FINAL REPORT

Intermodal Transport Development Project

(Tar No. 37233-01)

TA No. 4344-PHI

Airport Feasibility Studies

Volume II

Submitted to:

ASIAN DEVELOPMENT BANK

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THE Louis Berger Group Phils., INC.

Engineers ● Planners ● Scientists ● Economists

in association with

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Currency Equivalents
(as of May 2006)

$1.00 = Pesos 52.00

In this report, "$" refers to US dollars. A rate of $1.00 = Pesos 52 has been used. This was the approximate exchange rate prevailing during the PPTA Phase 2.

ABBREVIATIONS

AAGR	-	Annual Average Growth Rate
AAP	-	Airport Authority of the Philippines
ADB	-	Asian Development Bank
AFP	-	Armed Forces of the Philippines
AGL	-	Airfield Ground Lighting
AO	-	Administrative Order
AP	-	Affected People
ARMM	-	Autonomous Region in Muslim Mindanao
ATC	-	Air Traffic Control
ATM	-	Air Traffic Management
ATO	-	Air Transportation Office
BAe	-	British Aerospace
BIMP-EAGA	-	Brunei Darussalam, Indonesia, Malaysia and the Philippines, East ASEAN Growth Area
BOT	-	Build-Operate-Transfer
BXU	-	Butuan
CAAP	-	Civil Aviation Authority of the Philippines
CAB	-	Civil Aeronautics Board
CAMP	-	Civil Aviation Master Plan
CBO	-	Cotabato
CEB	-	Cebu
CFR	-	Crash, Fire and Rescue
CNC	-	Certificate of Non-Coverage
CNS	-	Communication, Navigation and Surveillance
DAO	-	Department Administrative Order
DENR	-	Department of Environment and Natural Resources
DIA	-	Davao International Airport
DME	-	Distance Measuring Equipment
DO	-	Department Order
DOTC	-	Department of Transportation and Communications
DPWH	-	Department of Public Works and Highways
DVOR	-	Doppler Very High Frequency Omni-Range
ECA	-	Environmentally Critical Area
ECC	-	Environmental Compliance Certificate
ECP	-	Environmentally Critical Project

EGF	-	Environmental Guarantee Fund
EIA	-	Environmental Impact Assessment
EIARC	-	Environmental Impact Assessment Regional Committee
EIB	-	European Investment Bank
EIRR	-	Economic Internal Rate of Return
EIS	-	Environmental Impact Statement
EMB	-	Environmental Management Bureau
EMF	-	Environmental Monitoring Fund
EMP	-	Environmental Management Plan
EU	-	Environment Unit
FAA	-	Federal Aviation Administration
FIRR	-	Financial Internal Rate of Return
GA	-	General Aviation
GDP	-	Gross Domestic Product
GNP	-	Gross National Product
GRDP	-	Gross Regional Domestic Product
IATA	-	International Air Transportation Association
ICAO	-	International Civil Aviation Organization
ICAO/SARP	-	International Civil Aviation Organization/Standard and Recommended Practice
IEE	-	Initial Environmental Examination
ILS	-	Instrument Landing System
IP	-	Indigenous People
IPSA	-	Initial Poverty and Social Assessment
ITDP	-	Intermodal Transport Development Project
JICA	-	Japan International Cooperation Agency
LARP	-	Land Acquisition and Resettlement Plan
LARPFPG	-	Land Acquisition and Resettlement Policy Framework and Procedural Guidelines
LDN	-	Day-Night Average Sound Level
LGU	-	Local Government Unit
LOS	-	Level of Service
MCIAA	-	Mactan Cebu International Airport Authority
MEDCO	-	Mindanao Economic Development Council
MIAA	-	Manila International Airport Authority
MMT	-	Multi-partite Monitoring Team
MNL	-	Manila
MOA	-	Memorandum of Agreement
MTPDP	-	Medium-Term Philippine Development Plan
MTRDP	-	Medium-Term Regional Development Plan
NAIA	-	Ninoy Aquino International Airport
NavAids	-	Navigational Aids
NEDA	-	National Economic and Development Authority
NGA	-	National Government Agency
NGO	-	Non-Government Organization
NPV	-	Net Present Value

NSCB	-	National Statistical Coordination Board
O&M	-	Operating and Maintenance
OM	-	Operational Manual
PAF	-	Philippine Airforce
PAI	-	Poverty Alleviation Initiatives
PAL	-	Philippine Airlines
PCG	-	Philippine Coast Guard
PCSD	-	Palawan Council for Sustainable Development
PENRO	-	Provincial Environment and Natural Resources Office
PIU	-	Project Implementation Unit
POID	-	Project Operations and Implementation Department
PPA	-	Philippines Ports Authority
PPIAF	-	Public-Private Infrastructure Advisory Facility
PPP	-	Public-Private Partnership
PSA	-	Poverty and Social Assessment
PSP	-	Private Sector Participation
R&FFF	-	Rescue and Fire Fighting Facilities
RAP	-	Resettlement Action Plan
RESA	-	Runway End Safety Area
RoRo	-	Roll-on Roll-off (port facility)
ROW	-	Right-of-Way
RWY	-	Runway
SARS	-	Severe Acute Respiratory Syndrome
SBMA	-	Subic Bay Metropolitan Authority
SEAIR	-	South East Asian Airlines
SEMS	-	Safety and Environment Management Staff
SIEE	-	Summary Initial Environmental Examination
SJ	-	Small Jet
SME	-	Small Medium Enterprise
SOW	-	Scope of Work
SPADP	-	Southern Philippines Airport Development Project
STOL	-	Short Take Off and Landing
TA	-	Technical Assistance
TADP	-	Third Airport Development Project
TOR	-	Terms of Reference
TP	-	Turbo Propeller
TSP/PM	-	Total Suspended Particulate / Particulate Matter
TSS	-	Total Suspended Solid
UNDP	-	United Nations Development Program
UPS	-	Uninterrupted Power Supply
VHF	-	Very High Frequency
WACC	-	Weighted Average Cost of Capital
ZOI	-	Zone of Influence

PART I

Introduction

Background on the ITDP Study and Airport Subprojects

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INTRODUCTION

BACKGROUND ON THE ITDP STUDY AND AIRPORT SUBPROJECTS

1. PROJECT BACKGROUND

1.0.1 In 2003, the Government of the Philippines (the Government) requested assistance from the Asian Development Bank (ADB) to prepare an intermodal transport program for the Southern Philippines (Mindanao and Palawan). Improving intermodal transportation is consistent with the policies and strategies for the transportation sector as set out in the *Medium Term Philippine Development Plan 2004 – 2010*. Focusing on the Mindanao and Palawan area reflects the Government's commitment to pursue its peace and development agenda for Mindanao, and seeks to revitalize transport and trade links between the Philippines and Brunei, Indonesia and Malaysia (BIMP) established under the BIMP Philippines-East ASEAN Growth Area.

1.0.2 Following the approval of the Project Preparation Technical Assistance (PPTA) for preparing the *Intermodal Transport Development Project* (ITDP) in May 2004, the ADB is funding the PPTA under the Japan Special Fund. The ITDP seeks to improve transport accessibility and efficiency in Mindanao and Palawan. The main objectives of the ITDP are to:

- Formulate an integrated transport development plan for the Southern Philippines which will identify priority activities and measures to improve the efficiency of the intermodal (air, sea and land) transport system;
- Develop an investment program covering the identified subprojects; and
- Prepare an implementation program including scope of selected subprojects, financing arrangements, and implementation mechanisms.

1.0.3 The ITDP supports the Government's policies and strategies for the transportation sector as stated in several master plans and development plans by facilitating international transport and trade links in the Philippines-East ASEAN Growth Area, and improving access and reducing isolation for communities in the Palawan and Mindanao regions which will have the benefit of contributing to the Government's peace and/ or development agenda.

1.0.4 The ITDP is consistent with ADB's country strategy (2005 – 2007) which emphasizes the high priority of improving access to remote areas of the southern Philippines and improving the efficiency of the intermodal transport system by reducing the deficiencies in land, air and sea systems and improving network interconnections. By targeting isolated areas for improvement and development of transport infrastructure, such as small ports and airports or sea and air landing facilities, the ITDP will link remote communities to provincial centers and markets.

1.0.5 Furthermore, the ITDP will contribute to on-going poverty reduction efforts in light of the fact that all regions of Mindanao and the province of Palawan have annual per capita

poverty thresholds below the national average. Some 18 provinces in Mindanao are included in the 44 poorest provinces and are recipients of the World Bank's *Comprehensive Integrated Delivery of Social Services* (CIDSS) program, while all five provinces of ARMM are among the ten poorest provinces in the country.

1.1 Subproject Screening and Shortlist

1.1.1 The PPTA has been undertaken in two phases. Phase 1 identified an initial long list of "potential" subprojects based on consultation with stakeholders and projects proposed in strategic development and master plans. The initial long list included some 135 port and airport projects. Stage 1 screening reduced the number of subprojects to 44, the "refined long list".

1.1.2 The refined long list was then subjected to a multi-criteria screening analysis using a range of technical, economic, financial, and environmental and social criteria which enabled subprojects to be scored and ranked. The result of the screening was a preliminary short-list of fourteen subprojects circulated to stakeholders for comment. Subproject identification and selection, as well as the intermodal transport development plan that guided project selection, is presented in the ITDP Second Interim Report.

1.1.3 Eight (8) short-listed subprojects were recommended for further study during Phase 2:

- Three airport subprojects – Puerto Princesa, Cotabato, and Butuan;
- Two hub port subprojects – Zamboanga, and General Santos; and
- Three feeder port subprojects – Jolo, Bongao and Sitangkai.

1.1.4 The inclusion of these eight subprojects was agreed to at the Tripartite Meeting following Phase 1 and reconfirmed at the Phase 2 Inception Report review Steering Committee Meeting.

2. THE SUBPROJECTS

2.1 Subprojects Studies Contained in this Volume

2.1.1 This volume contains the update of the feasibility, environmental and social studies for the three airport subprojects: Puerto Princesa, Cotabato and Butuan. **Figure 2.1-1** shows the location and zones of influence of these airport subprojects. **Figures 2.1-2**, **2.1-3** and **2.1-4** show vicinity maps for the three subprojects. The overall analysis of social and environmental safeguards is found in Volume V. Policy and operational and maintenance recommendations for the sector are found in Volume I.

2.1.2 **Puerto Princesa Airport** is the principal airport serving Palawan, the largest province and a major tourism resource of the Philippines, which is composed of 1,769 islands and islets. This airport is a major tourism gateway and has great potential and plans to accommodate international flights. The airport's zone of influence (ZOI) includes Palawan province with a population of 891,000 (2005 population forecast). In terms of passenger traffic, this airport ranks 7th in the nation.

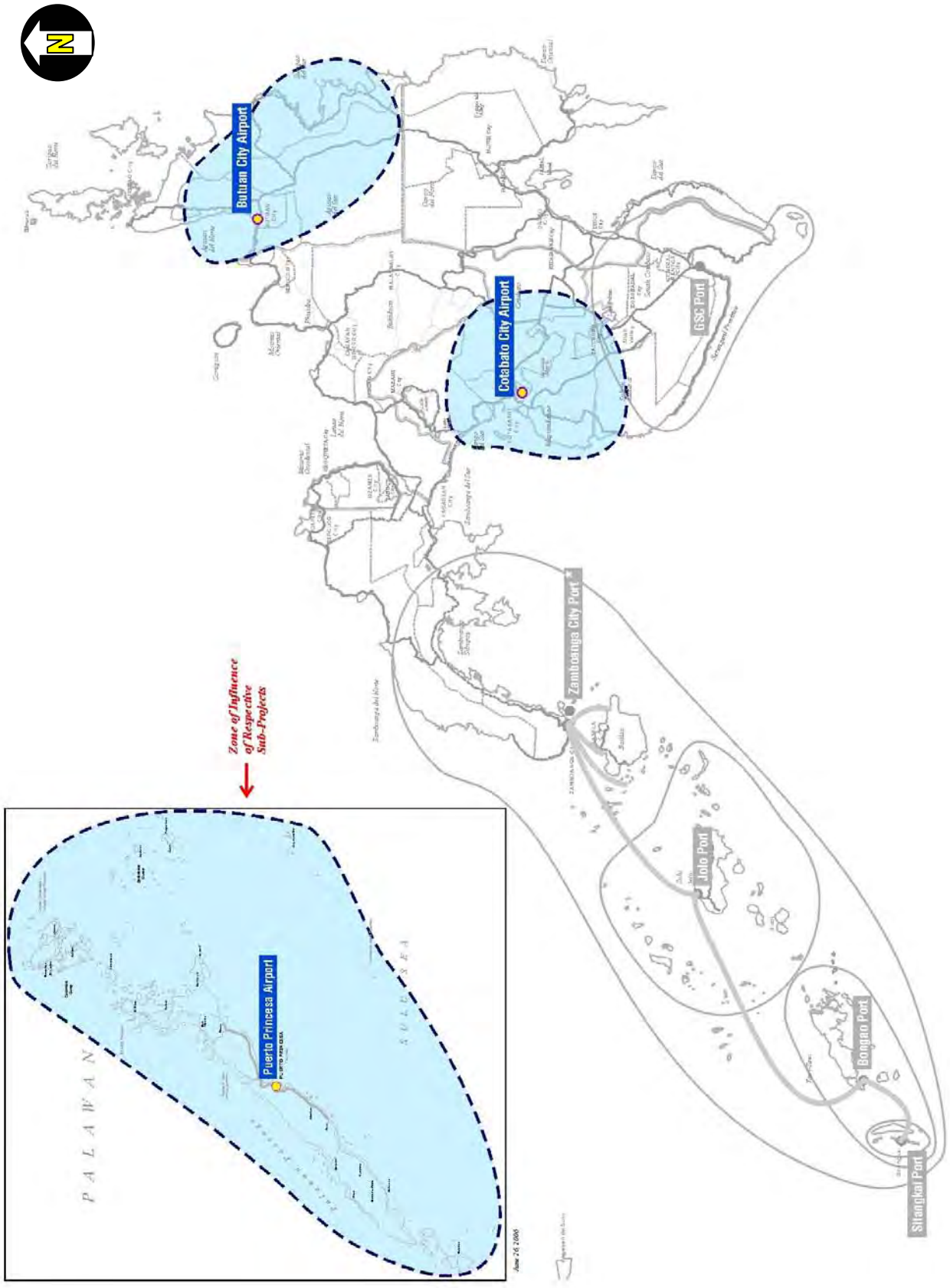

Figure 2.1-1: Location of ITDP Airport Subprojects

Figure 2.1-2: Vicinity Map of Puerto Princesa Airport

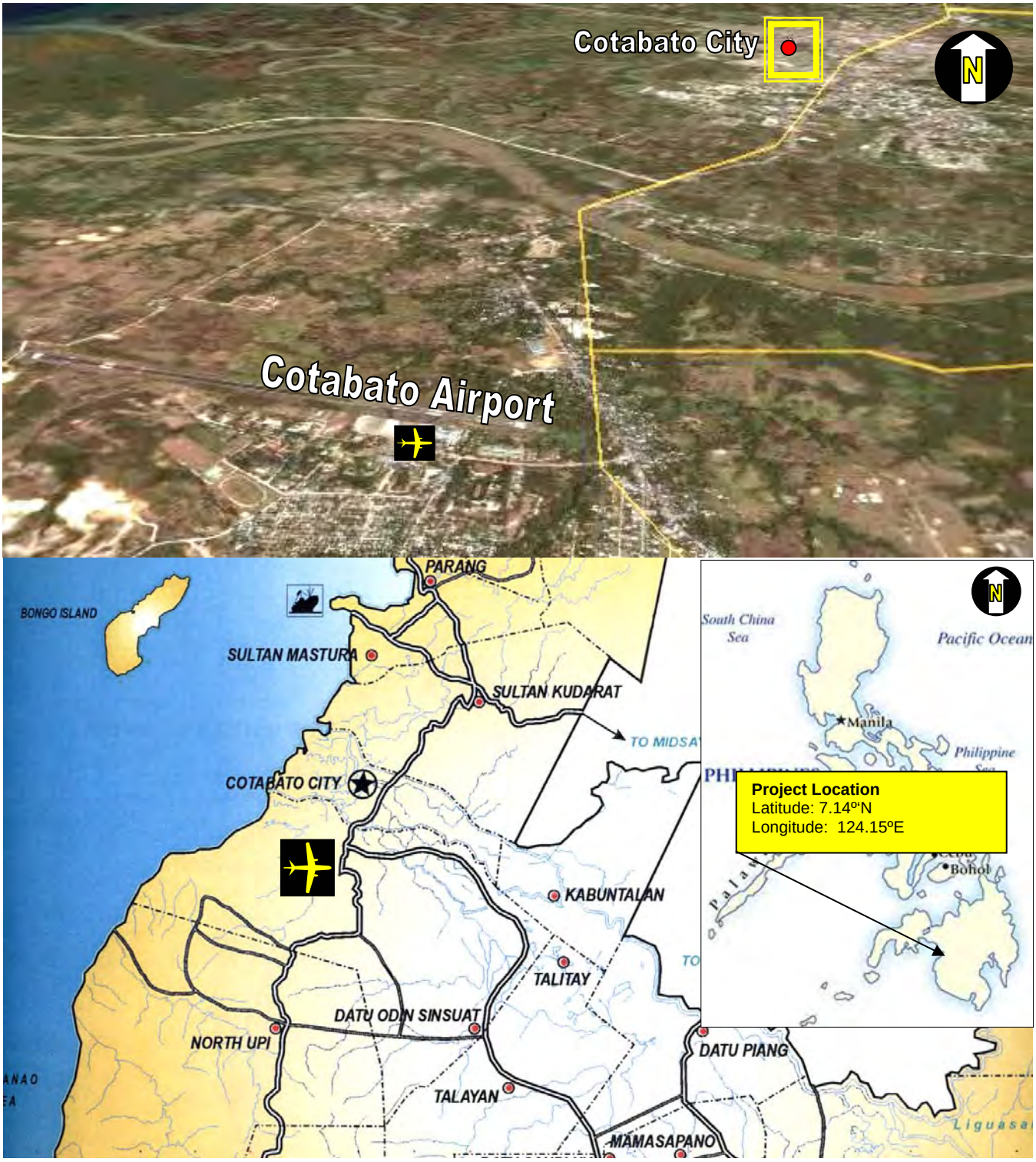

Figure 2.1-3: Vicinity Map of Cotabato Airport

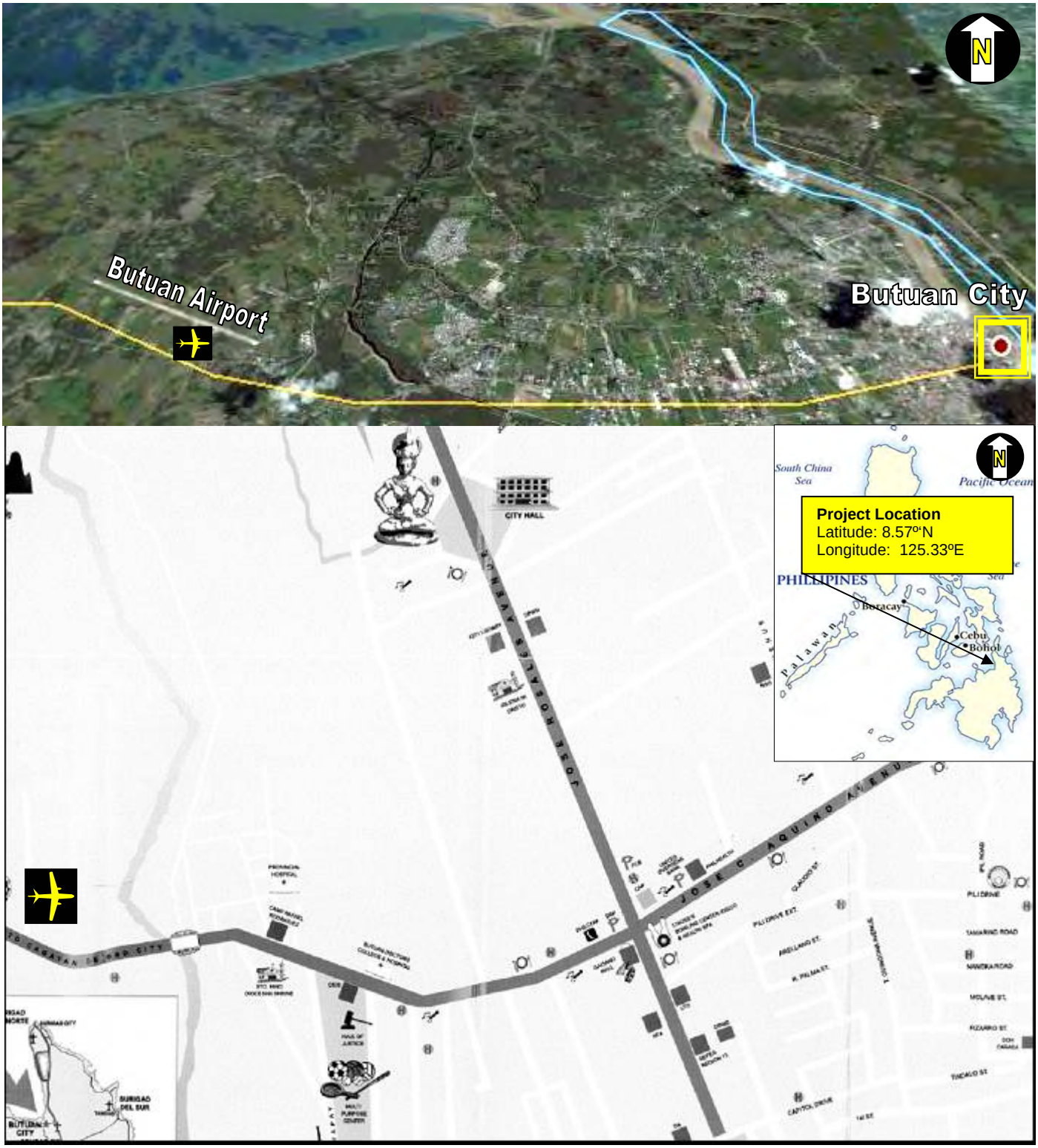

Figure 2.1-4: Vicinity Map of Butuan Airport

2.1.3 Improvements recommended include building a new passenger terminal with facilities for international arrivals and access road across the runway from the existing terminal.

