

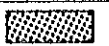


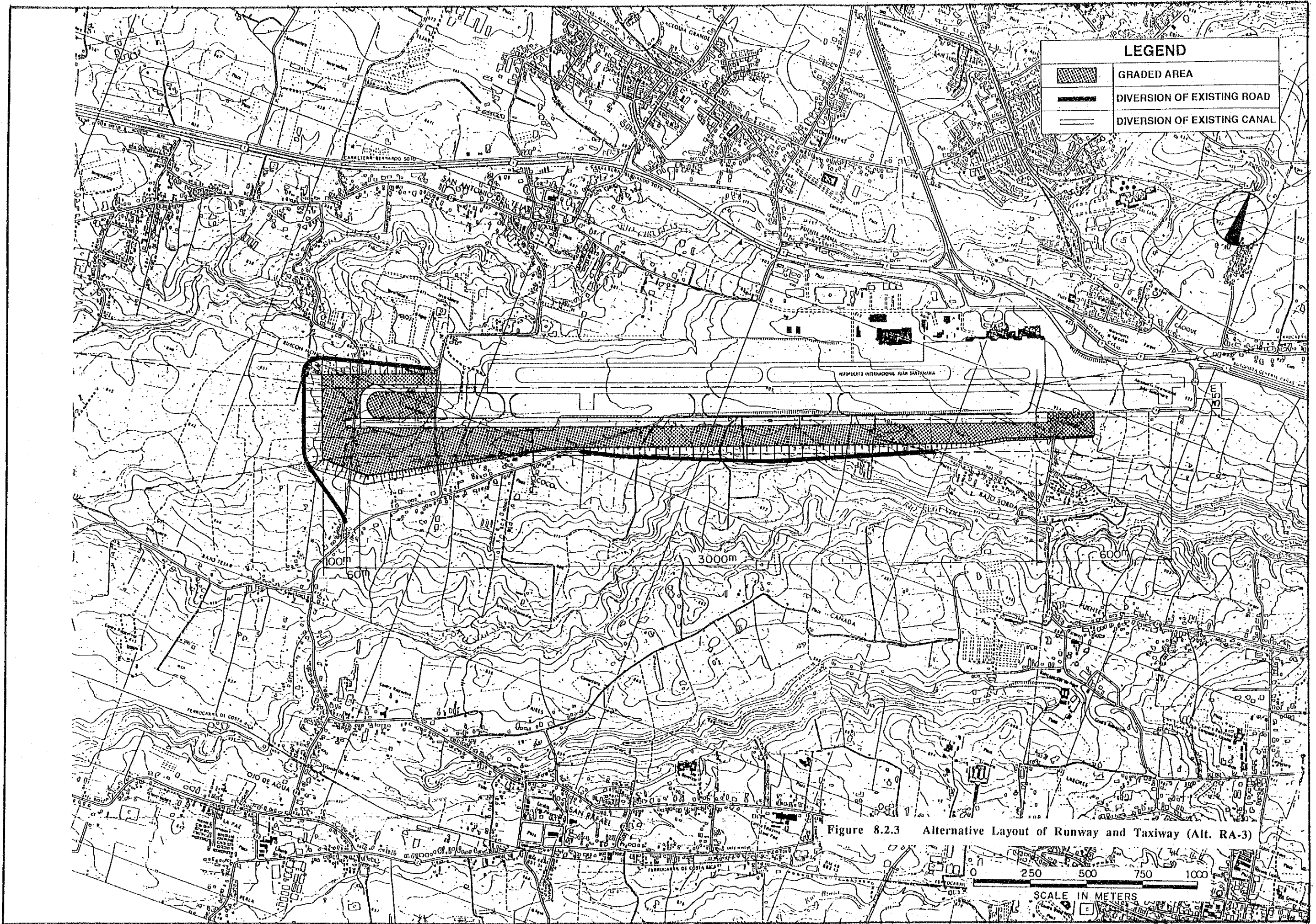
LEGEND	
	GRADED AREA
	DIVERSION OF EXISTING ROAD
	DIVERSION OF EXISTING CANAL

Figure 8.2.2 Alternative Layout of Runway and Taxiway (Alt. RA-2)

250 500 750 1000
SCALE IN METERS



3,000mの新滑走路と、平行誘導路として利用される既存滑走路とのクリアランスは、高速脱出誘導路を設置しない場合の最低基準である135 mとする。FAAが非精密進入滑走路の条件としている2.9%勾配の進入表面を確保するために、新滑走路25側末端は、既存滑走路の南側に設定し、新滑走路07側末端は、既存滑走路07側末端から西側へ600 m移動した位置とする。

- ・ R-B1案 (既存の滑走路を継続して使用するが、次の二つの誘導路改良工事を行う。第一の工事は、滑走路25側末端までの平行誘導路の追加であり、第二の工事は、ワイドボディジェットの就航に耐えうるように、既存誘導路の西側部分を改良することである。 : Figure 8.2.4参照)

既存の滑走路はそのままにして、平行誘導路を改良して処理能力を増加しようとするものである。平行誘導路の工事は、ターミナル地域と滑走路25側末端とを接続する1,000 mの長さの平行誘導路を設置するものである。空港用地の北側にパン・アメリカン・ハイウェイがあるため、本誘導路は、ターミナル地区の反対側に滑走路中心線から135 mの距離を隔てて平行に建設される。さらに、既存の平行誘導路の西側の1,800mの区間は、現在滑走路からの離れが基準以下の101 mしかないため、ワイドボディジェットが使用できない。したがって、この平行誘導路を滑走路中心線から135 mの地点、すなわち現在より24m北側に移設する。

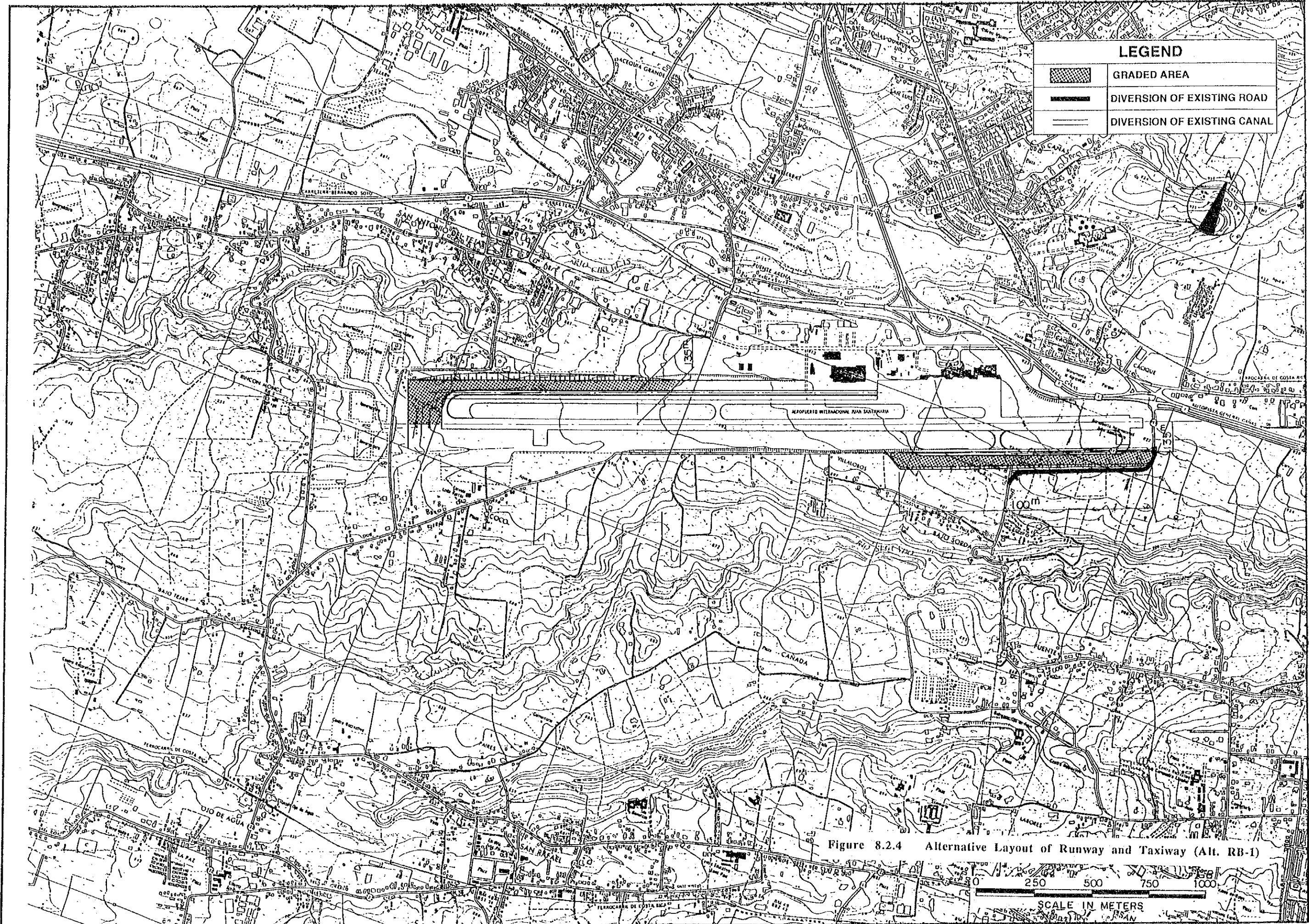
- ・ R-B2案 (既存の滑走路を使用し、滑走路25側末端までの平行誘導路を追加する : Figure 8.2.5参照)

既存の滑走路はそのままにして、最低限の誘導路改良の工事を行って処理能力を増加しようとするものである。ターミナル地域と滑走路25側末端を結ぶ長さ1,000 mの部分的な平行誘導路は、滑走路25側から離陸するジェット機の滑走路占有時間を短縮するためだけに建設される。

- ・ R-C案 (いかなる改良工事も実施せず、既存滑走路を継続して使用する。 : Figure 8.2.6参照)

本案では、滑走路と誘導路に何の改良も施さない。この場合、滑走路処理能力は2005年までに限界に達する。本案ではピーク時における使用事業航空機の運航制限あるいは非ピーク時間帯における駐機スポットの割り当てといった、DGACによる管理的処置が必要となる。

