社会開発協力部報告書

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

COLOMBO AIRPORT

DEVELOPMENT STUDY REPORT

MAY 1982

JAPAN INTERNATIONAL COOPERATION AGENCY

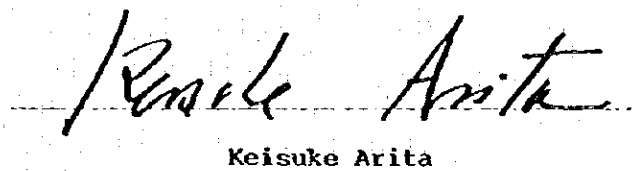
PREFACE

In response to the request of the Government of the Democratic Socialist Republic of Sri Lanka, the Government of Japan decided to conduct a feasibility study on the Colombo Airport Development Project, and entrusted the study to the Japan International Cooperation Agency (JICA). The JICA sent to Sri Lanka in December, 1981 a survey team headed by Mr. Masuzo Kikuta, Director of the Aerodrome Division, Tokyo Civil Aviation Bureau, Ministry of Transport, and another survey team in April, 1982 headed by Mr. Yuji Kitani, Special Assistant to the Director of Construction Division, Aerodrome Department, Ministry of Transport. These teams held discussions with officials concerned of the Government of Sri Lanka over the project and conducted field surveys. After the teams returned to Japan, further studies were made and the present report has been prepared.

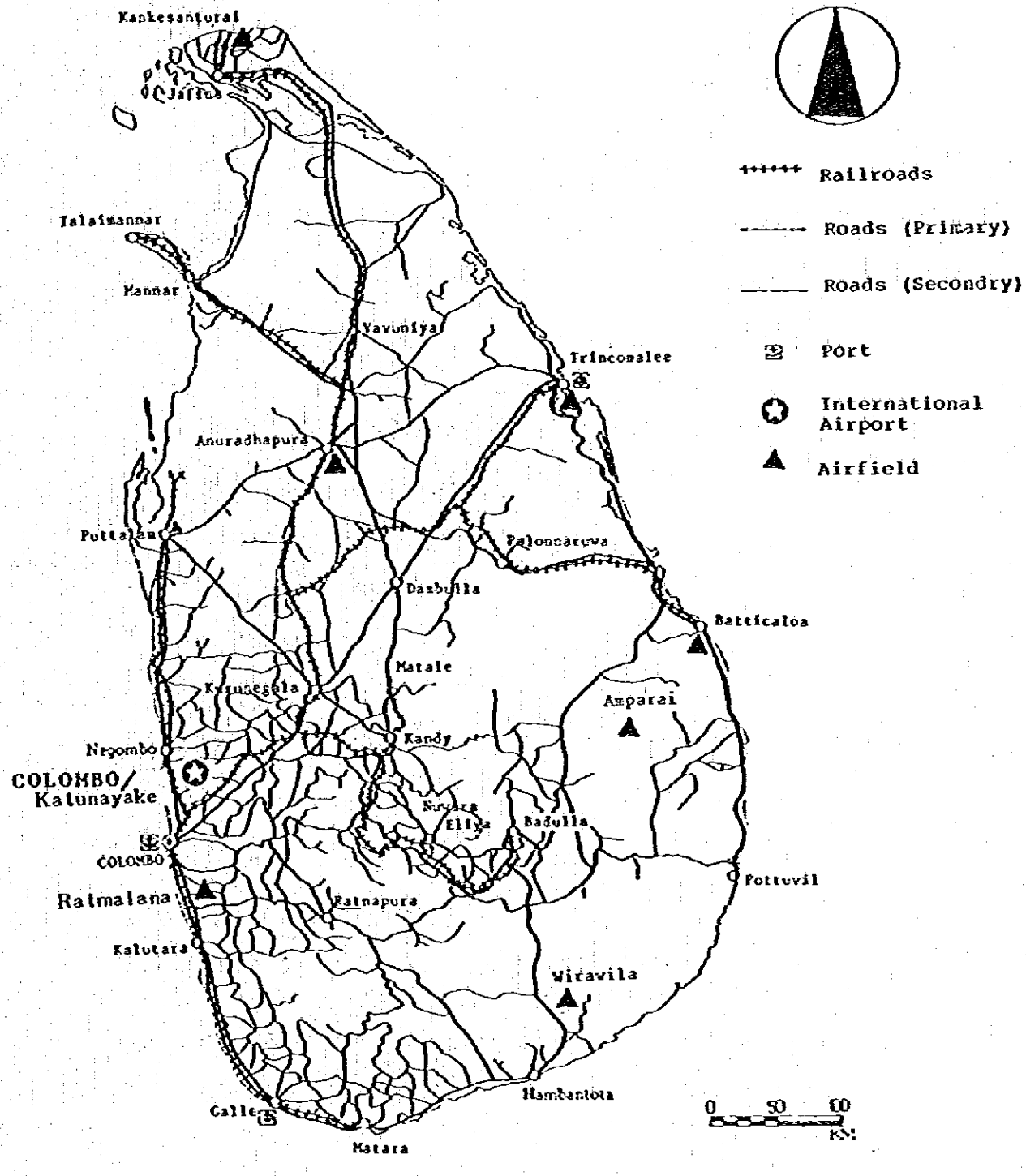
I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of Democratic Socialist Republic of Sri Lanka for their close cooperation extended to the team.

August, 1982



Keisuke Arita
President
Japan International Cooperation Agency



The Democratic Socialist Republic of Sri Lanka

COLOMBO AIRPORT DEVELOPMENT STUDY REPORT

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1. INTRODUCTION

Democratic Socialist Republic of Sri Lanka is an island country coextensive with the Ceylon Island situated close to and in the southeast of Indian Subcontinent. The existing Colombo Airport that serves the national capital is the only airport in the Republic that can accommodate large jets in international service. Air traffic at this airport has been on a sharp increase in recent years and the tendency is expected to continue through the foreseeable future.

The financial situation of the Republic is such, however, that the major facilities of the airport have been left undeveloped since 1965 when the airport, in order to become jetworthy, underwent an improvement work that included runway extension, apron expansion and construction of the new passenger terminal building. Consequently the facilities are generally worn out and outdated both physically and functionally.

The Government of Sri Lanka, recognizing the importance and urgency of the need to develop Colombo Airport to help develop the national economy, has requested the Japanese government to render assistance for the realization of such a development plan. The Japanese government, in compliance thereto, has undertaken to study the present situations involved, and to that end sent JICA (Japan International Cooperation Agency) study missions to the country in December 1981 and April 1982 respectively.

This report presents in a concise form results of the study of the Project in technical, economic and financial aspects based on the findings of the two study missions as well as on data and information provided by the Sri Lanka Government including the previous studies the existing development plan of the Government (Annex-1).

2. OUTLINE OF COLOMBO AIRPORT DEVELOPMENT PLAN

Presented hereunder in this chapter is the outline of the existing development plan of Colombo Airport, the only international gateway airport for Sri Lanka, which the Government of Sri Lanka is contemplating for implementation.