2.1.4 **Cotabato Airport** is the gateway to Central Mindanao and to the administrative center of the ARMM. Its improvement will directly support the peace and development objectives of the Government in this conflict-affected area and will be supportive of the pending peace agreement between the Government and the Moro Islamic Liberation Front (MILF). The airport's ZOI (the second largest among the airports studied) includes Cotabato City, Cotabato (North), Lanao del Sur and Maguindanao provinces. The population within this ZOI is 2.4 million (2005 population forecast). In terms of passenger traffic, the airport ranks 9th in the nation.

2.1.5 Improvements recommended include building a new passenger terminal and access road across the runway from the existing terminal.

2.1.6 **Butuan Airport** serves Butuan City, which is the capital and commercial center of the province as well as the regional center of the CARAGA Region. The airport's ZOI (the third largest among airports studied) includes Surigao del Sur, Agusan del Norte, Butuan City, and parts of Agusan del Sur. The population within this ZOI is 1.4 million (2005 population forecast). In terms of passenger traffic, the airport ranks 8th in the nation and it has a high passenger growth rate.

2.1.7 Improvements recommended include expansion and improvement to the existing terminal and extending the runway by 100 meters.

2.1.8 All updated feasibility studies include additional facilities relevant to improving safety, security, access, passenger and cargo movement efficiency, and operational efficiency generally.

2.2 Summary Scopes of Work for the Subproject Studies

2.2.1 The scopes of work of studies completed for each of the 3 airport subprojects were agreed to at the Tripartite Meeting following Phase 1 and reconfirmed at the Steering Committee Meeting to review the Phase 2 Inception Report. These scopes of work can be found in **Table 2.2-1**.

2.2.2 The impact of airports on poverty alleviation was also estimated.

3 CONTENTS OF VOLUME II

This Volume of the ITDP Final Report is divided into four parts. The Volume is organized as follows:

Part 1: Contains this Introduction

Part 2: Updated Puerto Princesa Airport Subproject Feasibility Study

Part 3: Updated Cotabato Airport Subproject Feasibility Study

Part 4: Updated Butuan Airport Subproject Feasibility Study

Appendices relevant to these Airport Feasibility Study updates can be found at the end of each Part.

Table 2.2-1: ITDP Airport Subprojects and Scope of Work

Subproject	Present Status	Phase 2 SOW: Technical Studies	Phase 2 SOW: Environmental / Social Safeguards	
			Environmental Safeguards	Social Safeguards
Puerto Princesa	Feasibility Study	• Updated Feasibility Study • Due Diligence Review	• Due Diligence Review of Designs • Assist DOTC to extend issued Environmental Compliance Certificate (ECC)	• Due Diligence Review of Designs • External LARP Monitoring by DOTC • Analyze cargo for inputs to PSA • Supplementary LARP
Cotabato	Feasibility Study	• Updated Feasibility Study • Due Diligence Review	• Due Diligence Review of Designs • Assist DOTC to extend issued ECC	• Due Diligence Review of Designs • External LARP Monitoring by DOTC • Analyze cargo for inputs to PSA • Supplementary LARP
Butuan	Feasibility Study	• Updated Feasibility Study • Due Diligence Review	• Due Diligence Review of Designs • Assist DOTC to extend issued ECC	• Due Diligence Review of Designs • External LARP Monitoring by DOTC • Analyze cargo for inputs to PSA • Supplementary LARP

DOTC - Department of Transportation and Communications
ECC - Environmental Compliance Certificate
PSA - Poverty and Social Analysis
LARP - Land Acquisition and Resettlement Plan

PART II

Updated
Puerto Princesa Airport
Subproject
Feasibility Study

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SECTION 1

Introduction

1 INTRODUCTION

1.1 Overview Project Description

1.1.1 The Asian Development Bank (ADB) extended technical assistance to the Government through the Department of Transportation and Communications (DOTC) to prepare an intermodal transport development program for Southern Philippines (Mindanao and Palawan). Improving the intermodal transport system of the country is consistent with the development policies and strategies for the transportation sector under the Medium-Term Philippine Development Plan, 2004-2010. The focus on Mindanao and Palawan reflects the government's commitment to pursue a "*peace and development*" agenda for Mindanao, and to revitalize the transport and trade linkages under the Brunei Darussalam, Indonesia, Malaysia, and the Philippines-East ASEAN Growth Area (BIMP-EAGA). The improvement/upgrading of the Puerto Princesa Airport is included in the approved priority list of intermodal transport projects for further project preparation under Phase 2 of the Intermodal Transport Development Project (TA No. 4344-PHI).

1.1.2 The Government previously secured capital assistance from the ADB and the European Investment Bank (EIB) to finance the upgrading of the Puerto Princesa Airport to international civil aviation standards under the Third Airports Development Project (TADP), which was terminated in 2003 after loan closing. Failing to implement the programmed investment in this airport, the ADB and DOTC carried out the review of the airport master plan and the updating of the airport feasibility study based on a reduced scale of investment in 2004 under the proposed Southern Philippines Airport Development Project (SPADP). However, with the budget deficit problem of the Government, the implementation of improvement works was deferred.

1.1.3 This report on the updating of the feasibility study on Puerto Princesa Airport presents the associated traffic forecasts, concept design, scope of work, environmental and social issues, cost estimates, financial and economic analyses, and project risk assessment associated with the proposed airport project. The study recommendations are outlined in Section 16.

1.1.4 The project is located on the eastern coast of central Palawan within the city of Puerto Princesa as shown in **Figure 1.1-1** and the existing and proposed layout plans are presented in **Appendix A**.

1.1.5 Puerto Princesa Airport is the principal airport serving Palawan, the largest province and a major tourism resource of the Philippines, which is composed of 1,769 islands and islets. This airport is a major tourism gateway and has great potential and plans to accommodate international flights. The airport's zone of influence (ZOI) includes Palawan province with a population of 891,000 (2005 Population Forecast). In terms of passenger traffic this airport ranks 7th in the nation.

1.1.6 Improvements recommended include building a new passenger terminal with facilities for international arrivals and access road across the runway from the existing terminal.

1.1.7 All updated airport feasibility studies include additional facilities relevant to improving safety, security, access, passenger and cargo movement efficiency, and operational efficiency generally.

Figure 1.1-1: Location Map of Puerto Princesa Airport

1.1.8 The scopes of work of studies completed for each of the three airport subprojects were agreed to at the Tripartite Meeting following Phase 1 and reconfirmed at the Steering Committee Meeting to review the Phase 2 Inception Report. These scopes of work for can be found in **Table 1.1-1**.

Table 1.1-1: ITDP Airport Subproject and Scope of Work

Subproject	Present Status	Phase 2 SOW: Technical Studies	Phase 2 SOW: Environmental / Social Safeguards	
			Environmental Safeguards	Social Safeguards
Puerto Princesa	Feasibility Study	• Updated Feasibility Study • Due Diligence Review	• Due Diligence Review of Designs • Assist DOTC to extend issued ECC	• Due Diligence Review of Designs • External LARP Monitoring by DOTC • Analyze cargo for inputs to PSA • Supplementary LARP

DOTC - Department of Transportation and Communications
ECC - Environmental Compliance Certificate
PSA - Poverty and Social Analysis
LARP – Land Acquisition and Resettlement Plan

1.2 Study Process

1.2.1 As Puerto Princesa Airport had previously been scheduled for upgrading based on earlier master planning, feasibility studies, and detailed design work, the feasibility study process covered the review and limited updating of the previous TADP and SPADP works. The study process has followed the following basic steps:

- Data gathering of actual passenger, aircraft and cargo statistics;
- Review of previous plans, designs and reports prepared under the TADP and SPADP. Review of the recent 2006 Japan International Cooperation Agency (JICA) sponsored National Airports Master Plan Study;
- Assessment and comparison of previous forecasts and preparation or adoption of new forecasts;
- Site inspections and determination of site and implementation issues;
- Review of the status of land acquisition, environmental issues, environmental approvals, affected persons and properties;
- Preparation of planning and design parameters, including target design capacity;
- Assessment of the project (first phase development) demand requirements in terms of scope of the project and comparison of the capacity of the major airport elements (passenger terminal, cargo terminal, parking aprons) as previously designed under the TADP and SPADP, and adjustment of the previous designs in such a way as to preserve the integrity of the earlier designs and minimize any redesign impacts/ costs;

- Assessment of future implementation issues relating to any second phase development leading towards the master plan design;
- Assessment of institutional strengthening proposals and the potential incorporation of PSP components;
- Reassessment of costs and schedules using up-to-date financial assumptions and unit rates;
- Reassessment of financial and economic impacts and evaluation results; and
- Assessment of risks and other factors relating to successful project implementation.

1.3 Limitations of the Study

1.3.1 As outlined above, this Study is essentially an update of previous studies. As such, available resources have been limited with the expectation that there would be few significant changes to the scope and layout of earlier designs.

1.3.2 There are limited recent air passenger profile surveys, cargo profile surveys, topographic surveys, geotechnical surveys, pavement condition surveys, pavement strength testing, instrument testing, and surveys of the condition of existing airport equipment and facilities; although data records were accessed from relevant agencies and observations and notations were made during airport site inspections.

1.3.3 Following agreements with land owners, including the Philippine Air Force, significant land acquisition and relocation of affected persons and buildings have already occurred under the TADP. This tended to define the basic configuration of the design concepts in line with the master plan as it delineates the available land area for development.

1.3.4 With the detailed airside, terminal area and passenger terminal layouts and designs, the Project Team's approach also involved preserving the integrity and details contained within the previous designs. However, it should be recognized that some of the previous designs required some modification. In addition, further modifications may be recommended as the ITDP sector loan project progresses to subsequent implementation phases. Previous designs prepared by the TADP consultant would need to be reworked to establish design liability under the new loan project.

1.3.5 Updated design demand parameters (such as updated busy hour passengers) were calculated and applied, and resulted in some modifications to concept designs, particularly for the passenger terminal building. These modifications are described in the following sections of this Report. Otherwise, there has been no "detailed" critique of the previous designs, although overall capacity needs and operational integrity were noted as being adequate.

1.3.6 It should also be noted that traffic levels are relatively low and schedules are relatively undeveloped compared to regional domestic airports in many other countries. As a result, the forecast traffic levels and forecast busy hour demand (both passengers and also aircraft stand demand) are difficult to predict and actual future traffic levels and busy hour demand may vary significantly from the results of the analysis in the Study. For example, it should be noted that Puerto Princesa has realized erratic growth over the last 10 years and future growth may also not be steady. However, if future growth is not smooth, the basic fundamentals relating to

Puerto Princesa as an airport destination should be noted and airport capacity should be available for the "rapid rebounds" that do often occur in aviation.

1.3.7 On environmental conditions, it is noted that a valid ECC exists for Puerto Princesa Airport. The project for Puerto Princesa as defined in this Study includes minor modifications from the original proposals under TADP, and none of these affected the findings or the recommendations of the EIS. Therefore, no additional environmental studies are required. Dialogue with the community regarding land acquisition issues has been on-going.

1.3.8 Experienced judgment was applied by the Project Team to provide conservative estimates of subproject benefits and impacts as part of the poverty and social impact appraisal. Estimates of direct poverty benefits are based on typical construction labor shares, costs and composition from similar types of projects. Estimates of indirect poverty benefits involved relative weightings of air cargo that may have been produced by poor population as well as 2004 survey results of Puerto Princesa air passenger expenditures while in Palawan.

1.3.9 Summaries of the need and status for land acquisition and resettlement were based largely on information originally provided in the Resettlement Action Plans (RAPs) prepared in 2002 for the Third Airport Development Project (TADP), supplemented by ITDP site visits and meetings with the TADP Project Management Office.

1.3.10 The Project Team has recommended that the Puerto Princesa Airport master plan be updated as part of the detailed design services and a budget has been provided for it in the proposed project investment.

1.4 Organization of this Report

1.4.1 The remainder of this Feasibility Study Report is organized as follows:

- Section 2, which contains the air traffic profile, including traffic statistics, airlines and route schedules, and current aircraft utilization;
- Section3, which presents the air cargo trends, airlift capacities and existing facilities;
- Section 4, which highlights the air transport forecasts, including the busy hour and aircraft stand demand analysis;
- Section 5, which indicates the airport project planning parameters, particularly the standards and design guidelines;
- Section 6, which introduces the airport development concepts, the detailed project scope and recommended implementation phasing;
- Section 7, which identifies the potential environmental impacts with the proposed Phase 1 investment, including the results of the due diligence review of the EIS and the compliance to ECC conditions (additional details can be found in Volume V);
- Section 8, which outlines the poverty and social impact assessments, particularly the land acquisition and resettlement issues (additional details can be found in Volume V);

- Section 9, which summarizes the required airport management philosophy on operations as well as options for private sector participation (PSP);
- Section 10, which presents the project investment cost and required operating and maintenance costs;
- Section 11, which discusses the proposed project implementation schedule and financing plan;
- Section 12, which identifies the financial impacts of the project from the view point of the government, including the financial viability indicators;
- Section 13, which indicates the results of the economic evaluation of the project investment, including the economic viability indicators;
- Section 14, which covers the review of existing airport management system and the recommended organizational structure and capacity
- Section 15, which presents the assessment of various implementation risks; and
- Section 16, which summarizes the proposed project scope, impacts, risks, countermeasures, and other Study recommendations.

SECTION 2

Air Traffic Profile

2 AIR TRAFFIC PROFILE

2.1 Air Traffic Statistics

2.1.1 Domestic Passengers

2.1.1 Statistics on air passenger movements at the Puerto Princesa Airport for the period from 1995 to 2004 were based on the figures contained in the "*The Master Plan Study on the Strategy for the Improvement of National Airports in the Republic of the Philippines*" that was conducted and prepared in 2006 by Aviation Systems Consultants (ASCO) for the DOTC and JICA. The most recent data for 2005 was taken directly from Air Transportation Office (ATO) and the airlines during ITDP survey and site inspection activities. These are summarized in **Table 2.1.1-1** below.

Table 2.1.1-1: Domestic Passenger Movements Puerto Princesa 1995-2005

Year	No. of Passenger Movements	Annual Growth Rate (%)	Comments
1995	146,795		
1996	193,330	31.7	
1997	230,054	19.0	
1998	159,106	-30.8	Stoppage of Philippine Airlines (PAL) services
1999	199,086	25.1	
2000	208,714	4.8	
2001	188,403	-9.3	Dos Palmas kidnapping incident
2002	147,000	-21.9	Dos Palmas kidnapping incident
2003	194,176	32.4	
2004	267,507	38.7	
2005	267,868	0.1	

Note 1: Data Sources: The Master Plan Study on the Strategy for the Development of National Airports in the Republic of the Philippines (DOTC / JICA, 2006) and ATO
Note 2: Domestic excluding GA and Military.

2.1.2 The statistical data shows that the trend in air passenger movements at Puerto Princesa Airport is erratic, although there has been a net increase in annual passengers of 6.2% over the period 1995 to 2005. Between 1995 and 1997 annual grow was 28%. The growth trend dropped in 1998, with passenger traffic falling 30% from the previous year. The negative growth rate was a result of disruptions in the operations of PAL that was triggered by the series of protests held by PAL employees against management, and which eventually culminated in the stoppage of the airline's services in September 1998.

2.1.3 The subsequent resumption of PAL's operations at the airport caused a rebound in passenger growth in 1999 up to 2000, with traffic growing by an average annual rate of 15.6% during the period. The negative growth noted in 2001 was a consequence of the kidnapping incident that occurred at the Dos Palmas, a popular resort in Palawan. The downtrend continued up to 2002 as perceptions of peace and order problems persisted. Due mainly to the efforts of Palawan local officials, and the general upswing in global and local economic conditions, tourist confidence was subsequently restored and air passenger traffic started to climb by 2003 up to 2005.

2.1.2 International Passengers

2.1.4 As there are no official international traffic records before 2005, interviews conducted with airport management, indicated that there have been occasional international charter operations at Puerto Princesa with varying aircraft types but with no regular schedules.

2.1.5 In April 2004, Layang Layang Aerospace of Malaysia signed an agreement with South Phoenix Airways of the Philippines for them to operate twice a week flights from Kota Kinabalu to Puerto Princesa using a 17-seater turbo prop aircraft as part of the BIMP-EAGA cooperation on air linkages. This would appear to have had limited success in implementation and ceased operation. However, airport management has now indicated that there will again be an attempt by the airline operator to run regular international flights to the airport. Arrangements, however, are still to be finalized.

2.1.6 In July 2004, PAL pioneered a special commercial service between Puerto Princesa and Seoul, opening a Philippine gateway for Korean tourists. Using an A320 aircraft, PAL proposed a twice weekly service, with departures from Seoul every Tuesday and Friday and return trips from Puerto Princesa on the same days. This international air service was discontinued after a month's trial.

2.1.3 Aircraft Movements

2.1.7 The statistics on aircraft movements at the Puerto Princesa Airport for the period from 1995 to 2004 were based on the figures contained in the JICA-assisted "*The Master Plan Study on the Strategy for the Improvement of National Airports in the Republic of the Philippines.*" The 2005 traffic data for this airport was taken directly from ATO and the airlines during ITDP survey and site inspection activities. These are summarized in **Table 2.1.3-1** below.

Table 2.1.3-1: Aircraft Movements Puerto Princesa 1995 to 2005

Year	Aircraft Movements[1]	Annual Growth Rate	Comments
1995	6,130		
1996	5,348	-12.8%	There is however a 31.7% increase in passenger traffic from 1995
1997	2,522	-52.8%	There is however a 19% increase in passenger traffic from 1996
1998	1,029	-59.2%	Stoppage of PAL services
1999	2,374	130.7%	
2000	1,834	-22.8%	There is however a 4.8% increase in passenger traffic from 1996
2001	2,658	44.9%	There is however a 9.3% decrease in passenger traffic from 2000
2002	2,000	-24.8%	
2003	2,792	39.6%	
2004	3,164	13,3%	
2005	4,144	31.0%	

Data Sources:
The Master Plan Study on the Strategy for the Development of National Airports in the Republic of the Philippines (DOTC / JICA, 2006) and ATO

Note 1:
All traffic represents domestic but excludes GA and Military, except in 2005 where 277 international movements were recorded.

2.1.8 Unlike the behavior of air passenger traffic, the statistics on the level of aircraft movements at the Puerto Princesa Airport are variable and do not correlate well with the fluctuating trend in passenger traffic. This would suggest that there have been significant changes in the size of aircraft and achieved load factors over the period.

