10.5 Airport Utilities

10.5.1 Power Supply System

(1) Power Supply System

The existing main power supply system, including the emergency power supply, will be developed so as to prepare the load increase in the short-term development. The system diagram is shown in Figure 10.5.1.

The breakdown of the total load capacity is planned as follows:

Passenger Terminal Building	:	400KVA
Cargo Terminal Building	:	200KVA
Air Navigation Systems	:	300KVA
Others	:	300KVA
Total	:	1,200KVA

The existing transformer and emergency generator capacity will be expanded as follows:

- Capacity of Main Transformers : 1,500KVA
- Capacity of Emergency Generator : 1,500KVA

10.5.2 Water Supply System

Potable water will be supplied by a main pipe from city. The major demand for potable water is at the present passenger terminal building and for the new cargo terminal area. This water will be supplied from the city main pipe along the existing airport road.

Total water demand for the airport will be 360 tons/day in the year 2000 as described in Table 5.1.1. The demand for the above two areas are broken down as shown in Table 10.5.1.

Table 10.5.1 Breakdown of Portable Water Demand

Area		Floor Area	Assumed Unit Demand	Daily Demand	Hourly Demand
Passenger Area	Existing area	m² 9,400	l/m²/day 23	tons/day 216	tons/day 54
	Expanded area (New)	2,400	23	55	14
Cargo Area	Cargo Building (New)	16,170	3	48	12
	Other Building (New)	4,100	10	41	10
Total				tons/day 360	tons/day 90

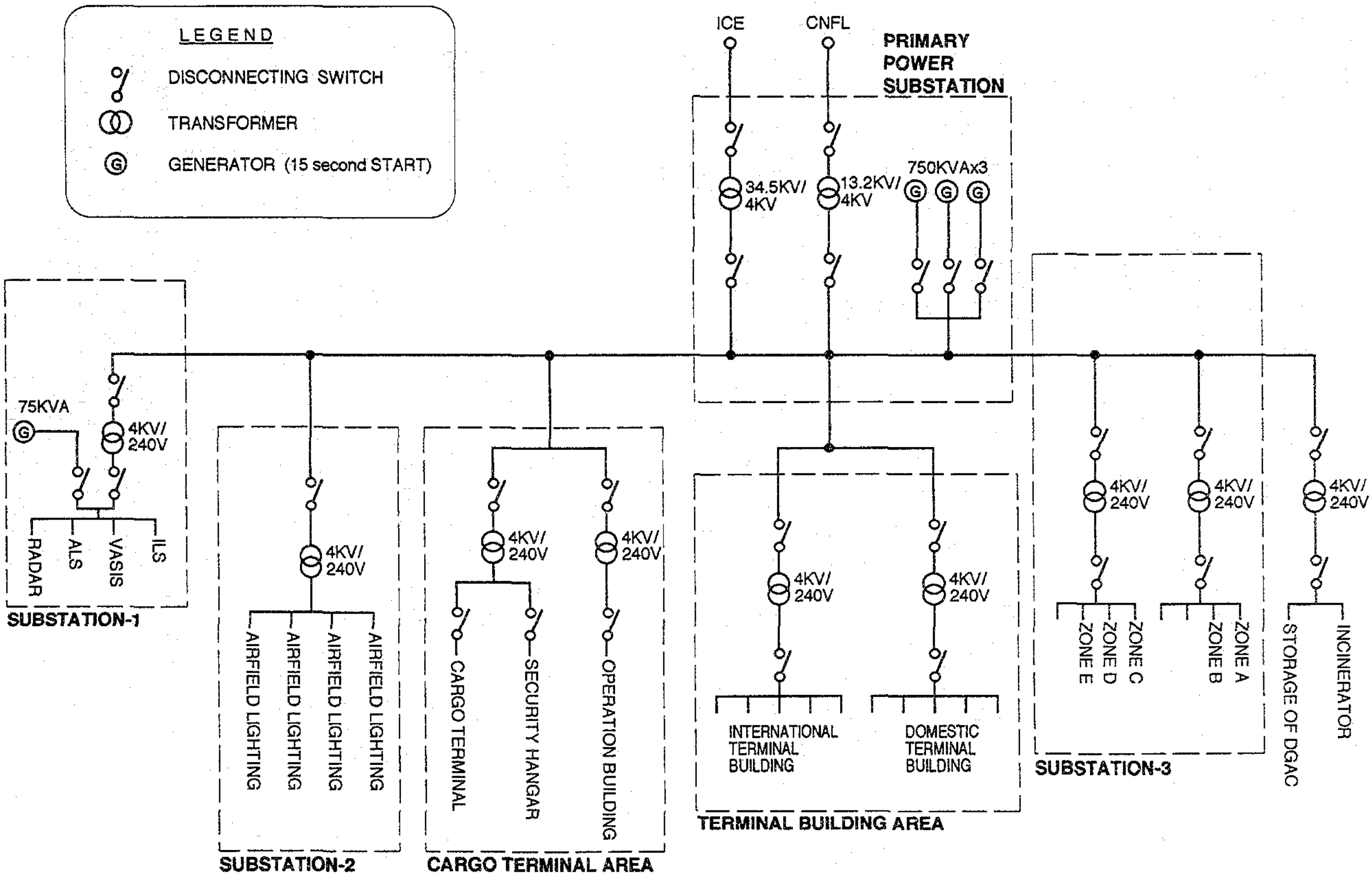

Figure 10.5.1 System Diagram of Power Supply System

As clarified in Table 10.5.1, the amount of 55 tons/day and 89 tons/day (48+41) of potable water will be newly distributed for passenger and cargo areas respectively.

An elevated tank system has been adopted for water distribution taking account of its easy maintenance and the existing distribution system. The concept of water supply system is shown in Figure 10.5.2.

Fire fighting water for the above building will be designed with NPFU standards.

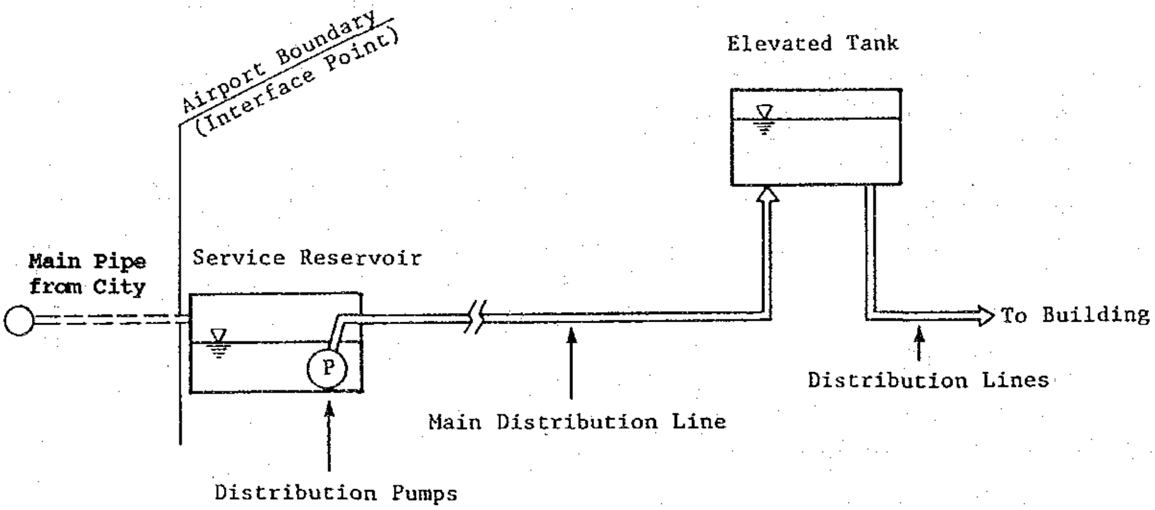

Figure 10.5.2 Concept of Water Supply System

10.5.3 Sewerage Treatment Plant

A wastewater collection and treatment system is planned based on the following conditions and assumptions.

a) Wastewater Volume

Daily maximum	:	360 tons
Hourly maximum	:	90 tons

b) Quality of Wastewater (influent)

BOD_5	:	200mg/l
SS	:	250mg/l

c) Quality of Wastewater (effluent)

BOD_5	:	Less than 20mg/l
SS	:	Less than 30mg/l

There are various systems to be considered for sewage treatment, such as extended aeration, soil filtration, stabilization pond, oxidation pond with imhoff tank etc. Among these systems, an oxidation pond with imhoff tank method is recommended for the following reasons:

- No impact on the public areas in terms of bad odors
- Lower operation and maintenance cost than that of extended aeration
- Stabler quality of the effluent water than that of soil filtration
- More suitable for the central sewerage treatment than soil filtration
- Smaller space than stabilization pond

The concept of the oxidation pond with imhoff tank method is shown in Figure 10.5.2.

The wastewater disposed from each building and facility will be collected and concentrated at the central sewage treatment plant through a sewer pipe network, and the effluent water will be discharged into the canal near the central sewerage treatment plant.

Although a stabilization pond requires a large area exceeding three times that of an oxidation pond with imhoff tank, maintenance and operation cost of the former is remarkably lower than that of the latter. If a broader area can be acquired for a stabilization pond, its introduction should be considered.

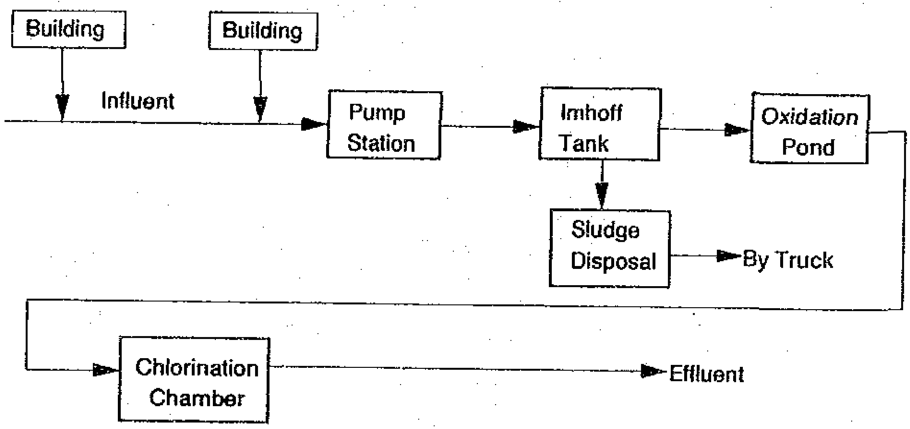

Figure 10.5.3 Concept of Sewerage Treatment Plant

10.5.4 <u>Solid Waste Disposal System</u>

The solid waste collected from the building will be burned in an incinerator to be located near the sewerage treatment plant. The capacity of the incinerator will be 2,200kg per day. An incinerator which can handle both rubbish and garbage waste will be installed.

CHAPTER 11 AIRSPACE USE

CHAPTER 11 AIRSPACE USE

11.1 General

This chapter describes the airspace use in Costa Rica and the relationship of closely located airspace of Juan Santamaria and Tobias Bolaños Airports in San Jose.