2.1 STAGES OF DEVELOPMENT

Phase I

Designed to meet the demand of the year 1990 with construction starting in November 1982 for completion within 1985

Phase II

Envisaged to meet the demand of the year 2000

2.2 AIR TRAFFIC FORECAST

(1) Air Passengers (International)

YEAR	ARRIVING AND DEPARTING PASSENGER MOVEMENTS	TRANSIT PASSENGER MOVEMENTS
1980(Record)	836,000	174,000
1985	1,770,000	287,000
1990	2,774,000	335,000
1995	3,825,000	465,000
2000	5,210,000	636,000

(2) Cargo (International)

YEAR	TONS
1980(Reocrd)	13,800
1985	30,000
1990	42,000
2000	70,000

(3) Aircraft Movements

YEAR	PASSENGER	CARGO	OTHER	TOTAL
1979(Record)	9,836		3,527	13,363
1986	18,000	300	5,500	23,800
1990	23,000	400	5,500	28,900
2000	33,000	900	5,500	39,400

(4) Aircraft Mix (International)

AIRCRAFT TYPE	1979	1986	1990	1995
HS748	22.2%	15%	15%	10%
B727,B737	19.6	15	15	15
707,DC8	39.6	30	20	15
D10,L11	12.2	25	20	20
B747,D10 Stretch	6.4	15	25	25
B747 Stretch	-	-	5	15

2.3 FACILITY DEVELOPMENT PLAN

(1) Facility Planning Paramenter

	PHASE I 1990	PHASE II 2000
Aircraft movements/day	94	139
Aircraft movements/peak hour	13	19
Aircraft movements arr. or dept. peak hour	9	13
Active parking stands required	12	17
Long term parking stands	6	10
Passenger movements per day	13,320	22,000
Passengers/peak hour	2,100	3,500
Passenger arr. or dept./ peak hour	1,650	2,750
Cargo volume in tons/year	42,000	70,000

(2) Summary of Phase I Facility Development

- Airfield
  - Design critical aircraft - 1.5 million pounds in weight.

  Runway
  - New single runway.
  - Length 3,350m with 90 m. and 60 m. stopways.
  - Width 45m.
  - Asphalt concrete surface.
  - Shoulder 7.5m width.

  Taxiway
  - Convert existing runway to parallel taxiway to Runway 22 & Runway 04.
  - Overlay 1,500m long from end at Runway 22.
  - Width 30m.
  - Asphalt concrete surface.
  - Shoulder width 7.5m.
  - 5-New 90° exit taxiways.

  Aprons
  - New pier concept

  Aircraft Stands
  - 17 for passenger terminal

  Areas
  - 185,250 sq.m.
  - Aircraft pavement

    Existing : 52,000 sq.m.
    New : 117,000 sq.m.
    Total : 169,000 sq.m.

  - Cement concrete pavement.
  - Shoulder width 10 m.

  Aircraft Maneuvering
  - Power-in/Push-out

  Passenger moving
  - Walk to/from aircraft or bus transport

- Passenger Terminal Complex

  Arrivals Building
  - Modification of existing Terminal (reinforced concrete structure).
  - 1,650 peak hr. passengers.
  - 12,000 sq.m. total floor area
  - 2 levels (1 level, 7,200 sq.m. only for passengers)

Departures Building	-	New reinforced concrete structure.
	-	1,650 peak hr. passengers.
	-	25,300 sq.m.
	-	3 levels
	-	1 level only for passenger procedure (12,000 sq.m.)
	-	upper levels for airline offices, transit lounge, restaurant, duty free shop, etc.
Existing Tower Cab	-	Convert to Apron control room.
Airside Corridor	-	Covered walkway
	-	No loading bridges
Terminal Special Equipment	-	Conveyor belt systems for outbound and inbound baggages.
	-	Public address system.
	-	Flight information system.
	-	Security check devices.
- Air Cargo Building	-	New building
	-	Reinforced concrete structure.
	-	6,000 sq.m. for cargo handling area.
	-	3,700 sq.m. for office spaces.
	-	Manual operation.
- Crash, Fire and Rescue Building	-	New reinforeced concrete structure.
	-	ICAO Category No.9
	-	1,320 sq.m. for tenders parking spaces.
	-	2,140 sq.m. for others
	-	17 sq.m. X 23 m. height drill tower

- AASL Airport Maintenance Complex	- New reinforced concrete structure. - 2 levels, 5,000 sq.m. total areas.
- Control Tower	- New reinforced concrete structure. - VFR room: floor elevation, 30.1 m. floor area, 50 sq.m.
- AASL Administration Headquarters	- New reinforced concrete structure. - 3,730 sq.m.
- Ancillary Buildings	- A.F.L. substations (New). - Utility buildings (New).
- Aeronautical Navigational Aids	
Visual Aids	- Renew, ICAO Annex 14. - Calvert approach lighting system on both ends of runway. - 3-bars VASIS on both ends of runway. - Category I runway lighting system. - Taxiway and apron edge lights. - Apron flood lighting. - Miscellaneous lighting. - Markings.
Air Traffic Services	- Aerodrom and approach control in new tower.
Radio-Nav-aids	- VOR/DME (Exist) - ILS Category I (Renew)
Telecommunications	- Equipment (Renew)
Meteorological Facility	- New weather office and equipment in passenger terminal building. - New Meteorological observation post and equipment.

- Area Control Center (ACC)
  - Relocation of Ratmalana ACC to Colombo airport
  - Building (New)
  - Equipment (Renew/Relocation)
  - Addition New SSR to existing ASR

- Utilities

  Power Supply
  - Addition
    6,790 KVA Connected load
    4,043 KVA Consumed load

  Emergency Power
  - Addition 1,717 KVA
  - New ring main.

  Water Supply
  - Addition
    Day demands, 550 cu.m.
    Storage tank, 800 cu.m.
  - New ring main

  Sewage Treatment
  - New System

  Solid Waste Disposal Facilitiy
  - New

- Other Related Facilities
  - Airfield service roads
  - Landside service roads
  - Public parking
  - Fencing, etc.

- Land Acquisition, etc.
  - Land for approach lighting
  - Railway and station relocation
  - Relocation of military facilities

- Fuel Storage & Distribution
  - Relocation to new site by the Ceylon Petroleum Corporation.
  - New cargo building at existing fuel farm

- Staff Housing	-	Convert contractors' field office to staff housing / barrack accommodation.

