Relocation of Broome International Airport

Broome International Airport Holdings

Report and recommendations
of the Environmental Protection Authority

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Summary and Recommendations

Broome International Airport Holdings proposes to construct and operate a new international airport at a site approximately 12 km north-east of Broome townsite. This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal.

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

Relevant environmental factors

In the EPA's opinion, the following are the environmental factors relevant to the proposal, which require detailed evaluation in the report:

(a) Biodiversity

- Vegetation communities – potential impacts of clearing 200 hectares of Pindan vegetation;
- Terrestrial Fauna – potential impacts on fauna such as the Greater Bilby (*Macrotis lagotis*) and Agile Wallabies;

(b) Migratory birds – potential impact on migratory birds and Roebuck Bay Ramsar site;

(c) Water quality – potential impact on water quality; and

(d) Noise – potential impacts on noise sensitive premises.

Conclusion

The EPA has considered the proposal by Broome International Airport Holdings to construct and operate a new international airport at a site approximately 12 km north-east of Broome townsite.

The EPA notes that the site selected for the proposed airport was one of a number of options considered with reference to aviation safety, Aboriginal heritage values, engineering design, biological values and community and social impacts within a reasonable distance from Broome.

The EPA has concluded that the proposal to establish the airport on the selected site is capable of being managed in an environmentally acceptable manner such that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the proponent's commitments and the recommended conditions set out in Appendix 4 and Section 4.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment and Heritage:

1. That the Minister notes that the proposal being assessed is for the construction and operation of a new international airport at a site approximately 12 km north-east of Broome, to allow for the redevelopment of the existing airport within the Broome townsite.
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3.
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4, including the proponent's commitments.

4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

5. That the Minister notes the advice provided in Section 5 of the report in relation to the social impact, coastal management planning, future planning with regard to potential noise impacts from aircraft operations, bird strike management, road traffic noise and redevelopment of the existing airport.

Conditions

Having considered the proponent's commitments and information provided in this report, the EPA has developed a set of conditions which the EPA recommends be imposed if the proposal by Broome International Airport Holdings Pty Ltd to construct and operate the relocated Broome International Airport is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

(a) that the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 4;

(b) that the proponent shall prepare and implement a Flora and Fauna Management Plan; and

(c) that the proponent shall prepare and implement a Noise Management Plan.

Other Advice

The EPA has considered other matters associated with the proposal and recommends that:

- the Shire of Broome conduct a social impact analysis to determine the potential impact the redevelopment of the existing airport site may have on the population of Broome, with particular emphasis on the indigenous population;

- the Shire of Broome and the Ministry for Planning, along with the Department of Conservation and Land Management, prepare and implement a Coastal Management Plan for the northern shores of Roebuck Bay;

- noise sensitive development be sited in areas further away from the proposed airport site where noise levels are anticipated to fall outside the 15 ANEF contour;

- The Shire of Broome consider the attractiveness to birds of rubbish sites and open water bodies, such as sewerage works, in determining the siting of such facilities in close proximity to the airport so as to minimise bird strike and the proponent provide annual bird strike records to CALM;

- Main Roads Western Australia examine and address potential increases in road traffic noise as a result of the proposal as part of the current study of traffic between the airport site and Broome; and

- issues associated with the redevelopment of the existing airport site in Broome will be considered by the EPA when the site is proposed to be redeveloped.

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1. Introduction and Background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal by Broome International Airport Holdings, to construct and operate a new international airport at a site approximately 12 km north-east of Broome townsite.

The new airport is proposed to replace the existing airport within the Broome townsite to allow for the northern expansion of Broome and to cope with anticipated demand for larger aircraft required for future tourism for the Kimberley area. The need for a new airport site was foreshadowed in the Waterbank Structure Plan, developed in 1999, which provided for long-term strategic planning for the expansion of the Broome townsite and the surrounding area.

The existing airport site will be redeveloped for residential, tourist and commercial purposes. The site is currently zoned Development Zone with an Airport Structure Plan to guide future development of the site. Some development has already taken place in the northern section of the airport land at Roebuck Estate.

The new airport site was identified by the Broome Airport Relocation Taskforce (BART) which included representation from the Shire of Broome, WA Tourism Commission, Ministry for Planning, Kimberley Development Commission, Department of Environmental Protection, Department of Land Administration, Airport Engineering Services, Broome Aviation and the Department of Transport (Halpern, Glick and Maunsell, 2000).

Ten potential sites were identified and evaluated according to a number of criteria including Aboriginal heritage values, aviation safety, distance from Broome, biological values and community and social impacts.

The ten sites were narrowed down to two options with the proposed site being selected because the other site, although more favourable in terms of aviation selection criteria, was adjacent to areas with significant indigenous cultural significance.

The proposal was referred to the Environmental Protection Authority (EPA) in September 1999 and a level of assessment was set at Public Environmental Review (PER) in order to ensure the airport proposal was appropriately located, designed and managed to meet the EPA's environmental objectives.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses environmental factors relevant to the proposal. The Conditions and commitments to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 provides Other Advice by the EPA, Section 6 presents the EPA's conclusions and Section 7, the EPA's Recommendations.

Appendix 1 to this report contains a list of organisations and individuals who made submissions on this proposal. Appendix 2 contains the references used in the EPA report. Appendix 3 contains a summary of the identification of the relevant environmental factors and Appendix 4 the EPA's recommended environmental conditions and the proponent's commitments.

A summary of issues raised in submissions and the proponent's response to each of these is provided at Appendix 5. This document is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process and which have been taken into account by the EPA appear in the report itself.

2. The Proposal

The proposed airport will be located in a site approximately 12 km north-east of Broome townsite (Figure 1). The proposal involves the construction of one main runway, parallel taxiway, turning nodes, apron parking, general aviation parking, maintenance and storage hangers and fuel storage. It also includes domestic and international terminals, land-side and airside commercial activities and a short future parallel runway for light aircraft.

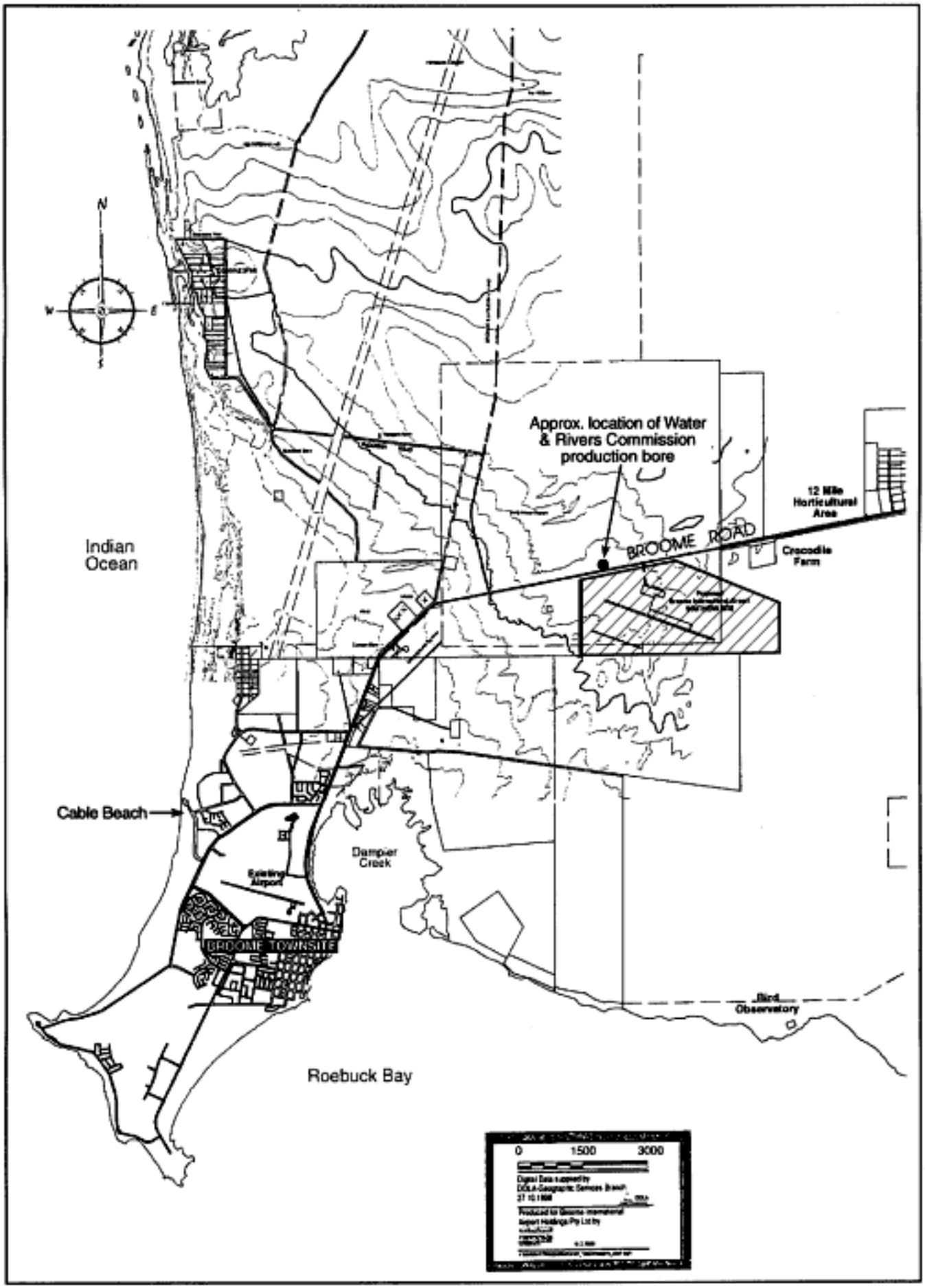

Figure 1. Location of the new airport in relation to Broome townsite (Source: PER, Figure 1.1).

The area of the site is approximately 800 hectares, of which approximately 200 ha will be cleared for airport facilities (Figure 2).

The current airport is used predominantly by BAe146 size aircraft which will be phased out over the next few years. The new airport will cater for an increase in the number of flights and the size of aircraft with forward estimates to the year 2025 being a mix of passenger aircraft of Boeing 737-300, -400, -700 size and passenger aircraft of A318 size with some smaller turboprop aircraft. Flights of occasional larger aircraft of 767 size will take place. International direct flights are forecast to be by Boeing 737 and Airbus A319/320.

The B767 flights are forecast to be day time only, 30% of B737 and BAe146/A318 are forecast to be night-time flights, 50% of medium capacity turboprop aircraft such as Brasilia, Metroliner and Coastwatch at night and 10% of general aviation at night.

The airport will have one runway aligned 11/29 (Figure 2) with 60% of take-off and landing traffic using runway 29 and 40% using runway 11.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Section 2 of the PER (Halpern Glick Maunsell, 2000)

Table 1 - Summary of key proposal characteristics

Element	Quantities/Description
Location	Approximately 12 kilometres north-east of Broome townsite on the south side of Broome Road
Airport reserve	800 hectares approximately
Construction duration	Staged over 5-7 years
Area of land clearing	200 hectares approximately, subject to final design
Runway dimensions (initial)	Approximately 2700 metres x 45 metres
Runway length (final)	Approximately 3500 metres x 45 metres
Runway bearing	$290^0/110^0$
Future short parallel runway for light aircraft - dimensions	Approximately 1300 metres x 45 metres
Taxiways	Approximately 2000 metres x 30 metres
Carparks, terminal buildings and sewerage	Approximately 32 hectares
Access road	Approximately 500 metres x 20 metres
Fuel storage capacity and use	Storage capacity of approximately 400,000 litres of Jet A1 and 100,000 litres of Avgas Approximately 24 million litres throughput per year
Water supply / consumption	Dedicated borefield to be constructed Estimated approximately 75 cubic metres of water per average day (27,000 cubic metres pa)

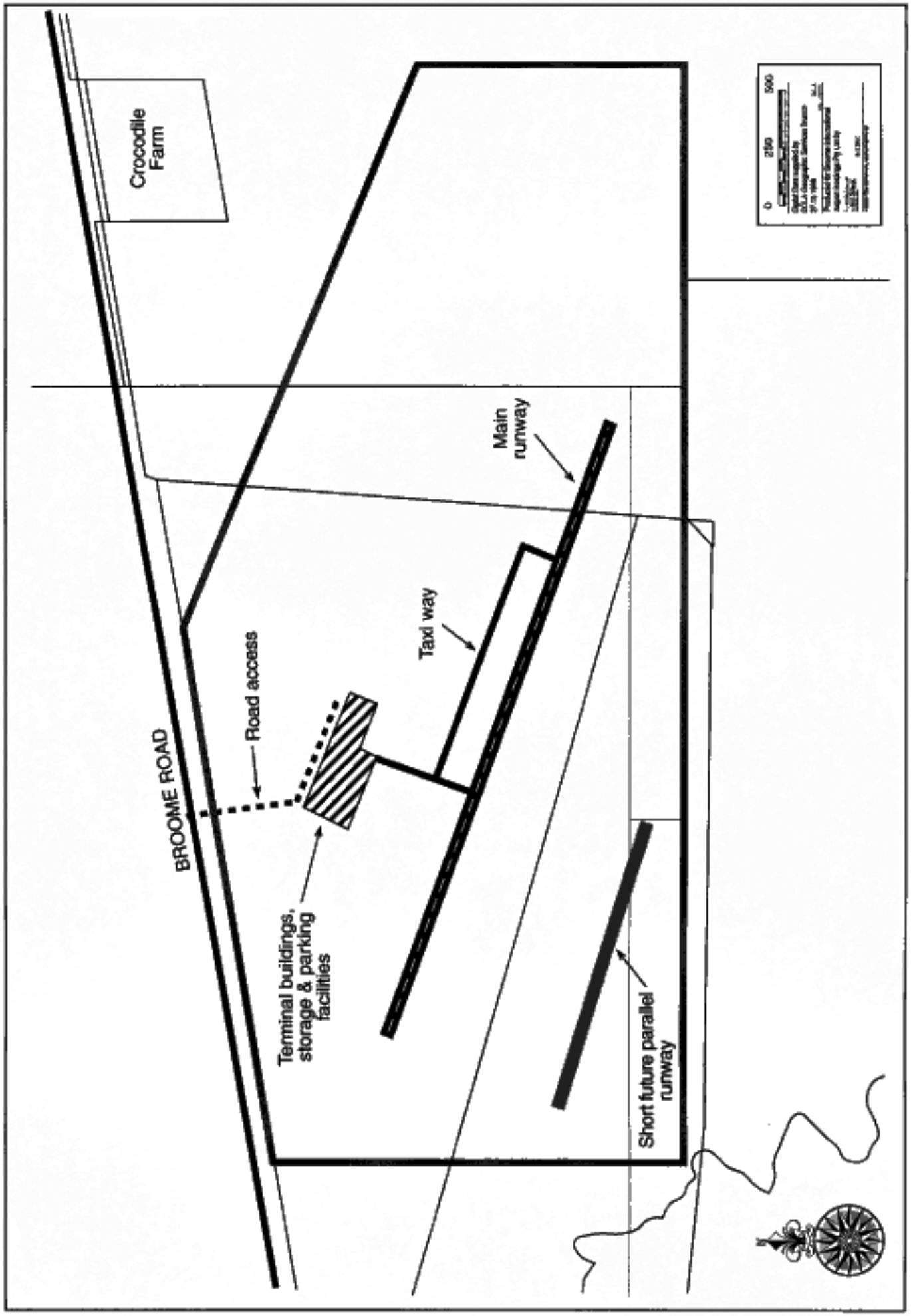

Figure 2. Proposed layout of airport runways within the airport reserve (Source: PER, Figure 2.1).

3. Relevant Environmental Factors

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the relevant factors is summarised in Appendix 3. It is the EPA's opinion that the following are the environmental factors relevant to the proposal which require detailed evaluation in this report:

(a) Biodiversity

- Vegetation Communities – potential impact of clearing 200 hectares of Pindan vegetation;
- Terrestrial Fauna – potential impact on fauna such as the Greater Bilby (*Macrotis lagotis*) and Agile Wallabies;

(b) Migratory birds – potential impact on migratory birds and Roebuck Bay Ramsar site;

(c) Water quality – potential impact on water quality; and

(d) Noise – potential impact on noise sensitive premises.

The above relevant factors were identified from the EPA's consideration and review of all environmental factors (preliminary factors) generated from the PER document and the submissions received, in conjunction with the proposal characteristics.

Details on the relevant environmental factors and their assessment is contained in Sections 3.1 - 3.4. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

A summary of the assessment of the environmental factors is presented in Appendix 4.

3.1 Biodiversity

3.1.1 Terrestrial Flora – Vegetation Communities

Description

The clearing of approximately 200 hectares of native vegetation and the construction and operation of the airport has the potential to affect the representation and viability of vegetation communities.

Submissions

A number of submissions raised issues regarding the adequacy of the flora and vegetation survey particularly with the limited time spent carrying out the work. Some of the submissions expressed the view that Pindan vegetation is not uniform and that greater variation would have been expected within the site.

The Department of Conservation and Land Management (CALM) initially advised the proponent that detailed surveys of the site would not be required, however, CALM subsequently advised that the two day surveys conducted were not adequate to determine the significance of the flora within a regional context.

Further field surveys were carried out in July 2000 but the survey sites were not located in areas to be cleared for airport purposes such as runways and buildings and involved resampling in the vicinity of the quadrats previously studied.

Assessment

The area considered for assessment of this factor is the airport reserve in the regional context of the Pindan vegetation distribution.

