POWER AND COMMUNICATIONS	398
MAINTENANCE STAFF UNDER MINISTRY OF WORKS	11
- DIRECTLY IDENTIFIABLE	---
- WORKMEN (No. VARIABLE)	---
TOTAL	409

September 20, 1970

KENYA
NAIROBI AIRPORT PROJECT
PROPOSED ORGANIZATION OF THE AERODROMES DEPARTMENT - 1972



THE DEPARTMENT WILL BE RESPONSIBLE FOR ALL AERODROMES; CHIEFLY: NAIROBI, WILSON, MOMBASA, KISUMU AND MALINDI.

ACTIVITIES AND OPERATIONS AND ALL RELATED FINANCIAL TRANSACTIONS WILL BE IDENTIFIED, RECORDED AND REPORTED BY AIRPORT, PARTICULARLY NAIROBI.

STAFFING LEVELS AND NUMBERS WILL BE DEVELOPED BY THE DIRECTOR AND DIVISION CHIEFS, WHEN HIRED.

September 23, 1971.

TABLE 1

KENYANAIROBI AIRPORT PROJECTInvestment Program

Expressed in Thousands of Kenyan Pounds Exchange Rate: KSh 1.00 = US\$2.80
 US\$1.00 = KSh 0.357 (Ksh 7.14)

For Year Ending:	<u>Total</u>	<u>Land</u>	<u>Runways, Taxiways and Apron</u>	<u>Roads and Utilities</u>	<u>Buildings</u>	<u>Equipment</u>	<u>Urgent Works (old terminal)</u>	<u>Administrative Support, Consultants & Training</u>
June 30, 1971	90	90					800	
1972	845	45						
1973								
1974								
1975								
1976 project	16,539		4,177	2,604	9,326	48		384
other	102					102		
1977	50					50		
1978								
1979								
1980	100					100		
1981								
1982								
1983	5,100				5,050	50		
1984								
Total	<u>22,826</u>	<u>135</u>	<u>4,177</u>	<u>2,604</u>	<u>14,376</u>	<u>350</u>	<u>800</u>	<u>384</u>

February 29, 1972

NAIROBI AIRPORT PROJECTEstimated Schedule of Disbursements

<u>IBRD Fiscal Years</u> <u>Quarter</u>	<u>Cumulative Disbursements</u> <u>at end of Quarter</u> <u>(US\$ '000)</u>
--	---

1972/73

September 30, 1972	1,653
December 31, 1972	3,044
March 31, 1973	4,711
June 30, 1973	6,114

1973/74

September 30, 1973	7,794
December 31, 1973	9,933
March 31, 1974	12,458
June 30, 1974	15,463

1974/75

September 30, 1974	18,613
December 31, 1974	22,043
March 31, 1975	25,002
June 30, 1975	26,635

1975/76

September 30, 1975	27,638
December 31, 1975	27,664
March 31, 1976	27,767
June 30, 1976	27,918

1976/77

September 30, 1976	28,940
December 31, 1976	29,000

May 11, 1972

KENYA

NAIROBI AIRPORT PROJECT

Estimated and Projected Operating Results

Expressed in Thousands of Kenya Pounds Exchange Rate: Ksh 1.00 = US\$2.80
US\$1.00 = Ksh 0.357 (Kah 7.14)

