(6) Car Parking

Car parking is planned to be located in front of the International Passenger Terminal Building on the landside.

A ceremony garden is designed in the middle of the car parking in order to express Bali traditional characteristic presenting Bali dances to all visitors as a welcome.

3.4 Other Facilities

(1) Control Tower and Administration Building

Taking into consideration a deteriorated condition of the existing Control Tower and the existing air navigation and facilities installed in the existing Control Tower which have depreciated, a new Control Tower is planned to be constructed in the new International Departure Building in the Short Term Plan.

A new Administration Building is planned to be accommodated in the new Domestic Passenger Terminal Building in the Middle Term Plan. The reason is the same explained as the Domestic Passenger Terminal Building item 3.2 (4) above.

(2) Localizer

The existing off-set localizer can be relocated on the right position on the basis of meterological analyses and economical considerations.

Hence, the existing off-set localizer will not be necessary to relocate on the prolonged center line of the runway until the Middle Term Plan. In the Long Term Plan the existing localizer is planned to be

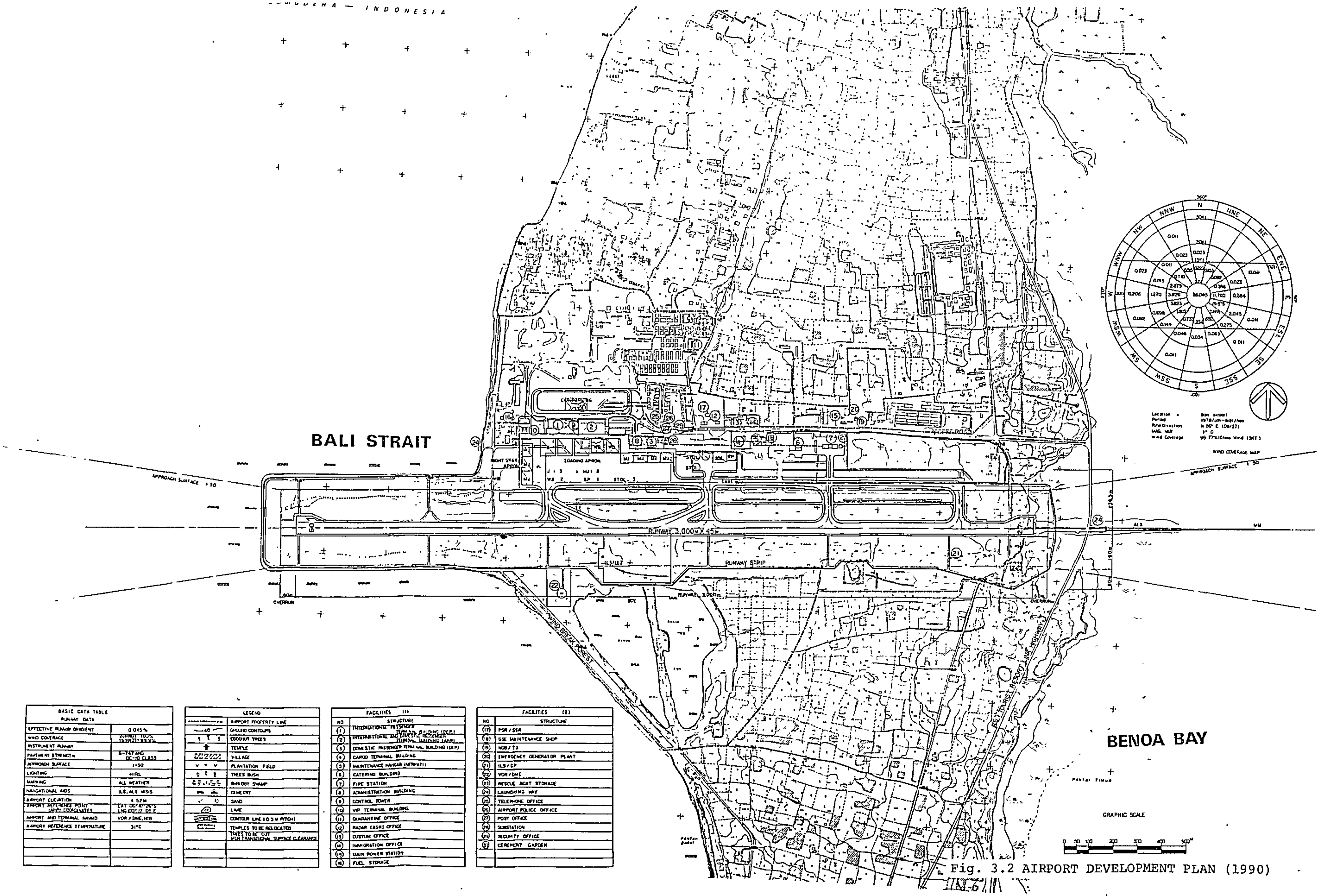
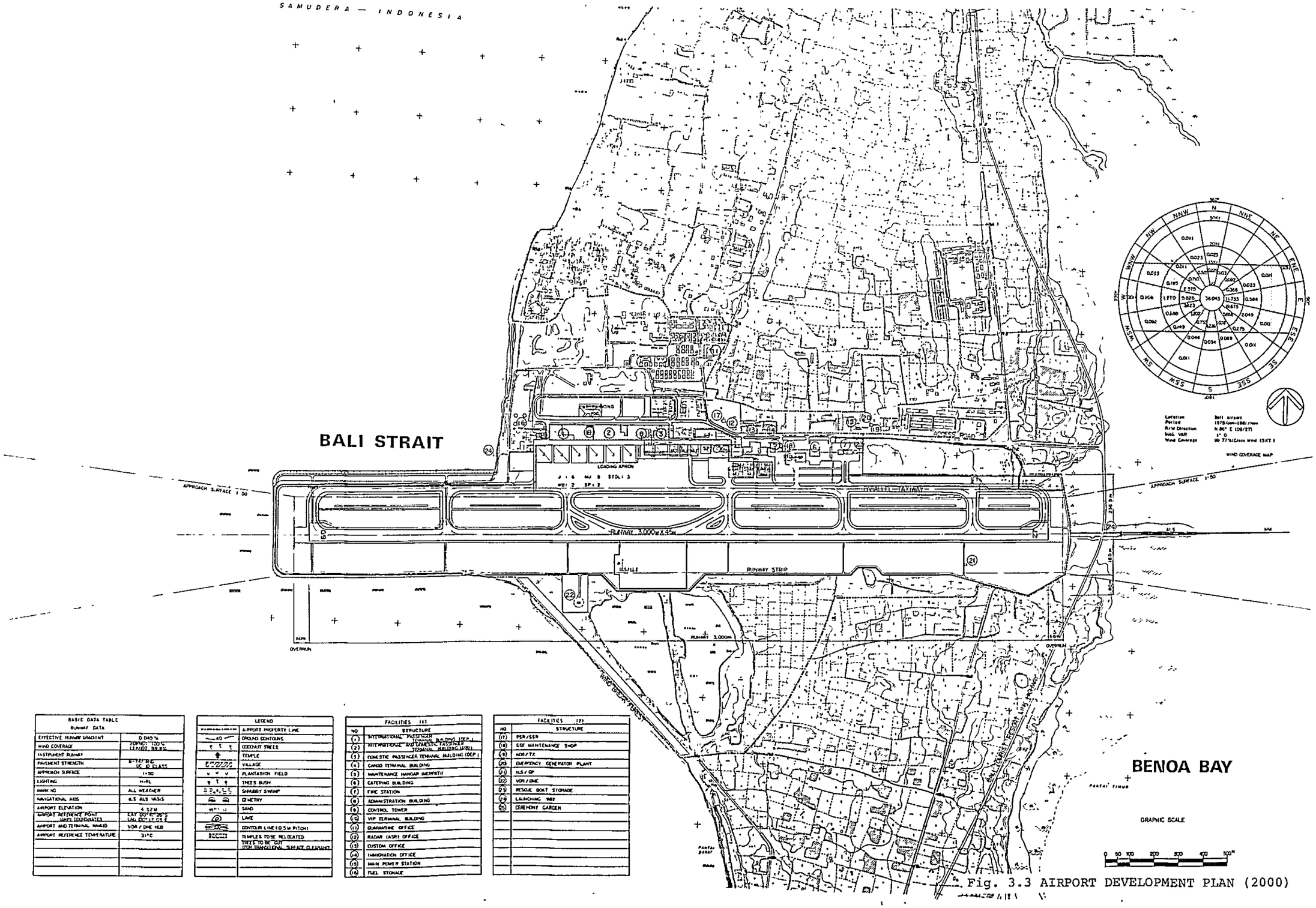