下表は、各案において解決可能となる問題を示したものである。



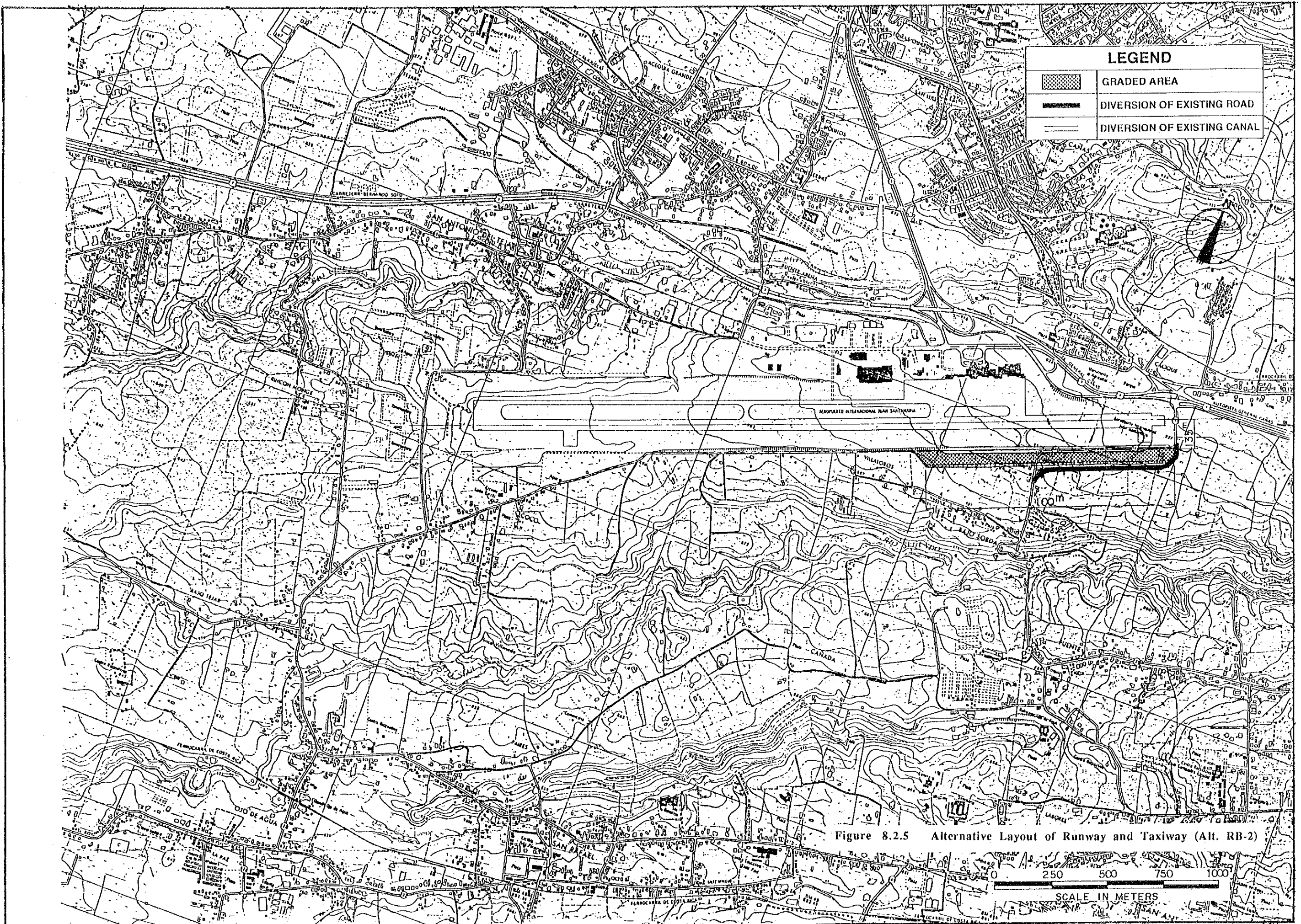


Figure 8.2.5 Alternative Layout of Runway and Taxiway (Alt. RB-2)

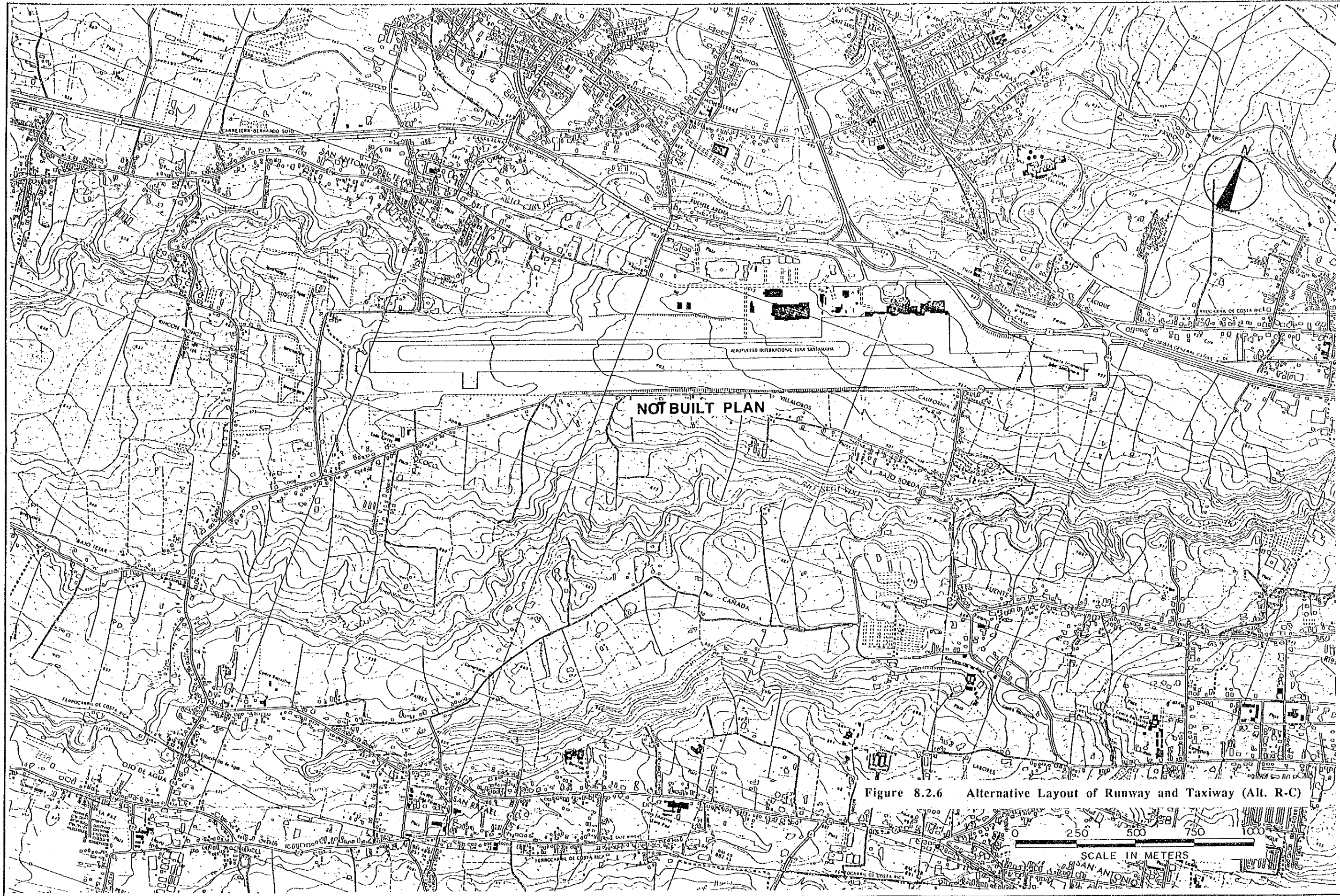


Figure 8.2.6 Alternative Layout of Runway and Taxiway (Alt. R-C)

Table 8.2.1 Problems to be Solved by Alternative Layouts of Runway and Taxiway

Legend, O: Problem to be solved or no problem with existing facility
X: Problem cannot be solved

Problems		Alternatives for Layout of Runway and Taxiway					
		R-A1	R-A2	R-A3	R-B1	R-B2	R-C
Group A	1) Insufficient Width of Runway Strip	O	O	O	X	X	X
	2) Obstacles to 07 Take-off Climb Surface	O	O	O	X	X	X
	3) Obstacles to Transitional Surface	X	O	O	X	X	X
	4) Insufficient Separation Distance between Centerlines of Runway and Taxiway	O	O	O	O*	X	X
Group B	5) Runway Capacity	Year 2000	O	O	O	O	O
		Year 2010	O	O	O	O	O

Note*: A part of the parallel taxiway, i.e., apron taxiway in front of the existing passenger terminal building will remain substandard.

2) 比較評価

上記の6案を、以下に列挙する観点について総合的に検討する。

- ・国際規格への準拠
- ・航空機運航上の観点
- ・将来の拡張性
- ・建設上の観点

比較の詳細はTable 8.2.2に示すとおりである。ここでは、以下に示す主な理由によりR-A3案を、滑走路および誘導路配置計画についての最適案として選定した。

- 国際基準に合致することにより、航空機運航の安全性の向上を図ることができる。
- 上記目標の達成に要する費用が最も少ない。
- 滑走路処理能力の向上により、2010年以降も滑走路の利用が可能である。

3) 段階整備計画

前述のように、R-A3案が最適案として選定された。しかし、滑走路の整備とともに解決すべき重要な問題がある。それは、既存のターミナル施設の容量不足である。6.2節で評価したように、エプロンや旅客ターミナルビル、貨物ターミナルビル、駐車場といったほとんどのターミナル施設は、急激に増加しつつある航空需要に対応できるよう、早急に拡張されるべきである。これらの施設拡張に関連して、現滑走路は、以下に示す理由により短期整備計画においては継続して利用されることが現実的である。

- ・R-A3案の新滑走路の建設は、航空機運航上の安全性という観点からは望ましいものであるが、処理能力の観点からの新滑走路の必要性は、2005年近くにならなければ差迫ったものとはならない。現時点では、滑走路の処理能力よりも、ターミナルの施設容量の問題のほうが重要である。
- ・新滑走路とターミナル施設の同時整備は非常に高額であり、結果として投資効果が低くなってしまふ。

Table 8.2.2 Comparative Evaluation of Alternative Layouts for Runway and Taxiway

Legend, ○ : Good, △ : Fair, X : Poor

Item	Alt. R-A1	Alt. R-A2	Alt. R-A3	Alt. R-B1	Alt. R-B2	Alt. R-C
• Sketch						
• Runway Strip	300m	300m	300m	150m	150m	150m
• Approach Surface (Slope)	2% 2%	2% 2%	2.9% (trees to be felled)	2% 2.9% (trees to be felled)	2% 2.9% (trees to be felled)	2% 2.9% (trees to be felled)
• Take-Off Climb Surface (Slope)	2% 2%	2% 2%	2.9% (trees to be felled)	2.9% (obstructed) 2%	2.9% (obstructed) 2%	2.9% (obstructed) 2%
• Transitional Surface	1/7 (obstructed)	1/7	1/7	1/7 (obstructed)	1/7 (obstructed)	1/7 (obstructed)
• Separation Distance between Centerlines of RWY and TWY	182.5m	182.5m	135m	135m	101m	101m
• Runway Strip	○ ICAO/FAA	○ ICAO/FAA	○ ICAO/FAA	○ Substandard	○ Substandard	○ Substandard
• Approach Surface - RWY 07 - RWY 25	○ ICAO/FAA ○ ICAO/FAA	○ ICAO/FAA ○ ICAO/FAA	○ ICAO/FAA ○ FAA	○ ICAO/FAA ○ Substandard ICAO/FAA	○ ICAO/FAA ○ Substandard ICAO/FAA	○ ICAO/FAA ○ Substandard ICAO/FAA
• Take-off Climb Surface - RWY 07 - RWY 25	○ ICAO/FAA ○ ICAO/FAA	○ ICAO/FAA ○ ICAO/FAA	○ ICAO/FAA	○ Many obstacles	○ Many obstacles	○ Many obstacles
• Transitional Surface	X Wide body jet on existing apron protrudes upon the surface.	○ ICAO/FAA	○ ICAO/FAA	○ Many obstacles	○ Many obstacles	○ Many obstacles
• Separation Distance between Centerlines of RWY and TWY	○ ICAO/FAA	○ ICAO/FAA	○ FAA	○ FAA	○ Substandard	○ Substandard
• Runway Length	3,000m 3,000m 3,000m 3,000m	3,000m 3,000m 3,000m 3,000m	3,000m 3,000m 3,000m 3,000m	3,000m 3,000m 3,000m 2,400m	3,000m 3,000m 3,000m 2,400m	3,000m 3,000m 3,000m 2,400m
• Runway Capacity	○ Beyond 2010	○ Beyond 2010	○ Beyond 2010	△ Up to 2010	△ Up to 2010	△ Up to 2004
• Runway Usability Factor	X 89.7%	△ 93.0%	X 89.7%	X 89.7%	X 89.7%	X 89.7%
• Taxiway Distance (from existing terminal to farther towards threshold)	X 4,200m	X 4,200m	△ 3,200m	○ 2,600m	○ 2,600m	○ 2,600m
• Expandability of Terminal Area	○ Large	○ Large	○ Large	△ Medium	△ Medium	△ Medium
• Provision of Actual Angle Exit Taxiway	○ Sufficient RWY/TWY separation	○ Sufficient RWY/TWY separation	X Insufficient RWY/TWY separation	X Insufficient RWY/TWY separation	X Insufficient RWY/TWY separation	X Insufficient RWY/TWY separation

