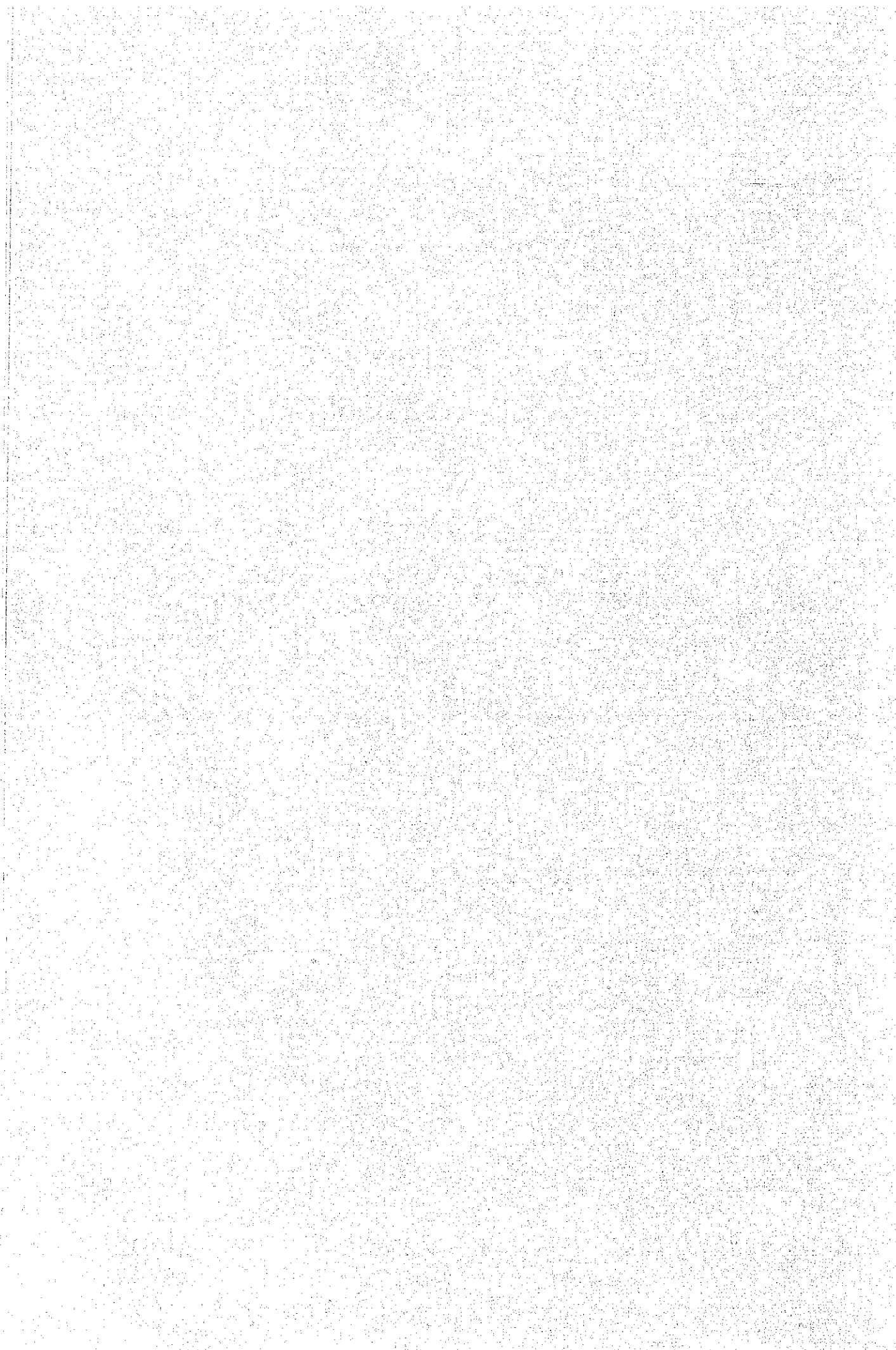


**CHAPTER 12 ECONOMIC AND
FINANCIAL ANALYSES**



CHAPTER 12 ECONOMIC AND FINANCIAL ANALYSES

12.1 General

This chapter examines the economic and financial feasibility for medium-term development of the Davao International Airport. The purpose of the economic analysis is to judge whether the medium-term development of Davao International Airport is feasible or not from the viewpoint of the national economy. The financial analysis will be conducted to determine the financial impact by the implementation of the project, as well as, to study the most effective fund planning through the calibration and analyses of the estimated yearly amounts of cash-in and cash-out accompanied by the project implementation.

12.2 Economic Analysis

12.2.1 Basic Concept of Economic Analysis

The economic analysis is conducted methodologically based on "benefit/cost analysis" which compares the benefits and costs accompanied by the project implementation. If the construction cost and incremental operating and maintenance costs of the project will be profitable, then the project is said to be economically feasible. The concept of the "benefit and cost analysis" and the formula to calculate the rate of economic profit (economic internal rate of return: EIRR) is shown in Table 12.2.1.

Table 12.2.1 Concept of Benefit/Cost Analysis

	With the project (1)	Without the project (2)	Difference (3)=(1)-(2)	Economic Internal Rate of Return (EIRR)
Cost	C _n	C _o	$\Delta C = C_n - C_o$	EIRR=i, satisfying the following formula: $\sum_t \frac{(\Delta B - \Delta C)_t}{(1+i)^t} = 0$ Where, t = Year (1,2,.....)
Benefit	B _n	B _o	$\Delta B = B_n - B_o$	

Note : IF Economic Internal Rate of Return(i) results in equal to or over the standard criterion (10% to 12 %), the implementation of the project is regarded to be feasible in general. (See Note 12.2.1)

Note 12.2.1 EIRR as Assessment Criterion

Any criterion for the return on investment(EIRR) is recommended to be set at a level that is at least equal to the normal level of the rate of return on investment in the Philippines considering the real economy and long-term accounting.

Actually, the rate of return on investments is influenced considerably by the economical risk of inflating prices. For example, in the Philippines the average lending rate on all maturities of secured loans for the period of 1981 to 1991 was 16.7 % while the average rate of increase in consumer prices for the same period was 14.6 %. While in Japan the average lending rates on loans at all banks remained low, around 6~9%, during the period of 1975 to 1990 while

the average annual rate of increase in consumer prices for the same period was only 3.6%. Additionally, it should be noted that there is a strong relationship between the yearly fluctuations of lending rates and consumer prices. (See Appendix-12.2.1) As mentioned later, future prices are assumed to be constant. This study proposes that the "rate of return" as the assessment criterion should be set at around 10% to 12% which corresponds to the rates applied widely in similar feasibility studies.

12.2.2 General Presumptions

To make it simple so as to avoid confusion, the evaluation of the benefits and costs for the project was made based on the following assumptions:

a) Evaluation Based on the Philippine Peso

All benefit and cost for the project is evaluated at Philippine Peso (PHP)

b) Evaluation at 1992 Prices

All benefit and cost is valued at 1992 prices. Neither inflation nor fluctuation of exchange rates for the future is considered.

c) Evaluation of Procurement Costs for Human and Physical Resources from Foreign Countries

Procurement costs of machinery, material, and engineering services, and the employment costs of human resources from foreign countries are evaluated at local currency(PHP) applying the 1992 foreign exchange rate (See Note 12.2.2).

d) Import Duties and Taxes

No duties on imports for the project are included since they will eventually be returned to local consumers in the form of benefits. However, if any import duty is included in the cost of the project, it should concurrently be counted in the benefits for the above reason. Taxes(VAT, excise, etc.) included in the prices of goods or services are not regarded, in general, to be the costs for the said goods and services. While any "special purpose tax" should be regarded as the cost of the relevant goods or services because the tax revenue is expended for the production of the above goods or services.

e) Project Life and Terms for EIRR Calculation

The project life is calculated from the value of the assets formed and/or constructed by the Phase-I project implementation, and their service lives are as shown in Table 12.2.2:

Table 12.2.2 Average Service Life

Assets	Value of Assets (%)	Service Life (Years)	Weighted Service Life
Civil	36	30	10.8
Architectural	37	60	22.2
Equipments	27	15	4.1
Average Service Life			37.1

Accordingly the project life for Phase-I is regarded to be 37 years. But it is assumed roundly as 35 years for this study.

The EIRR calculations are made to cover a 20 year period and includes the construction period in order to avoid the risks and uncertainties of the distant future. It should be noted that the benefits and costs in the distant future do not substantially affect the result of the EIRR calculation because the discounted amount of the benefits and cost will become very small relatively. Accordingly, the yearly benefits and costs for the period of 1995-2015 are counted for the EIRR calculation in this study.

Note 12.2.2 Foreign Exchange Rates

This study applies the following rounded off values of exchange rates by considering the rates applied at the Central Bank during the several months prior to September 1992. (See Appendix-12.2.2)

- a) Japanese Yen per Peso : 5.0 Yen/PHP
- b) Pesos per US\$: 25.00 PHP/US\$
- c) Japanese Yen per US\$: 125.00 Yen/US\$

12.2.3 Presumptions for "Without Project" and "With Project"

This medium-term project of Phase-I is designed to expand the existing airport to cope with the projected growing air traffic up to the year 2000.

However, the project costs in Phase-I includes a considerable amount of the funds for restoring the obsolete and unsatisfactory existing facilities. In addition, the project costs include some inseparable or common funds to cope with the future traffic demand beyond the year 2000. Accordingly, this study defines the traffic volume in the case of "Without Project" and "With Project" as shown in Figure 12.2.1. That is, the traffic volume of the "Without Project" case is constant and identical to that of 1990, while the incremental traffic volume accompanied by the project implementation ("With Project") is equal to the amount deducting the "Without Project" traffic volume from the projected traffic volume. The traffic volume of "With Project" is assumed to be maintained up to the year 2005 in addition the detailed finding makes it clear that the Phase-I project is able to cope with the traffic demand up to the year 2005.

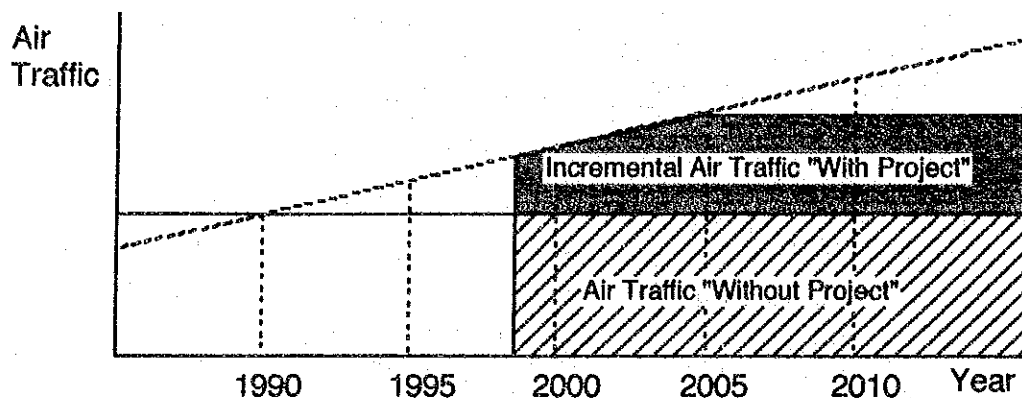


Figure 12.2.1 Assumed Classification of Air Traffic Volume in Case of "With Project" & "Without Project"

12.2.4 Definition of Benefit and Net Benefit

The measurable benefit and net benefit accompanied by the project are defined as follows:

(1) Benefit

The benefit is measured by the amount of "Willingness To Pay" by the consumer of the goods and/or the service. Under a free economy the "Willingness To Pay" is equal to or over the market price, but the former is realized only at the latter. While in the sheltered industry the price does not represent the "Willingness To Pay" because the price itself is regulated. The economy and transportation industry in the Philippines are operated under a "free economy". Accordingly, all of the benefits accompanied by project implementation are quantified at the prevailing market prices. It should be noted here that passenger fees, landing fees, operational charges and space rentals levied by governmental authorities concerned with airport services are not always a reflection of the market prices because the airport services forms only a part of the transportation services for transporting passengers and goods from one point to one destination, i.e., the airport services do not substantially have their own independent free market in the same sense as the transportation industry. Accordingly, the above fees and charges should be regarded as the market prices in sense of the total air transportation in the Philippines even though the said fees and charges are apart from the market prices by themselves.

(2) Net Benefit

The net benefit is indicated as shown in the following:

$$\text{Net Benefit} = \text{Benefit} - (\text{Cost} - \text{Tax and/or Subsidy})$$

The cost in the above means the expenditure to supply the goods and/or services.

From the standpoint of the recipient of the "Willingness To Pay" and market-price-wise the above equation is also indicated as follows:

$$\text{Net Benefit} = \text{Revenue} - (\text{Expenditure} - \text{Tax and/or Subsidy})$$

12.2.5 Benefits to be Quantified

The following four major categories of benefits are brought about by the Phase-I project implementation: (See Figure 12.2.2) It should be noted here that the benefits covered in this study are limited only to those enjoyed within the national economy of

the Philippines. In other words, the benefits belonging to foreign airlines and foreign countries are not counted in this study. Accordingly, the major benefits belonging to this category are as follows:

(1) Benefits for the Airport Services

The benefits brought about for the airport services are the "Willingness To Pay" of the users (passengers and airlines) for the services and/or facilities supplied by the airport as follows:

- a) Passenger fees paid by the air passengers
- b) Landing fees paid by the airlines
- c) Operational fees paid by the airlines
- d) Rentals and privileges, etc. paid by the airlines, aircraft fuel and oil suppliers, etc.

