



8. Soil (erosion, sedimentation and dust)

8.1 Objective

Northern Territory Airports PL aims to minimise soil erosion, sedimentation and dust on Darwin International Airport.

8.2 Overview

Soil conservation on Darwin International Airport generally involves the minimisation of unnatural or excessive erosion by wind or water. Water erosion is caused by disturbance of the soil and concentration of water flowing across the ground surface. This can cause gullies and rill erosion along tracks, bare soil surfaces and slopes. Due to the climatic conditions of the wet/dry tropics, the dominant erosion process is erosion by water which can cause large amounts of sediment to move through the water ways and in particular the storm water drains and Rapid Creek.

In 2003, Northern Territory Airports PL established a monitoring program in conjunction with the AEO in key areas in the major drainage lines on both airside and landside. The purpose of this monitoring program is to provide

information on the rates of erosion/deposition on airport over time. These transects were sited across the Airport specifically to gauge erosion levels in areas that are most likely to be subject to water erosion processes.

Over the past 5 years, Darwin International Airport has implemented a major capital works program to improve the condition of the open unlined drains. A report was commissioned in 2002 which provided Darwin International Airport with a 5 year works program for unlined drains. Current works to date include the installation of energy dissipaters, reinforcement of bed and banks and removal of accumulated sediment.

All construction on Darwin International Airport is dealt with under the "Site Rules" document. Site Rules include the submission of an erosion and sedimentation plan which is submitted for all development works. Such measures as sediment control fencing, temporary sediment retention basins and temporary grass cover are requested from all contactors on airport. Major development may be required to produce a construction EMP which deals with erosion and sediment control during the construction phase.

Some construction in the dry season can cause dust issues, however the amount of soil disturbed during this process is not sufficient to cause any major erosion and is addressed in the Air Quality section.

8.3 Achievements

Previous AES objectives, as outlined by the 2002 Minor Variation, are noted by a '*'. All specified soil conservation objectives have been achieved within the appropriate time frame.

Achievements in soil conservation management since 1999 include:

- The removal and disposal off site of all unused soil stockpiles and building rubble.
- A report produced by consultants in 2002 on the condition of open unlined drains (OUD's), including an extensive 5 year works program.
- Implementation of an extensive drain works program as per the recommendations of the Drainage Report.
- The development of erosion and sediment guidelines for the contractors 'Sites Rules'. All major developments are required to submit an erosion and sediment control plan. *
- The development and implementation of an erosion monitoring program across Darwin International Airport storm water drains. *
- All drains are inspected after each wet season to produce a prioritised works program for the dry season. *



8.4 Five Year Action Plan

High Priority Actions

- Work with stakeholders (RAAF, Larrakia, RCCACand RCCAC) to provide erosion works for the banks in the Yankee Pools (Rapid Creek) area.
- Continue the capital works project for the refurbishment of open unlined drains including erosion measures and energy dissipaters.
- Implement a policy for the prevention and minimisation of any further direct stormwater outlets from the Airport into Rapid Creek.
- Implement the recommendations from the 2004 Erosion Report.

Lower Priority Actions

- Upon development of the commercial precinct, consider options for the design and construction of a sediment retention pond (wetland) at Collopy Road to intercept stormwater run-off from commercial areas.

Ongoing Actions

- Inspect drains to ensure adequate maintenance.
- Continue targeting erosion control on areas where active erosion may occur and to continue with practices such as slashing fire breaks which minimise the risk of erosion.
- Keep current with erosion control techniques.
- Maintain cover on soil at all times, especially in the wet season.
- Continue policy of late wet season/early dry season controlled burns to ensure sufficient ground cover in the early wet season rains.

Monitoring and Measurements

Current

- The erosion and sediment monitoring program developed in the 2003 wet season will be continued in every wet season for this AES period. The program will be evaluated and modifications will be made if necessary and from advice from the AEO.

Future

- All major developments that are required to submit an erosion and sediment control plan will be monitored on site by the Environment Coordinator.



9. Wildlife Hazard Management System

9.1 Objective

Northern Territory Airports PL aims to ensure the safe operation of all aircraft movements within the vicinity of Darwin International Airport whilst minimising detrimental effects on local wildlife from airport operations.

9.2 Overview

The question of how to prevent birds or other wildlife interacting with moving aircraft is one of the most difficult and enduring problems faced by airports around the world. Bird strikes to aircraft can damage engines or other equipment and cost airlines millions of dollars each year. The cost however is insignificant compared with the potential risk to human life when strikes cause a plane to malfunction in flight or during take off or landing. Within NT Airports the Environment Department takes a lead role in dealing with Wildlife Hazard Management in cooperation with the Operations Department.

Over the years numerous attempts have been made to find an assured method of preventing birds from entering operational areas on airport, though none have been consistently successful. Most methods have focused purely on harassing problem bird species using birdfrite, or various forms of noise disturbance. In some instances airport safety crews must resort to shooting birds to remove them from runways where they pose an extreme safety hazard. Darwin International Airport however prefers to use non-destructive methods and culling is only very rarely carried out and as such this has not been necessary at Darwin International Airport for many years.

Birds, bats and feral dogs have been known to interfere with aircraft in take off or landing. Northern Territory Airports PL also recognises the fact that the issue of bird hazard management needs to be addressed in an overall approach, rather than focusing on individual problem bird species. Habitats, predators, water availability, food sources including vegetation, insects and other vertebrates, intra and interspecies bird behaviour and human interactions can all influence the number, type and placement of bird populations on an airport.

In light of this Northern Territory Airports PL has chosen to expand upon the bird hazard management procedures detailed in the previous AES and has

developed and implemented the first stages of a Wildlife Hazard Management System (WHMS). The primary objective of the WHMS is to reduce the number of bird strikes to aircraft, however it also recognises the fact that bird strikes and the current harassment technique of shooting birds is detrimental to native and migratory bird populations. The WHMS aims to identify and implement a range of techniques for discouraging birds from airside areas that in the long term are both more effective and less destructive than shooting.

The WHMS was introduced across Northern Territory Airports PL in 2003 and in its first year has focused on collating existing information and networking between various authorities and stakeholders. To this end all major aircraft operators have been consulted, as well as Airport Safety Officers (ASOs), ground staff, the AEO and local bird experts. Local meetings are held every three months to discuss actions and identify priorities. Meetings to discuss strategies across all Northern Territory Airports PL are held every 6 months. Databases on bird strikes and bird observations have been developed and are in use.

The WHMS is now at a stage where more detailed strategies for reducing bird numbers on airside can be implemented. Some strategies will continue to

9. Wildlife Hazard Management System



focus on direct bird harassment, whilst others will look at reducing bird attractants, particularly food and water sources and nesting or roosting habitat.

Permits

Northern Territory Airports PL currently holds a permit from NT Parks and Wildlife for shooting native species on Darwin International Airport. These species can only be shot if they pose a direct hazard to aircraft safety. The permit is reviewed annually and Darwin International Airport has halved the required numbers to be disposed of in the past year.

The permit also allows for the retention of bird or animal carcasses for identification or gut analysis. All carcasses that are not required for forensic purposes are provided to the Museum and Arts Gallery of the Northern Territory.

2003 Survey

A survey was conducted in the late dry season 2003 and early wet season 2004 on airside in order to identify further species of birds that had not previously been recorded. This was conducted as part of a general fauna survey conducted on landside areas.

Species of Conservation Significance

Several species of birds that are covered by international migratory bird agreements, Federal Government and Northern Territory Government Acts are found at Darwin International Airport. The majority of these birds have been observed on the airfield. Northern Territory Airports PL aims to minimise the impact of bird hazard management on these species and bird identification training has been implemented to ensure that ASO's conducting bird harassment are aware of the significance of these species.

9.3 Achievements

Previous AES objectives, as outlined by the 2002 Minor Variation, are noted by a '*', all specified bird hazard management objectives have been achieved within the appropriate time frame.

Specific achievements in developing the WHMS so far include:

- Development of a Wildlife Hazard database and reporting system.
- Commissioned consultants to research and provide recommendation on land management to reduce bird attractions.
- Commissioned a study in 2001 on the management of bird hazard (P.Davidson).