The EPA's environmental objective for this factor is to maintain the species abundance, diversity, geographic distribution and productivity of the vegetation.

The proposal will result in the permanent loss of approximately 200 hectares of vegetation composed of *Acacia eriopoda* on Pindan sands. The vegetation is largely in reasonably good condition, with the exception of the eastern portion of the 800 hectare area which has been grazed over a number of years. Recovery of this degraded vegetation will occur when grazing ceases as part of the development.

The Department of Environmental Protection (DEP) has advised that, because the second flora sampling was carried out in quadrats only approximately in the same locality and not in marked areas, some of the additional species found may be a consequence of looking in a new area rather than simply a seasonal effect. The DEP does not agree with the PER's assessment that the area does not have a particularly diverse flora and the fact that the second survey added an additional 25% of species emphasises the natural values of the area.

The proponent has acknowledged that there will be slight variations in the composition of flora species that are recorded from specific sites throughout the Pindan vegetation community, however, it was considered that the variations were not significant enough to warrant splitting into separate vegetation communities.

The DEP has recommended that mowing should be used around the airstrip rather than clearing, use of native grasses for verges of the runway, drainage to be managed to prevent weeds being directed outside the airport, fencing around the reserve and potential Bilby habitat, and that the remaining 600 ha of vegetation be retained and not developed.

CALM has advised that the proponent should focus on wildlife management in the preparation of an Environmental Management Plan (EMP).

In a regional context, approximately 28,000 ha of the Pindan vegetation community is reserved in the Coulomb Nature Reserve some 80 km to the north of the airport site (Hopkins, 1996). Therefore only approximately 2.3% of the vegetation is considered to be in secure conservation reserves, however, the Pindan vegetation community is extensive and 200 ha of clearing is unlikely to have a significant impact on its abundance and diversity (Figure 3).

The proponent has given a commitment to undertake an Environmental Management Plan which includes flora, fauna and operations management. A condition will be imposed for further flora and fauna survey work to be undertaken and to ensure protection of the remaining 600 hectares of vegetation within the airport reserve.

Summary

Having particular regard to:

1. The relatively uniform nature of the Pindan vegetation and its widespread distribution;

(b) The advice of the DEP;

(c) The proponent's commitment; and

(d) The advice of CALM,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor, provided a condition is imposed that the proponent undertakes further survey work focusing on specific wildlife management issues and protection of the remaining 600 ha of vegetation within the airport reserve.

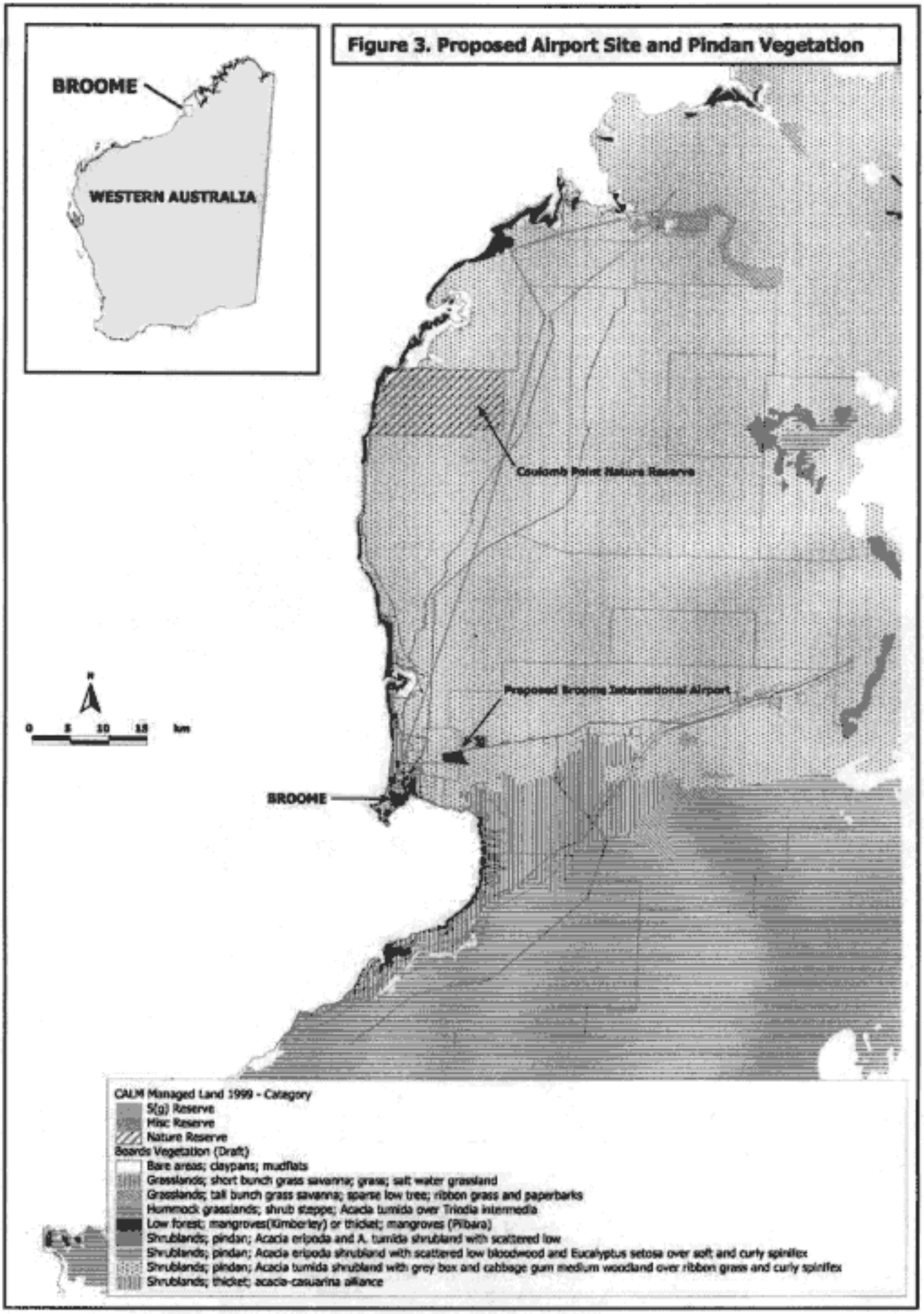

Figure 3. Proposed airport site and Pindan vegetation (Source: PER, Figure 2.3).

3.1.2 Terrestrial Fauna

Description

The clearing of approximately 200 hectares of native vegetation and the construction and operation of the airport has the potential to affect fauna populations on the airport reserve.

Submissions

A number of submissions raised issues regarding the adequacy of the fauna survey particularly with the limited time spent carrying out the work and the fact that the Bilby is known to be present in the area and had been recorded twice in roadkills in 1998.

CALM initially advised the proponent that detailed surveys of the site would not be required, however, it subsequently advised that the two day surveys conducted were not adequate to determine the absence or presence of the threatened mammal species the Greater Bilby *Macrotis lagotis.*

Further field surveys were carried out over two days and nights in July 2000 and no evidence of the species was found.

Assessment

The area considered for assessment of this factor is the airport reserve.

The EPA's environmental objective for this factor is to

- maintain the species abundance, diversity, geographic distribution of fauna; and
- protect Specially Protected (Threatened) and Priority Fauna and their habitats, consistent with the provisions of the *Wildlife Conservation Act*.

The DEP has advised that, in terms of Bilby conservation, the WA Museum recognises the area around Broome as a prime refuge because it is outside the permanent range of the fox. Like other arid-zone species with quasi-nomadic behaviour, the Greater Bilby does not have fixed home ranges and the animals may shift in response to availability of food. The DEP also advised that the observation times of the surveys would not coincide with the activity period of the animal.

The DEP has advised that the very low intensity sampling for terrestrial fauna might be suitable for a small area with much background data available, however, this is not the case for the airport site.

The DEP has advised that three 'seasonal sampling events' would be required to reflect the location with respect to the wet-dry tropics. These events would need to take place in the wet, the dry and in between the two and would need to cover a minimum of 5 days trapping.

CALM has advised that it is important that possible wildlife management problems are adequately addressed for the development and on-going management of the site and recommends the proponent should focus on wildlife management, including feral animals.

The proponent has given a commitment to undertake an Environmental Management Plan which includes flora, fauna and operations management. A condition will be imposed for further flora and fauna survey work to be undertaken and for management of wildlife within the airport site.

Summary

Having particular regard to:

(a) The proponent's commitment;

(b) The advice of the DEP; and

(c) The advice of CALM,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor, provided that a condition is imposed to include wildlife habitat and management issues.

3.2 Migratory Birds

Description

The construction and operation of the airport has the potential to impact on migratory birds by causing mortality through bird strikes, disturbance of feeding and roosting birds, contaminants entering Roebuck Bay through surface or groundwater and confusion of migrating birds from bright lights at the airport.

Roebuck Bay is listed as a Wetland of International Importance under the 1971 Ramsar Convention which aims to halt the loss of wetlands and to conserve the remaining wetlands. The migratory birds using this site are protected under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China-Australia Migratory Bird Agreement (CAMBA). These agreements provide for cooperation between governments to protect shared migratory bird species and their habitats. Roebuck Bay supports over 100,000 migratory wader birds with high species diversity.

Submissions

A number of submissions raised issues with regard to migratory birds particularly in relation to the significance of Roebuck Bay as probably the richest intertidal mudflats in the world and its importance to waders.

Broome Bird Observatory also raised this issue and also concerns about bird disturbance which could result in bird death if they were not able to store adequate energy from feeding if constantly disturbed. Helicopter flight disturbance was another concern of the Observatory because of the potential for impact on roosting birds if the helicopters were travelling along the coast. Potential impacts on Broome's coastal habitat, including Roebuck Bay, from pollution problems arising from increased human use in the coastal areas were also raised.

Environment Australia commented on the lack of data regarding the height and flight paths of migratory birds arriving and leaving Roebuck Bay and their relationship to aircraft movements.

Assessment

The area considered for assessment of this factor is the airport site and migratory bird habitats of Roebuck Bay and other nearby coastal areas.

The EPA's environmental objective for this factor is to avoid impacts on migratory birds and their habitats and meet Australia's international agreements on migratory birds.

The PER is based on two studies (Lane and Jessop, 1985 and Tulp et al, 1994) which used radar tracking and visual observations at limited locations near Broome to determine the bearings taken by birds undertaking their northerly migrations to China and beyond. The studies indicated that the majority of the birds appeared to head in a north-westerly direction on bearings between 280^0 and 345^0 with smaller numbers of birds heading in a more northerly direction (Figures 4-6).

The proponent commissioned a migratory bird watch study while the PER was on public review. This survey commenced in the beginning of April 2000 and ended in early May 2000 (Hassell, 2000). The study entailed skilled watchers, based at various locations along the northern shore of Roebuck Bay, attempting to visually determine the bearing, number of birds and species of birds on their northward migration.

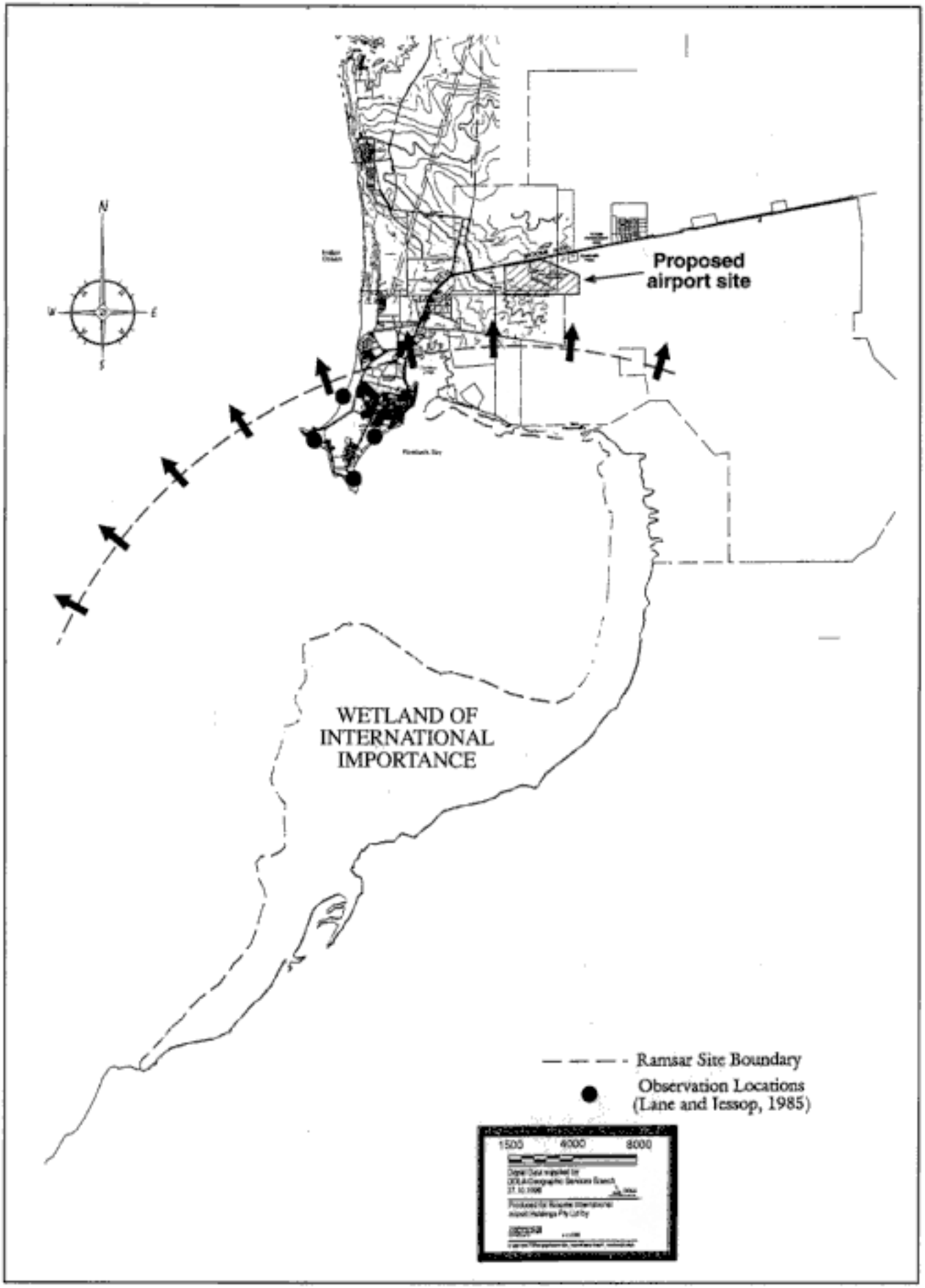

Figure 4. Potential departure range of migratory birds in relation to proposed airport site (Source: PER, Figure 4.1).

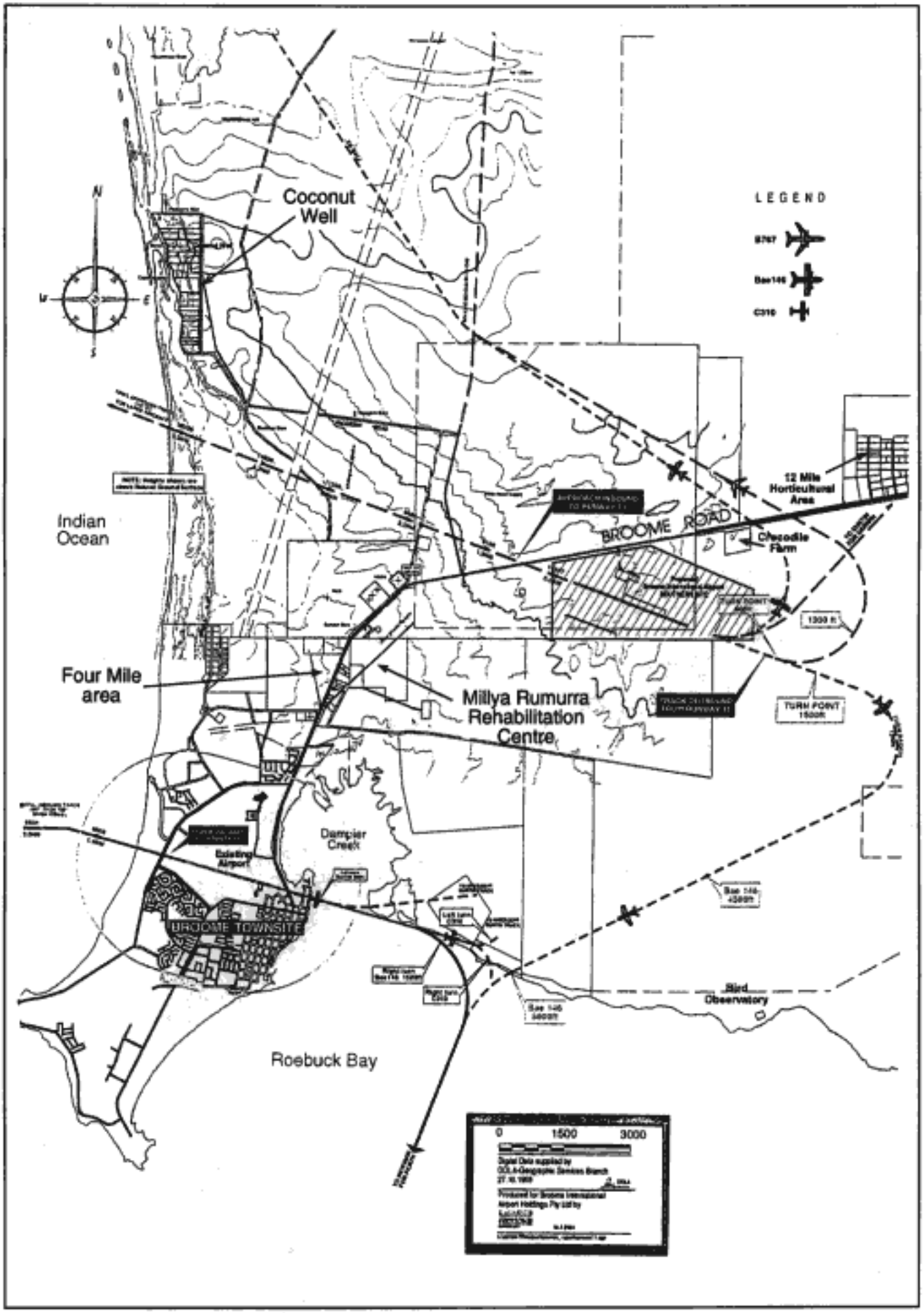

Figure 5. Proposed airport site - approaches and departures for Runway 11 (Source: PER, Figure 2.2).