2.2 Airlines and Aircraft Types

2.2.1 The airlines presently operating at the Puerto Princesa Airport, together with the type of aircraft used, frequency of movements per week and seating capacity are shown in **Table 2.2-1** below. A movement represents one aircraft arrival or one departure.

Table 2.2-1: Airline Operators and Aircraft Types (as of March 2006)

Airline Operator	Aircraft Type	Movements Per Week	Seating Capacity
Philippine Airlines	A330 A320	6 (MNL-PPS-MNL) 8 (MNL-PPS-MNL)	250 150
Cebu Pacific Air	DC9	14 (MNL-PPS-MNL)	118
Air Philippines	B737	14 (MNL-PPS-MNL)	120
Air Philippines	B737	14 (Dav/CEB-PPS-CEB/Dav)	120
Seair	LET 410	6 (El Nido-PPS-El Nido)	19

2.2.2 This weekly mix and number of aircraft produce a weekly seat capacity of 7,826 seats. Assuming annual passenger numbers are of the order of 286,000, then the average load factor is about 70% for each airline.

2.3 Route Profile

2.3.1 The route profile for the Puerto Princesa Airport showing the frequency of flights per week per airline operator as of March 2006 is given in **Table 2.3-1** below.

Table 2.3-1: Air Traffic Movements at Puerto Princesa Airport (March 2006)

Route	Frequency of Flight Per Week				
	PAL	Air Phil	Cebu Pacific	Seair	Total
Manila – Puerto Princesa	7	7	7	0	21
Puerto Princesa – Manila	7	7	7	0	21
Dav/Cebu – Puerto Princesa	0	4	0	0	4
Puerto Princesa – Cebu/Dav	0	4	0	0	4
Puerto Princesa – El Nido	0	0	0	3	3
El Nido – Puerto Princesa	0	0	0	3	3
Total Movements					56

2.4 Scheduling Characteristics

2.4.1 Puerto Princesa Airport receives most of its traffic in the morning with only one Seair (LET410) flight movement in the afternoon. **Table 2.4-1** shows the morning peak period schedules for Puerto Princesa.

Table 2.4-1: Morning Schedules (Peak period)

Route	Airline	Aircraft	Frequency	Departure	Arrival
Manila – Puerto Princesa	PAL	A320/A330	Daily	8:00 am	9:15 am
	Air Phil	B737	Daily	9:15 am	10:25 am
	Cebu Pacific	DC9	Daily	8:00/40 am	9:10/9:40 am
Puerto Princesa – Manila	PAL	A320/A330	Daily	10:15 am	11:25 am
	Air Phil	B737	Daily	11:00 am	12:10 pm
	Cebu Pacific	DC9	Daily	9:40/10:20 am	11:30 am
Dav/Cebu - Puerto Princesa	Air Phil	B737	Daily	9:55 am	11.00 am
Puerto Princesa – Cebu/Dav	Air Phil	B737	Daily	11:30 am	12:35 pm

2.4.2 The clustering of aircraft arrivals and departures is typical of airline scheduling where airlines are competing for similar markets.

2.5 Airlines and Aircraft Fleets

2.5.1 Domestic air services are provided by three major air carriers: the Philippine Airlines (PAL), Air Philippines and Cebu Pacific Air.

2.5.2 Until 1988, PAL was the only airline allowed to operate within the Philippines. PAL also serves the US, Japan, Hong Kong, Korea and the Middle East routes. PAL has no international routes or active international code share agreements from Mindanao or Palawan but PAL is considering reviving direct international routes into Puerto Princesa subject to demand and the availability of airport facilities. This most likely will start with seasonal charter flights from Seoul, Korea. PAL has expressed interest in using the A340 for this route but this would require two 7.5m sealed shoulder pavements to each side of the existing runway. Facilities for Customs, Immigration and Quarantine (CIQ) are likewise needed at Puerto Princesa Airport.

2.5.3 PAL entered a 10 year financial rehabilitation period in 1999. As part of this process it reduced its fleet from 65 to 31 aircraft and this also resulted in the complete withdrawal of services from a number of airports in Mindanao. It should be noted therefore that the historical fluctuation in passenger and cargo numbers at some Mindanao airports is due to supply problems (lack of an operator) and not just demand, which has also suffered over time due to various impacts such as the 1997 Asian Financial Crisis, the 2000 technology scare (Y2K), terrorist incidents in Southern Philippines, the events of 9/11, SARS, etc.

2.5.4 PAL operates a fleet of 31 wide-bodied and narrow aircraft, including Airbus 300, Airbus 320, Airbus 340, and Boeing 747 and Boeing 737-300. PAL made a decision in 2005 to phase out the B737-300 aircraft and is replacing them with A320 aircraft. PAL is not interested in operating aircraft smaller than A320. This means that airports serviced by PAL, and that would be most of the airports with regular scheduled services, need to be able to accommodate an A320 (International Civil Aviation Organization (ICAO) Category C aircraft) and its associated passenger load. This has a significant influence on the minimum design standards for airports in the Philippines.

2.5.5 PAL is currently using the large size A330, A340 and B747 aircraft on some domestic routes such as Manila-Cebu and Manila-Davao. PAL is operating the A330 into Puerto Princesa on a regular basis, about 4 times a week. While these are the larger routes in the Philippines, it should not be construed that large aircraft are needed to meet the demand. Primarily, PAL is deploying these aircraft on the domestic routes in order to enhance utilization of the aircraft when not required for international operations. If the demand for international services was higher, these larger aircraft would be used to meet that demand and PAL would deploy A320 with increased frequency on the Manila-Cebu, Manila-Davao and Manila-Puerto Princesa routes. Once PAL emerges from financial rehabilitation, it may embark on an expansion strategy, subject to demand and other factors, and adjust its fleet composition and deployment strategy accordingly. This leads again to the conclusion that the A320 is a more appropriate design aircraft for PAL services out of Manila to most destinations in Southern Philippines, except for Puerto Princesa and Davao and possibly Zamboanga (for which the design aircraft might more appropriately be the A330/A340 due also to the international potential).

2.5.6 Air Philippines, the airline with slogan “Fly High Filipino,” was founded in February 13, 1995 and owned by Mr. Lucio Tan. It operates six (older model) Boeing 737-200 aircraft which seats 109-148 passengers. Air Philippines competes with PAL (or perhaps supplements) on some routes, such as Manila-Zamboanga. The B737-200’s are relatively old (and noisy) aircraft and have been phased out of most airline fleets in the world.

2.5.7 Designated as the country’s second flag carrier, Cebu Pacific Air started operating domestic scheduled passenger and cargo air transport on August 24, 1995. As the “on-time, great value airline,” it operates 12 DC9-32 McDonnell Douglas Aircraft with 110-115 seating capacity and recently introduced an Airbus 757 in local service. In 2005, Cebu Pacific announced that they would phase out the DC9’s and upgrade their fleet with 14 new A319’s (same size as an A320) and two A320’s. This represents an aggressive modernization and expansion strategy within the Philippine domestic market. Cebu Pacific forecasts that it will overtake Philippine Airlines as the top domestic carrier in five years. The carrier currently holds a 38% share in the domestic market.

2.5.8 Under the progressive liberalization policy of the government in the 1990’s, other airlines were authorized to serve domestic routes. Two other airlines are providing service mainly on secondary and feeder airports, namely: Asian Spirit and Southeast Asian Airways (Seair).

2.5.9 Called the “People’s Airline,” Asian Spirit started its operation on April 4, 1995. It is the country’s only airline cooperative, called the Airline Employees Cooperative. Asian Spirit has a total of 10 aircraft, most of them specially designed for short take-off and landing such as the two CN 235-220 (40-seater, manufacturer IPTN Indonesia), two DASH 7 (47-seater, manufacturer DeHavilland, Canada), four Let 410 (19-seater, designed in the former Czechoslovakia),and two twin-engine turbo-propeller YS-11 A (60-seater).

2.5.10 In January 2005, Asian Spirit inaugurated the latest member of its fleet, the British Aerospace (BAe) 146 jet. This is Asian Spirit's first jet aircraft, and is one of four BAe 146s ordered. Asian Spirit has commenced daily Manila-Pagadian services using the BAe146 aircraft. This is also an aggressive expansion strategy by a Philippine airline and the use of a modern 70 seat jet aircraft may be a more appropriate jet aircraft size for many routes in the Philippine domestic market.

2.5.11 Seair, which started operation in 1994, has a fleet consisting of 13 aircraft, of which eight are 19-seater Let410, and the remaining five aircraft are: two Dornier-28 (9 passengers), one Piper Cherokee (3 passengers), one Alouette, and one Citabria, which are available for air charter. Seair is flying Let410 turbo prop aircraft into Manila. This airline has announced recently its intention to procure the 32-seater Dornier 328 aircraft for its future flights, including to and from Puerto Princesa Airport.

SECTION 3

Air Cargo Profile

3 AIR CARGO PROFILE

3.1 Cargo Volumes

3.1.1 The statistics on domestic cargo movements at the Puerto Princesa Airport for the period from 1986 to 2004 as summarized in **Table 3.1-1** were sourced from "*The JICA Airport Master Plan Study on the Strategy for the Improvement of National Airports in the Republic of the Philippines*." The most recent data for year 2005 was taken directly from ATO and the airlines during ITDP survey and site inspection activities.

Table 3.1-1: Cargo Movements at Puerto Princesa Airport

Year	Cargo Movement (Kg)	Annual Growth Rate (%)	Comments
1986	1,341,000		
1987	1,317,000	-1.8	
1988	1,493,000	13.4	
1989	1,336,000	-10.5	
1990	3,582,000	168.1	
1991	1,378,000	-61.5	
1992	1,550,000	12.5	
1993	1,781,000	14.9	
1994	2,033,000	14.2	
1995	2,322,134	14.2	
1996	3,723,987	60.4	
1997	3,584,987	-3.7	
1998	2,544,594	-29.0	Stoppage of PAL Services
1999	4,172,797	64.0	
2000	4,810,166	15.2	
2001	3,885,907	-19.2	Dos Palmas kidnapping incident
2002	3,795,726	-2.3	Dos Palmas kidnapping incident
2003	5,001,051	31.7	
2004	4,500,599	-10.0	
2005	4,744,875	5.4	

Data Sources: TADP Report and The Master Plan Study on the Strategy for the Development of National Airports in the Republic of the Philippines (DOTC / JICA, 2006) and ATO

3.1.2 Table 3.1-1 shows that the highest annual growth in the historical domestic cargo trend of 20-years period, occurred in year 1990 with a total cargo movement of 3,582 metric tons, or an average annual growth of 168.11% with respect to the preceding year's cargo movement. However, in 1991 and 1998 a significant drop of -61.53% and -29% respectively occurred resulting in negative annual growth. The negative growth rate was a result of disruptions in the operations of PAL, that was triggered by the series of protests held by PAL employees against

management, and which eventually culminated in the stoppage of the airline's services in September 1998. The resumption of PAL's operations at the airport has enabled a significant rebound in growth of cargo movements in 1999 to 2000.

3.1.3 Subsequently, negative growths were noted again in year 2001 and the downtrend continued up to 2002 as perceptions of peace and order problems persisted after the kidnapping incident occurred at the Dos Palmas, a popular resort in Palawan. Eventually, the efforts of the government's leadership both national and local as well as the general upswing in global and local economic conditions, and the tourist confidence subsequently restored normal traffic conditions and allowed cargo movements to climb in 2003, enabling the largest recorded volume of cargo movements at 5,001 metric tons.

3.2 Cargo Profile

3.2.1 The type of cargo flown from Puerto Princesa Airport may be classified as follows:

(i) fresh fish and tuna (aqua marine products);

(ii) live animals;

(iii) foodstuffs;

(iv) documents; and

(v) other products.

3.2.2 **Table 3.2-1** shows the commodity breakdown of cargo handled by PAL for cargo movements at Puerto Princesa Airport in 2005.

Table 3.2-1: PAL Cargo Distribution by Commodity Type, 2005

Cargo Type	% Share	Total (in Kg)
1. Fresh Fish	91.18	1,204,910
2. Live Animals	4.12	54,434
3. Documents	0.18	2,329
4. Foodstuffs	1.00	13,219
5. Others	3.52	46,481
T O T A L	100	**1,321,373**

Source: PAL Puerto Princesa Airport Record for Year 2005 Outbound Cargo

3.2.3 The largest share by cargo type is fresh fish/tuna items (aqua marine products), followed by live animals, representing 91% and 4%, respectively.

3.2.4 **Figure 3.2-1** shows the monthly trend of the cargo flows for the year 2005 at Puerto Princesa Airport. Fresh fish/tuna items peaked in the month of October with a total weight of 162.9 tons.

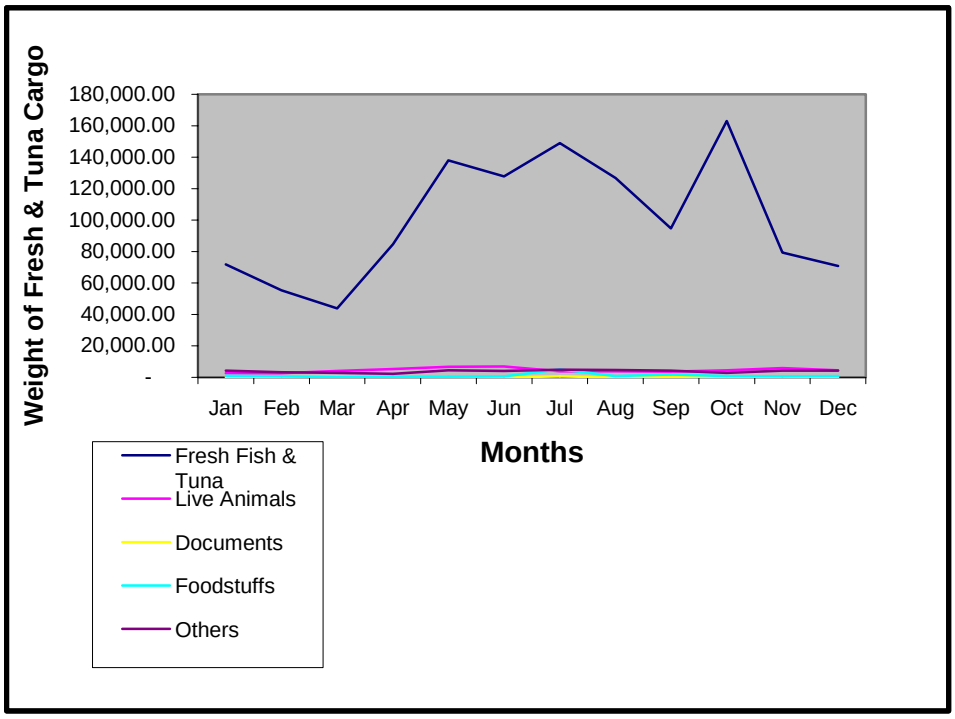

Figure 3.2-1: Cargo Commodity Monthly trends for 2005

3.3 Air Lift Capacity

3.3.1 At present, there are four airlines operating services at Puerto Princesa Airport as noted earlier. However, in 2005, there were five airlines and these airlines carried cargo totaling 4,744 metric tons for the year as presented in Table 3.1-1.

3.3.2 Based on the analysis of the aircraft types and maximum cargo loads determined by the airlines (being subject to route length and fuel loads), the cargo air lift capacity was determined as shown in **Table 3.3-1**.

Table 3.3-1: Scheduled Aircraft by Airline and Weekly Cargo Capacity

Airline Operator	Aircraft Type	Movements Per Week	Cargo Capacity (Tons)	
			Aircraft	Weekly
Philippine Airlines	A330 A320	6 (MNL-PPS-MNL) 8 (MNL-PPS-MNL)	27 5	162 40
Cebu Pacific Air	DC9	14 (MNL-PPS-MNL)	2	28
Air Philippines	B737	14 (MNL-PPS-MNL)	4	56
Air Philippines	B737	14 (Dav/CEB-PPS-CEB/Dav)	4	42
Asian Spirit	BAe146	7 (MNL-PPS-MNL)	1.50	10.5
SEAIR	LET 410	6 (Cuyo-PPS-Cuyo)	0.35	0.35
Total				**339**

3.2.5 This indicates that only 27% of available capacity is being utilized. However, considering that most of the cargo is outbound, then approximately 50% of outbound cargo capacity is being utilized.

3.2.6 **Table 3.3-2** shows the monthly cargo movement for 2005 by airline operating at the airport. In this table, the maximum cargo movement occurred in the month of May; while PAL experienced its maximum cargo movement during the month of September. However during the month of September a comparison with the available cargo carrying capacity of PAL reveals that PAL was only utilizing approximately 64% of outbound cargo-carrying capacity, again noting that most cargo was outbound.

Table 3.3-2: Monthly Cargo Traffic, 2005

Month	Cargo Movement (kg)					Total
	PAL	Cebu Pacific	Air Phil	Asian Spirit	Seair	
Jan	152,435	121,183	47,062	-	27	320,707
Feb	155,291	104,820	63,948	252	35	324,346
Mar	141,367	108,879	49,143	1,049	36	300,474
Apr	202,609	124,706	82,528	6,041	26	415,910
May	249,913	116,915	142,942	7,774	40	**517,584**
Jun	253,178	110,576	113,880	422	31	478,087
Jul	257,650	111,900	96,869	-	5	466,424
Aug	244,996	23,915	190,219	-	3	459,133
Sep	262,195	-	118,768	5,427	14	386,404
Oct	241,696	-	140,301	10,698	1	392,696
Nov	173,057	-	118,107	10,753	2	301,919
Dec	195,892	90,530	86,315	8,714	18	381,469
Total	**2,530,279**	**913,424**	**1,250,082**	**51,130**	**238**	**4,745,153**

Source: Puerto Princesa Airport, ATO

3.2.7 **Table 3.3-3** summarizes Table 3.3-2 and shows the percentage share of cargo movements by airline for 2005.

Table 3.3-3: Distribution of Cargo Movement by Airline Operator, 2005

Airline Operator	Total Cargo Movement (Kg)	% Share
Philippines Airlines (PAL)	2,530,279	53.3
Cebu Pacific	913,424	19.3
Air Philippines	1,250,082	26.3
Asian Spirit	51,130	1.1
SEAIR	238	0.01
Total	**4,745,153**	**100**

Source: ATO Puerto Princesa Airport

3.4 Cargo Facilities

3.4.1 Only PAL has its own dedicated cargo facility at Puerto Princesa Airport. This facility is adequate for current operations, but would be inadequate for future cargo traffic.

3.4.2 Other airlines, notably Cebu Pacific and Air Philippines, do not have dedicated facilities. For these airlines, cargo handling services are within the passenger terminal building of the airport. Security checks, re-packaging, clearing, storage, etc. prior to boarding are handled behind the check-in counters within the prescribed time of the airline (at least two hours before the flight departure).

3.4.5 At present, it would appear that there is no need for special cargo facilities such as refrigeration, dangerous good areas, livestock holding areas, bonded goods, etc. within cargo terminal facilities.

3.5 Cargo Growth Prospects/Issues

3.5.1 Air cargo is a worldwide growth industry. On a regional basis, Southeast Asia is projected to be one of the largest growth areas for air freight and the Philippines is expected to continue to contribute to that growth.

3.5.2 Most air cargo out of Puerto Princesa to Manila is expected to remain as fresh fish and other marine products with a significant proportion of these aquatic products expected to be transferred to international flights from Manila to north Asian destinations. All airlines flying into Puerto Princesa Airport have shown interest in maximizing their opportunities to carry air cargo.

SECTION 4

Air Demand and Capacity

4 AIRPORT DEMAND AND CAPACITY

4.1 Previous Forecasts

4.1.1 Third Airports Development Project (TADP, 2000 Study)

4.1.1 The air passenger and cargo traffic forecasts were estimated based on the relative share of air traffic at the Puerto Princesa Airport to the total volume of domestic traffic in the entire Philippines. The forecast of future domestic air traffic for the entire Philippines, on the other hand, was made using regression analysis where the per capita Gross Domestic Product (GDP) was used as a function of the historical annual air traffic demand.

4.1.2 To eliminate the wide fluctuations in air traffic movements and the adverse effects of economic recession that were noted for the period from 1989 to 1992 and the effects of PAL's cessation of service in 1998, the airport's share of the traffic was based on the historical trend observed during the period from 1992 to 1997. The relative traffic share of the airport to the total national air traffic was assumed to be equal to the average of shares for the period from 1992 to 1997.