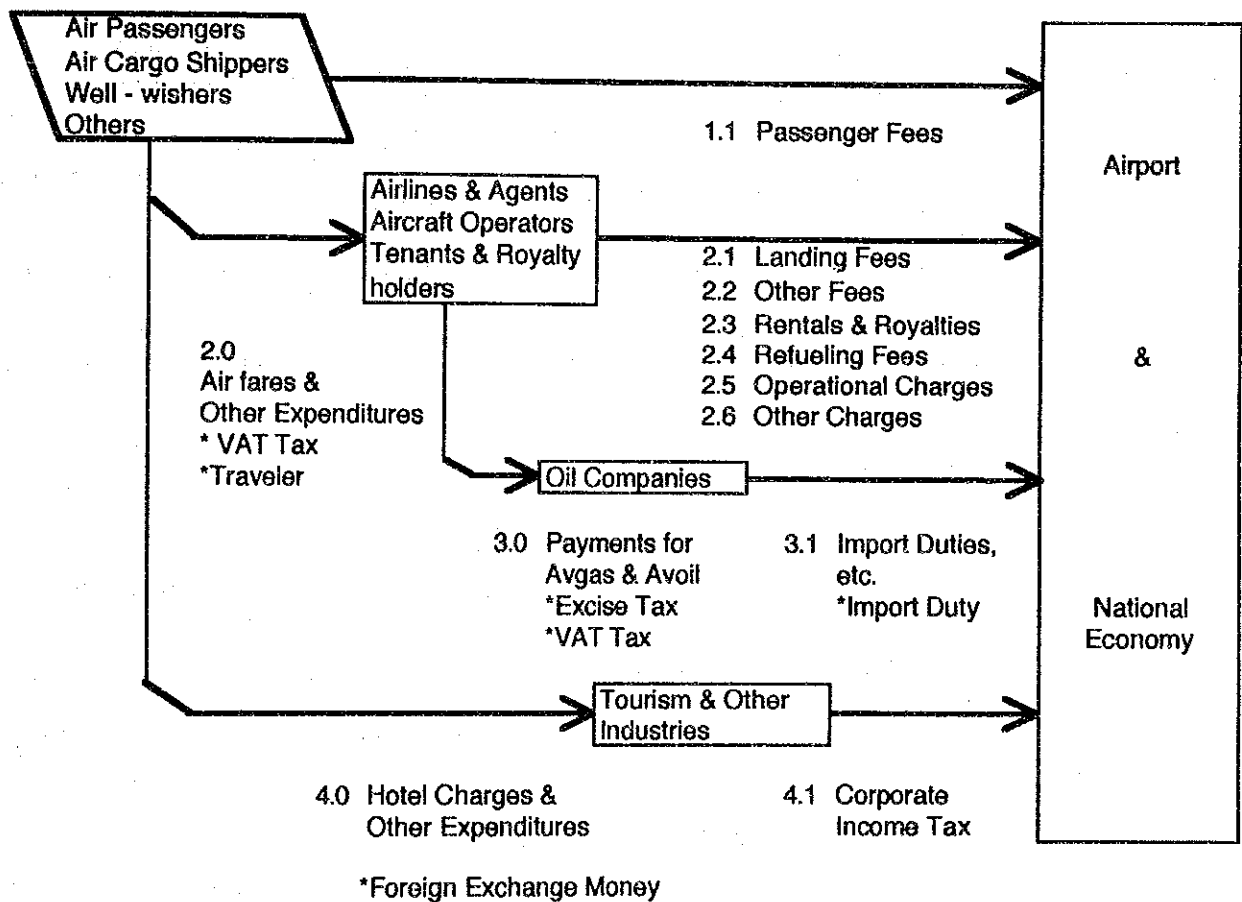


Figure 12.2.2 Typical Money Flow of Airport Users

(2) "Time Saving Benefit", "Cost Saving Benefit" and "Benefit of Increased Willingness To Pay" for Incremental Air Passengers and Air Cargo

The benefits belonging to this category are as follows:

- a) Time Saving Benefit or Benefit of Increased "Willingness To Pay" for Diverted Domestic Air Passengers

This benefit is, market-price-wise, indicated as the incremental revenue of the fare and charges paid by the incremental diverted air passengers who pay much more than that if otherwise paid to sea or bus transportation. This benefit is, from another viewpoint, expressed as the "time saving benefit" for the users who enjoy much faster air transportation than sea or bus transportation. However, it should be noted that these two benefits become equal as far as those benefits are measured at market prices.

- b) Benefit of Increased "Willingness To Pay" for Induced Domestic Air Passengers

This benefit takes place on the incremental air passengers who are induced or generated by the project implementation. These passengers are distinguished from the aforementioned diverted or shifted passengers. The details are mentioned later.

- c) Cost Saving Benefit and Time Saving Benefit for Diverted International Air Passengers from Existing via-Manila and via-Cebu Air Routes to Direct Air Route to Davao

- d) Benefit of Increased "Willingness To Pay" for International Air Passengers carried by PAL

- e) Benefit of Increased "Willingness To Pay" for Domestic Air Cargo carried by PAL

- f) Benefit of Increased "Willingness To Pay" for International Air Cargo carried by PAL

- g) Benefit of Increased "Willingness To Pay" for Overseas Air Travelers of the Philippines

- (3) Benefit of "Multiplier Effect" accompanied by Foreign Exchange Money Spent by Foreign Visitors

This study includes a part of the said "multiplier effect" as a benefit considering the importance of the receipt of foreign currency. It should be noted that the above "multiplier effect" is different from that generally used on economic terminology. (See Note 12.2.3)

- (4) Benefit of Increased "Willingness To Pay" for Aircraft Fuel and Oil

Note 12.2.3 Economic Effect of Receipt of Foreign Currency

It is widely understood that as a result of the foreign currency spent by foreign visitors the tourism industry contributes considerably to the local economy. According to an article, a number of studies have assessed the economic significance of tourism in terms of the impact of tourist expenditures on income generation. For instance, the income multiplier of tourist expenditures has been estimated at 0.56 and 0.42 in certain countries. In other words, every 100 dollars spent by a tourist generates an income of \$56 and \$42 to the local economy of the

respective country(Source: Courier No.122, July-August, 1990, P82). In consideration of the importance of foreign currency in promoting economic development, this study counts part of the above "income multiplier" as a benefit accompanied by the project implementation.

12.2.6 Quantification of Incremental Net Benefit by Category

To avoid confusion by a step-by-step calculation, each item is Fundamentally quantified in the "incremental net benefit" (Incremental Benefit - Incremental Cost). However it should be noted that if all of the corresponding costs to the specified incremental benefit are counted independently only the above incremental benefit should be counted. For instance, regarding airport services only incremental benefits (incremental revenues of airport fees and charges) are counted because all of the corresponding incremental costs to these incremental benefits are included in the "investment costs" and incremental "maintenance and operating costs" accompanied by the project implementation.

The above incremental costs accompanied by the project implementation are, of course, the "common costs" to all of the incremental benefits. This means that if any incremental costs except the above "common costs" are existent for a certain specified incremental benefit the above incremental benefits should be counted independently from the "common costs". Accordingly, each of the incremental net benefits to be quantified for this study are summarized in the following:

Table 12.2.3 Incremental Net Benefit ($\Delta B - \Delta C$)

Incremental Benefit (ΔB)	Incremental Cost (ΔC) except "Common Costs"
1. Passenger fees paid by incremental air pax.	-
2. Landing fees due to increased aircraft movement	-
3. Operational fees due to increased aircraft movement	-
4. Land and space rentals due to increased land & space	-
5. Increased payment for fare & charges by Dome. diverted air pax. from sea & road (air fare - sea/road fare)	Difference in operating cost excluding overhead cost between air and sea/road after deducting tax & subsidy
6. Increased payment for air fare made by domestic induced passengers	Operating cost excluding overhead cost after deducting tax and subsidy
7. Cost (fare) savings and time savings of inter, diverted air pax. from via-Manila to direct air route to Davao (Filipino only)	-
8. Increased payment for air fare made by intl. air passengers of PAL	Operating cost excluding overhead cost after deducting tax and subsidy
9. Increased payment for domestic air cargo	Operating cost excluding overhead cost after deducting tax and subsidy
10. Increased payment for international air cargo made by PAL users	Operating cost excluding overhead cost after deducting tax and subsidy
11. Increased payment for travel tax made by overseas travelers of the Philippines	-
12. Economic effect brought about by foreign exchange money spent by foreign visitors	-
13. Increased payment for aircraft fuel made by airlines	Supply cost after deducting excise tax

Note*: "willingness-to-pay" is quantified at the current market prices.

(1) Benefit from the Increased Passenger Fees

The benefit from increased passenger fees is quantified by the formula (12.2.1).

$$PFB = DPFR \cdot 1/2 \cdot IDP + IPFR \cdot 1/2 \cdot IIDP \text{ ----- (12.2.1)}$$

where, PFB : Incremental total benefit of passenger fees (thousand PHP)

- DPFR : Domestic passenger fee per air passenger (1.5 PHP) (See Appendix-12.2.7)
- IPFR : International passenger fee per air passenger (250 PHP which is assumed to be equivalent to that of Manila International Airport)(See Appendix-12.2.7)
- IDP : Incremental number of domestic air passengers from/to Davao (thousand passengers)
- IIDP : Incremental number of international air passengers from/to Davao(thousand passengers)
- 1/2 : Assumed coefficient to estimate the number of boarding air passengers from the number of air passengers from/to the airport

It should be noted here that the passenger fees are counted only for the Davao International Airport. The "to-be-expected" incremental passenger fees at other domestic and foreign airports are omitted because the domestic corresponding costs for the said domestic fees are difficult to be estimated and the fees of foreign airports should not be included. The calculated results are shown in Table 12.2.4.

Table 12.2.4 Benefit from the Increase of Passenger Fees

Items	1995	2000	2005	2010
A. Incremental Number of Domestic Air Passengers	159.9	344.4	541.2	541.2
B. Incremental Number of International Air Passengers	14.7	46.5	93.4	93.4
C. Benefit from Domestic Passenger Fees ((1/2)*A*1.5)	119.9	258.2	405.9	405.9
D. Benefit from International Passenger Fees ((1/2)*B*250)	1,837.5	5,812.5	1,1675.0	11,675.0
	1,957.4	6,070.7	12,080.9	12,080.9

(2) Benefit from the Increase of Landing Fees

The benefit from the increase of landing fees is quantified by the formula (12.2.2)

$$LFB = (SLFDi \cdot 1/2 \cdot DACTi + SLFi \cdot 1/2 \cdot IACTi) / 1,000 \text{-----} (12.2.2)$$

- where,
- LFB : Incremental total benefit of landing fees (thousand PHP)
 - LFDi : Amount of landing fee of domestic aircraft type (i). (PHP)
 - LFi : Amount of landing fee of international aircraft type (i)
International fees are assumed to be equivalent to those of Manila International Airport. (See Appendix-12.2.7)

Domestic	A300.....	916.70
	B737.....	316.70
	F50.....	116.70
International	DC-10.....	24,332.50
	A300.....	15,070.00
	B737.....	2,107.50
	HS748.....	1,627.50

- DACTi : Number of domestic aircraft movements (landing + take off) of aircraft type (i)

IACTi : Number of international aircraft movements (landing + take off) of aircraft type (i)

The calculated results are shown in Table 12.2.5.

Table 12.2.5 Benefit from the Increase of Landing Fees

(1) Incremental Annual Aircraft Movements						
Aircraft Type		1990	1995	2000	2005	2010
Domestic	A-300	-	501	1074	1660	1660
	B737	-	685	1485	2197	2197
	F-50	-	175	386	624	624
General Aviation:		-	224	430	883	883
Only Civil Aviation:		-	112	215	441.5	441.5
International	DC-10	-	-	12	12	12
	A-300	-	-	214	482	482
	B-737	-	24	24	24	24
	HS-748	-	35	76	117	117
(2) Benefit from Increase of Landing Fees (1,000 PHP)						
Aircraft Type		1990	1995	2000	2005	2010
Domestic (Type)	(Rate)(PHP)					
	A-300	916.7	229.6	492.3	760.9	760.9
	B737	316.7	108.5	235.1	347.9	347.9
	F-50	116.7	10.2	22.5	36.4	36.4
International (Type)	(Rate)(PHP)					
	DC-10	24,332.5	-	146.0	146.0	146.0
	A-300	15,070.0	-	1,612.5	3,631.9	3,631.9
	B-737	2,107.5	-	25.3	25.3	25.3
	HS-748	1,627.5	-	28.5	61.8	95.2
Total			402.1	2,595.6	5,043.5	5,043.5

(3) Benefit from the Increase of Operational Charges

The benefit from the increase of Operational Charges is quantified by the formula (12.2.3)

$$OPB = (OPIR \cdot TIACT + 1/2 \cdot OPDR \cdot TDACT + 1/2 \cdot OPGR \cdot TGAT) / 1,000 \quad (12.2.3)$$

- where,
- OPB : Incremental benefit of operational charges (thousand PHP)
 - OPIR : Operational charge for international flight: 3,750 PHP for each departing and arriving flight
 - OPDR : Operational charge for domestic flight excluding general aviation flight: 250 PHP for each flight (from one origination to one destination)
 - OPGR : Operational charge for domestic general aviation: 50 PHP for each flight (For the above charges, see Appendix-12.2.7)
 - TIACT : Incremental total number of international aircraft movements
 - TDACT : Incremental total number of domestic aircraft movements excluding general aviation flights

TGACT : Incremental total number of domestic general aviation aircraft movements

The calculated results are shown in Table 12.2.6.

Table 12.2.6 Benefit from the Increase of Operational Charges
(1,000 PHP)

Items	1995	2000	2005	2010
A. Incremental Domestic Aircraft Movements				
A1 Domestic Flight excl. General Aviat.	1,361	2,945	4,481	4,481
A2 Domestic General Aviation	112	215	442	442
A3 Incremental International Flight	59	326	635	635
B. Benefit from Increase of Operational Charges (1,000 PHP)				
B1 Domestic Flight excl. General Aviat. ((1/2)*A1*250/1,000)	170.1	368.1	560.1	560.1
B2 Domestic General Aviation ((1/2)*A2*50/1,000)	2.8	5.4	11.0	11.0
B3 Incremental International Flight (A3*3750/1,000)	221.3	1,222.5	2,381.3	2,381.3
Total	394.2	1,596.0	2,952.4	2,952.4

(4) Benefit from the Increase of Rentals and Privileges Concessions

The benefit from the increase of rentals and privilege fees is quantified by the formula (12.2.4)

$$RNTB = a (PFB + LFB + OPB) \text{-----} (12.2.4)$$

where, RNTB : Incremental benefit of rentals, privileges and royalties (PHP)

a : Ratio of the rental and privilege revenues to the total revenues of landing fees, passenger fees and operational fees. The value of (a) is assumed to be 0.21 (See Appendix 12.2.8)

The calculated results are shown in Table 12.2.7.

Table 12.2.7 Benefit from the Increase of Rentals, Royalties and Privileges

Aircraft Type	1990	1995	2000	2005	2010
A. Total Benefit of Passenger Fees, Landing Fees and Operational Fees	-	2,753.7	10,262.3	20,076.8	20,076.8
B. Benefit of Rentals, Royalties and Privileges (A*0.21)	-	578.3	2,155.1	4,216.1	4,216.1

(5) Net Benefit of the Increased "Willingness to Pay" or Time Saving on Diverted Domestic Air Passengers

The incremental "net benefit" for the domestic diverted air passengers is quantified by the formula (12.2.5) ~ (12.2.7).

$$NBDDP = \sum_m \sum_n (DDPR_{mn} - DDPC_{mn}) \text{-----} \quad (12.2.5)$$

- where, NBDDP : Incremental net benefit for the domestic diverted air passengers (thousand PHP)
- where, DDPR_{mn} : Incremental revenue for the diverted air passengers from the mode (m) on the route (n) (thousand PHP)
- DDPC_{mn} : Incremental costs for the diverted air passengers from the mode (m) on the route (n) (thousand PHP)
- m : Sea transportation or bus transportation
- n : Davao from/to Manila ,Cebu, Cagayan de Oro or Zamboanga

$$DDPR_{mn} = IDDP_{mn}(URDA_n - URDO_{mn}) \text{-----} \quad (12.2.6)$$

- where, IDDP_{mn} : Incremental number of diverted air passengers from the mode (m) of the route (n) (thousand passengers) (See Table 12.2.7 and Appendices-12.2.3 and 12.2.4)
- URDA_n : Unit operating revenue per air passenger for the route (n) (PHP) (See Table 12.2.8)
- URDO_{mn} : Unit operating revenue per diverted passenger for the shifted mode (m : sea or bus) of the route (n) (PHP) (See Table 12.2.8)

$$DDPC_{mn} = IDDP_{mn}([UEDA_n - VTP \cdot URDA_n] - [UEDO_{mn} - VTP \cdot URDO_{mn}]) \text{-----} \quad (12.2.7)$$

- where, UEDA_n : Unit direct operating expense per air passenger for the route (n). (PHP per person)The unit operating expense is assumed to be 90% of the unit operating revenue, i.e., the remaining 10% is regarded to be the overhead expense.
- UEDO_{mn} : Unit operating expense per diverted passenger for the shifted mode (m) of the route (n). The unit operating expense is assumed uniformly to be 90% of the unit operating revenue. (PHP per person)
- VTP : The ratio of the VAT(Value Added Tax) included in the unit revenue: 2.5% (See Note 12.2.7)

The calculations are shown in Table 12.2.8~12.2.11.