- Developed a bird observation database which includes information on bird species, obvious sources of bird attractants and effective harassment techniques.
- Continued with current effective bird harassment techniques.*
- Modified habitat where necessary to discourage birds.*
- Produced a bird identification kit for use by Airport Safety Officers.
- Provided training on Wildlife Hazard Management to Airport Safety Officers.
- Developed a Wildlife Hazard Management Steering committee consisting of major airport tenants, airport staff and interest groups (e.g. bird enthusiasts). Meetings have been quarterly on a local basis and biannually Territory wide for the purposes of identifying problem bird species, common bird attractants and new methods of bird harassment or discouragement.

9.4 Five Year Action Plan

The WHMS is an evolving process and new procedures and techniques will be applied and tested as they are identified.

High Priority Actions

- Revise existing studies and conduct further research into the current bird strikes.
- Research and trial of various land management techniques to reduce bird habitat.
- Research and trial of various bird harassment techniques.
- Design and construction of a new waste transfer station to incorporate mechanisms for reducing animal attraction.
- Review current Wildlife Hazard Management System in light of new available information, data and technology.

Lower Priority Actions

- Develop a policy for the use of plants with a low bird attraction potential for any new airport gardens.
- In relation to bird attraction, develop a policy for reducing human generated food sources on airside and make airport operators aware of the policy.

Ongoing Actions

- Current bird harassment and feral animal control will continue to be used in combination with new techniques.
- Continue regular meetings of the WHMS Steering Committee and recruit relevant members if required.
- Feral animal control techniques on airside will be reviewed as required.
- Updating of the bird strike and bird observation databases will be ongoing.

- Review of the permit to shoot native animals and to retain carcasses of native and migratory species will be conducted annually.
- A review of trends in the bird database information will be conducted at least annually.

Monitoring and Measurements

Current

- Continue to collect data on bird diversity and abundance on the airfield.
- Continue to report information on bird harassment methods.
- Continue to improve training in bird identification.

Future

- Revise and implement a new user friendly database to analyse monitoring data.



10. Land Management

10.1 Objective

Northern Territory Airports PL aims to manage airport land in a manner which allows for the continued safe and sustainable running of all operations on airport and does not have a significant impact upon the local environment. In addition airport land management practices will not be detrimental to the natural environment on neighbouring lands.

10.2 Overview

The lease area of Darwin International Airport has had an interesting history in the area of land use. Prior to Northern Territory Airports PL taking over the current lease, the area has been subjected to fire, extreme weed invasion, used for land fill and most areas have been cleared at some stage since the area was first used as an airport in 1945. The wet/dry tropics provides land managers with many challenges, the priorities of which for all landholders in the Top End are fire, weeds and feral animals. These 3 key issues are the focus areas for the Darwin International Airport Land Management Program

see **Figure 14**
Map of the Land Management on Darwin International Airport

The successful management of weeds and fire on airport in the past 5 years is considered to be a show case to best practice land management in the Darwin Region. Considerable resources have been provided to the Environment Department to manage weeds and fire fuel loads on airport.

Weeds

Since the commissioning of the existing aerodrome in 1940, Darwin International Airport lands have been subjected to intense and varied land

use that has significantly modified the landscape. Frequent disturbance and clearing of the existing vegetation has enabled a wide variety of weed species to colonise and thrive in the area. Given the considerable time since introduction many of the weed communities could be considered as late successional with highly competitive species such as Gamba Grass dominating ecological niches.

Intensive weed management has been implemented over the past 5 years at Darwin International Airport with significant progress in reducing the distribution and density of many weed species. Weeds of greatest concern at Darwin International Airport are Gamba Grass (*Andropogon gayanus*) and those of the Genus *Pennisetum*, namely Mission Grass (*Pennisetum polystachion*) and Deenanth Grass (*Pennisetum pedicellatum*).

Focused efforts in high priority areas, such as the Rapid Creek corridor, have seen a reduction in extensive stands of dense weed infestations to manageable patches interspersed through native communities that have reclaimed the areas through regeneration.

The implementation of Weed Management Programs has been conducted in conjunction with other environmental works, such as fire and rehabilitation to achieve an integrated management approach.

10. Land Management



Figure 14 Map of the Land Management on Darwin International Airport

10. Land Management



Darwin International Airport produces a restricted and prohibited species list which is included in the 'Contractors Site Rules'. No species listed under the *NT Weeds Management Act 2001* are permitted to be planted as well as species identified as potential environmental weeds.

Environmental Weeds of Concern

<i>Alsonia scholaris</i>	Cheesewood
<i>Andropogon gayanus</i>	Gamba grass
<i>Ardisia humilis</i>	
<i>Centrosema molle</i>	Centro
<i>Crotalaria goreensis</i>	Gambia pea
<i>Leucaena leucocephala</i>	Coffee bush
<i>Melinis repens</i>	Red Natal grass
<i>Mitracarpus hirtus</i>	Berrimah weed
<i>Passiflora foetida</i>	Wild Passionfruit
<i>Senna obtusifolia</i>	Sicklepod
<i>Stylosanthes</i>	Stylo

Fire

Darwin International Airport consists of considerable developed infrastructure surrounded by tracts of open woodland necessitating a combined fire management approach to primarily protect infrastructure and to prevent fires from exiting and entering the property.

To accomplish this, a two stage, seasonal specific burning strategy with burning in the wet season and in the early dry season has been implemented over the past 5 years. Wet season burning is used to maintain and enhance a rotational mosaic burn pattern, reduce the incidence of highly flammable grasses, such as annual *Sorghum spp.* (Spear Grass), and integrate weed management through a reduction of certain weed species densities (ie Gamba Grass and Mission Grass). Buffer burns are typically established along wooded external boundaries and protection burns around infrastructure are implemented in the early dry season.

Through this fire strategy habitat diversity is maintained and enhanced by varying the seasonality, frequency and intensity of fires occurring throughout Darwin International Airport.

Feral Animal Control

There are two feral species of concern (feral cats and feral dogs) that currently exist on airport. Within airside areas these species are controlled under the Wildlife Hazard Management System (Section 9) due to the hazard they pose to aircraft. In landside areas the common feral species is the feral cat and dog which can have a potentially devastating effect on native wildlife. These animals are difficult to control due to a continual influx of strays from surrounding suburbs. Preferred control measures are shooting and live

trapping of feral cats and dogs. Eradication of wild dogs on the airfield is done in cooperation with RAAF and professional shooters and trappers are used when necessary. Regular checks of the airside fence are conducted and works have been completed in areas where feral dogs have dug under the fence.

Darwin International Airport in cooperation with Parks and Wildlife embarked on a program to eradicate all feral pigeons from the Darwin region in 2002. This has been achieved successfully.

Cane Toads are the newest threat to native wildlife at Darwin International Airport. It is expected that the Cane Toads will invade the Marrara Swamp and Rapid Creek in the Wet Season of 2004/5. Northern Territory Airports PL will be cooperating with the NT Government and Larrakia Nation in various programs to reduce the impact on wildlife

Vector Control

Northern Territory Airports PL continues to monitor water ponding in airport drains as another potential mosquito breeding site and will respond to any infestations if they occur. Darwin International Airport works cooperatively with Territory Health who manages vector control in Darwin.

Native Gardens

Northern Territory Airports PL Airports has committed to a three year capital works project (commenced 2003) focussing on landscaping. In order to show case best practice, the landscaping project has focused predominantly on local native vegetation. An interpretive native garden has been established behind the terminal car park which shows various Top End vegetation communities including woodland, escarpment, cycads, monsoon vine forest and riparian communities. The garden has been laid out in such a manner that it provides an education opportunity for visitors. Interpretation signage will be developed in conjunction with Larrakia Nation. A native garden has also been established airside in front of the terminal building which show cases art designed and produced by local Aboriginal artists.

10.3 Achievements

Previous AES objectives, as outlined by the 2002 Minor Variation, are noted by a '*'. All specified land management objectives have been achieved within the appropriate time frame.