4.1.3 Using the per capita GDP for 1985 to 1998, the future per capita GDP values were determined by extrapolation using the method of least squares. A projection of the total domestic air traffic was then made by correlating per capita GDP and historical air passenger and cargo traffic for the years 1992 to 1997. Finally, a forecast of air passenger and cargo traffic at Puerto Princesa Airport was made by taking the relative traffic share of the airport to the projected total domestic air traffic.

4.1.2 Southern Philippines Airports Development Project (SPADP, 2004 Study)

4.1.4 Projections of air passenger and cargo traffic for the Puerto Princesa Airport were initially carried out through regression analysis using appropriate econometric models that are based on various factors such as the gross national product (GNP), gross regional domestic product (GRDP), population, peace and order conditions and relevant government initiatives. Several trial runs based on a number of varying combinations of economic factors were conducted until a statistically acceptable regression result was arrived at.

4.15 The air passenger traffic forecasts at the airport were finally based on a regression model where the Gross National Product (GNP) and the perception of peace and order condition in the area were used as a function of the annual air passenger traffic. The resulting equation was given as follows:

Passengers = (-) 140,575 + 0.354487 * GNP - 77047 * X1
Where: GNP is in constant 1985 prices
X1 is a dummy variable reflecting peace and order perception in the area
(0 = favorable, 1= unfavorable)

4.1.6 The results of the regression analysis indicated that 78% of changes in the level of cargo for Puerto Princesa Airport were correlated to increases/decreases in the level of the country's Gross National Product (GNP). The resulting regression formula was as follows:

Cargo = 4,337,117 + 8.1244 * GNP

4.1.3 Master Plan Study for the Development of National Airports (JICA, 2006)

4.1.7 The forecasts of air passenger traffic at the different airports were derived based on the historical domestic air sector passenger traffic from the period 1987 to 2003. Model estimation was conducted for the total domestic sector movements and each sector (where the end points of each sector are defined) using the following equations:

DOMPAXt = 5.93 + 1,546,612 x PHLGDPt

SECPAXt = a + b x PHLGDPt

SECPAXt = a + b x GRDP1t

SECPAXt = a + b x GRDP2t

SECPAXt = a + b x GRDP1t + c x GRDP2t

Where: DOMPAXt is the total domestic passenger traffic on all sectors in year t, used as national control total

SECPAXt is the sector passenger traffic in year t

a, b and c are the regression coefficients

PHLGDPt is the GDP in millions of Pesos at 1985 constant prices

GRDP1t is the GRDP of the region where one airport of the city-pairs (sector) is located

GRDP2t is the GRDP of the region where the other airport is located

4.1.8 The following criteria were then used in selecting the best fitting equation, namely: (a) b>0, c>0; and (b) t-value for b exceeding the minimum t-value at 95% confidence.

4.1.9 Based on the above criteria, statistically significant relationships were determined. Using the derived relationships and the projected GDP and GRDP figures, the future sector traffic was estimated. After these sector traffic volumes were projected, the figures were used as the basis for allocating the sector traffic predicted using the national control total passenger traffic model. Adjustments were then made on critical airports to ensure continuity between the start of the yearly forecasts to the base year. Finally, the airport passenger traffic figures were then derived from the final sector traffic values by totaling the sector movements on a per airport basis.

4.1.4 Comparison of Air Passenger Forecasts

4.1.10 A comparison of the air passenger traffic forecasts under the three previous studies mentioned above is provided in **Table 4.1.4-1**. These forecasts represent unconstrained annual passenger forecasts.

4.1.11 The comparison of previous forecasts revealed that the TADP and recent JICA forecasts correlate reasonably well despite the fact the JICA forecast was done five years after the TADP forecast. It also shows that the forecast done under the SPADP has significantly higher growth rates and produces much higher traffic toward the end of the forecast period as compared to the TADP and JICA forecast. The TADP is considered a more robust forecast than the one prepared under the SPADP.

Table 4.1.4-1: Comparison of Air Passenger Forecasts

Year	Actuals			TADP Forecast (2000 Report)			(SPADP Forecast 2004 Report)			JICA Master Plan Study Forecast (2006 Report)		
	Pass. Mov'ts	Growth Rate (%)		Pass. Mov'ts	Growth Rate (%)		Pass. Mov'ts	Growth Rate (%)		Pass. Mov'ts	Growth Rate (%)	
		Ann. Ave.	5-Yr Ann Ave		Ann Ave	5-Yr Ann Ave		Ann Ave	5-Yr Ann Ave		Ann Ave	5-Yr Ann Ave
1987	*90,540*											
1988	*41,508*	-54.2										
1989	*107,222*	158.3										
1990	*119,058*	11.0										
1991	*113,717*	-4.5										
1992	*113,490*	-0.2										
1993	*126,105*	11.1	4.7									
1994	*132,780*	5.3										
1995	*146,795*	10.6										
1996	*193,330*	31.7										
1997	*230,054*	19.0										
1998	*159,106*	-30.8	8.4									
1999	*199,086*	25.1										
2000	*208,714*	4.8		202,107								
2001	*189,412*	-9.2		213,985	5.9							
2002	*147,996*	-21.9		225,863	5.6							
2003	*195,975*	32.4	9.7	237,741	5.3	5.9						
2004	*271,769*	38.7		249,619	5.0		216,221					
2005	*309,559*	13.9		261,497	4.8		314,526	45.5		309,559		
2006				277,584	6.2		341,940	8.7		320,320	3.5	
2007				293,670	5.8		366,875	7.3		331,081	3.4	
2008				309,757	5.5	6.2	393,093	7.1	9.6	341,841	3.3	3.5
2009				325,843	5.2		420,662	7.0		352,602	3.1	
2010				341,930	4.9		465,957	10.8		363,363	3.1	
2011				362,026	5.9		507,169	8.8		380,190	4.6	
2012				382,123	5.6		542,661	7.0		397,017	4.4	
2013				402,219	5.3	5.9	580,070	6.9	8.4	413,843	4.2	4.6
2014				422,316	5.0		619,501	6.8		430,670	4.1	
2015				442,412	4.8		661,061	6.7		447,497	3.9	
2016				467,124	5.6		712,969	7.9		470,488	5.1	
2017				491,835	5.3		759,672	6.6		493,478	4.9	
2018				516,547	5.0	5.6	808,898	6.5	7.7	516,469	4.7	5.1
2019				541,258	4.8		860,783	6.4		539,459	4.5	
2020				565,970	4.6		915,471	6.4		562,450	4.3	
2021				595,404	5.2		1,007,347	10.0		593,197	5.5	
2022				624,838	4.9		1,070,241	6.2		623,944	5.2	
2023				654,273	4.7	5.2	1,136,532	6.2	8.0	654,690	4.9	5.5
2024				683,707	4.5		1,206,405	6.1		685,437	4.7	
2025				713,141	4.3		1,280,053	6.1		716,184	4.5	

Note 1: Domestic including GA and Military but excluding International.

4.1.12 As the JICA forecast was completed in 2006 and has been endorsed by DOTC, and as the JICA forecast also correlates well with the TADP forecast, it was decided to adopt the JICA forecast rather than prepare a new forecast.

4.2 Forecasts – With Project Scenario

4.2.1 Annual Passenger Movements

4.2.1 The 'with project' case scenario assumes that the proposed development works and corresponding investments as defined in Section 6 are made.

4.2.2 The proposed development is expected to address airport security, safety, operational and capacity constraints such that the full air travel demand potential (domestic and international) can be met and be translated into the actual growth of air passenger and aircraft movements as per the unconstrained forecasts.

4.2.3 Hence, the appropriate "With Project" scenario forecasts are the 2006 JICA passenger forecasts shown in Table 4.1.4-1.

4.2.4 **Table 4.2.1-1** provides details on the forecast of annual passenger movements under the "With Project" scenario broken down into international, scheduled domestic and general aviation plus military passengers.

Table 4.2.1-1: Forecast of Passenger Movements (With Project)

Year	International	Scheduled Domestic	GA + Military	TOTAL
2006	30,779	296,638	23,682	351,099
2007	32,472	306,801	24,280	363,552
2008	34,164	316,963	24,878	376,006
2009	35,857	327,126	25,476	388,459
2010	37,549	337,289	26,074	400,912
2011	39,901	353,541	26,649	420,090
2012	42,252	369,792	27,224	439,269
2013	44,604	386,044	27,800	458,447
2014	46,955	402,295	28,375	477,626
2015	49,307	418,547	28,950	496,804
2016	52,395	440,966	29,521	522,883
2017	55,484	463,385	30,093	548,962
2018	58,572	485,805	30,664	575,041
2019	61,661	508,224	31,236	601,120
2020	64,749	530,643	31,807	627,199
2021	68,804	560,828	32,369	662,001
2022	72,860	591,013	32,931	696,803
2023	76,915	621,198	33,492	731,606
2024	80,971	651,383	34,054	766,408
2025	85,026	681,568	34,616	801,210

4.2.2 Annual Aircraft Movements

4.2.5 Forecast annual aircraft movements are based on the forecast passenger demand. Annual aircraft movements can be estimated by comparing current and projected average passenger loads per aircraft with the annual passenger forecasts.

4.2.6 Factors affecting aircraft fleet type and frequency, such as market liberalization and the introduction of new aircraft, are considered and are factored into the projected average passenger loads.

4.2.7 As defined under the 2006 JICA Master Plan Study, the classification of aircraft is as follows:

a. SJ – Small Jets (B737, B757, A320, A319) with typical capacity of 120 to 150 seats;

b. TP – Turbo Prop (CN235, ATP, Ys11, DHC7, Do328, BAe146) with typical capacity of 55 seats; and

c. STOL – Short Takeoff and Landing (Let 410, Do228) with typical capacity of 20 seats.

4.2.8 Under the "With Project" case scenario, the aircraft movement forecast does not consider any operational constraints at the airport and is also an unconstrained forecast.

4.2.9 In the forecast of aircraft movements, the following assumptions as used in the 2006 JICA Master Plan Study were adopted:

a. For Scheduled Domestic Aircrafts Movements

- STOL class aircraft is used for very thin sectors with annual passenger demand less than 10,000;
- TP class aircraft is used for thin route with annual passenger demand between 10,000 and 29,000; and
- SJ is the most widely used with sector passenger more than 29,000 annually.

b. For International Aircraft Movements

- Average Passenger Load: 49 (based on the aircraft mix); and
- Aircraft Mix: 50% Small Jets (SJ); 50% Short Takeoff and Landing (STOL);

Based on these observations, the following aircraft usage – sector passenger relationship for the purpose of aircraft movement forecast were adopted:

- Small Jets shall be used for 29,000 - 5,000,000 range of annual sector passengers;
- Turbo Prop shall be used for 10,000 - 29,000 range of annual sector passengers; and
- Short Takeoff and Landing shall be used for 10,000 and below range of annual sector passenger.

c. For General Aviation and Military Aircraft Movements

The methodology adopted for forecasting General Aviation and Military Aircraft Movements, which adheres to that used under the 2006 JICA Master Plan Study, is as follows:

- First, an estimate of non-GA and non-military aircraft movements based on data from the Civil Aviation Board (CAB) were prepared from 2004;
- The differences between the ATO data on aircraft movements were calculated, the difference interpreted as being the GA and Military aircraft movements; and
- Applying regional population growth rates, future GA and Military aircraft movements were projected.

4.2.10 The resulting forecast of aircraft movements under a "with project" case scenario are summarized in **Table 4.2.2-1** below.

Table 4.2.2-1: Forecast Aircraft Movements (With Project)

Year	International		Scheduled Domestic			GA + Military	Total
	SJ	STOL	SJ	TP	STOL	STOL	
2010	179	179	3,036	0	1,324	1,752	6,470
2015	235	235	3,782	0	1,533	1,948	7,733
2020	309	309	4,808	284	1,064	2,142	8,916
2025	405	405	6,187	635	536	2,334	10,502

NOTES: SJ – Small Jets (B373, B757, A320, A319); TP – Turbo Prop (CN235, ATP, Ys11, DHC7, Do328, BAe146); STOL – Short Takeoff and Landing (Let 410, Do228)

4.2.11 It should be noted that the above forecasts apply to the estimation of annual aircraft movements. For the peak hour analysis in Section 4.5, the Project Team has made slightly different assumptions based on schedule information and a different approach to the start up of regular international operations.

4.3 Forecasts – Without Project Scenario

4.3.1 The capacity analysis conducted under Section 4.6 indicates that the airport terminal is already running at capacity. This means that, at peak times, the conditions for passengers in the terminal are crowded and uncomfortable and there is little, if any, room for additional passengers. However, although the airport may be deemed to be running at capacity, it does not necessarily mean that passenger and aircraft numbers cannot grow.

4.3.2 Growth can occur at "off-peak times" and on the shoulders of the peak. The extent that airlines will schedule flights at off-peak times is difficult to assess and depends on the airlines assessment of the market conditions and on other constraints associated with the airlines overall route structure/schedule for each aircraft in its fleet and possibly on slot constraints in Ninoy Aquino International Airport (NAIA), particularly as NAIA becomes increasingly constrained and congested.

4.3.3 Under a "without project" case scenario, it is assumed that passengers and aircraft can grow in the off-peak and shoulder period to a maximum traffic equivalent to the 2009 forecast, although, without the project this might not be realized until some later time.

4.4 Air Cargo Forecasts

4.4.1 The erratic nature of the cargo movement statistics are noted in Section 3 and Table 3.1-1. A linear regression analysis based on the 20 years available data was used as one means of assessing potential cargo demand.

4.4.2 The analysis from 1986 to 2005 indicates an average annual growth of 6.5% despite the generally erratic year on year growth. This is shown graphically in **Figure 4.4-1**.

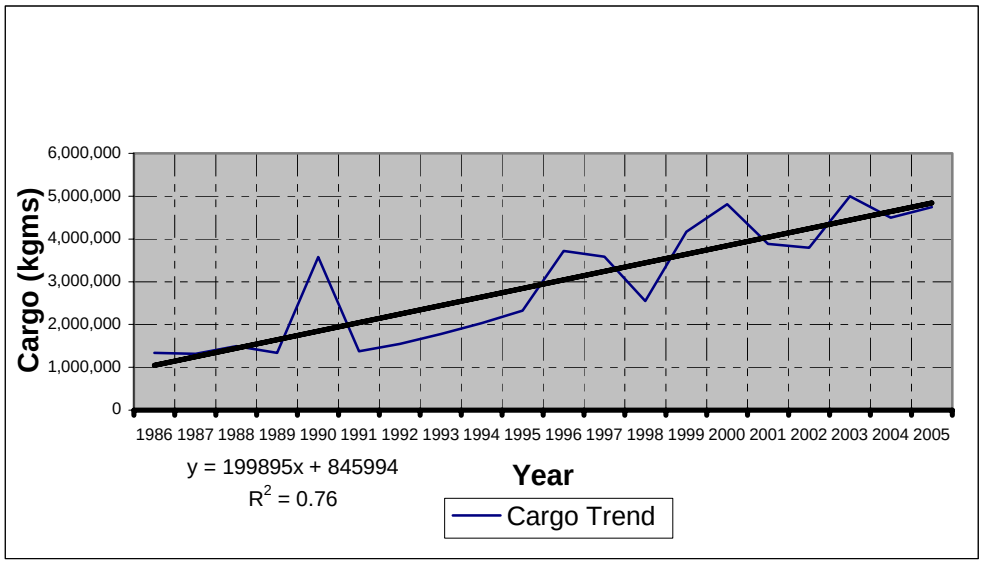

Figure 4.1-1: Puerto Princesa Cargo Trend

4.4.3 **Table 4.4-1** provides the projected cargo movement for the next 20 years (until year 2025) based on the linear regression analysis and compared to the recently completed JICA forecast.

Table 4.4-1: Comparison of JICA and ITDP Forecasts

Year	Projected Cargo (kg)	
	JICA	ITDP
2004	4,389,213	4,500,599
2005	4,746,187	4,744,915
2010	6,982,810	6,616,821
2015	9,983,626	9,227,209
2020	13,874,675	12,867,416
2025	18,950,616	17,943,712

4.4.4 The 2006 National Airport Master Plan (JICA) forecast was based on the 10-year historical trend from 1995 to 2004 and correlated against the national and regional gross domestic product.

4.4.5 The above methodology utilized by JICA resulted in an Annual Average Growth Rate (AAGR) of 7.2% for Puerto Princesa Airport.

4.4.6 The ITDP linear regression analysis results in an Average Annual Growth Rate of 6.90%. The following equation was used:

$Y = 199695X + 845994$ (This represent the equation of the line in Figure 3.5)

$R^2 = 0.76$

$AAGR = (CARGO_{(2005)} / CARGO_{(1986)})^{(I/(t2005-t1986))} - 1)$

4.4.7 Both methodologies produced similar results. As the JICA forecast used a more comprehensive approach and had been accepted by DOTC, the Project Team adopted the JICA cargo forecast for Puerto Princesa Airport.

4.5 Busy Hour and Stand Demand Forecasts

4.5.1 Introduction

4.5.1 This section calculates the current and forecast passenger busy hour demand, which would need to be carried by passenger terminal facilities.

4.5.2 Busy hour passenger demand is then converted into a peak hour stand demand by consideration of existing and projected aircraft mix profiles and apron occupancy times.

4.5.3 Busy hour forecasts are particularly important in terms of checking the adequacy of proposed passenger terminal and aircraft parking requirements.

4.5.2 Methodology

4.5.4 The passenger terminal busy hour demand is usually based on detailed examination of the existing flight schedules and aircraft mix. The growth in stand demand is correlated against the growth in passenger numbers and the impacts of aircraft substitution due to expected increases in average passenger loads. Other factors also influence stand demand such as the number of layover aircraft and allowances for off schedule aircraft.

4.5.5 As there are currently no regular international flights for Puerto Princesa, the schedule analysis that follows applies to domestic air services only.

4.5.6 The potential impact of international services is analyzed in Section 4.5.11.

4.5.3 Schedule Data Used

4.5.7 The demand analysis was based on aircraft schedules provided by ATO, the airlines and by internet research as summarized in Section 2.

4.5.4 Growth Assumptions

4.5.8 In order to forecast future aircraft and passenger busy hours and stand demand, relevant growth forecasts were required. In the absence of specific busy hour forecast growth rates, annual passenger growth rates were used as a base.

4.5.5 Definition of Terms

4.5.9 The following section defines the meaning of some key terms used in this analysis:

4.5.10 **Busy Hour.** The (arrivals or departure) busy hours refers to the one hour during the day with the greatest number of movements (arrivals or departures). For the purposes of this analysis, “Peak” busy hour refers to the busiest hour of the week.

4.5.11 **Active Stand Demand.** The active stand demand is calculated from the peak busy hour, by taking the sum of the aircraft within that hour.

4.5.12 **Total Stand Demand.** Total stand demand is a measure of the largest number of aircraft “on-the-ground” at any one time during the day. This includes “layover” or “overnight” aircraft in the peak period that maybe regarded as “non-active”.

4.5.13 **Layover.** Layover refers to an aircraft that stays on the airport overnight before departing the next day.

4.5.6 Conversion of Aircraft Schedules to a Gate Allocation Chart

4.5.14 The current 2006 aircraft schedules were plotted to show each aircraft’s arrival and departure time on a timeline as shown in **Figure 4.5.6-1** representing the Gate Allocation Chart. A 15-minute “buffer” was included in the figure for maneuvering time in the vicinity of the gate and for off-schedule arrival/departure of the aircraft.

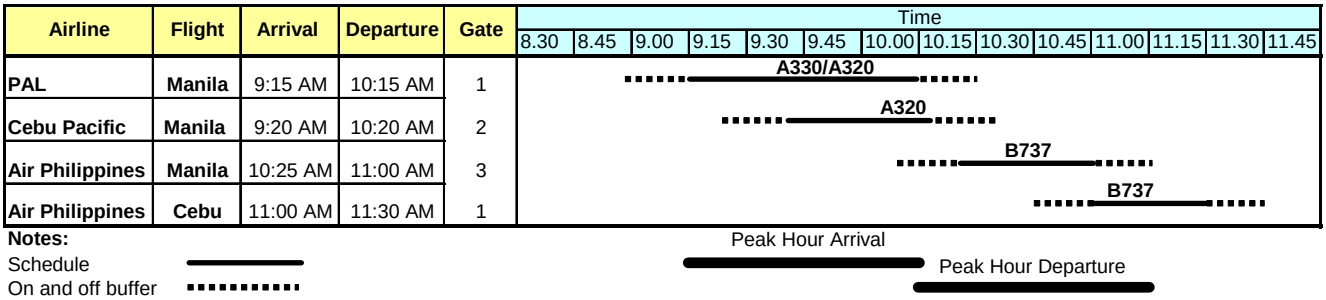

Figure 4.5.6-1: Puerto Princesa Gate Allocation Chart

4.5.7 Current Passenger and Aircraft Busy Hour Demand (2006)

4.5.15 The busy hour aircraft arrivals and departures are identified in Figure 4.5.6-1. The busy hour arrival and departure passengers are obtained by multiplying the busy hour aircraft arrivals and departures by the number of seats in each aircraft and an assumed load factor of 70% derived in Section 2.