Fig. 3.2 AIRPORT DEVELOPMENT PLAN (1990)



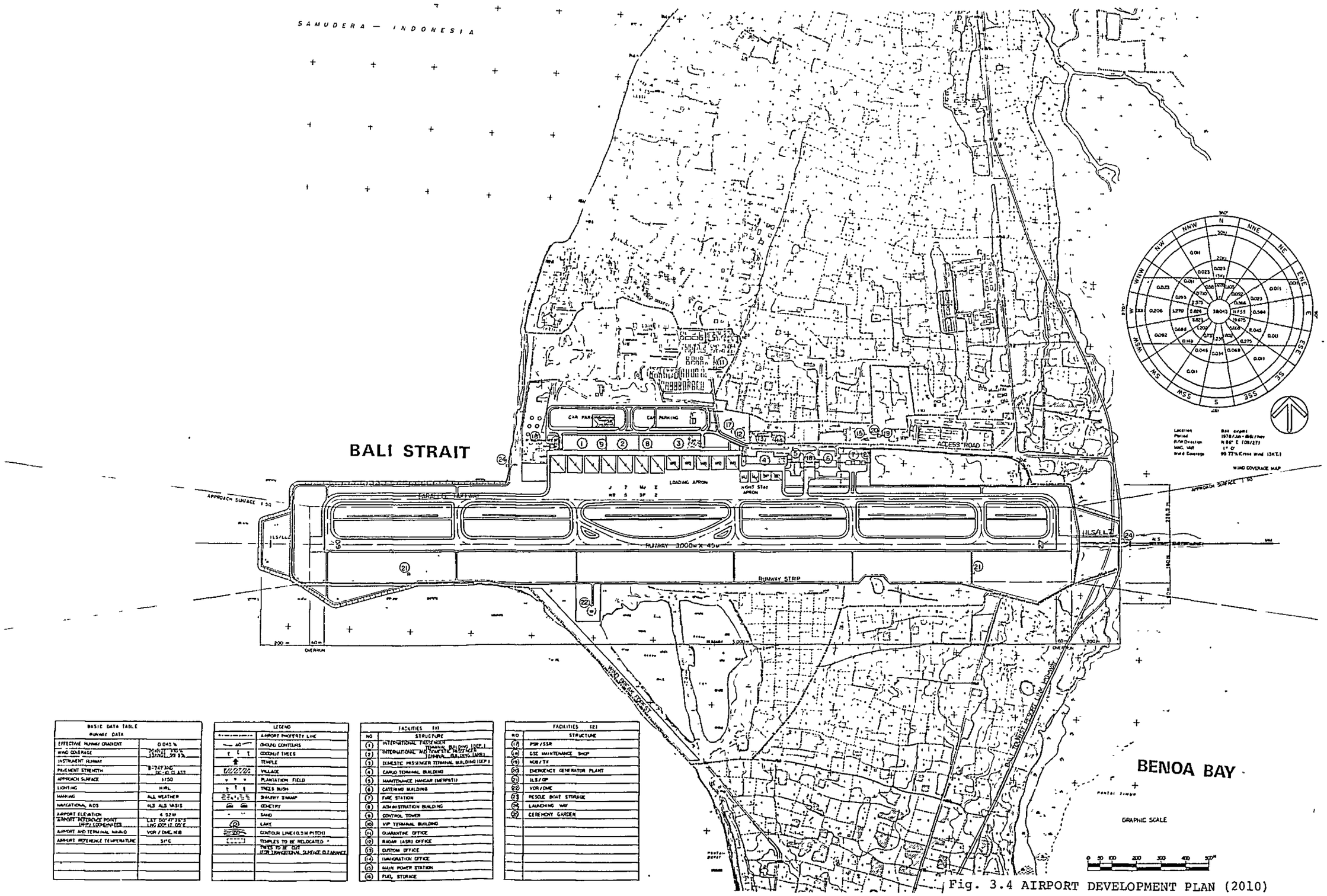
BASIC DATA TABLE	
RUNWAY DATA	
EFFECTIVE RUNWAY GRADIENT	0.045 %
WIND COVERAGE	20KNOT 100 % 13KNOT 99.9%
INSTRUMENT RUNWAY	
PAVEMENT STRENGTH	B-747 PCN SC 10 CLASS
APPROACH SURFACE	1:50
LIGHTING	HIRL
MARKING	ALL WEATHER
NAVIGATIONAL AIDS	ILS ALS VASIS
AIRPORT ELEVATION	4.57M
AIRPORT REFERENCE POINT (WGS84 COORDINATES)	LAT 00°46' 26"S LNG 00°14' 09"E
AIRPORT AND TERMINAL NAVAID	VOR / DME NDB
AIRPORT REFERENCE TEMPERATURE	31°C