Achievements in land management since 1999 include:

- Developed and implemented the first stage of the 5 year strategy for fire and weeds 2004 – 2008 including extensive mapping of weeds and treatment sites. *

- Worked in cooperation with Rapid Creek Landcare Group and members of RCCAC to reduce fire fuel loads in and around Rapid Creek.
- Successfully implemented the past 5 year weed program including the near eradication of Gamba Grass in and around the Rapid Creek Corridor. *
- All weed management sites and data has been input to the Environment GIS.
- Continued liaison with neighbouring landholders in the area of weed and fire management including meetings with RAAF, Darwin City Council and NT Government.
- Established a photo point monitoring program at all weed treatment sites.
- Conducted revegetation program of the Rapid Creek Corridor buffer zone using local native species.
- Developed the Wildlife Hazard Management System for management of native and feral animals, (primarily on airside).
- Monitored possible mosquito breeding sites and removed known breeding sites.*
- Modified structures or drains to eliminate pooling of water where practicable.*
- Controlled landscaping to avoid creating migration corridors or selecting plants known to harbour mosquitoes.*
- Implemented the feral species eradication program including the successful removal of all feral pigeons from Darwin International Airport.
- Designed and established native gardens both landside and airside.

(Further achievements are also listed in section 11. Native Fauna and Flora)

10.4 Five Year Action Plan

High Priority Actions

- Staged expansion of the current land management program (fire, weeds, and revegetation) into airside areas.
- Develop a landscaping plan for the landside GA areas incorporating local native plants whenever practical.
- Develop an ongoing feral dog eradication program in cooperation with RAAF and NT Parks & Wildlife for airside areas.
- Work cooperatively with RCCAC on issues of weed control and fire fuel load reduction in order to protect the Rapid Creek Corridor.
- Work cooperatively with Larrakia Nation to reduce the incident of arson in landside bushland areas.
- Work with Parks & Wildlife and Larrakia Nation in regards to the management, control and trapping of Cane Toads.
- Develop a policy for the utilisation of native plant species in landscaping projects whenever practical.
- Focus land management program on the new Environment Reserve with the development of a separate and concentrated weed and fire strategy.



Lower Priority Actions

- Develop education materials for tenants on the need for fire control and fire fuel load reduction, to be developed through the Ground Safety and Environment Committee.

Ongoing Actions

- Continue the implementation of the 5 year weed and fire strategy.
- Continue to comment on all proposed landscaping on Darwin International Airport and apply the policy of banned and restricted species for landscaping.
- Continue current feral animal control practices on airside as part of the Wildlife Hazard Management System.
- Monitor possible mosquito breeding sites and work co-operatively with NT Health, Entomology section in regard to control if necessary.
- Continue to control landscaping to avoid creating migration corridors or selecting plants known to harbour mosquitoes.

Monitoring and Measurement

Current

- Photo point monitoring will continue to be conducted at all treatment sites and entered onto the Environmental GIS.

Future

- All weed control data will be recorded annually and entered in the Environmental GIS. New treatment sites surveyed for the airside program will be added.
- Data relating to fuel reduction burns will be entered on an annual basis.



11. Native Flora and Fauna

11.1 Objective

Northern Territory Airports PL aims to protect rare and endangered species and any other area of environmental significance on the Airport. Natural habitats, flora and fauna will be preserved on the Airport wherever practicable and management practices will be compliant with relevant legislation.

11.2 Overview

Despite a history of disturbance of natural habitats in the Darwin International Airport lease areas, the site contains many intact habitats that are relatively high in biodiversity. The majority of vegetation communities are naturally regenerated and are under approximately 20-30 years old. Historical vegetation clearance, fire and weed infestations have affected the integrity of these communities. However due to the nature of the wet/dry tropics many vegetation communities are regenerating.

Further flora and fauna surveys have been conducted by Northern Territory Airports PL from the late dry season of 2003 to the late wet season of 2004 in order to collect information on the type of plants and animals inhabiting the Airport. The majority of the surveys were conducted in areas landside except for a focused effort in the proposed new environmental reserve located on the northern airside boundary. The primary objective of the surveys was to identify any species of conservation significance or rare or threatened species listed under NT Government or Federal Government legislation or International agreements. (See also section 2.5 Environmentally Significant Areas).

Summary of Darwin International Airport Habitats and Flora

Approximately two thirds of Darwin International Airport is comprised of cleared grassland associated with the terminal runway system. The remainder of surrounding vegetation communities includes remnants of Eucalypt woodland, seasonally inundated swamps and part of the Rapid Creek riverine corridor.

The Eucalypt woodland communities have been either cleared or subjected to frequent burning in the past. There is therefore a paucity of old trees. Although this means habitat for some fauna species is lacking, the resultant

combination of woodland, open woodland and grassland provides ideal habitat for others.

Although there are some major weed infestations, the Eucalypt woodlands support a diverse range of native species that engender relatively healthy and viable habitats compared to other remnants in close proximity to Darwin.

Plant species adapted to wet season waterlogging of lowland soils are represented in a variety of vegetation communities. A small swamp in a depression within the drier, open woodland supports young paperbarks with an understorey of small grasses, sedges and herbs. In the head waters of Rapid Creek an open woodland swamp supports banksias and ghost gums with a dense understorey of ferns and sedges, which merges into drier grassland scattered with pandanus.

The riverine corridor of Rapid Creek has suffered degradation due to indiscriminate use in the past and disruption of water flow from an upstream flood mitigation dam. This has diminished the structure of the community, providing a sparse middle and lower storey. However, a healthy population of rainforest and riparian tree species provide an important remnant for many mobile fauna species.

11. Native Flora and Fauna



Significant Flora

Four plant species on airport, *Polymeria pusilla*, *Drosera dilatato-petiolaris*, are of concern as little is known about them, and *Utricularia hamiltonii* and *Cycas armstrongii* have been identified as environmentally significant in the NT. These species were recorded in the December 2003 vegetation survey and are the only flora species of significance that have been recorded including results of surveys conducted in 1999.

13 species have been identified as endemic to the Northern Territory including:

Acacia mimula

Brachychiton megaphyllus

Carpentaria acuminata

Clerodendrum tatei

Cycas armstrongii

Hibbertia D6730 Darwin

Hibbertia tasmanica

Kailarsenia suffruticosa (Previously *Gardenia suffruticosa*)

Livistonia humilis

Sauropus paucifolius

Spermacoce leptoloba

Terminalia pterocarya

Utricularia hamiltonii

(section 2.5 Significant Areas contains a further explanation of Darwin International Airport 's assessment of 'significance')

Fauna

Vertebrate surveys have been conducted on Darwin International Airport including mammals, reptiles, birds, amphibians, bats and fish. In surveys conducted in 2003 and 2004 a total of 12 mammal species, 50 bird species 16 reptile species, 6 frog species and 7 fish species were recorded from the quadrats in both landside and airside and Rapid Creek transects during the late dry season and wet season surveys. Darwin International Airport has a relatively diverse fauna compared to some airports interstate. This is mostly due to the variety of habitats within the Airport lease including wetlands, riparian areas, woodland and grassland. (see also section 2.5 for fauna species of conservation significance).

Environment Reserve

Northern Territory Airports PL has made a commitment to retain an environmental reserve at Darwin International Airport for the purpose of protecting, maintaining and improving habitat.

Based on Metcalfe (1999), the 1999 AES recommended that a one hectare area of native vegetation on the North West corner of the Airport lease be committed for a "Bushland Park", principally to protect a healthy stand of *Cycas armstrongii*. All members of the Cycadaceae family and of the Orchadaceae family, one of which was found in Metcalfe's (1999) study were, at the time of the study, protected by Northern Territory legislation. Although this legislation is recognition of floristic importance, it does not preclude clearance of vegetation for development.

As a result of Metcalfe's report, a vegetation buffer of 20m from the airport boundary on Bagot Road and McMillans Road has been retained. The principal reason for this buffer was to provide an aesthetic screen for surrounding suburban areas, however the buffer is not effective as an wildlife corridor.

Recent Studies

A recent study was commissioned by Darwin International Airport to review the current AES in regards to vegetation management. The principal aim of the study was to make recommendations to establish an Environment Reserve of sufficient size to provide a sustainable wildlife habitat that provides recreational and aesthetic aspects concurrently with functional ecosystems, conservation and enhancement of the existing diversity of native flora and fauna.