11.2 Airspace Use in Costa Rica

11.2.1 Flight Information Region (FIR)

The airspace over Costa Rica is included in the Central American FIR. The Central American FIR is constituted by the airspaces of six countries, i.e., Costa Rica, Belize, Guatemala, El Salvador, Nicaragua and Honduras as shown in Figure 11.2.1. An airspace with the altitude of 19,000 feet or more within the airspace over Costa Rica is controlled by the Central American Area Control Center (ACC) located in Tegucigalpa, Honduras.

At present, the FIR boundary on the Pacific Ocean side is recommended by ICAO to be revised as shown in Figure 11.2.1, and coordination for these matters are now in progress between the authorities concerned.

An airspace with the altitude of 19,000 feet or below within the airspace of Costa Rica is controlled by the Coco Control located at Alajuela/Juan Santamaria International Airport. Twenty four controllers are working at Coco Control for the area control services and approach and aerodrome control services for Juan Santamaria Airport on a 24-hour basis.

11.2.2 Air Traffic Services (ATS) Routes

Figure 11.2.2 shows the ATS route structure in Costa Rica. All Instrument Flight Rules (IFR) aircraft operating below the altitude of 19,000 feet are controlled by the Coco Control. At present, the authority is planning the realignment of ATS routes in Costa Rica.

The ATS routes are composed of three VOR/DMEs and six NDBs which have been installed and maintained by the COCESNA (Coorporación Centroamericana de Servicios de Navegación Aérea). These radio navigation aids are operating normally except for one NDB located at Tobias Bolaños Airport which is is out of service. COCESNA annually carry out flight-check for NDB, and semi-annually for VOR/DME and ILS.

11.2.3 Approach Control Area

The area within a radius of 40NM centered on EL Coco VOR/DME (09°59'10"N/084°14'30"W) is designated as the approach control area for Juan Santamaria Airport. Radar control with a coverage of 60NM is provided for the control of IFR traffic.

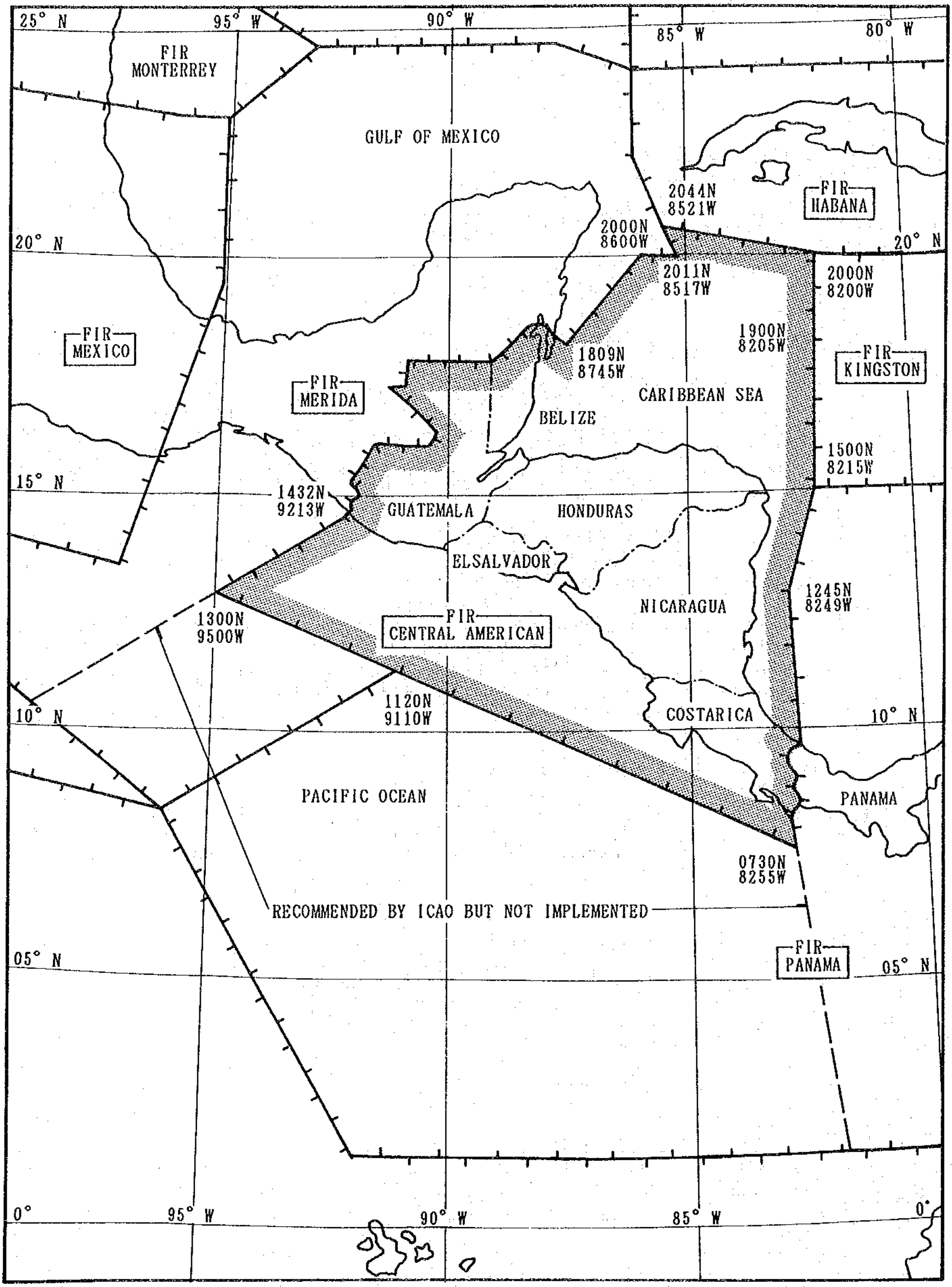

Figure 11.2.1 Central American FIR and Recommended FIR Boundary

RUTAS DE LLEGADA-SALIDA Y TRANSITO

CARTA DE AREA — TMA EL COCO

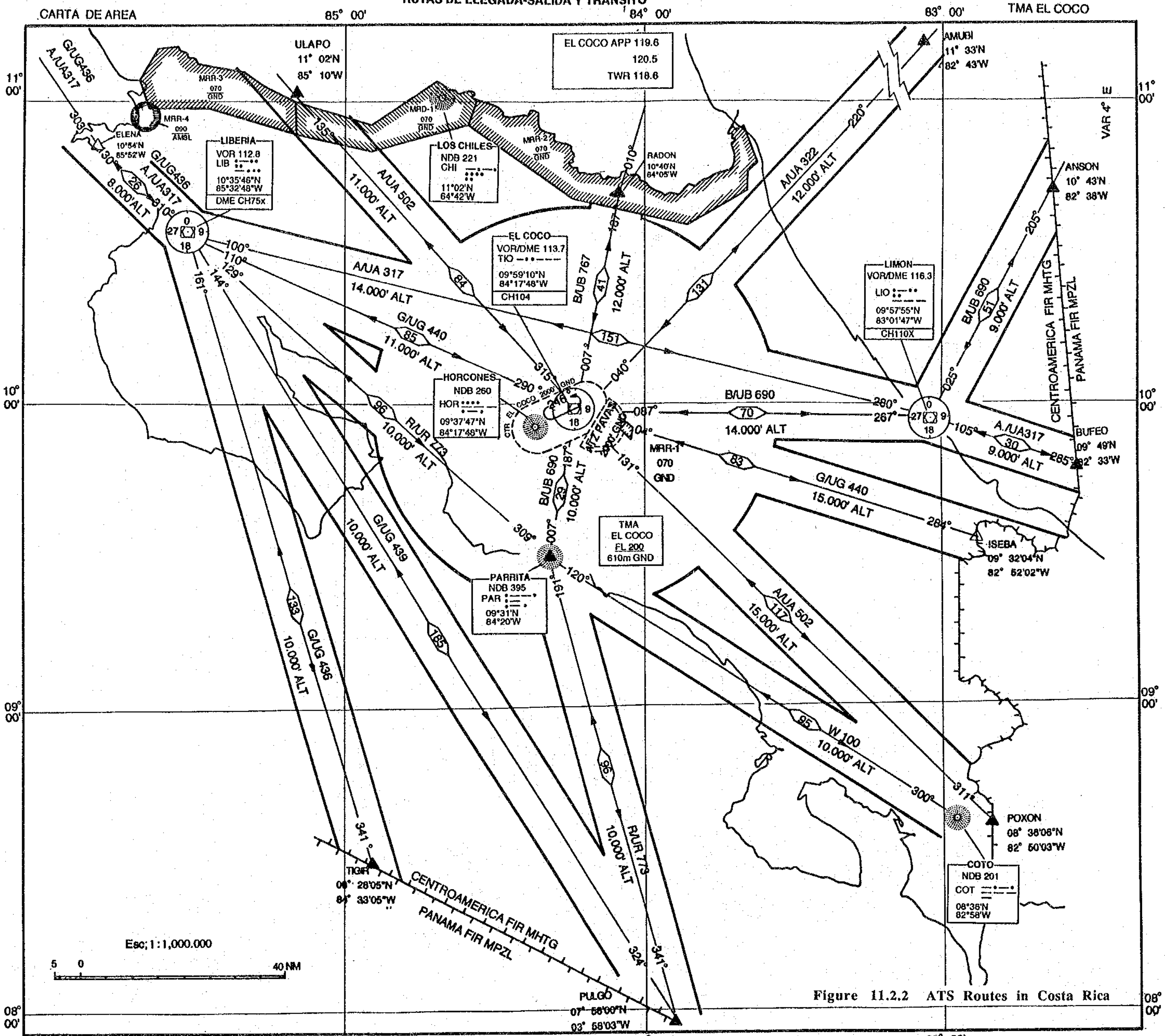

Figure 11.2.2 ATS Routes in Costa Rica

11.2.4 Control Zone and Airport Traffic Zone

The control zone (CTR) and airport traffic zone (ATZ) are established respectively for Juan Santamaria and Tobias Bolaños Airports as shown in Figure 11.2.3. They are established to separate the air traffic flows at the two airports for safe operations of aircraft.

11.2.5 Restricted Danger and Training Areas

Restricted and danger areas of MRR-2, MRR-3, MRR-4 and MRD-1 are established along the boundary with Nicaragua. The airspace over the President's official residence is also designated as Restricted Area MRR-1. In addition to the above, fuel dumping and training areas are designated in the AIP. The use of training areas is notified by the NOTAM in advance when each area is activated.

Details of the restricted and danger areas are included in Appendix-11.2.2.

11.2.6 Classification of Airspaces

To prevent mid-air collisions between IFR and VFR aircraft, the airspace below 19,000 feet altitude in Costa Rica is divided into three zones (Zones M, E and W) as shown in Figure 11.2.4. The airspace of each zone is classified into Class C and Class G by specified altitudes as shown in Table 11.2.1 in accordance with the ICAO Annex 11.(*)

It is felt that the establishment of the above airspace classification contributes to the promotion of air safety.