LEGEND	
	AIRPORT PROPERTY LINE
40	GROUND CONTOURS
	COCONUT TREES
	TEMPLE
	VILLAGE
	PLANTATION FIELD
	TREES BUSH
	SHRUBBY SWAMP
	CEMETRY
	SAND
	LAKE
	CONTOUR LINE (0.5 M PITCH)
	TEMPLES TO BE RELOCATED TREES TO BE CUT WITH TRANSITIONAL SURFACE CLEARANCE

FACILITIES (1)	
NO	STRUCTURE
(1)	INTERNATIONAL PASSENGER TERMINAL BUILDING (DEP.)
(2)	INTERNATIONAL ARRIVAL PASSENGER TERMINAL BUILDING (ARR.)
(3)	DOMESTIC PASSENGER TERMINAL BUILDING (DEP.)
(4)	CARGO TERMINAL BUILDING
(5)	MAINTENANCE HANGAR (MERPATI)
(6)	CATERING BUILDING
(7)	FIRE STATION
(8)	ADMINISTRATION BUILDING
(9)	CONTROL TOWER
(10)	VIP TERMINAL BUILDING
(11)	QUARANTINE OFFICE
(12)	RADAR (ASR) OFFICE
(13)	CUSTOM OFFICE
(14)	IMMIGRATION OFFICE
(15)	MAIN POWER STATION
(16)	FUEL STORAGE

FACILITIES (2)	
NO	STRUCTURE
(17)	PSR/SSR
(18)	GSE MAINTENANCE SHOP
(19)	NDB / TX
(20)	EMERGENCY GENERATOR PLANT
(21)	ILS / GP
(22)	VOR / DME
(23)	RESCUE BOAT STORAGE
(24)	LAUNCHING WAY
(25)	CEREMONY GARDEN

Fig. 3.3 AIRPORT DEVELOPMENT PLAN (2000)



BASIC DATA TABLE	
RUNWAY DATA	
EFFECTIVE RUNWAY GRADIENT	0.043 %
WIND COVERAGE	
INSTRUMENT RUNWAY	
PAVEMENT STRENGTH	
APPROACH SURFACE	1:50
LIGHTING	HIRL
MARKING	ALL WEATHER
NAVIGATIONAL AIDS	ILS ALS VASIS
AIRPORT ELEVATION	4.57 M
AIRPORT REFERENCE POINT (WGS1984DATUM)	LAT 00°47'25"S LONG 115°10'05"E
AIRPORT AND TERMINAL NAVAID	VOR / DME, NDB
AIRPORT REFERENCE TEMPERATURE	31°C

LEGEND	
	AIRPORT PROPERTY LINE
	GROUND CONTOURS
	COCONUT TREES
	TEMPLE
	VILLAGE
	PLANTATION FIELD
	TREES BUSH
	SWAMPY SWAMP
	CEMETRY
	SAND
	LAKE
	CONTOUR LINE (0.5 M PITCH)
	TEMPLES TO BE RELOCATED * TREES TO BE CUT FOR TRANSITIONAL SURFACE CLEARANCE

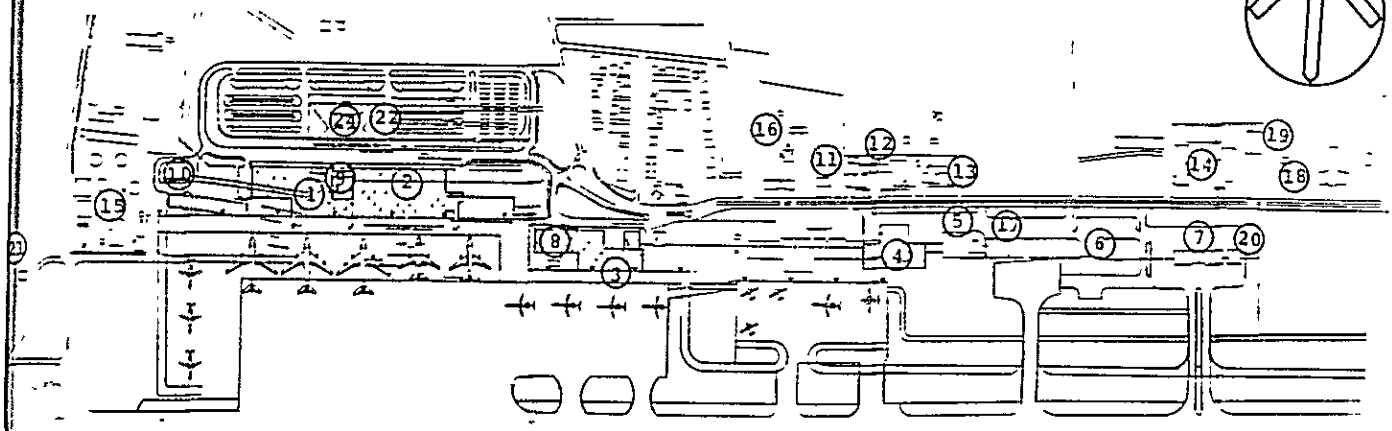
FACILITIES (I)	
NO	STRUCTURE
(1)	INTERNATIONAL PASSENGER TERMINAL BUILDING (TSP-1)
(2)	INTERNATIONAL AND DOMESTIC PASSENGER TERMINAL BUILDING (TSP-2)
(3)	DOMESTIC PASSENGER TERMINAL BUILDING (TSP-3)
(4)	CARGO TERMINAL BUILDING
(5)	MAINTENANCE HANGAR (MERPATI)
(6)	CATERING BUILDING
(7)	FIRE STATION
(8)	ADMINISTRATION BUILDING
(9)	CONTROL TOWER
(10)	VIP TERMINAL BUILDING
(11)	QUARANTINE OFFICE
(12)	RADAR (ASR) OFFICE
(13)	CUSTOM OFFICE
(14)	IMMIGRATION OFFICE
(15)	MAIN POWER STATION
(16)	FUEL STORAGE