When designing a reserve for biodiversity conservation, consideration must be given to size, shape and structure of vegetation patches (fragments), and connectivity of fragments to each other. Corridors are considered to be an important part of any fragmented landscape because they provide some species with habitat and facilitate the movement of species between otherwise isolated populations (Price 2001). This movement increases gene flow, reducing the likelihood of local extinctions. The Draft Report by Price (2001) recommends that fragments be connected with at least two corridors of retained woodland, of at least 50m width. Although the one hectare Bushland Park proposed in the 1999 AES may provide a 'stepping stone' for some mobile species, it is doubtful that it would be sufficient to maintain viable populations of existing flora and fauna species in the long term. A vegetation buffer of approximately 20m width and running for approximately 1.7 km along the boundaries with Bagot and McMillans Roads is the only potential corridor connecting this area to the Rapid Creek riparian zone.

The high edge to area ratio of natural vegetation fragments and corridors makes them more susceptible to fire and weed infestation. Thus, this type of reserve design demands high maintenance.

In order to maintain viable native plant populations and sustain the existing fauna populations a bushland reserve of at least 10 hectares and a corridor of at least 50m width linking the area with Rapid Creek would be the minimum requirement. The Bushland Reserve as described in the 1999 AES would be of little conservation value, would deteriorate quickly and would be costly to maintain.

Recommendations from this study were to increase the area of the reserve and to build connections to the Rapid Creek Corridor.

Summary

The proposed 'bushland park' will now be developed to the south of Collopy Road (see figure 9) with approximately 15 hectares incorporating 3 different habitat types including Riverine, regenerating *Melaleuca* swampland and woodland. The Reserve will initially be airside with a long term vision of allowing public access in the future with the change in the airside boundary.

Rapid Creek Corridor

In the 1999 AES, NT Airports committed to the protection of the Rapid Creek Corridor and committed to implement a 75 metre buffer zone from the Creek centre line. This commitment to the protection of Rapid Creek remains and weed control, revegetation works and litter removal has been focussed in this area over the past 5 years.

Overview of Rapid Creek Habitats

Riparian Habitat

Two habitat types have been identified in the Rapid Creek area including the riparian habitat and the transition zone from riparian to grassland/woodland. The riparian zone is a narrow band of remnant riparian monsoon vine thicket adjoining Rapid Creek. This area shows signs of regular flooding scouring the ground surface, exacerbated by indiscriminate use by people walking and picnicking in the area. *Caralia brachiata* is by far the dominant species with small pockets of *Melaleuca leucadendra* and *Lophostemon lactifluus*.

Grassland/Woodland

There is a transition zone between riparian and open woodland within the managed 75 metre buffer. The northern (riparian) side shows good diversity with a mix of riparian and woodland species. There is a diversity of weed species, however none of them abundant. The southern side is grassland, previously cleared, with scattered old trees and bushes planted during previous revegetation works.



A study was commissioned by Darwin International Airport (Jacka 2004) to provide information on the condition of the Rapid Creek corridor and provide some recommendations for its management. The study made the following recommendations:

- 1 A defined pathway, most of which would need to be boardwalk, along Rapid Creek to alleviate land degradation and improve amenity. Natural revegetation of some middle and ground storey species would follow, however this could be enhanced through direct planting of riparian species. If planted, heavily mulched and irrigated well before the onset of heavy rains, their roots will have a chance to grow and resist the inevitable flooding waters.
- 2 Picnic areas, rubbish bins and interpretive signage would enhance this area as a tourist attraction and educational resource, providing enjoyment for locals, and achieving greater respect for the area's values.
- 3 The transition zone between riparian and grassland/woodland areas require a long-term weed control program, which should include revegetation works. A combination of ripping with seeding and planting is recommended. Late dry season planting, heavy mulching and irrigation until the first rains, although costly, would yield a far greater success rate and would therefore be the most efficient use of resources.

As a result of these recommendations, Darwin International Airport has commissioned a new plan for the management of the Rapid Creek Corridor and has commenced the construction of board walks and trails.

11.3 Achievements

Previous AES objectives, as outlined by the 2002 Minor Variation, are noted by a "*", all specified flora/fauna management objectives have been achieved within the appropriate time frame. Achievements since 1999 include:

- Carried out developments and site management in a manner that does not impact upon natural biodiversity.*
- Controlled feral animals and declared weed species that would otherwise impact upon native species and habitats.*
- Developed an Environmental GIS where all information from studies can be retrieved and evaluated against any proposed development.
- Conducted extensive fauna surveys in all proposed development areas, the Rapid Creek Corridor, Marrara Swamp and the new Environmental Reserve.
- Conducted extensive flora surveys in all proposed development areas, the Rapid Creek Corridor, the new Environmental Reserve and wetland areas.
- Committed approximately 15 ha of land to be managed as environmental reserve.

- Implemented an extensive revegetation program within the Rapid Creek Corridor with the planting of approximately 1,000 plants.
- Commissioned a Plan of Management for the Rapid Creek Corridor and commenced the rationalisation of visitor access.
- Sponsored a "Green Corps" Team to design and build visitor tracks and boardwalks in the southern Rapid Creek buffer zone.
- The establishment of native gardens both landside and airside.

(Also refer to section 10. Land Management Achievements)

11.4 Five Year Action Plan

High Priority Actions

- Review and provide staged implementation of all practical recommendations from the Plan of Management for the Rapid Creek Corridor.(HLA 2004)
- Conduct targeted flora and fauna surveys focused on the Rapid Creek Precinct and Environmental Reserve based on recommendations from Plans of Management.
- Implement a 5 year program for further revegetation and regeneration along the Rapid Creek Corridor.
- Establish an Environment Reserve of approximately 15 ha of land to encourage and preserve flora and fauna.
- Commission the production of a Plan of Management for the Environment Reserve.
- Develop a program for the establishment of nesting boxes and hollows in the new Environment Reserve
- Develop plans and staged implementation for the establishment of tracks, boardwalks, trails and interpretation sites along Rapid Creek
- Review and provide staged implementation of all practical recommendations from the Vegetation Surveys Report (Jacka 2004).
- Work in cooperation with RCCAC stakeholders Larrakia Nation and RAAF to establish a new visitor's area at Yankee Pools.

Lower Priority Actions

- Investigate options for the establishment of wildlife corridors from the Environment Reserve to the Rapid Creek buffer zone.
- Commission a study to investigate design options for a water retention basin located in the proposed business park.

Ongoing Actions

- Maintain and update the flora/fauna inventory in response to new species being identified through the Wildlife Hazard Management System and fauna and flora studies.
- Maintain and update the Environmental Site Register for any new study sites or location of species of conservation significance.
- Continue to carry out developments and site management in a manner that does not impact upon natural biodiversity.

Monitoring and Measurement

Current

- Location of any species of conservation significance will continue to be recorded and plotted on the Environmental GIS.

Future

- All species recorded by future fauna and flora studies will be incorporated in the Environmental GIS.
- Numbers of trees planted or quantities of seed sowed will be recorded in the Environmental GIS.
- Areas of natural regeneration and revegetation will be recorded and plotted on the GIS.
- Any new regeneration or revegetation sites established will be monitored using standard Darwin International Airport photo point monitoring techniques and recorded on the GIS.



12. Air Quality, Greenhouse and Ozone Depleting Substances

12.1 Objective

Northern Territory Airports PL's objective is to comply with air quality standards as defined by Commonwealth and Northern Territory Regulations and to minimise air emissions from the Airport particularly greenhouse gases and ozone depleting substances.

12.2 Overview

Air quality issues at airports have relevance to the health of people in the area, as well as for the surrounding biological environment and for the health of the atmosphere. The Regulations define air pollution to have occurred when it is likely to cause harm to the environment or unreasonable inconvenience to:

- 1 The general public in any place, or
- 2 Persons conducting operations that are not located in the immediate vicinity of the pollutant source.