2.4 IMPLEMENTATION SCHEDULE (PHASE I)

(1) Civil Works and Support Functions

- Completion of Detailed Design - May 1982
- Contractor Selection/Work Start - November 1982
- Completion of Works (26 months) - December 1984

(2) Building Works and Other Facilities

- Completion of Detailed Design - July 1982
- Contractor Selection/Work Start - December 1982
- Completion of Works (32 months) - July 1985

2.5 ESTIMATED CONSTRUCTION COSTS (PHASE I)

(1) Basis of Costing

- Status of Design - Master Plan
- Price level - January 1981
- Contingencies - 15 %

(2) Estimated Construction Cost (Rupees Million)

	Total	Foreign	Local
1) Civil Works and Support Functions	843.00	667.40	175.60
2) Buildings and Other Facilities	1,225.2	944.7	280.5
subtotal	2,068.2	1,612.1	456.1
Contingencies at 15%			
to 1)	126.45	100.11	26.34
to 2)	183.8	141.7	42.1
subtotal	310.25	241.81	68.44
Grand Total	2,378.45	1,853.91	524.54

TABLE 2.1(A)

COLOMBO AIRPORT DEVELOPMENT PROGRAMME (PHASE I)

SUMMARY OF ROUGH COST ESTIMATES - (Rs.MILLION)

JANUARY,1981 PRICES

PACKAGE 1 - CIVIL WORKS AND SUPPORT FUNCTIONS

	Total	Foreign	Local
1. Runway,Apron,Taxiways and ancillary works			
Earthworks	120.00	96.00	24.00
Airfield lighting	40.00	33.00	7.00
Drainage	45.00	36.00	9.00
Taxiways	100.00	80.00	20.00
Runway	180.00	148.00	32.00
Apron	150.00	120.00	30.00
2. Other Civil Works			
Apron Service Road	11.0	8.8	2.2
Roadside Access	8.5	6.8	1.7
Permanent Road	7.5	6.0	1.5
Landside Access	10.0	8.0	2.0
Road Drainage	10.0	8.0	2.0
Earthworks	11.0	8.8	2.2
Fencing	5.0	4.0	1.0
3. Items related to civil works			
Land acquisition	10.00	-	10.00
Relocation of military facilities	100.00	72.00	28.00
Navigation aids	30.00	28.00	2.00
4. Support Facilities			
Meteo.Equipment	5.0	4.0	1.0
TOTAL	843.00	667.40	175.60
CONTINGENCIES AT 15%	126.45	100.11	26.34
GRAND TOTAL	969.45	767.51	201.94

(Source: AASL)

TABLE 2.1(B)

COLOMBO AIRPORT DEVELOPMENT PROGRAMME (PHASE I)

SUMMARY OF ROUGH COST ESTIMATES - (Rs. MILLION)

JANUARY 1981 PRICES

PACKAGE II - BUILDING WORKS AND OTHER FACILITIES

	Total	Foreign	Local
1. Terminal Building	650.0	497.0	153.0
2. Airport Maintenance facilities	71.9	54.9	17.0
3. Cargo Building	105.8	82.0	23.8
4. AASL HQ Building 2 Nos.	55.7	41.9	13.8
5. Meteo. obs.Building	0.4	-	0.4
6. Solid waste Disposal facility	5.0	4.0	1.0
7. Relocation of Railway Station	4.0	3.0	1.0
8. Staff housing/barrack accn.	20.0	13.0	7.0
9. Expansion of fuel farm	40.0	32.0	8.0
10. Furniture/furnishings & fixtures	25.0	18.0	7.0
11. Demolition of existing facilities	2.0	-	2.0
12. Fire Alarm System	2.3	2.0	0.3
13. Telephone system	5.4	4.9	0.5
14. Street Lighting	2.7	2.2	0.5
15. Central Fault System	1.5	1.3	0.2
16. Clock System	1.5	1.3	0.2
17. Compressed Air	0.4	0.4	-
18. Replacement of Air Handling Units	3.7	3.0	0.7
19. Water Supply	26.0	21.0	5.0
20. Water Treatment	2.4	2.0	0.4
21. Sewage Treatment	6.9	5.6	1.3
22. Power Supply	37.4	31.4	6.0
23. Emergency Power	5.9	5.6	0.3
24. ATC/AGC/Comm. facilities	116.0	91.8	24.2
25. Fire Rescue Building	33.3	26.3	7.0
Total	1225.2	944.7	280.5
Contingencies at 15%	187.7	141.7	42.0
Grand Total	1412.9	1086.4	322.5

(Source: AASL)

2.6 Economic and Financial Feasibility

Results of the economic and financial evaluation of the Project made by the NACO B.V., consultants to the Government of Sri Lanka on the Development Project, as briefly summarized hereunder, show that the Project is economically feasible, and that financial viability of the Project is confirmed in that it will at least generate necessary funds for loan repayment.

(1) Economic Evaluation

Analysis of the economic costs and benefits measured at October 1981 value and shadow priced to exclude taxes and transfers shows a net present value (NPV) of Rs 223 million at 12% discount rate and an internal rate of return (IRR) of 13.5 percent. Sensitivity analysis to changes in the cost and the benefits shows that to reduce the IRR to below 12 percent, either the investment costs must increase by 13.6 percent which is greater than the estimated physical contingency, or the benefits should be reduced by 24% and 17% respectively for the tourism and aviation fuel revenues. If the traffic forecasts for the With Project Case are reduced by 15 percent which is very unlikely, while the forecasts for the Without Project Case are maintained constant, the NPV at 12 percent discount rate turns nagative, and the IRR drops to 8.2 percent.

(2) Financial Analysis

The financial analysis is made on an assumption that the bulk of foreign currency requirements during the 3 year construction period between 1982 and 1985 will be met by a 2.5-percent interest loan repayable over 20 years with payments commencing in 1992, and that

other smaller foreign currency requirements during the same period of 1982 to 1985 would be met out of 5-year loans with no grace period and at 7.5 percent annual interest. The net operating surplus throughout the period between 1982 and 1993, after deducting depreciation and interest charges, is very small and cumulatively negative, and if the AASL is to be self-financing the airport charges need to increase.

The operating surplus, however, is sufficient to provide funds for recurring investments beyond 1986, and to generate an accumulated surplus of Rs 1038 million, approximately equivalent to the government contributions required between 1982 and 1985, the time of the major investment programme.

3. REVIEW OF EXISTING DEVELOPMENT PLAN

In this chapter the existing Development Plan of the Colombo Airport as contemplated by the Sri Lanka Government is reviewed to ascertain its adequacy and practicable timing of implementation, to re-examine the project cost with price escalation considerations, as well as to point out the problems that must be solved before the project is implemented, including some organizational considerations for the execution and management of the Project.

3.1 FACILITY DEVELOPMENT PLAN

(1) Air Transport Demand

Sri Lanka is an island country situated close to the southern tip of Indian Subcontinent and has an area of 66,000 km^2. Its population has increased on an average of 1.7% p.a. for the last ten years, registering 14,900,000 in 1981. Gross Domestic Projects have increased steadily at an average rate of 6.6% for the last 3 years, and reached Rs 63,000 million in 1980.

National transport system comprizes land, sea and air transportation, and the latter two serve as access to and from foreign countries. For the island country of Sri Lanka air transport plays an especially important role and accounts for approximately 80% of international passenger transport of the country.