For Year Ending June 30,

	Estimated			Projected												
	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
OPERATING REVENUES																
Landing fees	1,057	1,493	1,524	1,614	1,709	1,809	1,916	2,029	2,230	2,454	2,701	2,972	3,240	3,502	3,784	4,089
Parking fees	4	4	4	4	4	4	4	4	4	5	5	6	6	7	7	7
Ground handling fees	111	143	147	161	177	195	214	235	255	278	302	329	356	383	413	444
Passenger departure tax		5	139	156	167	188	212	277	377	422	476	537	605	672	746	827
Rentals - airlines	28	35	31	35	35	35	40	45	60	65	65	65	65	70	75	75
" - shops and others	1	1	1	2	2	3	3	17	42	50	50	50	50	60	60	60
" - freight terminal	4	4	4	5	5	5	5	50	120	150	150	150	150	150	150	150
Concession rights - catering	60	65	88	90	93	95	97	120	155	160	165	170	175	180	185	190
" - shops and miscellaneous	61	46	65	28	28	28	29	30	32	34	36	38	40	42	44	46
Parking lot								27	53	53	53	53	53	55	58	58
Old terminal lease								12	27	27	27	27	27	27	27	27
Ground leases	6	6	6	7	7	7	7	10	10	10	10	10	10	10	10	10
Total Operating Revenues	1,332	1,802	2,009	2,102	2,227	2,369	2,527	2,856	3,365	3,708	4,040	4,407	4,777	5,158	5,559	5,983
OPERATING EXPENSES																
Personnel costs and benefits	274	293	313	327	362	379	400	460	513	538	564	560	588	620	650	683
Uniforms and overalls	4	3	4	6	6	6	6	8	8	8	8	9	9	9	9	9
Travel and accommodation	3	1	3	5	5	5	5	7	7	7	7	9	9	9	9	9
Professional and technical fees and expenses				8	8	8	8	10	10	10	10	15	15	15	15	15
Ground handling service charges	102	77	115	126	138	152	167	183	199	217	236	257	278	299	322	346
Repair and maintenance - aircraft operating areas	30	33	41	60	63	67	72	105	153	163	174	187	199	213	227	242
" - terminal areas	9	11	9	18	19	20	21	93	198	212	227	243	260	278	297	318
" - roads and utilities				9	9	10	10	25	53	56	59	63	66	69	72	76
" - old terminal								5	10	10	10	12	12	12	12	12
Material and supplies	8	8	14	17	22	22	22	30	30	30	30	37	37	37	37	37
Utilities - net	24	23	27	40	41	42	43	84	125	130	133	136	139	142	145	148
Communications - net	1	1	1	4	5	5	5	10	10	10	10	12	12	12	12	12
Insurance	8	10	15	18	18	18	25	25	25	25	25	30	30	30	30	30
Miscellaneous	1	1	2	5	5	5	5	10	10	10	10	10	10	10	10	10
Depreciation - aircraft operating areas	80	85	85	85	85	85	85	174	279	279	279	284	284	284	289	289
" - terminal areas	24	24	24	24	24	24	24	238	471	471	471	471	471	471	471	471
" - roads and utilities	23	23	23	23	23	23	23	69	138	138	138	138	138	138	138	138
" - old terminal								54	15	15	15	15	15	15	15	15
Write-offs				200	200	200	200	348	48	48	48	48	48	48	48	48
Total Operating Expenses	591	593	676	975	1,033	1,071	1,121	1,938	2,302	2,377	2,454	2,536	2,620	2,711	3,061	3,161
Operating Income before Interest	741	1,209	1,333	1,127	1,194	1,298	1,406	918	1,063	1,331	1,586	1,871	2,157	2,447	2,498	2,822
Interest				99	266	512	708	741	744	714	682	648	612	573	530	
Earned Surplus - Annual	741	1,209	1,333	1,127	1,095	1,032	894	210	322	587	872	1,189	1,509	1,835	1,925	2,292
" - Cumulative	741	1,950	3,283	1,127	2,222	3,234	4,148	4,358	4,680	5,267	6,139	7,328	8,837	10,672	12,597	14,889

February 29, 1972

TABLE 4

KENYA

NAIROBI AIRPORT PROJECT

Estimated and Projected Cash Flow

Expressed in Thousands of Kenyan Pounds Exchange rate: Ks 1.00 = US\$2.80
US\$1.00 = Ks 0.357 (Ksh 7.14)