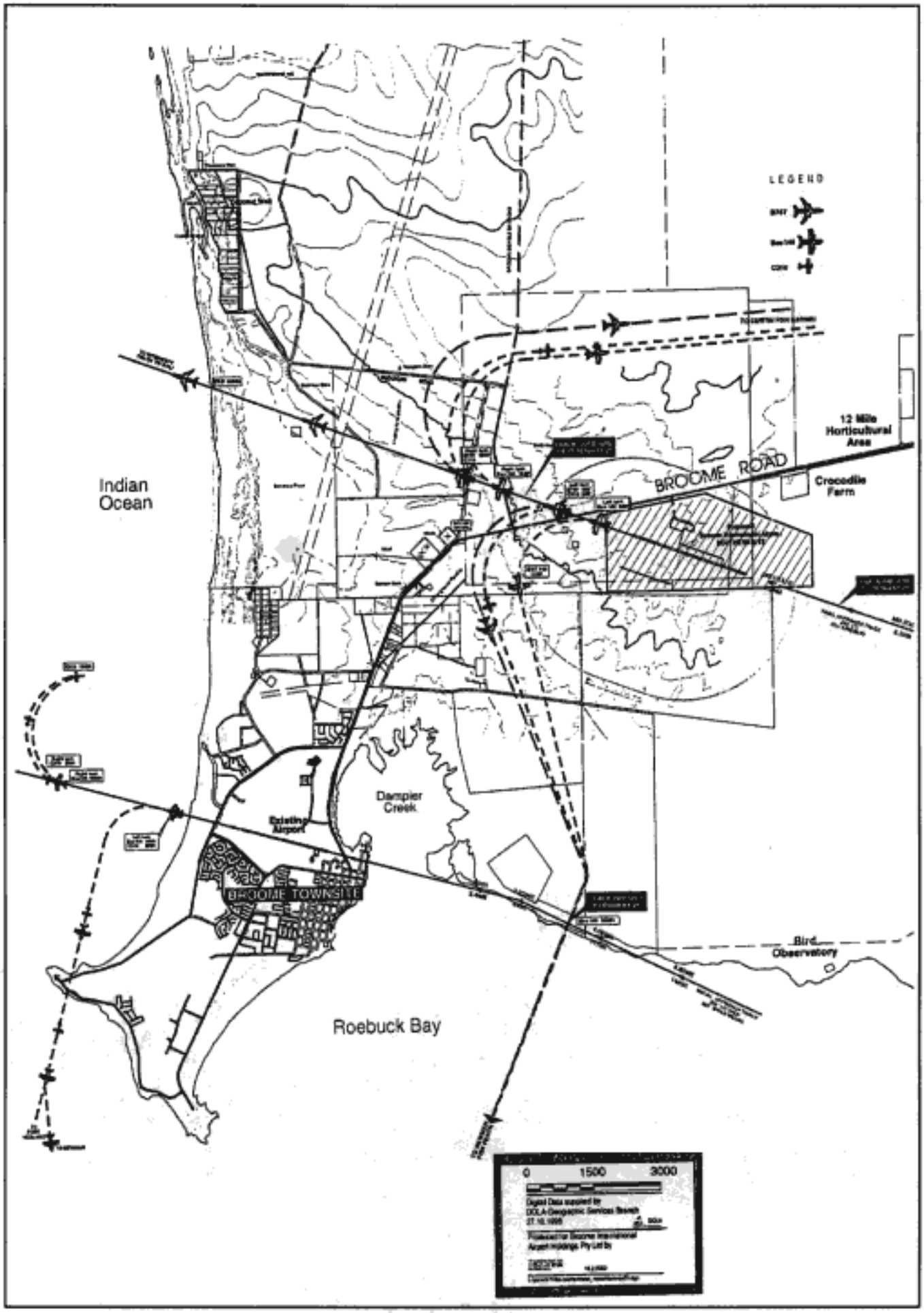

Figure 6. Proposed airport site - approaches & departures for Runway 29 (Source: PER, Figure 2.3).

The study revealed that most flocks and the largest number of birds (approximately 16,751) leave from the eastern end of Roebuck Bay as opposed to the western end nearer Broome (approximately 1612). The majority of the birds were found to head in a north-westerly to north direction on bearings between 315^0 and 360^0, towards the proposed airport site.

The proponent also commissioned another study into the southerly migratory routes which commenced in early September 2000 and ended in late October 2000. This study also attempted to visually determine the bearings of the birds arriving from their breeding areas in the northern hemisphere to determine if their flights would intersect with the proposed airport site.

The latter study was inconclusive as many of the birds arrived during the night and it was extremely difficult to form any judgments as to the incoming routes. There appeared to be a possibility that the birds travelled parallel with the coast along Cable Beach before heading east into Roebuck Bay.

Because of the uncertainty of the results of both surveys and the possibility that the EPA's objectives could not be met, the EPA sought the opinion of CALM with respect to the relative merits of the existing airport site compared with the proposed site in relation to the Roebuck Bay Ramsar wetland and its environmental values.

CALM advised that, on the basis of existing information, the proposed site is unlikely to be more detrimental than the existing airport in Broome and the proposed site is unlikely to lead to significant adverse impacts on the Roebuck Bay Ramsar site. CAMBA and JAMBA requirements to protect shared migratory bird habitats is therefore met.

CALM also advised that it considers that contamination from the proposed airport site to the Ramsar site is unlikely and that disturbance of feeding or roosting birds by aircraft would be likely to be negligible compared to that caused by human recreation.

CALM advised there remained possibilities that aircraft movements might disrupt shorebird migration and that lighting might confuse migrating birds possibly leading to long-term reductions of bird number, however, the dangers were not felt to be substantial. CALM considered that further investigations into migratory bird movements were not warranted.

The PER outlines the procedures taken at the existing airport with regard to bird strike hazard reduction and that these practices will continue at the proposed site. The airport owners inform pilots of the hazard through notices in published aviation documents, bird strikes have to be notified to Airservices Australia and ponding of drainage and rubbish are controlled to minimise attractiveness to birds. The proponent has made a commitment to include Bird Strike Reduction Procedures and minimisation of lighting overcast at the proposed site as part of the Environmental Management Plan.

The issue of potential contamination of the Ramsar site is considered further in Section 3.3.

Summary

Having particular regard to:

1. The advice of CALM; and
2. The proponent's commitment,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.**Water Quality**

Description

The construction and operation of the airport has the potential to lead to pollution from fuel spillage, sewage disposal, and surface drainage. These pollutants have the potential to impact on the Broome Groundwater Reserve, part of which lies beneath the northerly portion of the airport site.

In addition, the airport has the potential to lead to pollution of surface water quality and subsequent impacts on groundwater and Roebuck Bay.

Submissions

The Water & Rivers Commission (WRC) advised that the PER did not adequately address drinking water quality protection issues as the airport site is located in the Priority 3 area of the Broome Water Reserve, gazetted in 1947 under the *Country Areas Water Supply Act*.

WRC and public submissions raised the issue of the potential for the salt water interface to move further inland and the potential for vertical movement of salt water in the event of over-abstraction of groundwater related to the proposal.

One submission raised the issue of sewage disposal design to prevent contamination of groundwater and subsequent contamination of groundwater and subsequent contamination of Roebuck Bay. It was suggested that the aeration ponds would need to be covered to prevent them being attractive to birds.

Assessment

The area considered for assessment of this factor is the airport site, the proposed Broome Water Reserve (see Figure 7), Twelve Mile horticultural area and Roebuck Bay.

The EPA's environmental objective for this factor is to maintain or improve the quality of groundwater to ensure that existing and potential uses, including ecosystem maintenance are protected, consistent with the draft *Guidelines for Fresh and Marine Waters* (EPA, 1993). Note: The guidelines will be superseded by the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, the release of which is imminently expected at the time of preparation of this report.

WRC has advised that protection of Priority 3 areas is achieved through management guidelines rather than restrictions on land use. Airports can be sited in P3 areas, subject to appropriate site layout and best management practices, established in consultation with the WRC. WRC advised that airport infrastructure and runways should not be located within the 300 metre wellhead protection zone around a production bore located beside Broome Road.

The proponent has committed to preparing a Drainage Management Plan to the satisfaction of the WRC, and that development will not occur within 300 metres of any existing production bore. The Drainage Management Plan will need to be prepared in accordance with the new *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* and should address measures to avoid bird-attracting water bodies.

WRC also advised the EMP should address drinking water quality, and emergency response in the Operations Management section and that the agency should be consulted in the preparation of the EMP.

The proponent has included this in its commitments and has also committed to monitor any changes in salinity in any bore to be constructed by the proponent in the study area to the requirements and direction of WRC.

Summary

Having particular regard to:

(a) the proponent's commitment; and

(b) the advice of WRC and the requirement for WRC groundwater licence,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

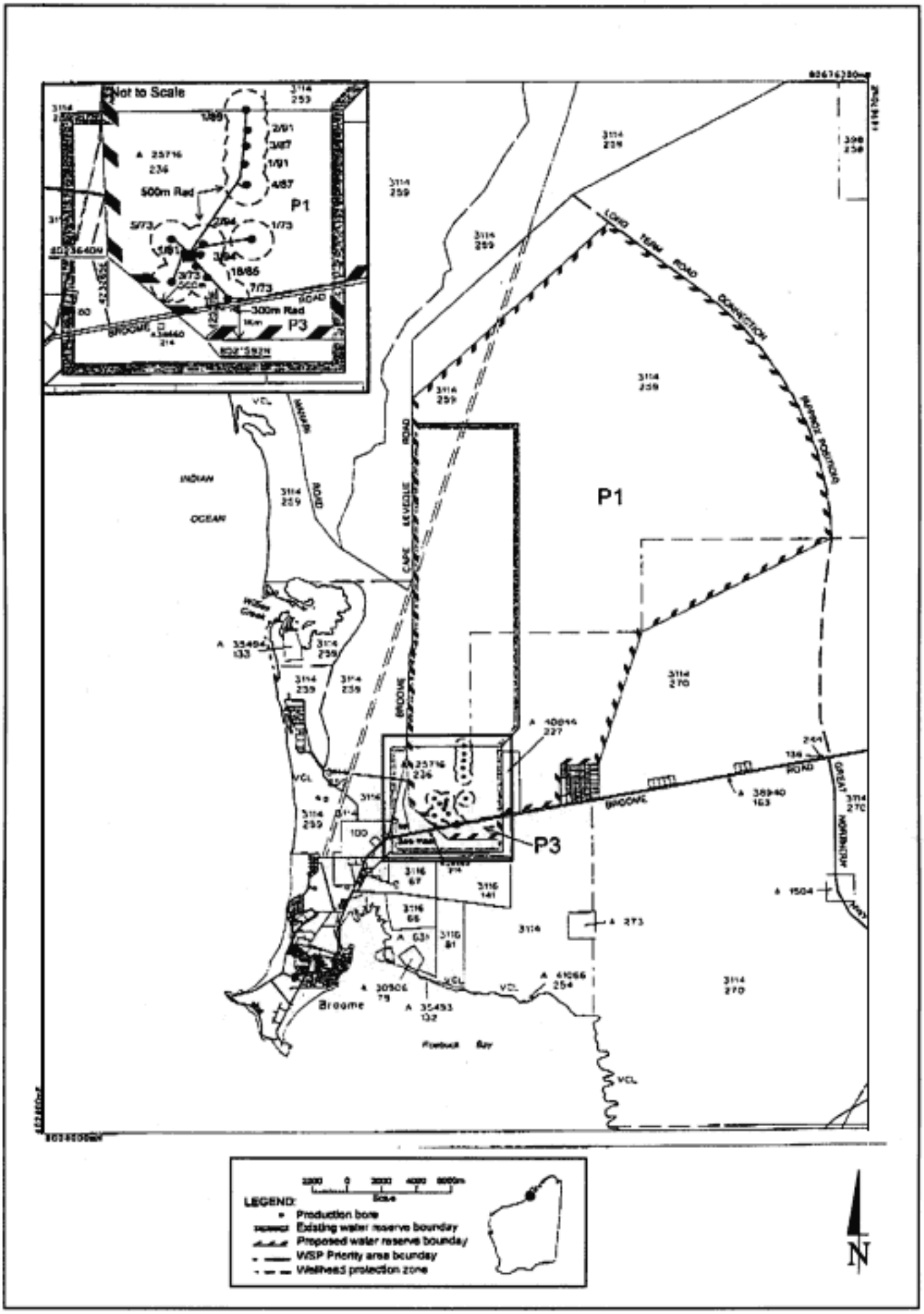

Figure 7. Proposed Broome Water Reserve.

3.3 Noise

Description

The construction and operation of the airport has the potential to adversely impact on the amenity of noise sensitive premises in the vicinity of the airport.

Submissions

A number of submissions were received from the residents of Coconut Well regarding impacts of noise from nearby flight paths.

The Millya Rumurra Rehabilitation Centre submitted that excessive noise has the potential to cause disruption to its clients' programmes, which require a stress-free environment.

A number of residents in the Four Mile area expressed concern at the increased road use and associated noise, especially if the road were to be widened. These submissions noted that the residents appear to be on the flight path for Runway 29.

Assessment

The area considered for assessment of this factor is the airport site and noise sensitive premises in the vicinity of the proposed airport site.

The EPA's environmental objective for this factor is to:

- ensure that noise impacts emanating from the proposal comply with acceptable standards; and
- ensure that the welfare and amenity of residents are not adversely affected.

The PER bases its noise assessment on the Australian Noise Exposure Forecast (ANEF) System as defined in AS 2021 – 1994 (Acoustics – Aircraft Noise Intrusion – Building Siting and Construction), and predicts the ANEF 20 and 25 contours for the years 1999, 2010 and 2025. Australian Standard 2021 – 1994 provides guidance on the construction of new buildings and the acoustic adequacy of existing buildings in the vicinity of airports. Table 2.1 of AS 2021- 2000 (a newer edition of AS 2021 – 1994) sets out building site acceptability (i.e. acceptable, conditionally acceptable or unacceptable) based on assessment of potential aircraft noise exposure at a given site based on the ANEF system.

The ANEF 20 contour for the year 2025 extends only a relatively short distance outside the airport site (Figure 7) and does not include any noise-sensitive areas and, as a consequence, the PER concludes that noise emissions meet acceptable standards. The PER indicates that noise exposures predicted for the airport in 2025 should not exceed the unacceptable or conditionally acceptable ANEF levels specified in AS 2021 – 1994 for any existing premises.

The ANEF is an annual average descriptor developed from data obtained from community surveys around the major Australian city airports, showing that at 20 ANEF, about 12% of the population will be "seriously affected", and about 45% will be "moderately affected". While the surveys were carried out on fairly stable populations around existing airports, the reactions of newly-exposed populations is expected to be different, as was observed in the case of the Second Runway in Sydney.

In addition, ambient noise levels in the capital cities are likely to be much higher than those on the outskirts in Broome and aircraft noise will be dominant at much lower levels in Broome.

The ANEF, being an annual average value, is difficult to use as a tool for providing community information about aircraft noise or for assessing impact on an existing residential property. The inadequacies of the ANEF system were made apparent in the 1995 report of the Senate Select Committee on Aircraft Noise in Sydney *Falling on Deaf Ears?* (Senate Select Committee on Aircraft Noise in Sydney, 1995). That report concluded that the ANEF system does not provide a complete picture and needs to be supplemented by frequency and intensity data for assessment purposes.