4.5.16 **Table 4.5.7-1** represents the arrivals and departures busy hour which shows that the busy hour for arrivals and departures is the same each day in the mid to late morning.

4.5.17 The arrivals busy hour consists of two aircraft.

Table 4.5.7-1: Arrivals & Departures Busy Hour, 2006

Aircraft	Seats	Arrival	Departure
B744	*400*	0	0
B773	*368*	0	0
A330	*250*	1	0
A320	*150*	1	1
B737	*150*	0	2
BAE146	*75*	0	0
Let410	*19*	0	0
Total	**A/C**	**2**	**3**
	Seats	400	450
	LF	70%	70%
	Pax	**280**	**315**
	Day	Everyday[1]	Everyday
	Time	9:15 -10:15	10:30-11:30

Note 1: Applies when PAL operates the A330 which is about 4 times a week.

4.5.18 The departure peak also occurs at the same time each day of the week and consists of three aircraft and 315 passengers.

4.5.8 Current "Active Stand" Demand (2006)

4.5.19 To calculate the active stand demand forecasts for the peak busy hour, the following method was used:

- Identify which of the arrivals or departures aircraft numbers are higher. This produces the critical terminal load; and
- Group the aircraft types in the busy hours by their aerodrome reference code.

4.5.20 For Puerto Princesa, there are no issues of long stay aircraft and return of these prior to departure. **Table 4.5.8-1** summarizes the active stand demand for current (2006) operations.

Table 4.5.8-1: Current Active Stand Demand, 2006

Code	Arrival	Departure
F	0	0
E	1	0
D	0	0
C	1	3
Regional Jet	0	0
Turbo Prop	0	
Total	**2**	**3**
Day	Everyday	Everyday
Time	9:15-10:15	10:20-11:20

4.5.9 Total Stand Demand

4.5.21 Since there are currently no "inactive aircraft" in the peak period, the Total Stand Demand is the same as the Active Stand Demand.

4.5.10 JICA Forecast Aircraft Busy Hour

4.5.22 Forecast busy hour aircraft movements at the Puerto Princesa Airport for the period from 2005 to 2025 are based on the figures contained in the "The Master Plan Study on the Strategy for the Improvement of National Airports in the Republic of the Philippines" that was conducted and prepared in 2006 by ASCO Aviation Systems Consultants for the DOTC and JICA. These are summarized in **Table 4.5.10-1** below.

Table 4.5.10-1: JICA Forecast Aircraft Busy Hour Movements

Year	International Aircraft Movements	Domestic Aircraft Movements	Total[1]
2005	1	3	4
2010	2	4	6
2015	2	4	6
2020	2	4	6
2025	2	5	7

Data Source: The Master Plan Study on the Strategy for the Development of National Airports in the Republic of the Philippines (DOTC / JICA, 2006)

4.5.23 This forecast was based on applying Busy Day and Peak Hour coefficients to annual aircraft movements. It was not based on an analysis of the current or likely future schedules and may therefore not be accurate. It does not distinguish between arrival and departure peaks. This methodology does however suggest that as traffic volumes increase and schedules mature there will be some peak spreading. It is difficult to estimate the degree of peak spreading, but it can be accounted for in a schedule analysis by growing the busy hour to a lesser extent than the forecast annual growth.

4.5.11 Forecast Domestic Passenger and Aircraft Busy Hour

4.5.24 The busy hour passenger forecasts were calculated by applying only "50%" of the median annual passenger growth forecasts to the current passenger busy hour calculated in Table 4.3.2-1.

4.5.25 The "50%" factor is an important yet difficult to assess assumption. Typically, at other airports with higher levels of traffic, it is sometimes assumed as 100% (to be conservative) which would result in a higher busy hour forecast. However at these other airports, there is often a well-defined peak and off-peak traffic profile.

4.5.26 In arriving at the 50% peak hour growth rate factor, the following considerations were taken into account:

- It could be expected that as growth continues airlines, particularly PAL and Cebu Pacific would go to two daily Manila flights and it could be argued that this would most likely occur in the afternoon and therefore see the emergence of an afternoon peak. However, this maybe countered by the fact that, if Puerto Princesa is to be a dominant tourism destination, morning flights are preferred to match in with hotel room availability and check out times.
- Currently there are three airlines in the departures peak, notably: PAL, Cebu Pacific and Air Philippines. It could reasonably be expected that Asian Spirit and/or Seair could also easily fly in the peak period at any time in the future. While there is currently a total of only five domestic carriers, this is not necessarily a constraint to the growth of the number of aircraft in the peak hour. This is demonstrated by the Air Philippines Cebu - Puerto Princesa flight, which suggests other routes by the same airlines could also fly in the peak hour or on the shoulder periods.
- Emergence of international operations is discussed in Section 4.5.12. International operations, if occurring in the peak period, will attract domestic connections at the same time particularly to northern Palawan thus tending to increase the aircraft parking demand during the peak period.

4.5.27 The forecast passenger demand then allows the aircraft busy hour forecasts to be calculated.

4.5.28 In a more mature schedule profile, the average aircraft seats would be grown at an annual rate of 1% for international aircraft and 2% for domestic aircraft. However, in this case, it is known that PAL and Cebu Pacific have made recent fleet mix decisions based on the A320 aircraft. It is not expected that PAL would increase the frequency of its A330 service. Air Philippines is using B737's and it is assumed they will not upgrade to an aircraft with significantly more seats. Other airlines may bring in aircraft of the same size (A320/ B737) but based on current trends, they are more likely to bring in smaller aircraft up to 70 seats (such as the BAe146).

4.5.29 The forecast aircraft busy hour was determined by adding a mix of aircraft whose seating capacity matches the forecast seats obtained by multiplying the forecast passengers at each year by an assumed load factor. Judgment is exercised to take account of possible future airline fleets as discussed above. The resultant number of aircraft and seats is checked against the average number of seats calculated from the assumed growth rates above.

4.5.30 **Table 4.5.11-1** shows the forecast passenger busy hours for arrivals and departures in five-year increments from 2010 to 2025.

Table 4.5.11-1: Domestic Aircraft Departures Busy Hour Forecast

Reference Code	Example	2006	2010	2015	2020	2025
F	A380	0	0	0	0	0
E	B777, A330	0	0	0	0	0
D	DC10, AB6	0	0	0	0	0
C	B737, A320	3	3	3	3	3
Regional Jet	Bae146	0	1	1	2	3
Turboprop	Let410	0	0	1	1	1
Total Aircraft		*3*	4	5	6	7
Seats		**450**	**525**	**544**	**619**	**694**
Assumed Load Factor		70%	70%	70%	70%	70%
Pax		**315**	**368**	**381**	**433**	**486**
Forecast Pax		315	343	383	434	497
Forecast Seats		450	490	547	620	710

4.5.31 As discussed above some judgment has to be used in what additional aircraft are brought into the mix as the growth in peak hour passengers occurs. As it is not expected that any additional A330 size aircraft are introduced into the mix, then all the growth can be assumed to be A330/B737 size or smaller. Given that Asian Spirit and Seair are not yet flying in the peak period (or from Manila), it might be reasonable to assume that these airlines would begin to fly and could fly Bae146 or smaller turbo prop aircraft.

4.5.12 Forecast Domestic Active Stand Demand

4.5.32 **Table 4.5.12-1** provides the forecast active stand demand. This assumes a maximum gate occupancy time of 60 minutes.

Table 4.5.12-1: Forecast Domestic Active Stand Demand

Reference Code	2006	2010	2015	2020	2025
F	0	0	0	0	0
E	0	0	0	0	0
D	0	0	0	0	0
C	3	3	3	3	3
Regional Jet	0	1	1	2	3
Turboprop	0	0	1	1	1
Total Aircraft	*3*	4	5	6	7

4.5.13 International Operations

4.5.33 Currently, there is no international traffic at Puerto Princesa except for occasional charter flights. PAL has expressed interest in bringing regular (perhaps seasonally based) international operations to meet growing tourism demand from north Asia using an A340 aircraft. Other airlines have also expressed interest including Malaysian based airlines that would link Kota Kinabalu with Palawan. These operations would most likely use an A320 or similar size aircraft.

4.5.34 It is yet to be seen whether international operations would be successful, but given Palawan's growing reputation as an international tourism destination and the lack of any competing airports on Palawan, it is reasonable to assume direct international operations will commence if adequate airport facilities are in place.

4.5.35 It is uncertain what time international operations from North Asia would arrive at Puerto Princesa. Late evening flights could be possible but early morning departures from North Asia thus arriving at Palawan are more likely, and would coincide better with hotel room availability. On this basis, given flying times from North Asia (say 4 hours), international operations could very well arrive during the mid/late morning domestic peak.

4.5.36 On this basis a simplified stand demand analysis is presented in **Table 4.5.13-1**. It is based on PAL initially operating North Asian flights on a seasonal basis using an A340-300 aircraft. In later years, it assumes a competing Korean-based carrier enters the market and flies to Puerto Princesa on a similar schedule.

Table 4.5.13-1: International Passenger/Aircraft Forecasts

Year	Annual Passengers[1]	Total North Asian aircraft movements (A340-300)[2,3]	Weekly north Asian flights assuming a 6 month seasonal schedule[4]	Corresponding Daily Stand demand in morning peak[5]
2007	*29,087*	117	3	1 Code E
2010	*37,549*	153	4	1 Code E
2015	*49,307*	201	6	1 Code E
2020	*64,749*	263	7	1 Code E

Note 1: Source JICA 2006 National Airports Master Plan Study. Note 2006 forecast moved to 2007.
Note 2: Assuming 70% Load Factor using an A340-300 with 264 seat capacity as flown by PAL.
Note 3: Assume North Asian flights represent 75% of international market
Note 4: Assume 70% of this market occurs within the 6 month seasonal schedule
Note 5: Assuming morning departures from north Asia and competing airlines as growth increases

4.5.37 It is assumed that any other international operation occurs outside of the busy period at off-peak times.

4.5.14 Recommended Stand Requirements

4.5.38 The Recommended Stand Demand is provided to account for the following:

- Active Stand Demand (domestic);
- Emergence of International traffic (also as active stands);
- Layover aircraft given also that there are no "tow off" stands available; and
- The risk of an aircraft being delayed or requiring unexpected maintenance.

4.5.39 Generally, inactive stand demand can be assumed at 25% of the active stand demand. This ensures operational flexibility and some capacity for unexpected growth in active and demand given the time lag associated in expanding the number of active stands. However, given that there is no home base carrier, nor any immediate likelihood of overnight stay aircraft, a 15% factor for inactive stands maybe appropriate. This factor may also provide some flexibility to park non scheduled aircraft such as executive jets.

Table 4.5.14-1: Recommended Aircraft Stands

Reference Code	2006/7	2010	2015	2020	2025
Domestic					
F	0	0	0	0	0
E	0	0	0	0	0
D	0	0	0	0	0
C	3	3	3	3	3
RJ	0	1	1	2	3
TP	0	0	1	1	2
Sub total	3	4	5	6	7
International					
E	1	1	1	1	1
D	0	0	0	0	0
C	0	0	0	0	0
Sub total	*4*	*5*	*6*	*7*	*8*
Layover/Stand off					
Assume 15%[1]	*1*	*1*	*1*	*1*	*2*
Total Aircraft Stands	**5**	**6**	**7**	**8**	**10**

Notes: 1. The stands provided for Layover/stand off should be near the active stands in front of the passenger terminal but do not necessarily have to be contiguous to it. If site constraints exist near the active stands they can be located more remotely, but this does impose a higher operational cost and inconvenience to the users.

SECTION 5

Project Planning Parameters

5 PROJECT PLANNING PARAMETERS

5.1 Introduction

5.1.1 A number of important planning and design parameters were used to underpin the evaluation of the concept and scope of work. These are briefly described as follows.

5.2 Master Planning

5.2.1 The development concept under this Study is based on the Master Plan and Concept prepared under the TADP.

5.2.2 It is noted however that the Master Plan, dated August 2000, was modified with an addendum issued in April 2001. The most significant change was the shift in the passenger terminal area from the mid point of the runway on the northern side, to the western end of the runway on the northern side. This would appear to be as a result of meeting the requirements of the Philippine Air Force (PAF).

5.2.3 The Design Aircraft is an ICAO Code E aircraft which is used to set out the airfield including runway widths, strip widths, runway to taxiway separations, taxiway to taxiway separations and taxiway to object separations, apron depths, taxiway fillets, etc.

5.2.4 The basic design configuration under the master plan is for the eventual full development of a single full parallel taxiway system to one side of the runway on the same side as the new passenger terminal area (and notably, on the same side as the Armed Forces of the Philippines (AFP)/ PAF facilities).

5.2.5 It should be noted that the parallel taxiway also serves as an apron edge taxiway and the taxiway will be blocked at the times aircraft push back from the apron.

5.2.6 The runway length is 2,600m and is suitable for A330/ 340 international operations from Asian destinations as far away as Bangkok (subject to refueling capability and weight restrictions).

5.2.7 Some issues have arisen in relation to the master plan and these are further discussed in Section 6.

5.3 Standards and Design Guidelines

5.3.1 Mandated by the Republic Act 776 or the Civil Aeronautics Act, the objective of DOTC's line agency Air Transportation Office (ATO) is to ensure safe, reliable, economical, and efficient air transportation, fully integrated with the national transportation system, taking into account the requirements of national interest and local concerns in accordance with the International Civil Aviation Organization Standards and Recommended Practices (ICAO SARP's).

5.3.2 In the absence of any other local/national airport regulations, the concept design outlined in this Study is based on ICAO (Annex 14) requirements for physical design and operation.

5.3.3 International Air Transportation Association (IATA) guidelines are also used with reference to Service Standards.

5.4 Target Demand/Capacity

5.4.1 The original Third Airports Development Project (TADP) targeted 2010 as the "design year" for the first phase development of facilities based on the "medium" traffic forecast.

5.4.2 Under the Southern Philippines Airport Development Project (SPADP), the same detailed designs completed under the TADP were used as the basis to the project with some adjustments to the scope. However, at the time of the SPADP, the 2003/2004 actual traffic levels had not reached the previous forecasts made under the TADP. This effectively pushed out the "design year" to 2015.

5.4.3 Since the completion of the SPADP, there has been a strong rebound in domestic traffic at Puerto Princesa and the new forecasts under ITDP (using the JICA Airport Master Plan Study) correlate closely with the original TADP forecasts.

5.4.4 Another factor to consider is the projected time line by which the ITDP would be implemented. As detailed in Section 11, the earliest anticipated date for commissioning and operations is April 2012.

5.4.5 On this basis it is recommended to adopt 2012 as the design capacity target. This means that for the most part, perhaps with some adjustments (refer to Section 6), the original designs prepared under the TADP can be adopted.

5.4.6 With this target design capacity year, it also means that service levels will begin to drop once operations commence and start to grow as there will be little spare capacity. Therefore, the flexibility to expand passenger terminal and aircraft parking and other facilities is essential.

5.5 Level of Service

5.5.1 The target Level of Service on opening or during the course of the life of the airport facility relates to the degree of passenger comfort. It is more an airport owner's policy decision regarding the target Level of Service. High levels of service generally provide a higher level of service at a higher cost.

5.5.2 IATA has developed a Level of Service Framework as listed in **Table 5.5-1**.

5.5.3 Normally, a Level of Service "C" is recommended as the minimum design level for new terminal elements. Key areas are the departures lounge and arrivals areas. For larger terminal with higher capacity processing areas, check-in, security, immigration and quarantine processing zones are also assessed in terms of level of service.

5.5.4 However, where certain constraints may exist, a lower Level of Service may be acceptable.

5.5.5 In terms of assessing the Level of Service at the end of the project life, a Level of Service "E" has been adopted.

Table 5.5-1: IATA Level of Service Framework

Level	Level Description
A	Excellent level of service; condition of free flow; no delays; excellent level of comfort
B	High level of service; condition of stable flow; very few delays; high level of comfort
C	Good level of service; condition of stable flow; acceptable delays; good level of comfort
D	Adequate level of service; condition of unstable flow; acceptable delays for short periods; adequate level of comfort
E	Inadequate level of service; condition of unstable flow; unacceptable delays for short periods; inadequate level of comfort
F	System breakdown

SECTION 6

Concept and Scope

6 CONCEPT AND SCOPE

6.1 Introduction

6.1.1 The upgrading and expansion of the Puerto Princesa Airport was originally included under the coverage of the TADP that was funded by the ADB and the EIB under a parallel co-financing arrangement. The TADP was a part of the Philippine Government's continuing program that aims to develop and improve the domestic aviation sector through the upgrading and rehabilitation of airport equipment and facilities to internationally prescribed standards. Under the parallel co-financing arrangement, all civil works components required for Puerto Princesa Airport were to be financed through the EIB loan while all equipment components will be financed out of the loan granted by ADB.

6.1.2 The Puerto Princesa Airport undertaking, like the other airports covered under the TADP, however suffered significant delays as a result of a number of crucial implementation problems and issues. By the time both loans reached expiry (the EIB loan expired on November 2003 without any extension being granted, while the ADB loan, after being extended, closed on May 2004), no significant progress was made in terms of the execution and implementation of the equipment, civil works and building components.

6.1.3 Due to its priority status, however, the Puerto Princesa Airport, together with the other five airports under the original TADP, were considered anew for possible financial assistance through a new loan from the ADB under the proposed SPADP, albeit at a reduced scope. The reduction in the scope of the works from that as originally envisioned under the TADP was agreed between the ADB and the DOTC apparently in consideration of two main factors, namely: (a) the limited amount of the loan initially programmed to finance the proposed SPADP and (b) the results of the "Re-appraisal Project Scope" prepared in November 2003.

6.1.4 The results of the 2004 ADB Country Programming Review Mission and as subsequently contained in a Memorandum of Agreement entered into by the ADB with the National Government as represented by NEDA, a total loan amount of US$50 million was programmed to finance the cost requirements of the SPADP. In comparison, the aggregate loan amount under the TADP was about US$ 122 million (US$ 97 million under the ADB loan and US$25 million under the EIB loan). The "Re-appraisal Project Scope" study (during the later phases of the TADP), on the other hand, was conducted for the purpose of validating/re-confirming the viability, through economic re-evaluation, of the TADP airport components (a) collectively as one package and (b) individually as stand alone projects.

6.1.5 The findings of the re-appraisal study showed that the Puerto Princesa Airport as a stand alone project will yield an economic internal rate of return (EIRR) of 28%, which was above the government-prescribed and ADB hurdle rate of 15% EIRR. This notwithstanding, the scope of works was still reduced due it seems to the limited funding available.

6.1.6 The SPADP feasibility study that was conducted based on the reduced scope of works, which is required for the processing and approval of the proposed new loan, was completed in October 2004. The SPADP study again confirmed the economic viability of implementing the upgrading and expansion of the Puerto Princesa Airport, with the project yielding an EIRR of 19%. The processing of the proposed loan however never occurred due to the lack of government counterpart funds resulting from the budgetary constraints under which the DOTC was operating at the time. The SPADP was eventually shelved by the ADB and

DOTC, but the upgrading and expansion of the Puerto Princesa Airport is now being considered under the "Intermodal Transport Development Project".

6.1.7 The development concept and scope of the works related to the Puerto Princesa Airport is presented in the following Section.

6.2 Development Concept

6.2.1 Introduction

6.2.1 The airport development concept is modeled on the concepts developed under the TADP and the SPADP.

6.2.2 Due to the time delays in implementing the airport projects identified in the TADP and SPADP, there has been a need under this Study to reassess the latest trends in passenger and aircraft traffic, recheck forecasts and the anticipated demand for the target year for "delivery" to assess whether the existing designs are still appropriate.