Year Ending June 30,	Estimated			Projected												
	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
SOURCES OF FUNDS																
Operating income before interest	741	1,209	1,333	1,127	1,194	1,298	1,406	918	1,063	1,331	1,586	1,871	2,157	2,447	2,498	2,822
Add: Depreciation and write-offs	127	132	132	332	332	332	332	883	951	951	951	956	956	956	1,214	1,214
Total internally generated funds	868	1,341	1,465	1,459	1,526	1,630	1,738	1,801	2,014	2,282	2,537	2,827	3,113	3,403	3,712	4,036
Government contribution - project				221	946	2,077	2,376	320	242							
Proposed IBRD loan - project				2,183	3,339	3,990	458	387								
Total project				3,129	5,416	6,366	778	629								
Total Sources	868	1,341	1,465	1,680	4,855	7,046	8,104	2,579	2,643	2,282	2,537	2,827	3,113	3,403	3,712	4,036
APPLICATION OF FUNDS																
Capital expenditures - project				221	3,037	5,299	6,261	723	614							
Deferred charges - project				92	117	105	55	15								
Total project				221	3,129	5,416	6,366	778	629							
Other capital expenditures		50	90	45				102	50			100	2,430	2,620	50	
Deferred charges - temporary expansion - old terminal		135	445	220												
Total capital expenditures		185	535	486	3,129	5,416	6,366	880	679			100	2,430	2,620	50	
Repayment of proposed IBRD loan										400	429	461	495	532	571	614
Interest and charges on proposed IBRD loan				99	266	512	708	741	744	714	882	848	612	573	530	
Total debt service				99	266	512	708	741	1,144	1,143	1,143	1,143	1,144	1,144	1,144	1,144
Increase in working capital - excluding cash	100	30	30	5	15	5	15	50	10	20	20	40	30	20	35	30
Total Application	100	215	565	491	3,243	5,687	6,893	1,638	1,430	1,164	1,163	1,283	1,603	1,784	1,229	1,174
CASH POSITION																
Surplus/(deficiency) - annual	768	1,126	900	1,189	1,412	1,359	1,211	941	1,213	1,118	1,374	1,544	(490)	(381)	2,483	2,862
- cumulative	768	1,894	2,794	1,189	2,601	3,960	5,171	6,112	7,325	8,443	9,817	11,361	10,871	10,490	12,973	15,835
Net cash to/(from) Government - annual	768	1,126	900	1,179	1,412	1,359	1,211	931	1,213	1,118	1,374	1,534	(490)	(381)	2,483	2,862
- cumulative	768	1,894	2,794	1,179	2,591	3,950	5,161	6,092	7,305	8,423	9,797	11,331	10,841	10,460	12,943	15,805
Cash at airport				10	10	10	10	20	20	20	20	30	30	30	30	30

May 11, 1972

TABLE 5

KENYA

NAIROBI AIRPORT PROJECT

Comparative Proforma Balance Sheets

Expressed in Thousands of Kenyan Pounds Exchange rate: KSh 1.00 = US\$2.80
US\$1.00 = KSh 0.357 (Ksh 7.14)