FACILITIES (II)	
NO	STRUCTURE
(17)	PSR/SSR
(18)	GSE MAINTENANCE SHOP
(19)	NDB/TX
(20)	EMERGENCY GENERATOR PLANT
(21)	ILS/GP
(22)	VOR/DME
(23)	RESCUE BOAT STORAGE
(24)	LAUNCHING WAY
(25)	CEREMONY GARDEN

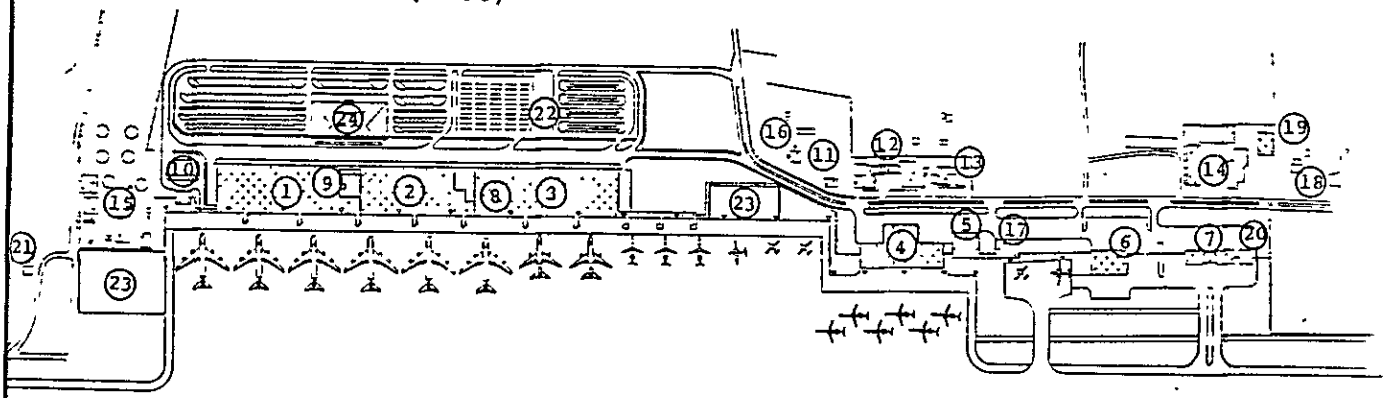
Fig. 3.4 AIRPORT DEVELOPMENT PLAN (2010)

Fig. 3.5 TERMINAL DEVELOPMENT PLAN

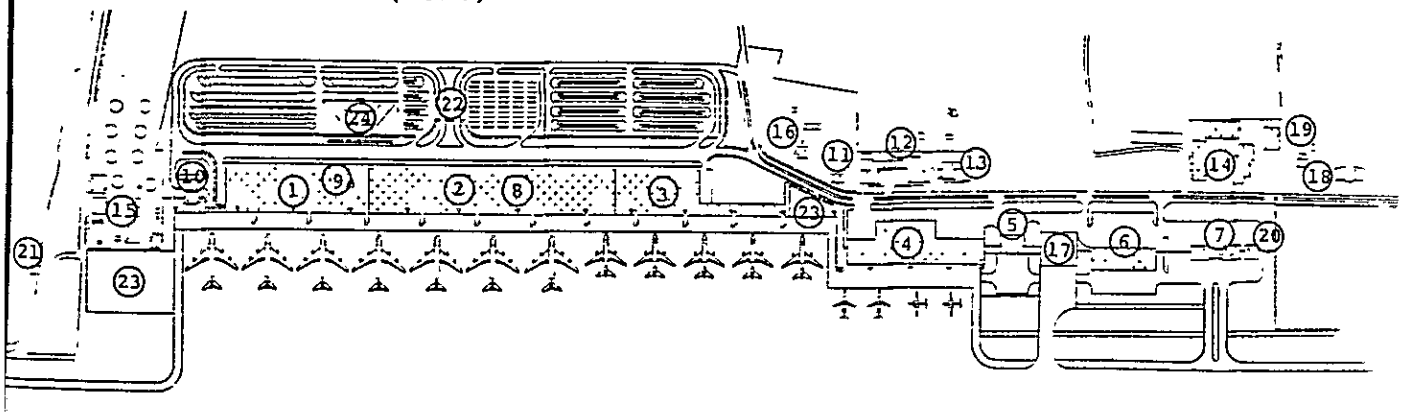
SHORT TERM PLAN (1990)



MIDDLE TERM PLAN (2000)



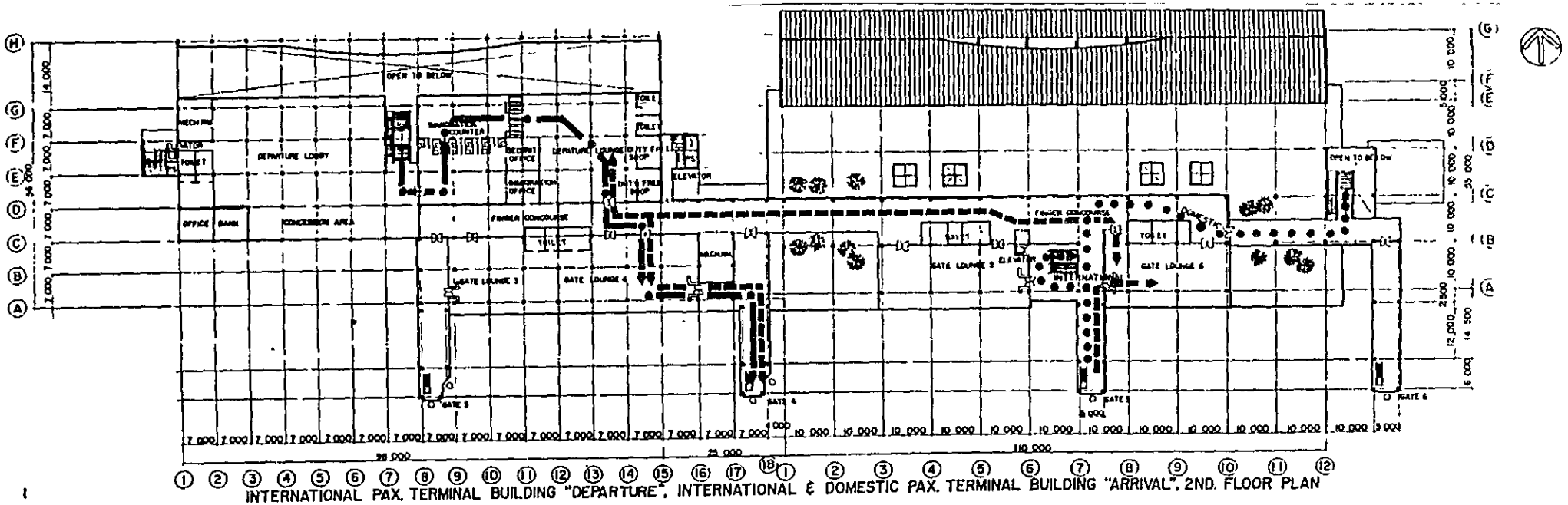
LONG TERM PLAN (2010)