Air pollutants, as defined by the Regulations may include:

- Particulate matter including dust, smoke and soot.
- Gases and Vapours including acids, oxides of nitrogen, Volatile Organic Compounds (VOCs), halogen compounds, heavy metal compounds, compounds of sulphur, ozone and carbon monoxide.
- Any substance causing an objectionable odour.

The Regulations and this Environment Strategy considers both stationary and other sources of air pollution.

Potential sources of Environmental Impact;

Stationary sources on airport include:

- Emissions generated by auxiliary (APU) and ground power units (GPU)
- Boilers, turbines, electrical generators and incinerators
- Fuel burning equipment
- Evaporation of VOC's from large storage tanks
- Oil or gas fired plant equipment
- Construction

Other sources include:

- Ground based operations generating dust or smoke (including fire training)
- Ground based aircraft movements
- Refuelling, defuelling and evaporation of VOC's from spillage
- Painting and paint stripping operations
- Cleaning operations using solvents

This Environment Strategy does not deal with air emissions from motor vehicles as they are controlled by *NT Motor Vehicles Amendment Act 2003*. Aircraft taxiing, landing and departure are regulated under *Air Navigation (Aircraft Engine Emissions) Regulations* and are not the responsibility of Northern Territory Airports PL.

On Darwin International Airport there are few current issues with air quality or air pollution. Complaints relating to air pollution from airport operations are rare and are typically associated with once off events such as bush fires or Airport Rescue Fire Fighter (ARFF) training exercises.

12. Air Quality, Greenhouse and Ozone Depleting Substances



Emissions

As Darwin International Airport is only of a moderate size, emissions from operations are generally not produced in quantities that can be considered significantly harmful or toxic to humans or to native flora and fauna in the area. In 2000 total air emissions produced by Darwin International Airport were assessed by the NT Department of Lands Planning and Environment (now Infrastructure Planning and Environment, DIPE) and the air emissions produced did not exceed the National Pollution Inventory (NPI) trigger levels, for any individual operation on airport, nor for the Airport as a whole.

Large aircraft activity at Darwin International Airport remains at or below levels experienced during the 2000 NPI reporting year and given the absence of major changes in other airport operations it is likely that total air emissions from the airport are in similar quantities to those recorded in 2000.

Black Smoke Agreement

ARFF fire training exercises producing Black Smoke are a necessary operation for the continual maintenance of an effective fire and rescue service on Airport. A local Black Smoke Agreement made between the Darwin AEO, AirServices Australia and DoTaRS allows for this operation to continue. All fire training exercises producing black smoke are conducted outside the hours of major aircraft activity.

Greenhouse Challenge Program

In 2001 the Airport joined the Greenhouse Challenge program with the aim of reducing greenhouse gas air pollution from airport operations. The principal source of greenhouse emissions is carbon dioxide related to energy use in buildings, transport and fixed plant. In the 2000-2001 inventory of Greenhouse emissions, Darwin International Airport produced an equivalent of 7780.74 tonnes of CO₂. A number of direct actions have been implemented including a review of airfield lighting and plant equipment operation, with the aim of reducing energy consumption and greenhouse gas production. Projected emission reduction for Darwin International Airport is 326.24 tonnes.

Air emissions that only impact upon the ozone layer (i.e. are ozone depleting) are not covered by the Regulations but are addressed in this Environment Strategy. Recommendations resulting from the Greenhouse Challenge program also targeted ozone depleting substances and Northern Territory Airports PL has implemented those recommendations.

12.3 Achievements

Previous AES objectives, as outlined by the 2002 Minor Variation, are noted by a '*'. All specified air quality objectives have been achieved within the appropriate time frame.

Achievements in air quality management since 1999 include:

- Commissioned the installation of new energy efficient chillers for the terminal
- Designed and implemented a new 5 year weed and fire strategy to reduce the incident of hot destructive burns.
- Continued the Black Smoke agreement with AirServices Australia, the AEO and DoTaRS.*
- Encouraged ARFF to only carry out training when conditions do not adversely impact on other airport users.*

Air Quality and Emission Management

- In 2001 Darwin International Airport joined the Greenhouse Challenge program and implemented practical recommendations from the program.
- In 2000 NPI reporting requirements for Darwin International Airport were assessed. No reporting requirements were identified.
- Carried out additional assessments of NPI substances with DIPE to update the inventory as required.*
- Added ozone-depleting substances to the Hazardous Materials register.*
- All line marking activities now use water based paints.*
- Developed a notification procedure to ensure the Work Health Authority is notified of any issues or incidents on the Airport.*

12.4 Five Year Action Plan

High Priority Actions

- Darwin International Airport will develop education materials in regards to current controlled burns conducted on the Airport.
- Develop educational materials to educate staff and tenants regarding energy efficiency and waste reduction.
- Continue to work co-operatively with community by planting trees along Rapid Creek to enhance the local catchment and degraded areas.
- Darwin International Airport will develop a Standard Operating Procedure for advising all operators and stakeholders of scheduled controlled burns.
- Darwin International Airport will review the agreement for Emission of Black Smoke between ARFF and Darwin International Airport.
- Darwin International Airport will produce education materials in conjunction with NT Work Health in regards to spray painting in hangars.
- Continue commitments under the Greenhouse Challenge

Ongoing Actions

- Continued implementation of operational methods promoting dust suppression.
- Continue contact with AirServices Australia, the AEO and DoTaRS to ensure the continued effectiveness of the local Black Smoke Agreement.
- Reassess NPI reporting requirements if or when there are major changes to airport operations involving significant production of air emissions or there are significant increases in air traffic volume through Darwin International Airport.
- Air quality monitoring by qualified consultants will be conducted if required.
- Continue to phase out the use of air conditioners or refrigerators utilising ozone depleting substances wherever feasible.

Monitoring and Measurements

Current

- Data will continue to be collected and provided in a report for the Greenhouse Challenge.

Future

- Monitoring will be conducted on all major construction sites as a requirement under construction EMP's.



13. Hazardous Materials

13.1 Objective

Northern Territory Airports PL will minimise the use of hazardous materials on airport as far as it is feasible and to manage hazardous material storage, use and disposal in a manner which minimises the risk to the surrounding environment.

13.2 Overview

Hazardous materials are classified as having any of the following characteristics:

- Explosive or flammable liquids/solids including fuels and oils.
- Poisonous; toxic; eco-toxic; infectious substances.
- Dust hazards (such as asbestos, paint stripping and fine powder chemicals).
- Dangerous goods (Corrosive substances, radiation hazards, highly reactive substances).
- Hazardous wastes.

On Darwin International Airport these substances, other than fuels and oils, are rarely used in quantities that pose a significant threat to the environment and stringent regulations apply to their use under occupational health and safety laws. As a matter of occupational health and safety the Regulations (1997) do not examine the storage and handling of hazardous materials and thus Northern Territory legislation applies including the *Dangerous Goods Amendment Act (2003)*, the *Dangerous Goods (Road and Rail Transport) Act (2003)* and the *Waste Management and Pollution Control Act (1998)*.

Potential sources for environmental impact

There are only a limited number of hazardous materials used on Darwin International Airport, with the most common being fuels and oils. The two major fuel stores currently on airport include Darwin JAFS, the BP/Shell Fuel Farm and Darwin Refuelling Services. There are also seven underground fuel tanks and three above ground fuel tanks on Airport. Numerous other GA apron operators store small quantities of fuel or oil or temporarily store waste fuel or oil from de-fuelling or aircraft/vehicle maintenance.

Other hazardous material stores on airport include:

- Herbicides
- Batteries and battery electrolytes.

- Paint and paint stripping products.
- Cleaning chemicals including acids and solvents used in aircraft maintenance.
- Waste water containing acid and heavy metals from paint stripping and aircraft maintenance.

Hazardous materials incidents at Darwin International Airport, other than minor fuel spills are extremely rare (less than 1 per year) and all tenants are required to store Material Safety Data Sheets (MSDS) for chemicals they use on site. In the unlikely event of a hazardous materials incident, Darwin International Airport provides chemical and hydrocarbon spill clean up kits in easy to access locations on the RPT apron and the GA apron. For large spills of hazardous materials the Airport Rescue Fire Fighters (ARFF) are qualified to contain and clean up the spill.