Table 8.2.2 (Continued)

Legend, ○ : Good, △ : Fair, X : Poor

Item	Alt. R-A1		Alt. R-A2		Alt. R-A3		Alt. R-B1		Alt. R-B2		Alt. R-C		
Construction Aspects	• Earth Work	23,250,000 m ³	27,000,000 m ³	8,500,000 m ³	1,100,000 m ³	490,000 m ³							
	- Fill Volume	X	X	△	○	○							
	- Cut Volume	24,700 m ³	22,000 m ³	20,000 m ³	78,000 m ³	78,000 m ³	-						
	- Bank Height	45 m	55 m	30 m	20 m	15 m							
	• Pavement Work	X	X	X	△	○							
	• Land Acquisition	315,000 m ²	405,000 m ²	225,000 m ²	130,000 m ²	50,000 m ²							
	• Compensation	125 ha	104 ha	76 ha	9 ha	9 ha							
	- Houses	X	X	△	○	○							
	- Road	110 houses	150 houses	80 houses	40 houses	30 houses							
	- Canal	4.6 km	3.9 km	3.0 km	1.1 km	1.1 km							
	• Difficulty of Work	X	X	△	○	○							
		High embankment	High embankment and temporary displacement of RWY 07 threshold	Medium-high embankment	No difficulty	No difficulty							
	• Construction Cost (land preparation and RWY/TWY pavements only) (including compensation)	X	X	△	○	○							
		US\$ 400 million	US\$ 480 million	US\$ 170 million	US\$ 34 million	US\$ 15 million							
	• Construction Period	X	X	X	○	○							
		80 months	84 months	60 months	30 months	20 months							
Overall Evaluation		Poor	Poor	Good	Poor	Poor	Poor	Poor	Poor	Fair			
		• Very high construction cost	• Very high construction cost	• Best alternative which conforms to international standards though the construction cost is high.	• There is no remarkable merit over Alt. R-A3.	• There is no remarkable merit over Alt. R-A3.	• There is no remarkable merit over Alt. R-B2.	• This alternative is superior to Alt. R-C only after 2005.	• Possible alternative until the completion of Alt. R-A3.				
		• There is no remarkable merit over Alt. R-A3.	• There is no remarkable merit over Alt. R-A3.	• Runway can be used beyond 2010.				• Capacity improvement of runway is only effective until 2010.	• Better than Alt. R-B1 and R-B2 until the capacity of the existing runway is saturated.				

- ・たとえ新滑走路を建設するにしても、2000年以前には完成しないであろうことから、短期整備の中にも含めることは困難である。

結果として、滑走路および誘導路の整備は、以下に示す段階で実施することが望ましい。

短期整備計画 R-C案（既存滑走路を継続使用）
長期整備計画 R-A3案（FAA基準に基づく新滑走路の建設）

8.2.3 ターミナル地区整備計画

1) ターミナル地区整備案

ターミナル地区の整備計画については、T-A案、T-B案、T-C案という3案が考えられる。T-A案の概念は、ターミナル施設の理想的な配置であり、T-B案は短期整備期間中において、できるだけ既存施設を有効利用するというものである。T-C案は、T-A案とT-B案双方の利点を用いるというものである。これらの3案は、現在の制限表面抵触物件の抵触の度合いを大きくしないために、Figure 8.2.7に示すように150m幅の着陸帯の縁から始まる1:7の転移表面への抵触物件がないように計画する。長期整備において完成するR-A3案の新滑走路の位置に合わせて短期のターミナル地区を滑走路に近づけて整備した場合は、航空機の尾翼が転移表面に接触して運航上の安全を確保することができない。

T-A案 (Figure 8.2.8)

T-A案では、ターミナル地区の西側への拡張を阻害しないために、COOPESA格納庫が短期整備において移設可能であることを前提としている。本案は、たとえば旅客（P）、貨物（C）、メンテナンス（M）の3つの主要機能が東から西へ並ぶという、適切なゾーニングを実現するものである。皮革工場は、長期整備においても移設する必要はない。

T-B案 (Figure 8.2.9)

本案は、既存施設を最大限に利用することを目的とし、短期整備計画においてはCOOPESA格納庫および自動車修理工場の移設ができないという条件に対応するものである。本案は、メンテナンス（M）が旅客（P）、貨物（C）の間に割り込むゾーニングとなる。しかし、短期整備において、旅客エプロンの一部をメンテナンス地区の西側にリモートエプロンとして建設する必要がある。

T-C案 (Figure 8.2.10)

本案も、既存施設の有効利用を目的としているが、COOPESA自動車修理工場は短期、皮革工場は長期整備において空港外へ移設することが必要となる。本案は、T-A案と同様に、旅客（P）、貨物（C）、メンテナンス（M）という適切なゾーニングを考えている。エプロンの配置はT-B案と同様であるため、短期整備においてリモートエプロンをメンテナンス地区の西側に建設する必要がある。

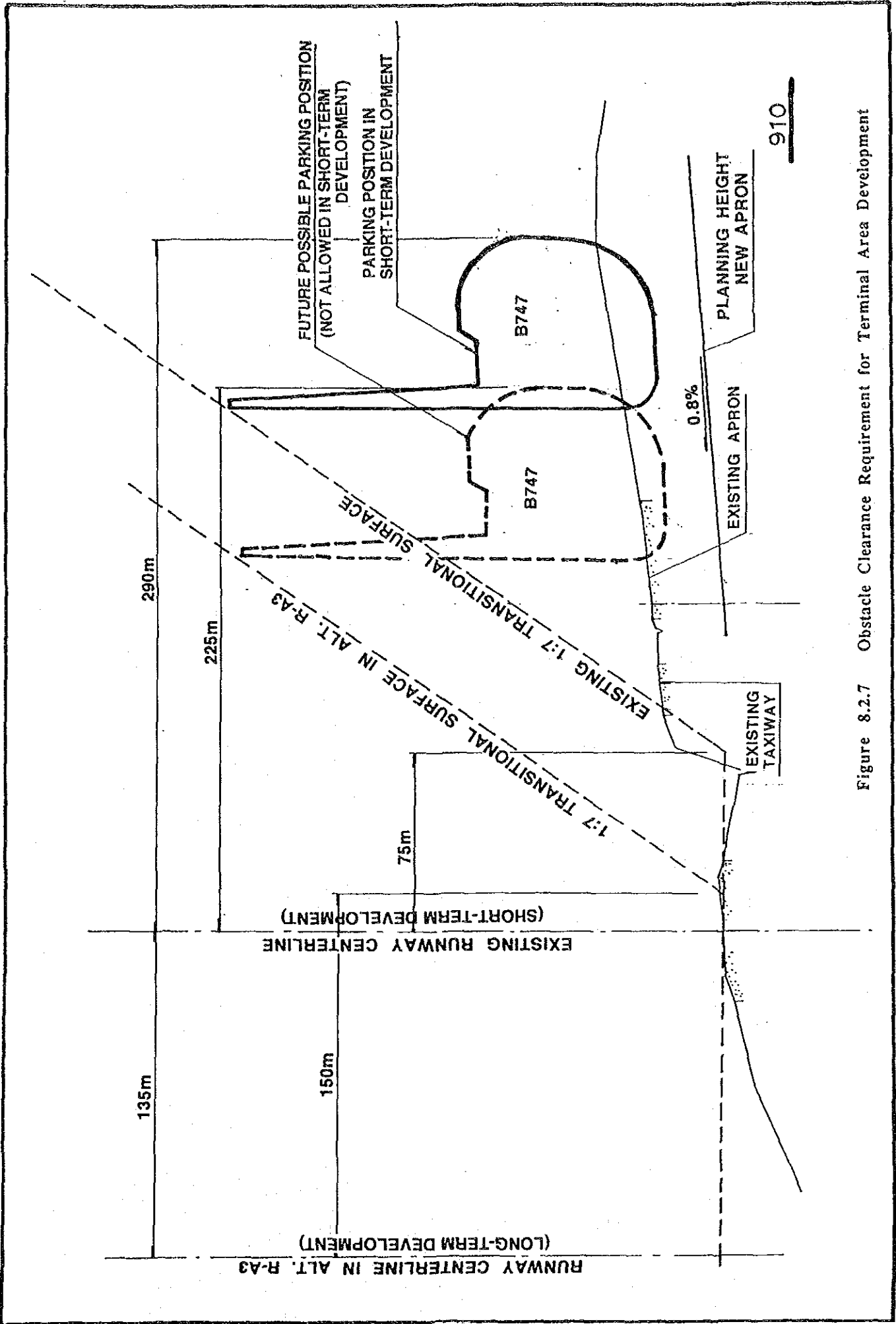


Figure 8.2.7 Obstacle Clearance Requirement for Terminal Area Development

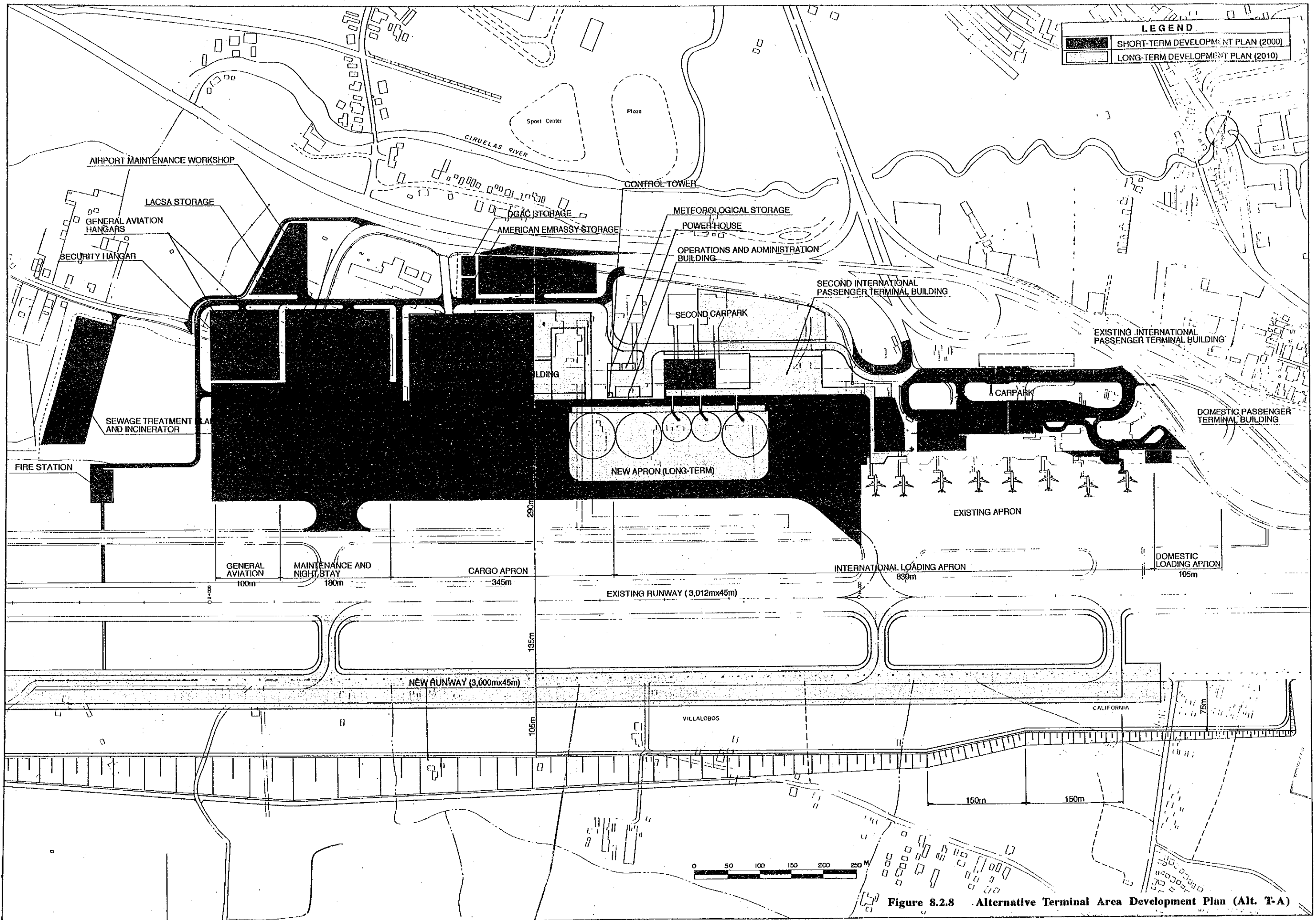


Figure 8.2.8 Alternative Terminal Area Development Plan (Alt. T-A)