As at June 30,	Reconstructed			Forecast												
	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
ASSETS																
Current Assets																
Cash	-	-	-	10	10	10	10	20	20	20	20	30	30	30	30	30
Accounts receivable	110	140	170	180	190	200	210	260	280	310	340	370	400	430	460	500
Inventory - stores	10	10	10	15	20	25	30	50	50	50	50	60	60	60	65	65
Subtotal	120	150	180	205	220	235	250	330	350	380	410	460	490	520	555	595
Fixed Assets																
Land	105	105	195	240	240	240	240	240	240	240	240	240	240	240	240	240
Runways, taxiways and aprons	1,300	1,300	1,300	1,300	1,300	1,300	1,300	5,177	5,177	5,177	5,177	5,177	5,177	5,177	5,177	5,177
Roads and utilities	460	460	460	460	460	460	460	2,764	2,764	2,764	2,764	2,764	2,764	2,764	2,764	2,764
Buildings	480	480	480	480	480	480	480	9,326	9,326	9,326	9,326	9,326	9,326	9,326	14,376	14,376
Equipment	150	200	200	200	200	200	200	250	250	250	250	300	300	300	350	350
Old terminal complex								300	300	300	300	300	300	300	300	300
Construction in progress				221	3,258	8,557	14,818	(614)					2,430	5,050		
Subtotal	2,495	2,545	2,635	2,901	5,938	11,237	17,498	17,443	18,057	18,057	18,057	18,107	20,537	23,157	23,207	23,207
Less: Accumulated Depreciation:																
Runways, taxiways and aprons	65	130	195	260	325	390	455	504	763	1,022	1,281	1,540	1,799	2,058	2,317	2,576
Roads and utilities	23	46	69	92	115	138	161	125	263	401	539	677	815	953	1,091	1,229
Buildings	24	48	72	96	120	144	168	233	699	1,165	1,631	2,097	2,563	3,029	3,748	4,467
Equipment	15	35	55	75	95	115	135	60	35	60	85	65	95	125	160	195
Old terminal complex									15	30	45	60	75	90	105	120
Subtotal	127	259	391	523	655	787	919	922	1,775	2,678	3,581	4,439	5,347	6,255	7,421	8,587
Net Fixed Assets	2,368	2,286	2,244	2,378	5,283	10,450	16,579	16,521	16,282	15,379	14,476	13,668	15,190	16,902	15,786	14,620
Deferred Charges																
Temporary expansion - old terminal		135	580	600	400	200										
Administrative support, training and consultants					92	209	314	369	336	288	240	192	144	96	48	
Subtotal		135	580	600	492	409	314	369	336	288	240	192	144	96	48	
TOTAL ASSETS	2,488	2,571	3,004	3,183	5,995	11,094	17,143	17,220	16,968	16,047	15,126	14,320	15,824	17,518	16,389	15,215
LIABILITIES AND EQUITY																
Current Liabilities																
Current portion - long term debt									400	429	461	495	532	571	614	659
Accounts payable and accruals	20	20	20	30	30	40	40	60	70	80	90	90	90	100	100	110
Subtotal	20	20	20	30	30	40	40	60	470	509	551	585	622	671	714	769
Long-Term Debt																
Proposed IBRD loan				2,183	5,522	9,512	9,970	9,957	9,528	9,067	8,572	8,040	7,469	6,855	6,196	
Government's Equity																
Invested capital	2,495	2,495	2,495	3,205	4,151	6,228	8,604	8,924	9,166	9,166	9,166	9,166	9,166	9,166	9,166	9,166
Earned surplus - cumulative	741	1,950	3,283	1,127	2,222	3,254	4,148	4,358	4,680	5,267	6,139	7,328	8,837	10,672	12,607	14,889
Less: Cash received - cumulative	(768)	(1,894)	(2,794)	(1,179)	(2,591)	(3,950)	(5,161)	(6,092)	(7,305)	(8,423)	(9,797)	(11,331)	(10,841)	(10,460)	(12,953)	(15,805)
Subtotal	2,468	2,551	2,984	3,153	3,782	5,532	7,591	7,190	6,541	6,010	5,508	5,163	7,162	9,378	8,820	8,250
TOTAL LIABILITIES AND EQUITY	2,488	2,571	3,004	3,183	5,995	11,094	17,143	17,220	16,968	16,047	15,126	14,320	15,824	17,518	16,389	15,215

