CIVIL AVIATION DEVELOPMENT AND INVESTMENT PROGRAM
(PROJECT 1)

INITIAL ENVIRONMENTAL EXAMINATION (IEE)

PROPOSED UPGRADING AND REHABILITATION OF GURNEY AIRPORT

MILNE BAY PROVINCE
PAPUA NEW GUINEA

June 2009

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AusAID	Australia Agency for International Development
CAA	Civil Aviation Authority
CSC	Construction Supervisory Consultant
DDC	Detailed Design Consultants
DIAC	Design Implementation and Advisory Consultants
DEC	Department of Environment and Conservation
EARF	Environmental Assessment and Review Framework
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
GoPNG	Government of the Independent State of Papua New Guinea
IEE	Initial Environment Examination
HIV	Human Immunodeficiency Virus
IEE	Initial Environmental Examination
LLG	Local Level Government
MFF	Multi-tranche Financing Facility
PNG	Papua New Guinea
PIU	Project Implementation Unit
REA	Rapid Environmental Assessment
RRP	Report and Recommendations to the President
SIEE	Summary Initial Environmental Examination
SR	Sensitive Receiver
TA	Technical Assistance
WHP	Western Highlands Province

WEIGHTS AND MEASURES

dB(A)	Decibel (A-weighted)
asl	above sea level
ft	Feet/Foot
km	kilometre
km/h	kilometre per hour
m	meter
m^3	cubic meter
m^2	square meter
s	seconds

I. INTRODUCTION

1. The Government of the Independent State of Papua New Guinea (GoPNG) has requested the Asian Development Bank (ADB) to provide a multi-tranche financing facility (MFF) to facilitate investments to improve the current state of the country's domestic air transport system under the Civil Aviation Development and Investment Program - (Investment Program). Five major airports (Project 1) in the country have been identified for upgrading and rehabilitation mainly based on the relative importance of these airports as domestic hubs for tourism and economic development on a regional basis. The Program is a comprehensive plan to upgrade, rehabilitate and maintain major domestic airports in Papua New Guinea (PNG). The executing agency (EA) for the Program is the Civil Aviation Authority (CAA).

2. This Initial Environmental Examination (IEE) presents the environmental assessments of the subproject – Upgrading and Rehabilitation of the Gurney Airport in Project 1 of the MFF. This IEE has been carried out to ensure that the potential adverse environmental impacts are appropriately addressed in line with *Environment Policy (2002)* and *ADB Environmental Assessment Guidelines (2003).* This IEE has also been prepared to meet the requirements of the GoPNG for environmental assessment.

3. The main purpose of this IEE is to provide environmental assessment of the proposed upgrading and rehabilitation of the Gurney Airport located in the Milne Bay Province. The key environmental impacts on natural and human environments have been assessed.

4. This IEE has been carried out to ensure that the potential adverse environmental impacts are appropriately addressed in line with *ADB Environment Policy (2002) and ADB Environmental Assessment Guidelines (2003).* This IEE has also been prepared to meet the requirements of the GoPNG for environmental assessment.

A. Overview

5. The proposed investment program will entail the upgrading and rehabilitation of the following existing airports (Batch 1): Wewak; Hoskins; Gurney; Mt. Hagen and Jackson's domestic airport. The upgrading and improvement of these major domestic airports is designed to bring the facilities to a level of development to fully meet airport safety standards and provide the runway, taxiway and apron capability to accept unrestricted operations by Fokker 100 aircrafts.

B. Environmental Regulatory Compliance

6. The environmental regulations of GoPNG are derived from the Environment Act 2000. The Environment (Prescribed Activities) Regulation 2002 categorizes designated projects that need environmental assessment as "Prescribed Activities" in two schedules according to the anticipated potential environmental impact. Projects that likely to have significant adverse environmental impact (Level 2 and Level 3) are required to obtain an Environmental Permit (EP) from the Department of Environment and Conservation (DEC) following environmental assessment. The upgrading and rehabilitation of existing airports is not listed as Level 2 and Level 3 of the "Prescribed Activities". However certain associated project activities commonly associated with upgrading and improvement works such as earthworks, surfacing, discharge of waste water, establishment of borrow pits, sourcing and extraction of aggregate materials from surface water courses are Level 2 activities that may require an EP depending on the duration and scale of those activities. Therefore, to ensure compliance with the government environmental assessment requirements, CAA will disclose the scale and scope of the subprojects to DEC so that DEC can decide whether any specific environmental requirements will be needed for the proposed airport upgrading and

rehabilitation. Considering the government environmental requirements and ADB Environmental Assessment Guidelines (2003), an IEE will be prepared for each subproject classified as environmental category B at the minimum.

7. Pollution standards are described for the protection of marine and aquatic life in fresh and marine waters in the Environment (Water Quality Criteria) Regulation 2002. These standards will be referred to for water quality monitoring during the environmental management of the subprojects.

C. Environmental Category of the Subproject

8. Under ADB's *Environmental Policy (2002)* and *Environmental Assessment Guidelines (2003)* the Project 1 is classified as Environmental Category B that requires IEE.

D. Objectives and Scope of IEE

9. The objectives of this IEE were to:

- Assess the existing environmental conditions in the project area including the identification of environmentally sensitive areas;
- Assess the proposed planning and development activities to identify their potential impacts, evaluate the impacts, and determine their significance; and
- Identify and recommend mitigating measures that can be incorporated into the proposed activities to minimize, or if at all possible, eliminate any adverse impacts, ensure that residual impacts are acceptable and propose monitoring and planning of future projects under the MMF.

10. This IEE is based mainly on secondary sources of information, field reconnaissance surveys and public consultation undertaken specifically for this study was also undertaken.

E. Report Structure

11. Following this introduction this report contains seven more sections including (ii) description of subproject; (iii) description of the environment; (iv) screening environmental impacts and mitigation; (v) public consultation; (vi) institutional requirements and environmental management plan; (vii) findings and recommendations; and (viii) conclusions.

II. DESCRIPTION OF THE PROJECT

A. Background

12. The current state of the airports in Papua New Guinea is inadequate to meet the increasing demand for air travel both for tourism and commercial purposes. This, in essence, presents itself as an obstacle to further economic growth and development of major regional centers in PNG and the country as a whole. The identified major domestic airports need to be upgraded and improved to meet the international standards and requirements and make it safety compliant as prescribed by the International Civil Aviation Organization (ICAO).

13. The first batch of development investments under Project 1 will be the upgrading and rehabilitation of the existing Wewak Airport in East Sepik Province; Hoskins Airport in West New Britain Province; Mt. Hagen Airport in Western Highlands Province; Gurney Airport in Milne Bay Province and Jackson's Domestic Airport in the National Capital District. (See Table 1).

TABLE 1. LIST OF SUBPROJECTS FOR PROJECT 1 OF THE CIVIL AVIATION DEVELOPMENT AND INVESTMENT PROGRAM

SUBPROJECT	LOCATION	PROPOSED DEVELOPMENT WORKS
Wewak Airport	East Sepik Province	▪ Extend runway length by 200m from existing 1,600m to 1,800m ▪ Retain Runway width of 30.0m similar to existing ▪ Construct Extension Strip width 150m (mark 90m to match exiting) ▪ Extension Surfacing : prime and 3 x coat seal (10mm/7mm/sand) similar to existing ▪ Realign Perigo Road ▪ Realign existing large Storm water drain ▪ Construct new bridge over Brandi Road at realigned storm water drain ▪ Extend Car park at rear of Terminal Building to cater for increase in passengers ▪ Lop infringing trees in Golf Course to clear Approach/Take-off path ▪ Supply, install and commission a New PAPI Landing Aid system (to replace the old existing T-VASIS system being phased out by CAA and replaced with PAPI)
Hoskins Airport	West New Britain Province	▪ Widening of the existing runway to from 30 meters to 45 meters; ▪ Construction of a 90 meter end of runway safety zone (RESA) at southeast end and stop ways at both ends; ▪ Widening of the existing flight strip to 150 meters; ▪ Replacement of all open drains within the strip with piping systems with the strip graded to meet required longitudinal and transverse slope standards; ▪ Relocate a Precision Approach Path Indicator (PAPI) visual guidance system at the southeast end to the new touch down point; ▪ Widening of the taxiway shoulders to 5.0 meters ▪ Designing of the Apron to provide for two F-100 parking positions with the tails clear of regulated obstacle limitation surfaces; ▪ Reinstate pavement markings
Mt. Hagen Airport	Western Highlands Province	▪ Lengthening of the Runway by 110 meters at the western end to provide the required total length of 2,300 meters, all within the CAA Airport Reserve and will not entail relocation of the existing 2.70 meter high fence; ▪ Construction of 3.0 meter wide full strength asphalt surfaced shoulders on each side of the Main Runway ; ▪ Surfacing of the strengthened aircraft pavements and new shoulders to Runway with dense graded asphalt and runway grooved; ▪ Widening of the Main Runway Strip from the existing 90 meters to 150 meters wide; ▪ Reconstruction of sealed Stopways 60 meter x 30 meter wide at each end of the strengthened Runway; ▪ Reconstruction of 90 meter x 90 meter RESA's beyond the Stopways each end of the Runway; ▪ Flank earthworks to match raised levels of aircraft pavements; ▪ Install new lighting systems to the Main Runway which shall only be utilized for daylight operations (inclement weather or dull conditions and not for nighttime operations); ▪ Strengthening of the pavements to the Secondary Runway to match raised level on the Main Runway – Prime and 3X coat seal surfacing; ▪ Reinstate all pavement markings; ▪ Adjustments to the PAPI Landing Aid System at each end of the Runway; ▪ Demolish the existing Terminal and construction of New Terminal Building at the same location; ▪ Construct temporary Terminal Building for Domestic and International Services to preclude disruption of aircraft operations during construction period; ▪ Construct new Access Roads into Carpark
Gurney Airport	Milne Bay Province	▪ Runway lengthening for F100 aircraft operations or equivalent aircraft operations. Extend the Eastern end by 160m x 30m to give 1,850m runway. ▪ Construction of a new 60m stopway at the Eastern end. ▪ Construction of 90m x 90m RESA at both runway ends. ▪ Apply single coat 7mm chip reseal to existing pavements and reinstate fuel resistance membrane and line markings. ▪ Diversion of the existing Open Unlined Drains (OUD) at the Eastern end and, supply and install a new culvert under the RFFS access road. ▪ Supply and Install a new multi-cell culvert under the plantation access road. ▪ Relocate existing PAPI at the Eastern end and conduct flight test.