The air passenger traffic at Colombo Airport, the only jet worthy airport of the Republic, has increased 5.8 times in 8 years between 1972 and 1980, registering 836,000 passengers in 1980. It is expected to reach 1,060,000 in 1981. Domestic air transport service plays a certain role but in a very limited manner.

International air cargo, on the other hand, increased 2.2 times in 5 years between 1975 and 1980, recording 14,000 tons in 1980, and is expected to reach 18,000 tons in 1981

The recent trend of growth in air transport demand is expected to continue for the foreseeable future. According to IATA Colombo Airport will retain its position as a transit point, and with one-stop Europe-Australia services the Airport could become even more important than at present. The air traffic at Colombo Airport has increased remarkably in recent years. In addition to the air passenger increase, the traffic growth at this airport is characterized by increasing movements of large jet aircraft such as B-747 and DC-10, and this trend is duly taken into consideration in the present development plan of the Sri Lanka Government. It is recommended however, that introduction of B-747-STR be considered as a future expansion possibility for the sake of effeciency of investment.

(2) Existing Runway

Colombo Airport is located on the sea coast 26 km northeast of Colombo City. The existing runway since its construction in 1968 has not been adequately maintained or repaired, and its surface pavement shows many dangerous cracks caused by uneven base-course settlement, etc. As a consequence, the existing runway poses a serious safety problem.

(3) Construction of New Runway

For executing the necessary and adequate reinforcement work, the existing runway will have to be closed to traffic several hours a day for a considerably long period. In view of the fact that no alternate

aerodrome for Colombo Airport is available within the country, and further that the flight activities at the airport are as busy as shown in Annex 04 (Station Diagram), construction of a new runway in this case is indispensable for the aviation safety of the airport.

(4) Apron, Terminal Building and Related Facilities

The existing 7 aircraft parking positions and the total floor area of 10,000 sq. m for the terminal building are both considered insufficient to meet the future air transport demand with increasing aircraft and passenger traffic. It is, therefore, considered necessary to expand and improve the passenger terminal building and related facilities not only to meet the future demand but also from the viewpoint of improving the standard of service to passengers so as to induce airport revenue increase.

(5) Air Navigation Facilities

(i) Airfield Lighting

It is recommended that Runway 22 be equipped with Simple Approach Lighting System and PAPI (Precision Approach Path Indicator) be considered instead of VASIS.

(ii) Radio Navigational Aids & Tower Equipment

Although the need for the development of these facilities as planned under Phase I of the Project is recognized in principle, the JICA Study Team, due to lack of sufficient planning

detail, has not been able to determine their technical adequacy. Since construction of these facilities are closely inter-related with airport civil works, early and well coordinated planning of these facilities are strongly recommended.

(iii) Ratmalana Area Control Center

Not sufficient detail as to the facility plan or the convincing necessity or urgency of the contemplated relocation of the Ratmalana ACC have been perceived by the Study Team. It is recommended that the ACC relocation be considered under a separate project so as to economize on the Phase I construction cost and thereby substantially improve the financial position of the Project.

(6) Conclusion

(i) The existing main facilities of the Colombo Airport, i.e. the runway, apron and passenger terminal, are inadequate and pose problems of aviation safety and passenger handling. The development of the airport as planned under the Phase I of the Project, therefore, is justified and urgently required.

(ii) The economic internal rate of return of 13.5% which has resulting from the cost-benefit analysis made by the Sri Lanka Government with the cash flow of the economic costs and the direct tangible benefits identified in the light of the national economy of Sri Lanka is considered high enough to justify the Project economically since the Republic's governmental policy establishes that for evaluation of government-funded projects, the opportunity cost of capital for discounting purpose is 12%.

(iii) The development plan under the Phase I of the Project is generally considered to be adequate to meet the air transport demand of up to 1990 except for the few points of reservation and slight deviation as recommended above. As for the Phase II development, however, it is recommended that a new air transport demand forecast be made at an appropriate timing to ensure due updating of the future development plan reflecting any upward or downward deviation from the present forecast.

3.2 HISTORY AND PRESENT STATUS OF AIRPORT AND OF PROJECT

(1) Airport History

The existing Colombo Airport has been in exclusively military use since the Republic's independence in 1948. The chronological listing of the major events of Colombo Airport evoluation are presented below.

1965 - Runway was extended from 1840 m to 3368 m to accommodate jet aircraft and international service function was transferred to Colombo from Ratmalana.

1968 - Existing apron and terminal building were constructed.

1971 - Apron was expanded.

1976 - Terminal building expanded and VIP building newly constructed.

1980 - February, Airports Authority of Sri Lanka (AASL) was established.

1981 - December, Apron expansion work started (completion scheduled for July 1982).

- Construction of the training center of Air Lanka, the national flag carrier, and aircraft maintenance hanger started.

- Current maintenance works include:

  ° Provisional grouting of holes discovered under the Runway concrete pavement structure and repairing of surface cracks.

  ° Replacement of worn-out underground cable for the runway lights.

° Repairing of airport peripheral fencing which is being executed as part of the Project.

(2) Project History

1979 - November, Master Plan for Katunayake International (Colombo) Airport was submitted by Canadian International Development Agency.

1980 - September, Consulting contract was concluded between AASL and Netherlands Airport Consultants (NACO) B.V.

- December, Master Plan Report, Katunayake International Airport, was submitted by NACO B.V.

1981 - January, Revised Master Plan Report, Katunayake International Airport, was submitted by NACO B.V. and approved by AASL.

- December, Civil Works Cost Estimate and Tender Drawings, Price Level October 1981, was submitted by NACO B.V.

1982 - August, tender documents for the buildings and airport utility facilities, are scheduled for submission by NACO B.V.

- Acquisition of land for the approach lights of the new runway is in progress, and preparation of construction site for the new airport utility facilities is being authority is said to have been obtained for the relocation of the existing railroad and railway station.

3.3 PROVISIONAL CALCULATION OF PROJECT COST

Provisional calculation of the Phase I Project Cost is made on the basis of the assumptions as follows:

(1) Facilities to be Developed

Phase I facilities as outlined in Chapter 2 hereinabove are to be developed.

(2) Implementation Schedule

Construction schedule as being contemplated by the Sri Lanka Government is observed, except that the starting date is postponed for one year until November 1983 and the total schedule is parallelly pushed forward. (Fig. 3.1)

(3) Construction Cost

Construction costs are those indicated by the Sri Lanka Government in varying degree of accuracy as follows:

(i) For the civil works and related facilities:

October 1981 estimates based on the detailed design.

(ii) For the airfield lighting:

October 1981 estimates based on the detailed design.

(iii) For the passenger terminal, airport maintenance building and control tower;

October 1981 estimates based on the draft

detailed design provided that 5% of the respective construction cost is added to cover the cost of the items under the "Particular Conditions" of NACO estimate.

(iv) For the buildings other than those under (iii) above:

January 1981 estimates based on the Master Plan.

(v) For other facilities:

January 1981 estimates based on the Master Plan.