LEGEND

①	INTERNATIONAL PASSENGER TERMINAL BUILDING (DEP.)	⑬	IMMIGRATION OFFICE
②	INTERNATIONAL AND DOMESTIC PASSENGER TERMINAL BUILDING (ARR.)	⑭	MAIN POWER STATION
③	DOMESTIC PASSENGER TERMINAL BUILDING (DEP.)	⑮	FUEL STORAGE
④	CARGO TERMINAL BUILDING	⑯	PSR/SSR
⑤	MAINTENANCE HANGAR (MERPATI)	⑰	G.S.E MAINTENANCE SHOP
⑥	CATERING BUILDING	⑱	NDB/TX
⑦	FIRE STATION	⑲	EMERGENCY GENERATOR PLANT
⑧	ADMINISTRATION BUILDING	⑳	RESCUE BOAT STORAGE
⑨	CONTROL TOWER	㉑	LAUNCHING WAY
⑩	VIP TERMINAL BUILDING	㉒	CARPARKING
⑪	RADAR (ASR) OFFICE	㉓	G.S.E AREA
⑫	CUSTOM OFFICE	㉔	CEREMONY GARDEN


BALI INTERNATIONAL AIRPORT



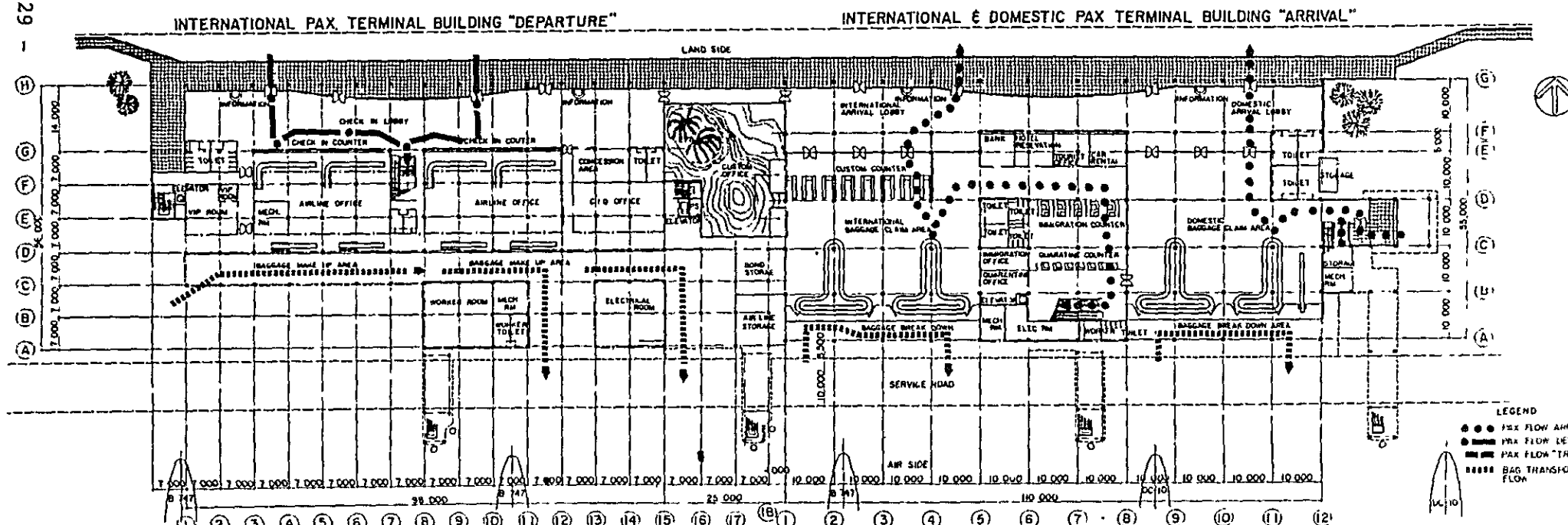


Fig. 3.6 INTERNATIONAL PAX. TERMINAL BUILDING "DEPARTURE INTERNATIONAL & DOMESTIC PAX ERMINAL BU LDING "ARRIVAL" IST. FLOOR PLAN

installed on the right position at the 09 side (east side) and a new localizer is also planned to be installed at the 27 side (west side) in order to provide the appropriate conditions for an international airport and to meet functional requirements for the localizers.

The facilities other than above are explained in the main report.

3.5 Aircraft Noise and Airport Organization

(1) Aircraft Noise and Land Use Surrounding the BIA

The WECPNL noise contours for the BIA in the Long Term Plan is shown Fig. 3.7 on the basis of future aircraft movement forecast.

As it can be seen in Fig.3.7, a wide area of the sea, the town of Benoa, the Benoa seaport, small villages surrounding the BIA and Living Quarter for airport staff are expected to be covered by more than WECPNL 70. However, the town of Kuta, hotels and cottages located in the north of the BIA will not be affected by aircraft noise. As a matter of fact, aircraft noise standards for land use control should be studied on the basis of aircraft noise survey carried outside. Thereafter, taking into account Bali local characteristics, the land use control on aircraft noise should be integrated with areawide comprehensive planning designed by BUPATI in order to solve the impact of aircraft noise.