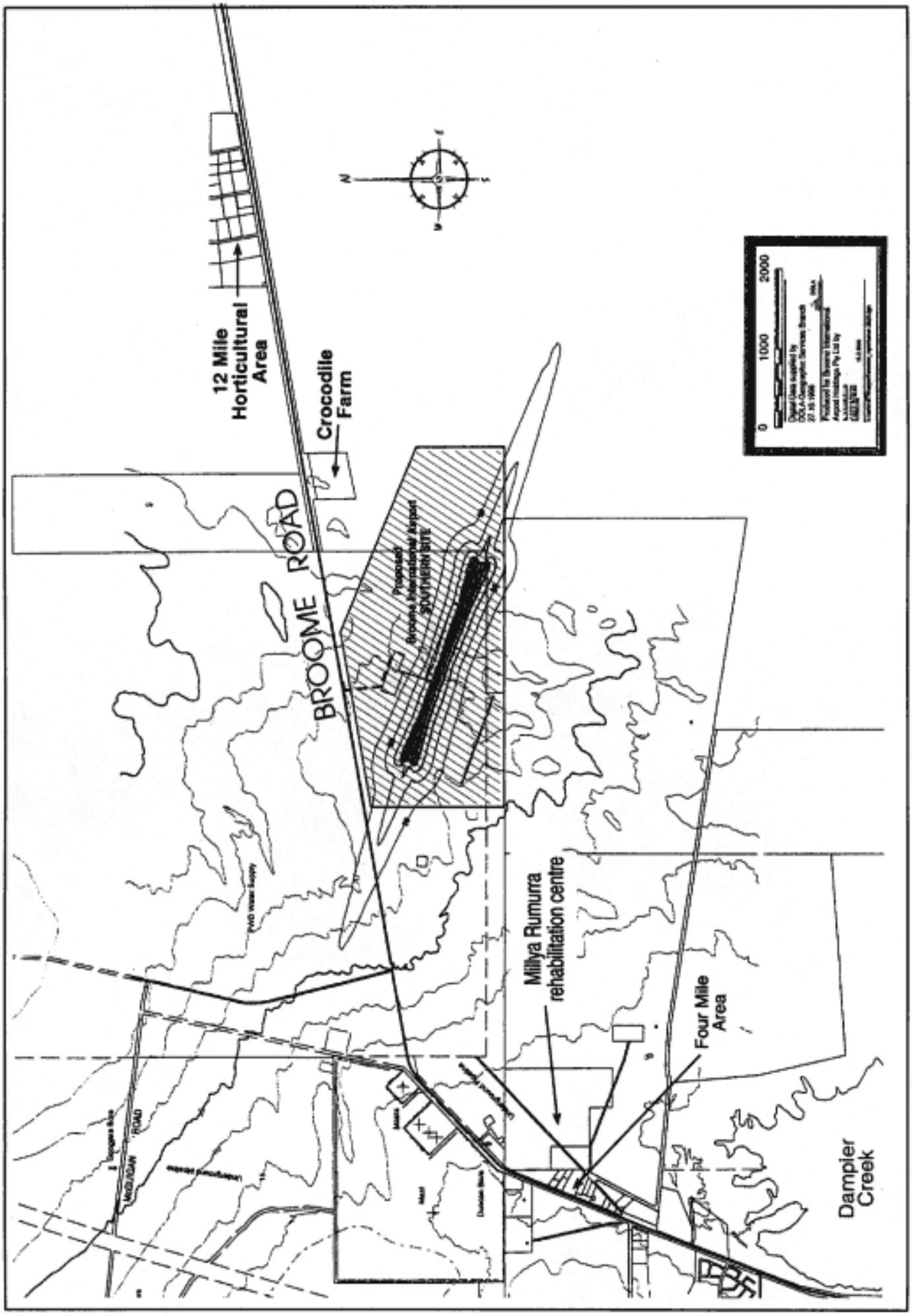

Figure 8. ANEF contours (Source: PER, Figure 7.1).

There is a move towards using indicators such as the number of events per day above a given noise level, for example, to give a more comprehensive assessment.

Table 3.3 of AS 2021 – 2000 also provides indoor design sound levels which are the maximum level for an aircraft flyover which, when heard inside a building by an average listener, will be judged as not intrusive or annoying by that listener.

Initial noise predictions calculated by the DEP for the year 2025 using flight paths in the PER, indicated that Indoor Design Noise Levels from Table 3.3 of AS 2021 – 1994 would be exceeded for single aircraft events (such as a B767) in 3 locations, at the Millya Rumurra Rehabilitation Centre, the Crocodile Farm and the 12-Mile Horticultural Area.

Through further identification and analysis of modified flight paths by the DEP, the proponent and the Department of Transport, it was demonstrated that it is possible to meet the levels in Table 3.3 of AS 2021- 2000 by extending the take-offs further from the airport or making right-hand turns instead of turning left after take-off where appropriate.

In order to ensure that there is ongoing dialogue between the community and the airport operators with regard to noise issues, the EPA considers a Community Consultative Committee should be established. The committee should comprise representatives from the Shire of Broome, appropriate State Government agencies, representatives of the community and the aviation industry and should address issues of noise impacts to noise sensitive premises.

The EPA has provided comment on road-related noise and future planning in Other Advice.

Summary

Having particular regard to:

(a) the advice from the DEP, the Department of Transport and the proponent,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor provided a condition is imposed regarding flight path planning and management to minimise noise impacts on noise sensitive premises within the vicinity of the proposed airport site.

4. Conditions and Commitments

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide an array of commitments to ameliorate the impacts of the proposal on the environment. The commitments are considered by the EPA as part of its assessment of the proposal and, following discussion with the proponent, the EPA may seek additional commitments.

The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponent's responsibility for, and commitment to, continuous improvement in environmental performance. The commitments, modified if necessary to ensure enforceability, then form part of the conditions to which the proposal should be subject, if it is to be implemented.

4.1 Proponent's Commitments

The proponent's commitments as set in the PER and subsequently modified, as shown in Schedule 2 and included in Appendix 4, should be made enforceable. These include:

- An Environmental Management Plan which incorporates vegetation, bird strike and other issues relating to airport construction and management;
- A Drainage Management Plan;
- A Landscape Management Plan;
- ANEF Contours for Land Use Planning; and
- A Public Consultation Programme.

4.2 Recommended Conditions

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions which the EPA recommends be imposed if the proposal by Broome International Airport Holdings to construct and operate a new international airport at a site approximately 12 km north-east of Broome townsite is approved for implementation.

These conditions are presented in Appendix 4.

Recommended conditions include:

(a) A Flora and Fauna Management Plan;

(b) A Noise Management Plan; and

(c) A Decommissioning Plan.

5. Other Advice

Social Impact Analysis

The EPA received a number of submissions on the proposal with regard to the likelihood that redevelopment of the existing airport might have a negative impact on the indigenous population of Broome through an imbalance in the demographic composition of Broome, increasing marginalisation of current living areas for the indigenous people, damage and desecration of culturally significant areas and significant loss in traditional fishing rights.

The EPA notes these concerns and recommends that the Shire of Broome conduct a social impact analysis to determine the potential impact the redevelopment of the existing airport site may have on the population of Broome, with a particular emphasis on the indigenous population.

Coastal Management

A number of submissions on the proposal expressed concern that the redevelopment of the existing site will result in increased population in Broome which will, in turn, lead to increased recreational pressure on the northern shores of Roebuck Bay causing potential disruption to migratory birds when feeding or roosting.

The EPA agrees with these concerns and therefore recommends that the Shire of Broome and the Ministry for Planning, in consultation with the Department of Conservation and Land Management, prepare and implement a Coastal Management Plan for the northern shores of Roebuck Bay with particular reference to the protection of feeding and roosting habitats of migratory birds.

Noise Levels and Land Use Planning

With regard to future development within the vicinity of the proposed airport site, the DEP has advised that Environment Australia, in its assessment of Badgery's Creek Airport, recommended that "land use planning restrictions which are more stringent than those advised by AS 2021 – 1994 be implemented around the proposed Badgery's Creek site" (Environment Australia, 1999, p 13-11). Environment Australia advised there should be no residential development inside 20 ANEF and development between 15 and 20 ANEF be conditional on appropriate noise attenuation of the new buildings.

Because of the availability of extensive vacant land around the proposed Broome Airport, the EPA considers it would be prudent to limit all noise sensitive development, such as residential areas, schools and hospitals to areas further away from the proposed airport where noise levels are anticipated to fall outside the 15 ANEF contour.

Bird Strike Management

The EPA received a submission regarding the potential for bird strike to be exacerbated at the proposed site if the new rubbish tip is located near the airport because of the attractiveness to birds.

The EPA recommends the Shire of Broome take this matter into consideration when planning the location of the proposed rubbish tip site and ensure that a safe distance is maintained between the rubbish disposal site and the proposed airport. This advice also applies to any future open water bodies, such as sewerage works, in close proximity to the proposed airport.

The EPA also recommends that the proponent provide annual bird strike records to CALM as part of the statutory requirement to report such strikes to Airservices Australia.

Road Traffic Noise

The EPA received a number of submissions with regard to the potential for increased road traffic noise between the airport and Broome, as a result of the relocation of the airport further away from Broome. The proponent has advised that Main Roads WA is currently conducting a separate study of traffic between the airport site and Broome. The EPA recommends that Main Roads WA examine and address potential increases in road traffic noise as a result of the proposal as part of the current study.

Redevelopment of Existing Airport Site

There are issues associated with the redevelopment of the existing airport in Broome, such as contamination, which the EPA will need to consider when the site is proposed to be redeveloped.

6. Conclusions

The EPA has considered the proposal by Broome International Airport Holdings to construct and operate a new international airport at a site approximately 12 km north-east of Broome townsite.

The EPA notes that the site selected for the proposed airport was one of a number of options considered with reference to aviation safety, Aboriginal heritage values, engineering design, biological values and community and social impacts within a reasonable distance from Broome.

The EPA has concluded that the proposal to establish the airport on the selected site is capable of being managed in an environmentally acceptable manner such that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the proponent's commitments and the recommended conditions set out in Section 4, including the proponents's commitments.

7. Recommendations

The EPA submits the following recommendations to the Minister for the Environment and Heritage:

6. That the Minister notes that the project being assessed is for the construction and operation of a new airport at a site approximately 12 km north-east of Broome to allow for the redevelopment of the existing airport within the Broome townsite.

7. That the Minister considers the report on the relevant environmental factors as set out in Section 3;

8. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4 and summarised in Section 4, including the proponent's commitments;

9. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

10. That the Minister notes the advice provided in Section 5 of the report in relation to social impact, coastal management planning, future planning with regard to potential noise impacts from aircraft operations, bird strike management, road traffic noise and redevelopment of the existing airport.

Appendix 1

List of submitters

Organisations:

Aboriginal Affairs Dept
Bilingurr Ratepayers Association
Bureau of Meteorology
Coconut Well Residents & Ratepayers
Department of Conservation and Land Management
Environment Australia
Environs Kimberley
Friends of Crab Creek & 4 Mile Area
Friends of Crab Creek & others
Kimberley Land Council
Milliya Rumurra Rehabilitation Centre
Broome Bird Observatory
Water & Rivers Commission
Western Australian Tourism Commission

Individuals:

Comino M & Akerman A (2)
Long M
McAuslane G & V
Rosenberg E
Southern A & Smoker B
Stivaletta R

Appendix 2

References

Environment Australia, 1999, *Proposed Second Sydney Airport at Badgerys Creek : Environmental Assessment Report*, Environment Australia, Canberra, ACT.

Halpern Glick Maunsell, 2000, *Relocation of Broome International Airport: Public Environmental Review*, HGM, Perth.

Halpern Glick Maunsell, 2000, *Response to Submissions for Broome International Airport Public Environmental Review*, HGM, Perth.

Hassell C, 2000, *Migration Report April 2000 for Broome International Airport*, Broome.

Hassell C, 2000, *Migration Report September/October 2000 compiled for Broome International Airport*, Broome.

Hopkins, AJM, et al., 1996, *Conservation status of vegetation types throughout Western Australia : final report* , National Parks and Wildlife, Canberra; Department of Conservation and Land Management, Perth, WA.

Lane, B & Jessop, A, 1985, Tracking of migrating waders in north-western Australia using meteorological radar, in *The Stilt* No 6: 16-28.

Senate Select Committee on Aircraft Noise in Sydney, 1995, *Falling on Deaf Ears?*, The Committee, Canberra, ACT.

Standards Australia, 1994, *AS 2021 – 1994 Acoustics – Aircraft Noise – Building siting and construction*, Standards Association, Sydney, NSW.

Standards Australia, 2000, *AS 2021 – 2000 Acoustics – Aircraft Noise – Building siting and construction*, Standards Association, Sydney, NSW.

Tulp I et al, 1994, Migratory departures of waders from North-Western Australia: Behaviour, Timing and Possible Migration Routes, in *Ardea*, 82(2): 201-221.

Appendix 3

Summary of identification of relevant environmental factors

Appendix 3: Summary of Identification of Relevant Environmental Factors

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
BIOPHYSICAL			
Biodiversity	Terrestrial flora Vegetation communities	Although the Department of Conservation and Land Management gave initial advice that detailed surveys of the flora of the site were not required, CALM subsequently advised that the two day surveys conducted were not adequate to determine the regional significance of the flora. CALM suggested that there was a need for further fieldwork to survey the 800 hectares site to confirm that what was discussed in a general sense was correct. Further field surveys were undertaken in July 2000, however, the survey sites did not cover the area to be cleared for airport purposes such as runways and buildings. The flora survey methodology involved resampling in the vicinity of quadrats previously studied. The DEP has advised that the flora sampling was carried out with quadrats only approximately in the same locality and not in marked areas which means that some of the additional species found may be the consequence of looking in a new patch rather than a seasonal effect. The DEP does not agree with the PER's assessment that the area does not have a particularly diverse flora. Public submissions have raised issues regarding the adequacy of the flora and vegetation survey.	**Vegetation communities is considered to be a relevant environmental factor**
	Declared Rare and Priority and other Significant Flora	The proponent carried out additional flora survey work during July 2000. There was no evidence of the Priority one flora species *Glycine pindanica* in either of the surveys carried out. CALM has advised it is unlikely that the Priority Flora occurs within the site.	**Declared Rare and Priority and other significant flora is not considered to be a relevant environmental factor**
	Terrestrial Fauna (including Specially Protected Fauna)	Although the Department of Conservation and Land Management gave initial advice that detailed surveys of the fauna of the site were not required, CALM subsequently advised that the two day surveys conducted were not adequate to determine the absence or presence of the threatened mammal species the Greater Bilby *Macrotis lagotis*.	**Specially Protected and other significant fauna is considered to be a relevant environmental factor**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
		Further field surveys were undertaken over two days and two evenings in July 2000. No evidence of the species was found. CALM has advised that it is important that possible wildlife management problems are adequately addressed for the development and on-going management of the site. The DEP has advised that, in terms of Bilby conservation, the Western Australian Museum recognises the population around Broome as a prime refuge because it is outside the permanent range of the fox. The fact that the Bilby was not sighted in the additional survey does not prove that they are not present as timing of the observations would not overlap with the activities of the animal. The DEP has advised that three 'seasonal sampling events', in the wet, dry and in-between are likely to be necessary. Public submissions have raised issues regarding the adequacy of the fauna surveys particularly the search for the Bilby given that they are known to be present in the area and two recorded findings in 1998. Public submissions have raised issues regarding the impact clearing 200 hectares will have on local birdlife.	
	Migratory birds	CALM has advised that, on the basis of existing information, the proposed airport site is unlikely to be more detrimental than the existing one and that the proposed airport site is unlikely to lead to significant adverse impacts on Roebuck Bay. CALM also advised that it considers contamination of Roebuck Bay unlikely and that disturbance of feeding and roosting birds by aircraft is less likely than that caused by human recreation. CALM has also advised that the danger of disruption by aircraft and confusion by lighting to migrating birds by aircraft is not substantial. CALM does not consider further investigations into migratory bird movements are warranted. Numerous public submissions were received on the issue of migratory birds raising similar doubts about the timing and adequacy of the surveys. Disturbance from helicopters and pilot training were	**Migratory birds is considered to be a relevant environmental factor**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
		also raised as serious potential impacts.	
Land	Landform	No submissions were received on this factor.	**Landform is not considered to be a relevant environmental factor.**
POLLUTION			
Water	Groundwater quality	Water & Rivers Commission has advised that the PER does not adequately address drinking water quality protection issues as the airport site is located in the Priority 3 area of the Broome Water Reserve, gazetted in 1947 under the Country Areas Water Supply Act. WRC has advised that airports can be sited in P3 area, subject to appropriate site layout and best management practices. The proponent has advised that no development will occur within 300 metres of production bores. WRC and public submissions raised the issue of potential for the salt water interface to be moved further inland and the potential for vertical movement of salt water in the event of over abstraction. The proponent has advised that monitoring of bores constructed by the proponent in the study will be undertaken to the requirements of the WRC. Groundwater quality can be managed through WRC which is responsible for groundwater well licences.	**Water quality is considered to be a relevant environmental factor.**
	Surface water quality	One submission raised the issue of sewage disposal design to prevent contamination of groundwater and subsequent contamination of Roebuck Bay. It was suggested that aeration ponds would need to be covered to prevent being attractive to birds. The proponent has made a commitment to carry out a Drainage Management Plan to the satisfaction of the WRC.	**Water quality is considered a relevant environmental factor.**
Non-chemical emissions	Noise	Public submissions were received from the residents of Coconut Grove regarding impacts of noise from nearby flight paths. The Milliya Rumurra Rehabilitation Centre submitted that excessive noise may cause disruption to its clients' programs, which require a quiet, stress-free environment.	**Noise is considered to be a relevant environmental factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
		A number of submissions representing residents in the Four Mile area expressed concern at the increased road use and associated noise, especially if the road were to be widened. These submissions noted that the residents appear to be on the flight path for Runway 29.	
SOCIAL SURROUNDINGS			
Aesthetic	Visual Amenity	No public submissions were received on this factor.	**Visual Amenity is not considered to be a relevant environmental factor.**
Culture and Heritage	Aboriginal culture and heritage	The Kimberley Land Council raised the issue of Rubibi Native Title Claim over the site and much of the Broome area. No submissions were received on any Aboriginal cultural or heritage sites of significance at the proposed airport site. A Work Programme Clearance for the proposed site carried out by the proponent is detailed in the PER.	**Aboriginal culture and heritage is not considered to be a relevant environmental factor in terms of development of the proposed site, however, the EPA considers Aboriginal culture and heritage may be impacted by the effect of development of the existing airport site.**
	Places listed on the Register of the National Estate	No submissions were received on places listed on the Register of the National Estate.	**Places listed on the Register of the National Estate is not considered to be a relevant environmental factor.**
Public health and safety	Public risk and hazard associated with operation of airport	A number of public submissions have commented on the possibility of bird strike. The proponent has given a commitment to include bird strike reduction procedures in the Environmental Management Plan.	**Public risk and safety is not considered to be a relevant environmental factor.**
OTHER			
		The Kimberley Land Council and numerous public submissions have raised concerns about the changes which will be experienced by Broome as a result of the redevelopment of the current airport site particularly with regard to Aboriginal culture.	**The issues will be addressed in Other Advice.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
		A number of public submissions have raised concerns about potential impacts on Roebuck Bay from increased visitation, particularly on the northern shores with increased recreation pressure. This would have the potential of impacting on the considerable values of Roebuck Bay. The DEP considers that planning agencies should apply the 15 ANEF noise contour for any future noise sensitive premises around the proposed airport site and avoid placing any noise sensitive premises inside this corridor. The DEP considers that the possible impacts of road traffic noise associated with the proposal is manageable and should be addressed in a study into potential road traffic noise impacts between the airport and Broome townsite. The DEP considers there are issues, including potential contamination, associated with the existing airport site which the EPA will need to consider when the site is proposed for redevelopment.	