Table 12.2.8 Incremental Diverted Air Passengers by Mode
(x 1,000)

to/from Davao		1990	1995	2000	2005	2010
Metro Manila	from Road	0.0	14.0	29.4	44.8	44.8
	from Sea	0.0	47.9	100.5	153.1	153.1
	Total	0.0	61.9	129.8	197.9	197.9
Cebu	from Road	0.0	0.0	0.0	0.0	0.0
	from Sea	0.0	38.7	83.9	132.5	132.5
	Total	0.0	38.7	83.9	132.5	132.5
Cagayan de Oro	from Road	0.0	18.7	40.2	65.6	65.6
	from Sea	0.0	0.0	0.0	0.0	0.0
	Total	0.0	18.7	40.2	65.6	65.6
Zamboanga	from Road	0.0	0.0	0.0	0.0	0.0
	from Sea	0.0	5.6	12.2	19.0	19.0
	Total	0.0	5.6	12.2	19.0	19.0
Total	from Road	0.0	32.7	69.6	110.4	110.4
	from Sea	0.0	92.2	196.6	304.5	304.5
	Total	0.0	124.9	266.2	414.9	414.9

Table 12.2.9 Unit Passenger Revenue
(PHP)

to/from Davao	Unit Revenue (one-way)		
	Air	Bus	Ship
Metro Manila	2,465	808	700
Cebu	1,016	-	403
Cagayan de Oro	703	190	-
Zamboanga	1,008	-	323

Table 12.2.10 Incremental Revenue for Diverted Air Passengers by Mode & by Route

(1,000 PHP)

to/from Davao		1990	1995	2000	2005	2010
Metro Manila	from Road	-	23,196	48,688	74,215	74,215
	from Sea	-	84,474	177,310	270,272	270,272
	Total	-	107,670	225,998	344,486	344,486
Cebu	from Road	-	-	-	-	-
	from Sea	-	25,605	55,539	87,689	87,689
	Total	-	25,605	55,539	87,689	87,689
Cagayan de Oro	from Road	-	9,591	20,635	33,656	33,656
	from Sea	-	-	-	-	-
	Total	-	9,591	20,635	33,656	33,656
Zamboanga	from Road	-	-	-	-	-
	from Sea	-	3,868	8,355	12,988	12,988
	Total	-	3,868	8,355	12,988	12,988
Total	from Road	-	32,787	69,323	107,871	107,871
	from Sea	-	113,946	241,203	370,948	370,948
	Total	-	146,733	310,526	478,819	478,819

Table 12.2.11 Net Time Saving Benefit or Net Benefit of the Increased "Willingness To Pay" for Diverted Domestic Air Passengers

	(1,000 PHP)				
	1990	1995	2000	2005	2010
Total Net Benefit (Revenue-(Expense-Tax))	-	18,341.6	38,815.8	59,852.4	59,852.4

Note: Total Net Benefit= Total Revenue x (1-(0.9-0.025))

Note 12.2.4 Tax Rates in the Philippines

According to the Bureau of Internal Revenue (BIR) and other Authorities, the current tax rates imposed in the Philippines are as follows:

- a) VAT 2.5% for the gross passenger revenue
3.0% for the gross cargo revenue
- b) Excise of 48.0% for the locally produced fuel and oil
- c) Import duty 10.0% for the imported fuel and oil
- d) Corporate tax 35.0% for the net operating revenue
- e) Overseas Travel Tax 1,650 PHP/Passenger

(6) Net Benefit of the Increased "Willingness To Pay" on Induced Domestic Air Passengers

The said "net benefit" is quantified by the formula (12.2.8)~(12.2.10)

$$NBDIP = \sum_n(DIPRV_n - DIPC_n) \text{-----} (12.2.8)$$

- where,
- NBDIP : The incremental net benefit for the induced air passengers on the route (n) (thousand PHP)
 - DIPRV_n : The incremental revenue for the induced air passengers on the route (n) (thousand PHP)
 - DIPC_n : The incremental cost for the induced air passengers on the route (n) (thousand PHP)

$$DIPR_n = IDIP_n \cdot URDA_n \text{-----} (12.2.9)$$

- where, IDIP_n : Incremental induced air passengers on route (n) (thousand passengers)

$$DIPC_n = IDIP_n \cdot (UEDA_n - VTP \cdot DIPRV_n) \text{-----} (12.2.10)$$

The calculated results are shown in Table 12.2.12~12.2.13.

Table 12.2.12 Incremental Induced Air Passengers
(x 1,000)

to/from Davao	1990	1995	2000	2005	2010
Metro Manila	0	24.0	53.4	85.4	85.4
Cebu	0	8.3	18.8	31.0	31.0
Cagayan de Oro	0	1.4	3.2	5.4	5.4
Zamboanga	0	1.2	2.7	4.4	4.4
Total	0	35.0	78.1	126.2	126.2

Table 12.2.13 Net Benefit of the Increased "Willingness To Pay" on Induced Domestic Air Passengers
(1,000 PHP)

to/from Davao	1990	1995	2000	2005	2010
Metro Manila	-	7,409.7	16,439.3	26,323.7	26,323.7
Cebu	-	1,102.7	2,505.3	4,122.0	4,122.0
Cagayan de Oro	-	126.9	283.2	477.3	477.3
Zamboanga	-	151.3	342.7	555.5	555.5
Total	-	8,790.6	19,570.5	31,478.6	31,478.6

Note: Net Benefit=Passenger x Unit Revenue x (1-(0.9-0.025))

(7) Net Benefit of the Increase of "Willingness To Pay" for International Diverted Air Passengers

The incremental net benefit for the international diverted air passengers is quantified by the formula (12.2.11).

$$NBIDP = IIDP (AVSC + AVST) \text{-----} (12.2.11)$$

where, NBIDP : Incremental net benefit for the diverted international air passengers from the "via Manila" and "via Cebu" routes to the direct route to Davao (thousand PHP)

IIDP : Incremental number of diverted international air passengers from the "via Manila" and "via Cebu" routes to the direct air routes (thousand passengers) (See Appendices-12.2.4, 12.2.5 and 12.2.6)

AVSC : Average cost saving benefit per passenger (PHP)
AVSC = 2,465 PHP, assumed to be equal to the air fare for Manila-Davao.

AVST : Average time saving benefit (PHP). This benefit is not counted in this study because it is, more or less, set off by the inconvenience due to less frequent direct routes than those of the "via Manila" + "via Cebu" routes.

The calculated results are shown in Table 12.2.14.

Table 12.2.14 Net Cost Saving Benefit on International Air Passengers of Filipino from via-Manila to Direct Air Routes from/to Davao

	1990	1995	2000	2005	2010
A. Estimated Diverted air Pax of Filipino from "via Manila" & "via Cebu" (x 1,000)	-	2.2	5.7	10.6	10.6
B. Net Benefit for Diverted Air Pax from "via Manila" & "via Cebu" to Direct Routes to Davao(1,000 PHP) (A * 2,465)	-	5,382.6	13,997.2	26,172.2	26,172.2

(8) Net Benefit of the Increase of "Willingness To Pay" for International Air Passengers carried by the Philippine Air Lines(PAL)

The incremental net benefit for the international air passengers carried by PAL is quantified by the formula (12.2.12)~(12.2.15).

$$\text{NBIIP} = \text{IIPR} - \text{IIPC} \text{-----} (12.2.12)$$

where, NBIIP : The incremental net benefit for the international induced air passengers carried by PAL (thousand PHP)
 IIPR : The incremental revenue for the international air passengers carried by PAL (thousand)
 IIPC : The incremental cost for the international air passengers carried by PAL (thousand passengers)

$$\text{IIPR} = \text{IIPK} \cdot \text{AVPR} \text{-----} (12.2.13)$$

where, IIPK : The incremental passenger-km of international air passengers carried by PAL (thousand)
 AVPR : Average operating revenue per passenger-km (PHP) 3.28 PHP/passenger-km (See Appendix-12.2.9)

$$\text{IIPK} = \text{IIPLP} \cdot \text{AVPLK} \text{-----} (12.2.14)$$

where, IIPLP : Incremental number of international air passengers carried by PAL
 AVPLK : Average passenger-km for the said international air passengers:
 AVPLK = 5,159 , assumed based on 1990 international air traffic data. (See the aforementioned Appendix-12.2.9)

$$\text{IIPC} = \text{IIPK}(\text{AVPLE} - \text{VTP} \cdot \text{AVPR}) \text{-----} (12.2.15)$$

where, AVPLE : Average operating expense per passenger-km for the said international air passengers: (assumed to be 90% of the average operating revenue).

The calculated results are shown in Tables 12.2.15 and 12.2.16.

Table 12.2.15 Estimated Incremental Number of Air Passengers of PAL

	(x 1,000)				
	1990	1995	2000	2005	2010
A. International Air Pax. on Direct Flights from/to Davao	-	14.7	46.5	93.4	166.6
B. Incremental International Air Passengers of PAL (A * 0.38) *	-	5.6	17.7	35.5	63.3

Note *: The Value of 0.38 is estimated by applying the following equation of a/b where,
a: 1,667 thousand international air passengers (1991 Statistical Yearbook)
b: 4,444.3 thousand total international air passengers from/to the Philippines
(See the foregoing Table 4.3.4)

Table 12.2.16 Net Benefit of the Increased "Willingness To Pay" for International Air Passengers carried by PAL

	1990	1995	2000	2005	2010
A. Incremental Air Pax-km (thousand passenger-km) (x 1,000)	-	28,818.2	91,159.5	183,103.2	326,606.0
B. Net Benefit of Intl. Air Passengers carried by Philippine Air Lines (1,000 PHP) (Revenue-(Expense-Tax))	-	11,815.5	37,375.4	75,072.3	75,072.3

(9) Net Benefit of the Increase of "Willingness To Pay" for Domestic Air Cargo carried by the Philippine Air Lines(PAL)

The incremental net benefit for the domestic air cargo is quantified by the formula (12.2.16)~(12.2.18)

$$NBDC = IDGR - IDGC \text{-----} (12.2.16)$$

where, NBDC_n : The incremental net benefit for the domestic air cargo on the route (n) (thousand PHP)
IDGR : The incremental revenue for the domestic air cargo (thousand)

$$IDGR = IDG \cdot AVGR \text{-----} (12.2.17)$$

where, IDG : Incremental Domestic air cargo (thousand tons)
AVGR : Average revenue per cargo ton (PHP/ton): AVGR = 8,200 PHP/ton, obtained based on the current rate for the general air cargo and GRDP of Manila, Cebu, Cagayan de Oro and Zamboanga.(See Appendix-12.2.10)

$$IDGC_n = IDG_n(AVGEn - VTG \cdot AVGR) \text{-----} (12.2.18)$$

where, AVGE_n : Average operating expense per cargo ton (PHP/ton): Assumed to be 90% of the average operating revenue.

VTG : VAT rate: 3.0 % for the gross cargo revenue. (See the foregoing Note 12.2.7)

The calculated results are shown in Table 12.2.17.

Table 12.2.17 Net Benefit of the Increased "Willingness To Pay" for Domestic Air Cargo

	1990	1995	2000	2005	2010
A. Incremental Domestic Air Cargo (1,000 ton)	-	11.1	24.1	37.4	37.4
B. Net Benefit of Domestic Air Cargo (1,000 PHP) (Revenue-(Expense-Tax))	-	11,795.3	25,709.8	39,886.5	39,886.5

(10) Net Benefit of the Increase of "Willingness To Pay" for International Air Cargo carried by the Philippine Air Lines(PAL)

The incremental net benefit for the international air cargo carried by PAL is quantified by the formula (12.2.19)~(12.2.22).

$$NBIC = IIGR - IIGC \text{ ----- (12.2.19)}$$

where, NBIC : The incremental net benefit for the international air cargo carried by PAL (thousand PHP)
 IIGR : The incremental revenue for the said international air cargo (thousand PHP)
 IIGC : The incremental cost for the said international air cargo (thousand PHP)

$$IIGR = IIGLK \cdot AVGLR \text{ ----- (12.2.20)}$$

where, IIGLK : The incremental ton-km of the international air cargo carried by PAL
 AVGLR : Average revenue per cargo ton-km for the said international air cargo:
 AVGLR = 12.16 PHP/ton-km (See Appendix-12.2.11)

$$IIGLK = IIGPL \cdot AVPLK \text{ ----- (12.2.21)}$$

where, IIGPL : Incremental cargo-ton of the said international air cargo
 AVPLK : average revenue kilometers per cargo ton: 5,159 km/ton assumed to be equal to that of the international air passengers(See the foregoing Appendix-12.2.9)

$$IIGC = IIGLK(AVGLE - VTG) \cdot AVGLR \text{ ----- (12.2.22)}$$

where, AVGLE : Average operating expense per cargo ton kilometers for the said international air cargo: (assumed to be 90% of the average operating revenue).

The calculated results are shown in Tables 12.2.18 and 12.2.19.

Table 12.2.18 Incremental International Air Cargo carried by PAL
(1,000 ton)

	1990	1995	2000	2005	2010
A. Projected International Air Cargo			1.6	5.3	11.9
B. Incremental International Air Cargo			1.6	5.3	5.3
C. Incremental International Air Cargo carried by PAL (B*0.38)*			0.6	2.0	2.0

* For the value of 0.38, see Note in Table 12.2.14

Table 12.2.19 Net Benefit of the Increased "Willingness To Pay" for International Air Cargo carried by PAL

	1990	1995	2000	2005	2010
A. Incremental International Air Cargo ton-km(x 1,000) carried by PAL	-	-	3,211.2	10,343.2	10,343.2
B. Net Benefit of Inter. Air Cargo (1,000 PHP) (Revenue-(Expense-Tax))	-	-	5,076.2	16,350.5	16,350.5

(11) Net Benefit of the Increase of "Willingness To Pay" for Travel Tax on Filipinos Traveling Overseas

The incremental net benefit of the travel tax imposed on the Filipinos travelling overseas is quantified by the formula(12.2.23).

$$NBTTX = TTXR \cdot IOSFP \text{-----} (12.2.23)$$

where, NBTTX : Incremental net benefit of the tax revenue imposed on Filipinos traveling overseas (thousand PHP)
 TTXR : Rate of the travel tax: 1,650 PHP per traveler
 IOSFP : Incremental number of Filipino travelings overseas (thousand passengers)

The estimated results are shown in Table 12.2.20.