(4) Ratio of Foreign/Local Portions

Ratio of the foreign/local currency requirements of the construction cost follows that of the Sri Lanka Government (Table 3.1), provided that:

(i) For Work Item 0201 Terminal Building:

The foreign/local currency ratio is changed from 70/30 to 80/20 considering the necessity to import sophisticated machinery and specialized terminal equipment.

(ii) For Work Item 0601 Electrical Power Supply:

The ratio is changed from 80/20 to 85/15, considering the fact that the entire equipment and materials such as cable, etc. has to be imported.

(iii) For Work Item 08 Land Acquisition, etc.

100% of the local portion is estimated.

(5) Physical Contingency

The rate of the physical contingency follows that of the Sri Lanka Government estimates. (Table 3.1)

(6) Price Contingency

Although the Sri Lanka Government's estimates in the master plan invariably provides for the price contingency at 40-75% of the estimated construction cost both for the foreign and local portions, the price contingency is calculated herein based on the different escalation rates for the foreign and local portions as follows:

PRICE ESCALATION RATES

Year	Annual Percentage Increase	
	Foreign Component	Local Component
1981	10	30
1982	10	30
1983	10	30
1984	10	25
1985	10	25
1986	10	20

(7) Project Cost

(i) Project cost is calculated on the basis of the annual construction cost of the respective work groups in accordance with the proposed construction schedule commencing in November 1983, divided in foreign/local portions as explained in paragraph

(4) above, to which is added the physical contingency, and on the basis of the resultant sum the price contingency is calculated according to the escalation rates presented in paragraph (6) above. Results of calculation of the Project Cost are presented in Tables 3.2 and 3.3.

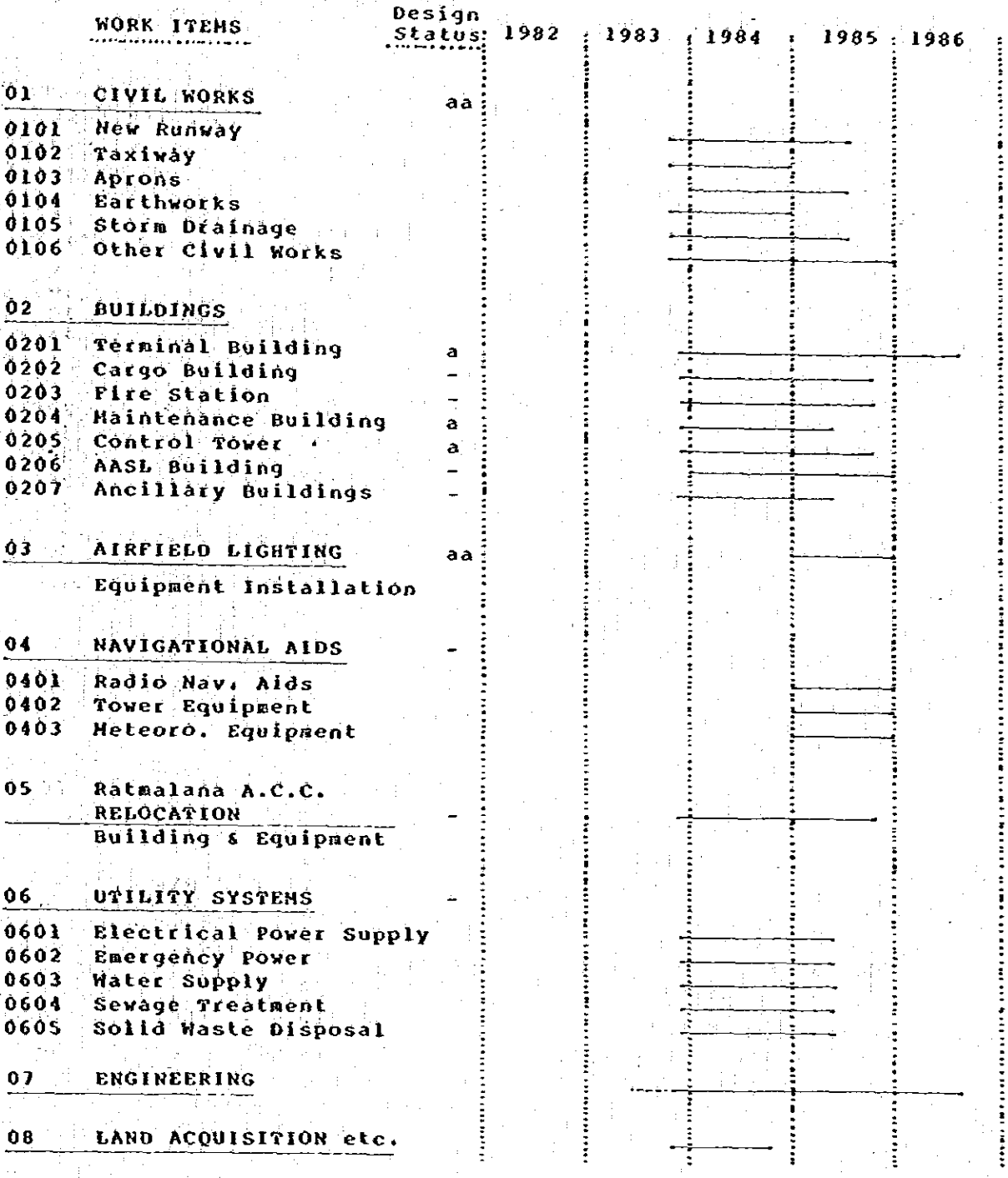
(ii) Convertion rate applied in the calculation is US$1.00 = 20 Rupees.

(iii) The Project Cost does not include engineering costs of detailed design, tender assistance or construction supervision, etc.

(iv) This Project is assumed to be exempt from taxes and other duties.

COLOMBO AIRPORT
MASTER PLAN PHASE I
PROGRAMME FOR CONSTRUCTION; REVISED IMPLEMENTATION SCHEDULE

FIGURE 3.1



Notes for
Design Status; Marked as aa: Final Design (Oct. 1981)
a : Pre Final Design (Oct. 1981)
- : Master Plan (Jan. 1981)

COLOMBO AIRPORT
MASTER PLAN, PHASE I
PROJECT COST ESTIMATES
PHYSICAL CONTINGENCY & CURRENCY COMPONENT

TABLE 3.1

	WORK ITEMS	Design Status	Physical Contingency in Percentage	Currency Component in Percentage	
				Foreign	Local
01	CIVIL WORKS	aa			
0101	New Runway		10	80	20
0102	Taxiway		10	80	20
0103	Aprons		10	80	20
0104	Earthworks		10	80	20
0105	Storm Drainage		10	80	20
0106	Other Civil Works		10	80	20
02	BUILDINGS				
0201	Terminal Building	a	10	80*	20*
0202	Cargo Building	-	15	70	30
0203	Fire Station	-	15	70	30
0204	Maintenance Building	a	10	70	30
0205	Control Tower	a	10	70	30
0206	AASL Building	-	15	70	30
0207	Ancillary Buildings	-	15	70	30
03	AIRFIELD LIGHTING (Equipment Installation)	aa	10	90	10
04	NAVIGATIONAL AIDS	-			
0401	Radio Nav. Aids		25	90	10
0402	Tower Equipment		25	90	10
0403	Meteoro. Equipment		25	90	10
05	Ratmalana A.C.C. RELOCATION (Building & Equipment)	-	25	80	20
06	UTILITY SYSTEMS	-			
0601	Electrical Power Supply		15	85*	15*
0602	Emergency Power		15	90	10
0603	Water Supply		15	80	20
0604	Sewage Treatment		15	80	20
0605	Solid Waste Disposal		25	80	20
07	ENGINEERING*		10	80	20
08	LAND ACQUISITION etc.	-	25	0*	100*