Appendix 4

Recommended Environmental Conditions and Proponent's Consolidated Commitments

RECOMMENDED ENVIRONMENTAL CONDITIONS

Statement No.

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

RELOCATION OF BROOME INTERNATIONAL AIRPORT, 12 KILOMETRES NORTH-EAST OF BROOME

Proposal: The construction and operation of Broome International Airport at a new site of approximately 800 hectares located12 kilometres north-east of Broome townsite, as documented in Schedule 1 of this statement.

Proponent: Broome International Airport Holdings Pty Ltd

Proponent Address: 53 Wheatley Street, Gosnells, WA 6110

Assessment Number: 1294

Report of the Environmental Protection Authority: Bulletin 1017

The proposal to which the above report of the Environmental Protection Authority relates may be implemented subject to the following environmental conditions, proponent commitments and procedures:

Procedures

1 Implementation

1-1 Subject to these conditions and procedures, the proponent shall implement the proposal as documented in schedule 1 of this statement.

1-2 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is substantial, the proponent shall refer the matter to the Environmental Protection Authority.

1-3 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

2 Proponent Commitments

2-1 The proponent shall implement the consolidated environmental management commitments documented in schedule 2 of this statement.

2-2 The proponent shall implement subsequent environmental management commitments which the proponent makes as part of the fulfilment of environmental conditions and procedures in this statement.

3 Proponent

3-1 The proponent for the time being nominated by the Minister for the Environment and Heritage under section 38(6) or (7) of the Environmental Protection Act 1986 is responsible for the implementation of the proposal until such time as the Minister for the Environment and Heritage has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person in respect of the proposal.

3-2 Any request for the exercise of that power of the Minister referred to in condition 3-1 shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the proposal in accordance with the environmental conditions, proponent commitments and procedures set out in the statement.

3-3 The proponent shall notify the Department of Environmental Protection of any change of proponent contact name and address within 30 days of such change.

4 Commencement

4-1 The proponent shall provide evidence to the Minister for the Environment and Heritage within five years of the date of this statement that the proposal has been substantially commenced.

4-2 Where the proposal has not been substantially commenced within five years of the date of this statement, the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment and Heritage will determine any question as to whether the proposal has been substantially commenced.

4-3 The proponent shall make application to the Minister for the Environment and Heritage for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement at least six months prior to the expiration of the five year period referred to inpProcedures 4-1 and 4-2.

4-4 Where the proponent demonstrates to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority that the environmental parameters of the proposal have not changed significantly, then the Minister may grant an extension not exceeding five years for the substantial commencement of the proposal.

5 Compliance Audit

5-1 The proponent shall submit periodic Compliance Reports, in accordance with an audit program prepared in consultation between the proponent and the Department of Environmental Protection.

5-2 Unless otherwise specified, the Chief Executive Officer of the Department of Environmental Protection is responsible for assessing compliance with the environmental conditions, procedures and proponent commitments contained in this statement and for the issue of formal, written advice that the requirements have been met.

5-3 Where compliance with any Environmental Condition, Procedure or proponent commitment is in dispute, the matter will be determined by the Minister for the Environment and Heritage.

ENVIRONMENTAL CONDITIONS

6 Flora and Fauna Management Plan

6-1 Prior to commencement of ground-disturbing activities, the proponent shall prepare a Flora and Fauna Management Plan to the requirements of the Department of Environmental Protection on the advice of the Department of Conservation and Land Management to achieve the following objectives:

- to conserve and protect listed species; and
- to conserve and protect vegetation associations/communities.

This Plan shall address:

1. Additional flora and fauna surveys of the new airport site to ensure compliance with the *Wildlife Conservation Act 1950*;
2. The protection of vegetation within the airport site outside the airport infrastructure area; and
3. Management of wildlife within the airport site.

6-2 The proponent shall implement the Flora and Fauna Management Plan required by condition 6-1.

6-3 The proponent shall make the Flora and Fauna Management Plan required by condition 6-1 publicly available, to the requirements of the Environmental Protection Authority.

7 Noise Management Plan

7-1 At least three months prior to operation, the proponent shall prepare a Noise Management Plan to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection and the Department of Transport, with the objective of minimising impacts on the amenity of noise sensitive premises.

This Plan shall address:

1. flight path planning and management, including flying training activities;
2. provision of information to the public; and
3. periodical review and revision.

7-2 The proponent shall develop and implement the Noise Management Plan required by condition 7-1 in association with a Consultative Committee comprising, at least, representatives from the Shire of Broome, appropriate State Government agencies, the community and the aviation industry.

The proponent shall report the outcomes and determinations of committee meetings annually to the Minister for the Environment and Heritage on behalf of the Committee.

7-3 The proponent shall make the Noise Management Plan required by condition 7-1 publicly available to the requirements of the Environmental Protection Authority.

8 Decommissioning Plans

8-1 Prior to construction, the proponent shall prepare a Preliminary Decommissioning Plan that provides the framework to ensure that the site is left in a suitable condition, with no liability to the State, to the requirements of the Environmental Protection Authority on the advice of the Department of Environmental Protection.

The Preliminary Decommissioning Plan shall address:

1. rationale for the siting and design of plant and infrastructure and conceptual plans for its / their removal or, if appropriate, retention;

2. conceptual rehabilitation plans for all disturbed areas and a process to agree on the end land use(s); and

3. management of noxious materials to avoid the creation of contaminated areas.

8-2 At least six months prior to the anticipated date of decommissioning, or at a time agreed with the Department of Environmental Protection, the proponent shall prepare a Final Decommissioning Plan designed to ensure that the site is left in a suitable condition, with no liability to the State, to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection.

The Final Decommissioning Plan shall address:

1 removal or, if appropriate, retention of plant and infrastructure;

2 rehabilitation of all disturbed areas to a standard suitable for the agreed new land use(s), and

3 identification of contaminated areas, including provision of evidence of notification to relevant statutory authorities.

8-3 The proponent shall implement the Final Decommissioning Plan required by condition 8-2 until such time as the Minister for the Environment and Heritage determines that decommissioning is complete.

8-4 The proponent shall make the Final Decommissioning Plan required by condition 8-2 publicly available, to the requirements of the Environmental Protection Authority.

Schedule 1

The Proposal (1294)

Construction and operation of an international airport at a site approximately 12 km north-east of Broome townsite. The proposal involves the construction of one main runway, parallel taxiway, turning nodes, apron parking, general aviation parking, maintenance and storage hangers and fuel storage. It also includes domestic and international terminals, land side and airside commercial activities and a future short parallel runway for light aircraft.

The current Broome airport site will be redeveloped (not as part of this proposal) for the expansion of Broome townsite in accordance with the Shire of Broome's long-term strategic planning.

Key Characteristics Table

Element	Quantities/Description
Location	Approximately 12 kilometres north-east of Broome townsite on the south side of Broome Road
Airport reserve	800 hectares approximately
Construction duration	Staged over 5-7 years
Area of land clearing	200 hectares approximately, subject to final design
Runway dimensions (initial)	Approximately 2700 metres x 45 metres
Runway dimensions (final)	Approximately 3500 metres x 45 metres
Runway bearing	$290^0/110^0$
Future short parallel runway for light aircraft - dimensions	Approximately 1300 metres x 45 metres
Taxiways	Approximately 2000 metres x 30 metres
Carparks, terminal buildings and sewerage	Approximately 32 hectares
Access road	Approximately 500 metres x 20 metres
Fuel storage capacity and use	Storage capacity of approximately 400,000 litres of Jet A1 and 100,000 litres of Avgas Approximately 24 million litres throughput per year
Water supply / consumption	Dedicated borefield to be constructed Estimated approximately 75 cubic metres of water per average day (27,000 cubic metres pa)

Figures Attached

Figure 1 attached shows the locality of the airport relative to Broome townsite.

Figure 2 attached shows the proposed layout of airport runways within the airport reserve.

Schedule 2

Proponent's Environmental Management Commitments

May 2001

RELOCATION OF BROOME INTERNATIONAL AIRPORT (1294)

BROOME INTERNATIONAL AIRPORT HOLDINGS PTY LTD

RELOCATION OF BROOME INTERNATIONAL AIRPORT
PROPONENT'S ENVIRONMENTAL MANAGEMENT COMMITMENTS

PROPONENT COMMITMENT	TIMING	OBJECTIVE	ACTION	AREA OF APPLICATION	WHOSE ADVICE
1. General Environmental Management Plan	Develop prior to construction, implement during construction and operations.	To ensure that environmental impacts are minimised in the design, construction and operation of the relocated Broome Airport	Prepare and implement an Environmental Management Plan. For details see Attachment A	Airport Reserve	CALM, Agriculture WA, Shire of Broome
2. Drainage Management Plan	Develop prior to construction, implement during construction and operations	Ensure that changes to surface hydrology and groundwater quality of the surrounding area are prevented or adequately managed.	Prepare and implement a Drainage Management Plan including identifying suitable hydrological parameters and design and pollutant controls, inspection and maintenance procedures and bird attraction issues in relation to water bodies.	Airport Reserve	Water & Rivers Commission, Shire of Broome
3. Landscape Management Plan	Develop during final design, implement during construction	Maximise the retention of local landscape values and enhance the visual amenity of the finished airport.	Prepare and implement a Landscape Management to retain local landscape character and remnant vegetation. Undertake appropriate earthworks and planting treatments.	Airport Reserve	Shire of Broome
4. Land Use Planning	Develop during final design and implement prior to commissioning	Assist the Shire of Broome in planning to ensure that noise sensitive development is not located in areas too close to the airport.	Prepare a contour map of the airport site showing the 15 ANEF noise contour and provide to the Shire of Broome for planning purposes.	Airport Reserve and surrounding area	Department of Transport
5. Public Consultation	Prior to and during construction	Ensure that key stakeholders are kept appraised of developments	Formalise a Consultation programme and submit outline to DEP. Liaise with key stakeholders, organise public meetings/advertisements as appropriate		

ATTACHMENT A

GENERAL ENVIRONMENTAL MANAGEMENT PLAN

TABLE OF CONTENTS

Appendix 5

Summary of Submissions and

Proponent's Response to Submissions

Response to Submissions for

Broome International Airport Public Environmental Review

1. General Comments on the Proposal

1.1 There is concern that there does not appear to have been any community consultation about the proposal during the past twelve months. There is considerable local knowledge of the area which has not been utilised in the compilation of the report. For instance, neither Environs Kimberley nor Broome Botanical Society was invited to participate. Residents at 4 Mile were also not consulted as a group. Broome Caravan Park is in the area and the Milliya Rumurra (alcohol centre) which is mostly nonindigenous locals have been ignored.

As detailed in Appendix 2 of the PER, a detailed public consultation program was undertaken during the site selection process for relocating the Broome International Airport. In January, 1998 the Broome International Airport Relocation Taskforce (BART) was formed. The taskforce included representatives from the general community, Broome tourist industry, local Aboriginal groups, aviation and relevant local and state government departments, including:

- Shire of Broome
- WA Tourism Commission – Broome
- Ministry for Planning
- Kimberley Development Commission
- Department of Environmental Protection
- Kimberley Land Council
- Department of Land Administration – Kimberley
- Airport Engineering Services Pty Ltd
- Broome Aviation
- Department of Transport – Broome

This Taskforce met on regular occasions and were key players in determining the preferred location of the new airport site.

During the preparation of the PER for the preferred airport site, a number of local experts located in Broome were contacted to discuss specific issues. Contact was made with representatives from the Kimberly Land Council, Broome Bird Observatory, CALM and Shire of Broome. Following the completion of the PER, the report was advertised for a four week public comment period. At least 60 copies of the report were issued to interested parties for comment, free of charge.

1.2 Two submissions, signed by 22 people, said they reject the new airport site on environmental and safety grounds. They recommend that the airport stay at the current site in the commercial area or go to Derby international airport because it is less costly in fuel, less pollution, safer from bird strikes, safer for approaches and landings because it is on the coast, and has better visibility. They assert that visitors come to Broome to see the waders and the environment will be increasingly important for Broome tourism.

The new airport site for which the PER was prepared was identified through a transparent site selection process. During the site selection process 10 potential sites for the new airport were

considered for evaluation. The ten sites were evaluated against a number of criteria including Aboriginal heritage values, engineering design issues, located within 15 km from the Chinatown Post Office, noise impacts, biological values such as flora, fauna, migratory birds and coastal wetlands, and aviation safety issues. Several working groups were involved with the evaluation of the options.

Following the completion of the evaluation process, the options were narrowed down to two preferred sites (A and B on Figure 2.4 in the PER). The final site (A) was chosen as a result of the alternative site (B) having significant indigenous cultural significance. The full evaluation process is described in Section 2.3 of the PER.

1.3 The current site is convenient and unique. Moving the site will be detrimental to trade in Chinatown. Travellers in transit walk to Chinatown while waiting for their next flight as it is close and tourists booking out from accommodation well before the flight is due often spend the rest of the time in Chinatown.

This is a social impact issue and is beyond the scope of the PER. This comment has been passed onto the Shire of Broome for their information.

1.4 It seems that a sweetheart deal has been done by Broome airport owners and the Shire and State governments, to move the airport only for financial gain, not to suit the ratepayers of Broome and like most development projects have not been upfront with the public or EPA.

As detailed in the PER, the main requirement for relocating the Broome Airport is to enable the timely development of the Broome township to the north, including developing the airport land itself. In addition, the runways of the existing Broome Airport will not be able to cope with future aircraft requirements to serve inbound tourism to Broome and the Kimberley.

Prior to the purchasing of Broome Airport by Airport Engineering Services Pty Ltd (now Broome International Airport Holdings [BIAH]), the Federal Government had requested that BIAH enter into a Heads of Agreement with the Shire of Broome. This Agreement was for BIAH to move the airport to a new site to be determined by BIAH and in consultation with all relevant authorities.

As mentioned in Section 1.1 above, a detailed public consultation program was undertaken during the site selection process for relocating the Broome International Airport.

1.5 Broome is changing at a very fast pace and the tourists want to see a town that can offer something different and if Broome becomes like any other town the visitors will stop coming. Many visitors already say they will not return because of all the changes such as modern shopping centres and large supermarkets which have changed the ambience.

This is a social impact issue and is beyond the scope of the PER. This comment has been passed onto the Shire of Broome for their information.

1.6 If more houses are needed, why not put them at the new airport site?

Future expansion of the Broome Township to the north, through the current airport site is planned by the Shire of Broome and has been identified as the area for future urban expansion in the Broome Town Planning Scheme. The current airport site cuts the Broome Peninsular in two and prohibits the planned development to the north. The airport is therefore being relocated to accommodate this proposed growth pattern.

1.7 The airport relocation and the Waterbank structure plan have huge implications for the future expansion of Broome. There is a need to identify a heavy industry area outside the town boundary of Broome which should be incorporated within the new airport boundary as a permitted use. The peninsula of Broome has limited space and coastal assets need to be

preserved. Locating heavy industry in the airport would solve the current issue of heavy haulage road trains passing through town.

Location of heavy industry within the Broome region is an issue beyond the scope of the PER and was therefore not addressed in the document. This comment has been passed onto the Shire of Broome for their information.

1.8 With the new airport and the subsequent big land development, there will be increased pressure on the local environment and the Broome lifestyle for locals will be destroyed.

The airport is being relocated to accommodate the future northward expansion of the Broome Township, in accordance with the Broome Town Planning Scheme. The PER was prepared to address the potential environmental issues associated with the Broome International Airport relocation. Assessing the potential impacts of the expansion of Broome Township was beyond the scope of the Airport relocation PER. This comment has been passed onto the Shire of Broome for their information.

1.9 A number of submissions made the point that the present site requires less fuel and car use. This is important at a time when global resources are expensive, in short supply and contributing to Greenhouse emissions. Why can't Derby airport be used for international flights and clients bussed in and out?