SUBPROJECT	LOCATION	PROPOSED DEVELOPMENT WORKS
Jacksons Airport	National Capital District	▪ Extend domestic apron by 162 m long x 80 m wide at the NW end ▪ Construct new Stub Taxiway connecting the new extended Apron to the existing Parallel Taxiway. Taxiway min 18.0m wide. ▪ Construct 5.0m wide sealed shoulders to both the new Apron and new Stub Taxiway. ▪ Construct new aircraft pavements comprising crushed rock basecourse surfaced with prime, single coat bituminous seal and dense graded asphalt ▪ Construct concrete encased duct bank 6 x 100mm x 60.0m long under new Stub Taxiway. ▪ Construct new Apron access road 10.0m wide x 90m long as an extension of the existing. ▪ Construct flank earthworks, topsoil and grassing beyond the shoulders to the new Extended Apron and Stub Taxiway. ▪ Construct 4 x concrete pads each 22m x 12m at 3 x future B-737-800 aircraft parking positions. (3 on NW side of exist Covered Walkway and 1 on the NE side) ▪ Construct Stormwater Drainage associated with the new Apron Extension and new Stub Taxiway including :- 1) New RC Box Culvert 2 No 1900mm wide x 1250mm high x 45m long under new Stub Taxiway 2) Construct open drain lining either end of the new Box Culvert 3) Realign the existing open unlined drain 4) Construct an open Vee Drain beyond the NW Shoulder to the extended Apron and Stub Taxiway. ▪ Supply and install Apron flood lighting to the extended Apron ▪ Paint new Pavement Markings to aircraft pavements

B. Location and Description of Existing Airport

14. Gurney Airport is located at 15 km from Alotau, the provincial capital of Milne Bay, on the south-eastern tip of mainland PNG. Road access between the airport and Alotau is via the Charles Abel Highway, consisting of 3 km of sealed road and 12 km of earth road. The airport is located on the western edge of Milne Bay. Mountains reaching over 800m in height border Milne Bay on its northern and southern sides. Between these mountains and extending westwards from the western end of Milne Bay are low-lying and floodplain areas traversed by several rivers including the Duagaibu, Gumini and Meiwara Rivers.

15. Gurney Airport is located approximately 2 km inland from Milne Bay on the northern side of this low-lying area and at the foot slopes of the mountains to the north. The land is flat at an elevation of 10-20m above sea level. The Kaloi River is situated immediately west of the airport. This river flows south to join the Meirwara River before flowing into Milne Bay. The airport, however, generally drains to the east via two open grassed channels constructed parallel to the runway. Runoff outlets from airport land on the north-eastern corner into Laviam Creek, before flowing approximately 3 km through oil palm plantations and coastal vegetation into Milne Bay. Gurney Airport's sewerage system is a standalone system (septic tanks) and is not connected to the main sewer line. Figure 1 shows the map of Papua New Guinea and location of Gurney Airport. Figures 2 and 3 shows the general layout plan and the aerial view of the existing Gurney Airport.

16. Some short duration flooding occurs at the western end of the airport, immediately outside the airport boundary, due to an undersized culvert in the southern drain. Excellent grass cover exists on all unpaved surfaces at the airport except within the main southern drain where grass cover is moderate. Minor erosion is occurring on the sides of this drain, with some sediment deposition in the base of the drain. The airport receives 1,703 mm annual average rainfall that is relatively evenly distributed throughout the year. Land adjoining the airport is almost entirely under oil palm plantations. The nearest houses to the runway are in the CAA workers settlement on the southern side of the airport (setback 220m from the runway) and in the small settlement of Village Oil Palm on the north-western side of the airport (setback 50m from the airport boundary), approximately 1km to the north-east of the airport passenger terminal on the Charles Abel Highway.

FIGURE 1. MAP OF PAPUA NEW GUINEA AND LOCATION OF GURNEY AIRPORT

FIGURE 2. GENERAL LAYOUT PLAN OF GURNEY AIRPORT

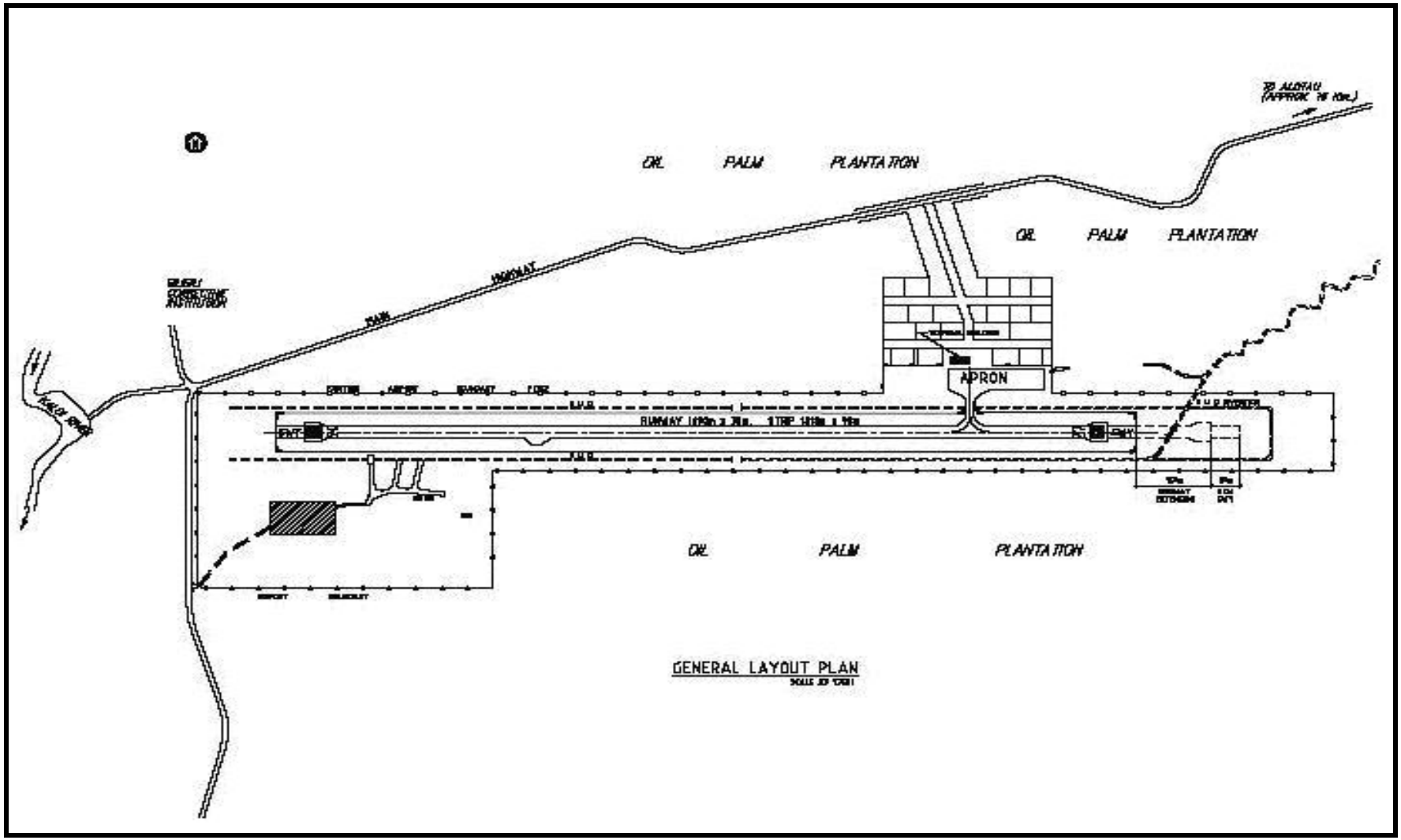


FIGURE 3. AERIAL VIEW OF THE EXISTING GURNEY AIRPORT

17. The airport runway is 1,690m long by 30m wide with 3.0m shoulders, aligned close to east/ west and set within a 90m wide strip. An associated taxiway and apron are located on the northern side. Other facilities on airport land include the main terminal with separate domestic and international passenger areas and a sealed car park, the Mobil fuel depot (currently not in use), the CAA office and associated residence, the CAA standby power house and a storage shed and workers houses on the south-western side of the airport. Airport land (71 ha) is fully fenced and with a 1.2m high post and wire fence. At times there is illegal access onto the aerodrome.