Note (*): ICAO Annex 11 classifies ATS airspaces into seven types with the following definitions:

Class A. IFR flights only are permitted, all flights are subject to air traffic control service and are separated from each other.

Class B. IFR and VFR flights are permitted, all flights are subject to air traffic control service and are separated from each other.

Class C. IFR and VFR flights are permitted, all flights are subject to air traffic control service and IFR flights are separated from other IFR flights are from VFR flights. VFR flights are separated from IFR flights and receive traffic information in respect of other VFR flights.

Class D. IFR and VFR flights are permitted and all flights are subject to air traffic control service, IFR flights are separated from other IFR flights and receive traffic information in respect of VFR flights, VFR flights receive traffic information in respect of all other flights.

Class E. IFR and VFR flights are permitted, IFR flights are subject to air traffic control service and are separated from other IFR flights. All flights receive traffic information as far as is practical.

Class F. IFR and VFR flights are permitted, all participating IFR flights receive an air traffic advisory service and all flights receive flight information service if requested.

Class G. IFR and VFR flights are permitted and receive flight information service if requested.

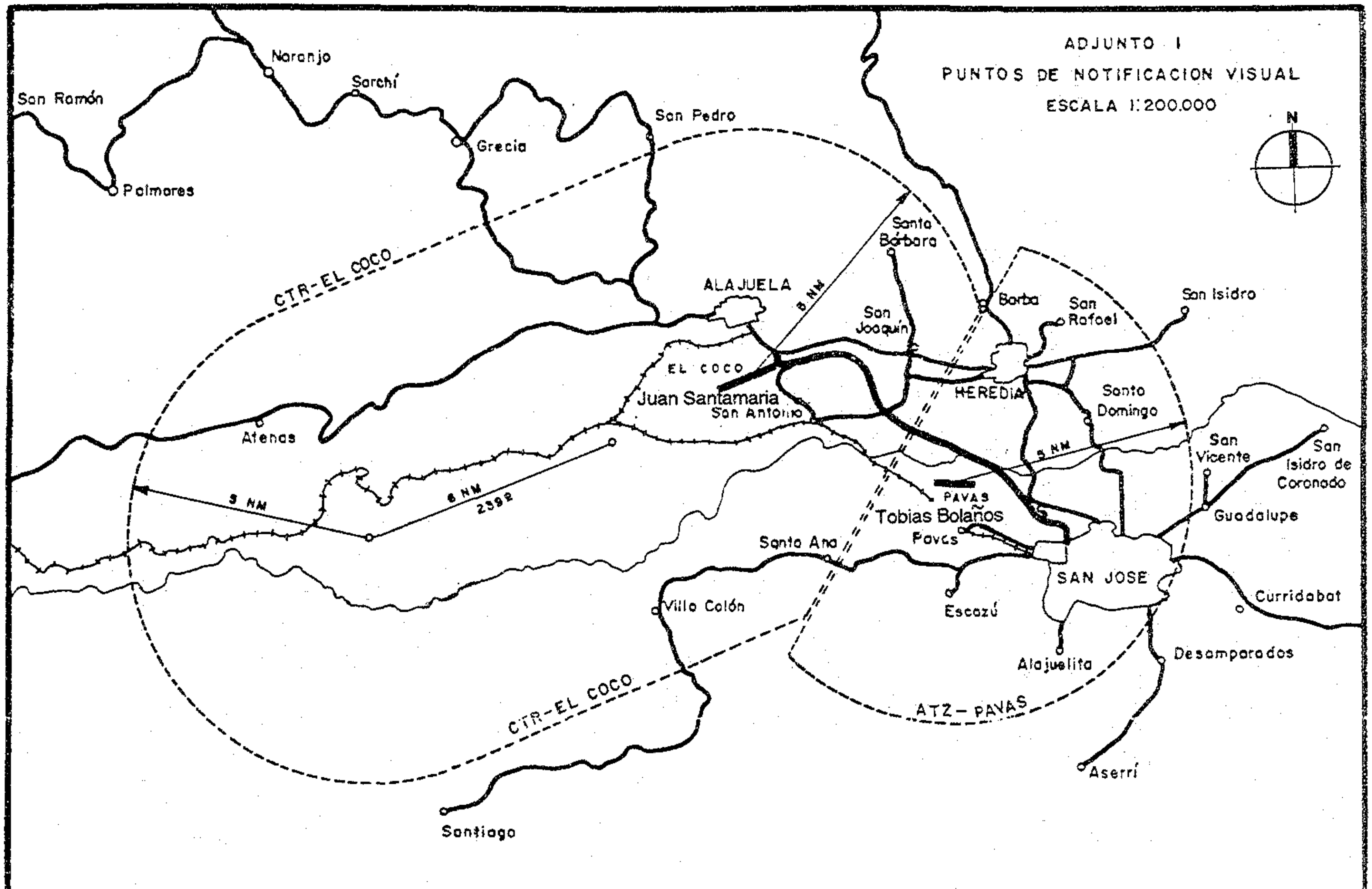

Figure 11.2.3 Control Zones for Juan Santamaria Airport and Airport Traffic Zone for Tobias Bolaños Airport

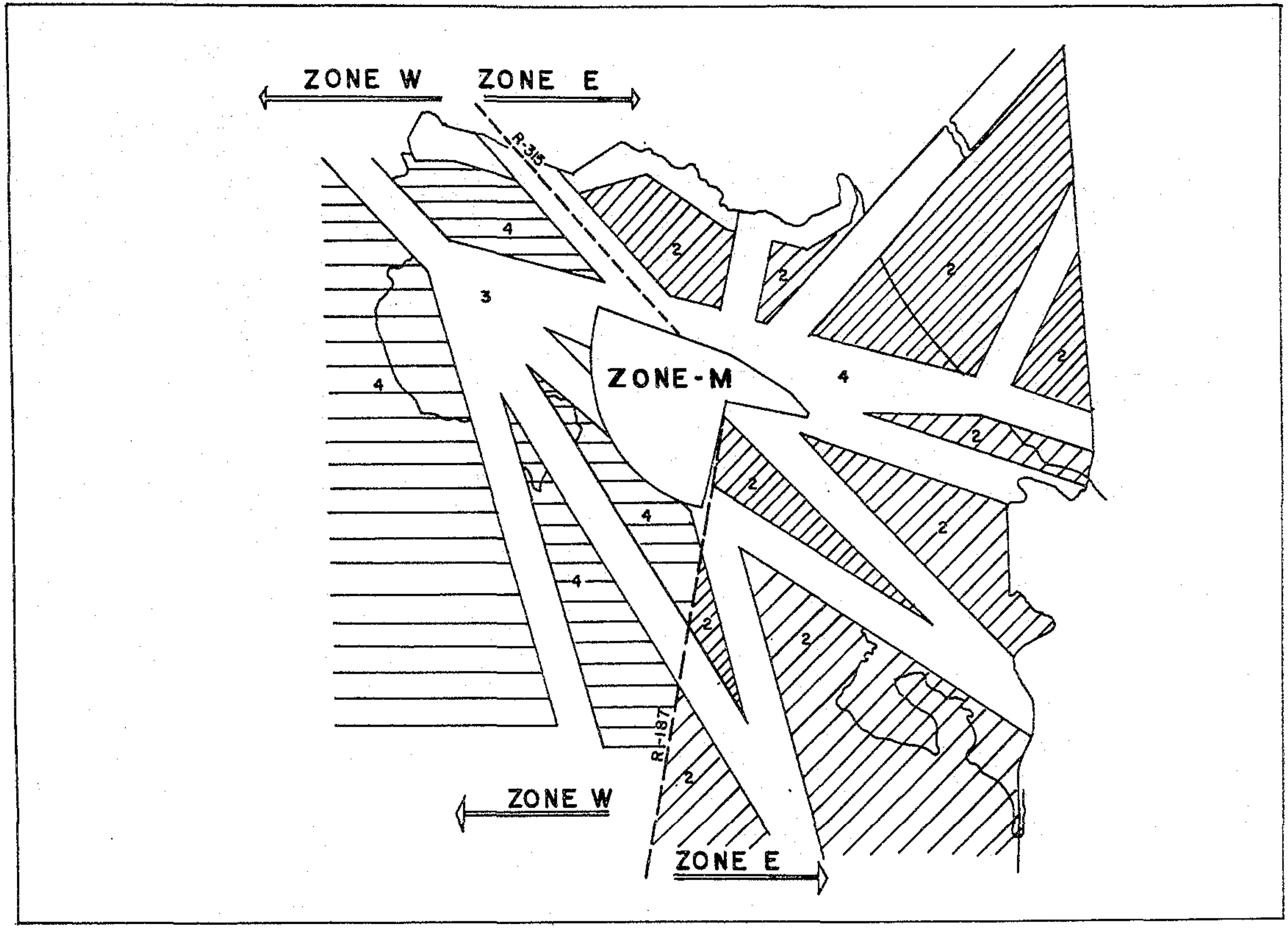

Figure 11.2.4 Classification of Airspace in Costa Rica

Table 11.2.1 Classification of Airspace in Costa Rica

Zone	Airway out of Awy	Altitude	Classification of Airspace
M	Airway and Out of Airway	19,000 3,000	C
		2,500 GND	G
E	Airway	19,000 MEA	C
		MEA-500 GND	G
	Out of Airway	19,000 15,000	C
		14,500 GND	G
W	Airway	19,000 MEA	C
		MEA-500 GND	G
	Out of Airway	19,000 9,000	C
		8,500 GND	G

11.3 Relationship between Airspace Use of Juan Santamaria and Tobias Bolaños International Airport

Tobias Bolaños Airport is a general aviation airport located approximately 4.5NM (8.3 km) southeast of Juan Santamaria Airport. This airport is used exclusively for VFR aircraft. The number of aircraft movements at the airport reached 28,258 in 1990, which was comparable with that of Juan Santamaria Airport.

As mentioned in Section 11.2.4, airspace for the two airports are segregated by the control zone and airport traffic zone, but to promote air safety and to make more convenient airspace around Juan Santamaria Airport, the authority is planning to revise the control zone of Juan Santamaria Airport and the airport traffic zone of Tobias Bolaños Airport are as shown in Figure 11.3.1.