The preferred location for the Broome Airport relocation was identified through a site selection process as described in 1.2 above. One of the criteria used for the assessment was that the sites should lie within 15 km of the Chinatown Post Office. This criteria was developed in accordance with requests from the Shire of Broome, residents and others for the airport to be located within a reasonable distance from the Broome town site. The existing Derby airport falls well outside the 15 km radius and therefore was not considered as a potential site for the Broome Airport.

1.10 The current site is safer as most paths are over the ocean where it is already polluted by hydrocarbons and where, if a plane crashes, it won't affect most residents and there is always the beach, mangroves or sea to land in as a Garuda DC3 did in the1970's.

Flight operations at both the existing and relocated site meet and will continue to meet the safety requirements of the Civil Aviation Safety Authority and the International Civil Aviation Organisation.

1.11 The location of the airport site should be reconsidered in conjunction with the power station. Residents of Lullfitz Drive, Sands Drive and Broome Road, Four Mile rural residential areas have endured enormous stress since they were first publicly threatened with an adjacent power house in the February meeting of the Broome Shire Council. Further investigations are required.

The location of a power station within the Broome Region is beyond the scope of the Airport relocation PER and therefore was not considered in the report. Identifying a suitable location for a power station should be subject to a separate environmental assessment process.

1.12 The Bureau of Meteorology seeks to install an automatic weather station at the new airport site which ideally requires more than 2 years overlap observations to be included in Master Planning. The Bureau will need to relocate to the new airport site and would take the opportunity of rebuilding in accordance with current standard design.

The Bureau of Meteorology has already installed an automatic weather station at the new airport site. Broome International Airport Holdings has no objection to the Bureau relocating to the proposed new airport site.

1.13 The Western Australian Tourism Commission believes that the document prepared by HGM provides a comprehensive review for the PER process.

This comment has been noted.

1.14 Environment Australia (EA) advises that the provisions of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC) may apply as the approval timeframes for the proposal span past 16 July 2000 when the EPBC comes into force. EA advises that the Commonwealth will seek to co-operate with the WA Government in the assessment process. In the event that consideration is needed under the EPBC Act, the Act specifies timings in which decisions on whether or not approval is needed, and the assessment approach, must be made.

This comment has been noted. Broome International Airport Holdings are aware of their requirements under the *EPBC Act 1999* and are in the process of formally referring the project to Environment Australia.

1.15 The Aboriginal Affairs Department is satisfied that the proponent has satisfied all obligations under the auspices of the Aboriginal Heritage Act 1972. Copies of the PER document did not appear to have been lodged with the Aboriginal Affairs Department library.

Noted. As required under section 3.1 of the DEP's guidelines issued for the Airport relocation PER, two copies of the PER were forwarded to the Aboriginal Affairs Department free of charge. There were however, no specific requirements for a copy of the PER to be forwarded to the Library of the Aboriginal Affairs Department.

1.16 Concern was expressed that the PER document was not available for purchase in Broome.

In the guidelines issued for the project, the DEP provides a list of government departments, local government authorities, libraries and community groups to which copies of the PER are to be provided. Although the PER was not available for purchase in Broome itself, within the region, the report was available for viewing at the Shire of Broome, Broome Library, Broome Bird Observatory and Kimberly land Council. Additional copies of the PER were available through Halpern Glick Maunsell as specified in the advertisements placed in the Broome Advertiser and Western Australian. A number of additional copies of the PER were purchased by Broome residents through Halpern Glick Maunsell during the public review period.

1.17 The proposed residential development (of the existing airport site) would create problems for the Broome community. Currently there are issues such as sewerage, provision of power, water and, in some areas, telephones, which would be exacerbated by the increased development.

As mentioned above, residential development within the existing Broome Airport site is subject to the provisions of a Local Structure Plan approved by the Shire and the Ministry for Planning. Requirements for sewerage, power, water and communication facilities for this proposed development have been addressed through that process. As this is beyond the scope of the Broome Airport Relocation PER, these issues are not addressed in the PER.

1.18 There is a problem with the proposed site of the airport because of the distance from the Broome townsite. The current location of the airport is what makes Broome different and special.

As previously mentioned, the proposed new site for the airport was identified through a site selection process where 10 potential sites were evaluated. Distance of the airport from the Broome Townsite was one of the criteria used during the evaluation process. In consultation with the Shire of Broome, local residents and others it was determined that the airport should be relocated to an area with a maximum distance of 15 km of the Chinatown Post Office. The proposed site complies with this criteria.

1.19 Among reasons given (for the relocation) was that certain agreements had been entered into so the project had to proceed. All agreements can be changed, altered or thrown out.

Comment noted.

1.20 One of the reasons for the relocation was to allow larger flights to be able to access Broome. Is this really necessary? Currently the flights in and out of Broome accommodate the bulk of the passengers except during July and August. For most of the year the current availability is fine.

As stated in the PER, the Broome International Airport is to be relocated to allow future expansion of the Broome townsite to the north, including developing the airport land itself. The number of air passengers at Broome has grown over 400% in the last 8 years. The flights in and out of Broome are currently fully booked at the peak of the tourist season, and are becoming full throughout the rest of the tourist season. The growth of the Broome town in the medium to long term will demand even more airline travel. Larger aircraft, such as the Boeing 737, will enable the demand to be met. Despite improvement works at the existing airport, these aircraft will always be limited in performance there due to the physical constraints on runway length. This makes them less economic to operate. At the relocated airport, the runway length requirements of all aircraft can be provided for. The use of larger aircraft, without capacity constraints, has usually improved access to discounted fares.

2. Biophysical Factors and Issues

2.1 Terrestrial Flora

2.1.1Vegetation communities

2.1.1.1 Dismay was expressed at the superficial way the flora and fauna survey of the proposed site was carried out. The sites of the flora survey in Appendix 5 are not depicted on any plan. Environs Kimberley requests a site plan be forwarded and a copy of the results of the survey to be carried out in May which will determine the ephemeral population.

A figure showing the location of the flora survey sites from the November and July flora surveys has been developed and is attached as Figure 1. A copy of this figure will be provided to Environs Kimberly.

2.1.1.2 The Pindan is not uniform as shown by the limited surveys. Some variations occur which would have been evident if a survey plan had been provided with the report. Owenia reticulata, noted at site 9, is not found at Twelve Mile. It is more commonly found between Broome and Sandfire Roadhouse and on the Dampier Peninsula. Small trees such as Maytenus cunninghamii and Premna acuminata are common on the submitter's property (nearby) but absent from the PER survey sites. It is noted with interest that Ventilago viminalis Medicine Bark Tree was found at 6 out of the 13 sites. This is used by Aboriginal and non-Aboriginal people as a treatment for skin diseases and does not appear to occur at Twelve Mile.

Sections 3.1 and 3.2 of the PER describe the methodology and results of the flora survey undertaken in the study area. The results of the survey indicated that the vegetation of the study area is relatively uniformed with only minor variations in species composition recorded. These minor variations are documented in the PER. It is acknowledged that there are also likely to be minor variations in the Pindan vegetation community that occurs at Twelve Mile and that which occurs in the study area, however it is considered unlikely that these variations are significantly different. Comparing the species composition at these two locations was not however within the scope of the flora survey for the study area.

2.1.1.3 It is simplistic to state that the Pindan is uniform, when even within the relatively small area of Twelve Mile there are variations especially among the Eucalypts. Since the Savannah woodlands represent a specialised habitat with a marked seasonal variation in rainfall, any alteration of the ground cover and run off will affect the natural vegetation.

As stated above, it is acknowledged that there will be slight variations in the composition of flora species that are recorded from specific sites throughout the Pindan vegetation community. However, within the study area it is considered that these variations were not significant to warrant splitting into separate vegetation communities.

Potential impacts from the proposed development on vegetation within the study area will be minimised by implementing the management measures outlined in Section 3.4 of the PER.

2.1.1.4. No mention was made of the fungi of the area. These are an important part of the ecosystem.

A number of fungi species are known to occur on the Dampier Peninsula. However, no fungi was located within the study area during the flora surveys undertaken in either November or July and therefore fungi was not included in the vegetation description or impact assessment provided in the PER.

2.1.1.5 Concern is expressed about the increased potential for the introduction of Mediterranean Fruit Fly and other exotic species into the horticultural area at Twelve Mile. What measures are being taken to control these?

The Quarantine measures currently being implemented for fruit fly at the existing Broome Airport will also be undertaken at the proposed airport when constructed. The potential for the Mediterranean Fruit Fly to be introduced into the horticultural area at Twelve Mile is therefore not expected to increase.

2.1.1.6 Extreme concern is expressed at the inadequate methods used to carry out the flora and fauna studies. Two days in November is not sufficient time to understand the flora and fauna of the area.

A seasonal flora survey for the proposed Broome Airport site was undertaken in July 2000 to fulfil environmental management commitment Number 3 as detailed in the PER. The aim of the seasonal flora survey was to capture the ephemeral flora species that may occur in the study area, specifically searching for the Priority one flora species *Glycine pindanica* which flowers from February to September. The results of the second flora survey have been detailed in a separate report. The Priority flora species *Glycine pindanica* was not located.

Additional diurnal and nocturnal searches for the Bilby were undertaken within the study area in July. The survey involved walked traverses of the study area searching for signs of presence of the Bilby including diggings, burrows and scats and spotlighting along existing tracks searching for Bilby activity. No evidence of the Bilby was observed from the study area and no Bilby's were observed during the nocturnal searches.

2.1.1.7 CALM notes that there is referral to only one field trip of two days duration to look at both flora and fauna. Although the existing databases have been researched and appropriate descriptions of the general environment of the Dampier Peninsula is provided, CALM suggests there is a need for further fieldwork to survey the 800 hectares site to confirm that what is discussed in a general sense is correct.

Prior to developing the methodology for the flora and fauna surveys for the project, discussions were held with CALM to determine an appropriate level of survey effort for the study area. It was recognised that the key issue in relation to fauna was the presence of the threatened mammal species the Bilby and in relation to flora, the key issue was the presence of threatened

flora species, in particular the priority species *Glycine pindanica*. The advice provided by CALM was that detailed flora and fauna surveys were not considered necessarily for the project area due to:

- the amount of information known about the Pindan flora and fauna;
- the large area of Pindan habitat which occurs throughout the Dampier Peninsular and its relatively uniformed nature; and
- the relatively small area of Pindan vegetation that would be cleared for the proposed Airport development.

In accordance with this advice, the two day field survey methodology as detailed in the PER was developed. The requirements for a seasonal flora survey to capture the ephemeral species and the flowering period of the Priority flora species *Glycine pindanica* was recognised and included as a commitment in the PER. This additional survey has now been completed and the Priority flora species was not detected. Further searches for the Bilby were also undertaken during July which included diurnal searches for evidence of the Bilby's presence and nocturnal searches for active individuals. No evidence of the Bilby's presence within the study area was however detected.

2.2 Terrestrial Fauna

2.2.1A number of submissions were concerned about the adequacy of the two day fauna survey conducted for the PER. No list of bird, resident or migratory, has been provided. A survey needs to be undertaken to determine both resident and migratory birds actually on site. There are other migratory birds visiting the site such as Dollar Bird Eurystomus orientalis, as well as shore birds.

As detailed above, the level of fauna survey effort undertaken for the PER was determined in consultation with CALM. The fauna survey undertaken for the PER involved opportunistic censusing of avifauna along four transects within the study area. A list of the birds observed during that survey is provided below.

Table 2.1 Avifauna recorded during field investigations

Common Name	Scientific Name
Whistling Kite	*Haliastur sphenurus*
Australian Kestrel	*Falco cenchroides*
Oriental Pratincole	*Glareola maldivarum*
Peaceful Dove	*Geopelia striata*
Rainbow Lorikeet	*Trichoglossus haematodus*
Red-winged Parrot	*Aprosmictus erythropterus*
Pallid Cuckoo	*Cuculus pallidus*
Black-eared Cuckoo	*Chrysococcyx osculans*
Horsefield's Bronze Cuckoo	*Chrysococcyx basalis*
Pheasant Coucal	*Centropus phasianinus*
Southern Boobook	*Ninox novaeseelandiae*
Blue-winged Kookaburra	*Dacelo leachii*
Sacred Kingfisher	*Todiramphus sanctus*
Rainbow Bee-eater	*Merops ornatus*
Dollar Bird	*Eurystomus orientalis*
Red-backed Fairy-wren	*Malurus melanocephalus*
Red-browed Pardelote	*Pardalotus rubricatus*
White-throated Gerygone	*Gerygone olivacea*
Brown Honeyeater	*Lichmera indistincta*
Little Friarbird	*Philemon citreogularis*
Rufous-throated Honeyeater	*Conopophila rufogularis*
Grey-crowned Babbler	*Pomatostomus temporalis*

Varied Sittella	*Daphoenositta chrysoptera*
Rufous Whistler	*Pachycephala rufiventris*
Grey Shrike-thrush	*Colluricincla harmonica*
Willie Wagtail	*Rhipidura leucophrys*
Magpie Lark	*Grallina cyanoleuca*
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
White-winged Triller	*Lalage tricolor*
Little Woodswallow	*Artamus minor*
Pied Butcherbired	*Cracticus nigrogularis*
Torresian Crow	*Corvus orru*

In addition to the opportunistic censusing within the study area, a detailed survey targeting migratory birds was undertaken during March/April 2000 when the migratory birds depart Roebuck Bay. A list of the bird species observed during this targeted survey is provided below.

Table 2.2 Migratory Bird Species Recorded During Survey

1.1 **Common Name**	**Scientific Name**
Black-tailed Godwit	*Limosa limosa*
Bar-tailed Godwit	*Limosa lapponica*
Whimbrel	*Numenius phaeopus*
Eastern Curlew	*Numenius madagascariensis*
Common Greenshank	*Tringa nebularia*
Terek Sandpiper	*Xenus cinereus*
Grey-tailed Tattler	*Tringa brevipes*
Ruddy Turnstone	*Arenaria interpres*
Asian Dowitcher	*Limnodromus semipalmatus*
Great Knot	*Calidris tenuirostris*
Red Knot	*Calidris canutus*
Red-necked Stint	*Calidris ruficollis*
Curlew Sandpiper	*Calidris ferruginea*
Grey Plover	*Pluvialis squatarola*
Lesser Sand Plover	*Charadrius mongolus*
Greater Sand Plover	*Charadrius leschenaultii*
Gull-billed Tern	*Sterna nilotica*
Common Tern	*Sterna hirundo*

2.2.2Since many creatures are nocturnal or diurnal it is not surprising that they are rarely sighted during daylight surveys. Travelling the highway often at night, Macropus agilis Agile Wallaby is often seen feeding close to the highway as well as the occasional Euro Macropus robustus. A management plan has not been described which takes into account the fact that Agile Wallabies are able to dig under normal fences. Increased traffic will result in more road kills.

The preparation of an environmental management plan for the proposed Airport development was recommended in the PER and was included as an environmental management commitment. The environmental management plan will outline management measures that are to be implemented to minimise potential environmental impacts, including fauna road kills. Management measures to minimise road kill of fauna species that may be recommended in the EMP include erecting Native Wildlife road signs along the road to the airport site or erecting a fauna proof fence around the airport development.

2.2.3Concern is expressed at the inadequate methods used to carry out flora and fauna studies. Seasonal variabilities of the site have been completely overlooked. In particular we are not convinced by the findings on the Bilby (Macrotis lagotis). The PER suggests that "no evidence

of the Bilby was recorded from the project area". The last recording of the Bilby in the general area in 1970 is questioned, as the authors have knowledge of at least two other findings in 1998. Both were deceased and found on Crab Creek Road. The first was found in Jan, only 1 km from the proposed airport site. This specimen was lodged with WA Museum (GPS ref: 1754 south, 12217 east). The second was in May, which was lodged with CALM (GPS ref: 1757 south, 12217.30 east). The Bilby is Schedule 1 and it is of extreme importance that a comprehensive study of the local population of the Bilby be carried out prior to any clearing or construction.

The threatened fauna records obtained from CALM for the study area indicate that the Bilby was last recorded in the Broome area in 1970 as documented in the PER. Following receipt of the information provided in the submission summarised above, CALM were again contacted in regards to these more recent sightings and the location of these recorded road kills were confirmed.

The two day fauna survey undertaken in November, 1999 included a search for the signs of presence of the Bilby. No such evidence was observed. Additional diurnal and nocturnal searches for evidence of the Bilby were undertaken within the study area during July 2000. However, again no signs of this species were observed within the study area.

2.2.4 CALM also points out that the PER is incorrect in Section 4.3 concerning the Bilby which mentions that the last recorded from the area was August 1970. CALM points out that there is an active warren along the Roebuck Plains station access road.

Noted.

2.2.5CALM suggests that, rather than delaying progress on the project, it is recommended that, through the development of an environmental management plan (EMP) for the site, additional survey work should be undertaken as part of the EMP.

Noted.

2.2.6The impact of clearing 200 hectares of bushland could not possibly be assessed because the area has not been surveyed for resident birds. Observations for the Royal Australasian Ornithologists Union (RAOU) show that clearing impacts heavily on smaller species such as wrens and honey eaters and opens up habitat for larger birds such as Straw-necked Ibis Threskiornis spinicollis, Little Corella Cacatua sanguinea and Galah Cacatua roseicapilla. This increases the potential for bird-strikes. Collins (1995) states that a flock of 560 Straw-necked Ibis was observed on Roebuck Plains in 1994. Little Corellas may congregate in large flocks. Collins (1995) states that a flock of 2000 was observed in July 1992. There are also other migratory birds apart from the Shore-birds, such as Dollar Bird Eurystomus orientalis, a wet-season visitor.