* JICA's Estimates

Note for
Design Status; Marked as aa: Final Design (Oct. 1981)
a : Pre Final Design (Oct. 1981)
- : Master Plan (Jan. 1981)

COLOMBO AIRPORT
MASTER PLAN, PHASE I
PROGRAMME FOR CONSTRUCTION: REVISED IMPLEMENTATION SCHEDULE
PROJECT COST ESTIMATES : (Rupees Million)

TABLE 3.2

	WORK ITEMS	Status of Design	Estimated Cost Total	Foreign	Local
01	CIVIL WORKS	aa	841.9	673.5	168.4
0101	New Runway		227.3	181.8	45.5
0102	Taxiway		136.4	109.1	27.3
0103	Aprons		200.0	160.0	40.0
0104	Earthworks		150.0	120.0	30.0
0105	Storm Drainage		54.6	43.7	10.9
0106	Other Civil Works		73.6	58.9	14.7
02	BUILDINGS		1,116.4	856.5	259.9
0201	Terminal Building	a	793.4	634.7	158.7
0202	Cargo Building	-	105.8	72.0	33.8
0203	Fire Station	-	33.3	22.6	10.7
0204	Maintenance Building	a	89.8	62.9	26.9
0205	Control Tower	a	12.9	9.0	3.9
0206	AASL Building	-	55.7	37.9	17.8
0207	Ancillary Buildings	-	25.5	17.4	8.1
03	AIRFIELD LIGHTING (Equipment Installation)	aa	53.6	48.2	5.4
04	NAVIGATIONAL AIDS	-	33.0	29.0	4.0
0401	Radio Nav. Aids		20.0	18.0	2.0
0402	Tower Equipment		8.0	7.0	1.0
0403	Meteoro. Equipment		5.0	4.0	1.0
05	Ratmalana A.C.C. RELOCATION (Building & Equipment)	-	90.0	72.0	18.0
06	UTILITY SYSTEMS	-	83.8	69.7	14.1
0601	Electrical Power Supply		37.4	31.8	5.6
0602	Emergency Power		5.9	5.3	0.6
0603	Water Supply		26.0	21.0	5.0
0604	Sewage Treatment		6.9	5.6	1.3
0605	Solid Waste Disposal		7.6	6.0	1.6
	WORKS SUB TOTAL		2,218.7	1,748.9	469.8
07	ENGINEERING		-	-	-
08	LAND ACQUISITION etc.		114.0	0	114.0
09	CONTINGENCIES				
	Physical		285.0	201.4	83.6
	Price		1,578.7	712.6	866.1
	TOTAL PROJECT COST		4,196.4	2,662.9	1,533.5

Notes for Design Status;
Marked as aa: Final Design (Oct. 1981 Prices)
a : Pre Final Design (Oct. 1981 Prices)
- : Master Plan (Jan. 1981 Prices)

No Engineering Cost is included.

TABLE 3.3

COLOMBO AIRPORT
MASTER PLAN, PHASE I
PROGRAMME FOR CONSTRUCTION: REVISED IMPLEMENTATION SCHEDULE
PROJECT COST ESTIMATES: ANNUAL COST (Rupees Million)

Year	Total	Currency Component	
		Foreign	Local
1983	232.5	131.2	101.3
1984	2,195.3	1,331.7	863.6
1985	1,425.4	967.1	458.3
1986	343.2	232.9	110.3

3.4 RECOMMENDATIONS

Some of the major problems anticipated that must be solved before implementing the Project are presented hereunder.

(1) Executing Agency and Project Management Organization

(i) Executing Agency

For the successful implementation of the project of this magnitude it is imperative to establish within the national government of Sri Lanka an executing agency that will represent the government in all its external relations and intra-governmental affairs pertinent to the Project. As this matter has not been made clear to date, an early decision on the part of the Sri Lanka Government is strongly recommended.

(ii) Project Management Organization

By the same token it is just as important to establish an effective organization capable of managing the Project, such as cost-budget control, construction schedule control, quality control of the works, coordination between AASL and other related agencies (government, airport users, contractors, and consultants).

(2) Fund Procurement and Adjustment of Implementation Plan

It is recommended that the necessary funds both in foreign and local currencies be secured in the first place and that the contents of the implementation program be adjusted as necessary according to the actual amount of funds secured.

(3) Detailed Design and Construction Cost Estimates

(i) Detailed Design Report

It is understood that AASL has not received the detailed design report of the Project from the consultants as of this date. Since this document isindispensable for the satisfactory execution of the Project on the part of the executing agency in the review and approval of design, modification of design, confirmation of design quantity, supervision of construction, examination of completed works, etc., it is strongly recommended that AASL ensure possession of this document which will also be required for airport operational purposes after completion of the works.

(ii) Specifications

Specification is one of the most important element of technical evaluation of the Project, and though the JICA Team has so far had the opportunity of reading the technical specification of the civil works and related facilities only, based on this rather limited knowledge it is recommended that conformity of the technical specifications to the procurement guidelines of the lending institutions be examined.

(iii) Finalization of Construction Cost

Detailed breakdown of the construction cost has been submitted only on the civil works and related facilities, passenger terminal building, airport maintenance building and control tower. For all the rest of the facilities only the master plan estimates with the physical contingency of 15 - 25% have so far been provided. Before preparing the implementation program of the Project it will be necessary to finalize the construction cost on the basis of the final design documents.