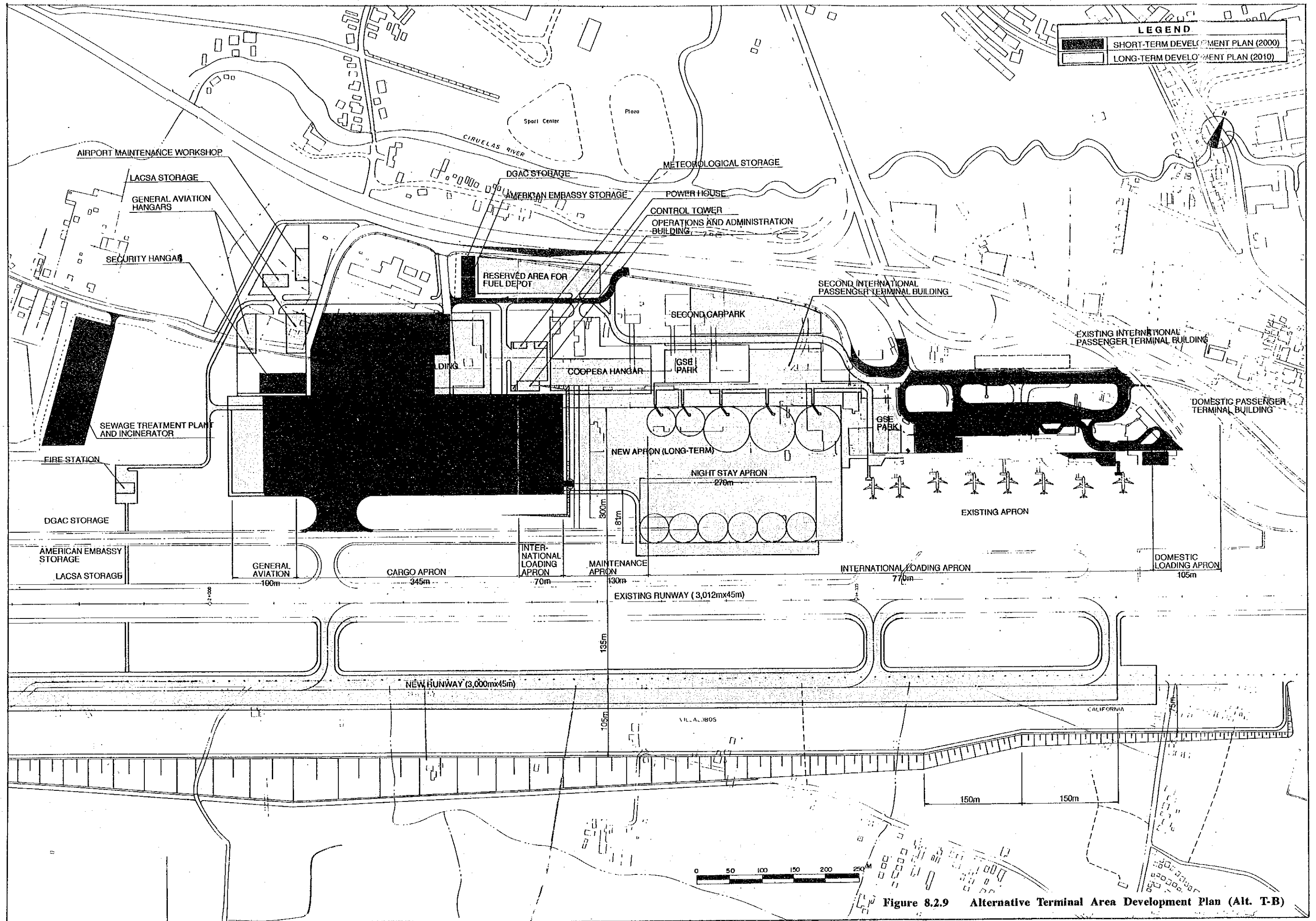


Figure 8.2.9 Alternative Terminal Area Development Plan (Alt. T-B)

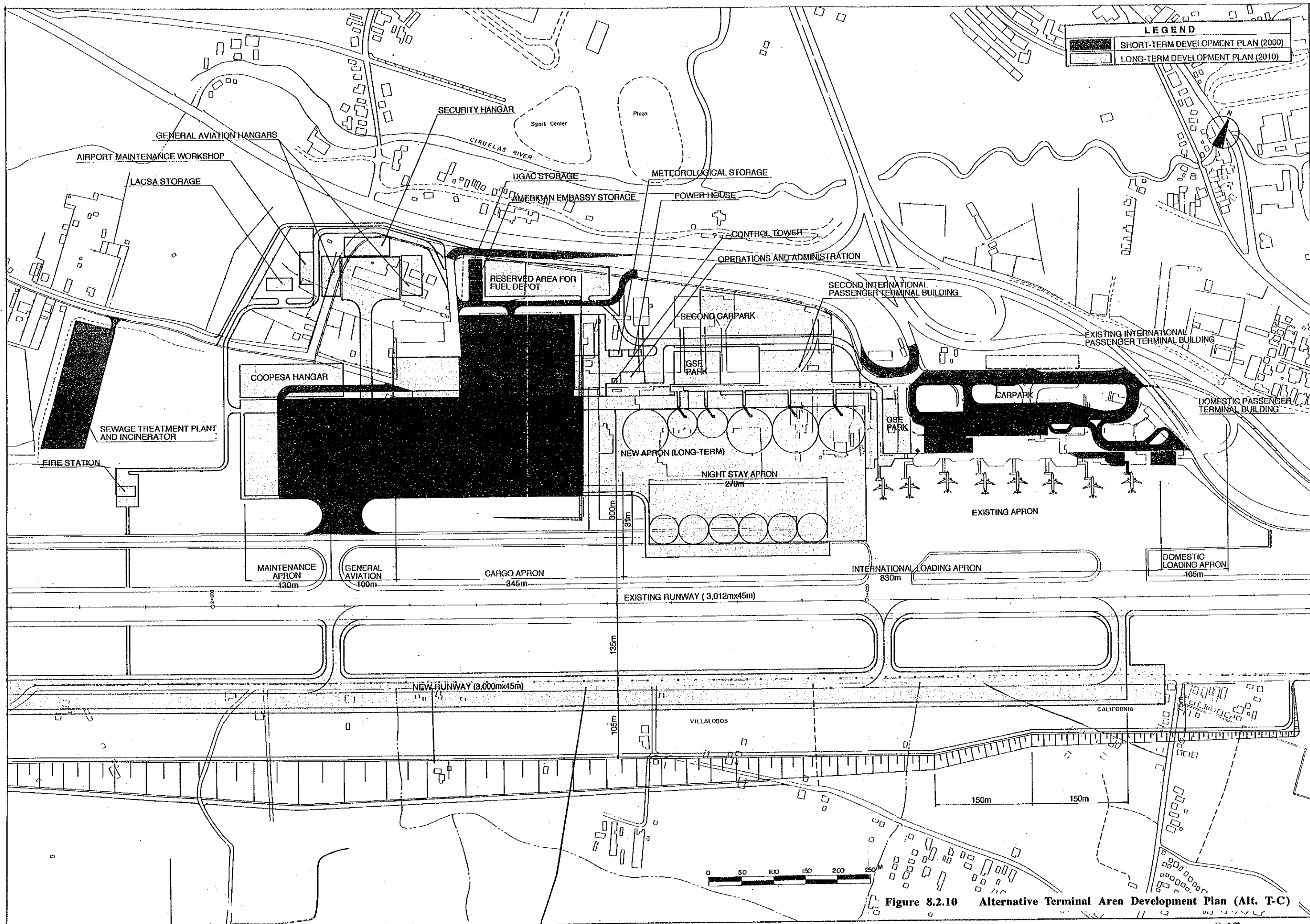
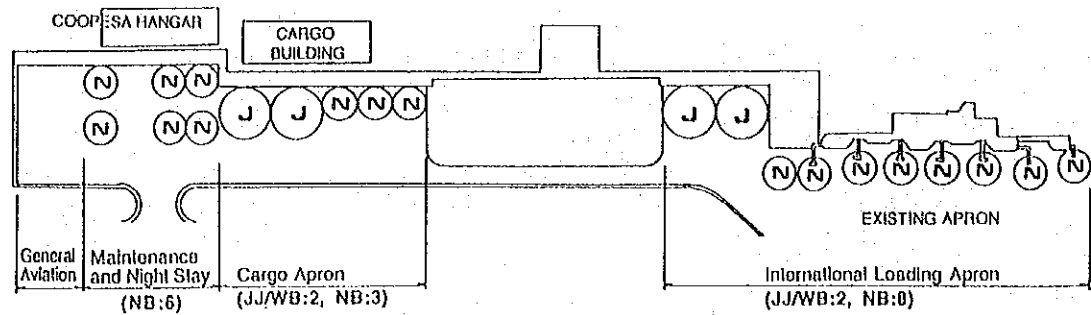
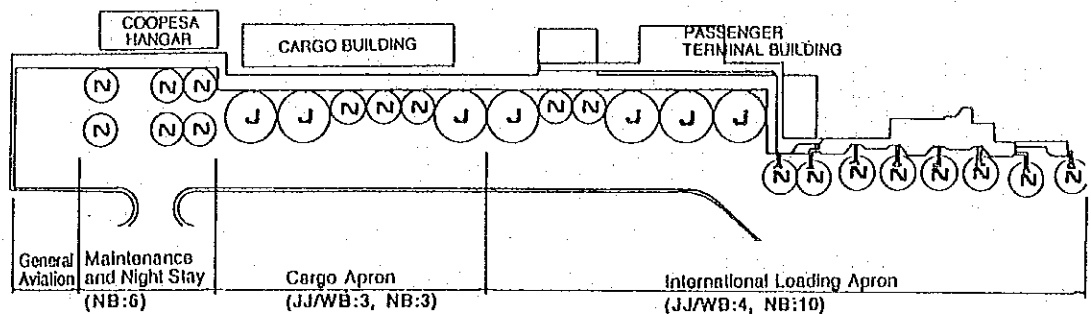


Figure 8.2.10 Alternative Terminal Area Development Plan (Alt. T-C)