The information provided on the types of birds within the Broome area is noted. A list of resident and migratory birds that have been recorded from the study area and its surrounds is provided in 2.2.1 above. The potential impacts of the proposed development on resident birds have been considered in the PER. As mentioned in the PER, the study area lies within the Yeeda Land System that covers an area of approximately 15,798km^2. Within this land system, four land units are recognised including sand plain, shallow valleys, plains with a thin sand cover and pans (CSIRO, 1964). Only the sand plain unit occurs within the study area. This unit comprises 82% of the Yeeda Land System and is vegetated with Acacia dominated Pindan. The removal of 200 hectares (0.015%) of this habitat type for the proposed airport development is not considered to constitute a significant loss of this habitat type in the region.

2.2.7Raptors such as Wedge Tail Eagle Aquila audax, Black Kite Milvus migrans should also be considered when altering vegetation regimes. Red-tailed Black Cockatoo Calyptorhynchus banksii, "is seen…in larger numbers at the bores on Roebuck Plains" (Collins 1995).

The potential impact of removing 200 hectares of Pindan vegetation from the study area on resident or migratory bird populations is not considered to be significant due to the reasons outlined in 2.2.6 above.

2.2.8I would like to know why invertebrates were not considered, they are an important part of the savannah ecosystem.

It is acknowledged that terrestrial invertebrates are indeed an important part of the savannah ecosystem. There was however no requirement in the EPA guidelines for this fauna group to be surveyed for the Broome International Airport Relocation project. Should any additional fauna survey work involving pitfall trapping be undertaken in the study area, invertebrates caught in such traps will be collected and forwarded to the WA Museum for identification.

2.2.9The bush corridor from Lulfitz Drive to Roebuck Plains and the coast will now be fenced off by the airport's demands for a huge area of land around it – where do the bush animals go now for water or for shelter and food in this area? Is CALM removing them?

The study area is approximately 800 hectares in size, of which approximately 200 hectares will be cleared for the airport development. Although the loss of this habitat will affect some fauna species, the net loss of available sand plain habitat is not considered to be significant. The development of the Airport is not expected to impede current fauna movement patterns and no fauna populations are likely to become isolated as a result of the development. Fauna disturbed during construction of the proposed development are likely to move into surrounding habitat that will be retained (approximately 600 ha) in the study area. Therefore there are no plans to relocate species from the study area.

2.2.10 CALM points out that, according to the Conservation Officer, Broome District (Tim Willing) the delicate mouse, house mouse, northern brushtail possum, agile wallaby, blossom bats and possibly bilby and echidna could be present in the area.

Noted.

2.2.11 A number of submissions raised the issue of increased toll on wildlife from road kills with increased traffic.

As mentioned in the response to item 2.2.2 above, an environmental management plan (EMP) will be developed to fulfil environmental management commitment No 1 identified in the PER. The EMP will address the management measures that will be implemented to minimise potential environmental impacts including potential road kill of native fauna species.

2.3 Migratory birds

2.3.1The largest number of comments concerned the migratory birds. Eleven submissions representing 56 members of the public and WA Tourism Commission, Broome Bird Observatory, Environment Australia and CALM made comments on this issue.

Noted.

2.3.2A number of submissions commented that the proposed site is unsuitable because it is too close to the internationally important habitat of Roebuck Bay. Roebuck Bay is the 4th most important wader habitat in the world and the most biodiverse wader mud flats environment.

Requirements for potable water for the expansion for Broome and its industry needs consideration. This includes the proposed airport site, its infrastructure such as sewerage, horticultural surroundings and water requirements for the 20,000 population planned to be between the airport and Four Mile. Benthic animals on which the waders depend rely on unpolluted water and are affected by an abstracted water table.

As mentioned in item 1.2 above, the proposed new airport site was identified through a transparent site selection process. During the site selection process 10 potential sites for the new airport were considered for evaluation. The ten sites were evaluated against a number of criteria one of which involved as assessment of biological values such as flora, fauna, migratory birds and the internationally significant Ramsar area, Roebuck Bay. Several working groups were involved with the evaluation of the options.

As detailed in the PER, the proposed airport site is approximately eight kilometres north of the shores of Roebuck Bay, compared to the existing airport site which is situated virtually on the edge of the Bay. By moving the airport further from the Bay, the potential to directly impact the Ramsar wetland will be markedly reduced.

Potable water and other service requirements for the new airport will be determined during the detailed design stage of the development and in consultation with relevant authorities.

2.3.3 Western Australian Tourism Commission has asked Halpern Glick Maunsell for some additional work on migratory birds to be undertaken.

Halpern Glick Maunsell has not been approached by the Western Australian Tourism Commission to undertake any additional work on migratory birds. When questioned in regards to this issue, the WATC were not aware that they had requested any additional work. However, an additional migratory bird survey for the project has been undertaken and further migratory bird survey work is scheduled for September/October 2000.

2.3.4Broome Bird Observatory (BBO) is of the view that further research and precautions need to be taken before the relocation of the airport can be finalised. BBO is of the opinion that the location of the current site is not satisfactory and suggest that a detailed assessment of the proposed site is warranted by the relatively pristine and internationally recognised conditions of Broome's natural environment. Such an assessment should cover the long-term impacts of the airport and should utilise techniques of sustainable development.

As mentioned in item 1.2 above, the new airport site for which the PER was prepared was identified through a transparent site selection process. During the site selection process 10 potential sites for the new airport were considered for evaluation. The ten sites were evaluated against a number of criteria including Aboriginal heritage values, engineering design issues, located within 15 km from the Chinatown Post Office, noise impacts, biological values such as flora, fauna, migratory birds and coastal wetlands, and aviation safety issues. The preferred site was determined by a working group and it was for this site that the detailed PER was prepared.

A number of specific environmental and social studies were undertaken to provide information for the PER. The information on migratory birds that was included in the PER was obtained from undertaking a comprehensive literature review, from consultation with a number of expert ornithologists and a review of a review of two key published studies, Tulp *et al* (1994) and Lane and Jessop (1984).

The need to undertake a migratory bird survey specifically for the proposed airport development was recognised as an important requirement for the project and as such was included in the PER as an environmental management commitment (Number 6).

To fulfil this commitment, Broome International Airport Holdings commissioned Broome Ornithologist Mr Chris Hassell to undertake a migratory bird departure survey in April 2000. The aim of this survey was to ascertain the number of birds whose flight paths lie close to the

existing and proposed airport sites to assist in determining whether the proposed site will have a higher or lower potential risk for bird strike than the existing airport site.

The previous surveys by Tulp *et al* (1994) and Lane and Jessop (1984) found that the majority of birds departed Roebuck Bay in a north-westerly direction. The recent survey undertaken by Hassell (2000) indicated that the majority of birds were recorded flying in a northerly direction with north-west being the second most common departure direction. Reasons for the differences in results from the recent survey and the previous surveys may include:

- The recent survey did not collect information from the first half of the migration period when some of the larger and more abundant species depart;
- The recent survey collected data from different locations within the Bay to the previous surveys; and
- There may have been duplication in counting bird numbers and directions due to the greater number of observers located within the northern section of the Bay.

No data on migratory bird arrival paths is currently available for Broome. To enable a complete picture of the potential risk of bird strike at the proposed airport site to be modelled, Broome International Airport Holdings has commissioned Chris Hassell to undertake a survey targeting migratory bird arrival paths, the first of its kind. This survey is due to commence in August and will continue through to early October to capture the peak bird arrival period.

There is in excess of 50 years of operational data at the existing airport at Broome on aircraft/bird interaction and interaction of aircraft with migratory shore birds. The existing airport has co-existed with the migratory shore birds, and the RAMSAR recognised wetlands in the eastern and southern inter-tidal zone of Roebuck Bay throughout this period, including flight paths over the proposed airport site and Roebuck Bay. There have been a number of birdstrikes at the existing airport with no hull losses and no fatal accidents in over 50 years.

The risk of contact by aircraft with migratory shore birds at the relocated airport will be managed, in accordance with aviation safety norms, by using the same procedures as the existing airport. Bird management is carried out on a day to day basis by means of regular checks, drainage and rubbish control, bird harassment, and participation in the Airservices Australia bird reporting programme. At the relocated airport, the same birdstrike management practices will be implemented.

The EMP which will be prepared for the project will detail the management and monitoring measures that will be implemented to ensure any potential short and long term impacts of the proposed airport construction and operation are minimised.

2.3.5BBO is of the view that there is insufficient evidence to claim that the relocation will result in a reduced level of disturbance to shorebird habitats. BBO points out that stress or disturbance of migratory birds can occur in a number of ways. A bird can become airborne and land at the same site, or it may leave the area altogether. It may increase its heartbeat or may cease feeding temporarily. These experiences affect the amount of energy a bird will accumulate or lose. In the weeks before or after migration, migratory birds have little energy to waste through stress. Some birds may die during migration if they have not been able to fully prepare their fat reserves.

To further understand the potential impacts of the proposed airport development on migratory birds, the Broome International Airport Holdings commissioned a survey during the migratory bird departure period to determine the number of birds whose migratory paths lie close to the existing airport site and the proposed airport site. Previous migratory bird surveys undertaken by Lane and Jessop, (1985) and Tulp *et al*, (1994) collected data from observation points in the north-eastern section of Roebuck Bay. The recent survey undertaken by Hassell was designed to collect data from observation points in both the north-east and north western sections of the Bay. The recent survey however, only collected data in the second half of the migration period.

The survey therefore did not capture the first half of the departure season when some of the largest and most abundant species migrate.

A second survey has recently been commissioned to collect similar information during the migratory bird arrival period.

The risk of contact by aircraft with migratory shore birds at the relocated airport will be managed, in accordance with aviation safety norms, by using the same procedures as the existing airport. Bird management is carried out on a day to day basis by means of regular checks, drainage and rubbish control, bird harassment, and participation in the Airservices Australia bird reporting program. At the relocated airport, the same birdstrike management practices will be implemented.

There is in excess of 50 years of operational data at the existing airport at Broome on aircraft/bird interaction and interaction of aircraft with migratory shore birds. The existing airport has co-existed with the migratory shore birds, and the RAMSAR recognised wetlands in the eastern and southern inter-tidal zone of Roebuck Bay throughout this period. This includes flights over the proposed airport site and Roebuck Bay. There have been a number of birdstrikes at the existing airport with no hull losses and no fatal accidents in over 50 years.

2.3.6BBO points out that the increased number of flights and the larger aircraft may disturb the birds.

The increase in flights will only occur if there is growth in the township of Broome and growth in tourism in Broome, both of which are outside the control of BIAH. If the forecast growth at Broome occurs as predicted, the relocated airport will reduce the number of flights required to meet forecast demand by allowing larger aircraft to be used. By 2025, the forecast annual airline aircraft movements are 12,023 using a mix of aircraft. If aircraft size were limited to the current BAe146 aircraft, there would have to be 18,074 movements, to carry the same number of passengers.

The proposed airport site is located further from the shores of Roebuck Bay than the existing airport site and aircraft will be at a significantly higher altitude in the vicinity of the coast. Therefore, disturbance to birds using the Bay is not anticipated to increase.

2.3.7 BBO points out that, as helicopters are prevented from travelling over the ocean, it is common practice to fly along the coast. Shore birds have been seen expressing high levels of disturbance when helicopters come within a 1 km radius. Birds disturbed by helicopters generally leave the area which is equivalent to temporary habitat loss. BBO recommend helicopters be restricted from travelling along the coastline and confined to crossing the coast at points which are known to support lesser number of shorebirds. They also suggest continued research be conducted into the causes and outcomes of bird distress and disturbance.

Twin-engine helicopters can fly over water, as can single-engine helicopters under some circumstances. Single-engine helicopters on charter flights are however, restricted to flying close to land due to public safety issues. At the existing airport, this has caused some helicopters to track the shoreline while flying south. The proposed airport is located east of the existing airport and helicopters flying south from the proposed site will be able to fly directly over land, without having to track along the shoreline. Potential disturbance to shorebirds from helicopters is therefore expected to decrease with the proposed airport relocation.

2.3.8BBO make the observation that a causal outcome of the relocation of the airport will be a significant increase in tourists and locals in Broome. It is likely that a majority of these people will be spending their leisure time on the coast. The increase in boats, vehicles, dogs and people will all correlate with an increase in bird disturbance. To date no suitable management strategy has been implemented.

This issue is beyond the scope of the PER. This comment has been passed onto the Shire of Broome for their information.

2.3.9With predicted passenger numbers, Broome's coastal habitat, including Roebuck Bay, will be subject to increased problems such as dune erosion, sewage volumes, pollution from storm water drains, rubbish, vehicles on beaches, uncontrolled fishing and crabbing, shell collection, inappropriate access to and treatment of aboriginal sites, affect of motor powered boats on sea grass and dugongs and fires. Roebuck Bay is currently accessed by an ungazetted road dangerously close to the coast.

This issue is beyond the scope of the PER. This comment has been passed onto the Shire of Broome for their information.

2.3.10 BBO points out that Cable Beach is known to provide a significant roosting site for waders and that increasing numbers of people using it will alter its ecological integrity as a habitat. Conservative estimates suggest 15,000 waders roost on Cable Beach at nights of spring tides. Recently 30 of 48 radio tracked migratory birds were recorded frequenting this site at night.

Issue noted.

2.3.11 Environment Australia (EA) comments on the lack of data regarding the height and flight paths followed by migratory birds arriving and leaving Roebuck Bay and their relationship to aircraft movements. EA acknowledges that the proponent is undertaking studies of migratory bird flight path and supports this initiative. It is recommended that the research be continued up until the airport becomes operational and that additional research be undertaken to include additional sighting points along the migratory paths and the collection of bird flock height data.

Broome International Airport Holdings commissioned Chris Hassell to undertake a migratory bird survey in April 2000. The aim of the survey was to ascertain relative numbers of birds whose migratory flight paths lie close to the existing and proposed airport sites. Previous migration studies undertaken in Broome have collected data from observation points in the north-eastern section of Roebuck Bay. The recent survey was designed to collect data from observation points in both the north-eastern and north western sections of the Bay.

Additional research on migratory birds is currently being undertaken to provide sufficient data to enable an appropriate bird management program to be developed for implementation during operation at the new airport site.

2.3.12 Environment Australia comments that, given the importance of Roebuck Bay area to an internationally significant number of migratory shorebirds, all efforts should also be undertaken to ensure that the environmental impacts of the development and the future operations of the airport are negligible. EA has international obligations to protect and conserve these areas and species including obligations under the Ramsar convention, Japan Australia Migratory Bird Agreement (JAMBA), China Australia Migratory Bird Agreement (CAMBA), the Convention on Migratory Species and the Asia Pacific Migratory Waterbird Conservation Strategy.

Comment noted. The environmental management plan for the Airport development will detail environmental management measures that are to be implemented during construction and operation to minimise potential impacts on all aspects of the environment, particularly those aspects of the environment including Roebuck Bay and migratory birds which are protected under international agreements.

2.3.13 CALM, Woodvale Research Centre, points out that Roebuck Bay is a Ramsar site and, with 80 Mile Beach, forms one of the most important shorebird roost and feeding ground on the

East-Asian Australasian Flyway. Recent information, as a result of benthic research, has identified Roebuck Bay as possibly the richest known intertidal mudflat in the world. Contaminants from an airport could be detrimental to the long-term viability of the biodiversity if allowed to reach the mudflats.

Information noted. Potential contaminants from the airport facility will be contained and managed in accordance with best practise environmental management techniques to ensure the chance of polluting Roebuck Bay is minimised. However, as previously mentioned, the proposed airport site is located further from the shores of Roebuck Bay than the existing airport sites and therefore the potential to pollutants to reach the bay will be reduced.

Pollution management

3.1 Groundwater quality

3.1.1The level of water extraction at the site has the potential to move the saltwater/freshwater interface inland towards the bore field, which could impact on the supply of potable water for the Broome townsite. There needs to be scientific studies of the effects of the proposed extraction.

Any ground water extraction within the study area will be limited to a sustainable rate determined in conjunction with the Waters and Rivers Commission.

3.1.2Environs Kimberley requests a copy of the Drainage Management Plan. Are contaminants to be removed to a lined pit, and, if so, where will this be located?

The preparation of a drainage management plan for the Airport was included as a commitment in the PER. The DMP will be developed during the detailed design stage of the Airport development and will be prepared in accordance with the requirements of the Water and Rivers Commission. A copy of the DMP will be made available to Environs Kimberley once it has been completed.

3.1.3Changes in the fresh/saline interface have the potential to harm existing horticultural enterprises at Twelve Mile. The proponent should monitor, at their expense, any changes in salinity in their proposed bore site under the direction of Water & Rivers Commission.

The proponent will monitor at their expense any changes in salinity in any bore constructed by the proponent in the study area. Monitoring will be to the requirements and direction of Waters and Rivers Commission and Water Corporation.

3.1.4 Water & Rivers Commission (WRC) comments that the PER does not adequately address drinking water quality protection issues. The proposed Broome airport site is located in the Broome Water Reserve, which was gazetted under the Country Areas Water Supply Act 1947 for public drinking water source protection. The Broome Water Reserve mentioned in the PER is in relation to the Land Act Reserve 25716. The subject part of the Water Reserve is managed by the WRC as a Priority (P3) source protection area.