C. Salient Features of the Project

18. The main scope of works will essentially be upgrading of Gurney Airport in 3 stages. In Stage 1, the existing pavements will be upgraded for F100 aircraft operations or equivalent aircraft operations. In Stage 2, will involve the supply and installation of Galvanized Steel Picket Type Security Fence and the construction of an access road on the airside of the new fence line. Subsequently in Stage 3, upgrading the airport for B737 – 800 aircraft or equivalent. The estimated construction period for the development works is 36 weeks commencing on 01 October 2013.

19. The upgrading works under Project 1 will be within the existing land area of the airport and will include the following activities:

- Runway lengthening for F100 aircraft operations or equivalent aircraft operations. Extend the Eastern end by 160m x 30m to give 1,850m runway.
- Construction of a new 60m stopway at the Eastern end.
- Construction of 90m x 90m RESA at both runway ends.
- Apply single coat 7mm chip reseal to existing pavements and reinstate fuel resistance membrane and line markings.
- Diversion of the existing Open Unlined Drains (OUD) at the Eastern end and, supply and install a new culvert under the RFFS access road.
- Supply and Install a new multi-cell culvert under the plantation access road.
- Relocate existing PAPI at the Eastern end and conduct flight test

20. The Gurney Airport re-development would involve earthworks as follows:

- Estimated material and earthworks quantities:
  1. Cut to stockpile 100mm topsoil for future re-use - 58,000 m^2
  2. Excavation earthworks - 22,000 m^3
  3. Pavement Construction Material (Crushed base course) - 45,000 m^3
- Topsoil will be used and/or be re-used for topsoil and grassing
- Excavated in-situ material will be used in landscaping and/or flight strip widening and grading.
- All materials will be stockpiled at a designated location on the airside.
- Base course material shall be crushed river gravel – proposed source is Kaloi River. 10m^3 trucks shall cart material from source and stockpiled on-site.

III. DESCRIPTION OF EXISTING ENVIRONMENT

21. Milne Bay is a province of Papua New Guinea. Its capital is the township of Alotau. The province covers 16,202 km² of land and 252,990 km² of sea. Within the province there are more than 600 islands, about 160 of which are inhabited. The province has about 210,000 inhabitants, speaking about 48 languages, most of which belong to the Eastern Malayo-Polynesian branch of the Austronesian language family. Economically the province is dependent upon tourism, oil palm, and gold mining on Misima Island; in addition to these larger industries there are many small-scale village projects in cocoa and copra cultivation. (See Figure 4 for Map of Milne Bay Province)

22. Milne Bay province comprises both the extreme eastern end of Papua New Guinea and a host of islands, atolls and reefs. The mainland section of the province is extremely mountainous as the rugged Owen Stanley Range plunges abruptly into the ocean. The islands are enormously diverse, from the smallest islet barely breaking the surface of the sea to the larger islands such as Fergusson and Goodenough in the D'entrecasteaux Group. Some of the islands have mountain peaks as high as 2,400 meters, while the Trobriand Islands are virtually flat.

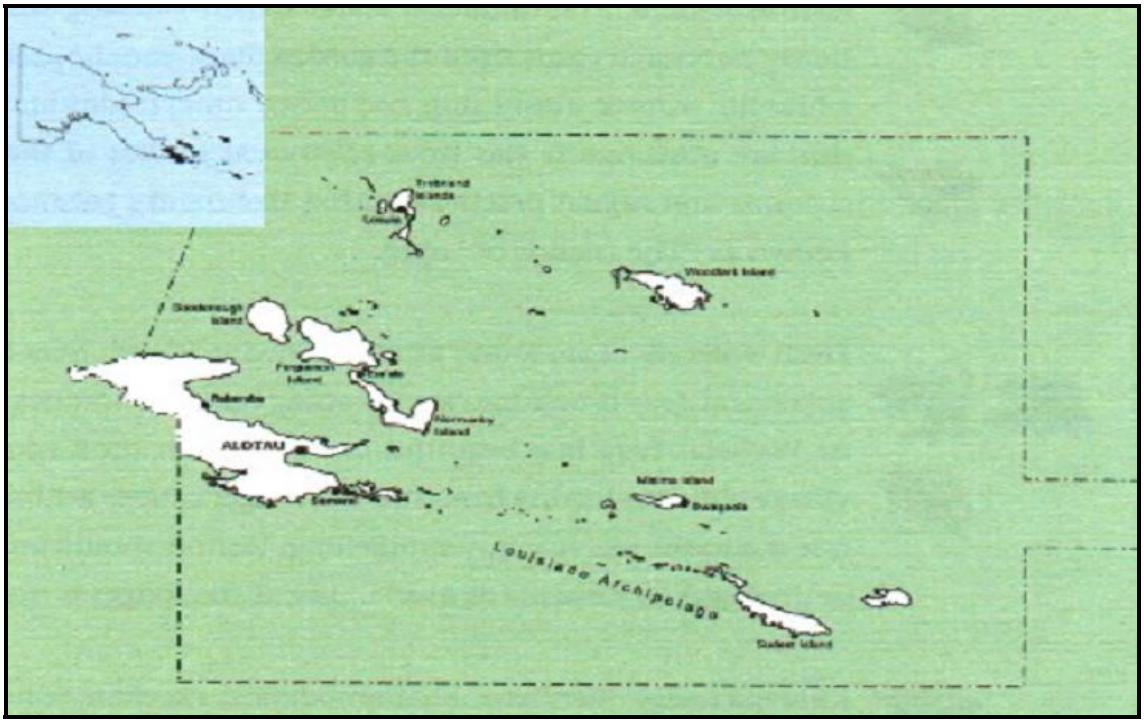
23. The Milne Bay Islands are divided into seven groups – Trobriand, Woodlark, Laughlan, Louisiade Archipelago, the Conflict Group, Samarai and the D'Entrecasteaux Group. All can be reached from the provincial centre of Alotau on the mainland. Alotau is spectacularly sited on the edge of Milne Bay, and is principally used by visitors as a jumping off point for other destinations. Like most other towns in Papua New Guinea, Alotau is worth a visit for its stunning views, bush walks, and local customs. The harbor is alive with activity, and is only a short walk from town.

24. Samarai is a tiny island of 24 hectares in China Strait, situated only five kilometers from the mainland. It is once the provincial headquarters but lost this function to Alotau in 1968 because of overcrowding and inconvenient location. The D'Entrecasteaux Islands are three large islands separated from the mainland north coast by a narrow strait. Goodenough Island has fertile coastal plains flanking a mountain range with twin peaks over 2400 meters in height. Vivigani hosts the major airstrip in the group. In the centre of the island is a large stone covered with strange paintings, said to have power over yam crops. The largest of the three islands is Fergusson, notable for its active thermal region – hot springs, bubbling mud pools, spouting geysers and volcanoes. Narrow Dobu Passage separates Normanby Island from Fergusson, where the first Methodist mission station was established. Sewa Bay, on the southwest coast, was used by Allied warships during WWII, and is still used as a port for inters island ships.

25. Kimbe, the Provincial Capital, is a rapidly growing town of 15,400 people (estimated in 2004). The town of Kimbe is on Kimbe Bay and was established to provide a port and infrastructure facilities for the oil palm industry. Kimbe is on the site of an old coconut plantation called San Remo Plantation.

26. Kimbe town is the centre of many industries including oil palm, cocoa, logging and coconut plantations. Many of these products are shipped out using Kimbe's main port. The biggest industry in West New Britain and Papua New Guinea itself is called New Britain Palm Oil Limited or NBPOL which is also the owner of Ramu Agriculture. The company's main headquarters is in Mosa, a small town around 12 kilometers from Kimbe's main area. The company grows oil palm and then uses the fruit to create palm oil which is used in cooking oil, shampoo, soap, body products, moisturizers and many other products. The oil is produced by 4 oil mills and 1 refinery. The names of the mills are Mosa Oil Mill, Kumbango Oil Mill, Numundo Oil Mill, Kapiura Oil Mill, Kumbungo Kernal Mill and Kumbungo Oil Refinery. The company also has a cattle station which is used as food for the region.

FIGURE 4. MAP OF MILNE BAY PROVINCE



A. Physical Environment

1. Land Resource and Land Use

27. Land adjoining the airport is almost entirely under oil palm plantations. Minimal amount of land are cultivated for cash crops like coconut, betel nut, yam and other necessary food and vegetables produce. CAA workers settlement on the southern side of the airport within the boundary (setback 220m from the runway) and a small oil palm settlement on the north-western side (setback 50m from the airport boundary).

28. The airport current runway is 1 690m long by 30m wide with 3.0m shoulders aligned close to east/ west set within a 90m wide strip. An associated taxiway and apron are located on the northern side, connected to the Charles Abel Highway by a sealed road.