Table 12.2.20 Net Benefit of the Increased of "Willingness To Pay" of Filipinos Traveling Overseas

	1990	1995	2000	2005	2010
A. Incremental Number of International Air Pax. (x 1,000)	-	14.7	46.5	93.4	93.4
B. Incremental Number of Filipinos Overseas Air Travelers(x 1,000) (A*0.5*0.3368)	-	2.5	7.8	15.7	15.7
C. Net Benefit of Travel Tax on Filipino Travelers (1,000 PHP)	-	4,084.5	12,920.5	25,952.1	25,952.1

(12) Net Benefit of "Multiplier Effect" accompanied by Foreign Exchange Money spent by Foreign Visitors

The net benefit brought about by the foreign visitors is quantified by the formula (12.2.24).

$$NBTI = CNAV \cdot MLP \cdot (AVEX \cdot IFVT) \text{ ----- (12.2.24)}$$

where, NBTI : Net benefit brought about by the expenditure of foreign currency by incremental foreign visitors (thousand PHP)

IFVT : incremental number of foreign visitors (thousand) (See Appendices-12.2.4, 12.2.5 and 12.2.6)

AVEX : Average expenditure per foreign visitor(PHP) AVEX: 11,370 PHP (See Appendix-12.2.12)

MLP : "multiplier" as defined in the aforementioned Note 12.2.4. The value of MLP is assumed to be 0.5

CNAV : Degree or ratio for the contribution of the airport developments. CNAV is assumed to be 1/2 presuming that the total multiplier effect is brought about equally by the airport development and the tourism industry.

The estimated result is shown in Table 12.2.21.

Table 12.2.21 Net Benefit of the "Multiplier Effect" Accompanied by Exchange Money from Foreign Visitors

	1990	1995	2000	2005	2010
A. Incremental Foreign Visitors from/to Davao Phase-I Project(x 1,000)	-	16.6	43.8	78.9	78.9
B. Net Benefit from Foreign Exchange Money expended by Foreign Visitors ((1/2)*A*11,370*0.5*(1/2) (1,000 PHP)	-	23,648.3	62,188.9	112,162.6	112,162.6

(13) Net Benefit of the Increased "Willingness To Pay" for Aircraft Fuel and Oil

The net benefit for the increased "Willingness To Pay" for aircraft fuel and oil is quantified by the following formula (12.2.25).

$$NBEXC = UPRC \cdot INFEL \cdot [1 - 1/(1 + EXCRT)] \text{ ----- (12.2.25)}$$

where, NBEXC : Net benefit of excise tax paid on the domestically produced aircraft fuel consumed at the Davao International Airport accompanied by the incremental flights.

EXCRT : Excise tax rate: 48% (See the foregoing Note 12.2.7)

UPRC : Buying unit price , Jet A-1 : 14.3597 PHP/liter

INFEL : Incremental quantity of fuel consumed accompanied by the project implementation (See Appendix-12.2.13)

The estimated result is shown in Table 12.2.22.

Table 12.2.22 Net Benefit of the Increased "Willingness To Pay" for Aircraft Fuel and Oil

	1990	1995	2000	2005	2010
A. Incremental Quantity of Aircraft Fuel (kl.) (Domestic*2 + Inter.*1) #	-	23,177	47,565	74,186	74,186
B. Net Benefit of Excise Tax of Aircraft Fuel (1,000 PHP)	-	107,942	221,519	345,500	345,500

Note #: The total quantity of aircraft fuel consumption within the Philippines is estimated by doubling the quantity consumed at Davao airport.

12.2.7 Summary of Estimated Net Benefits

The foregoing estimated net benefits are summarized as shown in Table 12.2.23.

Table 12.2.23 Summary of Estimated Net Benefit

	(1,000 PHP)			
	1995	2000	2005	2010
1. Benefit from Fees and Charges, etc.	3,332	12,417	24,293	24,293
1.1 Increase of Passenger Fee	1,957	6,071	12,081	12,081
1.2 Increase of Landing Fees	402	2,596	5,044	5,044
1.3 Increase of Operational Fees	394	1,596	2,952	2,952
1.4 Increase of Rental Concessions, etc.	578	2,155	4,216	4,216
2. Net Benefits of Increase of "Willingness To Pay" for the Following:	60,210	153,465	274,765	274,765
2.1 Domestic Diverted Air Passengers	18,342	38,816	59,852	59,852
2.2 Domestic Induced Air Passengers	8,791	19,571	31,479	31,479
2.3 Inter. Dive. Air Pax carried by PAL	5,383	13,997	26,172	26,172
2.4 International Pax carried by PAL	11,815	37,375	75,072	75,072
2.5 Domestic Air Cargo	11,795	25,710	39,887	39,887
2.6 Inter. Air Cargo carried by PAL	-	5,076	16,350	16,350
2.7 Filipino Overseas Travelers	4,085	12,920	25,952	25,952
3. Benefit brought about by Tourism	23,648	62,189	112,163	112,163
3.1 Increase of "multiplier" effect	23,648	62,189	112,163	112,163
4. Benefit brought about in Fuel & Oil Industry	107,942	221,519	345,500	345,500
4.1 Increase of Excise Tax Receipt	107,942	221,519	345,500	345,500
5. Total	195,132	449,590	756,720	756,720

12.2.8 Economic Cost of Airport Development

The cost of the airport development consists of the land acquisition and compensation costs, the construction cost and operating and maintenance costs.

(1) Land Acquisition and Construction Costs

The annual fund requirements for the land acquisition and construction of the medium-term development are estimated as shown in Table 12.2.24. from the project implementation schedule and construction cost estimate in Chapter 10.

Table 12.2.24 Annual Fund Requirements

Year				(1,000 PHP)
	Land Acquisition	Construction	Engineering	Total
1995	123,846	-	120,000	243,846
1996		494,329	60,000	554,329
1997		871,925	60,000	931,925
1998		675,223	60,000	735,223
Total	123,846	2,041,477	300,000	2,465,323

Note: Contingency is not included.

(2) Incremental Operating and Maintenance Costs Accompanied by Project Implementation

The operating and maintenance costs consist of two(2) major categories of "personnel costs" and "maintenance and operating costs". Annual incremental personnel costs are estimated based on the additional number of staff personnel in "with project" and the average personnel expenditure per staff (40,000 PHP).(See Table 12.2.25).

Annual incremental maintenance and operating costs are roughly estimated as 1% of the construction costs for civil and architectural works and 5% for construction costs of airport utilities, air navigation system, and the rescue and fire fighting and fuel supply system. The incremental annual cost is obtained by deducting the current annual lighting expenses, and the maintenance and repair expenses from the above amount of annual maintenance and administration costs (See Appendix-12.2.14 and Table 12.2.26).

Table 12.2.25 Incremental Personal Costs

Year	Current	1995	2000	2005	2010
A. No. of Personal	147	162	177	194	210
B. Incremental No. of Personal for Phase-I	-	15	30	47	47
C. Incremental Annual Expenses (1,000 PHP)	-	600	1,200	1,880	1,880

Table 12.2.26 Incremental Maintenance Cost

(1,000 PHP)

	Local Portion	Foreign Portion	Total
1.1 Civil Work	326,564	344,115	670,679
1.2 Architectural Work	229,693	474,977	704,670
1.0 Total	556,257	819,092	1,375,349
A. Maintenance Cost (1% of Total)	5,563	8,191	13,754
2.1 Airport Utilities	21,720	82,320	104,040
2.2 Air Navigation Systems	59,805	245,283	305,088
2.3 Rescue & Fire Fighting	300	5,700	6,000
2.4 Fuel Supply System	15,000	45,000	60,000
2.0 Total	96,825	378,303	475,128
B. Maintenance Cost (5% of Total)	4,841	18,915	23,756
C. Total Maintenance Cost (A+B)	10,404	27,106	37,510
D. Current (1991) Annual Maintenance Expenses	-	-	2,072
E. Incremental Annual Maintenance Cost (C-D)	-	-	35,438

12.2.9 Results of the Economic Analysis

The benefits and costs described in the previous sections are tabulated as cash flow as shown in Table 12.2.27. The Economic Internal Rate of Return(EIRR), Benefit Cost Ratio(B/C) and Net Present Value(NPV) of the project are summarized in Table 12.2.28.

Table 12.2.28 Evaluation Indicator

EIRR (%)	17.74
B/C Ratio (%)*	1.20
NPV (thousand PHP)	412,406

Note * : At a discount rate of 15%

Table 12.2.27 Cash Flow of Revenues and Expenditures

unit : 1,000 PHP

Year	Benefit	Cost	Residual Value	Balance
1995		243,846		-243,846
1996		554,329		-554,329
1997		931,925		-931,925
1998		735,223		-735,223
1999	379,924	36,482		343,442
2000	449,590	36,638		412,952
2001	498,711	36,750		461,961
2002	553,323	36,874		516,449
2003	614,048	37,008		577,040
2004	681,586	37,156		644,430
2005	756,721	37,318		719,403
2006	756,721	37,318		719,403
2007	756,721	37,318		719,403
2008	756,721	37,318		719,403
2009	756,721	37,318		719,403
2010	756,721	37,318		719,403
2011	756,721	37,318		719,403
2012	756,721	37,318		719,403
2013	756,721	37,318		719,403
2014	756,721	37,318		719,403
2015	756,721	37,318	1,451,880	2,171,283
NPV/IRR	3,626,773	1,792,144		17.74%

The results of the economic analysis show that the medium-term or Phase-I project is feasible from the national economic viewpoint since the EIRR is far greater than the opportunity cost of capital of 10% to 12% which is usually used as a criterion for economically viable projects by the World Bank and the Asian Development Bank.

Sensitivity tests are carried out to provide probabilistic judgment on the investment .

The EIRRs were calculated for various projections and summarized in Table 12.2.29.

Table 12.2.29 Sensitivity Tests

Projections	EIRR(%)
Original	17.74
Cost Up by 20%	15.10
Cost Down by 20%	21.30
Traffic Up by 20%	20.62
Traffic Down by 20%	14.55
Cost Up by 20% and Traffic Down by 20%	12.20

It is noted that the EIRRs are still greater than the opportunity cost of capital of 10% even for possible cost overrun and traffic demand stagnation by 20% for the each at the same time. This means that the said project is still feasible even in the worst situation for the future.

12.3 Financial Analysis

12.3.1 General

The main purpose of the financial analysis is to examine the financial impact of the project implementation on the operating entity of the airport. At present the Davao International Airport is managed by the ATO, a substructure of the DOTC. The budget for the airport is prepared quarterly by the ATO with the approval of the DBM (Department of Budget Management). Based on the above budget, the personnel, maintenance and operating expenses are covered by governmental disbursement while the revenues from passenger fees, landing fees, operational fees, rentals of floor and land areas, concession's privilege fees, royalties and other charges are paid to the Treasury. Recently, DOTC and ATO have been envisaging raising the current fees and charges levied at the national airports which have been unchanged for many years. Considering the above-stated situation, this study proceeds with the examination from the following major viewpoints:

- a) to examine the financial impact on the local governmental sectors accompanied by implementation of Phase-I project.
- b) to examine the yearly revenues and expenses accompanied by Phase-I project implementation applying the current level of the fees and charges.
- c) to examine the financial viability based on the revenues and expenses accompanied by Phase-I project implementation applying the projected fees and charges. This examination is carried out by repeated calculations or "calibrations".

12.3.2 Financial Impacts on the Local Governmental Sectors

The yearly amount of the investment disbursement including contingency for the Phase-I project are shown in the Table 12.3.1

Table 12.3.1 Yearly Amount of Investment Disbursement

(1,000 PHP)

Year	Land Acquisition	Civil Construction	Engineering	Contingency	Total
1995	123,846	-	120,000	25,154	269,000
1996		494,329	60,000	54,671	609,000
1997		871,925	60,000	93,075	1,025,000
1998		675,223	60,000	73,777	809,000
Total	123,846	2,041,477	300,000	246,677	2,712,000

In the above, the yearly amounts of the fund to be procured by the Philippine Government are estimated as shown in Table 12.3.2. (See Table 12.3.9(1) and Table 12.3.9(2))

It is noteworthy that this fund plan is made assuming 75% of the total investment fund including land procurement fund is covered by the foreign soft loan.

Table 12.3.2 Estimated Amount of Government Fund

(1,000 PHP)

Classified Fund	1995	1996	1997	1998	total
Land Procurement	136,000				136,000
Civil & Construction		135,112	227,405	179,483	542,000
Interest Repayment during Construction for Foreign Soft Loan	3,591	16,386	37,921	54,918	112,816
Total	139,591	151,498	265,326	234,401	790,816

Note : Total amount of the governmental fund excluding interest payment is 678,000 thousand PHP, equivalent to 25% of the total investment disbursement of 2,712,000 thousand PHP.

For the comparison of the above expenditures with the development expenditure in the Philippines, the national Government expenditure programs are presented in Tables 12.3.3 and 12.3.4.

From the above tables the followings are summarized.

- a) The highest yearly expenditure of 265.3 million PHP for the Phase - I development of the Davao International Airport is only 0.1% of 254.4 billion PHP in total government expenditure and 1.36% of 19.5 billion PHP in communication and transportation expenditures in 1991.
- b) The above highest yearly expenditure 265.3 million PHP accounted for only 9.8% of the total expenditure of 2,719 million PHP for the airports and airways in 1992 in the National Government Expenditure Program, 1990-1992.

Table 12.3.3 National Government Expenditure Program by Sector : 1985-1991

(Million PHP)

	1985	1986	1987	1988	1989	1990	1991
Total expenditures	92,511	115,272	155,504	167,410	173,304	211,756	254,385
Economic Services	31,373	31,845	25,039	26,093	39,507	49,747	64,344
Agriculture	3,359	3,987	7,477	8,429	12,946	16,812	21,496
Trade and Industry	1,256	1,705	1,001	891	1,206	1,181	1,646
Tourist	86	88	156	256	269	251	538
Power and Energy	2,050	2,595	1,778	211	990	2,245	2,350
Water Resource Development	4,047	3,995	1,395	1,413	1,989	3,816	4,961
Communication, and Transportation	7,281	8,498	9,184	12,945	16,917	17,027	19,451
Other Economic Services	13,294	10,977	4,048	1,948	5,190	8,415	13,902
Social Services	21,759	26,192	27,493	31,061	38,511	56,144	62,509
Defense	9,236	9,137	12,549	18,298	19,766	23,321	26,010
General Public Services	6,142	6,885	12,559	15,730	17,453	22,144	25,982
Net Lending	1,732	651	7,641	4,907	1,569	-471	777
Debt Services	22,269	40,562	70,223	71,321	56,498	60,871	74,763

Sources: Budget of Receipt and Expenditures, Department of Budget and Management and Annual Financial Report, Commission on Audit.