6.2.3 Given that the new forecasts in this report and those done under the TADP show rough correlation and given that TADP was targeting 2010 and this project is targeting 2012 for "delivery", there are few significant changes to the development concept except as summarized as follows:

- A marginal increase in the size of the passenger terminal to allow for increased departure lounge areas;
- Increased aircraft parking area; and
- Allowance for a second Cargo terminal for Cebu Pacific operations.

6.2.4 In addition to these adjustments, there have also been a few issues emerge that require further more detailed assessment in subsequent phases of this project and these are also summarized below.

6.2.5 Aspects of the development concept that are the same as the TADP are generally not discussed below.

6.2.2 Passenger Terminal Building

6.2.6 Based on experience and investigations at other airports, the required floor area of terminal buildings at airports with the analyzed characteristics of Puerto Princesa is generally in the range of 8-12 m²/peak hour passenger.

6.2.7 The total number of design peak hour passengers in two directions will amount to about 750 passengers in 2012.

6.2.8 The approximate total floor area required in the passenger terminal building would therefore be: 12 x 750 = 9,000 m^2 for the 2012 target year. The TAPD design is 9,350 m^2 and would therefore appear broadly adequate, although as detailed below, it is recommended that passenger departures areas be adjusted and this has resulted in a revised terminal area of 9,800 m2.

6.2.9 It should be noted that the passenger terminal building concept as described in this project does not represent the final development concept. Under the existing Master Plan, a "one and a half" level facility (upper level departure lounge) is envisioned for subsequent expansion phases.

6.2.10 **Departure Lounge/Waiting Area – Domestic.** The departure lounge area developed under the TADP/ SPADP has an area of approximately 825 m2. However, this area has been increased to approximately 900 m^2 under the ITDP as a consequence of allowing more space for concurrent international departures (see below).

6.2.11 If IATA Level of Service "C" is adopted for design a minimum of 2.0 m^2 can be allocated to each occupant for the busy hour.

6.2.12 The projected departures busy hour in 2012 is approximately 375 passengers. This implies a minimum area requirement of 750 m^2 which is within the provisions of the TADP and ITDP designs.

6.2.13 It should be noted that the space for domestic departures can be increased by opening the partitions that divide the domestic and international departures area provided that the international departures area is not required for operations.

6.2.14 **Departure Lounge/Waiting Area – International.** The departure lounge area developed under the TADP/ SPADP has an area of approximately 280 m^2.

6.2.15 Based on a single A340 operation in the peak hour, the number of persons to be accommodated in the departure lounge assuming a 70 % load factor = 264*0.7 = 185. At 2.0 m^2 per person, a minimum area of 370 m^2 is required for international departures.

6.2.16 The area for international departures has therefore been increased to 383 m^2 by expanding the terminal building in the central area by one structural grid bay (7.2 m). This also allows for the inclusion of a shop in the international departures area which was not previously allowed for.

6.2.17 **Arrivals Hall/ Baggage Claim Area – Domestic.** The domestic arrivals hall has an area of 465 m^2. The projected 2012 arrivals peak hour is approximately 360 passengers. If 1.6 m^2 (IATA Level of Service C) is allocated to each occupant the required area is 570 m^2. This is less than the concept provides but it should also be considered that the adjacent international baggage reclaim area can be accessed if international arrival operations are not concurrent.

6.2.18 **Arrivals Hall/ Baggage Claim Area – International.** The international arrivals hall has an area of 290 m^2. The projected 2012 arrivals peak hour is approximately 184 passengers. If 1.6 m^2 (IATA Level of Service C) is allocated to each occupant the required area is 300 m^2 which matches reasonably well with the design.

6.2.19 **Check-in Counters and Layout.** At virtually all domestic airports in the Philippines, the ATO provide dedicated check in counters for each domestic airline. Although most airports have coped reasonably well with this policy since domestic deregulation in 1996, it may not be the most appropriate policy for the future as new entrant airlines fly to an increasing number of destinations and as competition increases.

6.2.20 The concept design allows for the implementation of a common use check-in policy with airlines offices located behind the check-in counters but not connected to the check-in counters. If a common use check-in policy is implemented, it means that airlines wishing to use computer reservation systems will need to move them from their offices to the check-in counters for each flight. This is not usually a problem for single daily flights. With this policy ATO would need to implement a check-in counter allocation system and a charging mechanism (typically time-based). ATO would also need to determine a signage policy for airlines compatible with its own overall terminal signage policy.

6.2.21 For Puerto Princesa Airport, there should be eight domestic check-in counters and four international check-in counters. International and domestic can be operated at the same time. If there are no international operations, the international check in counters could be used for domestic.

6.2.22 There are at least four airline offices to allow for an increased number of airline operators.

6.2.3 Terminal Parking Apron

6.2.23 As summarized in Table 4.5.11-1, the aircraft stand demand forecast requires a mix seven aircraft (ICAO codes 1E, 5C and 1B) by 2020 and at least one additional parking position for layover or stand off aircraft.

6.2.24 The new aircraft parking area has been maximized within the existing land constraints and this allows for the required 7 aircraft.

6.2.25 Stands provided for Layover/ Stand Off aircraft should in principle be near “active stands” in front of the passenger terminal but do not necessarily have to be contiguous to it. If site constraints exist near the “active stands”, they can be located more remotely, but this does impose a higher operational cost and inconvenience to the users.

6.2.26 It should also be remembered that these stands may also be used for any unscheduled aircraft, executive jets, helicopters or other aircraft and so the flexibility for additional stands in addition to those needed for the scheduled aircraft busy hour should not be underestimated.

6.2.27 At this stage of the concept design, a location for the additional Layover/ Stand Off aircraft stand requirement, which will be required in 2020, has not been found. It is recommended to investigate this issue further as part of the updating of the Master Plan in subsequent phases of this project. However, notwithstanding a review of the Master Plan, the following options may be further evaluated for accommodating Layover/Stand Off aircraft stands.

- Re-evaluation of the linear aircraft parking concept with a view to some aircraft being able to park in pier formation to be studied in conjunction with the provision of stands that allow power forward operations and not just requiring push back.
- The use of the existing military apron (to be repositioned outside the strip under the agreement with the AFP) and/or civil apron (to go back to the military) although the fact that the existing aprons are within the new 300m wide strip would need to be considered in terms of compliance with ICAO and operational safety factors.

6.2.4 Airline Cargo Facilities

6.2.28 The cargo terminal area is located to the south west side of the passenger terminal within the terminal area.

6.2.29 Provision for two cargo terminal operations is considered the minimum requirement, one for Philippine Airlines and one for Cebu Pacific.

6.2.30 In terms of facility development, the option remains to develop two buildings or one building with internal partitions to separate lease areas.

6.2.31 The development concept is for DOTC to construct the terminals and for these to be leased out to airlines by ATO. Project cost estimates in this Study allow for 600m2 (or two 300m2) of cargo building.

6.2.5 Aviation Fuel Storage Facilities

6.2.32 An area reservation (only) of 0.5 ha has been made on the airside of the apron service road for the aviation fuel storage facilities.

6.2.33 The total expected jet A-1 fuel storage requirement depends on the reliability of the fuel supply to the airport. For the airport use, only storage for a few days consumption will be required.

6.2.34 It is proposed to store both Jet A-1 fuel and aviation gasoline (AVGAS) for the small aircraft. The refueling will be done by means of bowser trucks. The provision of a fuel hydrant system in the apron is not proposed.

6.2.35 It is noted that the military have their own fuel storage facilities. It an option that the new fuel storage area could be jointly developed between ATO, PAF and a possible refueling operator.

6.2.6 Landside Access Roads

6.2.36 The landside road system will essentially consist of a main access road from the National Highway to a roundabout from where the traffic will be distributed to the passenger terminal building, the cargo building and administrative/operational facilities respectively.

6.2.37 Land has been acquired under the TADP for the access road and is 20 m wide with a direct connection to the National highway. The existing design is for a two lane road but the Project Team recommends a four lane access road and improvement of the intersection at the National Highway. A conceptual design is provided in **Appendix B**.

6.2.38 Based on national standards, a four-lane access road with median strip and sidewalks should be 18.4 meters wide. This will fit within the available 20m right of way (ROW) area but the final design should provide for above ground services (lighting, power, signage poles) on either side of the road and for additional landscaping in the median or on the sides to create a more appropriate entry statement.

6.2.39 The national highway is currently a two lane road with shoulders. According to the Department of Public Works and Highways (DPWH), the road reserve width in the vicinity of the new intersection is 30 m wide (15 m each side of the highway center line) but several structures on the east side of the highway encroach to within 7 - 9 m of the road centerline and various utilities or within the reported ROW areas on both sides of the highway. The estimated width requirement for a five-lane highway (including a turning lane) is at least 22.55 meters.

6.2.40 Although not reflected on the current land acquisition plans, there is also a need for additional "splays" or triangular pieces of land at the intersection to accommodate right turn slots from Puerto Princesa City into the airport and from the airport access road turning right onto the national highway heading north. To clarify any additional row issues, it is recommended that a detailed (1:1,000) base map of the intersection section of the national highway be prepared, including 100 m distance in each direction from the center line of the access road.

6.2.41 It is emphasized that the above roadway design is adequate from a traffic engineering perspective provided that public transport, such as jeepney's and tricycles, do not establish a major pick up/ drop off and waiting area at the intersection of the access road with the national highway. Greater width should be considered in the revised master plan and final design on the access road and National Highway to make a more significant and perhaps more appropriate entry statement to the province and city through the provision of more open space and landscaping.

6.2.42 Secondary roads in the terminal area should meet the DPWH requirements of an 8.0 m ROW; section standard road, with a roadway width of 6.7 m and a ROW width of at least 8.0 m.

6.2.43 A dedicated utilities distribution reservation will parallel most of the main and secondary road system. Typically, the utility corridor will be 5 m wide over and above the road width.

6.3 Development Concept Issues Summary

6.3.1 This section summarizes the major issues associated with the development concept moving forward.

6.3.2 **Terminal Area.** Airports and particularly passenger terminal areas at airports are very dynamic areas. There is a multitude of activities, processes and functions occurring within a confined area. Another significant characteristic of airports is the often unpredictable rate of growth or changes in the nature of the operations. These factors point to the need to ensure flexibility by ensuring additional land areas (both on the landside and airside parts of the terminal area) are available to allow for changes and adjustments to the layout and capacity of facilities.

6.3.3 This point is reinforced by the fact that there is a wide array of assumptions associated with the traffic forecasts (particularly international) and in the planning/design parameters used in sizing and layout of facility requirements.

6.3.4 The land acquired for the new terminal area is the minimum requirement to allow for the construction and operation of the terminal area. This lacks flexibility and does not allow any room to make adjustments either during construction or later in terms of optimizing operations after operations commence.

6.3.5 Just as significantly, it does not allow the ability to quickly expand facilities should growth at Puerto Princesa increase rapidly.

6.3.6 **Aircraft Parking Apron.** In the concept it has not been possible to co-locate the Active and Layover/ Stand Off aircraft stands, which will be needed in 2020, due to land constraints to either side of the aircraft parking apron. Furthermore, these land constraints will impact any future expansion of the apron that may be needed if traffic forecasts exceed expectations or if airlines wish to further concentrate services.

6.3.7 **Terminal Access Road.** The land reserve acquired from the AFP for the new terminal access road is only 20 m wide. More significantly, there has been no increase in the ROW width at the junction with the National Highway to allow for turning slots/ splays. Similarly, there has been no apparent consideration given to widening of the National Highway to cater for any increased traffic along the National Highway or for right turn lanes into the airport access road. The access road requirements should be further assessed during the preparation of engineering designs as well as the revised airport Master Plan in coordination with DPWH.

6.3.8 Any proposed solutions under the Master Plan should consider not only minimal traffic engineering requirements but also additional width to allow for landscaping and signage to create an appropriate entry statement to the airport as the gateway to Palawan. The reported total width of the AFP property along the access road is 30 m, with an additional 10 m strip belonging to the AFP to the north side of the presently acquired 20 m wide strip. It is recommended that the DOTC formally request from the AFP if this additional 10 m strip could be transferred to the DOTC for use as an expanded access road ROW. If the AFP grants this request, it is further recommended that during detailed design, the centerline of the access road, be adjusted (shifted 5 m to the north) to match the new centerline of the expanded 30 m wide ROW.

6.3.9 This proposed “shift” of the access road during detailed designs to match a wider ROW is also expected to result in an improved intersection configuration with respect to the existing access road to the former Asia World Hotel. In the absence of such an access road shift, the relocation of the Asia World access road will need to be evaluated during the detailed design stage.

6.4 Updating of Master Plan

6.4.1 As noted in Section 5, the development concept under this Study is based on the previous Master Plan and Concept prepared under the TADP.

6.4.2 It is noted, however, that the Master Plan of August 2000 was modified with an addendum issued in April 2001. The most significant change was the shift in the passenger terminal area from the midpoint of the runway on the northern side, to the western end of the runway on the northern side. This would appear to be as a result of meeting the requirements of the PAF/ AFP.

6.4.3 Perhaps as a result of this late change to the Master Plan, there exists some limitations associated with the development concept and some lack of development flexibility. Most notably, issues connected with the airport access road and the intersection with the national highway and the lack of expansion capability for the aircraft parking apron, as discussed in Section 6.3.

6.4.4 The land areas acquired for the terminal area are generally adequate for the immediate development project although there is really insufficient area to allow for adjustments to the concept once operations begin and to cater for the rapid increase in aircraft parking stands if the demand for aircraft stands exceeds forecasts.

6.4.5 As a general planning principle, it is imperative that a growing airport has the capacity to easily add additional aircraft parking stands between major redevelopment phases. This ensures growth can occur in an unconstrained and timely manner. Given also that there is no other aircraft parking area under the control of ATO and that the existing passenger terminal and aircraft parking area reverts to the control of the military, the capability to easily add extra aircraft parking stands is even more imperative.

6.4.6 An update of the Master Plan is recommended and budgeted for in the proposed ITDP loan project, including an update of the PAF/ AFP Master Plan for their facilities which will be immediately adjacent the new civil facilities unlike previous arrangements when the civil facilities were on the southern side of the runway. The compatibility of both the DOTC/ ATO and AFP/ PAF plans is critical to the future success of the airport.

6.4.7 An update of the Master Plan would clarify the best direction (east and/ or west) for the next and subsequent phases of expansion for facilities and this would therefore clarify the need and location for additional land acquisition requirements. As land may require extensive periods of time to acquire, the early identification of total land requirements can be beneficial if processes with the AFP/ PAF and other parties can be started sooner. It would also enable the AFP/ PAF to develop there facilities with added confidence.

6.5 Summary of Project Scope

6.5.1 In line with the development concept described in Chapter 6.2 above, a summary of the proposed scope of the works for Puerto Princesa Airport that is envisioned under this Study vis-à-vis those as identified under the previous TADP and SPADP studies is presented in **Table 6.5-1**. The scope of the works enumerated for the two (2) previous studies were culled from available documents obtained from the DOTC and the Project Implementation Unit (PIU) of the TADP.

Table 6.5-1: Comparison of Project Scope

TADP	SPADP[1]	ITDP
Airside Facilities and Works		
• Runway strip widening and grading works • New runway shoulders, turning eave at runway end 27 and blast pads at both ends • Apron, military apron, taxiways, maneuvering area, and shoulders • Airside roads (Rescue and Firefighting (R&FF), service and maintenance roads) • Existing runway overlay, grooving, cracking and seating • Demolition and removal works	• Runway strip widening and grading works • New runway shoulders, turning eave at runway end 27 and blast pads at both ends • Apron, military apron, taxiways, maneuvering area, and shoulders • Airside roads (R&FF, service and maintenance roads) • Repair of cracks and joints on the existing runway pavement • Demolition and removal works	• Runway strip widening and grading works • New runway shoulders, turning eave at runway end 27 and blast pads at both ends • Apron, military apron, taxiways, maneuvering area, and shoulders • Airside roads (R&FF, service and maintenance roads) • Existing runway overlay, grooving, cracking and seating • Demolition and removal works
Landside Facilities and Works		
• New passenger terminal building (7,500 sq.m.) • New cargo terminal building (650 sq.m.) • Other new buildings (Administration and operations; R&FF; Airport Maintenance/ Emergency generator; Sewerage treatment plant; Chiller; Pump house; Control Tower; AGL Substation • New landside roads, security fence and parking facilities • Drainage (Runway, road apron, parking)	• New passenger terminal building (5,320 sq.m.) • New cargo terminal building (312 sq.m.) • Other new buildings (Administration and operations; R&FF; Airport Maintenance/ Emergency generator; Sewerage treatment plant; Chiller; Pump house; Control Tower; AGL Substation • New landside roads, security fence and parking facilities • Drainage (Runway, road apron, parking)	• New passenger terminal building (7,500 sq.m.) • New cargo terminal building (650 sq.m.) • Other new buildings (Administration and operations; R&FF; Airport Maintenance/ Emergency generator; Sewerage treatment plant; Chiller; Pump house; Control Tower; AGL Substation • New landside roads, security fence and parking facilities • Drainage (Runway, road apron, parking)

[1] The upgrading and expansion of the Puerto Princesa Airport under the SPADP study was proposed to be carried out in three (3) phases. The first phase development was to be implemented in 2007 and subsequent investments are to be made in 2015 and 2022. The scope of the works under the SPADP as presented in the table refers to the first phase development works only.

Table 6.5-1: Comparison of Project Scope (Continuation)

Equipment		
• Navigational Aids (DME; DVOR; Remote Control; Power Supply; and Instrument Landing System (ILS)) • ATC & Communications (VHF system; Voice switch control system; recording equipment, HF communication and UPS. • Airfield Ground Lighting (Category I approach lighting for RWY 27; simple approach lighting system for RWY 09; 300 m. displaced threshold; Runway edge lights; High intensity runway end lighting; High intensity runway threshold lighting; High intensity runway threshold identification lights for RWY 09; Medium intensity taxiway edge lighting; Apron flood lighting; Obstacle lighting; Illuminated wind cones; Aerodrome beacon) • Airfield Maintenance (Tractor; Grass mower; Utility vehicle) • Crash, Fires and Rescue (Rescue and fire fighting vehicles; Inflatable rescue boat)	• Navigational Aids (Option for radio navigation including a DVOR/DME, and ILS Category I for landing on Runway 27) • ATC & Communications (VHF system; Voice switch control system; recording equipment, HF communication and UPS. • Airfield Ground Lighting (Category I approach lighting for RWY 27; simple approach lighting system for RWY 09; 300 m. displaced threshold; Runway edge lights; High intensity runway end lighting; High intensity runway threshold lighting; High intensity runway threshold identification lights for RWY 09; Medium intensity taxiway edge lighting; Apron flood lighting; Obstacle lighting; Illuminated wind cones) • Airfield Maintenance (Tractor; Grass mower; Utility vehicle) • Crash, Fires and Rescue (Rescue and fire fighting vehicles; Inflatable rescue boat)	• Navigational Aids (DME; DVOR; Remote Control; Power Supply; and Instrument Landing System[2] (ILS)) • ATC & Communications (VHF system; Voice switch control system; recording equipment, HF communication and UPS. • Airfield Ground Lighting (Category I approach lighting for RWY 27; simple approach lighting system for RWY 09; 300 m. displaced threshold; Runway edge lights; High intensity runway end lighting; High intensity runway threshold lighting; High intensity runway threshold identification lights for RWY 09; Medium intensity taxiway edge lighting; Apron flood lighting; Obstacle lighting; Illuminated wind cones; Aerodrome beacon) • Airfield Maintenance (Tractor; Grass mower; Utility vehicle) • Crash, Fires and Rescue (Rescue and fire fighting vehicles; Inflatable rescue boat)

[2] One-way ILS system is suitable with current one runway approach considering a range of mountains at a distance of some 12 to 15 km (Stanley Hills and Thumb Hills) with elevations ranging from 800 m to over 1200 m, which prohibit straight-in approaches from the west.