Airports can be sited in P3 areas, subject to appropriate site layout and best management practices, established in consultation with the Commission. WRC recommends that airport infrastructure and runways should not be located within a 300 metre radius wellhead protection zone around production bore 7/73 (located beside Broome Road) which covers part of the subject area.

The requirements of the WRC are noted and BIAH assures that these requirements will be included into the detail design and layout of the Airport. No development will occur within 300 metres from any existing production bores.

3.1.5WRC also advises that the salt water interface extends inland beyond the boundary of the proposed airport site (to north east of airport boundary) so there is potential for vertical movement of salt water in the event of over abstraction. There is, however, a significant freshwater resource available. The proponent will need to contact WRC Karratha office regarding groundwater well licences. WRC will provide further advice about the best location of the bores and licensing issues.

Comment noted.

3.1.6Requirements and advice regarding preparation of the proposed Environmental Management Plan should involve WRC. The EMP should include discussions on drinking water quality protection. In addition, the Operations Management section of the EMP should address energy response.

Comments noted. Relevant sections of the EMP will be provided to the WRC for comment when prepared.

3.1.7WRC would like to be consulted during the development of the Drainage Development Plan.

As stated in the environmental management commitments table provided in the PER, the drainage management plan will be developed and implemented in accordance with the WRC requirements. The WRC will therefore be consulted during the preparation of the DMP.

3.2 Sewage waste disposal

3.2.1Sewage disposal will need to be carefully designed to prevent contamination of groundwater and subsequent contamination of Roebuck Bay. Aeration ponds would need to be covered to prevent them from becoming an attraction to water birds (Monkey Mia is a good example of possible preventive measures). The settling ponds at Broome attract a large number of water birds.

Comments noted.

3.3 Aircraft noise

3.3.1A number of submissions representing 36 people were concerned at the increased road use and noise. Road upgrading would lose the little fringing bush that shields us from current noise (Four Mile residents). The submissions noted that the residents also appear to be right on the flight path for noise for approaches and departures runway 29.

Main Roads Western Australia (MRWA) is currently undertaking a separate study of traffic for Broome Highway between the airport site and the Port of Broome. Preliminary indications from MRWA are that no significant upgrades would be required to the Broome Highway as a result of the airport relocation. Some minor upgrading of existing intersections may however be undertaken. The location and design of the intersection between the Highway and the access into the airport will require approval from MRWA prior to construction.

3.3.2Milliya Rumurra Rehabilitation Centre is concerned that excessive noise would cause disruption to client's programs. These comprise educational, experiential sessions where concentration is required. The Centre requires a non threatening stress free environment. Planes flying overhead will be detrimental to the clients' wellbeing during their recovery and rehabilitation.

The Milliya Rumurra Rehabilitation Centre lies well outside the 20 ANEF for the year 2025 forecast, which is considered to be an acceptable level for residential developments. This means

that the proposal complies with Australian Standard AS 2021-1994 without the need for any special management measures.

The impact of flights from the proposed airport over the Milliya Rumurra Rehabilitation Centre area is not expected to increase. At the existing airport, international flights departing from runway 10, and many of the flights departing/arriving to/from the north-east are likely to pass nearby or overhead the Milliya Rumurra Rehabilitation Centre. At the proposed airport, there are no specific flight paths over the Centre and therefore it is anticipated that very few aircraft would pass overhead.

3.3.3Milliya Rumurra Rehabilitation Centre also makes the point that their location in the outer area of Broome is necessary and beneficial for their clients and that increased traffic would alter this environment.

Comment noted. The impact of aircraft noise on the Centre is addressed in the response to comment 3.3.2.

3.3.4Currently there is no problem with noise because the flight paths go over Chinatown and the sea. The new site could provide a noise issue for the people who live at 12 mile and surrounding areas and also for the birds at the Observatory.

A noise impact assessment was undertaken as part of the PER. Potential noise impacts resulting from the proposed airport are discussed in detail in Section 7 of the PER and a copy of the Flight and Noise forecasting report is provide as Appendix 3 in the PER. As part of the noise assessment, the Australian Noise Exposure forecast system was used to determine noise exposure levels around the airport.

The ANEF figures for the Airport show that the 20 ANEF, which is considered to be an acceptable level for residential developments, lies almost entirely within the Airport study area for the 1999 forecasts and approximately 1.5 km beyond the airport boundary 2025 forecasts. No residential areas currently lie within the 2025 ANEF 20 contour and therefore no sensitive receivers will be affected. The people who live at 12 mile and surrounding areas and also for the birds at the Observatory areas all lie outside the 2025 ANEF 20 contour. This means that the proposal complies with Australian Standard AS 2021-1994 without the need for any special management measures.

3.3.5Coconut Well Residents and Ratepayers Association appreciates that relocation of the airport was a difficult task, however, a number of the members, particularly those at the southern end of the subdivision, are concerned that they will be significantly impacted by noise. Even though the southern end of the Coconut Well subdivision is not in the 'immediate vicinity' of the airport site they are in the 'immediate vicinity' of aircraft flight paths. Public meetings have not diminished some people's fear of noise impact in the area and further EPA information is required for those residents.

A noise impact assessment was undertaken as part of the PER. Potential noise impacts resulting from the proposed airport are discussed in detail in Section 7 of the PER and a copy of the Flight and Noise forecasting report is provided as Appendix 3 in the PER. As part of the noise assessment, the Australian Noise Exposure forecast system was used to determine noise exposure levels around the airport. The ANEF figures for the Airport show that the 20 ANEF, which is considered to be an acceptable level for residential developments, lies almost entirely within the Airport study area for the 1999 forecasts and approximately 1.5 km beyond the airport boundary 2025 forecasts. Coconut Well lies well outside the 2025 ANEF 20 Contour. This means that the proposal complies with Australian Standard AS 2021-1994 without the need for any special management measures.

3.3.6Many houses in the Coconut Well area are especially noise sensitive due to the open plan designs to allow for maximum breezes and air flow in the area. The statement in the Executive Summary of the PER and under the section Existing Environment which states that 'there are no noise sensitive premises in the vicinity of the site proposed for the airport relocation' is obviously false and I thoroughly object to it as a summary of my welfare as a resident.

Comment noted.

3.3.7As a nearby resident (of Coconut Well) I demand more tests be performed at the proposed site with regard to flightpaths to ensure that such take-off and landing paths are determined at an angle that has no (noise) impact on such residents, and in fact fly over a significant expanse of vacant land between Broome and Coconut Well where there are no existing settlements.

Test flights have already been undertaken over the Coconut Well area using a jet aircraft chartered by Broome International Airport Holdings for the purpose. A noise impact assessment was undertaken as part of the PER and is discussed in detail in Section 7 of the PER, and a copy of the Flight and Noise forecasting report is provided as Appendix 3 in the PER.

As part of the noise assessment, the Australian Noise Exposure forecast system was used to determine noise exposure levels around the airport. The ANEF figures for the Airport show that the 20 ANEF, which is considered to be an acceptable level for residential developments, lies almost entirely within the Airport study area for the 1999 forecasts and approximately 1.5 km beyond the airport boundary 2025 forecasts. The people who live at Coconut Well lie well outside the 2025 ANEF 20 contour. This means that the proposal complies with Australian Standard AS 2021-1994 without the need for any special management measures.

Social Surroundings

4.1 Culture and Heritage

4.1.1The Kimberley Land Council, representing the combined Rubibi claim (the only registered native title claim in Broome), makes the point that the expanded Broome airport will trigger radical changes to the demography of Broome. Rubibi is keenly aware of the social effects on their culture of the exponential economic activity projected to be delivered by the new airport, particularly the potential for ongoing residential and business development in Broome. Such development could lead to;

- *Marginalisation of current living areas for indigenous communities, forcing people again off their country and inland;*
- *Damage and desecration of culturally significant areas both on land and waters;*
- *Significant effects of traditional fishing food gathering rights (which serve both practical and cultural roles) through significant population increase; and*
- *Loss of participation rights in activities on country.*

The social issues raised above are beyond the scope of the PER for Relocating the Broome International Airport and therefore were not addressed. Native title issues are currently being addressed by DOLA's Native Title Unit through a separate process.

4.1.2To date there has been no social impact study done on the proposed airport. This is an alarming oversight, given that the specific reason to expand the airport is due to the fact that Broome is targeted as the centre of future economic development in the Kimberley. The PER merely states that there are ongoing discussions with native title claimants as to future impact on their cultural associations with the airport and that the issue is therefore addressed. Rubibi strongly contests the assessment in relation to the second term of reference. The discussions are in no sense addressing the key concerns of Rubibi as in 4.1.1. Recent correspondence

between Rubibi and the developers makes it clear there is a fundamental misunderstanding as to what Rubibi means by cultural associations with the area.

The preparation of a social impact assessment is beyond the scope of the PER requirements and was therefore not addressed in the PER. As mentioned above, Native Title issues are currently being addressed by DOLA's Native Title Unit through a separate process.

4.1.3A formal social impact assessment should be completed prior to the project being cleared under the environmental impact assessment process, as an additional aspect of the environmental review.

The development of a social impact assessment was not included as part of the PER process and is not assessable by the DEP.

4.2 Public health and safety

4.2.1CALM, Woodvale Research Centre, points out that the proposed airport site is probably still within the main shorebird migration path. The elevations that birds may be flying at, when over the new airport location, or near the aircraft approaches to the airport, may vary between a few hundred metres for larger birds, such as Whimbrel, to migration heights of 5000 to 6000 metres for smaller birds.

There is in excess of 50 years of operational data at the existing airport at Broome on aircraft/bird interaction and interaction of aircraft with migratory shore birds. There has been no fatal Regular Public Transport (RPT) accident due to a birdstrike at Broome (nor in Australia). A risk analysis has been undertaken which showed that the probability of a fatal RPT accident due to a birdstrike at Broome was 1 in 4,662 years, which is considered insignificant. This study will be refined in October 2000 when the data from 2 additional studies into bird migration is available. The preliminary indication is that there is no evidence to suggest that bird strike risk will change substantially at the relocated airport.

4.2.2BBO acknowledges the work being done by BIAH in relation to bird strikes, but feels that further data needs to be gathered, particularly in relation to the altitude of migratory shorebird flight and whether flocks are dispersed by approaching aeroplanes. Study also needs to be conducted in relation to flight paths that birds take as we currently only have information on the direction observed as they fly over monitoring sites in Roebuck Bay.

There are two published studies on migratory bird paths at Broome (Tulp *et al*, 1994; and Lane and Jessop, 1985). A further study was commissioned by BIAH and undertaken in April/May 2000 by Chris Hassell on the visible migration of departing shorebirds. A fourth study has been commissioned by BIAH and will be undertaken during September/October 2000 by Mr Chris Hassell on the visible migration of arriving shorebirds. The aviation risk study will be refined in October 2000 when the data from the two additional studies into bird migration is available. The preliminary indication is that there is no evidence to suggest that bird strike risk will change substantially at the relocated airport.

4.2.3It should be recognised that the cultivation of lush, grassy expanses either side of the bitumen landing strip may attract migratory birds and nomadic shorebirds such as Little Curlew. These may pose an aircraft bird strike at the airport.

Comments noted. Although the airport development will require large open areas on either side of the bitumen runways, these areas will not be actively watered to encourage the grass growth. On the ground measures such as regular checks, use of bird scare devices and drainage and rubbish control currently implemented at the existing airport will also be implemented at the proposed airport site to manage bird strike issues at the airport.

4.2.4Broome Bird Observatory (BBO) is not convinced that the risk of bird strike will be eliminated at the proposed site because the future airport's grassy areas will be attractive to Little Curlews, Masked Lapwings (Vanellus miles) and Oriental Plover (Charadruys veredus).

The risk of bird strike will not be eliminated by relocating the Broome Airport from the existing site to the proposed site. However it is unlikely that the risk will increase by the proposed relocation. The risk of contact by aircraft with migratory shore birds at the relocated airport will be managed, in accordance with Australian and International aviation safety norms. This would include regular checks, drainage and rubbish control, bird harassment, and participation in the Airservices Australia bird reporting program.

4.2.5BBO comments that the Waterbank Structure Plan identifies a new rubbish tip to be developed to the east of the proposed airport. BBO has recorded in excess of 300 Black Kites (Milvus migrans) at the current site at one time which presents a serious bird strike risk. Silver Gulls (Larus novaenollandiae) and Torresian Crows (Corvus orru) have also been recorded at the current tip in large numbers. It is recommended that the proposed tip is planned at a safe distance if the airport is to go ahead at the proposed site.

Comments noted.

5. Additional Comments on the Proposal

5.1 A number of submissions commented on the increased traffic on Broome Road which would result from the airport relocation. This was considered a serious omission from the PER.

Main Roads Western Australia (MRWA) is currently undertaking a separate study of traffic and main road access to/from Broome. Preliminary indications from MRWA are that no significant upgrade would be required to the Broome Road/Great Northern Highway as a result of the airport relocation, other than some minor work at intersections.

5.2 Airborne pollution of Roebuck Bay, affecting the benthic invertebrates and shorebirds, is of concern.

Issue noted.

5.3 Where are the materials to construct the runway to come from? What impacts will be caused by removal and transport of those materials? Where will the pindan to be removed from the runway site be disposed of and what effect will that have on both sites?

The type and source of construction materials etc will be identified during the detailed design stage of the project. It is however, anticipated that the bulk of the material will be sourced from existing quarries and mining leases. Specific management measures that will be implemented to minimise any impacts from transporting materials to and from the proposed airport site will be detailed in the EMP prepared for the project.

5.4 The further from the sea the longer the airstrip has to be making it more difficult for aircraft to take off than from the current site.

Comment noted.

5.5 Fire is a major problem in the Crab Creek area where the proposed airport site is located. Controlled and uncontrolled fires will affect visibility at the proposed airport site.

Fire management measures currently implemented at the existing airport site will also be implemented at the proposed site. The management of fire during construction is also an important issue which will be addressed in the EMP prepared for the project.

5.6 If a plane crashes at current site, it can land in the beach, mangroves or sea as a Garuda DC3 did in the 1970's. This will not be possible at the proposed site.

Comment noted.

5.7 A consequence of the relocation of the airport is increased pressure on the infrastructure and environment of the area. Currently the power station is unable to provide continuous power at peak times and, as the recent cyclone Rosita has shown, the distribution of power within Broome is vulnerable.

The availability of existing infrastructure such as power, water, communications etc will be assessed during the detailed design of the Airport when anticipated requirements are calculated. Relevant agencies will then be contacted to determine availability of these services.

5.8 I am concerned about the introduction of pathogens from overseas. This has not been adequately addressed.

The Quarantine practices currently in operation at the existing Broome Airport will be applied at the proposed airport site. Therefore there will be no increase in the opportunity for pathogens to be introduced into the Broome region.

5.9 There seems to be potential for escape of potentially hazardous materials in their transport from the airport site. Since the Shire of Broome does not have a suitably located lined pit to dispose of these kinds of waste will the proponent be providing such a disposal site at their expense? Where will this be? Where will contaminated material from hydrocarbon storage be removed to?

The quarantine and hazardous material management practices currently in operation at the existing Broome Airport will be applied at the proposed airport site. All quarantine material will be disposed of in accordance with Department of Health regulations.

5.10 Fog occurs more than one or two weeks each year. It arrives earlier at the proposed site than in town and visibility is often reduced until after 8.30 am.

Fog was identified in the PER as an aviation issue. To gather operational aviation experience on the incidence of fog, a survey was conducted of general aviation pilots flying in the Broome area. This is in accordance with recommended ICAO international aviation practice. The survey response showed that there were some problems with fog at Broome, but these were less at the relocated airport site. The relocated airport site tends to clear earlier because the type of fog experienced is a sea fog, which typically clears from the land side at Broome.

As problems with fog only occur for a week or two, twice a year, appropriate aviation management measures will be implemented at the proposed site during those times to ensure potential risks are minimised.

5.11 Bilingurr Ratepayers Association feel that the siting of the power station and heavy industrial area adjacent to the proposed airport site is compelling in terms of Broome's long term planning. The Association feels that an independent consultant should investigate the possibility of dissipating emissions from a powerhouse located adjacent to the proposed airport. This was not looked at a report by Mr Shorthouse which ruled out the location of a power station near the proposed airport.

This issue is beyond the scope of this PER and therefore was not addressed. Identifying a suitable location for a power station would be subject to a separate environmental assessment.

5.12 One submission deals with the issue of the location of the power station in some detail, stating that there was an apparent abandonment of sound planning principles and plans such as TPS4 and Waterbank Structure Plan which had been researched and developed over many years by experts in the planning field. One of the alternative sites proposed (for the power station) is close to the home of the submitters. They believe that the safety issues are not conclusive and require further investigation and should be considered in a holistic manner.

This issue is beyond the scope of this PER and therefore was not addressed. Identifying a suitable location for a power station would be subject to a separate environmental assessment.

5.13 The maps do not show the inland road from its intersection near the Cape Leveque/Broome Road. One submission assumes Crab Creek road will be absorbed in the airport and queries where will the new road to this area be and how much access will the public have to the coast since Bird Observatory will now back onto the airport?

Crab Creek Road occurs well to the west of the proposed airport site. Access to the Broome Bird Observatory and the northern section of Roebuck Bay will therefore not be altered by the proposed airport relocation project.

5.14 The final sentence of Section 4.5.2, first paragraph of the PER should read "the eastern end of the current airport landing strip is actually submerged at high tides". Otherwise the sentence reads as if the whole airfield is submerged.

Comment noted and agreed.