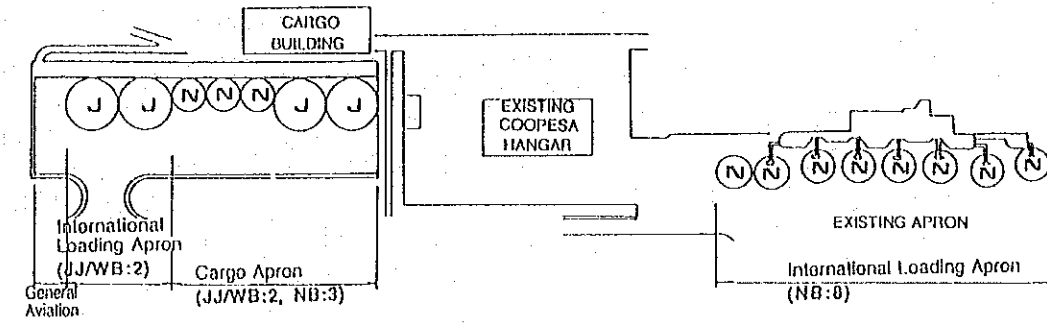


<Short - term Development>

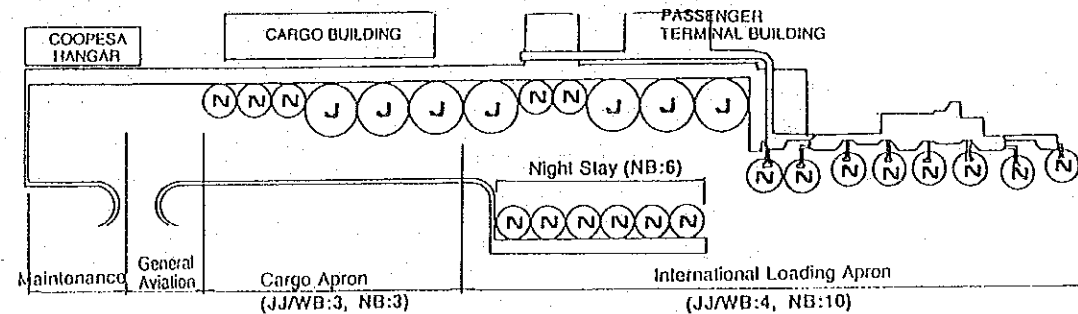


<Long - term Development>

Alt.T-A

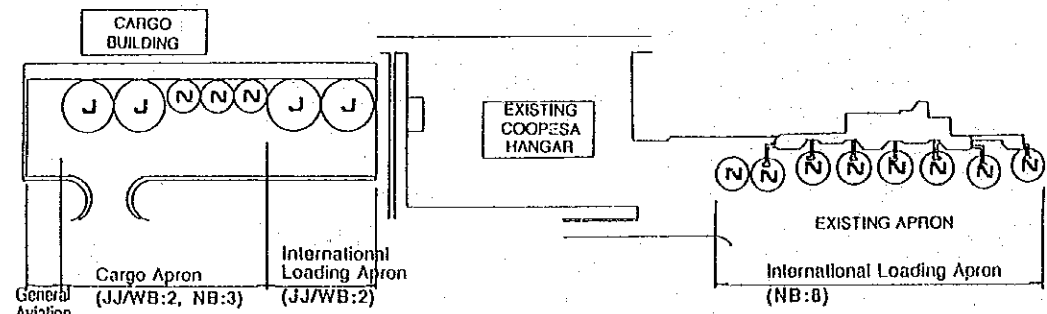


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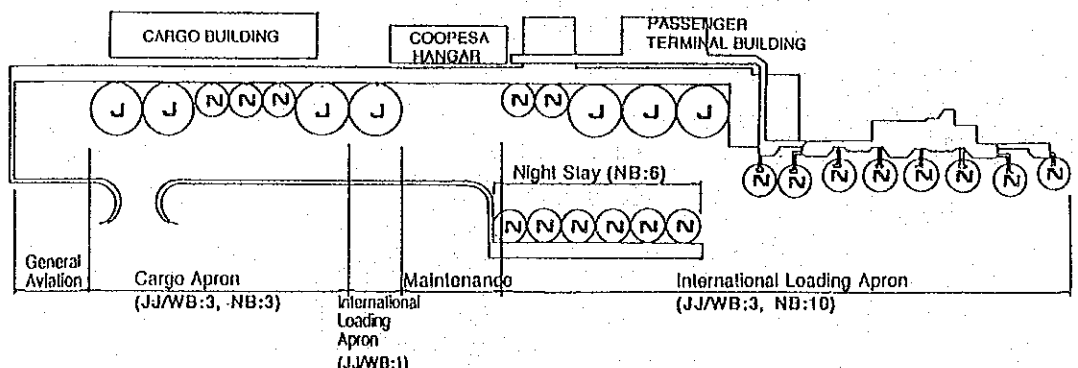


<Long - term Development>

Alt.T-C



<Short - term Development>



<Long - term Development>

Alt.T-B

LEGEND	
J	Jumbo Jet and Wide Body Jet
N	Narrow Body Jet

Figure 8.2.11 Comparison of Layout Plan

新旧各エプロンの駐機スポットの利用に関しては、Figure 8.2.11に示すとおりである。

各案の差異を明確にするために、短期整備計画における整備項目をTable 8.2.3に示す。また、各案の施設の内容を、Table 8.2.4に説明する。

2) 比較評価

上記3案について、以下に示す観点より総合的に比較評価を行なう。

- ・航空機運航上の観点
- ・旅客および貨物取扱上の観点
- ・施設整備における拡張性および柔軟性
- ・既存施設の有効利用
- ・プロジェクト実施の難易
- ・事業費

比較検討の詳細については、Table 8.2.5に示す。主に以下に示す理由により、T-C案がターミナル地区整備計画の最適案として選定された。

- ・短期整備においてターミナル施設の容量を増大するための現実的な解決策であること。
- ・T-A案と比較して、短期整備において有効利用できる既存施設が多いこと。
- ・短期整備計画の事業費が安く、新たな用地取得が不要であるため、補償費用が最も少なく、円滑な計画の実行が見込まれること。

8.2.4 航空保安施設整備

ファン・サンタマリア国際空港のすべての無線施設は1980年以前に設置されたものである。無線施設および通信施設の耐用年数は、その信頼性から見て15年から20年とされている。したがって、既存の航空保安施設は、その耐用年数が2000年までに達するため、更新することが必要である。

しかし、無線施設の更新は、新滑走路および新オペレーションビルの建設といった関連工事との調整を取りつつ実行することが必要である。現滑走路において運用されているILS、VOR/DME、NDBといった航空保安施設は、新滑走路建設と同時に更新されるべきである。航空管制施設も移転、移管が容易であることから、新管制塔の建設と同時に更新されるべきである。

1) 無線施設

ILS、VOR/DME、NDBといった既存の無線施設は、2000年まで使用する。これら全ての無線施設は、長期整備における新滑走路建設と同時に更新する計画とする。

M L Sの導入は、長期整備計画において検討すべき問題である。

2) 航空管制システム

COCESNAによって1992年に更新が計画されている空港監視レーダー（ASR）は、短期及び長期整備計画段階においても使用される。

既存の対空通信施設、飛行情報業務施設およびテープレコーダーは、短期整備において更新される。その他のATC管制卓のようなATC機器は、長期整備において更新される。

3) 航空通信施設

既存の航空通信施設は、2000年まで使用可能である。この施設の更新は長期整備において計画される。

4) 航空照明施設

既存の航空照明施設は、DGACによって性能の低下したものから更新されてきた。したがって、新ターミナル地区における誘導路およびエプロンの照明は、短期整備において更新されると考えられる。

長期整備計画においては、新滑走路の照明施設、平行誘導路（現在の滑走路）および誘導路拡幅部の照明施設が必要となる。カテゴリーIの精密進入に対応した標準式進入灯（ALS）は、新滑走路の07側に設置され、そして、簡易式進入灯（SALS）は新滑走路25側に設置される。

5) 気象観測施設

消防車庫と駐車場の間に位置する既存の気象観測区画は、ICAOの第3付属書に準拠して、滑走路の接地帯付近に移設する。全ての観測装置およびデータ処理装置は短期整備において更新する。気象観測事務所は、長期整備時のオペレーションビルの一部に設置する計画とする。滑走路視距離（RVR）測定装置および雲高観測用のシーロメータは、短期整備で設置する。

気象衛星NOAAの受信機およびラジオゾンデについても、短期整備において整備する。

8.2.5 供給処理施設

1) 電力供給施設

電力供給施設は、本プロジェクトの必要容量に合わせて整備する。既存の非常用電源は、通常の空港運用に必要な負荷がかけられるように短期整備において整備する。

Table 8.2.3 List of Facilities to be Constructed in Each Alternative

Legend,

- : Facility to be newly constructed.
- △ : Expansion of Existing Facilities.
- : Utilization of Existing Facilities.
- × : Relocation to Outside of Airport.

Facilities	Alt. T-A		Alt. T-B		Alt. T-C	
	Short-term Development	Long-term Development	Short-term Development	Long-term Development	Short-term Development	Long-term Development
Public Facilities						
-Apron Int'l Loading	△ (Adjacent)	△	△ (Remote)	△	△ (Remote)	△
Overnight Stay	○	●	●	○	●	○
Cargo	○	△	○	△	○	△
Domestic	●	●	●	●	●	●
General Aviation	○	●	●	○	●	○
-Int'l Passenger Terminal Building	△	○ (2nd Bldg.)	△	○ (2nd Bldg.)	△	○ (2nd Bldg.)
-Dom. Passenger Terminal Building	○	●	○*	●	○	●
-Cargo Terminal Building	○	△	○	△	○	△
-Operations and Administration Building	●	○	●	○	●	○
-Control Tower	●	○	●	○	●	○
-Meteorological Office	●	○	●	○	●	○
-Carpark	△	○ (2nd Park)	△	○ (2nd Park)	△	○ (2nd Park)
-Fire Station	○	●	●	○	●	○
-Airport Maintenance Workshop	○	●	●	○	●	○
-Power House	○	△	●	○	●	○
-Sewage Treatment Plant	○	△	○	△	○	△
-Security Hangar	○	●	○*	●	●	○
-Storage(DGAC)	○	●	○	●	○	●
-Storage(Meteorological)	○	●	●	○	●	○
Private Facilities(Compensation)						
-Fuel Depot	○	△	●	○	●	○
-COOPESA Hangar	○	●	●	○	●	○
-General Aviation Hangar	○	●	●	○	●	○
-COOPESA Automobile Workshop	×		●	×	×	
-Leather Factory	●	●	●	●	●	×
-Storage(American Embassy)	○	●	○	●	○	●
-Storage(LACSA)	○	●	●	○	●	○