COLOMBO AIRPORT

REFERENCE MATERIALS

- Master plan for KATUNAYAKE INTERNATIONAL AIRPORT, by Canadian International Development Agency, November 1979.
    1) Final Report
    2) Runway Evaluation Report
    3) Technical Memoranda

- Master Plan Report, KATUNAYAKE INTERNATIONAL AIRPORT, NACO, December 1980.
- Revised Master Plan Report, KATUNAYAKE INTERNATIONAL AIRPORT, NACO, January 1981.
- Revised Outline Plans, Civil Works, Colombo Airport (Katunayake), NACO, January 1981.
- Master Plan and Outline Plans, Executive Summary, NACO, February 1981.
- Report, Site Investigation for proposed extensions to Colombo Airport, Sri Lanka, NACO/Soil Mechanics, July 1981.
- Final Outline Plans of Buildings, Colombo Airport, NACO, August 1981.
- Final Report, Economic and Financial Evaluation, Colombo Airport, NACO, March 1982.
- Colombo Airport Development Programme (Phase I), Referenced Materials for Estimated Cost;
    1) Summary of Rough Cost Estimates, January 1981 Prices.
    2) Civil Works Cost Estimate and Tender Drawings, Price Level October 1981, Draft dated December 1981.
    3) Implementation Schedule, Civil Works and Other Civil Works, 6.4.82 NACO B.V.
    4) Implementation Schedule - Cost Phasing, Building and Utility Services (Phase I), 09.04.82 (Price Level October 1981).
    5) Cost Estimates and Drawings, Selected, (Draft April 1982, NACO B.V.) for;

Terminal building
AASL MTCE building complex
Control tower

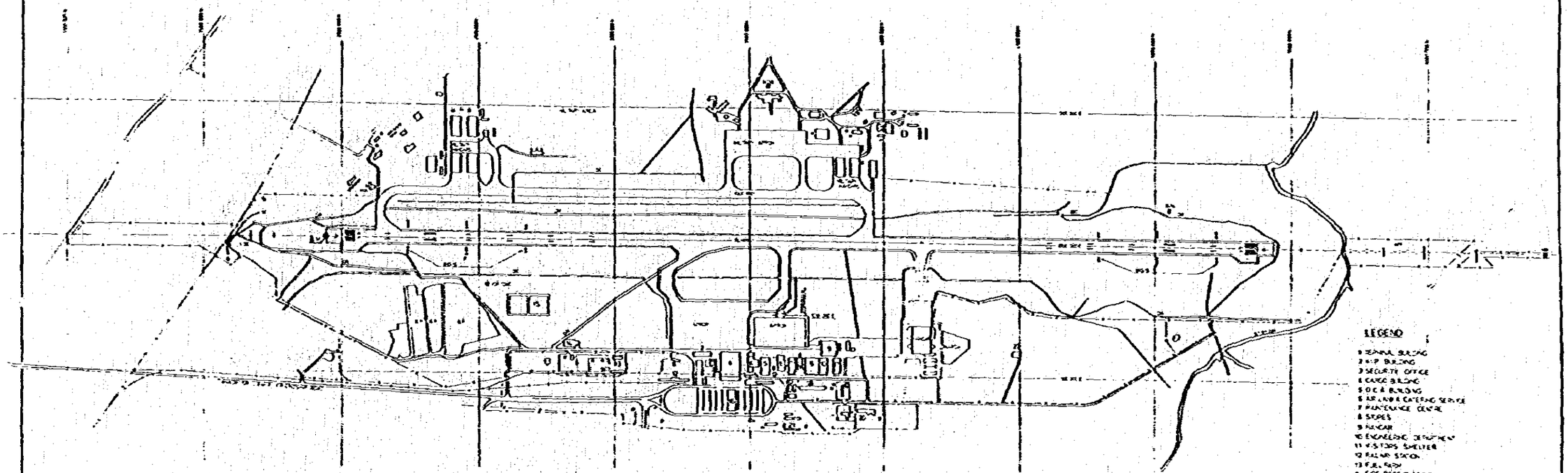
6) Colombo Airport Development Programme, Reply to J.I.C.A. Questionnaire, AASL February 1982.

- Statistical bulletin on housing and construction, notes on cost indices of building materials and construction, housing loans granted by lending institutions and production of selected building materials, issued by the Programming Division, Ministry of Local Government, Housing and Construction, Volume 9 No.1, August 1981.