(See also information on spills in section 7. Water)

Auditing

An audit was conducted recently for a number of tenants on Darwin International Airport to review their chemical storage arrangement and maintain awareness of the appropriate management of hazardous materials.



The findings from these audits indicate that most tenants comply with storage standards, including the use of flame proof bunded cabinets, warning signage and having MSDS's available. Any issues regarding hazardous materials that were identified in these audits were discussed with the operator.

Northern Territory Airports PL, in conjunction with the AEO, will implement a self auditing program for the tenants and Airport staff within the 2004-2009 period. The results of the annual audits will be provided to the AEO for review and use in conducting site inspections.

Hazardous Materials Register

Northern Territory Airports PL maintains a Hazardous Materials Register for its own lease holdings, as required under its EMS. The register covers all hazardous materials and products stored by Northern Territory Airports PL. The Register is connected to the Environmental Sites Register where the location of all major fuel storage is spatially stored.

Spills Policy

Northern Territory Airports PL has a multi level approach to spill prevention. Tenants are required to "Report All Spills" and "Explain All Spills" that occur from their operations to Northern Territory Airports PL. This process is aimed at quantifying the sources and frequency of spills on Airport. Small spills are cleaned up by the operator using spill containment products. Northern Territory Airports PL provides emergency spill response kits for spill cleanups on the GA and RPT apron areas.

If large spills occur then the Darwin International Airport Ground Staff and ARFF are called in to conduct the clean up and the cost of the call out is billed to the tenant who created the spill. These charges can be significant and provide additional incentives to tenants to prevent the reoccurrence of spills.

13.3 Achievements

Previous AES objectives, as outlined by the 2002 Minor Variation, are noted by a '*'. All specified hazardous material management objectives have been achieved within the appropriate time frame. Achievements in hazardous material management since 1999 include:

- Establishment of an agreement with ARFF to enable Northern Territory Airports PL to access the AirServices Hazardous Materials Database. In the event of a hazardous materials incident on the Airport the ARFF will attend to provide first response and identify the substance. If required they will then notify the NT Fire Service who are properly equipped and trained to handle hazardous materials incidents.

- A hazardous register has been developed and linked to the Environmental Sites Register GIS.*
- The emergency spill response program has been reviewed and updated.*
- A "Report All Spills" and "Explain All Spills" policy was implemented for airport staff and tenants.
- Hazardous materials spill clean up kits have been installed on the main airport apron. The kits are regularly checked to see if they are sufficiently stocked.*
- Fuel and oil storage facilities have been audited to meet NT Regulatory Standards with regard to bunding, roofing and spill containment.*
- Three spill training sessions have been conducted by Darwin International Airport for airport staff and other airport operators.*

13.4 Five Year Action Plan

High Priority Actions

- An annual Self-Auditing program for all airport tenants will be initiated and the results of these audits at Darwin International Airport will assist the AEO in encouraging tenants to comply with storage requirements for hazardous materials.
- Darwin International Airport will commit to sponsoring further spill training sessions for all operators.
- Darwin International Airport will consider options for the implementation of an annual Environmental Awareness Seminar for airport tenants. This will provide another forum where the requirements for best practice methodologies for storing and handling hazardous material can be conveyed to airport operators.

Ongoing Actions

- Tenants using hazardous materials will be encouraged to meet the required NT regulatory standard for storage and handling.
- Spill response procedures will be reviewed and updated.
- Continue ground safety and environmental meetings where all spills and other issues will be discussed-quarterly.

Monitoring and Measurements

Current

- Darwin International Airport has commenced and will continue to maintain records of all personnel on airport that have undergone spill training.

Future

- Develop spill educational materials and training procedures for tenants, to enable them to conduct their own training of personnel.



14. Resource Use

14.1 Objective

Northern Territory Airports PL aims to minimise the use of non renewable natural resources wherever practicable and to improve the efficiency of the use of natural resources, particularly energy and water. In addition Northern Territory Airports PL will encourage the use of renewable energy sources.

14.2 Overview

Resource use considered in this section is focused on energy (including electricity usage and engines powered by fossil fuels) and water. Inefficient or excessive use of these resources contributes to some of the largest environmental problems that occur at a national and international scale. Northern Territory Airports PL understands that as a good corporate citizen it is essential that these resources be used sustainably on Airport.

Energy

Darwin International Airport is a relatively large facility that requires significant amounts of energy in its day to day operations and energy costs are one of the major expenses of the Airport. Darwin International Airport is connected to the power grid of Darwin City, running on a natural gas fired power plant. On site emergency power is provided via diesel generators.

The main sources of energy consumption on Darwin International Airport include:

- Aircraft movement.
- 24 hour runway lighting.
- Control tower operations.
- 24 hour lighting and air-conditioning within the terminal buildings and other buildings occupied by airport staff and airport tenants.
- Airside vehicle movement including safety and emergency vehicles, security patrols, maintenance and haulage vehicles.
- Landside vehicle movement including security patrols, airport shuttle services and haulage vehicles.

The Airport has worked with the NT Power & Water Authority NT to install power factor correction equipment in the Airport's power distribution network, which reduces the amount of power used to run the airports facilities.

In 2001 Northern Territory Airports PL joined the Greenhouse Challenge program resulting in greenhouse gas emissions due to energy consumption being evaluated. In the initial inventory of Greenhouse emissions in 2000-2001, Darwin International Airport greenhouse emissions were equivalent to 7780.74 tonnes of CO₂. A number of direct actions have been implemented including a review of airfield lighting and plant and equipment. Projected emission reductions, resulting from the implementation of the Greenhouse Challenge findings for Darwin International Airport by 6/2004 is 326.24 tonnes.

Overall the ongoing energy auditing procedures indicate that Darwin International Airport is using close to the minimal amount of energy as practicably possible.

Water

Darwin International Airport is currently supplied by Darwin town water managed by the NT Power & Water Authority.

Major sources of water use on airport include:

- Aircraft and vehicle washdownwash down
- Fire training exercises by Airport Rescue Fire Fighters
- Water usage by airport customers
- Garden maintenance



Northern Territory Airports PL is committed to reducing water usage on airport and will consider options to commission a study to identify methods of improving water efficiency. Landscape gardening policies have already been modified, with the installation of local native gardens, with low water requirements around the airside terminal entrance and behind the terminal carpark. Tenants are also advised to use local native species that require less water than exotic species for their landscaping requirements. All landscaping plans for a new development are provided to the Environmental Department for comment

14.3 Achievements

Previous AES objectives, as outlined by the 2002 Minor Variation, are noted by a “*”. All specified resource management objectives have been achieved within the appropriate time frame. Achievements since 1999 include:

Energy

- Undertook the Greenhouse Challenge program run by the Australian Greenhouse Office and implemented practical findings from the energy review.*
- Installed energy efficient lighting within the terminal building and reduced lighting wattage in appropriate areas.
- Conducted ongoing monitoring of airport power consumption.
- Two new chillers for the terminal are being commissioned which will be more energy efficient.

Water

- Implemented a gardening policy using local native plants with low water requirements for new landscaping initiatives.

14.4 Five Year Action Plan

Lower Priority Actions

- Continue policy of planting of natives to reduce water use where ever practical.
- Explore options for alternate energies for new developments when practical.
- Revise schedule for load balancing work on power factor correction equipment.
- Darwin International Airport will consider alternative sources of energy including natural gas, solar energy and wind power.
- Consider design options for solar lighting for the native garden.
- Explore potential for use of grey water for irrigation from hotel development.

Ongoing Actions

- Tenants will continue to be encouraged to use energy efficient building design and the use of efficient technologies through the building and development approvals process.
- Tenants will continue to be encouraged to use local native plants in garden design.

Monitoring and Measurements

Current

- Continue to monitor all landscaping on airport and ensure that local native plants are used where ever practical.
- Continue to report energy use via the Greenhouse Challenge reports



15. Waste, Recycling and Litter

15.1 Objective

Northern Territory Airports PL will aim to minimise waste production from all airport operations and recycle waste products wherever practicable. In addition the Airport will ensure wastes are properly stored, transported and disposed of.