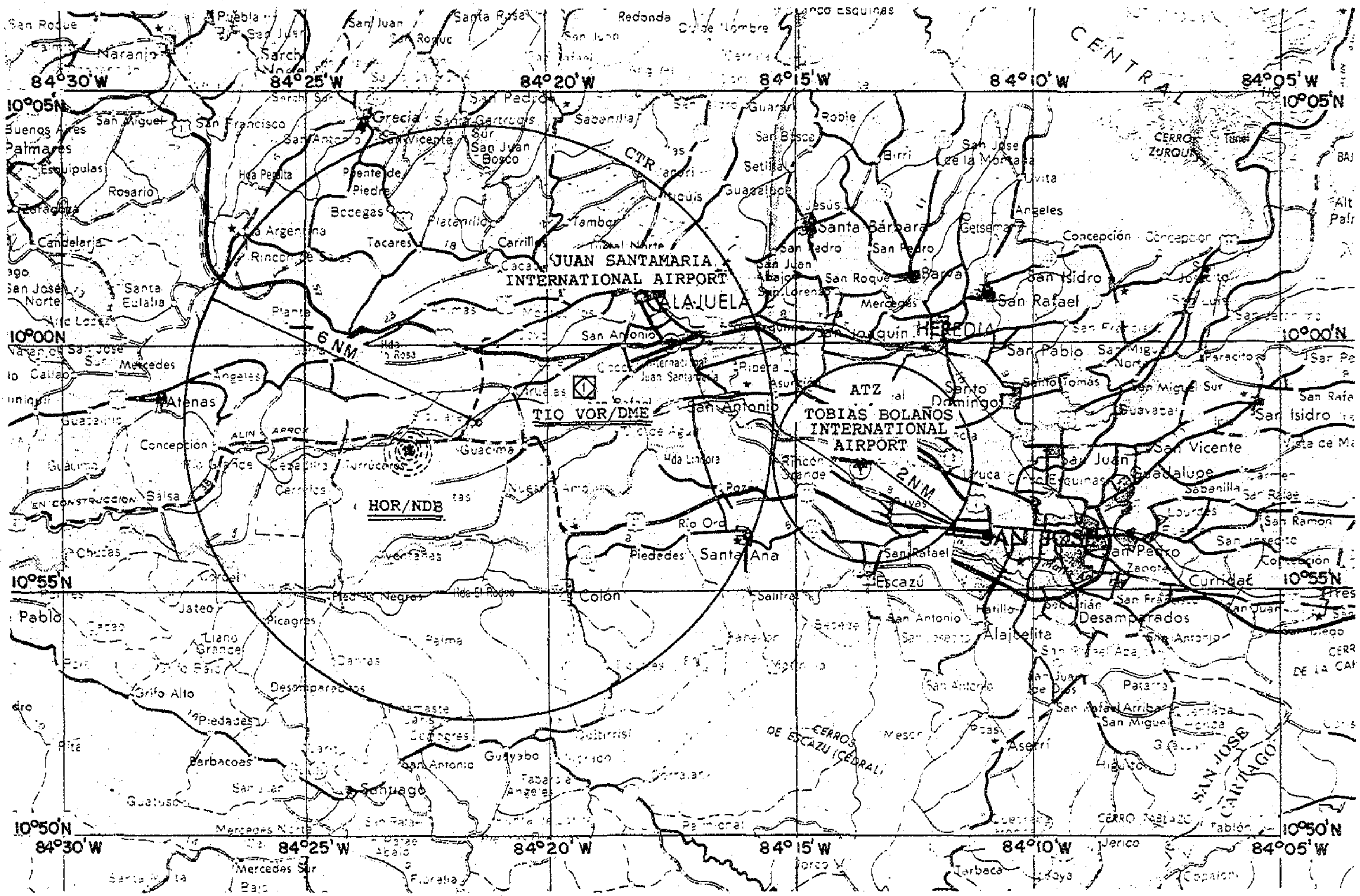

Figure 11.3.1 Plan of Revision of CTR/ATZ for Juan Santamaria and Tobias Bolaños International Airports

It is felt that the above-mentioned measures together with the classification of airspace mentioned in Section 11.2.6 are appropriate to manage closely located airspace of Juan Santamaria and Tobias Bolaños Airports. However, at present, it is also felt that the safety of aircraft operations can be enhanced by the following additional measures:

a) The airport traffic patterns of the two airports and the circling approach area for Juan Santamaria Airport should be strictly separated.

b) All aircraft operating around the airspace of Juan Santamaria Airport are to be positively controlled by Coco Control, particularly in the final approach areas for runways 07 and 25.

Figure 11.3.2 shows a circling area plan for both airports which has been prepared for the separation of aircraft maneuvering at both airports. Appendix 11.3.1 explains Figure 11.3.2 in detail.

11.4 Aircraft Operation Procedures

This section describes the aircraft operation procedures of Juan Santamaria Airport. The aircraft operation procedures of Juan Santamaria Airport will be basically the same as the existing procedures in the short-term development because the existing runway and air navigation facilities can be utilized until 2000.

Approach charts and standard instrument departures (SID) for Runways 07 and 25 which are shown in the Aeronautical Information Publication in Costa Rica (AIP) are shown in Appendix 11.4.1.

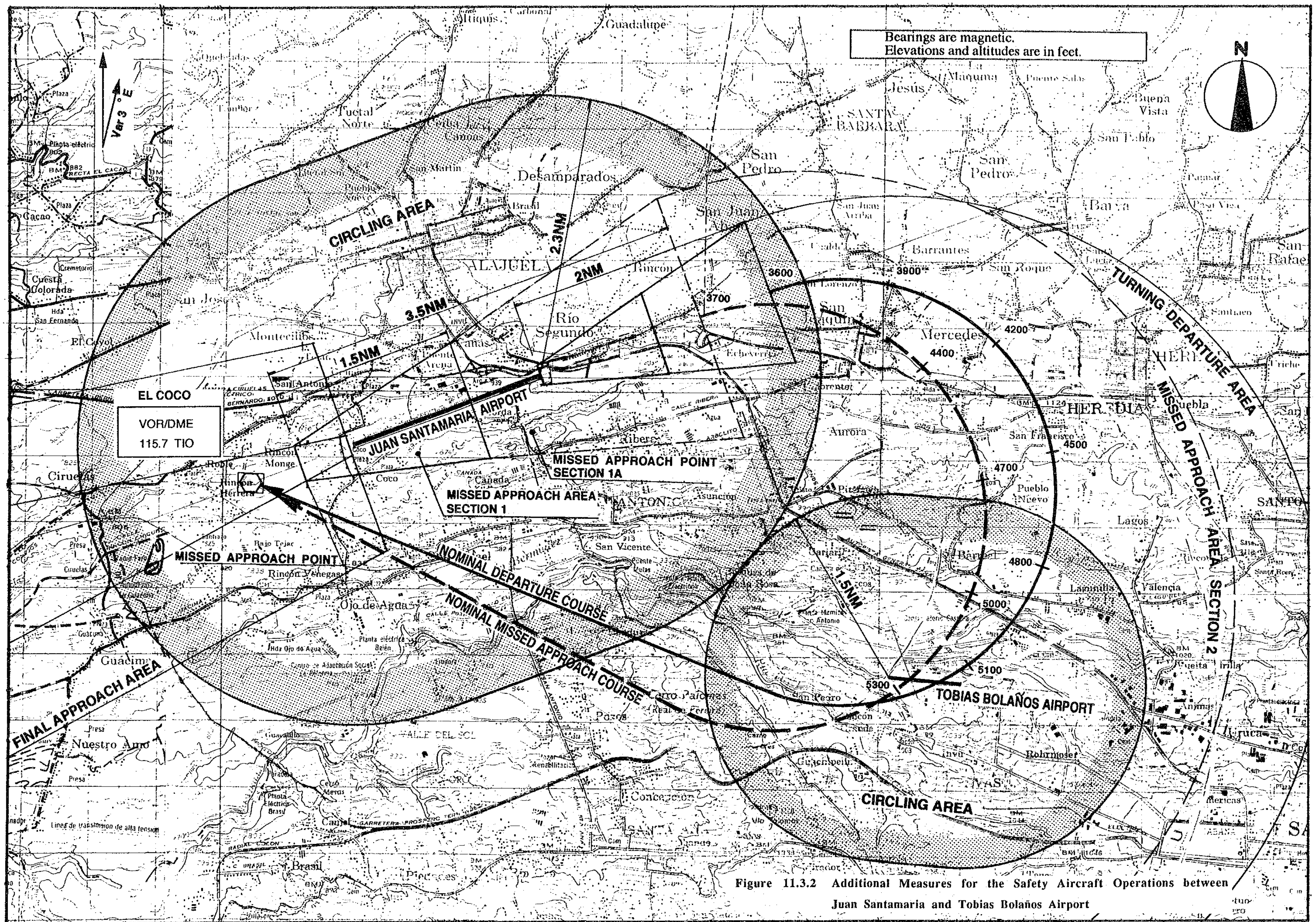

Figure 11.3.2 Additional Measures for the Safety Aircraft Operations between Juan Santamaria and Tobias Bolaños Airport

CHAPTER 12 AIRCRAFT NOISE ANALYSIS

CHAPTER 12 AIRCRAFT NOISE ANALYSIS

12.1 General

This chapter examines the aircraft noise influence on the surrounding area of Juan Santamaria and Liberia airports.

12.2 Aircraft Noise Contours

The level of aircraft noise is estimated by use of WECPNL (weighted equivalent continuous perceived noise level), which is one of ICAO standard indices for aircraft noise, and noise contours are drawn on the existing land use map.

The contours are calculated for the years 1991 (present), 2000 (the short-term development) and 2010 (the long-term development) of Juan Santamaria Airport and for the year 2010 of Liberia Airport as shown in Figures 12.2.1 through 12.2.4. The conditions for calculation of aircraft noise are included in Appendix-12.2.1.

12.3 Evaluation of Noise Influence

It is determined in Japan that appropriate countermeasures are required for aircraft noise if WECPNL in residential areas is more than 75. The countermeasures basically consist of the following:

a) Airport Surroundings Protection Measures

- Indemnity for relocation of local residents (WECPNL > 90), sound proofing work for dwellings (WECPNL > 75), etc.
- Land use planning of airport surroundings for industrial use, buffer green belt (WECPNL > 95), etc.

b) Airport Structural Improvements

- Relocation of runways, construction of buffer green belts and noisebreak forests within airport property.

c) Noise Source Control Measures

- Improvements in operating methods such as adoption of rapid climb out, delayed flap approach procedure and preferential runway use.
- Restrictions on night flights, establishment of arrival/departure quotas and introduction of larger aircraft with reduced frequencies.
- *Aircraft improvements including modification of existing engines to lower* noise types and introduction of low noise aircraft.