Table 8.2.4 Details of Alternative Terminal Area Development Plan

	Alt.T-A	Alt.T-B	Alt.T-C
1. Apron-int'l Loading	<p>Short-term Two international passenger loading stands of B-747 size will be constructed on the west side of the existing international passenger terminal building. The landside edge of the apron will be 290m from the existing runway centerline to secure the 1:7 transitional surface from the existing 150m wide runway strip. Passengers using these stands will be transported to/from the existing terminal building by bus. The construction of this apron together with the new apron taxiway (part of parallel taxiway) will require relocation of the COOPESA hangar, fire station, fuel depot, general aviation hangars, etc. because lowering of apron elevation should be carried out to enable one level continuous apron in the future. Eight narrow-body stands are planned to be provided in front of the existing passenger terminal building. (Two DC-10s can be parked.) Of which, seven will have boarding bridges.</p> <p>Long-term The apron completed in the short-term development will be expanded to the west by adding 2 B-747 stands and 2 narrow-body stands.</p>	<p>Short-term Two international passenger loading stands of B-747 size will be constructed as remote stands on the west side of the existing COOPESA hangar. The land side edge of the apron will be 300m from the existing runway centerline to secure necessary separation distance for aircraft ground movements. This location is more or less the same as planned by the DGAC, and immediate construction without the relocation of the COOPESA hangar is possible.</p> <p>Long-term The lowering of ground level between the existing passenger loading apron and remote stands completed in the short-term development will be carried out, and 3 B-747 stands and 2 narrow-body stands will be constructed. One out of 2 remote stands completed in the short-term development will be used as an extra stand for passenger loading. (Another for cargo stand.)</p>	<p>Short-term Two international passenger loading stands of B-747 size will be constructed as remote stands next to the cargo apron prepared on the west side of the existing COOPESA hangar.</p> <p>Long-term The existing apron will be lowered to the same level as the remote stands completed in the short-term development, and 4 B-747 stands and 2 narrow body stands will be constructed. 2 remote stands completed in the short-term development will be used as maintenance apron and general aviation.</p>
2. Apron-Overnight Stay	<p>Short-term Six narrow-body stands will be constructed for aircraft overnight stay in front of the new COOPESA hangar. Every 2 aircraft will be parked in a file to save apron space.</p> <p>Long-term No additional requirement is expected.</p>	<p>Short-term Six narrow-body jet aircraft which will be crowded out from passenger loading apron during night will be parked around the COOPESA hangar and domestic terminal building as practiced at present.</p> <p>Long-term Six narrow-body stands will be constructed between the new apron taxiway and new parallel taxiway. (The existing runway will be used as parallel taxiway when the new runway is completed in the long-term development.)</p>	The same concept as Alt.T-B will be applied.
3. Apron-Cargo	<p>Short-term Five cargo aircraft stands, 2 for B-747 and 3 for narrow-body jets will be constructed on the west side of the COOPESA hangar. This location will enable immediate construction of cargo apron without waiting for the relocation of the COOPESA hangar.</p> <p>Long-term The cargo apron will be expanded to the east by adding one stand of B-747 size.</p>	<p>Short-term Five cargo aircraft stands will be constructed on the west side of the remote stands for passenger loading.</p> <p>Long-term One out of 2 remote stands completed in the short-term development for passenger loading will be used for the additional cargo stand required in the long-term development.</p>	<p>Short-term Five cargo aircraft stands will be constructed on the west side of the existing COOPESA hangar.</p> <p>Long-term One additional B-747 stand will be constructed on the west side of the international loading apron.</p>
4. Apron-Domestic	<p>Short-term The existing aircraft stands for cargo aircraft will be used for parking area for 3 domestic passenger aircraft.</p> <p>Long-term No additional requirement is expected.</p>	The same concept as Alt.T-A will be applied.	The same concept as Alt.T-A will be applied.

Table 8.2.4 (Continued)

	Alt.T-A	Alt.T-B	Alt.T-C
5. Apron-General Aviation	<p>Short-term Parking space for general aviation aircraft together with their hangars will be grouped at the west end of the expanded terminal area in the short-term development. This is because all aircraft hangars in the north side of the COOPESA hangar and security hangar will need to be demolished in the short-term development.</p> <p>Long-term No additional requirement is expected.</p>	<p>Short-term General aviation aircraft of hangars on the north side of the COOPESA hangar will not be influenced by the short-term development. Only the apron for aircraft using security hangar will be constructed.</p> <p>Long-term Apron and hangars for all general aviation aircraft will be grouped in an area at the west end of the terminal area.</p>	<p>Short-term General aviation aircraft of hangars on the north side of the COOPESA hangar will not be influenced by the short-term development. Only the apron and taxiway for aircraft using security hangar will be constructed.</p> <p>Long-term The stands between the cargo apron and the maintenance apron will be used for all general aviation aircraft. The hangars for general aviation aircraft will be constructed behind new COOPESA hangar and the cargo terminal area.</p>
6. Int'l Passenger Terminal Building	<p>Short-term The existing passenger terminal will be expanded to secure larger space. The first floor of the building will be expanded by 12m (2spans) toward the landside to increase the depth of the check-in lobby. The width of the check-in lobby will also be expanded by 18m (3 spans) to the west to widen check-in area for the LACSA. An additional gate lounge with a boarding bridge will be constructed on the east side of the existing terminal building. The bus lounge for the new loading stands will be added on the basement floor.</p> <p>Long-term The second terminal building of approximately 9,000sq.m floor area will be constructed. This building will be of one and a half level concept with five boarding bridges. The depth of the terminal building of 50 to 60m is recommended. The two terminal buildings will be connected by a corridor. All aircraft will be served with boarding bridges.</p>	The same concept as Alt.T-A will be applied.	The same concept as Alt.T-A will be applied.
7. Dom. Passenger Terminal Building	<p>Short-term A new domestic passenger terminal building of approximately 700 sq.m will be constructed at the location of the existing cargo terminal building after its relocation. The domestic cargo will also be handled in this building.</p> <p>Long-term No additional requirement is expected.</p>	The same concept as Alt.T-A will be applied.	The same concept as Alt.T-A will be applied.
8. Cargo Terminal Building	<p>Short-term A cargo terminal building with a total floor area of 16,100sq.m will be constructed in the landside front of the cargo apron. It will be located on the west side of the cargo area to allow future expansion to the east. The COOPESA automobile workshop and security hangar should be relocated.</p> <p>Long-term The cargo terminal building will be expanded forward to the east side of the cargo area to cope with traffic increase. The additional floor area will be 10,000sq. m.</p>	<p>Short-term The same concept as Alt.T-A will be applied. The location is approximately 100m westward of Alt.T-A. Major difference is that this alternative will not require the relocation of the COOPESA automobile workshop in the short-term development.</p> <p>Long-term The cargo terminal building will be expanded upon completion of the relocation of the COOPESA automobile workshop.</p>	<p>Short-Term The same concept as Alt.T-A will be applied. The location is also same as Alt.T-A, however, security hangar should not be relocated in this alternative.</p> <p>Long-Term Although the additional stands for cargo aircraft will be prepared on the east side of the cargo apron constructed in the short-term development, the cargo terminal building will be expanded forward to both sides of the cargo area because the operations and administration building and control tower will be constructed between the cargo area and the int'l passenger terminal buildings.</p>

Table 8.2.4 (Continued)

	Alt.T-A	Alt.T-B	Alt.T-C
9 Operations and Administration Building	<p>Short-term The operational and administrative function of the DGAC will remain in the existing passenger terminal building.</p> <p>Long-term The new operations and administration building will be constructed with a total floor area of 1,300sq.m between the international passenger terminal building and the cargo terminal area. The administrative function will be divided between this new building and in the existing passenger terminal building.</p>	<p>Short-term The same concept as Alt. T-A will be applied.</p> <p>Long-term The new operations and administration building will be constructed between the COOPESA hangar and the cargo terminal area. The total floor area will be same as that of Alt. T-A(1,300sq.m).</p>	The same concept as Alt. T-A will be applied.
10. Control Tower	<p>Short-term The existing control tower will be utilized continuously in the short-term development.</p> <p>Long-term A new control tower of 35m height will be constructed on the west side of the operations and administration building to secure unobstructed view of movement areas.</p>	The same concept at Alt.T-A will be applied. (The location is approximately 100m westward of Alt.T-A.)	The same concept as Alt. T-A will be applied.
11. Meteorological Office	<p>Short-Term The existing meteorological office in the existing passenger terminal building will be utilized.</p> <p>Long-Term The meteorological office will be accommodated in the new operations and administration building taking into account its merit of close location to the DGAC's operational function and meteorological service.</p>	The same concept as Alt.T-A will be applied.	The same concept as Alt.T-A will be applied.
12. Car Park	<p>Short-term The arrangement of terminal circular road in front of the existing passenger terminal building will be changed to increase carpark capacity and to cope with the expansion of the terminal building toward the landside. The capacity of the carpark will be increased to 550 cars.</p> <p>Long-term The second carpark for the second international passenger terminal building will be constructed. The capacity of the carpark will be 420 cars.</p>	The same concept as Alt.T-A will be applied.	The same concept as Alt.T-A will be applied.
13. Fire Station	<p>Short-term A new fire station of 450sq. m large will be constructed on the west side of the general aviation apron.</p> <p>Long-term Three new fire vehicles to confirm to ICAO Category-8 will be introduced to replace the existing old vehicles.</p>	<p>Short-term The existing fire station will be used continuously.</p> <p>Long-term A new fire station of 450sq. m will be constructed on the west side of the general aviation apron. Three new fire vehicles to confirm to ICAO Category-8 will be introduced to replace the existing old vehicles.</p>	The same concept as Alt.T-B will be applied.
14. Airport Maintenance Workshop	<p>Short-term A new airport maintenance workshop will be constructed on the northwest corner of the expanded terminal area.</p> <p>Long-term No additional requirement is expected.</p>	<p>Short-term The existing airport maintenance workshop will be used continuously.</p> <p>Long-term The airport maintenance workshop will be relocated to the northwest corner of the expanded terminal area.</p>	The same concept as Alt.T-B will be applied.

Table 8.2.4 (Continued)

	Alt.T-A	Alt.T-B	Alt.T-C
15. Power House	<p>Short-term A new power house will be constructed on the north side of the new operations building.</p> <p>Long-term No additional requirement is expected except capacity of the transformer and generator.</p>	<p>Short-term The existing power house will be used with the expansion of transformer and generator capacity.</p> <p>Long-term The airport maintenance workshop will be constructed on the north side of the operations building.</p>	The same concept as Alt.T-B will be applied.
16. Sewage Treatment Plant and Incinerator	<p>Short-term A sewage treatment plant will be constructed under the slope to the west of the expanded terminal area. An incinerator will also be installed. The facility should cope with average efficient volume of 360ton per day.</p> <p>Long-term The capacity of the sewage treatment will be increased to average 610ton per day.</p>	The same concept as Alt.T-A will be applied.	The same concept as Alt.T-A will be applied.
17. Security Hangar	<p>Short-term Security hangar will be relocated to the general aviation area on the west side of the expanded terminal area.</p> <p>Long-term No additional requirement is expected.</p>	<p>Short-term The same concept as Alt.T-A will be applied. The apron in front of security hangar will be utilized for the parking space for security aircraft.</p> <p>Long-term The 100m wide apron completed for general aviation will be jointly utilized with security aircraft parking.</p>	<p>Short-Term The existing security hangar will be utilized continuously. The taxiway will be constructed to connect the existing security hangar and the west side edge of the new apron.</p> <p>Long-Term Security hangar will be relocated to the general aviation area on the north side of the COOPESA hangar and the cargo terminal area.</p>
18. Storage-DGAC	<p>Short-term The existing DGAC storage will be relocated to a storage area on the west side of the area reserved for fuel depot.</p> <p>Long-term No additional requirement is expected.</p>	<p>Short-term The same concept as Alt.T-A will be applied.</p> <p>Long-term No additional requirement is expected.</p>	The same concept as Alt.T-A will be applied.
19. Storage-Meteorological	<p>Short-term A new storage to accommodate the equipment for radiosonde, etc. will be constructed on the north side of the new operations and administration building to replace the existing meteorological observation building (storage).</p> <p>Long-term No additional requirement is expected.</p>	<p>Short-term The existing meteorological observation building is operable in this alternative.</p> <p>Long-term A new storage to accommodate the equipment for radiosonde etc. will be constructed on the north side of the new operations and administration building to replace the existing facility.</p>	The same concept as Alt.T-B will be applied.
20. Fuel Depot	<p>Short-term A new fuel depot will be constructed on the north side of the cargo terminal area. The planned storage capacity of the fuel depot is 1,300kl of Jet-A1 and an appropriate amount of Avgas.</p> <p>Long-term The capacity of the fuel depot will be increased to 2,000kl.</p>	<p>Short-term The existing fuel depot will be used continuously.</p> <p>Long-term The fuel depot will be relocated to the north side of the new cargo area. The fuel depot will have a storage capacity of 2,000kl of Jet-A1 and an appropriate amount of Avgas.</p>	The same concept as Alt.T-B will be applied.
21. COOPESA Hangar	<p>Short-term The COOPESA hangar will be relocated to the west side of the new cargo terminal building. The new hangar is planned to be able to expand its capacity for up to three narrow-body jet aircraft.</p> <p>Long-term No additional requirement is expected.</p>	<p>Short-term The existing COOPESA hangar is a operable in this alternative.</p> <p>Long-term A new hangar will be constructed between the second international passenger terminal building and operations building.</p>	<p>Short-term The same concept as At.T-B will be applied.</p> <p>Long-term A new hangar will be constructed at the west end of the expanded terminal area.</p>