29. Other airport facilities include the main terminal with separate domestic and international passenger areas and a sealed car park, the Mobil fuel depot (currently not in use), the CAA office and associated residence, the CAA standby power house and a storage shed and workers houses on the south-western side of the airport. Airport land (71 ha) is fully fenced and with a 1.2m high post and wire fence. At times there is illegal access onto the aerodrome.

2. Meteorology and Climate

30. The climate throughout Milne Bay is varied with distinct climate zones that are strongly related to topography. Generally, the province has an average rainfall of 2055mm per annum. The airport is within the equator and has a tropical climate with warm or hot temperature throughout the year ranging from 20 to 37ºC. Climate in the area generally consists of a wet season and a dry season. May to October is usually the wet season with rougher seas; however the airport receives 1 703mm annual average rainfall that is relatively unevenly distributed throughout the year. The best season for fieldwork is between November and April.

31. Alotau is basically hot and humid all year around. Temperatures are uniformly high throughout the year and ranges from 31 - 35 degree Celsius during daytime and fall to about 28-30 ^{o}C at night.

3. Topography, Geology and Soils

32. Gurney Airport is located on the Western edge of Miline Bay Province. Mountains reaching over 800m in height border Miline Bay on its Northern and Southern sides. Between these mountains and extending westwards laid the airport on the low-laying floodplain at the foot slopes of the mountains to the north, 20km inland from Miline Bay. Elevation on the site ranges between 10 – 20m above sea level. The general topography of the immediate area is generally flat to gentle slope (0.7) with an overburden of grassland vegetation, organic materials and mangrove swamps on part of the coastline. In the surrounding areas way from the coastline, it is anticipated that the geology would comprise basaltic, pillow; lava and dykes with some tuffaceous arenite and argillite of the middle Eocene aged Kutu volcanics.

33. The underlying geology of the area is alluvium (Quaternary aged) and beach deposits: comprising gravel, sand, silt and clay. Gravity, refraction seismic and magnetic surveys indicate that the crust beneath the Papuan peninsula is about 32km thick and that the crust beneath the Trobriand platform is 24km thick, thinning towards the Solomon Sea and beyond the shelf lays the Trobriand Trough which may be part of a southward dipping subduction trench. Areas of volcanism are spatially associated with faulting (McNeil, 1992). Recorded information shows that the largest earthquake (Mw = 6.8) was recorded in Alotau in 1991 (Geoffrey A. Abers I, 1991)

4. Surface and Ground Water Resources

34. The Kaloi River, situated immediately west of the airport flows south to join the Meirwara River before flowing into Milne Bay. The airport, however, generally drains to the east via two open grassed channels constructed parallel to the runway. Runoff outlets from airport land on the north-eastern corner into Laviam Creek through oil palm plantations and coastal vegetation into Milne Bay. Some short duration flooding occurs at the western end of the airport, immediately outside the airport boundary, due to an undersized culvert in the southern drain. Excellent grass cover exists on all unpaved surfaces at the airport except within the main southern drain where grass cover is moderate. Minor erosion is occurring on the sides of this drain, with some sediment deposition in the base of the drain.

35. Although groundwater was not encountered during the geotechnical investigation of the current runway, there is a likelihood of water content change in the in-organic clay (3rd layered subsoil profile). While that is proposed, control of subsoil moisture changes may be difficult due to groundwater influence where the water table was estimated to be 4-6m below the existing ground surface. However, to control the amount of water entering the subgrade, it is recommended that the existing stormwater drainage system parallel to the apron be maintained. Two bore holes approximately 50m apart are setback about 150 – 200m from the runway pumps groundwater to two reservoirs (storage tanks) stationed about 150m directly at an area at the back of the airport terminal beside Charles Abel Highway in-situ.

36. Groundwater supply to the local community including the terminal facilities from the reservoirs is potable and requires some treatment from time to time. However, quality of nearby surface water that runs through the oil palm may be potentially contaminated.

5. Air and Noise

37. There are no specific instruments to calculate and measure the Air and Noise quality measurements of the airports therefore no baseline data is available. Indeed, airports are noisy place categorized under Industrious noise (Simon. M, 1987), but the noise is intermittent only during aircraft take off and landing. The Government has a body that regulates and controls such noise.

B. Ecological Resources

1. Forestry Resources

38. The Province's forest resource base is very small compared to other provinces. Traditionally, the forest is used for many things such as carvings, crafts, construction of dwellings, firewood, herbal medicine and food. For the modern value, the forest is harvested, processed and sold for economic benefit. The province has a Provincial Forest Plan which details how the forest resources are protected and/or developed.

39. At present, Sagaria/Gadaisu Timber Resource Permit (TRP) is the only active logging project in Milne Bay. The two main large scale sawmills operating are Milne Bay Industries and South Pacific Timber Enterprises. There are several portable sawmills around the province. Currently, the total volume of log input for processing in the mills is about 20,000 cubic metres. The airport site is largely cut over and consists mainly of brush and grassland and large extension of oil palm.

2. Fishery resources and Coastal Resources and Management

40. The most fertile fishing ground in Milne Bay is the Orangerie Bay along the southern mainland coast where trawl nets are used to catch prawns. There is an abundance of finned fish found over the continental shelves through the province's waters. Pelagic fish such as tuna, shark and Spanish mackerel, frequent near surface water; and demersal fish visit the ocean floor.

41. Invertebrates of commercial importance, including clams, lobsters and crabs are abundant but make up only a small percentage by weight of catch. A fast-growing business is the harvest of beche-de-mer stocks. This is managed and controlled under the Milne Bay Beche-de-mer Fishery Management Plan and is a cottaged business. Other fisheries are managed by National Fisheries Authorities (NFA) and their sub-contractors, Provincial Government Fishery or Natural Resource Division in collaboration with respective Local level Government (LLGs) and the Resource owners. There may be some freshwater fish and prawns common in the nearby rivers and creeks around the airport vicinity.

3. Rare or Endangered Species and Protected Areas

42. There are no rare or endangered species of flora or fauna in the general areas of the site. Protected areas are mainly based on Marine ecosystem usually called Marine Protected areas (MPAs). Fauna found in the area are snakes, occasional wild boar and flocks of eagles.

C. Social-Cultural Environment

1. Population and Demography

43. According to 2000 census, Milne Bay has a population of 210,000 people and has an annual growth rate of 2.5 percent. Alotau, the major town, has 10,000 inhabitants and the remaining is rural population. The population density is at 15 people per square kilometre.

44. Most population within the airport vicinity is indigenous with good number of families and houses along Charles Abel Highway within a range of 2-5km from the site. A handful of residents are recent migrants from other Islands or elsewhere due to the expansion economic activities associated with oil palm Industry.

45. There are no mineral resources or prospect of exploration in the area and no mining. The main source of income of the residents of the area is subsistence farming supplemented by small-scale commercial activities like markets and mini trade stores along the main highway. The overall income level is fair.

46. Since the predominant land use is oil palm plantation, efforts have been taken by local Department of Civil Aviation (DCA) and Provincial Authorities to restrict any future encroachment on the airport site. It is based on the safety regulations of Civil Aviation Authority (CAA) concerning heights and use restrictions for the area surrounding the airport.

47. Generally, agriculture and fisheries continues to play an integral part of the livelihood of the various rural communities in the province. Some 97 percent of the rural population is absorbed by the agriculture system. Tree crop farming is a major revenue earner for the province and for many rural farmers. Cocoa is planted widely in the province and extension work has been carried out by the Cocoa and Coconut Extension Agency. There are 555 cocoa growers in Milne Bay with an average 1.5 hectares each. There are 32 fermentaries. In 2004, smallholders produced an estimated total 10,000 tonnes of cocoa. Two varieties of Coffee are grown – Robusta in the lowlands and Arabica in the higher altitudes. In 2004, 31.4 tonnes of coffee parchment was produced and sold by 496 farmers from the villages. Vanilla, nutmeg, chili, cardamom and other spices have been introduced by the Department of Agriculture and Livestock to encourage farmers to grow alternative crops.

2. Cultural/Historical/Archaeological Resources, Schools and Housing

48. Gurney airport was built by the US Army 96th Engineer General Service Regiment during Second World War (WW2). Today, Second World War monuments are located away from the airport and an old WW2 machine gun is stationed right in front of the terminal. Hagita Secondary school is about 5km south of the site along the Charles Abel Highway. Traditional houses built from light material to semi-permanent houses are set back >10m beyond the roads side drain. There are no reports of public health post and landline telephone services for the inhabitants of the area. Nor are sources of wastewater treatment available. Power lines along the highway provide electricity to some of the homes.

IV. SCREENING ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

49. This section provides an assessment of the positive and negative impacts on the physical environment in the immediate vicinity of the study area resulting from the development of the project, and the corresponding mitigation and enhancement measures to negate such negative impacts. The environmental quality of the project site could be affected from project activities during each phase of project development, if environmental management measures are not properly followed.

50. This section discusses the potential environmental impacts of the proposed rehabilitation project of the subproject airport and identifies mitigation measures to minimize the impacts in the design, construction and operational phases.

51. The major environmental issues regarding the Gurney Airport upgrading and rehabilitation project are related to i) temporary impacts of mobilization and construction; ii) problems of pollution related to the disposal of sewage, waste fuel and oils, and solid wastes generated during construction and operations; iii) impacts associated with increased road and air traffic and noise in the area when flights are increased; and iv) possible accidents. The proposed development will not affect any nor encroach into ecologically sensitive areas.