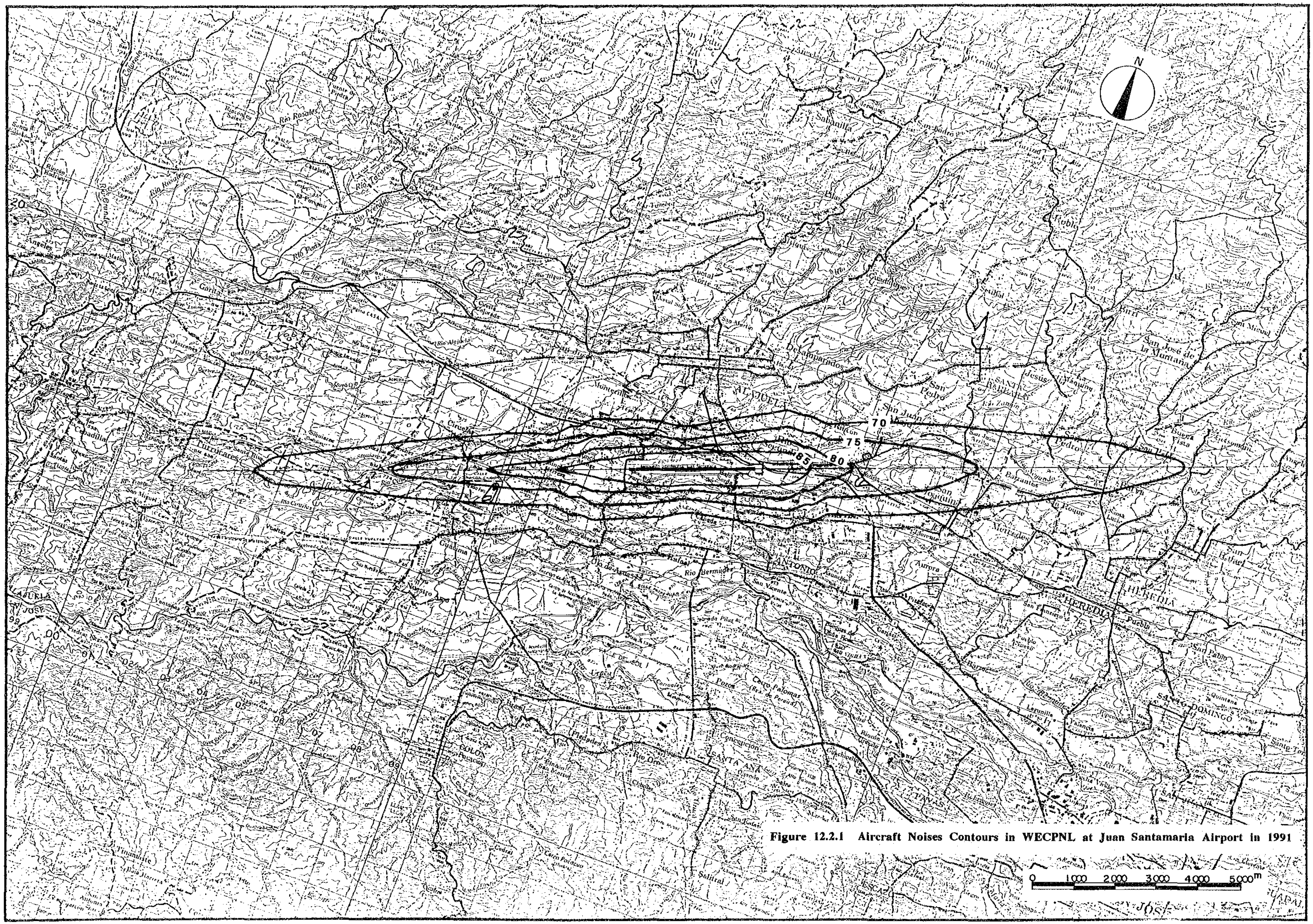

Figure 12.2.1 Aircraft Noises Contours in WECPNL at Juan Santamaria Airport in 1991

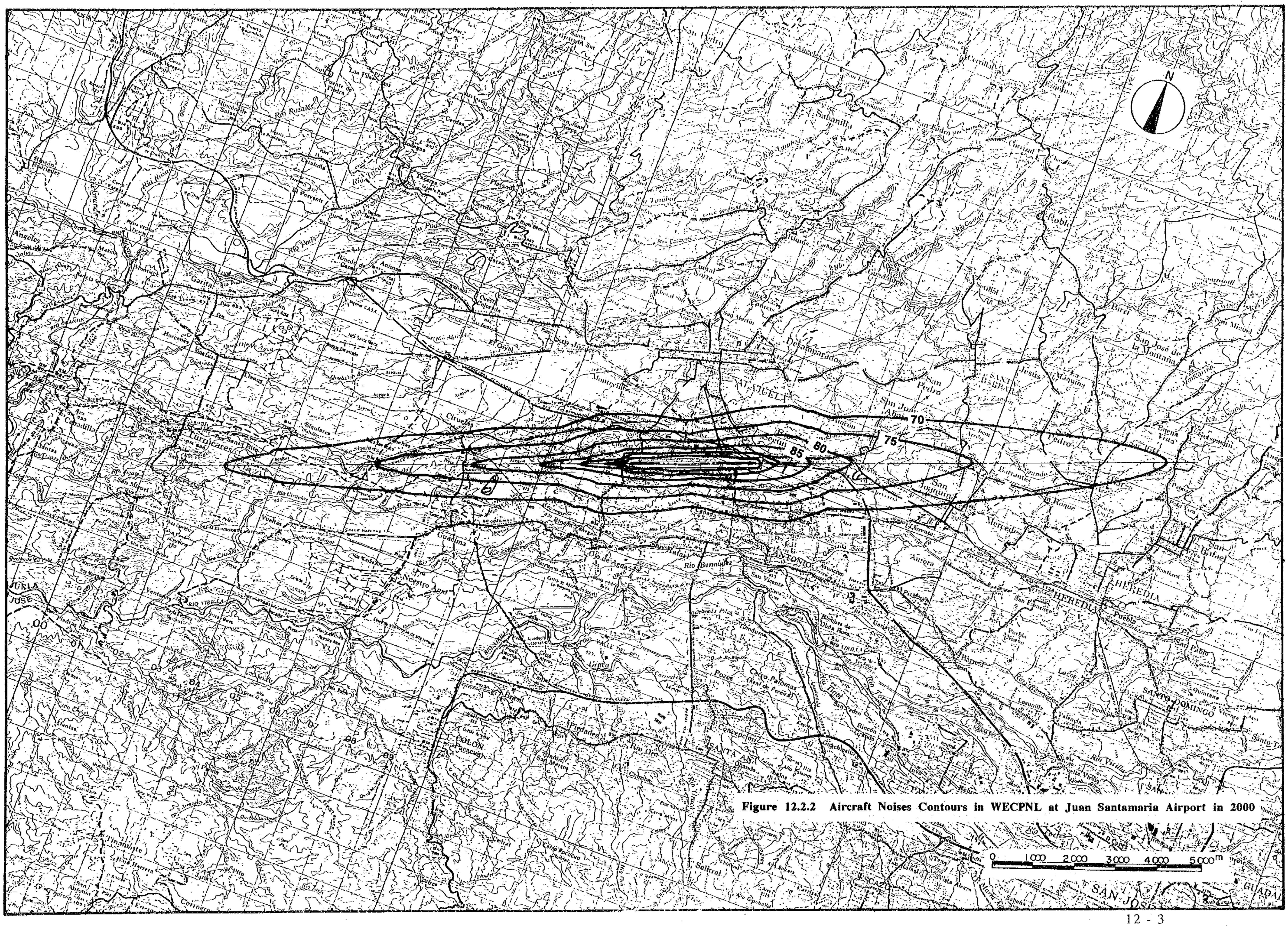

Figure 12.2.2 Aircraft Noises Contours in WECPNL at Juan Santamaria Airport in 2000

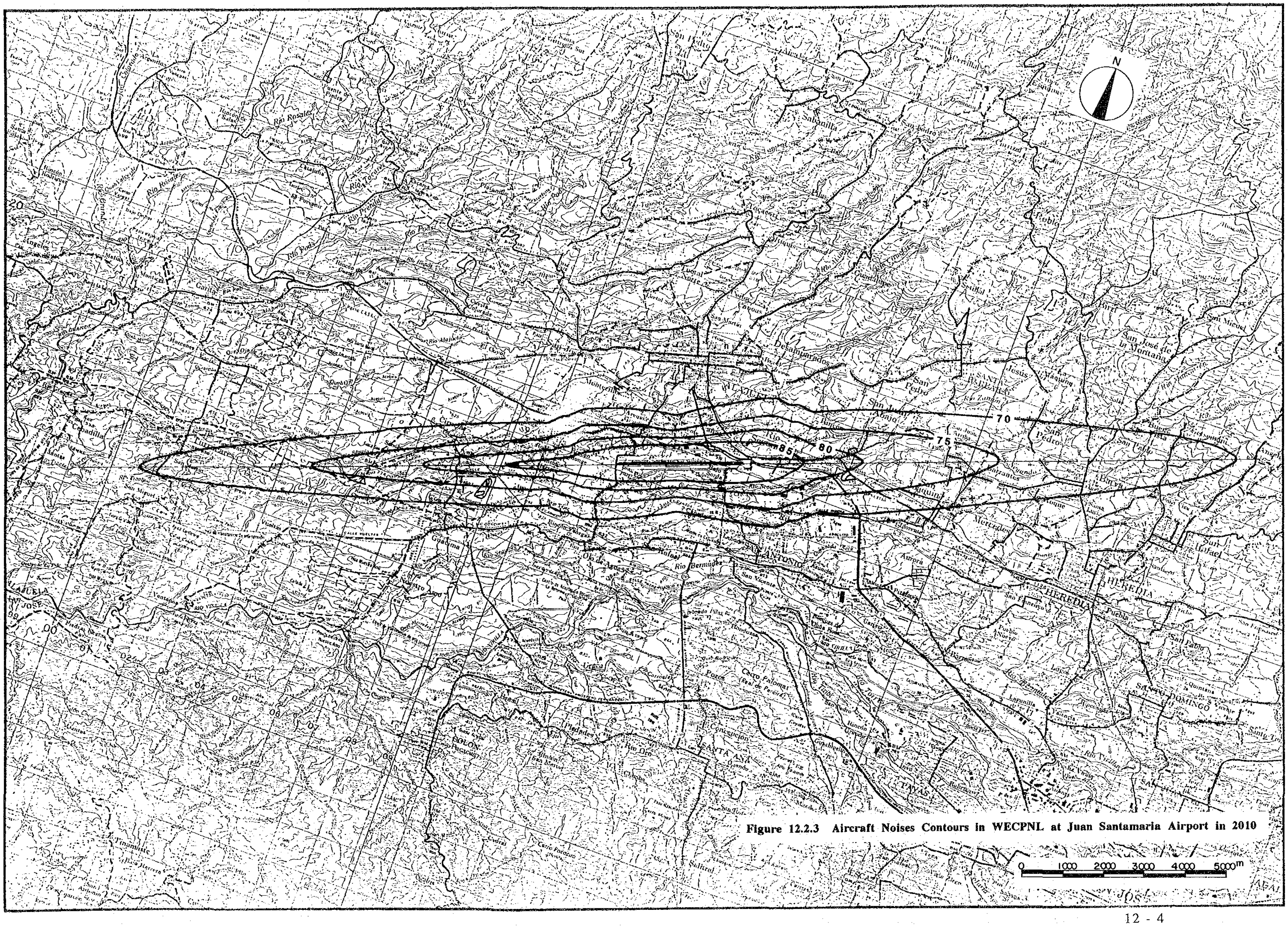

Figure 12.2.3 Aircraft Noises Contours in WECPNL at Juan Santamaria Airport in 2010