6.5.1 Intermodal Components

6.5.2 The potential to improve intermodal components of the project were investigated and the most appropriate scope for incorporating or upgrading intermodality is summarized as follows:

- Road Signage from city and outside areas to the airport. This would need to be coordinated with DPWH and the city government.
- Development of a Traffic Management Plan controlling access of various modes of transport to the airport and airport vehicle parking and kerbside areas. A key objective of this plan would be to ensure the "convenient" movement of people and baggage from land based vehicles (including public transport modes) to the terminal frontage. This objective would need to be at the forefront of the Plan while still managing security issues and other traffic engineering principles. Solutions could include attention to:
  - Designated parking areas and drop off/pick up zones.
  - Ensuring pavements/footways between the terminal kerbside and vehicle parking areas are "friendly" to the use of trolleys, with consideration also given to the location of trolley storage areas.
  - Construction of covered walkways.
  - Adequate signage.
- Development of a high capacity intersection at the junction of the airport access road and the national highway and the limitation of accessibility to the national highway from adjacent land use in the vicinity of the intersection.

6.5.3 Consideration was given to the development of truck docks for cargo at cargo terminals but this did not seem to be a priority.

6.5.4 Budgets exist within the cost plan for implementing the various intermodal project components.

6.6 Future Project Phasing (Outside the ITDP)

6.6.1 The project as described in this Study represents the first phase implementation of the Master Plan. The capacity of this first phase is further discussed in Section 6.5. Subsequent development phases will include:

- Extensions to the passenger terminal building including the development of an upper level departure lounge and the connection of aerobridges;
- Expansion of the aircraft parking apron to the east and/or west;
- Expansion of landside vehicle parking areas, administration and other facilities;
- Expansion of cargo terminals and the potential development of additional terminals;
- Expansion of the parallel taxiway system;
- Addition of a second ILS for runway 09;

- Potential development of a fuel farm and perhaps even small catering and other support facilities; and
- Expansion of the landside access road and intersection with the national highway;

6.6.2 It should be noted that subsequent development phases will require additional land and further negotiations with the AFP. It is therefore recommended to update the Master Plan to clearly define future requirements and potentially initiate processes to ensure the timely implementation of subsequent redevelopment phases.

6.7 Airport Capacity Estimate

6.7.1 An airport is a system of components that function together. From a capacity and operational perspective these components are usually divided into two areas, landside and airside. The landside component is sometimes subdivided into passenger terminal area and access road/ carpark/ kerbside areas. The effective use of capital should ensure that these components are in balance from a capacity perspective.

6.7.2 For Puerto Princesa Airport, the critical capacity component for both the "With Project" and Without Project" scenarios are considered to be the passenger terminal.

6.7.1 With Project

6.7.3 The project essentially delivers additional passenger terminal and aircraft parking capacity. The widening of the runway shoulders will permit the use of large four engine aircraft.

6.7.4 The passenger terminal includes dedicated international passenger processing facilities. Other aspects of the project also improve capacity, such as with additional cargo terminals, additional taxiways but these are less critical components. Other project components address maintenance and improve operational efficiency, safety and/or security.

6.7.5 **Domestic Operation.** The dedicated domestic departure lounge is approximately 825 m2. If maximum capacity is based on IATA Level of Service "E", which is a very low level of service, approximately 1.6 m2 can be allocated to one person. This provides a capacity of 515 people.

6.7.6 The design allows for the international portion of the departure lounge to be used for domestic when not in use. However, since it is assumed that international and domestic will be concurrent in the peak hour, the international portion is not included.

6.7.7 The new baggage reclaim hall is 465m2. Based on IATA Level of Service "E", which is a very low level of service, approximately 1.2 m2 can be allocated to one person. This provides a capacity of 385 people.

6.7.8 Based on the forecast arrival peak hour demand, this should provide a design life through to approximately 2020, although beyond that date for departures.

6.7.9 **International Operation.** There are no schedules available to conduct an international busy hour analysis as noted in Section 4.6.

6.7.10 However, assuming one PAL A330 operation in the peak hour and a load factor of 70%, there would be a peak passenger load of 184.

6.7.11 The departures area is 383 m2. At a level of Service "C", the capacity would be 192 passengers and at a Level of Service of "E", the capacity would be 240 passengers. In other words, on commissioning (target Level of Service "C"), the size of the international departure lounge allows for a single A330 operation on departure, but would be under pressure if there were any concurrent international operations on departure. This is not expected prior to 2020, but this forecast is built on a set of assumptions which could easily vary once regular international operations commence (refer Section 4.5.13).

6.7.2 Without Project

6.7.12 Without the project, it is assumed that there will be limited constrained growth within the existing airport facilities. It is assumed there will be no introduction of regular international services.

6.7.13 The existing departure lounge is approximately 460 m2. Based on IATA Level of Service "E", which is a very low level of service, approximately 1.6 m2 can be allocated to one person. This provides a capacity of 288 people.

6.7.14 The existing baggage reclaim hall is 125m2. Based on IATA Level of Service "E", which is a very low level of service, approximately 1.2 m2 can be allocated to one person. This provides a capacity of 104 people.

6.7.15 As discussed in Section 4.5, the existing departures busy hour is 315 people and the arrivals busy hour is 280 people.

6.7.16 On this basis, at peak times, the airport is already running over capacity and in need of expansion.

6.7.17 Recent site inspections confirm this point in that the passenger terminal is highly congested and uncomfortable at peak times. People have to stand in the departures lounges and people find difficulty in getting near the baggage reclaim belt on arrival and need to stand away.

SECTION 7

Environmental Impact Appraisal

7 ENVIRONMENTAL IMPACT APPRAISAL

7.1 Environmental Categorization

7.1.1 Department of Environment & Natural Resources System of Categorization

7.1.1 The Philippine Environmental Impact Statement (EIS) system is mandated by Presidential Decree No. 1586 (1978). DENR's Administrative Order No. 30 establishes quantitative thresholds for project categorization. The EIS system is based on a four-level categorization of projects:

- Category A – environmentally critical projects (ECPs) with significant potential to cause adverse environmental impacts. ECPs include projects in the heavy or resource extractive industries as well as some infrastructure projects and golf course projects;
- Category B – projects that are not environmentally critical in nature, but which may cause negative effects because they are located in environmentally critical areas (ECAs);
- Category C – projects intended to enhance environmental quality or address existing environmental problems; and
- Category D – projects that were operational prior to 1982, projects not falling under other categories OR projects unlikely to cause adverse environmental impacts.

7.1.2 Under Administrative Order No. 42, all projects categorized as A or B require the issuance of an 'environmental compliance certificate' (ECC) prior to implementation while Category C and D projects require the issuance of certificate of non-coverage (CNC).

7.1.2 Asian Development Bank System of Categorization

7.1.3 The ADB has a threefold categorization based on generic "locational" characteristics and magnitude of impacts of projects:

- Category A – projects with likely significant adverse impacts that are located in or near sensitive environments; cultural heritage sites; densely populated areas; regions subject to heavy development or create conflicts with natural resource allocation; and lands or waters containing valuable resources;
- Category B – projects that will have impacts on environmentally important areas or people that are less adverse than Category A and mitigation measures can be designed more easily than for Category A projects. Category B deemed environmentally sensitive are subject to the same disclosure requirements as Category A projects; and
- Category C – projects that are likely to have minimal or no adverse environmental impacts. Category C projects need to be reviewed for identification of mitigation measures that can be incorporated directly into project design or could be subject to an environmental management plan.

7.1.4 It should be noted that, if a project with many components or subprojects has one component that is categorized as A, the entire project becomes a Category A project and an Environment Impact Assessment (EIA) must be prepared, full disclosure of which is required at least 120 days before ADB Board consideration. If a subproject will result in significant resettlement, this will mean the project is treated as a 'Category B Sensitive' project and is also subject to the disclosure requirements.

7.1.3 Recommended Categorization of ITDP

7.1.5 For both DENR and ADB systems of environmental assessment, the environmental category is determined according to the likelihood and magnitude of risk associated with a project (and subprojects) either being located in an ECA, and/or posing potentially significant adverse environmental impacts when implemented without mitigation.

7.1.6 The overall risks associated with ITDP are considered low because the project does not include any new development, rather it is focused on improving and rehabilitating existing facilities.

7.1.7 Activities envisaged by the ITDP for airport improvements include construction of new, or extension of existing, access roads to existing airports, extension of airport runways, widening of aprons, passenger terminal expansions, and provision of safety facilities.

7.1.8 The initial screening process determined that all the short-listed subprojects fall under Category B for both DENR and ADB classifications. These subprojects are not located in ECAs but are anticipated to create a range of potentially adverse environmental impacts when implemented without mitigation. Therefore, the recommendation is that the ITDP can have an overall environmental categorization of Category B.

7.1.4 Summary of DENR & ADB Procedural Requirements and Safeguards

7.1.9 According to DENR's Administrative Orders, the level of environmental assessment and documentation should be appropriate for the environmental category to which a proposed subproject is assigned. ADB's reporting process is very similar to that required by DENR with a difference in terminology, rather than document content.

7.1.10 There are no Category A subprojects to be included under ITDP. Category B projects require either an Initial Environmental Examination (IEE) or EIS/ EIA - depending on the scale of works proposed - and a short resettlement plan. The level of environmental analysis and reporting differs for major improvement projects vis-à-vis minor airport improvement projects, as shown in the **Table 7.1.4-1**.

7.1.11 DENR and ADB environmental procedures prescribe preparation of an EIS/IEE for Category B subprojects and submission of an EIS/IEE Report to the Regional DENR-Environment Management Bureau (EMB) Office in the subproject area for review and approval of issuance of an ECC. This process clears the subproject for implementation.

7.1.12 EIS Preparation & Submission for Puerto Princesa Airport Subproject. The Puerto Princesa Airport subproject is one of the four short-listed subprojects with existing ECCs issued by the Regional DENR-EMB offices concerned.

Table 7.1.4-1: Environmental Analysis & Reporting Requirements for Airport Projects

Project	Components/Activities	Analysis & Reporting Required
Airports	New projects, major improvements (> 50 % extension or widening of runway)	EIS
	Minor improvements (< 50 % extension or widening of runway) or private airstrip	IEE

Source: DENR's Procedural Manual for Administrative Order No. 30 (2003)

7.1.13 The airport subproject has a currently valid ECC which was issued based on an approved EIS report prepared and submitted by DOTC as part of the feasibility study conducted for the earlier SADP/ TADP funded by ADB.

7.1.14 The ECC for Puerto Princesa Airport subproject was issued on 13 February 2004 and is effective for five years from issuance date. The ECC includes a number of conditions for compliance by the implementing agency. A "due diligence" review of the status of compliance by the project proponent has been made to assess whether the ECC conditions have been, are being, or can be, met by the implementing agency (refer to Section 7.5).

7.1.15 The ECC will expire before the project reaches the likely construction starting timeframe of August 2009, therefore application for an extension of ECC validity will need to conform to the prescribed procedural guidelines of DENR's Administrative Order No. 2003-30.

7.1.16 **Process for Puerto Princesa Airport EIS Review and Approval.** The EIS for Puerto Princesa Airport improvements was reviewed and approved by DENR prior to the issuance of the ECC, following the process prescribed in Department Administrative Order (DAO) 2003-30. As noted above, the Regional EMB Director has granted the issuance of an ECC.

7.1.17 The ADB Environment Specialist to the project has confirmed that an overall project Summary IEE (SIEE) will be required. The SIEE has been prepared according to prescribed ADB content outline and reporting format, the SIEE includes a summary of the main relevant elements of the Puerto Princesa Airport EIS and the review of ECC compliance, along with recommendations.

7.1.18 The SIEE will be submitted to ADB for review and approval, and this will include review and sign-off by the Environment Specialist for the ITDP as well as the safeguards division (RSES). During the review period, the project proponent and the PPTA consultant will be available to respond to any review comments or request for additional information by ADB.

7.2 Puerto Princesa Airport EIS Report Components

7.2.1 Summary of EIS Process Applied in Accordance with Requirements

7.2.1 The EIS study for the Puerto Princesa Airport subproject closely followed the procedural guidelines prescribed by DAO 96-37 of DENR. Primary and secondary data was gathered complying with a set of studies that were agreed upon at a scoping meeting held at DENR-EMB office in Quezon City (07 February 2001). A Project Description was submitted to DENR-EMB, and the scope and criteria for the study and subsequent EIS report were agreed at this meeting.

7.2.2 The agreed upon scope for procedural compliance of the EIS included topics on meteorology, air quality, water quality, terrestrial ecology, geology, socio-economic studies and social acceptability. The minutes of the technical scoping meeting and the attendance sheet are included as an appendix to the EIS.

7.2.3 The characterization of baseline conditions is in accordance with the criteria and methods prescribed by the DENR's AOs and guidelines.

7.2.4 This was followed by collation of secondary data covering geology, meteorology, hydrology and socio-economic aspects of the subproject site obtained from government, private and academic institutions. The full list of information sources used for compilation of the EIS is provided in the References section of the EIS report. Already published secondary data was supplemented by data gathered from Barangay Health Centers, and Municipal Planning and Health Offices.

7.2.5 A second scoping meeting and public consultation was conducted (held at VJ Rodriguez Multi-Purpose Hall of the Provincial Capitol, 23 February 2001). This consultation was the first forum for DOTC and its consultants to present the proposed development stakeholders (representatives from the affected barangays), local government officials of Puerto Princesa, and other concerned individuals and agencies. DOTC and its consultants also responded to various questions and requests for clarifications on the project components. The issues and concerns raised during the meeting were summarized and presented as the Scoping Report (included as an appendix to the EIS).

7.2.6 Community meetings were also held in the two affected barangays in Bancao-Bancao on 08 March 2001 and San Miguel on 09 March 2001. The meetings were attended by affected families, barangay captains and officials, church pastors and representatives from religious groups, people's organizations, as well as other interested residents.

7.2.7 Following the second meeting, scoping teams undertook primary data gathering on the physical environmental, terrestrial, and socio-economic parameters of the project site and affected communities in order to establish the existing baseline environmental conditions. This included a perception survey conducted during March 2001 which surveyed a sample of the affected population to gauge the public's level of awareness and acceptance of the proposed subproject. From this primary data, the potential impact of the project on the physical, biological and socio-economic aspects of the environment was assessed and corresponding mitigation and enhancement measures drawn.

7.2.8 As part of the procedural requirement for the EIS study, an *Engineering, Geological & Geo-hazard Assessment Report (EGGAR)* was prepared and submitted to the Mines and Geosciences Bureau Region IV for review and evaluation. The report is also attached as an appendix to the EIS.

7.2.9 The potential impacts of the project on land, water, air and communities were identified, predicted and assessed in terms of their negative or positive effects, significance and severity. Based on the impact assessment and prediction, mitigating and enhancement measures were recommended and the corresponding environmental management and monitoring plans were prepared.

7.2.2 Summary Outline and Description of the EIS Report

7.2.10 The EIS prepared for Puerto Princesa Airport was prepared in January 2002 and contains the following:

- Executive summary – summarizing the project components and anticipated effects, process for EIS preparation, overall assessment approach and results, and requirements for compliance;
- Project description – including a brief description of the project and development phases, and an analysis of alternatives including the “do nothing” option;
- Baseline environmental conditions – describing the existing status of the physical (geology, meteorology and climate, airy quality, noise, and water quality), biological (flora and fauna), and social (demography and socio-economic profile) environments;
- Impact assessment and mitigating measures – sets out the analysis of the impacts for both construction and operation phases of the development and proposed mitigation measures for negative environmental effects;
- Environmental management plan (EMP) – provides the management plan for the construction and operation phases of the subproject for the various environmental components, including worker’s health and safety and employment aspects;
- Social development plan – contained the resettlement plan and how rehabilitation assistance would be managed, it included an economic assistance program and procedures for strengthening community relations (consultation plan);
- Contingency emergency response plan – prepared for each phase of subproject development in the event of emergency or disaster. This plan sets out the responsibilities and tasks of emergency tem members and coordinators, response procedures, evacuation routes, and reporting systems;
- Environmental monitoring plan – establishing the parameters and requirements for monitoring the subproject implementation and operation focusing on air quality, noise levels, water quality, and solid and liquid waste;
- Institutional plan – sets out the responsibilities for implementation of the subproject, including compliance with EMP and monitoring plan, and a health and safety program;

- Information and education campaign – includes the communication plan for the subproject, it identifies responsibilities for dissemination of information to the public, methods and avenues for dissemination, and the timeframe; and
- References and appendices - all information sources, people consulted, ancillary reports.

7.3 Summary of Finding of Puerto Princesa Airport EIS

7.3.1 Summary of Key Environmental Impact Concerns

7.3.1 The EIS concluded that the majority of adverse impacts on the physical, biological and social environment will be incurred during the construction phase. The construction phase effects are considered to be of low to medium adverse impact and are able to be mitigated, as shown in the table below. The EIS also concluded that there are a number of impacts that will be caused as a result of subproject operation, all of which are already being experienced because the airport is an existing facility and would also be experienced in a "without project" case. The main effects include air quality, noise, water quality, and impacts on the community.

7.3.2 A Gaussian plume model was used to determine the effects on air quality as a result of the access road and expansions of the runway at several downwind measuring points. The results showed that for all emissions tested – CO, HC, NOx, SOx and PM - concentrations fell within the prescribed DENR standards. The operational impact on air quality was therefore considered to be extremely small.

7.3.3 The EIS provided data showing the increase in noise impacts on the area surrounding the airport for the 2010 and Master Plan cases compared with the 2000 case. The 2010 modelling determined that the 65 dB LDN would increase from a lateral distance of 576 m to 594 m and from a longitudinal distance of 2,823 m to 2,944 m thus enclosing an area of 671 ha, compared with 638 ha in 2000. The impact area would increase to 822 ha in the Master Plan. The existing airport has been operating with minimal noise annoyance complaints from residents within the impact zone (65 dB LDN). It should be noted that the impact of noise was not raised as an issue during the scoping or consultation meetings and noise pollution was stated to be a negative effect by only one per cent of the participants in the perception survey, making it the lowest ranked impact identified.

7.3.4 The impact on water quality as a result of the proposed changes in layout and arrangements is negligible. The new apron will be equipped with a separate system for collection of oil or fuel spilled on the runway which will be separated from water before it is discharged to the main drainage system. Mitigation measures are proposed in the EMP to avoid and minimize emissions to adjacent watercourses.

7.3.5 Land acquisition is considered the most significant effect on the community. This will be undertaken in strict accordance with the Land Acquisition and Resettlement Plan (LARP) to ensure that affected households are not left worse off as a result of project implementation.

7.3.6 For some environmental components the proposed improvements to airport operations will increase the level of these impacts. Mitigation measures have been identified for these impacts, but some depend on the cooperation of other agencies, such as municipal authorities in the case of noise and land use planning. A summary of the impacts is provided in **Table 7.3.1-1**.