A. Temporary impacts of mobilization and construction

52. Contractor's mobilization on site and equipment operation can have impacts on local people in terms of noise and traffic disturbance. The mobilization of the contractor will involve heavy equipment, machineries and vehicles, although, the impact is expected to be minimal. Once the heavy equipment and construction materials are delivered to the airport's work site there should be insignificant traffic impact.

53. The development works (i.e. extension of runway, resealing of pavements, drainage works, etc) would entail construction of sub-grade and subsequent pavement base, foundations, earthworks, and laying of pavement, will require concrete, bitumen, pipes, backfill aggregate material and the supply of other requisite materials, etc. Bulk delivery of materials is expected as materials are stockpiled on site for use when required so that traffic disturbances will be limited to short periods when delivery is taking place. Monitoring of this impact shall be implemented as part of the Contractor's Environmental Management Plan with cleanup initiatives undertaken as required.

54. The timing of the mobilization phase during the dry months is expected to result in minimal impact on the nearby residences. Dry season operations will also limit run-off, soil losses, and other adverse impacts.

B. Constractor's Temporary Facilities

55. The Contractor will establish a depot area at the Airside area of the facility. This will approximately be 5,000 m^2 in area and will house the Site Office, Materials Testing Laboratory, Store, Covered Storage Area, Car Park, First Aid Room, Toilets, and Mechanical Workshop. The Contractor's Depot Area will have the potential for adverse environmental impacts as a result of their location, their operation and their abandonment.

56. There will be no construction camp that will be established for the works. The Contractor(s) will rent a small compound for the skilled staff (10-15 persons) that will be recruited for the construction works such as the Pavements Supervisor and Foreman, Mechanical Supervisor and Plant Operations Supervisor, etc. All other skilled and unskilled personnel which are estimated at 30-40 persons shall be sourced locally and would not require local housing.

C. Construction Activity

57. The grubbing of topsoil, grass areas and service trench material will require stockpiling in a controlled area during construction. The removal of topsoil material should be followed by placement of subgrade and subbase material quickly to prevent soil erosion. This could also be accomplished by use of a berm constructed on the lower side of the stockpile. It is expected that this material would be reused during the landscaping period at the completion of the constructions.

58. All construction spoils, including solid and coal tar wastes and empty containers from the work sites should be removed from site and transported to the public waste disposal area. Disturbed areas should be re-vegetated immediately after earthworks are completed and/or sealed.

59. Building construction will commence upon completion of the sub-ground service activities including building of subgrade for airfield pavement and road pavement and foundations. Concrete will be required for building footings and slabs and this will be supplied using concrete trucks mainly from the on-site work areas, but concrete trucks may come also from concrete mixing plants outside the airport site. It is normal practice that as concrete trucks empties their load the truck drivers would want to wash off excess concrete from the drum and the concrete chute. This process should be performed in a controlled area and remediated at the end of the project by the contractor.

60. Processing and stockpiling of bitumen and aggregate needs also to be performed in a controlled environment. A designated location at the work site will be established that is to be paved or have concrete applied later, such as a roadway or parking lot.

61. Any solid and liquid waste associated with the building construction will be removed from the site and deposited at the municipal waste dumpsite. Drainage controls must be applied during this stage of construction. Once the pavement, concrete footings and slabs are installed the framing and interior works should have little or no effect on the site.

D. Pollution

62. Pollution effects relate to the contamination of water, soil and air by sewage, hazardous chemicals or gasses. Proper sanitation and sewerage facilities (septic tanks of adequate capacity or connection to the main sewer line) need to be constructed/established as part of the re-development works.

63. A range of hazardous chemicals including fuel, oils, fire-fighting chemicals (Foam/ Acquired Firm Forming Foam (AFFF) or Dry Chemical Powder (DCP), pesticides, paints, detergents, solvents, industrial chemicals used in aircraft maintenance and other hazardous materials are currently in use at the airport. These chemicals can affect soil, groundwater and stream ecosystems through direct toxicity, through increasing oxygen demand, and favoring the growth of bacteria and algae. The result can be localized areas of degradation, accumulations of toxins and adverse impacts on human health.

64. A formal waste oil/hazardous chemical collection system and solid waste removal system is required to be incorporated into the hangars, workshops and fuel depot area. This needs to be designed to ensure that all waste chemicals are properly handled, that short-term storage is safe and that materials do not escape to the environment. Environmental impacts of pollution associated with sewage, fuels, oils, incineration, and the use of other chemicals can be mitigated by good handling, storage, disposal and recycling.

65. Appropriate consideration will also be required to accommodate the environmental impacts of a major accident. This needs to be addressed not only the impact of fire fighting chemicals but also issues such as major fuel spills and overall site contamination.

E. Increased traffic and noise

66. Aircraft noise emissions, whilst considered only a minor issue at present, can increase with increasing flight frequency in the future operation of the airport, and need to be proactively managed. The problem can mostly be ameliorated by the careful location of ground running, and by the times these activities are undertaken. Less significant at present, but in need of monitoring and managing, are the noise impacts of aircraft in flight [typical noise levels in airports – 60-80dB(A)]. At the completion of later stages of re-development, both ends of the runway will be closer to residential/settlement/housing areas (approximately 600 meters from the Airport) and occupational and residential exposure to aircraft noise is expected to increase over time, although the noise impacts will be only for very short duration during aircraft take off and landing only.

F. Operations, Drills and Possible Aircraft accidents

67. The operation of an airport is not without risk. While aviation is an inherently safe industry, accidents do occur on or near airports with significant environmental and social risk. Further, to minimize the risks associated with accidents, it is necessary to carry out exercises on emergency response and fire-fighting which can result in chemicals escaping to the environment. Gurney Airport has an existing Unit Training Program (UTP) and Airport Emergency Plan (AEP). The UTP is conducted regularly based on a schedule as predefined by the Airport Rescue Fire Fighters (ARRF) Headquarters in Port Moresby. The AEP is carried out once or twice a year and involves all emergency parties or civil RFF such as Police, Medical Personnel, Security Personnel and safety officers for emergency procedure exercises. This is managed by the CAA Airport Manager.

68. A major accident of an aircraft on approach could involve major loss of life and property in the air and on the ground, particularly given the presence of villages on either end of the runway and the significant built up area of the township.

69. Also as a major construction site in an operational environment, the Project will also need to consider everyday accidents involving construction activities plus environmental damage from fuel spills and fire. As part of the Contractor's obligations it will be a requirement that contractor implement site Occupational Health and Safety Plan.

V. ENVIRONMENTAL MANAGEMENT PLAN

70. As the specific construction and operational activities are not yet fully defined for the project, the Environmental Management Plan (EMP) given here provides only a general outline of the measures and monitoring that will be undertaken for the project. It will be necessary to prepare a more detailed EMP during the detailed engineering design phase of the project. A condition of the proposed loan will be the adoption and enforcement of a Contractor's EMP to mitigate negative impacts associated with airport re-development. An EMP developed to cover the expected impacts for the upgrading and rehabilitation of Gurney Airport is described here. (See Appendix B).

A. Summary of Potential Impacts

71. The environmental impacts of the proposed development will be generally insignificant as the works only involve upgrading and rehabilitation of the airports within the existing property. The potential environmental impacts associated with the subprojects particularly

occur during the construction and operation phases. The major potential environmental impacts to be addressed for the Gurney Airport upgrading and rehabilitation project are concerned primarily with temporary impacts of mobilization and construction, problems of pollution related to the disposal of sewage, waste fuel and oils, and solid wastes generated during construction and operations, impacts associated with increased road and air traffic and noise in the area when flights are increased; and possible accidents. as follows:

1. **Construction Impacts:** During the conduct of earthworks, heavy rains and soil erosion problems can be expected in some areas. Control measures will be established to minimize the possibility of soil erosion. Major earthworks are not expected but there is possibility of increasing dust during construction. The impact of residual emissions is not expected to be significant because these will be for a very short duration. Construction activities may cause noise impacts for a short duration. Nonetheless, all mechanical equipment (e.g., excavators, dozers, etc.) will at all times be properly maintained and fitted with mufflers. Work will be limited only during the daytime to eliminate disturbance to surrounding communities during nighttime. Construction run-off from unprotected cleared areas, spillage and leakage from storage sites and machines may cause water quality deterioration of nearby water courses. Fumes from bituminous chemicals may cause impact if not properly mitigated. In general, the fumes are likely to be well dissipated in the open terrain and are unlikely to accumulate to nuisance levels.

2. **Pollution:** Problems of pollution related to the disposal of sewage, waste fuel, oils and solid wastes generated during operations; Temporary site contamination, noise and soil erosion associated with construction; pollution associated with firefighting drills and wastes collected from incoming flights;

3. **Noise impacts:** These would be associated with increased air traffic in the area and ground running of aircraft; and

4. **Accidents:** Possible airport accidents.

B. Planned Mitigation Measures

1. Impacts from Construction Activities

72. Potential contamination of the surrounding waters may occur as a result of the establishment of the temporary construction facilities and the minor clearing works in the project site. Loose soil and debris during the works may affect the water quality of the waters in the immediate vicinity of the work areas. The operation of heavy equipment will likewise contribute to the sedimentation from silt and mud at the project sites.