May 11, 1972

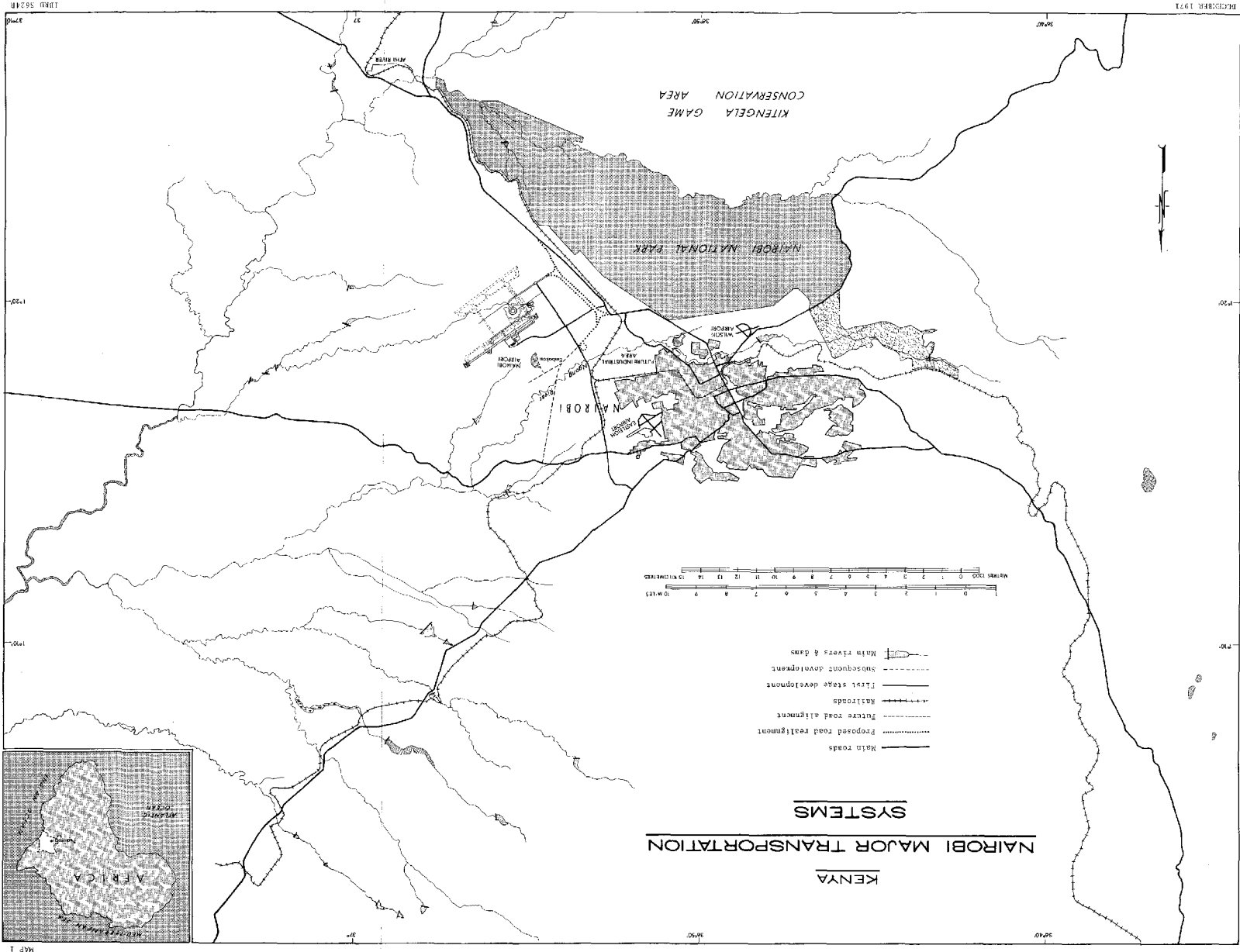
TABLE 6

KENYANAIROBI AIRPORT PROJECTFinancial Ratios After Completion of Project

<u>For year ending or as at June 30,</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
Annual rate of return on net fixed assets %	9.7 ^{1/}	6.4	8.4	10.6	13.3	16.3	19.9	18.1	18.6
Operating ratio %	68.0	68.0	64.0	61.0	58.0	55.0	53.0	55.0	53.0
Times interest earned	1.3	1.4	1.8	2.2	2.7	3.3	4.0	4.4	5.3
Debt service coverage	2.5	2.7	2.0	2.2	2.5	2.7	3.0	3.2	3.5
Debt/Equity ratio	58/42	60/40	61/39	62/38	62/38	53/47	44/56	44/56	43/57

^{1/} Higher than 1977 since the net fixed assets at beginning of year do not include the fixed assets financed under the project.