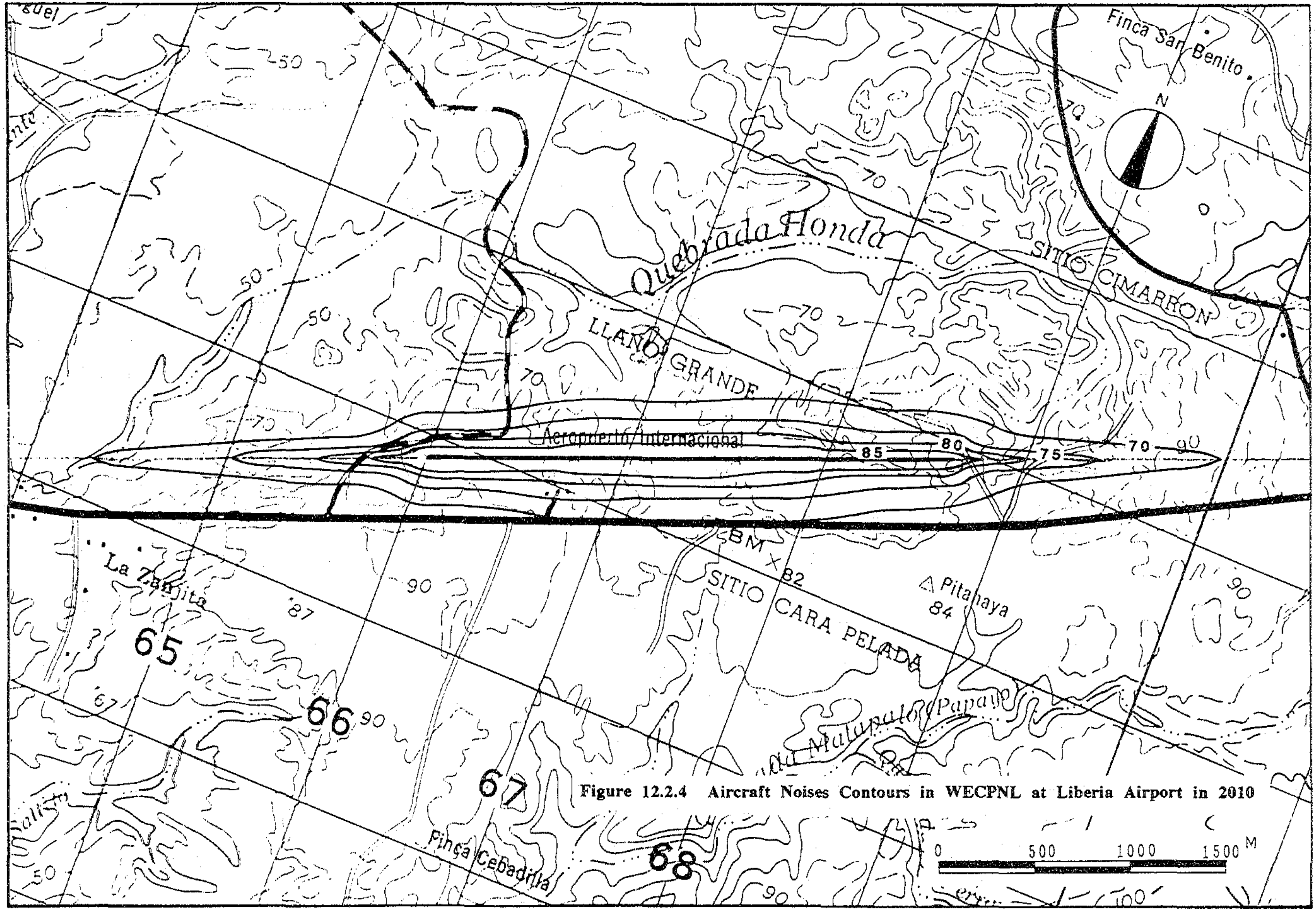

Figure 12.2.4 Aircraft Noises Contours in WECPNL at Liberia Airport in 2010

12.4 Juan Santamaria Airport

12.4.1 Areas to be Affected by Aircraft Noise

The total area with WECPNL more than 70 and 75 are estimated for the year 1991, 2000 and 2010 as shown in Table 12.4.1.

Table 12.4.1 Noise Affected Area around Juan Santamaria Airport

Year	WECPNL	
	more than 70	more than 75
1991	3,904 ha	1,741 ha
2000	3,964 ha	1,747 ha
2010	5,184 ha	2,254 ha

As is clear form the above table, the aircraft noise influence is serious around Juan Santamaria Airport even now. Particularly, the noise level of densely populated Rio Grande area under the runway 25 approach surface is serious with a WECPNL of more than 80. Bajo Sorda, Coco and Rincon Herrera are also within the WECPNL 80 contour.

The aircraft noise influence in 2000 will not increase in severity when compared with the existing condition regardless of increase in aircraft movements. This is because the present B727-200 will be replaced with the A320 which uses a lower noise type engine.

12.4.2 Evaluation of Current Land Use Regulation

At present, the land use around the airport is controlled by the DGAC by a regulation indicated in Figure 3.2.3 (Page 3-13). The comparison between the WECPNL contours in and the areas subject to the current land use regulation is show in Figure 12.4.1. The coverage of the regulation more or less agrees with the WECPNL 70 contours. Therefore, it can be said that the current land use regulation is compatible with the expected noise influence in the future.

Nevertheless, it is a fact that the location of Juan Santamaria Airport is not appropriate from the viewpoint of aircraft noise.

12.5 Liberia International Airport

As indicated in Figure 12.2.3, the aircraft noise at Liberia Airport will not affect the surrounding community even in 2010. This is because of low airport traffic and the surrounding agricultural land use.

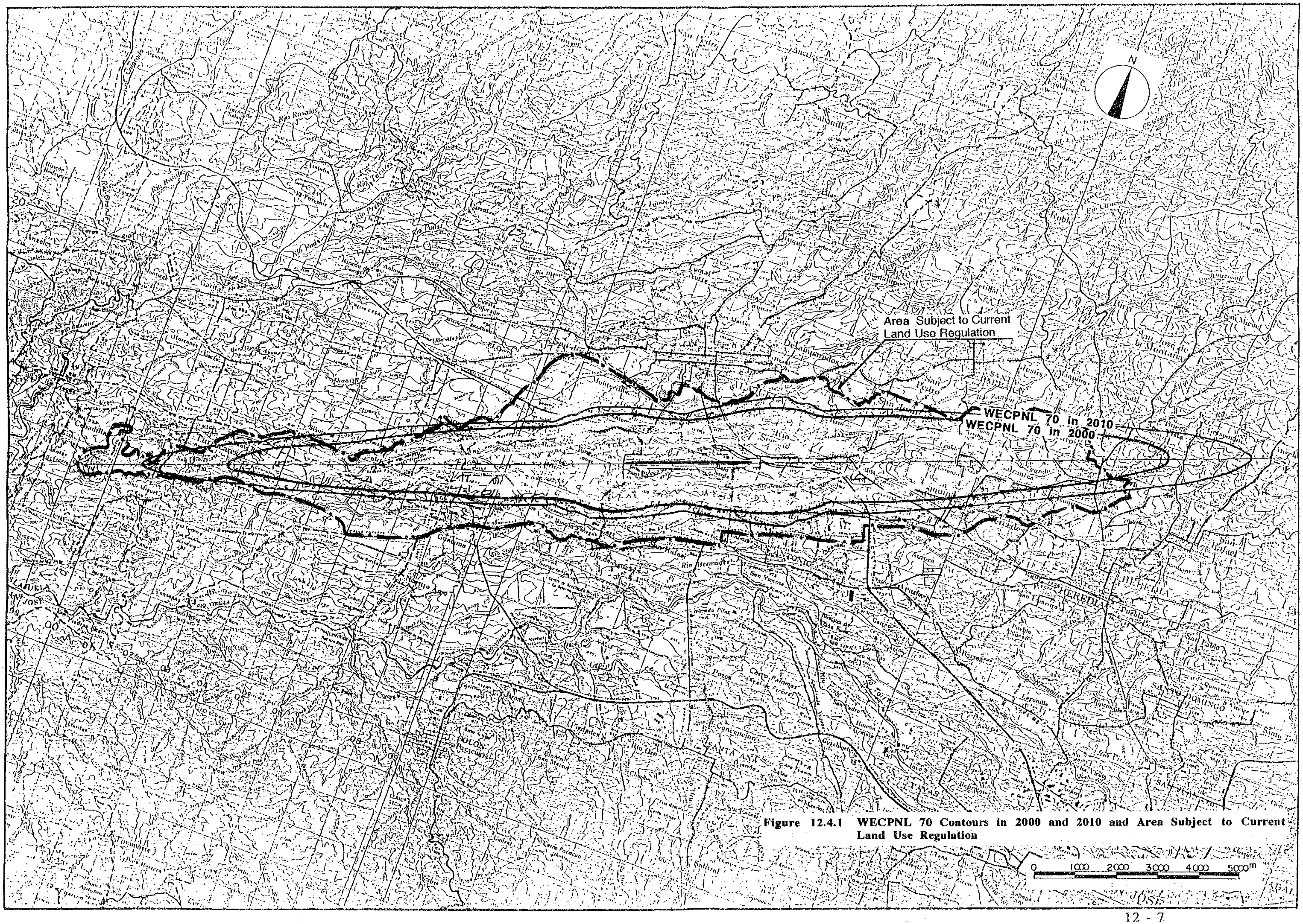

Figure 12.4.1 WECPNL 70 Contours in 2000 and 2010 and Area Subject to Current Land Use Regulation

CHAPTER 13 STUDY OF AIRPORT OPERATION AND MAINTENANCE

CHAPTER 13 STUDY OF AIRPORT OPERATIONS AND MAINTENANCE

13.1 General

In this chapter, the existing organization and additional airport staff are described.

13.2 *Existing Organization*

The Directorate General of Civil Aviation (DGAC), which belongs to Ministry of Public Works and Transport (MOPT) administrates Juan Santamaria International Airport and three other international and thirty domestic airports. The organization and number of staff of DGAC are shown in Figure 13.2.1.

The organization of Juan Santamaria International Airport consists of 13 sections as shown in Figure 13.2.2. All of the staff are housed in the administration office at the airport terminal building and perform routine work of airport operation and maintenance under the administrative control of DGAC.

Large scale maintenance works such as repair of runway and passenger terminal buildings are directly performed by DGAC at its convenience due to an insufficient number of staff and equipment at the airport administration office.

The meteorological office located at the airport is managed by the DGAC and performs observation services of airport meteorological conditions in accordance with ICAO Annex 3.

The COCESNA dispatches staff to the airport in order to maintain the ILS, VOR/DME and NDB facilities formulating Air Traffic Services (ATS) routes. The number of its staff is indicated in Figure 13.2.2.

The rescue and fire fighting services are principally organized by the National Institute of Insurance (INS). The organization chart is shown in Figure 13.2.3.