Table 7.3.1-1: Summary of Environmental Impacts

Impacts	Magnitude, time-scale & geographic extent of impact	Mitigation & Enhancement Measures
Construction Phase		
Impacts on the geology and topography; increase in soil erosion and change in relief	Insignificant negative, temporary – project site	Diversion of surface run-off flow from exposed soil areas; Construction of soil retaining wall, berm, or temporary interceptor trenches; Provision of secondary containment and lining of fuel/oil storage areas; and Undertake appropriate geotechnical engineering tests
Impacts on air quality; possible generation of TSP and increase in ambient concentration of NO_2, SO_2 and CO due to emission from construction equipment	Insignificant negative, temporary – project impact area	Water sprinkling of dust generating areas; Cover construction materials with tarpaulin during delivery and storage; and Proper maintenance of construction equipment
Impacts on noise level	Insignificant negative, temporary – project impact area	Maximize daytime period for construction and utilization of excessive noise-producing construction equipment; Night operations noise to be kept within permissible levels; Provision of ear mufflers for workers exposed to excessive noise; and Proper maintenance of equipment
Impact on water quality; increase in dissolved and suspended solids (TSS)	Insignificant negative, temporary – project site	Installation of proper drainage, silt traps, etc.
Sanitary wastewater generation	Insignificant negative, temporary– project site	Provision for sufficient number of proper toilets in the workers' area
Impact on terrestrial ecology	Insignificant negative, temporary – project site	Landscaping and re-vegetation

Table 7.3.1-1: Summary of Environmental Impacts

Impacts	Magnitude, time-scale & geographic extent of impact	Mitigation & Enhancement Measures
Generation of construction wastes	Insignificant negative, temporary – project site	Encourage recycling of materials, i.e., use of excess soil as filing materials; Daily collection and delivery of debris to dumpsite; and Establish and enforce solid waste management system
Change in land use	None	No mitigation/enhancement required
Displacement of affected residents/properties	Significant negative, long-term – local level	Strict implementation of resettlement and compensation plans based on proponents Land Acquisition and Resettlement (LARP)
Increase in job business opportunities	Significant positive, short-term - local level	Preference for hiring workers be given to qualified workers within the project site Patronize local goods and services
Additional income and benefits to the local government	Significant positive, short-term - local level	Increased taxes for the local government
Increase of migrants	Insignificant negative, temporary – local level	Hiring of existing residents first; Hiring of qualified local workers on contract basis for airport project only;
Impact on health and safety	Insignificant negative, temporary – project site	Require workers to use safety equipment; Implementation of health and safety program for workers
Traffic	Insignificant negative, temporary - project site	Traffic enforcement within construction area;
Deterioration of visual or aesthetic quality	None beyond project site	Immediate disposal of excavated materials; Good working layout and cleanliness during construction and operational phases

Table 7.3.1-1: Summary of Environmental Impacts

Impacts	Magnitude, time-scale & geographic extent of impact	Mitigation & Enhancement Measures
Operational Phase		
Increase in air emissions	Insignificant negative, long-term, manageable – local level	Proper maintenance of equipment used in operation; Strict implementation of traffic management
Traffic	Insignificant negative, long-term, manageable – local level	Installation of traffic signage and markers; Proper scheduling and provision of parking/waiting areas for vehicles; Implementation of traffic management plan in coordination with City traffic planning
Increase in noise level	**Insignificant negative**, long-term, manageable – local level	Request for zoning ordinance that would prohibit building of new houses and other noise sensitive facilities beyond the 65 dB contour line and construction of any new structures to be in accordance with ATO's regulations (incl. height restrictions in flight paths); Enforcement by ATO of aircraft noise abatement procedures (reduced thrust conditions on take-off and flaps setting on landing) and aircraft operating restrictions (no night operation and redesigned flight paths avoiding noise sensitive uses)
Generation of additional wastewater effluent	Insignificant negative, long-term, manageable – project site	Construction of centralized sewerage treatment plant
Generation of solid wastes	Insignificant negative, long-term, manageable – project site	Proper collection and disposal of solid wastes; Adherence to the methods of reducing waste generation
Improved airport utilities and facilities	Significant positive, long-term – local and regional site	Device regulations and programs that will further improve and streamline airport services; Proper maintenance of airport facilities to improve services

Table 7.3.1-1: Summary of Environmental Impacts

Impacts	Magnitude, time-scale & geographic extent of impact	Mitigation & Enhancement Measures
Increase in economic activities incl. additional income and benefits to local government	Significant positive, long-term – local and regional site	More jobs and livelihood activities Improve and accessibility of services
Increased commercial activities	Significant positive, long-term – local and regional site	More jobs and business in the area Improvement of transportation services shall encourage mobility and improve tourism and other related economic activities Develop tourism industry through development of other support services

7.3.2 Summary of Recommended EMP, Mitigation & Monitoring Measures

7.3.7 The EIS concluded that the environmental effects, as summarized above, can be mitigated and prepared an EMP identifying the actions required and their costs. A summary of the EMP included in the EIS is provided below.

7.3.8 Of the thirteen impacts requiring mitigation, the EIS estimated a cost, over and above the project development cost or costs already included in ongoing programs or activities of government agencies, for nine of the items. The total cost of mitigation as set out in the EMP was estimated as PhP 380,000.

7.3.9 An overall cost for monitoring of PhP 420,000/year was established as the minimum requirement in the EIS. This includes air quality, noise, and water quality during monitoring both the construction and operational phases.

7.3.10 A summary of the EMP is included as **Table 7.2.3-1**.

7.3.3 Summary of Conditions of Environmental Compliance Certificate

7.3.11 The conditions for the three airport subprojects are very similar and include the following items:

- Compliance with the EMP mitigation measures including noise, drainage, waste/sewage treatment and management, spoil handling and storage, traffic management, shore protection, silt and erosion control, and implementation of a safety and risk management plan;

Table 7.3.3-1: Summary Environmental Management Plan

Impacts	Mitigation/Enhancement Measures	Method of Implementation	Schedule and Frequency of Implementation	Responsible Party	Cost of mitigation or enhancement	Guarantee
CONSTRUCTION PHASE						
Generation of excessive particulate matter	Regular sprinkling of bare earth surfaces; Project cover to construction materials during delivery and storage; Excavated soil must be stockpiled to avoid particulate airborne; Proper maintenance of equipment	Provide water for spraying dust-generating areas Regular checking of equipment	Throughout construction phase	DOTC and Contractor	PhP 20,000.00	Compliance with ECC conditions
Increase in TSS/turbidity of surface water	Construction of temporary sediment traps and temporary drainage and diversion canals	Design and construct silt fences and traps	Throughout construction phase	DOTC and Contractor	PhP 80,000.00	Compliance with ECC Conditions
Noise level concentration	Maximize daytime period for construction and utilization of excessive noise-producing construction equipment; Night operations noise to be kept within permissible levels; Provision of ear mufflers for workers exposed to excessive noise; Proper maintenance of equipment	Inspection and regular maintenance of equipment		DOTC and Contractor	PhP 60,000.00	Compliance with ECC Conditions
Sanitary waste generation	Provision of portable toilets for workers at the construction site	Procure and install portable toilets	Throughout construction phase	DOTC and Contractor	PhP 50,000.00	Compliance with ECC Conditions

Impacts	Mitigation/Enhancement Measures	Method of Implementation	Schedule and Frequency of Implementation	Responsible Party	Cost of mitigation or enhancement	Guarantee
Impacts on terrestrial ecology	Landscaping and re-vegetation	Landscaping and re-vegetation	Post-construction	DOTC and Contractor	PhP 10,000.00	Compliance with ECC Conditions
Increase in waste generation	Collection and delivery of debris to dumpsite; Establish and enforce solid waste management system	Design and implement waste management plan that adheres to proper guideline	Pre-construction to construction phase	DOTC and Contractor	PhP 50,000.00	Compliance with ECC conditions
Impact on health and safety	Require workers to use personal protective safety equipment; Implementation of health and safety program for workers Availability of first aid and medical attention in cases of accident or emergency	Personnel inspection, Design and provide guidelines on health and safety	Throughout construction phase	DOTC and Contractor	PhP 50, 000.00	Compliance with ECC conditions
Land acquisition	Implementation of LARP; Strict compliance with compensation and rehabilitation measures as set out in Framework and LARP	Compliance with Framework and LARP; Monitoring	Before and during the project implementation	DOTC, Coordinating Committee	Included in the project cost	Compliance with ECC conditions and LARP
Traffic	Strict traffic enforcement within the construction area; Systematic scheduling of delivery of construction materials; Provision for traffic construction signs	Provide and implement traffic rules and regulations	Throughout construction phase	DOTC and Contractor	PhP 20,000.00	Compliance with ECC conditions

Impacts	Mitigation/Enhancement Measures	Method of Implementation	Schedule and Frequency of Implementation	Responsible Party	Cost of mitigation or enhancement	Guarantee
Increase in livelihoods & employment opportunities	Priority hiring of local residents, esp. qualified workers; Include construction phase employment as part of LARP rehabilitation measures Implementation of Social Development Plan	Compliance with LARP	Throughout construction phase	DOTC, LGU, Contractor and Coordinating Committee	Included in DOTC/LGU program or included in Contractor's scope of work	Compliance with ECC conditions
OPERATION PHASE						
Air emissions	Proper maintenance of equipment used in operation; Strict implementation of traffic management; Coverage of cargoes during deliveries; Promote Clean Air Act provisions	Coordinate with the local government agencies to facilitate the implementation	Operational phase	DOTC and LGU	Part of project cost	MOA with local government
Increase in noise level	Request for zoning ordinance that would prohibit building of new houses and other noise sensitive facilities beyond the 65 dB contour line and construction of any new structures to be in accordance with ATO's regulations; Assist the local government to apply for a land use conversion of the Master Plan impact area into an industrial area to conform with US FAA noise standards	Coordinate with the local government agencies to facilitate the implementation	Operational phase	DOTC and LGU	Part of project cost	MOA with local government

Impacts	Mitigation/Enhancement Measures	Method of Implementation	Schedule and Frequency of Implementation	Responsible Party	Cost of mitigation or enhancement	Guarantee
Solid waste generation	Regular collection/disposal of waste; Adoption of waste recycling and minimization program	Periodic inspection of disposal site and amount of waste to be disposed	Operational Phase	DOTC and LGU	PhP 40,000.00	MOA with local government
Generation of liquid domestic waste	Construction of centralized wastewater treatment facility that shall treat domestic wastes prior to discharge	Incorporate as part of the engineering design	Operational Phase	DOTC and LGU	Part of development cost	Engineering design/Compliance to ECC conditions
Benefits to local economy incl. increase in local revenue	None required	None required	Operational Phase	DOTC and LGU	None	None

- Memorandum of Agreement between proponent and landowners regarding land acquisition and resettlement, to be approved by EMB prior to any relocation. Livelihood development projects be implemented for all relocating households;

- Preparation and implementation of an information and education campaign on environmental issues and matters related to project construction and operation;

- Establishment of an Environmental Unit (EU) within the proponent/implementing agency, responsible for environmental management and monitoring;

- Specific monitoring requirements including submission of an updated EMP with revisions of necessary, post-assessment permits are secured, compliance audits prepared every two years, and conducting detailed studies (noise and air quality) annually for the first five years;

- Establishment of an Environmental Monitoring Fund and an Environmental Guarantee Fund; and

- Establishment of a Multipartite Monitoring Team for external monitoring and to oversee compliance.

7.3.12 A copy of the ECC is attached as **Appendix C**.

7.4 Due Diligence Review of Proposed Investment

7.4.1 Purpose of Due Diligence Review

7.4.1 The main objectives of the due diligence review are:

- To determine whether there are any substantial or significant design modifications between the original proposal assessed in the EIS and for which an ECC has been granted and those proposed under ITDP and if so, whether they require additional environmental assessment;
- To determine whether baseline environmental conditions have changed since the preparation of the EIS;
- To review of the status of compliance by DOTC; and
- To assess whether the ECC conditions have been, are being, or can be, met by the implementing agency.

7.4.2 The methodology for the due diligence review included field investigations to verify that baseline environmental conditions have not changed, a reading and clear understanding of the EIS and ECC, undertaking of interviews with key personnel of the TADP Project Management Office of the DOTC and DENR-EMB, review of any monitoring reports, and an understanding of the activities and arrangements as proposed under ITDP for the subproject.

7.4.2 Results of the Due Diligence Review

7.4.3 There are two modifications to the TADP's design proposed under ITDP; an expansion of the terminal from 9,334 m2 to 9,816 m2, and enlarging the aircraft parking apron by up to 20 per cent. These are minor changes and have no substantive effect on the original assessment as presented in the EIS.

7.4.4 As noted in Section 7.2, the date of ECC issuance was 13 February 2004.

7.4.5 The ECC is valid until February 2009, after which time the same shall be revoked if construction has not commenced unless an extension from DENR has been sought.

7.4.6 The Puerto Princesa subproject has not been implemented. The predicted impacts cannot occur if no preceding construction-related activity has taken place, therefore there are no impacts to mitigate at least in the context of the submitted EMP. In the case of documentary requirements like permits from other government agencies, the same are dependent on the subproject's actual implementation. Similarly, compliance with the ECC conditions is contingent on the construction activities which first have to take place.

7.4.7 The ECC stipulates some eight conditions. Two conditions; condition 4 and condition 5, contain several sub-conditions relating to mitigation and establishment of an EU. Two conditions (condition 3 and condition 4.2) will be covered by the LARP. All conditions remain as they stand and will be complied with upon commencement of subproject implementation.

7.4.8 Neither an EU nor a Multi-Partite Monitoring Team (MMT) had been established. This may be construed as a breach of the ECC conditions (condition 5 and condition 5.2) requiring that the DOTC set-up such groups. However, it can be argued that because the TADP was not progressed the EU and MMT have not been required, and therefore this requirement may be deferred until the implementation schedule of the ITDP is determined.

7.4.9 As noted above, the design changes made since the original subproject EIS was prepared and the existing ECC was issued, are minor, therefore the airport subproject does not require any additional environmental assessment for clearance by DENR.

7.4.10 The DOTC will need to inform the Regional DENR Office of the minor design modifications proposed for this subproject under the ITDP, without having to request an amendment to the ECC. As the subproject is to be implemented beyond the ECC validity period, a request for an ECC extension will need to be fielded by DOTC to the Regional DENR Office. Consultation with the DENR in Quezon City has now verified the applicability of the existing ECC and the need to request for an ECC extension for the subproject.

7.4.3 Outline of Procedure for Extension of ECC

7.4.11 In the case of the Puerto Princesa Airport subproject, DOTC may apply for relief from ECC commitment due to non-implementation of the TADP. The procedure is set out in the provisions of Chapter 8 of DAO 2003-30 Procedural Manual, which explain that a proponent is given the opportunity to seek relief from the requirement of, or continued compliance with, ECC commitments under the following circumstances:

- A project was not implemented;

- A project was issued ECC but has since been re-classified as Category D; and
- A project has been terminated (including projects that have been abandoned, completed, or decommissioned).

7.4.12 DOTC now wishes to pursue implementation of ITDP and its various subprojects under a new loan package, essentially creating the need for an extension of ECC validity and/or amendments to certain conditions thereof. Section 8.3 of DAO 2003-30 provides the parameters for amending an ECC. There are different levels of approval depending on the nature of the request:

- If modifications are required to the ECC, which is a project and location-specific document, because there are changes to; project location; major changes in process flow or technology to be used that may affect the validity of the EIS findings; or, baseline characteristics have changed significantly that the impact assessment (as embodied in the EMP) are no longer appropriate;
- Major modifications to the original proposal such as; expansion of land/project area; increase in production capacity; or, major change/s in process flow or technology to be used; and
- Minor modifications to the original proposal such as; extension of deadlines for submission of post-ECC requirements; extension of ECC validity; change in company name/ ownership; decrease in land/project area or production capacity.

7.4.13 Indicated in **Figure 7.4.3-1** is a procedural flow diagram for the processing of a request to amend an ECC.

7.4.14 The approximate cost of an amendment to an ECC is PhP 300 for a minor amendment and PhP 1,200 for a major amendment. The requested period of extension of ECC validity should not exceed three years and should be filed at least three months before the expiration of the ECC.

7.4.15 In the case of Puerto Princesa Airport, the two design modifications proposed are minor and do not alter the findings of the already approved EIS or the conditions attached to the ECC. This is the most recent of the ECCs issued for TADP subprojects, application for an extension of validity can be made in 2008, once the loan conditions have been agreed and the implementation schedule is known with more certainty. The documentation supporting the request for extension would need to include a statement to the effect that the ECC needs to be valid for a further five years in order that the ECC covers the likely timeframe for commencement and completion of construction (including the possibility of some delay). Approval for ECC extension would need to be gained from DENR prior to start of construction, currently forecast for August 2009.

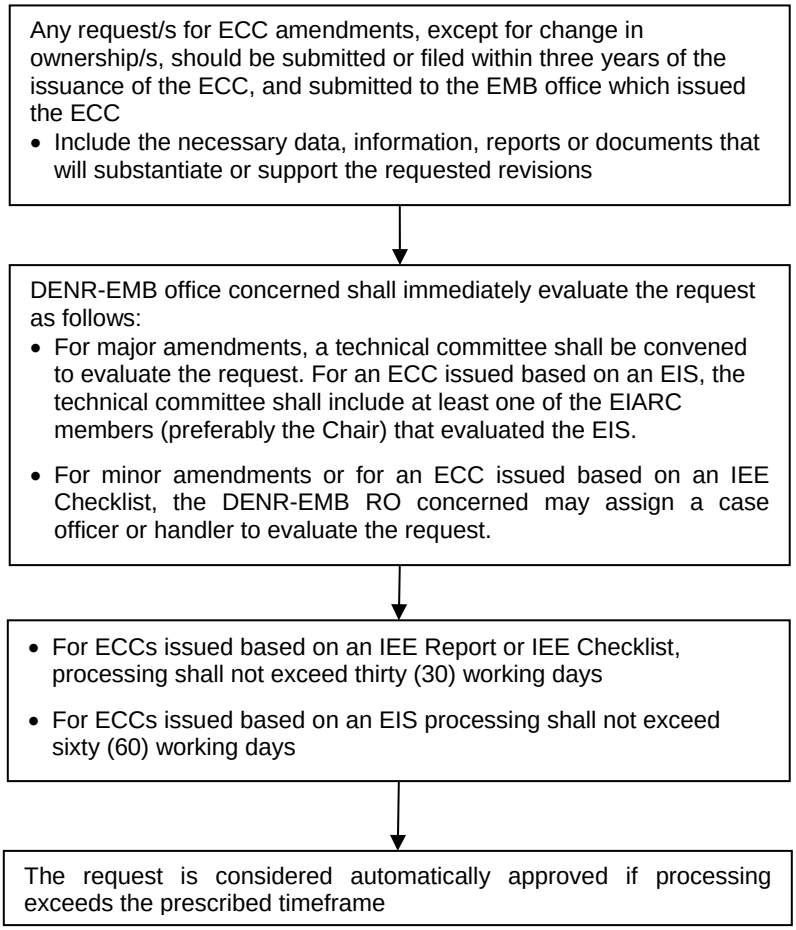

Figure 7.4.3-1: Amendment to ECC Request Procedure

7.4.4 Recommended Measures to be Applied under ITDP

7.4.16 The conclusion of the due diligence review is that neither the subproject description nor scope of work have changed substantively, only two minor design modifications are proposed under ITDP.

7.4.17 Based on the results of the due diligence review the following recommendations are made:

- That DOTC advise DENR-EMB of the two design modifications, stating that these are minor in nature and do not change the impact analysis or conclusions of the EIS already submitted;

- That DOTC apply for an extension of the validity period of the ECC once the overall timeframe for implementation and actual execution of the projects is determined (including design and construction timeframes);

- That DOTC request a deferment of compliance with specific ECC conditions that have not been needed thus far because the overall project, and subsequently subproject, is still in the planning stages;
- That compensation and relocation of the affected residents must be carried out strictly in accordance with the LARP in order to avert potential unrest and unnecessary uncertainty for the affected families.
- That the DOTC establish the EU immediately upon loan agreement in order that the training and capacity building can be provided prior to the commencement of construction activities when the environmental management capability of DOTC will be required. The EU should consist of at least four people, including a head of office and three staff. The functions of the EU will be to handle compliance with the ECC and other environment and safety related matters.
- That DOTC allocate adequate and regular funding and resources required for the function of the EU and MMT. The appropriate budget must also be set aside for the establishment of the Environmental Guarantee Fund, Environmental Management Fund and all other expenses relating to environmental management and compliance.
- The total cost of mitigation and implementing the EMP was estimated as PhP 380,000. The EIS was submitted in January 2002 and mitigation costs were based on 2001 prices. An inflation adjustment of 15 per cent plus a five per cent contingency should be included in the overall budget line for this item. Thus the costs associated with implementing the EMP for Puerto Princesa airport will be in the order of PhP 496,000.
- An overall cost for monitoring of PhP 420,000/year was established as the minimum requirement in the EIS. The EIS was submitted in January 2002 and monitoring costs were based on 2001 prices. An inflation adjustment of 15 per cent plus a five per cent contingency should be included in the overall budget line for this item. Thus monitoring costs associated with Puerto Princesa airport will be in the order of PhP 504,000.

7.5 Consultation, Disclosure and Social Acceptability

7.5.1 Consultation was undertaken during the preparation of the EIS, and has been fully documented in the EIS. Ongoing dialogue with the community, since that time, has focused primarily on land acquisition. As the two design modifications proposed under ITDP do not change the nature of the impacts or the overall conclusions of the EIS, additional consultation has not been required. The EIS includes a communications plan which will be implemented by DOTC upon commencement of subproject design.

7.5.2 The Accountability Statement and project endorsements obtained as part of the EIS consultation are included as an appendix to the report.

7.5.3 Disclosure will conform to the new *Public Communications Policy of the ADB: Disclosure and Exchange of Information (March 2005)* which requires that environmental assessment reports for ADB projects are accessible to interested parties and the general public.

The draft IEEs and SIEEs prepared for subprojects will be uploaded on ADB website before appraisal.[1]

7.5.4 A detailed description of the consultation, disclosure and social acceptability is contained in Volume V.

[1] The project's Resettlement Policy Framework and any resettlement plans prepared during the PPTA will also go through this process.