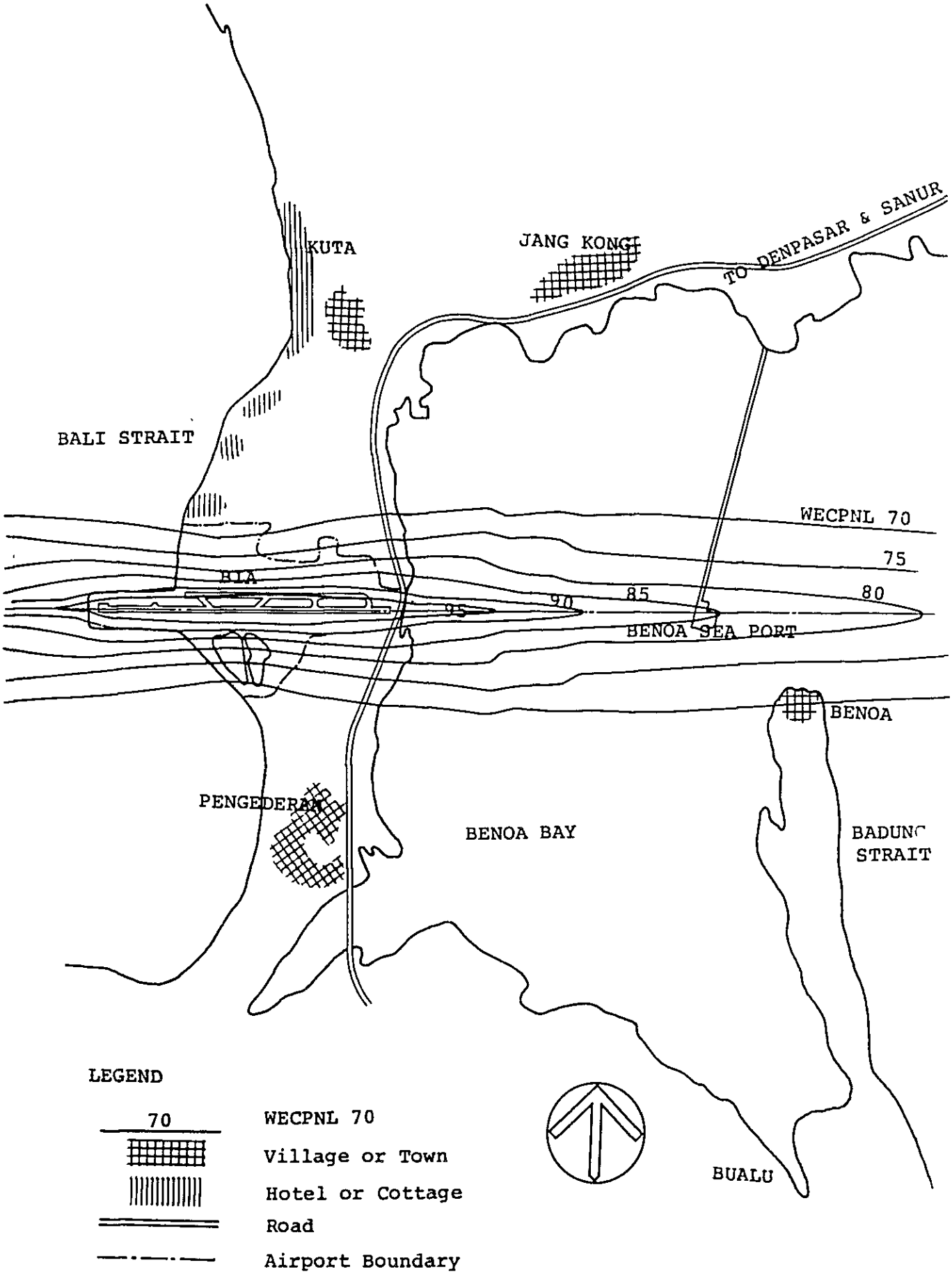


Fig. 3.7 WECPNL NOISE CONTOUR (THE YEAR 2010)

S=1:50,000

(2) Airport Organization

Although there has been no problem in organization or staffing of the existing airport, it is necessary to reconsider the capacity and organization due to the development plan and the growth of airport.

The demand level of airport staff number for the Short Term, the Middle and the Long Term Plan are expected to be 800, 1100 and 1200 staff respectively in contrast to 400 staff employed at present.

3.6 Construction Schedule and Summary of Project Cost

The construction schedule for major work items is summarized in Table 3.2.

Each development plan requires for its implementation approximately 6 to 8 months to select the planning consultant and complete drawings, and also about 20 to 24 months for selecting the contractor and for the construction. Therefore, the preparation should begin about 4 to 5 years in advance of each construction completion target year.

It is noted that construction method and its schedule must be coordinated with the airport authority not to influence the airport operation and maintenance in the course of the construction. Especially, pavement works for the extension of the runway and taxiways should be studied carefully and should be coordinated with the airport authority to explain the work method and its schedule. Temporary works, work schedule and its method for architectural work also should be provided in safety and convenience for the passengers and the airport staff during the construction period.

Project cost for the development plan of BIA is summarized in Table 3.3 . About 30.7 billion Rp for the Short Term Plan is estimated roughly. The amount includes the engineering fees and physical contingency.

Although oil prices were increased in January, 1982 by 60% in the area concerned and affecting the price index locally, the estimate of construction cost has been based on the price index as of the end of December, 1981, without taking those factors into consideration.