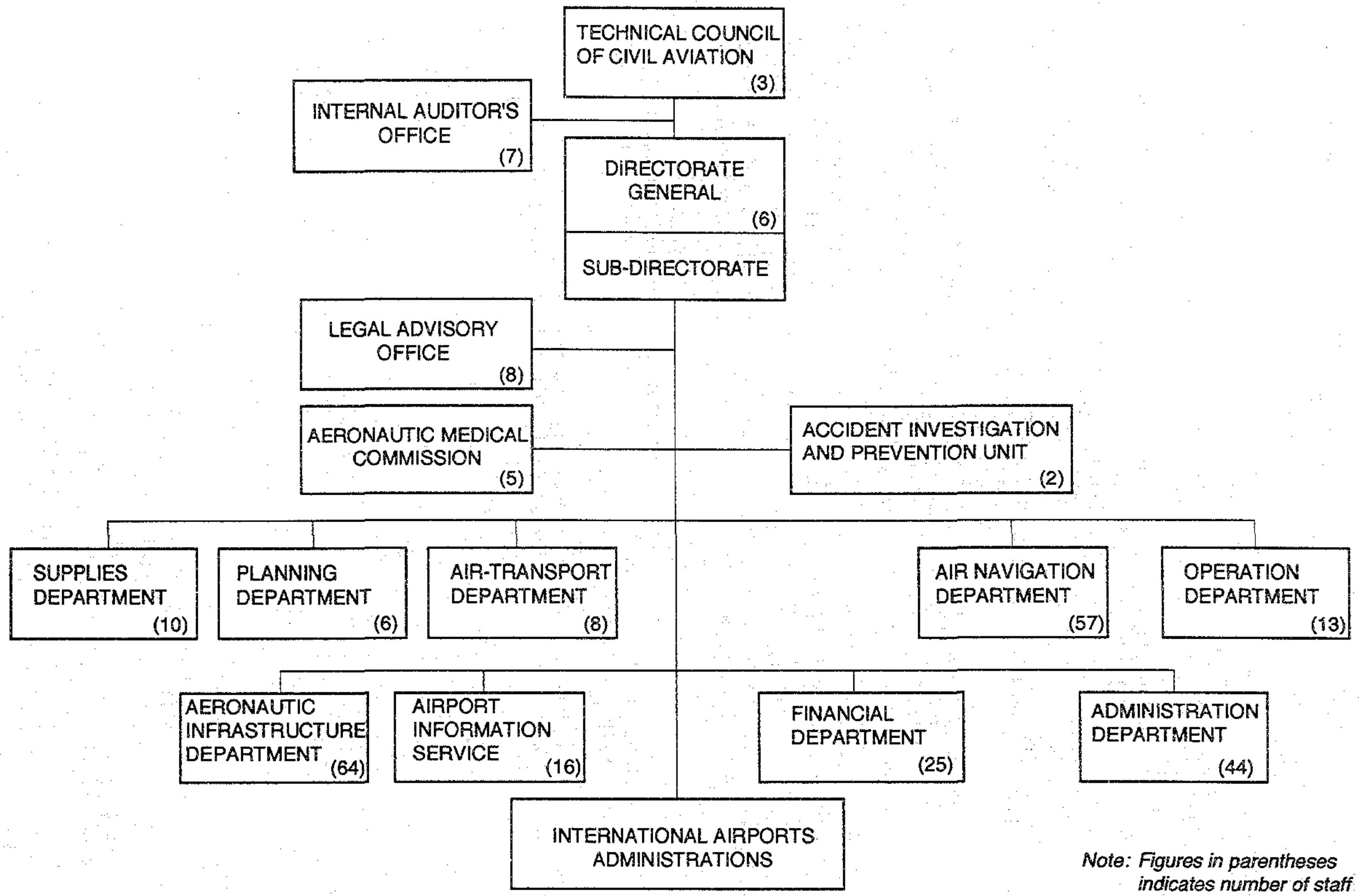

Figure 13.2.1 Organization Chart of the DGAC

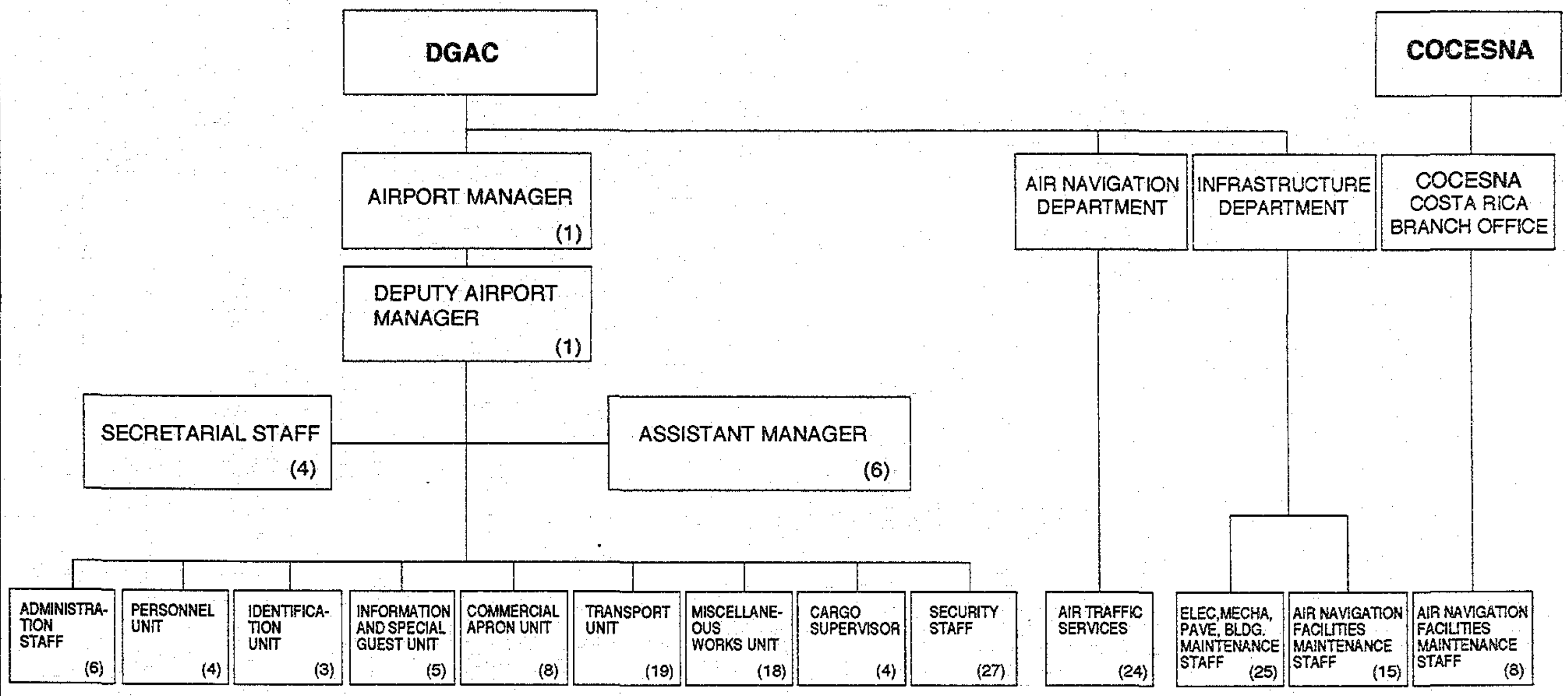

Figure 13.2.2 Organization Chart of Juan Santamaria Airport

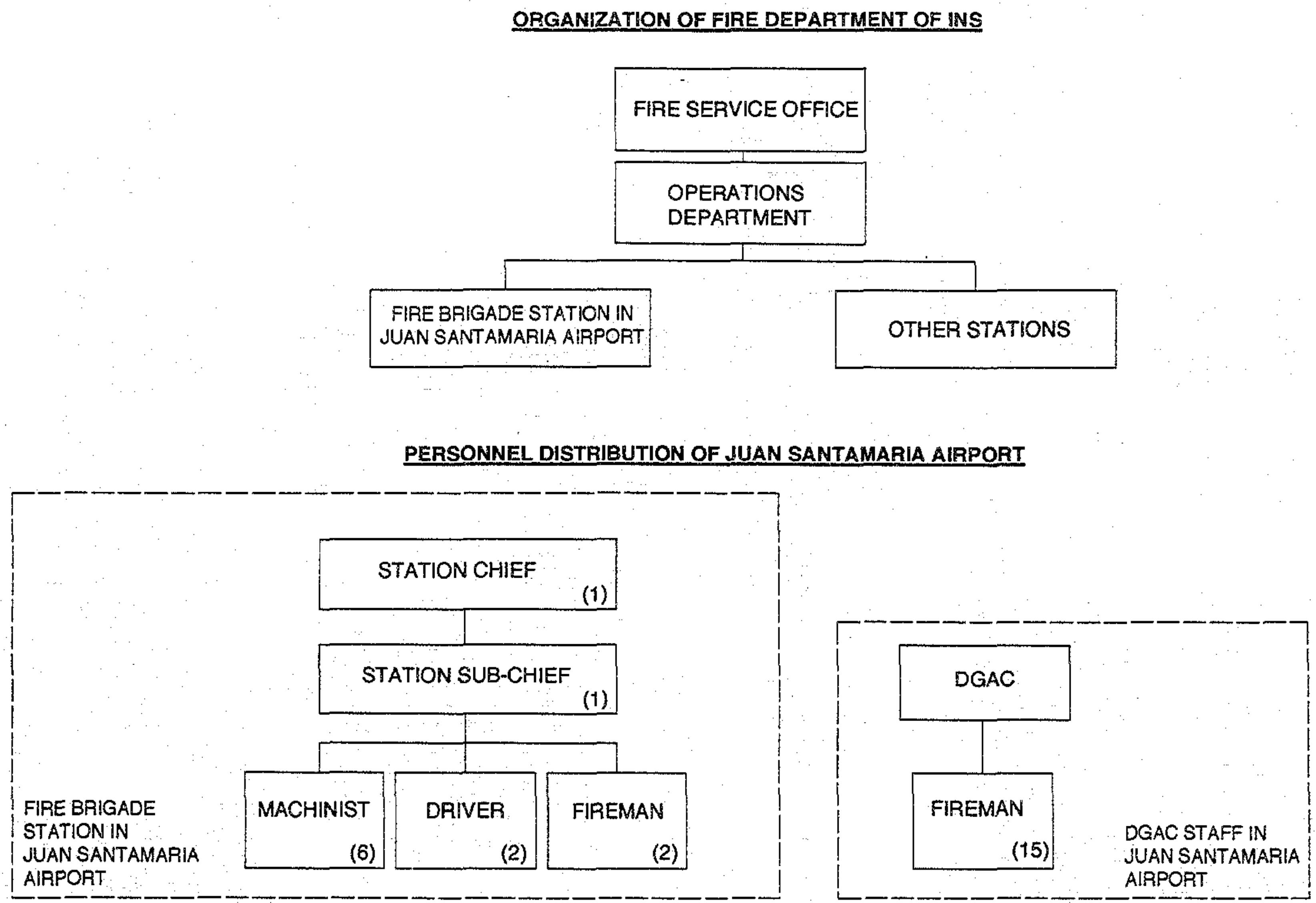

Figure 13.2.3 Organization Chart of the Resque and Fire Fighting Staff at Juan Santamaria Airport

13.3 Additional Airport Staff

The additional airport staff required for short-term development is to be examined to obtain the additional personnel cost in economic and financial analyses.