Table 12.3.4 Government Infrastructure Development Program by Sector, 1990-1992

	(Million PHP)			
	1989	1990	1991	1992
	Actual			
Energy, Power & Rural Electrification	9,340	21,981	28,785	44,068
Transportation	6,862	16,721	21,615	31,338
Roads and Bridges	5,544	10,748	14,881	18,491
Railways	319	2,073	1,604	385
Airports and Airways	313	1,413	1,868	2,717
Ports/Shore Protection/Lighthouses	686	1,383	2,274	2,688
Urban Transport	N.A.	1,056	619	6,513
Others	N.A.	48	369	544
Water Resources	5,205	11,887	19,148	22,564
Social Infrastructure	2,742	4,051	6,001	7,693
Communications	1,332	2,021	4,045	9,180
Total	25,481	56,661	79,594	114,843

Data source: Update of the Medium Term Philippine Development Plan, 1990-1992

12.3.3 Financial Analysis Based on Current Airport Fees and Charges

The fund and income statement based on the projected yearly fund disbursements and current airport fees and charges are shown in Table 12.3.9(1) to Table 12.3.9(2) and Figure 12.3.1. The applied main presumptions and current airport fees and charges are shown in Table 12.3.5 together with those applied for the financial viability analysis in the following section.

From the above statement the following are evident.

- a) Revenues from airport fees and charges are not sufficient to cover the maintenance and operating expenses of the airport

The yearly operating revenue from the airport fees and charges, and the yearly operating expenses for the personnel, maintenance and repair are extracted for the selected years, from the above income statement, as shown in the Table 12.3.6.

Table 12.3.5 Presumptions on Fund Planning for the Phase-I Development of Davao International Airport

	Current Fees and Charges	Level-up Fees and Charges
Charge		
Passenger		
Domestic	1.5	60.0
International	250.0	300.0
Landing Fees(PHP)		
Domestic		
A300	916.7	9,167.0
B737	316.7	3,167.0
F50/HS748	116.7	1,167.0
International		
DC10	24,332.5	24,332.5
A300	15,070.0	15,070.0
B737	2,107.5	2,107.5
F50/HS748	1,627.5	1,627.5
Operational Charges		
Domestic		
Flight excl. General Av.	250/flight	1,250/flight
General Aviation	50/flight	250/flight
International		
Flight excl. General Av.	3,750/landing or take-off	3,750/landing or take-off
Rentals	0.21 of (Passenger Fees, Landing Fees and Operational charges)	0.21 of (Passenger Fees, Landing Fees and Operational charges)
Fund		
(1) Local Government Fund		
a) Principal Repayment	No	
b) Interest Payment	No	
(2) Foreign Soft Loan		
a) Principal Repayment	Equal yearly amount for 20 years	
b) Interest Payment	2.7	
c) Term of Deferment	10 years	
(3) Short-term interest		
a) Borrowing	15%	
b) Deposit	10%	
Number of Personnel	At present	
	In 2000	
	In 2010	
Personnel Cost per person	40,000 PHP/person/annum	
Maintenance/Inspection	1% of total construction	
	5.0% of const. of equipment	
Other Revenue	Estimated based on the other revenues than passenger and landing fees, and personnel cost	

Note: (1) The amount of the foreign loan is assumed as 75% of the total investment cost.
(2) Landing fees and operational fees for international flights are same as those of Manila International Airport.

Table 12.3.6 Operating Revenue and Expense based on Current Fees and Charges

(1,000 PHP)			
Year	Revenue	Expense	Shortage
2000	16,224	44,590	28,366
2005	28,509	45,270	16,761
2010	28,509	45,270	16,761
2020	28,509	45,270	16,761

As clear from the above table the yearly operating revenue is not able to cover the yearly needed expenditure for the operating expenses, while the shortage of the revenue for the operating expenses is not very small.

- b) Neither interest payment nor capital repayment is able to be made from the airport operating revenue.

It is natural from the before mentioned in a) that both of the interest payment and the principal repayment on the foreign soft loan, which accounts for 75% of the the total investment cost, are not able to be made from revenue generated by the Davao International Airport.

- c) Self-supporting management is hopeless at the level of current airport fees and charges

It is futile to achieve a self-supporting management by covering the yearly operating expenses and the interest payment and principal repayment on the foreign soft loan as far as the current airport fees and charges remain unchanged.

As clear from the before mentioned income and fund statement, the yearly accumulated fund shortage increases rapidly year after year due to the increasing yearly fund demand to pay the interest to cover the deficit in the operating revenue and to pay the interest on the foreign soft loan. The above accumulated fund shortage increases to a huge amount of 1 billion PHP and 1.6 billion PHP in the year 2010 and 2020 respectively. Besides, it should be noted that the above amount of the fund shortage do not include any shortage which may, otherwise, be accompanied by the principal repayment on the foreign soft loan, which is assumed to be covered by the governmental disbursement in this study. (See Table 12.3.9(1) to Table 12.3.9(2))

- d) The current airport fees and charges are relatively very low.

As before mentioned, the national airport fees and charges have been kept at a very low level for many years. Those applied at the Davao airport are not exceptional.

The comparison in the current airport fees and charges between Davao Airport and the Manila International Airport (MIA) which is operated as a public corporation is indicated in Table 12.3.7.

Table 12.3.7 Comparison between Current and Increased Airport Fees and Charges

(PHP)

Airport Fees & Charges	Davao	Manila (MIA)	
	Domestic	Domestic	International
Airport Fees	1.5	10.0	250.0
Landing Fees			
DC-10	1,445.0	6,797.0	24,332.5
A300	916.7	4,213.0	15,070.0
B737	316.7	1,280.0	2,107.0
F50/HS748	116.7	457.8	1,627.5
Operational Charges			
(a) Exclud. (b)	250.0 for each flight	250.0 for each flight	3,750.0 for take-off or landing
(b) General Aviation	50.0 for each flight	50.0 for each flight	-

Note: See Appendix-12.2.7

As clear from the above table, the domestic fees and charges applied at the Davao Airport are extremely lower than those at the MIAA. The domestic passenger fee at the Davao Airport is 1/7 and 1/170 respectively of the domestic fee and international fee at the MIAA. The domestic landing fee for the aircraft type of A300 at the Davao Airport is 1/5 and 1/16 respectively of the domestic and the international at the MIAA. The domestic operational charge at the Davao Airport is only 1/30 of the international one at the MIAA.

e) **Necessity to raise the airport fees and charges**

As clear from the foregoing examination, increase of the airport fees and charges is inevitable to realize a self-supporting airport management after the Phase-I project implementation.

12.3.4 Financial Viability Analysis based on Projected Airport Fees and Charges

(1) **Presumptions for Analysis**

Generally, major international airport in free economy countries are operated under a principle of self-supporting management to achieve a more efficient management and an optimum distribution of national resources.

Additionally, the Davao international airport after the Phase-I project implementation will handle a considerable amount of the international air traffic which is, however, expected to be rather very small in quantity compared to the domestic air traffic. Accordingly, an expected self-supporting management of the Davao international airport may be different from the current self-supporting management of the MIA.

Considering the above situation and conditions, a financial viability analysis is carried out by the "trial and error" analysis on how much the airport fees and charges should be raised up to realize a self-supporting management covering the operating expenses and interest payment on the foreign soft loan.

A result obtained from the above analyses is shown in Table 12.3.10(1) and Table 12.3.10(2).

From the income and fund statement shown in the above table, the following are evident:

The fund disbursement borne by the local Government is assumed as follows:

a)	Construction cost	:	2.7 billion PHP, accounts for 25% of 2.7 billion PHP of the total investment fund
b)	Interest payment for the construction period	:	About 0.1 billion PHP
c)	Principal repayment starting in the year 2005, ending in 2028	:	Highest yearly amount is about 0.1 billion PHP

Under the above assumption, if the current rates of airport fees and charges are raised up as shown in Table 12.3.8, the self-supporting management for the said project is viable as described later:

Table 12.3.8 Comparison in Airport Fees and Charges between Current and Increased Rate

Airport Fees and Charges	Current Rate (PHP)	Increased Rate (PHP)	Comparison (%)
Passenger Fees			
Domestic	1.5	60.0	4,000
International	250.0	300.0	120
Domestic Landing Fees (A300)			
Davao	916.7	9,167.0	1,000
(MIA)	4,213.0		218
Domestic Operational Charges			
Davao	250.0	1,250.0	500
(MIA)	250.0		500

Note: Landing fees and Operational fees for international flights are not raised.

From the comparison in the operating revenue between before and after the raising of the airport fees and charges in the year 2005, the total revenue shows an increase of about three (3) times (94,392/28,509=3.31).

Rentals are increased so as to correspond to the increase in the airport fees and charges.

(2) Results of Financial Viability Analysis

If the governmental fund disbursement and the increase of the airport fees and charges as before-mentioned, the operation and management of the Davao international airport after the Phase-I project implementation will be able to make up

the accumulated fund shortage mainly due to the interest payment on the foreign soft loan by the 21st year from the beginning of the airport operation of the said project and produces a fund surplus or net profit after the above year which could be used for the remaining principal repayment to be borne by the local government.

In conclusion, if the foregoing governmental disbursement for the fund and increase of the fees and charges are secured, the said project will be able to produce a net operating profit earlier in the latter half of the 35 years of the project life.

12.3.5 Conclusion

The yearly amount of the investment disbursements accompanied by the Phase-I project implementation will not be a heavy burden for the Government.

Under the present level of the airport fees and charges, the operating profit is negative from the start while the cumulative shortage in the yearly fund management will grow year after year, reaching a huge amount of more than 1.0 billion PHP shortage by the end of the year 2020 (See Table 12.3.9(1), Table 12.3.9(2) and Figure 12.3.1).

However, if a certain reasonable governmental fund disbursement and a moderate increase of airport fees and charges are implemented, a self-supporting management will be viable by a relatively earlier period than 35 years of the said project life (See Section 12.3.4).

It should be noteworthy that if the above amount of raising of the fees and charges is regarded to be too large or undue from the viewpoint of attracting traffic demand. Some part of the said amount is recommended to be covered by the governmental disbursement because the said project produces a big and enough benefits in the national economic accounting as before mentioned.

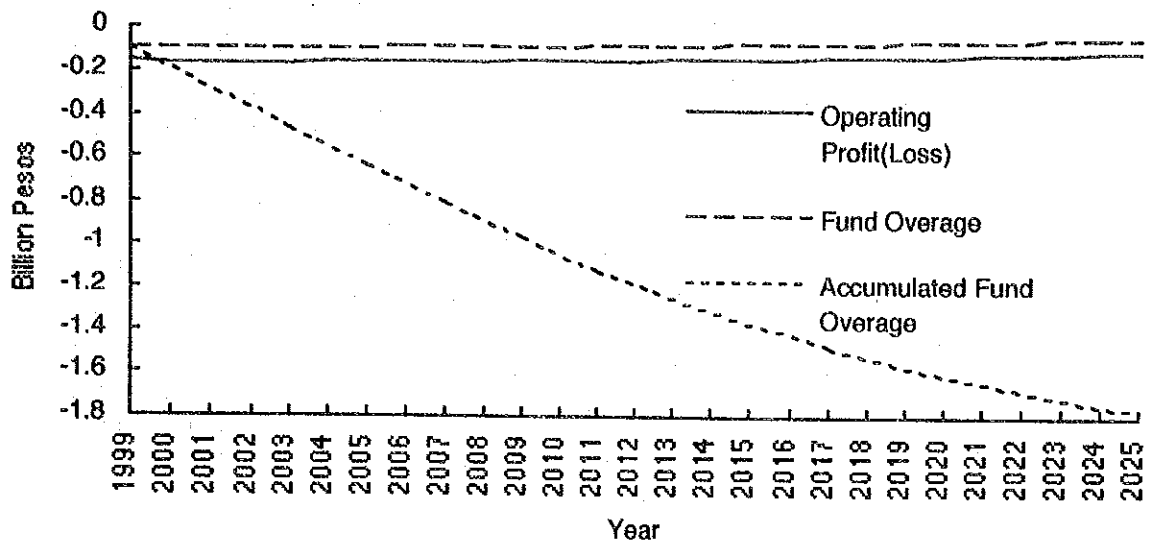


Figure 12.3.1 Operating Profit, Fund Overage and Cumulative Fund

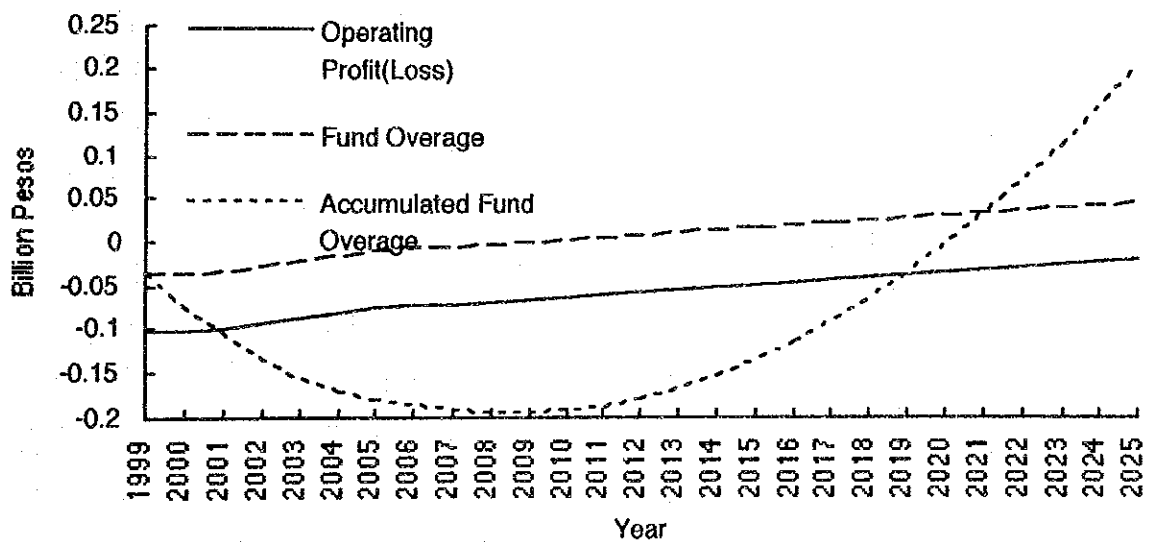


Figure 12.3.2 Operating Profit, Fund Overage and Cumulative Fund

Table 12.3.9 (1) Income and Fund Statement Under Current Changing System

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
INCOME STATEMENT																
Operating Revenue					13,364	16,224	18,101	20,223	22,633	25,330	28,509	28,509	28,509	28,509	28,509	28,509
Operating Expense					110,706	110,830	110,961	111,094	111,226	111,369	111,510	111,510	111,510	111,510	111,510	111,510
a) Operating Expense					44,468	44,500	44,721	44,854	44,986	45,129	45,270	45,270	45,270	45,270	45,270	45,270
b) Depreciation					68,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240
Current Profit(Loss)					-97,342	-94,607	-92,860	-90,870	-88,592	-86,040	-83,001	-83,002	-83,001	-83,001	-83,001	-83,001
Interest Revenue					0	0	0	0	0	0	0	0	0	0	0	0
Interest for Short Term					0	-12,903	-14,428	-14,395	-14,092	-13,704	-13,263	-12,741	-12,636	-12,497	-12,192	-11,735
Interest for Self Loan					54,918	54,918	54,918	54,918	54,918	54,918	54,918	54,738	53,919	52,023	49,277	46,531
Operating Profit(Loss)					-152,250	-162,428	-162,206	-160,163	-157,802	-154,862	-151,182	-150,481	-149,556	-147,521	-144,470	-141,287
After-tax Profit					-152,250	-162,428	-162,206	-160,163	-157,802	-154,862	-151,182	-150,481	-149,556	-147,521	-144,470	-141,287
Accumulated Profit(Loss)					-152,250	-314,688	-478,894	-637,077	-794,878	-949,341	-1,100,523	-1,251,004	-1,400,560	-1,548,061	-1,692,551	-1,833,818
FUND STATEMENT																
Total Fund Revenue	2,824,816	272,591	625,386	883,918	68,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240
Local Government Fund	678,000	138,000	227,405	179,483	0	0	0	0	0	0	6,650	30,344	134,464	167,940	167,940	167,940
Interest during Const.	112,816	3,591	16,306	54,918												
Self Loan	2,034,000	133,000	473,880	629,517												
Reserve for Depreciate					68,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240
Total Fund Expenses	2,824,816	272,591	625,386	883,918	0	0	0	0	0	0	8,850	30,344	70,224	101,700	101,700	101,700
Principal Repayment																
Operating Profit(Loss)					-152,250	-162,428	-162,206	-160,163	-157,802	-154,862	-151,182	-150,481	-149,556	-147,521	-144,470	-141,287
Fund Overage	0	0	0	0	-66,020	-96,188	-95,965	-93,943	-91,352	-88,422	-84,942	-84,241	-83,316	-81,281	-78,230	-75,027
Accumulated Fund Overage	0	0	0	0	-66,020	-162,208	-278,174	-372,117	-463,478	-561,901	-638,843	-721,094	-804,400	-885,681	-963,911	-1,038,938

Note: It should be noted that the yearly loan is borrowed at the beginning of the respective year and the repayment of the interest on the respective loan is paid at the end of the respective year and the yearly repayment of the interest on the respective yearly loan is paid at the end of the respective year.
However, the floating debt is borrowed at the end of the year and the interest repayment on the floating debt is paid at the end of the next year.