Table 8.2.4 (Continued)

	Alt.T-A	Alt.T-B	Alt.T-C
22. General Aviation Hangars	<p>Short-term The general aviation hangars presently located on the north side of the COOPESA hangar should be relocated. The new location will be in the new general aviation area at the west end of the expanded terminal area.</p> <p>Long-term Additional hangars, if so required, will be constructed in the new general aviation area.</p>	<p>Short-term The existing general aviation hangar on the north side of the COOPESA hangar is operable in this alternative.</p> <p>Long-term A new general aviation area will be constructed at the west end of the expanded terminal area, and all the hangars will be relocated in this area.</p>	<p>Short-Term The same concept as Alt.T-B will be applied.</p> <p>Long-Term A new general aviation area will be prepared on the north side of the COOPESA hangar, and two hangars will be constructed on the both side of the security hangar.</p>
23. COOPESA Automobile Workshop	<p>The COOPESA automobile workshop will need to be relocated to outside of the airport in the short-term development.</p>	<p>Short-term The existing COOPESA automobile workshop is operable in this alternative.</p> <p>Long-term It will need to be relocated to outside of the airport for the construction of the new COOPESA hangar and expansion of the cargo terminal building.</p>	<p>The same concept as Alt.T-A will be applied.</p>
24. Leather Factory	<p>The leather factory is operable in this alternative.</p>	<p>The existing leather factory is operable in this alternative.</p>	<p>Short-Term The existing leather factory is operable in the short-term development.</p> <p>Long-Term It will need to be relocated to the outside of the airport for the construction of the security hangar and the general aviation area.</p>
25. Storage-American Embassy	<p>Short-term Storage of American Embassy will be relocated next to the DGAC Storage on the west side of the reserved area for fuel depot.</p> <p>Long-term No additional requirement is expected.</p>	<p>The same concept as Alt.T-A will be applied.</p>	<p>The same concept as Alt.T-A will be applied.</p>
26. Storage-LACSA	<p>Short-term Storage of LACSA will be relocated next to the airport maintenance workshop on the northwest corner of the expanded terminal area.</p> <p>Long-term No additional requirement is expected.</p>	<p>Short-term The existing LACSA storage is operable in this alternative.</p> <p>Long-term The LACSA storage will be relocated next to the airport maintenance workshop on the northwest corner of the expanded terminal area.</p>	<p>The same concept as Alt.T-B will be applied.</p>

Table 8.2.5 Comparative Evaluation of Alternative Terminal Area Development Plan

Legend, ○ : Good
 △ : Fair
 × : Poor

Items	Alt. T-A	Alt. T-B	Alt. T-C
Aircraft Operational Aspects			
Infringement of Transitional Surface			
-Short-term	× - Tail fin of DC-10: 10.0m - Tail fin of B-727: 2.3m - Passenger terminal building: 7.1m	× - Tail fin of DC-10: 10.0m - Tail fin of B-727: 2.3m - Passenger terminal building: 7.1m - COOPESA hangar: 12.8m	× - Tail fin of DC-10: 10.0m - Tail of B-727: 2.3m - Passenger terminal building: 7.1m - COOPESA hangar: 12.8m
-Long-term	○ - No obstacles	○ - No obstacles	○ - No obstacles
Aircraft Ground Movements			
-Short-term	○ - New apron to be constructed in the western part of the terminal area will be connected with the existing terminal by the new apron taxiway which satisfies the runway-taxiway separation standard.	△ - New apron will be cul-de-sac configuration. - Separation distance between the runway and taxiway will remain substandard.	△ - New apron will be cul-de-sac configuration - Separation distance between the runway and taxiway will remain substandard.
-Long-term	○ - Dual taxiway for the entire terminal area	○ - Dual taxiway for the entire terminal area	○ - Dual taxiway for the entire terminal area
Passenger and Cargo Handling Aspects			
Passenger Handling (Distance between the terminal building to the farthest aircraft stand)			
-Short-term	△ - 300m(bus transport)	× - 800m(bus transport)	× - 1,100m(bus transport)
-Long-term	○ - All aircraft stands except an extra stand will be served with boarding bridges.	○ - All aircraft stands except an extra stand will be served with boarding bridges.	○ - All aircraft stands except an extra stand will be served with boarding bridges.
Cargo Handling (Distance between the terminal building to the farthest aircraft stand)			
-Short-term	△ - 1,100m	△ - 1,350m	△ - 1,100m
-Long-term	△ - 1,000m	△ - 1,250m	△ - 900m
(Running of cargo trolleys)			
-Short-term	○ - No problem	△ - Cargo trolleys should go across the airside edge of the COOPESA maintenance apron	△ - Cargo trolleys should go across the airside edge of the COOPESA maintenance apron
-Long-term	○ - No problem	○ - No problem	○ - No problem
Airport Operational and Administrative Aspects			
Distance from Operations to Fire Station			
-Long-term	△ - 900m(air side), 1,100m(land side)	△ - 800m(air side), 1,000m(land side)	△ - 800m(air side), 1,000m(land side)
Response Time of Fire Vehicle to Farther End of Runway			
-Short-term	△ - 140 sec.	△ - 180 sec.	△ - 180 sec.
-Long-term	△ - 160 sec.	△ - 160 sec.	△ - 160 sec.

Table 8.2.5 (Continued)

Legend, ○ : Good
 △ : Fair
 × : Poor

Items	Alt. T-A	Alt. T-B	Alt. T-C
Visibility from Control Tower -Short-term -Long-term	○ - No problem ○ - No problem	△ - The existing COOPESA hangar obstructs the visibility from the control tower. ○ - No problem	△ - The existing COOPESA hangar obstructs the visibility from the control tower. ○ - No problem
Expandability and Flexibility of Facility			
Expandability of Terminal Area beyond 2010	○ - Sufficient	○ - Sufficient	○ - Sufficient
Flexibility of Facility Development against Changes of Future Traffic Demands	△ - Concentration of investment in the short-term development is a demerit when the growth of traffic demands is lower than expected.	○ - Minimum investment requirement in the short-term development is a merit to cope with the changes in future traffic demands.	○ - The maximum vacant space can be secured in the area facing the loading apron even in the long-term development.
Utilization of Existing Facilities			
Continuous Utilization of Existing Facilities In Short-term Development (Public facilities)	× - Int'l loading apron(with expansion) - Cargo apron(for domestic aircraft) - Int'l passenger terminal bldg. (with expansion) - Administration office - Control tower - Meteorological office - Carpark(with expansion)	○ - Int'l loading apron(with expansion) - Overnight stay apron - Cargo apron(for domestic aircraft) - Int'l passenger terminal bldg. (with expansion) - Administration office - Control tower - Meteorological office - Carpark(with expansion) - Fire Station - Airport Maintenance Workshop - Power House - Meteorological Storage	○ - Int'l loading apron(with expansion) - Overnight stay apron - Cargo apron(for domestic aircraft) - Int'l passenger terminal bldg. (with expansion) - Administration office - Control tower - Meteorological office - Carpark(with expansion) - Fire Station - Airport Maintenance Workshop - Power House - Meteorological Storage
Ease of Project Implementation			
Land Acquisition -Short-term -Long-term	△ - 3ha ○ - Nil	○ - Nil △ - 3ha	○ - Nil △ - 3ha
Compensation (Private facilities) -Short-term -Long Term	× - Fuel depot - COOPESA hangar - General aviation hangars - COOPESA automobile workshop - Storages(American Embassy, LACSA) ○ Nil	○ - Storage(American Embassy) × - Fuel Depot - COOPESA hangar - General aviation hangars - COOPESA automobile workshop - Storage(LACSA)	△ - COOPESA automobile workshop - Storage(American Embassy) × - Fuel Depot - COOPESA hangar - General aviation hangars - Leather factory - Storage(LACSA)

Table 8.2.5 (Continued)

Legend, ○ : Good
 △ : Fair
 × : Poor

Items		Alt. T-A		Alt. T-B		Alt. T-C
Construction Cost						
Terminal Area Development (Million US\$)						
-Short-term		44.1		37.0		36.4
	×	53.0 (incl. compensation)	○	41.3 (incl. compensation)	○	40.7 (incl. compensation)
-Long-term		62.7		41.2		42.3
	×	70.7 (incl. compensation)	○	53.8 (incl. compensation)	○	56.0 (incl. compensation)
-Total(Discounted at 10% for 3 years for Short-term and 10 years for Long-term)	×	57.3		43.7		43.7
	×	67.1 (incl. compensation)	○	51.8 (incl. compensation)	○	52.2 (incl. compensation)
Overall Project Cost (Million US\$)						
-Short-term		48.7		41.6		41.1
	×	57.6 (incl. compensation)	○	45.9 (incl. compensation)	○	45.4 (incl. compensation)
-Long-term		198.7		177.2		178.4
	×	228.8 (incl. compensation)	○	211.9 (incl. compensation)	○	214.1 (incl. compensation)
-Total(Discounted at 10% for 3 years for Short-term and 10 years for Long-term)	×	113.2		99.6		99.7
	×	131.5 (incl. compensation)	○	116.2 (incl. compensation)	○	116.7 (incl. compensation)
Overall Evaluation	-	The investment requirements of the short-term development will be very high because of less utilization of existing airport facilities and extensive compensation required, while the functional advantage over Alt. T-A is minimum.		Practical solution to increase the capacity of the terminal facilities in the short-term development. However, the construction cost is more expensive than Alt. T-C because the Security office will need to be relocated to outside of the airport in the short-term development.		This alternative is more practical than Alt. T-B because the construction cost for the short-term development is minimum although the COOPESA automobile workshop will need to be relocated to outside of the airport in the short-term development.