73. The Contractor's Depot Area, offices and terminal building will be provided with sanitary disposal facilities that will address the generation of domestic wastewater and proper solid waste management practices shall be institutionalized in all areas. Silt traps shall be established around areas identified for clearing to prevent siltation of the surrounding waters. Proper management, handling and disposition of spoils and unsuitable materials will be practiced during the project implementation to prevent siltation and sedimentation of nearby water bodies. During the works, it will be ensured that an adequate supply of an appropriate quality of water will be provided for both domestic (for the Contractor's Depot Area and temporary terminal) and other purposes (construction activities i.e. concrete mixing, clean-up of machineries and washing of trucks).

74. The minor clearing and upgrading/rehabilitation works in the immediate may cause an acute, albeit temporary, increase in levels of Total Suspended Particulates (TSP). The generation of SO_2, NO_2 and other gaseous materials is also an unavoidable impact of the

development activities, which is a direct result of the operation of fossil fuel burning equipment, vehicles and machineries.

75. The projected duration of this impact is short-term and is insignificant in scale and is not expected to cause concentrations that will be detrimental to human health. The increase in vehicular and human traffic during the operation of the upgraded airport shall have minimal impact on the air quality in the vicinity of the facility.

76. The clearing and development works will only be undertaken when necessary and will be limited only to the required areas. It will be endeavoured that dust generation be minimized and controlled. Regular water spraying of exposed areas will be undertaken to prevent the occurrence of excessive dust in work areas. This would also minimize the risk of the workers contracting upper respiratory problems as a result of excessive inhalation of dust particles.

77. It will also be ensured that all vehicles, equipment and appurtenant facilities will be properly maintained during all the Works. Appurtenant facilities will be sited in areas where nuisance to settlement and institutional areas will be minimal. Appropriate methods and equipment will be utilized for the collection; disposal and prevention of dust as a result of the operation of these facilities. Re-vegetation of cleared areas and landscaping of the airport will be undertaken to mitigate dust generation.

78. Activities attendant to the works and operation of the upgraded airport is not projected to cause any significant adverse impacts to the terrestrial ecology of the project area. The development works will be undertaken in the existing airport which is already a cleared/disturbed area.

79. It will at all times be endeavoured that clearing of vegetative cover be undertaken only when necessary so as to minimize, or if at all possible, eliminate loss of habitat of faunal communities. Re-vegetation of exposed areas and landscaping of the facility shall be undertaken.

80. There will be no household that will be evicted, relocated or resettled. The proposed development will be located within the property of the existing airport.

81. The proponent will give qualified local residents priority in employment during all phases of the implementation of the project. Skilled and unskilled workers for the development phase will be sourced from the villages in the impact areas. During the operation of the facility, service and maintenance requirements shall be sourced from the villages within the impact areas.

82. Livelihood opportunities will be created independent of the project. Residents engaged in these activities are expected to improve their standard of living because of additional income for their families.

83. After the all the Works have been completed, the Contactors will ensure that unauthorized occupants in the work area, because of their participation in the works, return to their original place of residence

2. Pollution

84. Pollution will be generated during construction and operation phases and is expected to include day-to-day production of solid waste, domestic sewage, oil and chemical wastes, as well as periodic pollution associated with emergency drills. The handling of pollution will also be an important part of emergency response for spills and accidents. These considerations

will be addressed in the environmental management plan for the Project. The EMP incorporates the following features for the Construction Phase:

a) Restrict the contractor to a single, pre-planned construction site;
b) Require the contractor to install a septic tank or mobile toilets;
c) Establish mechanisms for grey water to be managed according to site conditions;
d) Require the introduction of a commercial solid waste management system involving appropriate storage and removal from site of all solid wastes – no burial or burning;
e) Require that all lubricants be collected and recycled;
f) Ensure that the contractor has a spill contingency plan including drainage/ settling pond control, bunds, drainage around fuel and storage areas;
g) Ensure demobilization is clearly addressed.

85. Operational waste management processes as incorporated in the EMP for the sub-project will prescribe the proper handling, storage and disposal of all hazardous and toxic materials. Specific requirements under the plan will be to cease direct release of waste materials to the environment, to remove the existing solid waste rubbish dump and to identify and remediate any areas where existing practices have caused soil contamination.

86. The airport will continue to use fire retardant chemicals, but controls will be introduced on the volumes used such as proper storage cooling system for the AFFF and DCP and the provision of personnel protective equipment (PPE) for staff handling these chemicals, and the Project will fund the redevelopment of the fire practice site to more effectively control environmental impacts of this activity.

3. Air Quality and Noise Impacts

87. Temporary air and noise pollution may be controlled by requiring the Contractor's vehicles to travel at a reduced speed along major roads and that vehicle on site are turned off when not in use. Construction activity near residential areas (e. g. earthmoving, operation of heavy equipment and machineries) will be required to be constrained to defined working hours. Ancillary facilities must be located away from residential areas.

88. Aircraft ground operating noise will require management under the EMP that will provide for negotiated agreement between airlines, airport management and the local communities on times, frequency and locations of operations. Noise from aircraft in flight requires addressing in the context of the EMP. The Airport Operator will prepare, regularly update and promulgate noise exposure forecasts in accordance with the ANZECC 1992 or Australian Noise Exposure Forecast (ANEF).

89. Workers will be provided with basic Personnel Protective Equipment (PPE) such as hard hats, reflectorized vests (for workers in the airstrip areas), masks and gloves (for workers handling bitumen and other hazardous and toxic materials).

4. Accidents

90. The Contractor's Occupational Health and Safety Plan will include processes and procedures to protect the health and safety of workers and the public during construction. The Contractor will also be required to conform to aviation safety, security and method of working procedures in accordance with Papua New Guinea (PNG) Civil Aviation Regulations. The Contractor's adherence to this will be monitored by the Program Support Consultant at all stages of the development works. The Airport Operator, airlines and other aviation operators will introduce, under the Civil Aviation Regulations, a formal Safety

Management System. For Gurney Airport, this will address both temporary safety risks during construction, and ongoing safety risks during normal operations. This system will also address management of environmental impacts of accidents and safety management processes.

C. Planned Environmental Monitoring

91. A general Environmental Monitoring Plan to cover the program is presented in Appendix C. The Monitoring Plan focuses only on impacts of the project that are likely to need attention and which will be incorporated into the final EMP after detailed airport design. A baseline survey will be conducted prior to commencement of works. The Environmental Monitoring Plan includes the main elements, including the Detailed Design, Pre-Construction, Construction and Operations Phase of the Project as follows:

A. Design considerations for surface run-off, erosion, siltation and flooding;
B. Inspections of the Contractor's operations and the construction sites;
C. Inspections of waste management and the handling of hazardous wastes

92. The estimated costs for the EMP that covers environmental mitigation and environmental monitoring plan are estimated at $159,000, covering environmental mitigation at $ $128,000 and environmental monitoring at $31,000. The costs of the environmental mitigation plan will be part of the construction costs (Appendix C).

D. Coordination and Dialogue with stakeholders

93. Regular dialogues during all phases (detailed design, pre-construction, construction and commissioning and operation of the facility) of project implementation will be undertaken by all parties concerned with the stakeholders and communities within the vicinity of the proposed development. This will ensure that information will be fed back to the stakeholders and communities relevant to the project implementation and that issues and concerns of the affected people and communities will be streamed back to the Design Consultants (DC), Construction Supervision Consultants (CSC), CAA, IES and EO, etc. Recruitment of local labour should form part of the community involvement process where practical.

E. Responsibilities and Authorities for Implementation of Mitigation Measures

94. Effective implementation of the EMP requires an institutional setting, framework and information flows. The Civil Aviation Authority (CAA) as the implementing agency will be responsible for the construction and operation of the project. The responsibility for implementing the environmental management and monitoring plan (EMP) will be the CAA. A Project Implementation Unit (PIU) will be established within the CAA and an International Environmental Specialist (IES) and Domestic Environmental Specialist (Environment Officer) will form part of the PIU. A detailed description of the responsibilities of all parties concerned is incorporated in the Environmental Assessment and Review Framework (EARF) for the Investment Program.

F. Report Requirements

95. The Environmental Officer (EO) at the PIU will be responsible for monitoring of the EMP implementation by contractors, and will forward monthly progress reports to CAA. The reports will contain progress made in EMP implementation with particular attention to compliance with the principles and matrix set out in the EMP for each subproject. A section on compliance with the EMP will be included in the semi-annual report that is prepared for ADB as a requirement for the loan. The CAA will submit semi-annual monitoring report to

ADB. General good practice requires that an EMP monitoring report will be completed according to the following schedule:

1. A report at the end of project design. Prepared by the IES and EO in CAA-PIU,
2. A report prepared every 1 month during construction, by the contractor,
3. A report prepared every 3 months by the EO in PIU for the CAA,
4. A report prepared every 6 months by the IES and EO in PIU for the ADB and,
5. A yearly report that is prepared by Program Support Consultant during operation for as long as the monitoring is specified in the EMP.