Table 12.3.9 (2) Income and Fund Statement Under Current Changing System

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
INCOME STATEMENT															
Operating Revenue	28,509	28,509	28,509	28,509	28,509	28,509	28,509	28,509	28,509	28,509	28,509	28,509	28,509	28,509	28,509
Operating Expense	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510
a) Operating Expense	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270
b) Depreciation	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240
Current Profit(Loss)	-83,001	-83,001	-83,000	-83,001	-83,001	-83,001	-83,001	-83,001	-83,001	-83,001	-83,001	-83,002	-83,000	-83,001	-83,000
Interest Revenue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest for Short Term	-11,254	-10,770	-10,286	-9,801	-9,316	-8,832	-8,347	-7,863	-7,378	-6,894	-6,409	-5,924	-5,440	-4,955	-4,471
Interest for Soft Loan	43,785	41,039	38,294	35,548	32,802	30,056	27,310	24,564	21,818	19,072	16,326	13,580	10,835	8,089	5,343
Operating Profit(Loss)	-138,040	-134,810	-131,580	-128,350	-125,119	-121,889	-118,658	-115,428	-112,197	-108,967	-105,736	-102,506	-99,275	-96,045	-92,814
After-tax Profit	-138,040	-134,810	-131,580	-128,350	-125,119	-121,889	-118,658	-115,428	-112,197	-108,967	-105,736	-102,506	-99,275	-96,045	-92,814
Accumulated Profit(Loss)	-1,971,859	-2,106,669	-2,239,249	-2,366,599	-2,491,718	-2,613,607	-2,732,265	-2,847,693	-2,959,890	-3,069,857	-3,174,553	-3,277,099	-3,376,374	-3,472,419	-3,565,233
FUND STATEMENT															
Total Fund Revenue	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940
Local Government Fund	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700
Interest during Const.															
Soft Loan															
Reserve for Depreciate	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240
Total Fund Expenses	101,700	101,700	167,940	167,940	0	0	0	0	0	0	6,850	30,344	70,224	101,700	95,050
Principal Repayment															
Operating Profit(Loss)	-138,040	-134,810	-131,580	-128,350	-125,119	-121,889	-118,658	-115,428	-112,197	-108,967	-105,736	-102,506	-99,275	-96,045	-92,814
Fund Coverage	-71,800	-68,570	-65,340	-62,110	-58,879	-55,649	-52,418	-49,188	-45,957	-42,727	-39,496	-36,266	-33,035	-29,805	-26,574
Accumulated Fund Coverage	-1,110,739	-1,179,309	-1,244,649	-1,306,759	-1,365,639	-1,421,207	-1,473,705	-1,522,853	-1,568,850	-1,611,577	-1,651,073	-1,687,339	-1,720,374	-1,750,179	-1,778,753

Note: It should be noted that the yearly loan is borrowed at the beginning of the respective year and the repayment of the interest on the respective loan is paid at the end of the respective year and the yearly repayment of the interest on the respective yearly loan is paid at the end of the respective year. However, the floating debt is borrowed at the end of the year and the interest repayment on the floating debt is paid at the end of the next year.

Table 12.3.10 (1) Income and Fund Statement Under Current Changing System

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2008	2010
			Construction Period													
INCOME STATEMENT																
Operating Revenue					62,419	68,208	72,571	77,336	82,501	88,109	94,392	94,392	94,392	94,392	94,392	94,392
Operating Expense					110,706	110,830	110,981	111,094	111,226	111,369	111,510	111,510	111,510	111,510	111,510	111,510
a) Operating Expense					44,466	44,590	44,721	44,854	44,986	45,129	45,270	45,270	45,270	45,270	45,270	45,270
b) Depreciation					66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240
Current Profit(Loss)					-48,287	-42,622	-38,390	-33,758	-28,725	-23,260	-17,118	-17,118	-17,118	-17,118	-17,118	-17,118
Interest Revenue					0	0	0	0	0	0	0	0	0	0	0	0
Interest for Short Term					0	-5,545	-5,527	-4,889	-4,099	-3,225	-2,274	-1,211	-1,024	-873	-566	-108
Interest for Soft Loan					54,918	54,918	54,918	54,918	54,918	54,918	54,918	54,738	53,919	52,023	49,277	46,531
Operating Profit(Loss)					-103,205	-103,085	-98,835	-93,565	-87,742	-81,403	-74,311	-73,087	-72,062	-70,015	-68,982	-63,758
After-tax Profit					-103,205	-103,085	-98,835	-93,565	-87,742	-81,403	-74,311	-73,087	-72,062	-70,015	-68,982	-63,758
Accumulated Profit(Loss)					-103,205	-208,290	-305,125	-398,690	-486,432	-567,835	-642,148	-715,213	-787,275	-857,290	-924,252	-988,010
FUND STATEMENT																
Total Fund Revenue	2,824,816	272,591	625,388	1,062,921	893,918	68,240	68,240	68,240	68,240	68,240	68,240	68,240	68,240	68,240	68,240	68,240
Local Government Fund	678,000	136,000	135,112	227,405	179,483	0	0	0	0	0	6,650	30,344	134,464	187,940	187,940	187,940
Interest during Const.	112,816	3,591	10,386	37,921	54,918											
Soft Loan	2,034,000	133,000	473,888	797,595	629,517											
Reserve for Depreciate						66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240
Total Fund Expenses	2,824,816	272,591	625,386	1,062,921	893,918	0	0	0	0	0	8,650	30,344	70,224	101,700	101,700	101,700
Principal Repayment																
Operating Profit(Loss)					-103,205	-103,085	-98,835	-93,565	-87,742	-81,403	-74,311	-73,087	-72,062	-70,015	-68,982	-63,758
Fund Overage	0	0	0	0	-36,985	-36,845	-32,556	-27,325	-21,502	-15,163	-8,071	-6,927	-5,822	-3,775	-722	2,462
Accumulated Fund Overage	0	0	0	0	-36,985	-73,810	-106,405	-133,730	-155,232	-170,395	-178,488	-185,293	-191,115	-194,890	-195,612	-193,130

Note: It should be noted that the yearly loan is borrowed at the beginning of the respective year and the repayment of the interest on the respective loan is paid at the end of the respective year and the yearly repayment of the interest on the respective yearly loan is paid at the end of the respective year. However, the floating debt is borrowed at the end of the year and the interest repayment on the floating debt is paid at the end of the next year.

Table 12.3.10 (2) Income and Fund Statement Under Current Changing system

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
INCOME STATEMENT															
Operating Revenue	94,392	94,392	94,392	94,392	94,392	94,392	94,392	94,392	94,392	94,392	94,392	94,392	94,392	94,392	94,392
Operating Expense	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510	111,510
a) Operating Expense	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270	45,270
b) Depreciation	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240
Current Profit(Loss)	-17,118	-17,118	-17,118	-17,118	-17,118	-17,118	-17,119	-17,119	-17,319	-17,119	-17,119	-17,119	-17,118	-17,118	-17,118
Interest Revenue	248	558	864	1,169	1,474	1,779	2,085	2,390	2,695	3,000	3,305	3,610	3,915	4,220	4,525
Interest for Short Term	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest for Solt Loan	43,786	41,039	38,294	35,548	32,802	30,056	27,310	24,564	21,818	19,072	16,326	13,580	10,835	8,089	5,343
Operating Profit(Loss)	-60,656	-57,599	-54,548	-51,497	-48,446	-45,395	-42,344	-39,293	-36,242	-33,191	-30,140	-27,089	-24,038	-20,987	-17,936
After-tax Profit	-60,656	-57,599	-54,548	-51,497	-48,446	-45,395	-42,344	-39,293	-36,242	-33,191	-30,140	-27,089	-24,038	-20,987	-17,936
Accumulated Profit(Loss)	-1,048,665	-1,106,264	-1,160,812	-1,212,309	-1,260,755	-1,306,150	-1,348,494	-1,387,787	-1,424,029	-1,457,220	-1,487,360	-1,514,449	-1,538,487	-1,559,474	-1,577,410
FUND STATEMENT															
Total Fund Revenue	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940	167,940
Local Government Fund	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700
Interest during Const.															
Solt Loan															
Reserve for Depreciate	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240	66,240
Total Fund Expenses	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700	101,700
Principal Repayment															
Operating Profit(Loss)	-60,656	-57,599	-54,548	-51,497	-48,446	-45,395	-42,344	-39,293	-36,242	-33,191	-30,140	-27,089	-24,038	-20,987	-17,936
Fund Overage	5,584	8,641	11,692	14,743	17,794	20,845	23,896	26,947	29,998	33,049	36,100	39,151	42,202	45,253	48,304
Accumulated Fund Overage	-187,545	-178,904	-167,212	-152,469	-134,675	-113,030	-89,934	-62,987	-38,989	60	36,100	75,311	117,513	162,766	211,070

Note: It should be noted that the yearly loan is borrowed at the beginning of the respective year and the repayment of the interest on the respective loan is paid at the end of the respective year and the yearly repayment of the interest on the respective loan is paid at the end of the respective year. However, the floating debt is borrowed at the end of the year and the interest repayment on the floating debt is paid at the end of the next year.

**CHAPTER 13 IMPACTS OF AIRPORT
DEVELOPMENT ON
SURROUNDING AREA**

**CHAPTER 13 IMPACTS OF AIRPORT DEVELOPMENT ON
SURROUNDING AREA**

13.1 General

This chapter evaluates the environmental and social impacts of airport development on the surrounding area and presents the future land use plan. Based on this evaluation, airport development is comprehensively evaluated from various aspects.

13.2 Environmental Impact

13.2.1 Aircraft Noise Influence

Aircraft noise influence is generally evaluated by WECPNL (weighed equivalent continuous perceived noise level), which is one of ICAO standard indices for aircraft noise. Noise contours drawn on the existing land use plan for the years 1992 (present), 2000 (the medium-term development) and 2010 (the long-term development) are shown in Figures 13.2.1 to 13.2.3.

Due to the medium-term development in which the runway will be shifted 140 m to the north of the existing runway, the area exposed to noise will shift to the north. In the long-term development in which the runway will be extended 500 m to the west, the exposed area will extend to the west.

Number of house units to be exposed to aircraft noise is shown in Table 13.2.1.

Table 13.2.1 Number of House Units Exposed to Aircraft Noise

WECPNL	1992	2010	Increase	Decrease	Balance
More than 95	0	0	0	0	0
95 - 90	25	0	2	27	-25
90 - 85	269	60	19	228	-209
85 - 80	808	248	109	669	-560
80 - 75	2,242	1,706	826	1,362	-536
75 - 80	4,326	4,227	2,955	3,054	-99
Total	7,670	6,241	3,911	5,340	-1429

Table 13.2.1 shows that many houses are already exposed to aircraft noise of high WECPNL and that many houses will continue to be exposed.

No standard for aircraft noise is available in the Philippines and the WECPNL is not familiar in the Philippines. Thus, the aircraft noise contours by A300, indicated in dB(decibel), are presented in Figures 13.2.4 and 13.2.5 in order for the Philippine people to better understand the meaning of noise levels. It is noted that the evaluation by dB is not applicable for the aircraft noise influence because dB is the index for instantaneous noise levels whereas the WECPNL is for the integrated noise level.

The aircraft noise contours by DC-10 and B737 in dB(A) are presented in Appendicies-1.2.1 to 13.2.4.