Table 3.2 CONSTRUCTION SCHEDULE

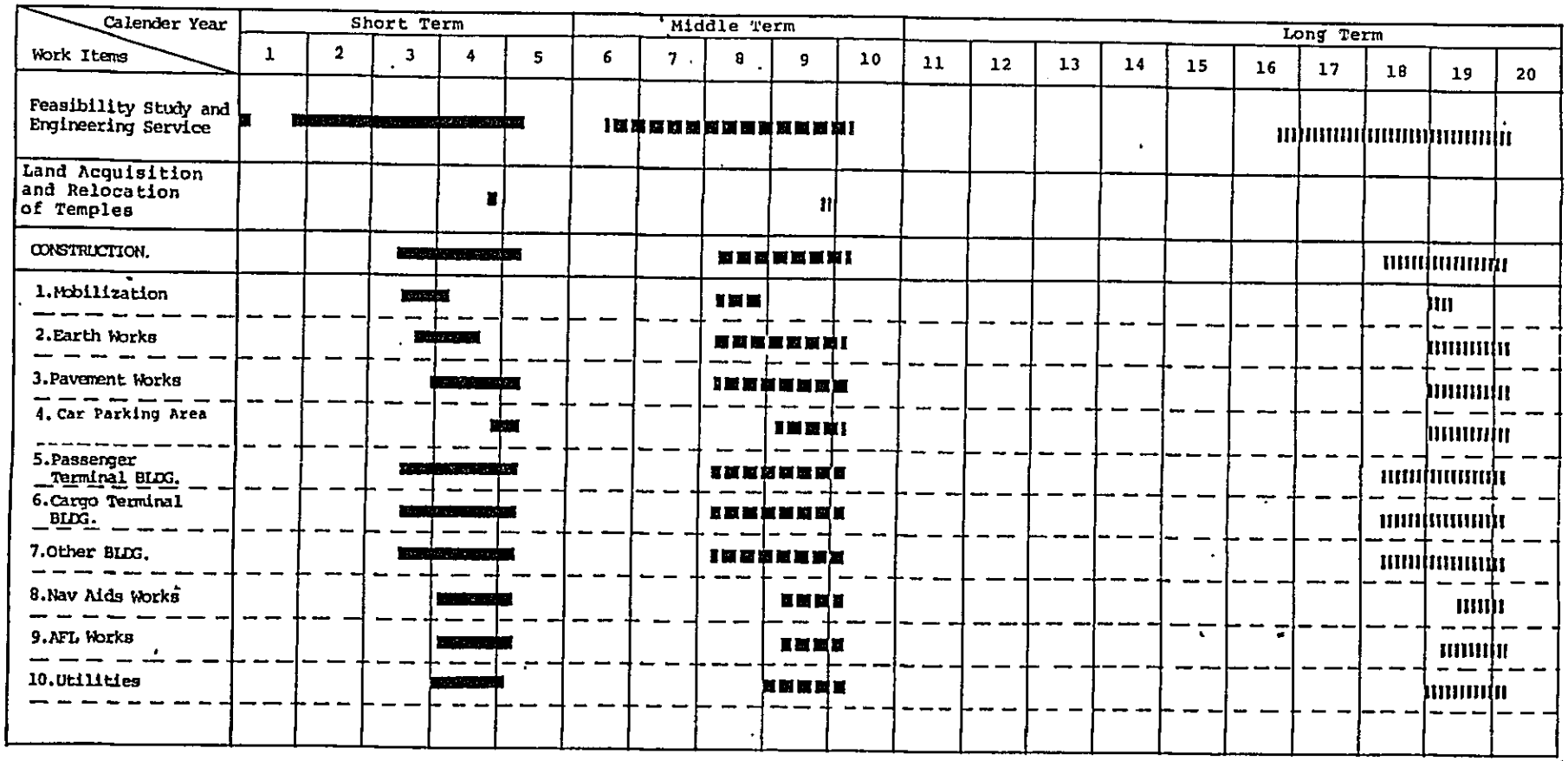


Table 3.3 ESTIMATED CONSTRUCTION COST

Unit Million Rupiah

Item			Short Term			Middle Term			Long Term			TOTAL		
			Foreign Portion	Local Portion	Total	Foreign Portion	Local Portion	Total	Foreign Portion	Local Portion	Total	Foreign Portion	Local Portion	Total
Civil Work	Pavement Work	Runway	1,367	844	2,211	-	-	-	-	-	-	1,367	844	2,211
		Taxiway	1,337	852	2,189	1,212	774	1,986	-	-	-	2,549	1,626	4,175
		Apron	1,016	648	1,664	1,425	911	2,336	152	96	248	2,593	1,655	4,248
		Car parking Area	126	79	205	91	55	146	102	67	169	319	201	520
	Drainage Work		245	456	701	82	152	234	-	3	3	327	611	938
	Earth Work		1,121	748	1,869	2,733	1,822	4,555	3,212	2,140	5,352	7,066	4,710	11,776
	Miscellaneous		272	166	438	9	6	15	6	6	12	287	178	465
	SUB TOTAL		5,484	3,793	9,277	5,552	3,720	9,272	3,472	2,312	5,784	14,508	9,825	24,333
Architectural Work	International PAX BLDG		6,097	4,065	10,162	1,840	1,226	3,066	3,451	2,301	5,752	11,388	7,592	18,980
	Domestic PAX BLDG		631	420	1,051	9,005	6,004	15,009	4,836	3,224	8,060	14,472	9,648	24,120
	Cargo Terminal BLDG		596	397	993	254	169	423	596	397	993	1,446	963	2,409
	Others		491	327	818	1,752	1,168	2,920	526	350	876	2,769	1,845	4,614
	SUB TOTAL		7,815	5,209	13,024	12,851	8,567	21,418	9,409	6,272	15,681	30,075	20,048	50,123
Navigational Aids System Work	Navigational Aids		972	108	1,080	1,314	146	1,460	447	50	497	2,733	304	3,037
	Field Lighting		552	61	613	26	3	29	263	29	292	841	93	934
	SUB TOTAL		1,524	169	1,693	1,340	149	1,489	710	79	789	3,574	397	3,971
Services Facility Works	Power Supply & Generating System		251	44	295	920	161	1,081	622	108	730	1,793	313	2,106
	Others		496	88	584	1,367	239	1,606	1,241	219	1,460	3,104	546	3,650
	SUB TOTAL		747	132	879	2,287	400	2,687	1,863	327	2,190	4,897	859	5,756
Special Services Facility Works	Boarding Bridge		625	32	657	359	20	379	1,104	123	1,227	2,088	175	2,263
TOTAL			16,195	9,335	25,530	22,389	12,856	35,245	16,558	9,113	25,671	55,142	31,304	86,446
Contingency			1,600	900	2,500	2,200	1,300	3,500	1,600	900	2,500	5,400	3,100	8,500
Consulting Fee			2,686	-	2,686	2,628	-	2,628	1,752	-	1,752	7,066	-	7,066
GRAND TOTAL			20,481	10,235	30,716	27,217	14,156	41,373	19,910	10,013	29,923	67,608	34,404	102,012

NOTE; Exchange rate : US 1$=644Rp=220.1 yen

CHAPTER 4

ECONOMIC AND FINANCIAL ANALYSIS

CHPATER 4 ECONOMIC AND FINANCIAL ANALYSIS

Detailed economic and financial analysis for the development plan of BIA are explained in the Chapter 12 of the main report. In this chapter, only the result of economic and financial analysis are discussed.