VI. INSTITUTIONAL REQUIREMENTS

96. The Civil Aviation Authority (CAA) as the implementing agency will be responsible for the construction and operation of the project. The responsibility for implementing the environmental management and monitoring plan (EMP) will be the CAA. A Project Implementation Unit (PIU) will be established within the CAA and an IES and EO will form part of the PIU.

97. The overall MFF Program will be overseen by a steering committee. The executing agency of the MFF Program will be the CAA. The Project Implementation Unit (PIU) will be responsible for the daily implementation of the Program. An International Environmental Specialist (IES) will be engaged intermittently as part of the CAA during the Investment Program, i.e. eight (8) months over the Investment Program period and a National Consultant (EO) will be engaged full time for ninety six (96) months as National Expert input. The primary tasks of the IES includes: (i) strengthening the environmental management of the Project during detailed design, bidding process, contract process, construction, and implementation, (ii) supervision and guidance of the environmental assessment process for all subprojects under the MFF, (iii) supervision of the EMP implementation of subprojects, and (iv) undertaking the necessary institutional strengthening including on-the-job training for the Environmental Officer (EO) of CAA by giving major tasks to the EO in all of these activities. The IES will report directly to the CAA and the EO will report to PIU, they will be accountable and responsible for implementation of the EMP. The IES and the EO will coordinate the implementation of the EMP of the subprojects. The CAA will allocate sufficient resources to the IES and the EO to undertake their tasks to supervise and monitor the environmental assessment process and to monitor the EMP implementation of all subprojects under the MFF.

VII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

98. As required by the Environmental Guidelines of the ADB, a dialogue was conducted with Mr. Kako Dagoela, Councilor (Male representative) of Gabugabuna Village, Huhu LLG and Mr. Tims Vincent, Councilor (Male representative) also of Huhu LLG on 20 May 2009 as part of the preparation of the IEE. The main purpose of the dialogue was to present the proposed project, illicit issues and concerns that the people in the impact area may have relevant to the proposed development and discuss the ADB environmental requirement for projects of this type. Among the major issues raised relevant to the proposed development are as follows:

1. Noise Pollution. The villagers raised the issue of noise pollution as a result of the operations of the existing airport;

2. Insurance or compensation. The Councilors want an insurance and/or compensation in the event of accidents or emergencies attributable to the operation of the Gurney Airport which would affect their health, livelihood or the environment.

VIII. FINDINGS AND RECOMMENDATIONS

99. The IEE has carried out a screening process that determined the potential environmental impacts due to location, construction and operation of the subproject as well as the direct and indirect effects on the existing environment. Impacts are expected to occur due to location and at all project stages. However, they were assessed to be either insignificant or temporary and reversible.

100. Mitigation measures to prevent or minimize unnecessary impacts are also provided. Potential impacts and risks during construction were also characterized as short term and unnecessary impacts will be minimized through good construction management and housekeeping practices. An environmental management plan (EMP) that covers environmental mitigation of potential impacts and environmental monitoring plan has been prepared to ensure that the project will be implemented in an environmentally sound and sustainable manner.

IX. CONCLUSIONS

101. The Project will cause short-term environmental disturbances associated with construction activity that will be mitigated by operational procedures during construction, within the framework of a contractor's approved EMP to be supervised by the PIU.

102. Positive impacts to the local economy will accrue through increased rent payments to landowner groups, new income earning opportunities generated by demand for labour during construction and airport staffing and management arrangements, and through the creation of new non-aeronautical business opportunities in the terminal facilities and surrounding areas.

103. This IEE concludes that in the context of appropriate mitigating strategies described above, and the positive environmental benefits to flow from the Project, environmental impacts can be managed within acceptable levels. There are no significant environmental impacts needing further detailed study or EIA. All potential and associated impacts can be addressed through implementation of the mitigation measures as proposed in the IEE. Provisions will be made in the Project Budget to cover the environmental mitigation and monitoring costs. Therefore, this IEE is sufficient for the proposed project and with its proposed environmental management and monitoring program can be considered the completed EIA.

APPENDIX A
PHOTOGRAPHS

PHOTOGRAPH 1 – EASTERN END OF THE RUNWAY WHICH WILL BE EXTENDED BY 160 METERS

PHOTOGRAPH 2 – PALM OIL TREES LOCATED OFF THE EASTERN END OF THE RUNWAY WILL NOT BE AFFECTED BY THE PROPOSED DEVELOPMENT

PHOTOGRAPH 3 – TAXIWAY AND TERMINAL OF GURNEY AIRPORT

PHOTOGRAPH 4 – GURNEY AIRPORT TERMINAL AND APRON

APPENDIX B
ENVIRONMENTAL MANAGEMENT PLAN

TABLE 2. ENVIRONMENTAL MANAGEMENT PLAN FOR GURNEY AIRPORT

POTENTIAL IMPACTS	LOCATION	POSSIBLE EFFECTS	MITIGATING MEASURES	SIGNIFICANCE OF EFFECTS				MITIGATION COSTS	INSTITUTIONAL RESPONSIBILITY
				NOT	SMALL	MED	MAJOR		
A. IMPACTS DUE TO AIRPORT LOCATION									
1. Disruption of Surface Water									
a. Changes in hydrological regimes	Airports and surrounding areas	i) Impairment of aquatic ecology ii) Drainage disrupted iii) Drinking water source	i) Dimension of drains ii) Diversion of stream iii) Use of grassed areas for runoff	X X	 X 			NIL NIL NIL	PIU/DC PIU/DC PIU
b. Pollution as leaking from stockpiles and spoils	Downstream from construction areas	i) Impairment of aquatic ecology ii) Drinking water source	i) Location of stockpiles on paved areas ii) Removal of stockpiles after construction iii) Re-vegetation after construction	 X	X 			NIL NIL	PIU/DC PIU
2. Disruption of groundwater									
a. Changes in hydrological regimes	Airports and surrounding areas	i) Impairment of yields		X				NIL	PIU
b. Pollution by spoils leachate	Downstream from construction areas	i) Impairment of drinking water		X X				NIL NIL	PIU PIU/DC
3. Changes in nearby land values	Surrounding areas and nearby villages	I) Increase in vicinity of Airport		X				NIL	LA
4. Loss of aesthetics	Vicinity of Airports	i) Loss of aesthetic value of land	i) Landscaping and re-vegetation	X				**USD10,000**	PIU/DC
B. IMPACTS DUE TO DESIGN									
1. Slope erosion	Airport vicinities	i) Siltation of rivers affecting hydrology and water quality	I) Installation of silt traps on all drains		X			**USD5,000**	PIU/DC
2. Human and chemical waste	Downstream of Airport sites	i) Pollution of surface and groundwater resources	i) Installation of oil and water separators, and traps on drains ii) Development of safe storage areas and proper handling of hazardous and toxic materials iii) Proper disposition of hazardous and toxic materials iv) Connection of Airport to main sewer line or construction of proper septic tanks of adequate capacity		X			**USD15,000**	PIU/DC
C. IMPACTS DURING CONSTRUCTION									
1. Sediment runoff	Downstream of Airport sites and waterways	10 Damage to aquatic/marine ecology and/or flooding issues	i) Locate stockpiles in controlled areas ii) Sub-grade and sub-base material placed quickly after removal of topsoil iii) Planned construction work during dry season iv) Removal of spoils and construction debris		X			**USD10,000**	Contractors/PIU
2. Safety of workers	Airport sites	i) Hazards to worker's health and safety	i) Construction methodology under control of Safety Officer and CSC ii) Approved Contractor's Occupational Health and Safety Plan	X				**USD3,000**	Contractors/PIU
3. Communicable disease hazards	Airport site and adjacent villages and settlements	i) Risks to worker's health	i) Contractor to source labourers and workers from the nearby villages	X				NIL	Contractors/PIU
4. HIV and other communicable diseases	Airport site and adjacent villages and settlements	i) Risks to worker's health ii) Risks to residents	i) Contractor to source labourers and workers from the nearby villages ii) Contractors to increase awareness of workers	X	 X			NIL NIL	Contractors/PIU Contractors/PIU