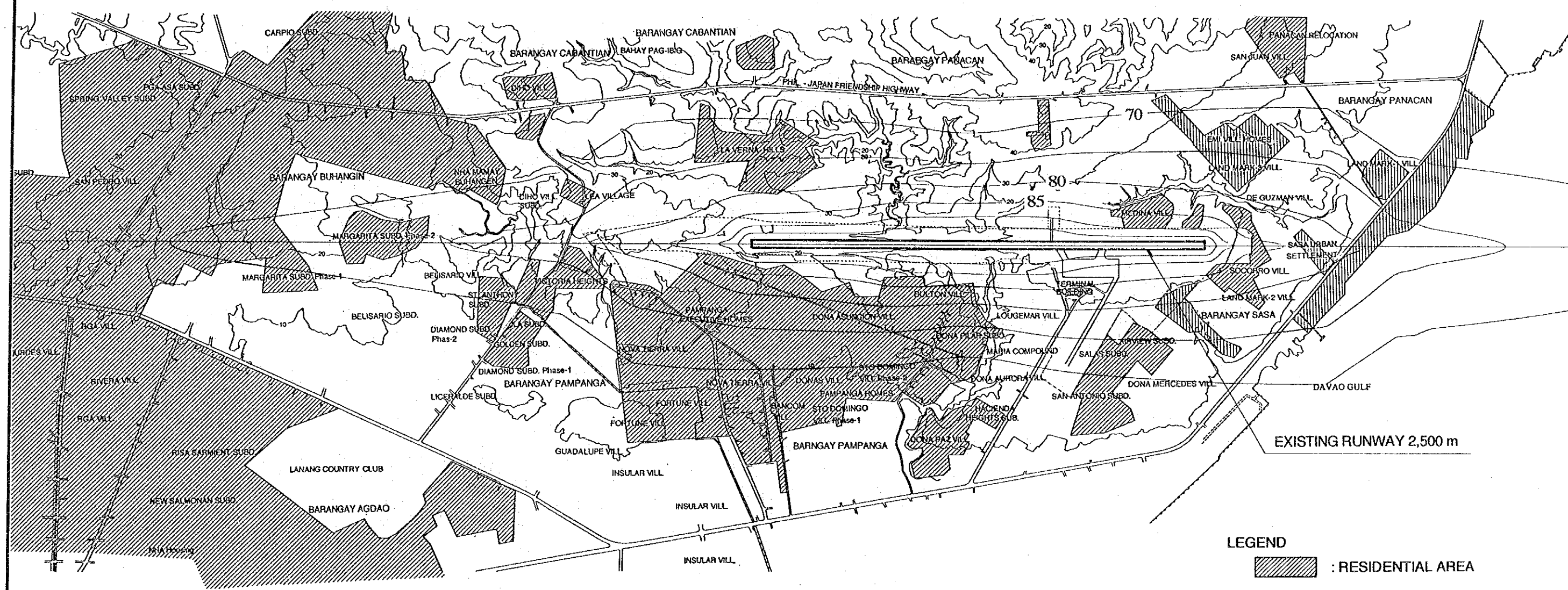
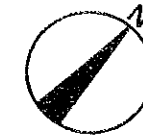
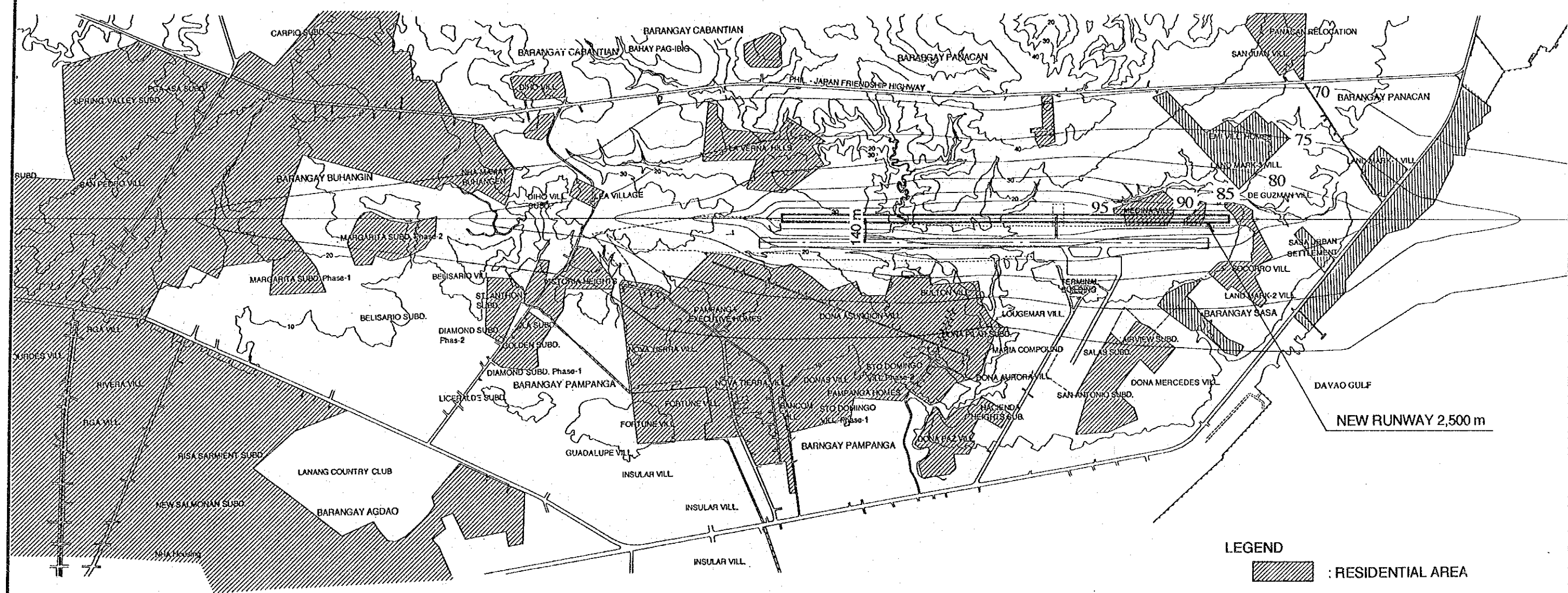
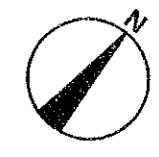


Figure 13.2.1 Aircraft Noise Contours of WECPNL in 1992



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[Shaded Area] : RESIDENTIAL AREA

0 200 400 600 800 1000m

Figure 13.2.2 Aircraft Noise Contours of WPCPNL in 2000

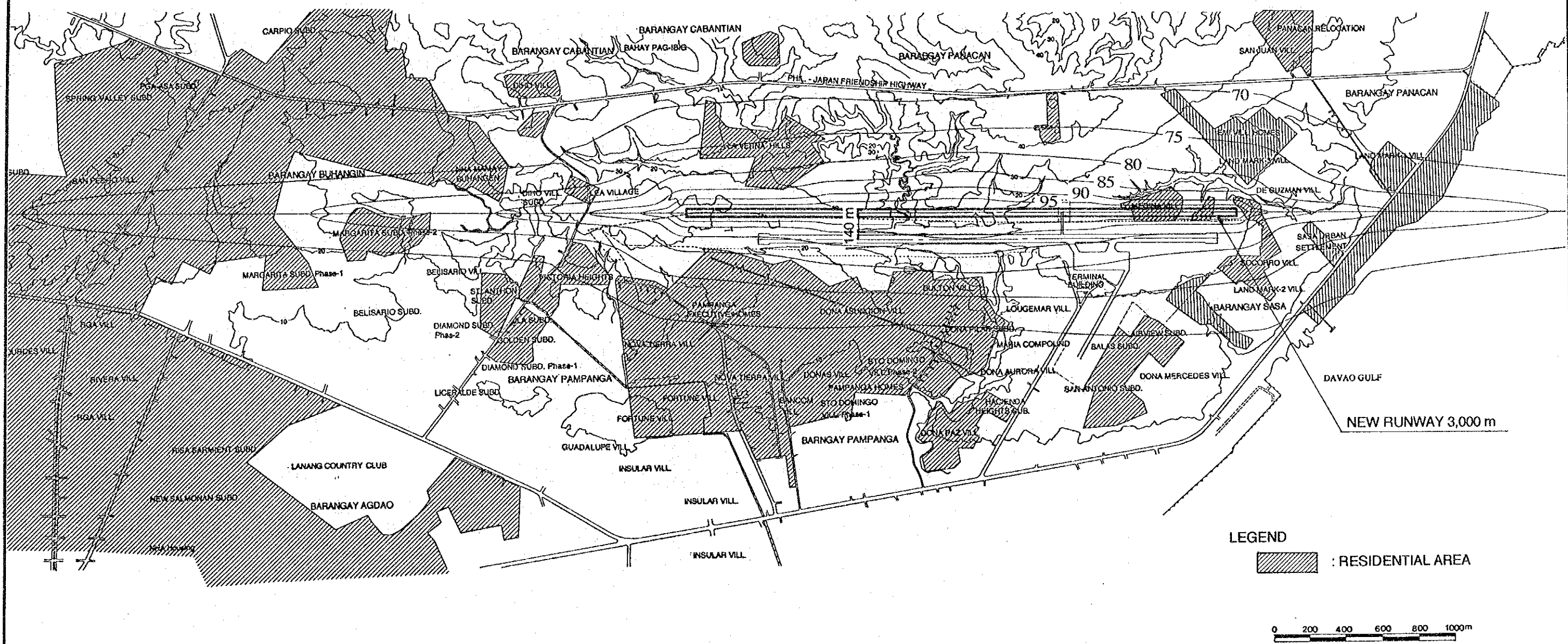
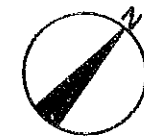
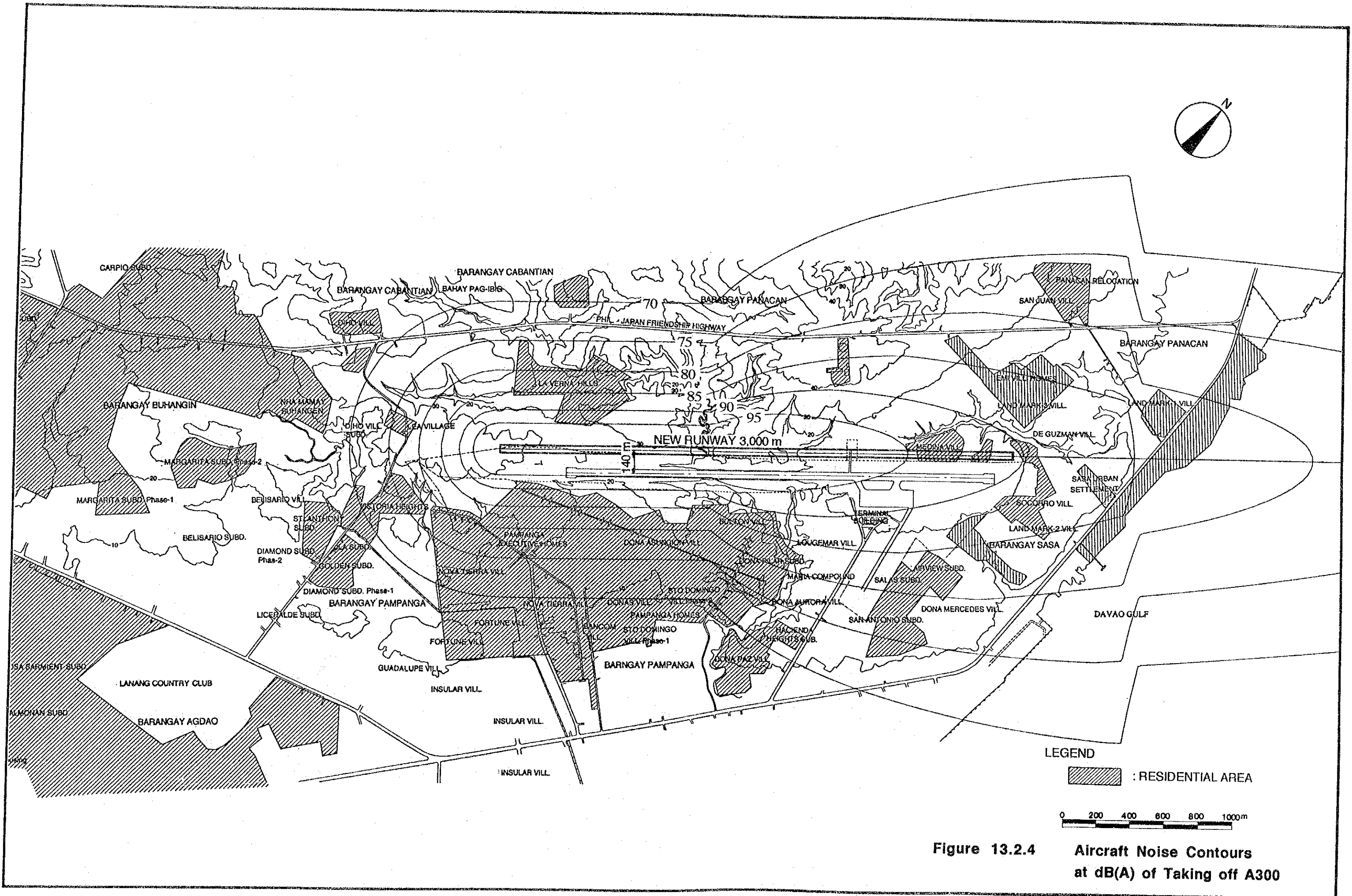


Figure 13.2.3 Aircraft Noise Contours of WECPNL in 2010



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 [Hatched Box] : RESIDENTIAL AREA

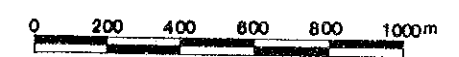


Figure 13.2.4 Aircraft Noise Contours at dB(A) of Taking off A300

For the reference, the number of housing units to be exposed to aircraft noise level by A300 indicated in dB is shown in Table 13.2.2.

Table 13.2.2 Number of Housing Units Exposed to Aircraft Noise in the Year 2010

dB (A)	A 300	
	Taking Off	Landing
More than 95	0	0
95 - 90	2	200
90 - 85	810	210
85 - 80	1,710	410
80 - 75	1,900	670
75 - 70	1,600	1,550

Note: In case of approach from RWY 23 and takeoff from RWY 05.

Noise standards adopted in the Philippines are shown in Table 13.2.3. It is noted that the standards are not for aircraft noise.

Table 13.2.3 Noise Standards in the Philippines

Category of Area	Unit: dB(A)		
	Daytime 9:00 - 18:00	Morning & Evening 5:00 - 9:00 18:00 - 22:00	Night Time 22:00 - 5:00
AA (School, Hospital, etc.)	50	45	40
A (Residential Area)	55	50	45
B (Commercial Area)	65	60	55
C (Light Industrial Area)	70	65	60
D (Heavy Industrial Area)	75	70	65

Source: Rules & Regulations of the National Pollution Control Commission (1978), Section 78, Table 1 - Environmental Quality Standards for Noise in General Areas (maximum allowable noise levels in general areas).

Appendix-13.2.5 shows an example of noise level.

Through the discussions between DOTC and the Study Team on the selection of an alternative master plan, it was confirmed by DOTC that the estimated aircraft noise level at the airport surroundings will not be a major problem in the future. On the other hand, it is considered that a tolerance and consciousness to the noise might be changed in the future with the upgrading of living standards.

Therefore, the following measures are recommended to be taken in order to minimize the adverse effects of aircraft noise on the surrounding area:

- a) Exert strict control by local government agencies on land use at the area surrounding the airport. The area to be controlled is broadly illustrated in Figure 13.2.6.

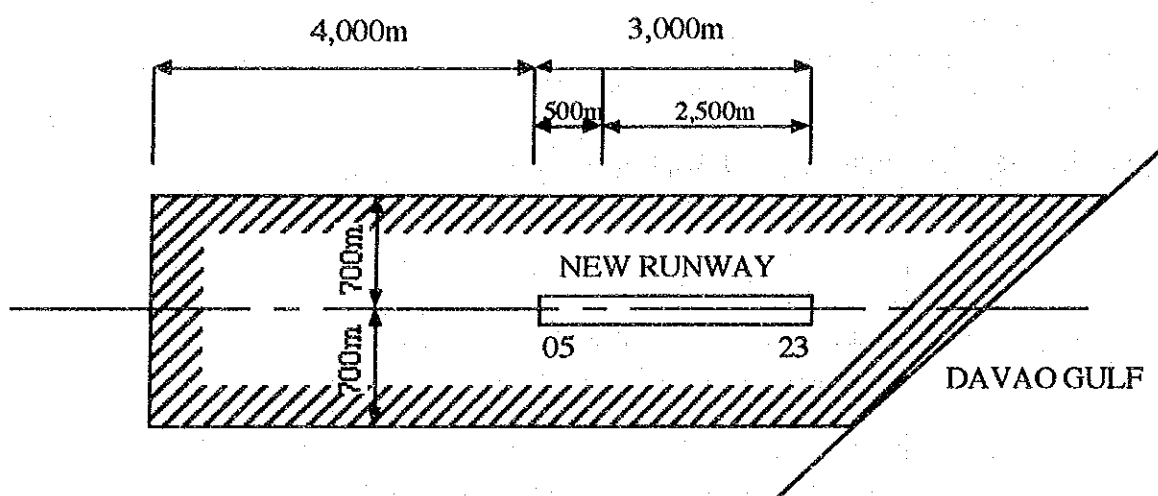


Figure 13.2.6 Area to be Controlled on Land Use

- b) Implement preferential runway usage pattern, that is an approach from RWY 23 and a takeoff from RWY 05, as much as possible in order to minimize the influence of aircraft noise on the western area of the airport.
- c) Restrict early morning/late evening flights as well as night flights.
- d) Introduce low noise aircraft.