15.2 Overview

Waste management is the responsibility of the individual tenant, though Northern Territory Airports PL encourages all tenants to adopt waste minimisation strategies. The types and volume of waste production by airport tenants has been reviewed through an audit conducted by a consultant.

Wastes at Darwin International Airport are collected and handled by local waste contractors, primarily Waste Master. General wastes are disposed of at the Shoal Bay Dump run by the Darwin City Council. It is essential that all

waste oil and battery storage on airport meets requirements for bunding and roofing as defined by the relevant NT regulation.

Materials dealt with in this section include:

- Paper waste, cardboard and plastic packaging waste
- Glass waste
- Green waste from gardening and landscaping
- Food preparation waste
- Waste oil and grease
- Batteries
- Tyres

Illegal dumping of waste on airport lands has been a problem in the past. Particularly garden waste dumped along road sides from passing traffic on Larkin and Collopy Road and litter along the length of Rapid Creek. Signs have been erected along these roads and the amount of waste being dumped has decreased. A number of bins have also been placed in areas of high public usage and this should further reduce illegal dumping and litter on airport land. Darwin International Airport is working with Larrakia Nation to clean up litter in and around the Rapid Creek Area.

A recent initiative of Northern Territory Airports PL is to stockpile green waste on airport. This green waste will then be mulched and used on the landscaping areas on the Airport.

Darwin Airport also participates in the national "Clean Up Australia Day" event held annually across Australia. The focus of the clean up is on the high public usage areas along the Rapid Creek riparian zone on airport land.

15.3 Achievements

Previous AES objectives, as outlined by the 2002 Minor Variation, are noted by a '**', all specified waste management objectives have been achieved within the appropriate time frame.

Achievements since 1999 include:

- Encouraged tenants to undertake waste minimization practices for office, construction, industrial and food wastes by written notification.*
- Implemented a monitoring system to discourage illegal dumping on airport property.*
- Cleaned up and disposed of illegally dumped wastes that could be harmful to the environment on Darwin International Airport.*



15.4 Five Year Action Program

High Priority Actions

- Investigate the options for a staged recycling program commencing with terminal areas and incorporating the GA at a later stage.
- Work with Larrakia Nation to develop an effective green waste operation.
- Develop a monitoring program to regularly check that waste oil and battery storage on airport meets requirements for bunding and roofing.
- Conduct a survey with all tenants on a proposed recycling program.

Lower Priority Actions

- Consider design options and implementation of a new waste transfer station for the RPT area.
- Initiate and develop options for collection of items such as batteries, tyres and waste oil.
- Consider options for an annual review of the types and volume of waste production on Darwin International Airport.

Ongoing Actions

- Progress recycling and group collection ideas through the Ground Safety and Environment Committee.
- Continue to work with the Larrakia Nation for litter collection along Rapid Creek.

Monitoring and Measurements

Future

- Data from the audit conducted on the current waste stream will be entered into the Environmental GIS.
- Upon implementation of a recycling program data will be collected frequently in the early stages to determine the percentage of waste stream recycled. – in the event.



16. Noise

16.1 Objective

Northern Territory Airports PL will minimise noise and vibration associated with ground running aircraft and all other operations and to comply with relevant noise standards.

16.2 Overview

Noise resulting from aircraft in flight and taxiing is regulated under the Air Navigation (Aircraft Noise) Regulation 1984 and is controlled independently by CDIA. For vehicles registered in the Northern Territory vehicle noise is regulated by the Motor Vehicles Amendment Act 2003. Responsibility for ground running aircraft engines, auxiliary power units and all other airport operations lies with Northern Territory Airports PL.

Darwin International Airport has had no serious noise related incidents since the inception of the 1999 AES and noise complaints are rare and are usually directed at Defence operations.

For the initial Master Plan and Environmental Strategy Darwin International Airport noise levels were assessed using the *Australian Standard AS2021 - 1994 "Acoustics – Aircraft Noise Intrusion – Building Siting and Construction"* the equal energy index *Australian Noise Exposure Forecast (ANEF)*.

A new ANEF contour study was commissioned for the current Master Plan and includes noise generated by aircraft movement. Forecast figures examined how noise levels may increase within the next five years given projected aircraft movement frequency and ground based operational activity. The current study indicates that noise is unlikely to become a significant issue within the medium term future. Darwin International Airport will continue to implement the Engine Ground Running Management Plan 2000 for future monitoring and to deal with any complaints.

16.3 Achievements

Previous AES objectives, as outlined by the 2002 Minor Variation, are noted by a "**". All specified noise management objectives have been achieved within the appropriate time frame.

Achievements since 1999 include:

- Investigated individual noise complaints (rare) and responded as needed.
- Ensured that new developments on airport comply with noise standards during construction and assessed likely noise levels from ongoing operations.*
- Conducted regular qualitative noise monitoring of airport operations.
- Reviewed existing noise contour intervals surrounding Darwin International Airport and compared current noise levels with predicted values described in the 1999 AES.
- Development and implementation of the Darwin International Airport Engine Ground Running Management Plan 2000.

16.4 Five Year Action Plan

Ongoing Actions

- Evaluate the potential for noise generated by new developments on Airport to impact upon other airport users or surrounding properties –in the event.
- Investigate individual noise complaints and respond appropriately -ongoing.
- In the absence of significant noise complaints continue to conduct qualitative noise monitoring on an ongoing and opportunistic basis.



- Installing new chillers in the plant rooms opposite the terminal which will reduce running plant noise.
- In the event of major changes to Airport operations or unprecedented increases in air traffic volume Northern Territory Airports PL will reevaluate the impact of noise levels at that time.

Monitoring and Measurements

Current

- Record all noise complaints and report to the AEO on a quarterly basis and report in the AER.

Future

- Develop a noise monitoring data sheet.
- Conduct noise monitoring on an opportunistic basis and report findings.



17. Contaminated Sites

17.1 Objective

Northern Territory Airports PL's objective is to prevent the creation of new contaminated sites and to monitor and remediate existing contaminated sites at Darwin International Airport.

17.2 Overview

For the purposes of this AES, contaminated sites are classified as soil or water bodies that have received, through accident or mismanagement, quantities of toxic substances considered harmful to the environment or people.

Most airport operations that involve the use of toxic substances occur either indoors or on concrete/tarmac areas where the risk of contamination reaching exposed soil is low. All operators on airports have a general duty to protect the environment and are responsible for any pollution that occurs as a result

of their operations or management practices. Where contaminated sites are identified the person or company responsible will be informed of their general duty and required to remediate the site at their expense to standards defined by Northern Territory Airports PL and the AEO.

Contaminated Sites Register

Northern Territory Airports PL has developed a Contaminated Sites Register as a component of the Environmental Site Register for Darwin International Airport. All known current and historic contaminated sites are listed on the Register, along with any remedial plans that have been completed or are underway. Measures implemented to prevent further contamination from occurring at the site are also recorded on the Register. All sites are recorded on the Environment Dept Geographic Information System.

Currently there are three contaminated sites on Darwin International Airport land that have not been "closed-out" on the Contaminated Site Register.

These include:

- 1 Cyclone Tracey dumps located north of the General Aviation area;
- 2 Rubbish dumps that have been capped by roads, the RPT apron and Taxiway Uniform; and
- 3 Cyclone Tracey dumps airside adjacent to runway 29.

These 3 sites are historical landfill dating back to 1974 when the entire site was operated by Defence. These sites are considered stable and no remediation will be attempted unless any proposed development will disturb the sites. As stated in section 7 Water, Darwin International Airport will investigate the options for expansion of the water monitoring program to monitor ground water from the Cyclone Tracey dumps, north of the GA area.

During the past 5 years, Darwin International Airport has remediated 5 contaminated sites including an Avtur spill between Overell and National Jet Hangers, waste oil spill within National Jet hangar lease, old diesel contamination from a decommissioned AST at the Darwin International Airport workshop, the old ARFF's training ground and an historical (left over from FAC management) waste oil contamination nearby to gate India. On the GA apron, Darwin International Airport's role in these projects included providing resources for the clean up, providing technical expertise, taking soil samples and liaison with the AEO. All sites have been successfully remediated and soil tests indicate that no hydrocarbons are present at the sites.