POTENTIAL IMPACTS	LOCATION	POSSIBLE EFFECTS	MITIGATING MEASURES	SIGNIFICANCE OF EFFECTS				MITIGATION COSTS	INSTITUTIONAL RESPONSIBILITY
				NOT	SMALL	MED	MAJOR		
5. Slum creation risks	Airport sites	i) Slums forming in construction sites after completion of works	i) Demolition of structures as part of abandonment plan	X				**USD10,000**	Contractors/PIU
6. Cultural differences risk/social conflicts	Airport site and adjacent villages and settlements	i) Social disruption	i) Contractor to source labourers and workers from the nearby villages	X				NIL	Contractors/PIU
7. Escape of hazardous materials	Airports vicinities	i) Health risks to residents of nearby communities/villages	i)Installation of oil and other traps on drains ii) Development of safe storage areas and proper handling of hazardous and toxic materials	X				NIL (cost included in item C. 2.)	Contractors/PIU
8. Increase in levels of Total Suspended Particulates (TSP), SO_2 and NO_2	Airport site and adjacent villages and settlements	i) Health risks to workers and residents of nearby villages and communities	i) Locate Ancillary Facilities away from residential and settlement areas ii) Provide workers with Personal Protective Equipment (PPE)	X				**USD15,000**	Contractors/PIU
9. Noise Pollution	Airport site and adjacent villages and settlements	i) Health risks to workers and residents of nearby villages and communities	i) Control vehicles speed in work areas and sensitive locations ii) Locate Ancillary Facilities away from residential and settlement areas iii) Provide workers with Personal Protective Equipment (PPE)	X				NIL (cost included in item C. 9.)	Contractors/PIU
10. Water pollution from domestic sewage and wastes	Ancillary facilities	Ii) Contamination of nearby water courses and land	i) Proper solid waste management system to be practiced in work areas	X				**USD5,000**	Contractors/PIU
11.Ground and water contamination from oil and grease	Ancillary facilities	i) Damage to surrounding areas from improper handling of materials	i) Collect and recycle petroleum products ii) Development of spill contingency plans iii) Construction of bund walls and drainage systems around fuel storage areas		X			**USD15,000**	Contractors/PIU
12.Disruption of utilities	Nearby settlements	i) Disruption of services	I) Investigate limits to required services and minimize disruptions	X				NIL	Contractors/PIU
13.Increase in traffic	Surrounding areas	i) Traffic congestion in major roads	i) Prepare traffic management plans	X				NIL	Contractors/PIU
14. Demobilization	Ancillary facilities	i) Contamination of ground/land ii) Solid waste generation	i) Preparation of abandonment plan ii) Demolition of temporary offices and Contractor's Depot Area iii) Dismantling of ancillary facilities iv) Re-vegetation of exposed areas v) Proper disposition of construction debris	X				**USD10,000**	Contractors/PIU
D. IMPACTS DURING OPERATION AND MAINTENANCE									
1. Noise nuisances	Nearby settlements	i) Noise pollution	i) Establishment of buffers between airport and nearby settlement areas ii) Preparation of operational procedures by Airport Operator based on ANZECC 1992 or Australian Noise Exposure Forecast (ANEF)			X		**USD15,000**	CAA/PIU/ DEC
3. Water pollution	Downstream of Airports	i) Contamination of surface and groundwater resources	i) Proper handling, storage and disposal of petroleum, hazardous and toxic materials ii) Development of spill contingency plans		X			NIL	PIU/ DEC
4. Air pollution	Airport vicinities	i) Health hazards and nuisances to nearby villages and settlements	i) Regular monitoring of air quality in the vicinity of the airports and sensitive receptors	X				**USD15,000**	PIU/DEC
5. Increased traffic	Airport vicinities and major roads into the Airports	i) Traffic congestion in major roads	i) Preparation of Traffic Management Plans					NIL	PIU/Local Government Units

PIU – Project Implementation Unit; DC –Design Consultants; DEC –Department of Environment and Conservation

USD000,000 – Cost quoted are estimates and will be finalized upon completion of Detailed Design (to be included in Bill of Quantities)

APPENDIX C
ENVIRONMENTAL MONITORING PLAN

TABLE 3. ENVIRONMENTAL MONITORING PLAN FOR GURNEY AIRPORT

PHASE/IMPACT	MITIGATING MEASURE	PARAQMETERS TO BE MONITORED	STANDARDS	LOCATIONS[1]	DURATION	FREQUENCY	IMPLEMENT	SUPERVISE
PRE-CONSTRUCTION PHASE								
1. Erosion, siltation and flooding of waterways	i) Drainage design ii) Use of gently sloping grass surfaces iii) Silt traps in all drains	i) Drains are of sufficient quantity and size to accommodate additional volume ii) Silt traps are of sufficient quantity and size to protect surrounding areas from siltation	Capacity sufficient for 80% of 30 year maximum	Gurney Airport	Detailed Design Phase	Once at Detailed Design Phase	Design Contractor	PIU
CONSTRUCTION PHASE								
1. Sediment runoff	i) Stockpiles in controlled areas ii) Sub-grade and sub-base material placed immediately after removal of topsoil iii) Planned construction during the dry period iv) Removal of spoils and construction debris v) Provision of sediment traps	i) Inspection of stockpiles ii) Construction schedule for earthworks iii) Contents of sediments traps iv) Turbidity of streams	i-iii) Stockpiles and earthworks are managed to best practices-Defined in Final EMP iv) Water Quality Standards of DEC	Gurney Airport	Construction period	Monthly	Contractor/ PIU/CSC	DEC/CAA
2. Water Pollution	i) Installation of oil and other traps on drains ii) Proper handling and storage of hazardous and toxic materials iii) Locate ancillary facilities away from settlement areas	i) Inspection of storage of hazardous and toxic wastes areas ii) Inspection of oil traps in drains iii) Pollution load of downstream water courses	i-ii) Best practices – Defined in final EMP iii) Water Quality Standards of DEC	Gurney Airport	Construction Phase	Monthly	Contractor/ PIU/CSC	DEC/CAA
3. Health and safety of workers	i) Construction methodology and work plan ii) Contractor's approved OH &S Plan	i) Site inspection	i) Compliance with method of Working Plan and OH & S Plan	Gurney Airport	Construction Phase	Monthly	Contractor/ PIU/CSC	DEC/CAA
4. Demobilization	i) Preparation of abandonment plan ii) Demolition of temporary offices and Contractor's Depot Area iii) Dismantling of ancillary facilities iv) Re-vegetation of exposed areas v) Proper disposition of construction debris	i-v) Inspection of operations and site	i-v) Best practices – Defined in Final EMP	Gurney Airport	End of construction phase	Once	Contractor/ PIU/CSC	DEC/CAA
OPERATION AND MAINTENANCE PHASE								
1. Noise disturbance	i) Establishment of buffers between airports and nearby settlements ii) Preparation of operational procedures by Airport Operator	i) Ambient Noise	i) ANZECC 1992 or Australian Noise Exposure Forecast (ANEF)	Gurney Airport	Operations	Semi-Annual	PIU/CAA	DEC
2. Water pollution	i) Proper sanitation and sewerage systems (construction of septic tanks or connection to main sewer line) installed ii) Spill contingency plan	i) Inspection of operations and site ii) Storage for hazardous and toxic materials	i-ii) Water Quality Standards of PNG-DEC	Gurney Airport	Operations	Semi-Annual	PIU/CAA	DEC
3. Air pollution	i) Proper maintenance of vehicles ii) Re-vegetation of exposed areas	i) Total suspended particulates	i) DEC Air Quality standards	Gurney Airport	Operations	Semi-Annual	PIU/CAA	DEC

PIU – Project Implementation Unit; CSC – Construction Supervision Consultants; CAA – Civil Aviation Authority; DEC –Department of Environment and Conservation

[1] Specific sampling stations will be defined during the conduct of the baseline survey before commencement of works

TABLE 4. MATRIX OF ENVIRONMENTAL MONITORING PLAN FOR THE PROPOSED UPGRADING AND REHABILITATION OF GURNEY AIRPORT

ENVIRONMENTAL PARAMETER		INDICATOR PARAMETERS	MONITORING FREQUENCY	PLANNED AREA OF MONITORING	EQUIPMENT REQUIREMENTS AND COST (US$)	COST OF MONITORING (MONTHLY COST IN US$)
Physical Environment	Air and Noise	Sulfur dioxide	Monthly During Construction Period/Semi-Annual During Operation Period	2 stations	1 Unit - PM10 Portable US$2500 1 Unit - 3 Gas Analyzer Portable US$2000.00	US$500.00 (includes transport and lab analysis)
		Nitrogen dioxide	Monthly During Construction Period/Semi-Annual During Operation Period			
		Total Suspended Particulate	Monthly During Construction Period/Semi-Annual During Operation Period			
		Noise	Monthly During Construction Period/Semi-Annual During Operation Period		1 unit – Noise Meter US$500.00	US$400.00 (includes transport and lab analysis)
	Water Quality	Temperature pH Biological Oxygen Demand (BOD) Dissolved Oxygen (DO) Oil and Grease Total Coliform Count Total Suspended Sediments (TSS) Total Dissolved Solids (TDS)	Monthly During Construction Period/Semi-Annual During Operation Period	1 Station	1 Unit Portable Water Quality Analyzer US$2000.00	US$600.00 (includes transport and lab analysis)

TABLE 5. SUMMARY OF ENVIRONMENTAL MANAGEMENT COSTS FOR THE PROPOSED UPGRADING AND REHABILITATION OF GURNEY AIRPORT

PHASE			COST[2] (US$)
Impacts Due to Airport Location			10,000.00
Impacts Due to Design			20,000.00
Impacts During Construction			68,000.00
Impacts During Operation and Maintenance			30,000.00
Sub-Total			**128,000.00**
PARAMETER	**EQUIPMENT (US$)**	**MONTHLY MONITORING (US$)**	**COST[3] (US$)**
Air and Noise	5,000.00	900.00	19,400.00
Water Quality	2,000.00	600.00	11,600.00
SUB-TOTAL	**7,000.00**	**1,500.00**	**31,000.00**
GRAND TOTAL			**159,000.00**

[2]Costs quoted are estimates and will be finalized upon completion of Detailed Design Phase (to be included in Bill of Quantities). Costs will be incorporated in total construction cost.
[3]Cost inclusive of Equipment, transport, and laboratory analysis for Baseline survey before commencement of works, 9 months of construction period, and 3 years operation phase