The organization structure in year 2000 is assumed to be the same system as existing and to be expanded in proportion to the growth of air traffic volume.

Expansion of aprons and passenger terminal buildings, construction of new cargo buildings, and installation of new equipment will require additional staff for operations and maintenance.

The total number of airport staff in Juan Santamaria including the staff of COCESNA and INS is estimated to increase from the present 205 persons to 262 persons in the year 2000 after short-term development. The break down of additional airport staff is shown in 13.3.1.

Table 13.3.1 Breakdown of Additional Airport Staff in Juan Santamaria

Section	No. Of Staff in 1990	No. of Staff in 2000	No. of Additional Staff	Remarks
1. Airport Manager	1	1	0	-
2. Deputy Airport Manager	1	1	0	-
3. Administration & Accounting Staff	28	34	6	Estimated as 20 % of total number of staff based on the increase of handling passenger
4. Vehicle Operator	27	35	8	Assumed to increase in proportion to administration, accounting and maintenance staff
5. Miscellaneous Works Staff	18	23	5	Ditto
6. Cargo Supervisor	4	13	9	Assumed to increase in accordance with cargo handling volume
7. Security Staff	27	34	7	Assumed to increase in accordance with security control area
8. Air Traffic Services Staff	24	32	8	Estimated as 30 % of total number of staff based on the increase of aircraft movement
9. Maint. Staff of Elec.Mech. Pvml. & Bldg.	40	54	14	Assumed to increase in accordance with floor area of building, pavement and grass area
10. COCESNA Staff	8	8	0	Remain unchanged because of no development of air navigation facilities maintained by COCESNA
11. Rescue and Fire Fighting Staff	27	27	0	Remain unchanged because of no development of rescue and fire fighting facilities.
Total	205	262	57	

CHAPTER 14 PROJECT IMPLEMENTATION SCHEDULE AND COST ESTIMATES

CHAPTER 14 PROJECT IMPLEMENTATION SCHEDULE AND COST ESTIMATES

14.1 General

This chapter explains the implementation schedule including the construction planning, and cost estimates of the short-term development project based on the preliminary design in Chapter 10.

14.2 Project Implementation Schedule

14.2.1 Construction Planning

(1) Runway Overlay

The runway overlay will be carried out at night avoiding the airport operating time.

(2) Existing Terminal Road and Carpark

The realignment of the existing terminal road will be carried out in the following 5 stages:

Stage-1 : The departure terminal road and carpark will be constructed on the 1st floor level

Stage-2 : The arrival terminal road area where the pedestrian bridges are planned will be excavated to the basement level. The foundations of the bridges will be also constructed.

Stage-3 : The pedestrian bridges will be constructed.

Stage-4 : The whole area of the arrival terminal road will be excavated to the basement level. The slope between the 1st floor level and the basement level will be protected.

Stage-5 : The arrival terminal road and connecting road will be paved and the terminal curb on the basement will be constructed.

The detailed construction plan on each stage is shown in Appendix 14.2.1.

(3) International Passenger Terminal Building

The construction of the new block and the remodeling of the existing blocks will be divided into five stages so that the existing terminal can be kept operable during the work with minimum nuisance. The following are to show an example:

Stage-1 : Construct a new block at the west side of the central block, which should be synchronized with the construction of the land side deck and access road in front.

Stage-2 : Move the functions located in the west half of the existing basement such as airline offices, VIP, etc., into the completed new block, thus enabling the remodeling work in the vacant area. VIP is to be located temporarily in the new bus departure lounge until the completion of Stage-4. As soon as the new departure baggage handling facilities get ready, two thirds of the new check-in counters are ready to start operating, and the space for the remaining one third is to be used temporarily for departure immigration and security check spaces. The arrival passenger processing will remain as it is.

Stage-3 : Remodel the west half of the basement and all the first floor of the existing central block, which should be synchronized with the construction of the land side deck and access road in front. Then start operating the west half of the new arrival passenger processing, but leading arrival passengers to the upstairs of the new block. At this step, the new curb at the first floor level is to be utilized by both departure and arrival passengers. At the completion of the new departure immigration and security check spaces, the full facilities for departure passenger processing are now available.

Stage-4 : Remodel the east half of the basement to complete the entire facilities for arrival passenger processing, other public offices, staff utilities, VIP, etc. At the completion of the new VIP, the bus departure lounge will be available. The landside access to the new VIP is to be completed at this stage. The remodeling work on the 2nd and 3rd floors of the existing central block (which are relatively minor), will be done at this stage, and the re-arrangement of both public and private offices are to be finalized. Normal operation of the proposed facilities for passenger processing can start now.

Stage-5 : Construct the new block at the east end with the additional boarding bridge. Completion of the facilities for short-term development.

The above staging is shown in Appendix 14.2.2.

14.2.2 Implementation Schedule

The implementation schedule of the short-term development project is shown in Figure 14.2.1.

The next stage of the project implementation to this Study is the financial arrangement for the project. Other preparatory items to be completed prior to the commencement of the construction work are topographic surveys, soil investigations, basic design, detailed design and tendering.

The construction work will take approximately 2 years to complete, including test operations and flight check. It will start with the runway overlay and construction of the new taxiway, apron and landside facilities followed by the construction of some buildings, and preparation of airport utilities and air navigation systems.

Table 14.2.1 Project Implementation Schedule

	1992	1993	1994	1995	1996
1 Service Period					Short-term
2 Feasibility Study					
3 Financial Arrangement					
4 Topographic Survey and Soil Investigation					
5 Basic Design					
6 Detailed Design and Tendering					
7 Construction Works					
7.1 Runway Overlay					
7.2 Taxiway and Apron					
7.3 Landside Facilities					
7.4 Buildings					
7.5 Airport Utilities					
7.6 Air Navigation Systems					
8 Test Operation and Flight Check					

14.3 Project Cost Estimates

(1) Assumption of the Cost Estimates

The costs were estimated using the following assumptions:

a) The costs are based on the unit construction prices at the end of 1991.

b) The exchange rates are Costa Rica colone 130 per US dollar.

c) The costs are estimated in Colones.

d) No price escalation is considered for cost estimates.

e) The facilities to be provided by the oil company and the airlines such as the fuel supply system and ground service equipment are not included in the project cost.

f) All costs are subject to ±10% error.

g) The foreign currency portion of the project costs includes the following items:
   - Procurement cost for the imported materials and equipment
   - Procurement cost for the imported construction equipment
   - The general expenses and profit for the foreign contractors and engineering firms
   - Wages for foreign staff

h) The Costa Rican currency portion of the project costs includes the following items:
   - Operation cost of the construction equipment including fuel and lubricants
   - Procurement costs of the construction materials which are available in Costa Rica such as aggregate and others
   - Transportation costs for procured materials and labor employed in Costa Rica
   - The general expenses and profit for the Costa Rican contractors and engineering firms
   - Wages for Costa Rican laborers
   - Compensation and land acquisition

i) Contingencies are estimated to be about 10% of the sum of the total cost of construction work, soil investigations, topographic surveys and engineering services cost.

(2) Cost Estimates for the Short-term Development Project

The cost of the short-term development project is shown in Table 14.3.1. The total cost of the project is estimated to be 6,863 million colones (US$53 million)

Table 14.3.1 Cost Estimates for the Short-term Development Project

(Unit:1,000xColones)

ITEM	FOREIGN PORTION	COSTA RICAN PORTION	TOTAL
CIVIL WORKS			
Earth Works	94,756	61,741	156,497
Drainage	15,380	10,172	25,552
Runway Overlay	164,260	84,040	248,300
Taxiway	12,586	7,070	19,656
Apron	389,540	248,730	638,270
GSE Road & Park	19,552	10,810	30,362
Access Road & Car Park	56,754	31,701	88,455
Pedestrian Bridge	135,000	33,750	168,750
Miscellaneous	4,790	2,290	7,080
Sub-total	892,618	490,304	1,382,922
ARCHITECTURAL WORKS			
Int'l. Passenger Terminal	1,337,745	379,863	1,717,608
Dom. Passenger Terminal	58,047	19,867	77,914
Int'l. Cargo Terminal	794,917	288,964	1,083,881
Sub-total	2,190,709	688,694	2,879,403
AIR NAVIGATION SYSTEMS			
ATC System	108,376	344	108,720
Meteorological System	138,813	2,002	140,815
Airfield Lighting System	72,967	8,645	81,612
Sub-total	320,156	10,991	331,147
AIRPORT UTILITIES			
Water Supply	21,622	5,418	27,040
Sewerage	249,240	33,570	282,810
Waste Disposal	42,300	4,700	47,000
Power supply	101,675	10,825	112,500
Telephon	12,800	19,200	32,000
Sub-total	427,637	73,713	501,350
TOTAL OF CONSTRUCTION COST	3,831,120	1,263,702	5,094,822
COMPENSATION	0	536,000	536,000
ENGINEERING SERVICES	537,278	185,320	722,598
CONTINGENCY	383,112	126,370	509,482
TOTAL OF PROJECT COST	4,751,510	2,111,392	6,862,902

CHAPTER 15 ECONOMIC AND FINANCIAL ANALYSES

CHAPTER 15 ECONOMIC AND FINANCIAL ANALYSES

15.1 General

The economic and financial analyses were conducted out for the development of Juan Santamaria International Airport. In the economic analysis, the short-term development project was evaluated from the viewpoint of its contribution to the national economy. The financial analysis was carried out to investigate on the financial impact of the project by the Directorate General of Civil Aviation.

15.2 Economic Analysis

15.2.1 Standard Conversion Factor

The economic analysis evaluates all inputs and outputs for a project at economic prices because existing market prices are influenced by various kinds of market distortions such as import and export taxes and subsidies.

The standard conversion factor is estimated as 0.9, which converts financial value to economic value eliminating transfer portion. The rationale for the 0.9 is as follows:

(1) The excise tax in Costa Rica is now 13%, but within several years it will be reduced to 10%.

(2) In addition, the upper limit of the import tax is presently 40%, but in 1995 it will be reduced to 20%, realizing a 10% import tax on the average.

15.2.2 Economic Costs of the Project

(1) Construction Cost

The annual disbursement schedule of the construction costs for the short-term development are indicated in Table 15.2.1 in accordance with the implementation schedule in Table 14.2.1. The Costa Rican portion of the construction cost is converted from financial price to economic price by multiplying the Standard Conversion Factor of 0.9.

Table 15.2.1 Disbursement Schedule of Investment Costs

(Unit: 1,000 Colones)

Item / Year		1993	1994	1995	Total (Short-term)
Foreign Currency		214,911	1,958,475	2,578,124	4,751,510
Costa Rican Currency	Financial	610,128	860,831	640,433	2,111,392
	Economic	549,115	774,748	576,390	1,900,253
Total Economic Cost		*764,026*	*2,733,223*	*3,154,514*	*6,651,763*