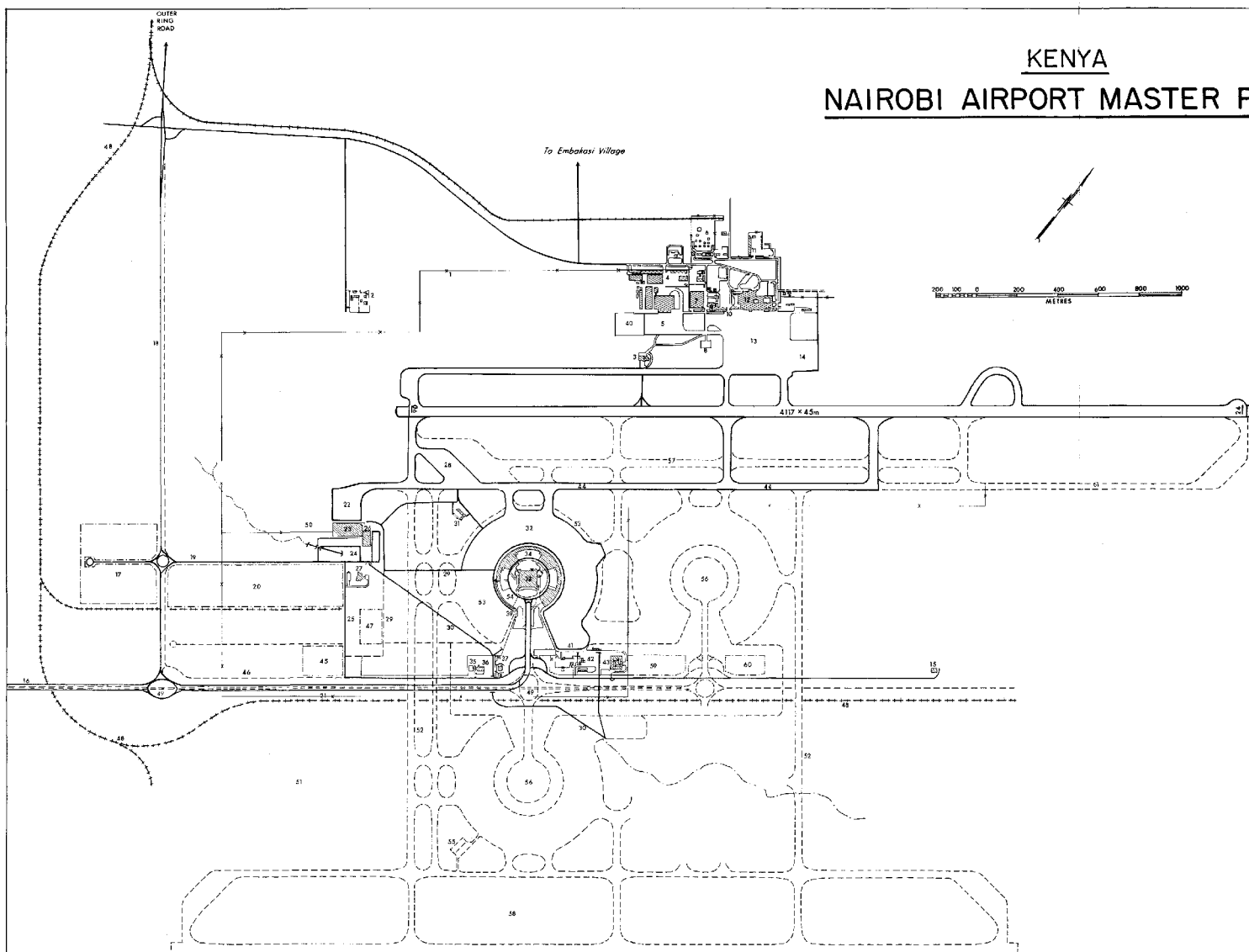
February 29, 1972



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KENYA

NAIROBI AIRPORT MASTER PLAN



EXISTING NAIROBI AIRPORT

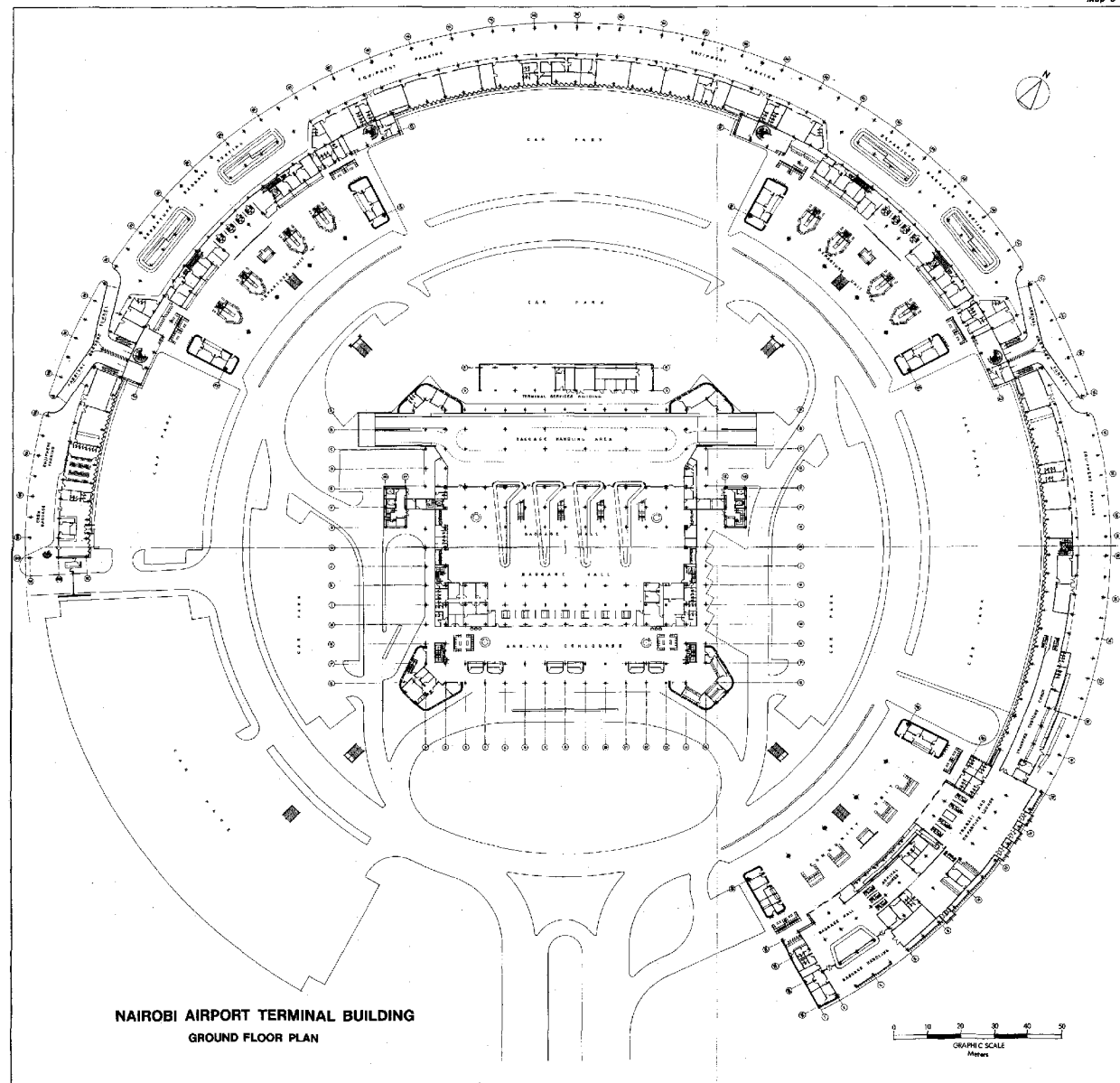
1. Airport Security Fence.
2. Fire Training School.
3. Main Crash Fire, and Rescue Station.
4. E.A.A. H.Q. and Maintenance Area.
5. E.A.A. Maintenance Apron.
6. Fuel Storage Area and Rail Siding.
7. Freight Terminal.
8. Satellite Fuel Storage Area.
9. Uplift Catering Facility.
10. Airline Engineering Stores.
11. Ministry of Works Airport Maintenance Area.
12. Passenger Terminal.
13. Main Apron.
14. New 747 Standing.