- Economic evaluation : Forecast minimal economic benefit is adopted.

  EIRR 20.8%

  B/C 1.49 (On the basis of 15% discount rate)

  NPV 20,750 million Rp

- Sensitivity analysis: Taking into consideration Indonesian economic condition and calculation method on the construction cost and cost benefit for the development plan, sensitivity analysis is studied based on the construction cost increased by 10% and 20% respectively.

  For 10% cost increase

  EIRR 19.5

  B/C 1.37 (On the basis of 15% discount rate)

  For 20% cost increase

  EIRR 18.3

  B/C 1.27 (On the basis of 15% discount rate)

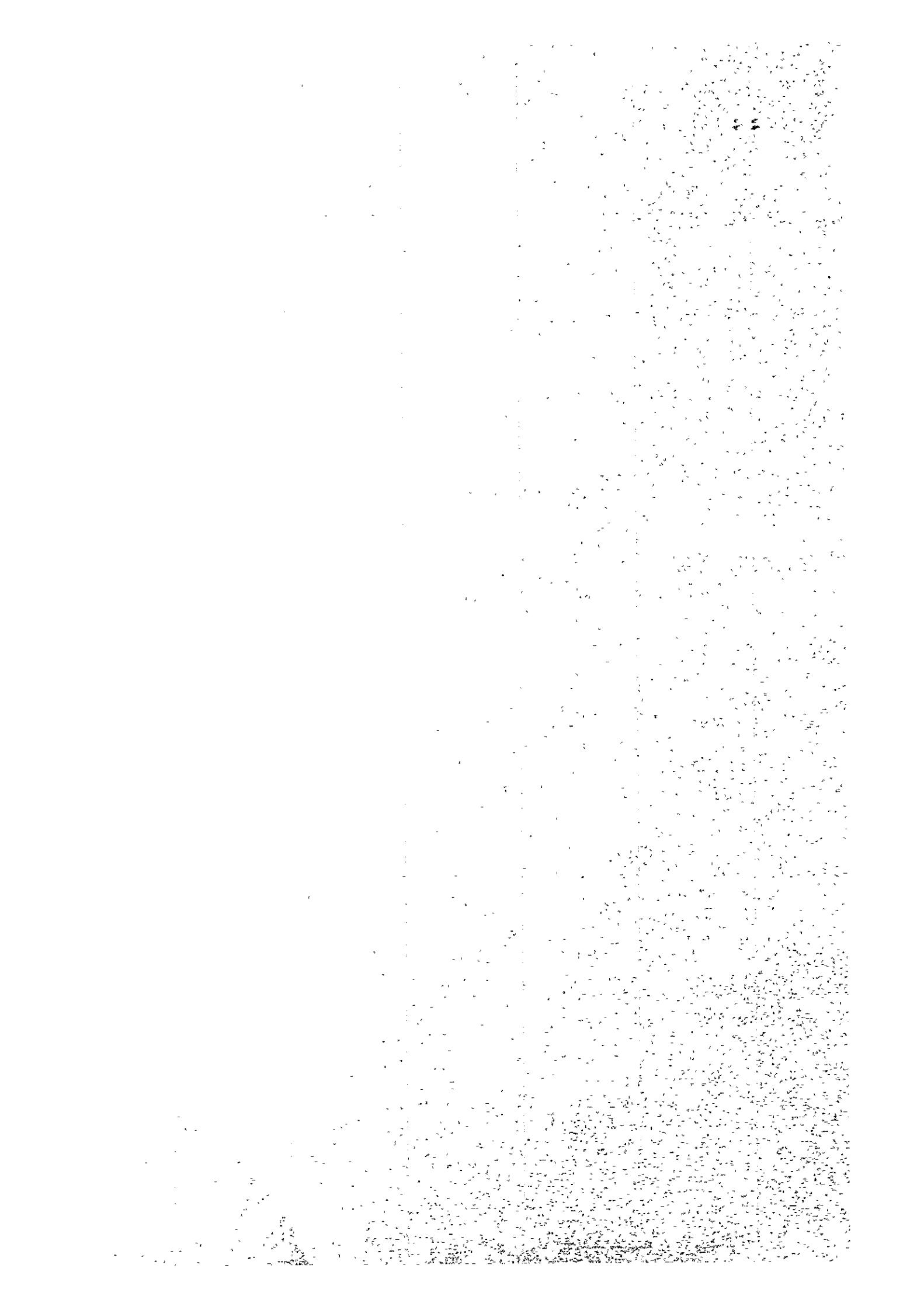
In fact, sensitivity analysis on a variation of the cost benefit and the construction cost, shows that the project will be influenced by the actual number of passengers for the project benefit.

- Financial evaluation: The results of financial analysis, show that a 40% increment of the airport charge such as landing charge, facility charges, etc. is necessary in order to provide suitable finance after the completion of the project in the Short Term Plan.

Accordingly, the project is considered financially feasible if a 40% increment in the airport charge is implemented.

Therefore, it is concluded that this project is a suitable plan for promotion by the Indonesian Government based on the both economic and financial evaluation.

RECOMMENDATIONS FOR PROJECT IMPLEMENTATION



RECOMMENDATIONS FOR PROJECT IMPLEMENTATION

The following recommendations are made concerning project implementation.

- The preparations including request for financial assistance, topographic survey, soil investigation, etc. should be initiated at the earliest possible date so that the engineering services including basic design, detailed design, preparation of tender documents assistance in evaluation of the contractors, etc. can be completed by the end of 1983 at latest.

- The works included in the Short Term Plan correspond to the facility requirements for 1990. However, it is recommended to initiate the construction of the works included in the Short Term Plan at the beginning of financial year 1984 and complete them by the end of fiscal year 1985 since the earlier completion will make a great improvement in the safety of airport operation.

- The construction of the works included in the Middle Term Plan for the air traffic demand in the year 2 should be completed by the end of 199[illegible].

- The construction of the works included [illegible] Plan for the air traffic demands in [illegible] be completed by the beginning of 2001.

JICA