ANNEX 02

COLOMBO AIRPORT

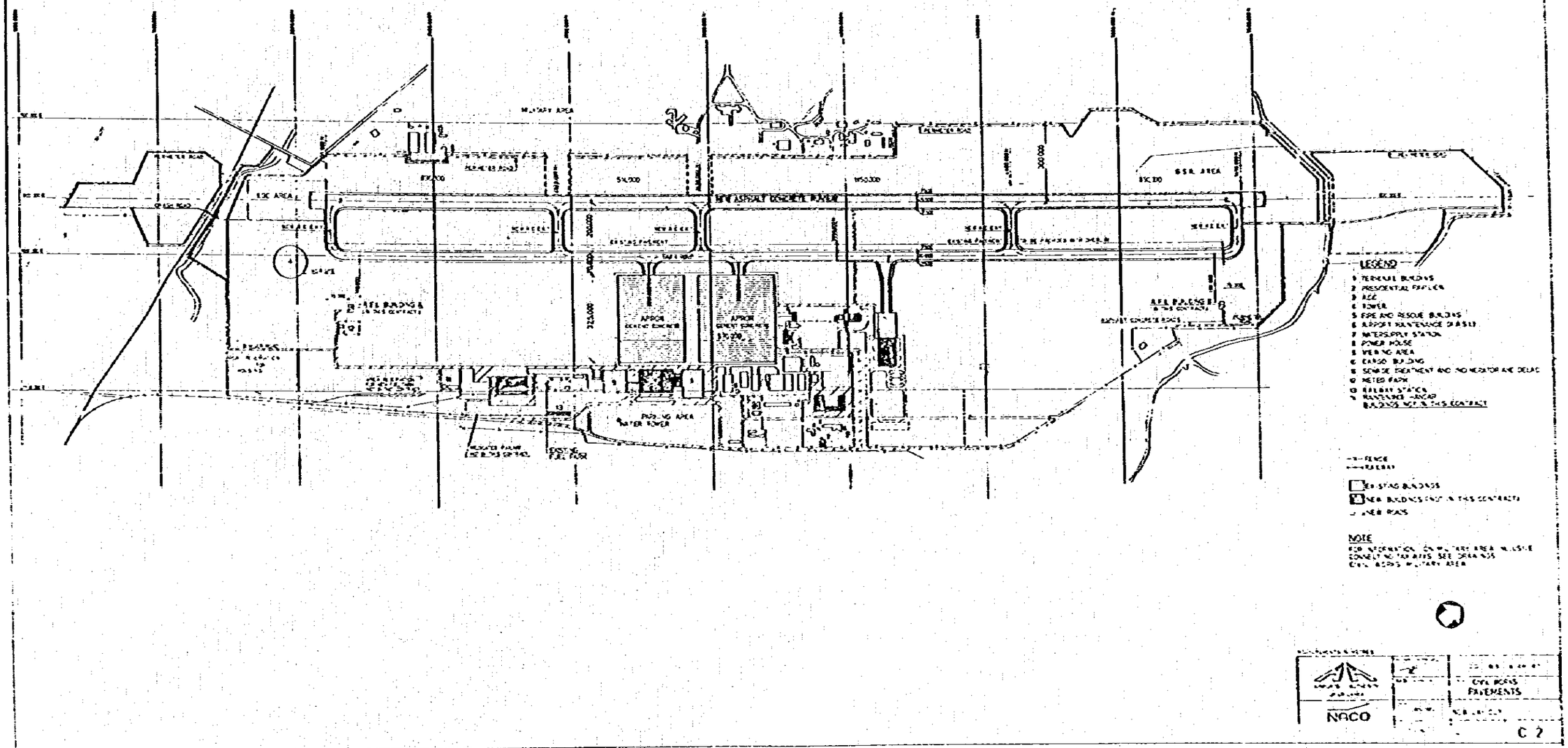
EXISTING LAY OUT



ANNEX 03

COLOMBO AIRPORT

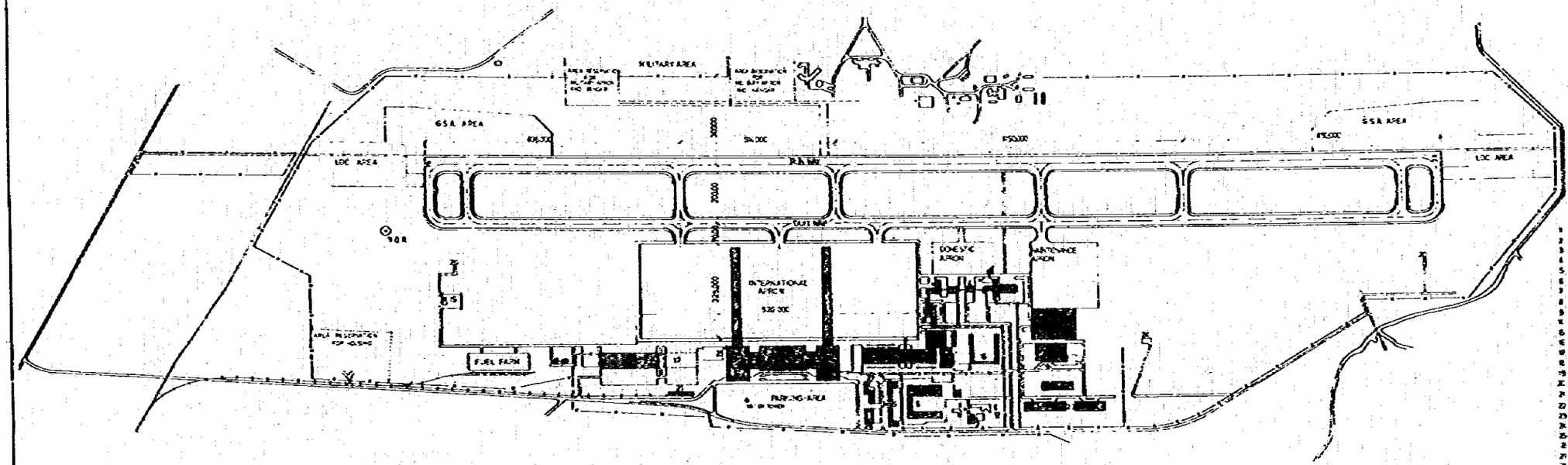
NEW LAY OUT (1990)



ANNEX 04

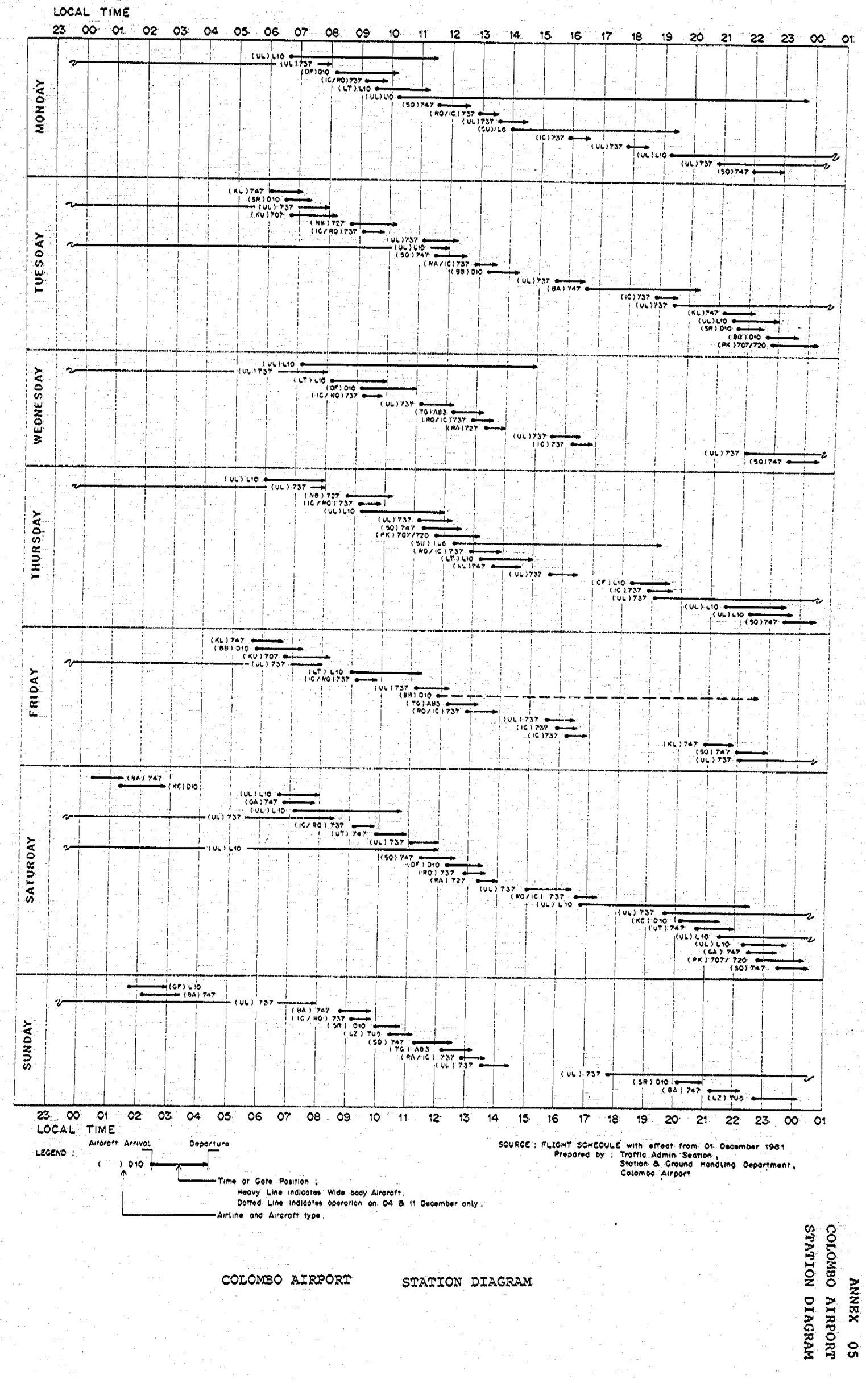
COLOMBO AIRPORT

NEW LAY OUT (2000)



NACO

MR 3B



COLOMBO AIRPORT STATION DIAGRAM

ANNEX 05
COLOMBO AIRPORT
STATION DIAGRAM