FIRST STAGE DEVELOPMENT

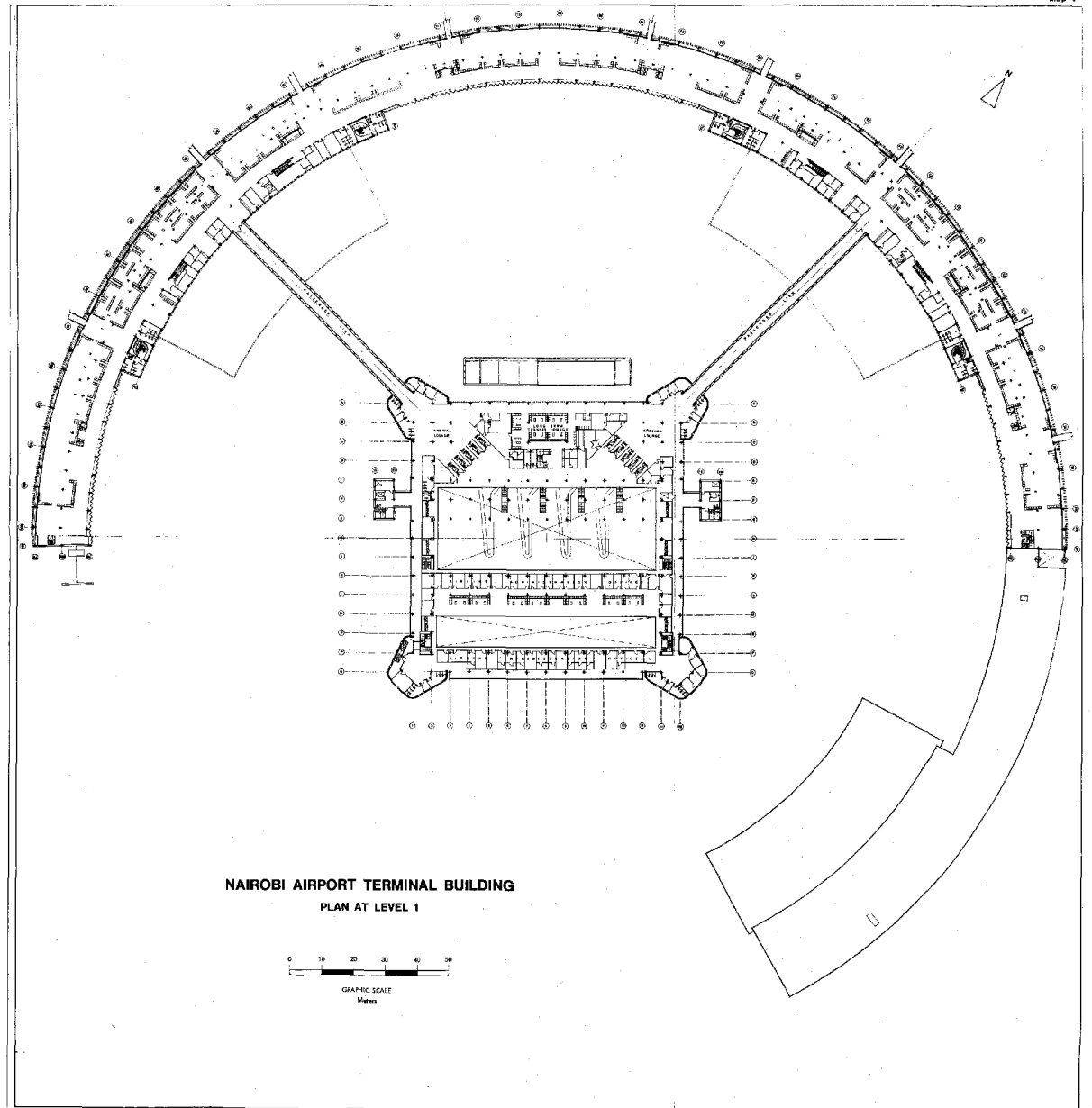
15. Remote Receiver Station.
16. Main Access Road.
17. Fuel Storage Area.
18. Freight Access road.
19. Freight Entrance Road.
20. Area for Specialised Freight Development.
21. Airport Perimeter Fence.
22. Freight Apron.
23. Freight Terminal.
24. Freight Terminal Car Park.
25. Freight Service Road.
26. Mail Unit.
27. Staff Canteen.
28. Holding Area.
29. Airside Road System.
30. Main Drainage Outfall.
31. Main Crash Fire, and Rescue Station.
32. Passenger Apron.
33. Passenger Terminal.
34. Passenger Terminal Car Parks.
35. Water Reservoir.
36. Services Building and Sewage Pumping Station.
37. Telephone Exchange.
38. Police Station.
39. Aircraft Sewage Disposal Point.
40. Extension to E.A.A. Apron.
41. State Aircraft Standing.
42. State Pavilion.
43. Control Block.
44. Taxiway.

SUBSEQUENT DEVELOPMENT

45. Location for Future M.O.W. Airport Maintenance Area.
46. Future Main Service Road.
47. Future Uplift Catering Facility.
48. Rapid Transit System.
49. Grade Separated Junctions.
50. Freight Terminal Extension.
51. Area for Freight Handling Development.
52. Cross taxiways.
53. Main apron Extensions.
54. Passenger Terminal Extensions.
55. Future Crash Fire, and Rescue Station.
56. Future Passenger Terminal Area.
57. Second Parallel Taxiway.
58. Second Runway and Taxiway System.
59. Airport administrative H.Q. Site.
60. Airport Hotel Site.
61. Parallel Taxiway Extension.



NAIROBI AIRPORT TERMINAL BUILDING
GROUND FLOOR PLAN



NAIROBI AIRPORT TERMINAL BUILDING
PLAN AT LEVEL 1