Through the implementation of the above measures, it is expected that there will be no adverse noise influence on the surrounding community by the airport development.

13.2.2 Other Environmental Impacts

Other impacts, such as physical environment, biological environment and cultural environment are briefly described as preliminary environmental impact study in this section. Various environmental impacts at and around the airport were identified and their countermeasures were studied. Prior to proceeding with the implementation of the project, further environmental impact assessment (EIA) shall be carried out by DOTC in accordance with the Philippine Environment Policy.

(1) Physical Environment

a) Water resources and water quality

There are two streams: one flows southward through the airport almost at its center and into Davao Gulf; the other flows northeasterly through the northern side of the existing runway (almost parallel to the runway) and into Davao Gulf.

Drainage systems for the development of Davao airport will retain the natural stream flows as much as possible in order not to influence the lower reaches of the streams especially by flooding.

A sewage treatment plant will be constructed in the airport to treat domestic waste waters generated at the airport terminal area.

With regard to water consumption, water will be supplied by deep wells to be installed within the airport. In fact, potable water is now being supplied by the deep wells installed at the airport without any water treatment plant. However, a water supply station, including a treatment plant, will be under the influence of water consumption changing the quality and quantity of water. At the early stage of the basic design, water quality and available water quantity examinations should be carried out to design the water supply station for the project.

b) Soil and topography

Cut and fill earthwork will be executed to construct a new runway, an apron and the terminal by taking into account the soil and topography environments. Pavements for the runway, the apron, car parks and access roads turn the ground surfaces impervious. However, the rest of area should be landscaped by turf, bushes and trees to retain the beauty of nature taking into consideration the soil and topographic conditions prevailing at the airport.

c) Noise and vibration during construction period

The noise and vibration which may be brought about by construction equipment during the airport development will not seriously influence the communities since majority of the construction works will take place at sparsely populated area.

(2) Biological Environment

a) Vegetation and wildlife

It is deemed that neither vegetation nor wildlife at and around the airport would be affected harmfully by the development and operation of the airport.

(3) Cultural Environment

a) Historical and cultural landmarks

No historical and cultural landmarks, such as national treasures and important cultural assets, have been found in the airport area by site inspection.

Consequently, it is noted that no serious environmental impacts are predicted at and around the airport.

13.3 Social Impact

The number of housing units to be relocated and the area of land acquisition are shown in Tables 13.3.1 and 13.3.2 respectively.

Table 13.3.1 Number of Housing Units to be Relocated

	Required *1	Desirable *2	Total
House (medium)	57	148	205
House (small)	234	13	247
School	1	0	1
Church	1	1	2
Total	293	162	455

Note, *1 : Required for medium-term development
 *2 : Desirable for long-term development and future provision of parallel taxiway

Table 13.3.2 Required Area to be Acquired

	Required	Desirable	Total
Subdivision	0.0	2.8	2.8
Other Residential Area	11.5	4.6	16.1
Agricultural Land	62.8	23.0	85.8
Total	74.3	30.4	104.7

(ha)

As shown in Tables 13.3.1 and 13.3.2, the airport development requires the relocation of many houses and land acquisition. Based on the tentatively proposed airport master plan Alternative-M3, Davao City council approved the amended official zoning map in November 1992 to secure the future airport development. It is expected that the social impact to be caused by housing relocation will be minimal by the above legal measures. Fortunately, in the proposed site for the airport development, there are no squatters.

In order to minimize the social impact of airport development, the following specific measures are recommended to be taken by the Philippine side:

- a) Davao Municipal Government is to amend the figures of 72 to 80 ha and extent of the reserved area for airport expansion indicated in the city ordinance issued in November 1992 as soon as possible so as to be in accordance with the airport master plan finally selected which requires the expansion of area of about 105 ha.
- b) For the implementation of the medium-term development project, DOTC and local government agencies, such as Davao Municipal Government, HLURB-XI, RDC-XI, NEDA-XI and the Department of Interior and Local Government-XI (DILG), are to closely coordinate matters with each other.
- c) For the long-term airport development, land use at the area surrounding the airport is to be controlled by the zoning map to be amended.
- d) DOTC is to acquire the land and relocate the houses at the wider area during the earlier stage. Then, DOTC is to arrange the necessary budget in the earlier stage.

In the meeting on the airport master plan, DOTC and local government agencies confirmed that specific measures and efforts would be taken by the Philippine side to ensure the availability of the land required for the implementation of the airport development, as listed in items b) and c) above.

Therefore, it is expected that the social impacts of the airport development on the surrounding community, in terms of land acquisition and housing relocation, will be minimized by taking the above measures.

13.4 Future Land Use Plan

13.4.1 General

The establishment of a future land use plan is for developing the Davao International Airport in harmony with the living communities surrounding the airport. Based on the study flow chart indicated in Figure 13.4.1, the future land use plan was studied as follows:

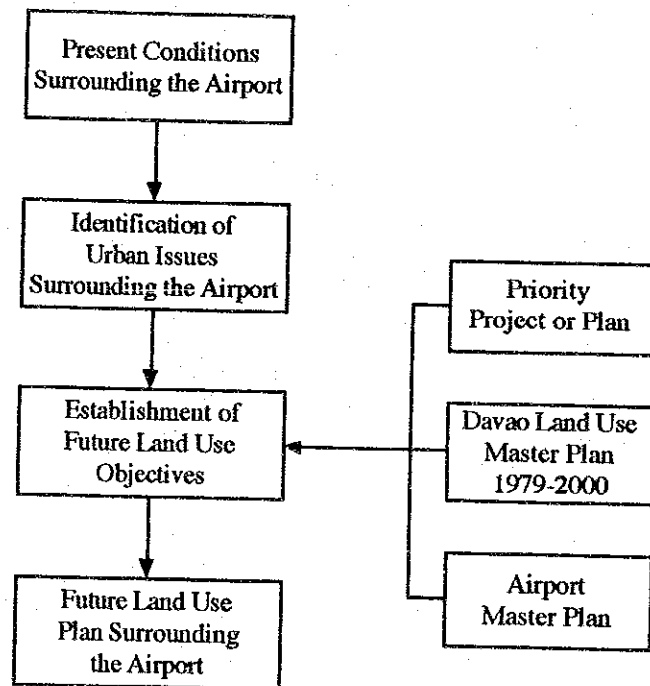


Figure 13.4.1 Land Use Plan Study Flow Chart

13.4.2 Present Conditions and Identification of Urban Issues

First of all, present conditions, such as present land use surrounding the airport (Refer to Section 3.12), (Refer to Figure 13.4.2) were examined to determine the role surrounding the airport in terms of Davao City function. The area could be the sub-city center surrounding the airport as many points of interest and regional industrial center are close to the airport.

Prior to the identification of the urban issues expected, aircraft noise (Refer to Figure 13.4.3), was also studied to identify the urban problems in and around the airport. Major urban issues surrounding the airport are shown in Figure 13.4.4.

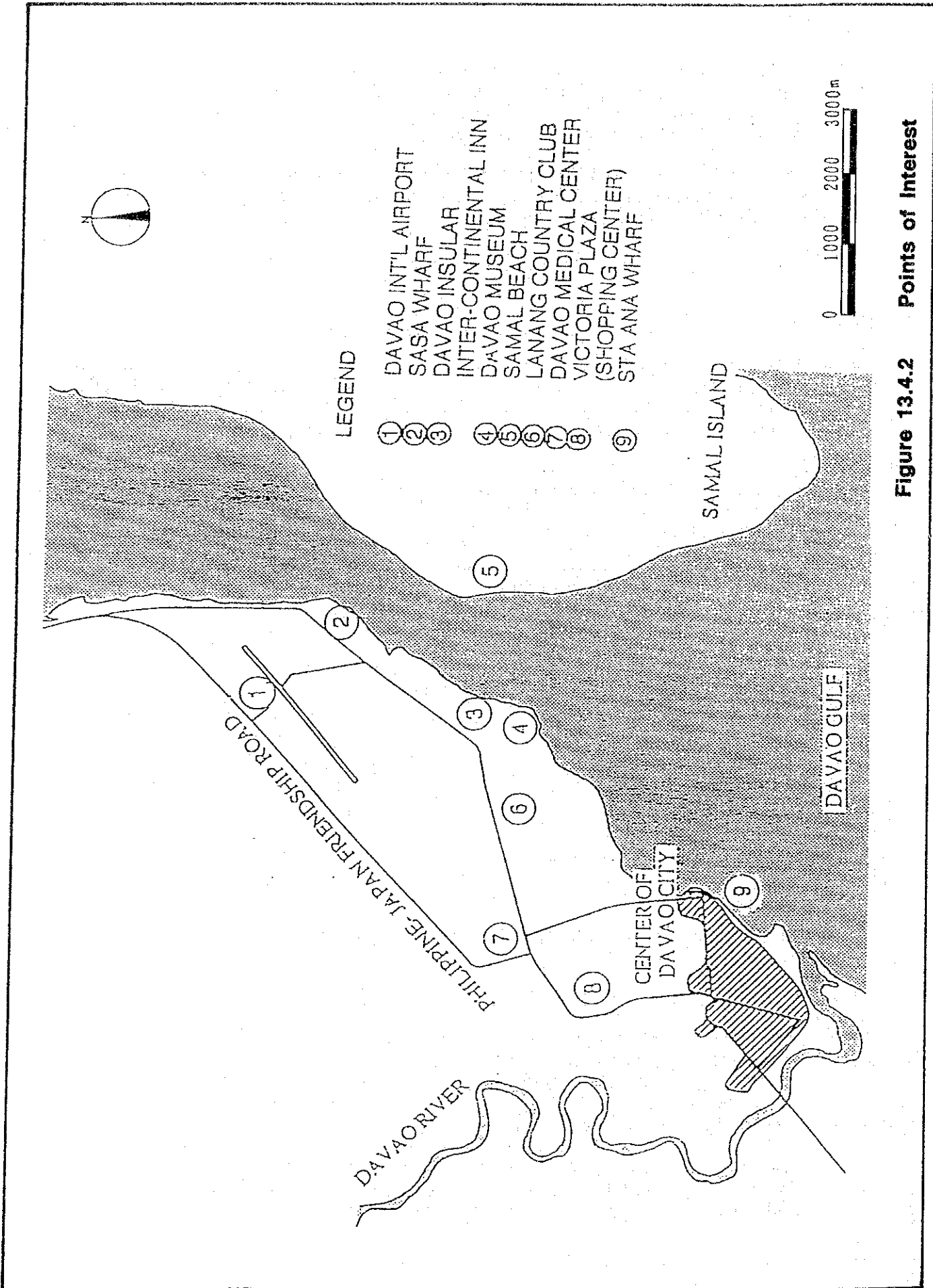
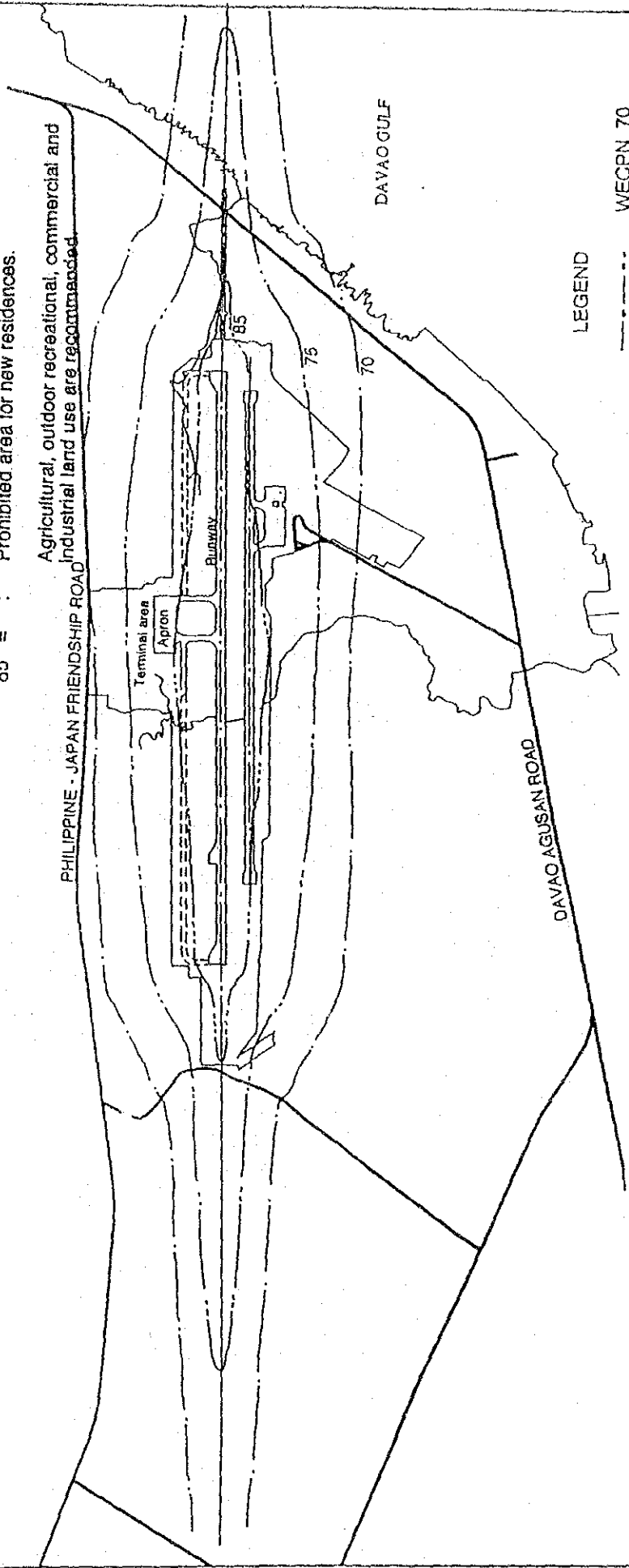


Figure 13.4.2 Points of Interest

The criteria described here are proposed taking into account the land use controls for aircraft noise influence based upon experience in Japan. The aircraft noise contours for 2010 shown in this map have been derived from Section 13.2.1.

Proposed Criteria

- WECPNL 70 = : No school, hospital, mosque, church, etc., is permitted.
- 75 = : No new residence will be basically permitted. Agricultural, commercial and industrial land use only is recommend.
- 85 = : Prohibited area for new residences. Agricultural, outdoor recreational, commercial and industrial land use are recommended.



LEGEND

--- (dashed line with dots)	WECPN 70
--- (dashed line with dashes)	75
--- (dashed line with long dashes)	85



Figure 13.4.3 Aircraft Noise for Land Use Control