2) 電話設備

現在の電話設備は、質、容量とも不十分なものであり、プロジェクトの早い段階での更新が望ましい。新たな電話設備は、新オペレーションビル内に設置されるべきである。これは設備の保守と監視の便を考慮して決定されたものである。オペレーションビルは長期整備で建設されるので、新しい電話設備もこのビルの建設期間中に設置されるべきである。新たな電話設備では、公共用および空港運営用に、およそ600回線のデジタル交換機の設置を考えるべきである。

3) 汚水処理施設

新たな汚水処理施設は、衛生上の観点から、短期整備計画でターミナル地区拡張用地の西側に設けることを計画している。焼却炉も同じ場所に設置する。

4) 上水道

空港における飲料水は、現在市街地からの水道本管により供給されている。水源の容量は、ターミナル地区の拡張後においても十分供給可能である。現在の旅客ターミナル地区および新設の貨物ターミナル地区への水道水は、構内道路に沿っている水道本管から供給する。

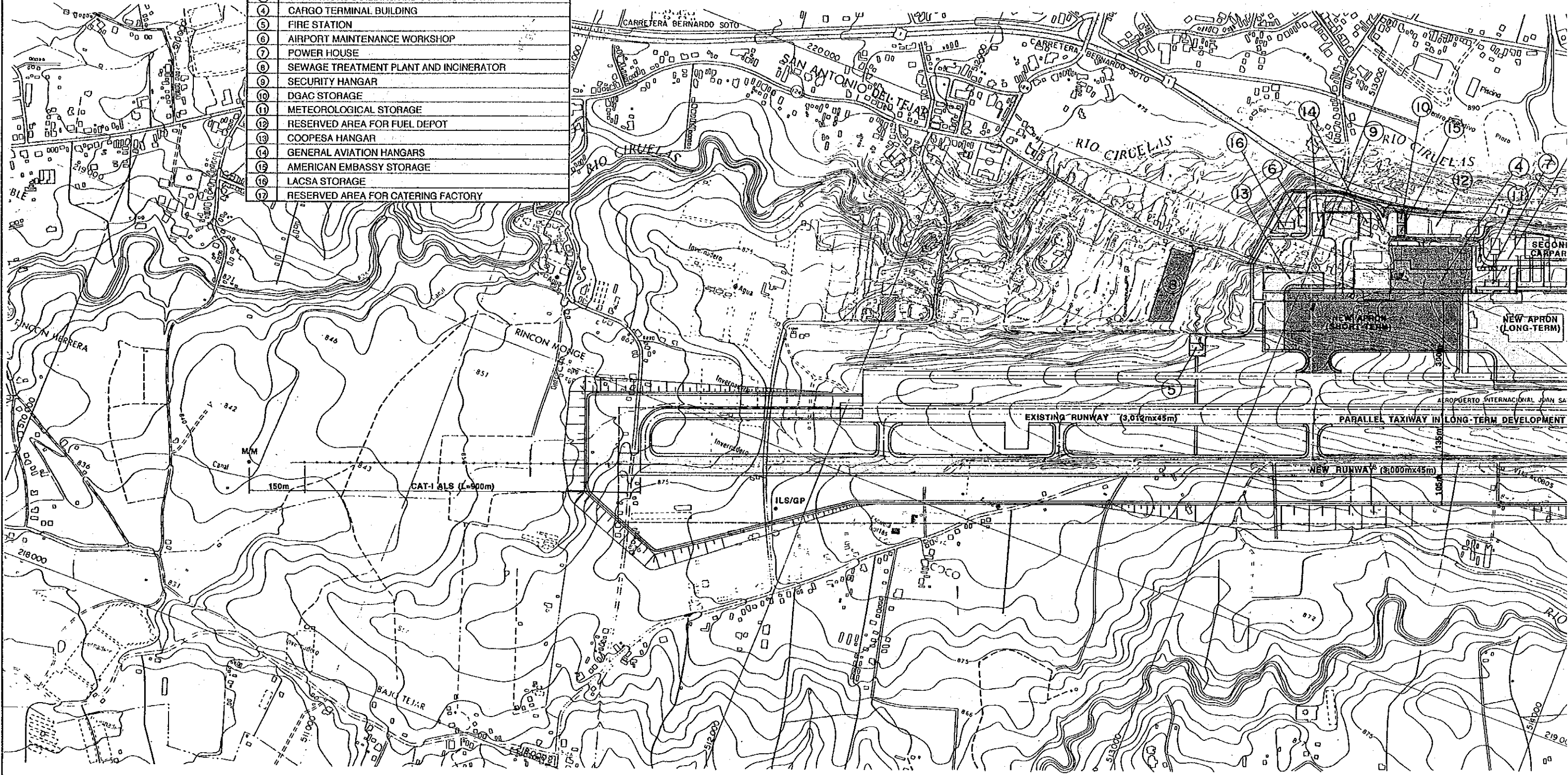
8.2.6 空港マスタープランの整備項目

ファン・サンタマリア空港のマスタープランは、Figure 8.2.12に示すとおりである。また、ファン・サンタマリア空港のマスタープランの整備項目は、次のとおりである。

Table 8.2.6 Work Items of Master Plan of Juan Santamaria Airport

<p>A. Short-term Development Plan</p> <ol style="list-style-type: none"> 1) Overlay of Existing Runway 2) Connecting Taxiway for New Apron (50m x 57m) 3) Expansion of Apron for Passenger and Cargo Loading Stands (130.5m x 415m) 4) Security Apron (130.5m x 50m) 5) Expansion of International Passenger Terminal Building (2,600m²) 6) Domestic Passenger Terminal Building (700m², including Cargo Handling Area) 7) Cargo Terminal Building (16,000m²) 8) GSE Road and Other Airside Road 9) Terminal Circulation Road 10) Carpark (550 cars) 11) ATC System (VHF radio, ATIS and tape recorder) 12) Meteorological Observation System 13) Taxiway and Apron Lighting 14) Expansion of Airport Utility (Power Supply System, Telephone System, Water Supply System and Sewage Treatment System) 15) Compensation (American Embassy Storage COOPESA Automobile and DGAC Storage) 16) Land Acquisition (2,000 m²)
<p>B. Long-term Development Plan</p> <ol style="list-style-type: none"> 1) New Runway (3,000m x 45m) 2) Parallel Taxiway (23m x 600m) 3) Exit Taxiways (23m x 101m x 6) 4) Expansion of Apron for Passenger and Cargo Loading Stands (130.5m x 440m) 5) Expansion of Apron for Overnight Stay Stands (92.5m x 270m) 6) Expansion of Maintenance Apron (130.5m x 50m) 7) Second International Passenger Terminal Building (9,000m²) 8) Second Cargo Internal Building (11,000m²) 9) Operations Building with Control Tower (1,800m²) 10) Security Hangar 11) Fire Station (including Category-8 Equipment, 450m²) 12) Airport Maintenance Workshop (1,000m²) 13) General Aviation Hangars 14) LACSA Storage 15) Power House (200m²) 16) Meteorological Storage (200m²) 17) GSE Road and Other Airside Road 18) Terminal Circular Road 19) Second Car Park (420 cars) 20) Radio Air Navigation Aids (ILS, VOR/DME, NDB) 21) Renewal of Aeronautical Telecommunications System 22) Aeronautical Ground Lights (ALS, SALS, PAPI, RWYL, RWTL, WBAR, TWYL, AFL, ABN, WDIL, etc.) 23) Expansion of Airport Utilities 24) Compensation (Fuel Depot, COOPESA hangar, General Aviation Hangars, Leather Factory, LACSA Storage, 80 private residence, 3.0km road diversion) 25) Land Acquisition (79ha)

LEGEND	
	SHORT-TERM DEVELOPMENT PLAN (2000)
	LONG-TERM DEVELOPMENT PLAN (2010)
(14)	EXISTING INTERNATIONAL PASSENGER TERMINAL BUILDING
(16)	SECOND INTERNATIONAL PASSENGER TERMINAL BUILDING
(2)	DOMESTIC PASSENGER TERMINAL BUILDING
(3)	OPERATIONS BUILDING AND CONTROL TOWER
(4)	CARGO TERMINAL BUILDING
(5)	FIRE STATION
(6)	AIRPORT MAINTENANCE WORKSHOP
(7)	POWER HOUSE
(8)	SEWAGE TREATMENT PLANT AND INCINERATOR
(9)	SECURITY HANGAR
(10)	DGAC STORAGE
(11)	METEOROLOGICAL STORAGE
(12)	RESERVED AREA FOR FUEL DEPOT
(13)	COOPESA HANGAR
(14)	GENERAL AVIATION HANGARS
(15)	AMERICAN EMBASSY STORAGE
(16)	LACSA STORAGE
(17)	RESERVED AREA FOR CATERING FACTORY



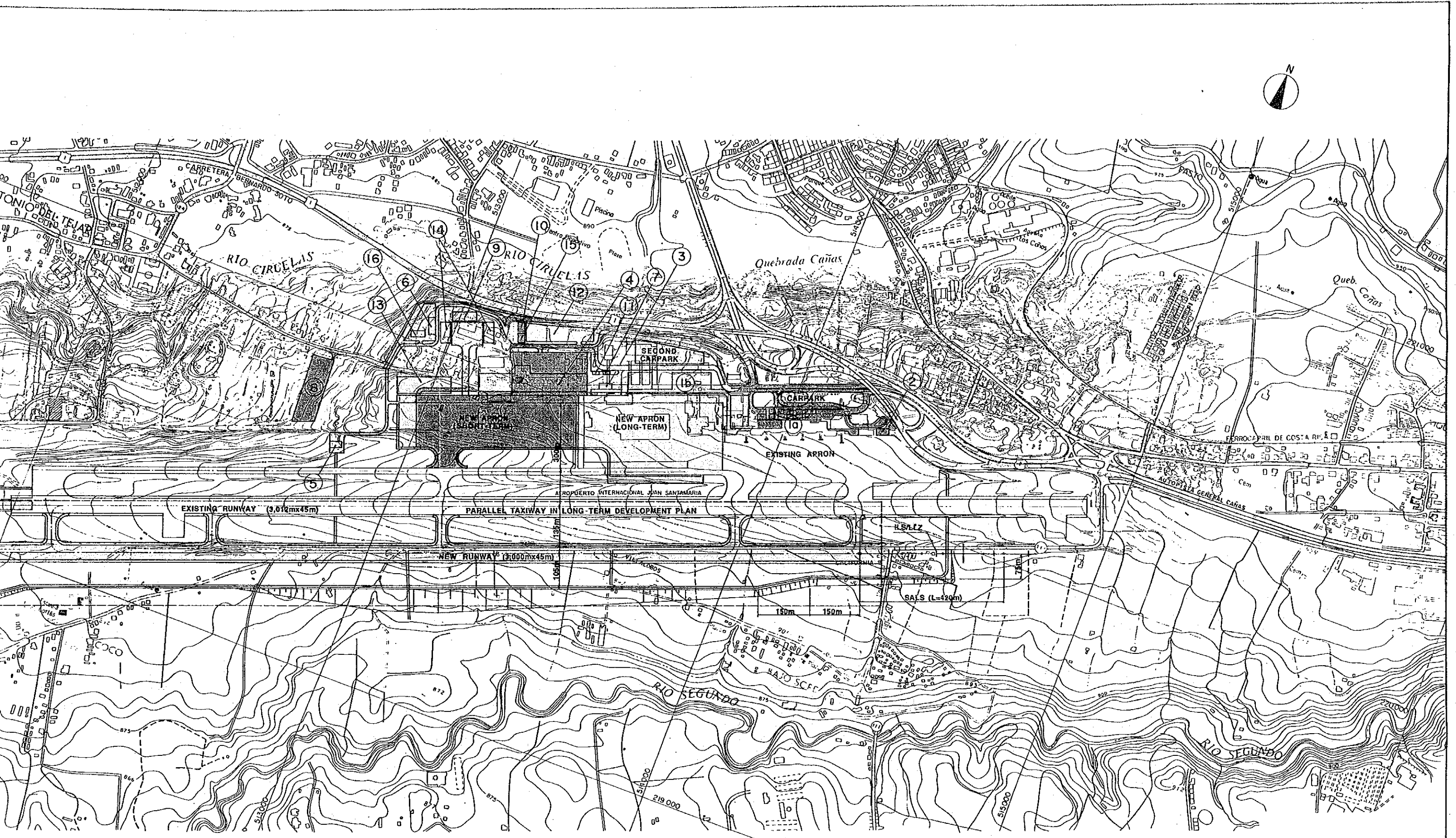


Figure 8.2.12 Masterplan of Juan Santamaria Airport