17.3 Achievements

Northern Territory Airports PL has made significant progress with remediation of existing and historic contaminated sites on Darwin International Airport as well as implementing systems to minimise the risk of creating new contaminated sites. Previous AES objectives, as outlined by the 2002 Minor Variation, are noted by a '*'. All specified contaminated site management objectives have been achieved within the appropriate time frame.

Achievements since 1999 include:

- The remediation and management of five contaminated sites.
- Development of a Contaminated Sites Register as part of the Significant Sites Register GIS. *
- Provision of training and education to Darwin International Airport staff and tenants on how to prevent and clean up spills.
- Implemented a "report all spills" and "explain all spills" policy.
- Used AS/NZ 4360:1999 risk matrix to prioritise all contaminated sites on Airport. This information is stored in the Contaminated Site Database which is connected to the Significant Sites Register GIS.
- Plotted on the Environment GIS, the estimated extent of the Cyclone Tracey dump sites using old aerial photos and anecdotal evidence by Darwin International Airport Groundstaff.

(Also see achievements under section 13 Hazardous Products)

17.4 Five Year Action Plan

High Priority Actions

- Investigate the options and feasibility for incorporating ground water monitoring of Cyclone Tracey Dump sites north of the General Aviation area, into the existing Water Monitoring Program.
- An investigation on remediation options for the Cyclone Tracey dumps will be commissioned in the event of any proposed development of these sites.

Lower Priority Actions

- Work with RAAF in regards to collection of further data on the contents of Cyclone Tracey dumps.
- Continue to record any anecdotal evidence in regards to contents of dump sites and record in the contaminated sites register.
- Review spill procedures annually and conduct spill training for staff and tenants.

(Also see section 13. Hazardous Products)

Ongoing Actions

- Tenants with under ground fuel storage facilities will be checked regularly to ensure they continue to monitor the integrity of those tanks -annually.
- Maintain the Contaminated Site Register and continue with tenant consultation and awareness raising initiatives to minimise the potential for creation of new contaminated sites.

Monitoring and Measurement

Future

- In the event that any ground water monitoring is conducted, data will be entered into the Water Quality Monitoring data base.
- Any further information collected on the contents of the dump sites will be entered into the Contaminated Sites Register.
- Any data collected from remediation or further investigation of the dump sites will be entered into the Contaminated Sites Register.
- Any new contaminated sites will be entered into the Contaminated Sites Register and progress for remediation tracked-in the event.



18. Indigenous and Heritage

18.1 Objective

Northern Territory Airports PL aims to preserve all currently identified indigenous and heritage sites located on Darwin International Airport. In addition, if new sites are discovered they will be preserved wherever practicable and procedures are in place to consult relevant stakeholders in this event.

18.2 Overview

Indigenous Cultural Heritage

Northern Territory Airports PL has been advised by the Aboriginal Areas Protection Authority (AAPA) that no 'recorded' Aboriginal Sacred Sites appear on their register managed under the *Aboriginal Sacred Sites Act 1989*.

Northern Territory Airports PL has made a formal application to the AAPA to conduct an investigation into the potential for any Sacred Sites on Darwin International Airport existing within the zones of potential development. This investigation will include the facilitation of meetings with Traditional Owners and Custodians from the Larrakia People. Once the investigation is complete, the AAPA will issue an Authority Certificate to Northern Territory Airports PL indemnifying them from prosecution under the *Aboriginal Sacred Sites Act 1989*. These certificates may state specific conditions. If sites are identified within the Darwin International Airport lease area, Northern Territory Airports PL will act in accordance with the management provisions, to ensure it remains compliant with the *Aboriginal Sacred Sites Act 1989*.

Heritage

The Darwin International Airport lease was extracted from Defence land in April 1989 when it was passed to the Federal Airport Corporation. The land which Darwin International Airport is located on has had an interesting history including the bombing of Darwin during World War II as well as the majority of infrastructure being devastated during Cyclone Tracey in December 1974. The majority of old buildings relating to the historical use of the Darwin Airport are located within the RAAF lease. No significant heritage sites have been identified within the Darwin International Airport lease area.

18.3 Achievements

Previous AES objectives, as outlined by the 2002 Minor Variation, are noted by a '*'. All specified heritage management objectives have been achieved within the appropriate time frame.

Achievements since 1999 include:

- Application for a certificate from AAPA defining known indigenous cultural sites on Darwin International Airport.
- The establishment of a close working relationship with the Larrakia Nation including contracts for litter and vegetation works, contracting three Larrakia people as groundsmen and the establishment of "Karawa Park" on Darwin International Airport land.
- A procedure Included actions in the event of a discovery of a heritage site or object in the contractors "Site Rules".*

18.4 Five Year Action Plan

High Priority Actions

- Darwin International Airport will apply for an AAPA Certificate indemnifying Northern Territory Airports PL under the *NT Aboriginal Sacred Sites Amendment Act (2002)*.

18. Indigenous and Heritage



- Darwin International Airport will communicate and work cooperatively with the Larrakia People in regards to projects in and around Rapid Creek.
- Darwin International Airport will continue to develop good working relationships with the Larrakia Nation and continue joint projects in regards to the cultural protection of Rapid Creek.
- Review Darwin International Airport's heritage requirements under the amended EPBC Act.
- Work cooperatively with Defence on identified heritage sites and objects.
- Darwin International Airport will establish a management procedure to ensure that no development will occur on identified heritage and indigenous cultural sites without the appropriate approvals and processes.

Ongoing Actions

- Work on developments will be stopped immediately if culturally significant artefacts are found and the relevant authorities informed.
- Ensure all contractors understand their cultural and heritage obligations under the 'Site Rules' documents.

Monitoring and Measurement

Future

- Any identified Sacred Sites or Heritage sites will be input in the Environment Site Register.



19. Social and Community

19.1 Objective

Northern Territory Airports PL aims to maintain and increase involvement with local environmental initiatives and promote positive relations with Darwin community groups. In addition, Northern Territory Airports PL will work with airport tenants and operators to ensure best environmental practice continues to be implemented in all airport operations.

19.2 Overview

Within the last Environment Strategy period Darwin International Airport has continued to play an important role within the community of Darwin, providing sponsorship to a number of local clubs and sporting groups as well as remaining an active member of local industry and environmental organisations. Keeping strong links with the local community is the most effective way of communicating the environmental objectives and values of

Northern Territory Airports PL to the public, as well as for gaining an independent perspective on how the public views Northern Territory Airports PL achievements and management practices.

Internal

Internally it is also vital to maintain a positive working relationship with tenants and other airport operators to ensure that the objectives of the AES and Northern Territory Airports PL EMS can be carried out effectively.

Wildlife Hazard Management System

Airport tenants have also been invited to join the local committee reviewing the Darwin International Airport Wildlife Management System (Section 9). This provides another forum for tenants to view Darwin International Airport's ongoing commitment to environmental management and allows for tenants to put forward their own views and ideas.

Ground Safety and Environment Committee

The Ground Safety and Environment Committee meet every quarter and provide representation for all major airlines, GA operators, Fuel Farm operators and AirServices Australia. Darwin International Airport spill reports and incident reports are tabled at all meetings as well as other environmental issues being discussed.

19.3 Achievements

Achievements in community development and relations since 1999 include:

Darwin Community

- Joint project with Larrakia Nation for a Green Corps Team working along Rapid Creek Corridor.
- Continued to be an active member of RCCAC.

Airport Tenants and Operators

- Quarterly meetings with the AEO and tenants regarding the implementation of the Northern Territory Airports PL Wildlife Hazard Management System.
- Darwin International Airport continued to host the Ground Safety and Environment Committee every quarter.

19.4 Five Year Action Plan

High Priority Actions

- Continue to build on existing relationships with local Landcare, residents and community groups.
- Continue to be an active member of Rapid Creek Catchment Advisory Committee (RCCAC)



- Include environmental activities in the current Corporate Giving Program.
- Continue to be involved in the community Clean Up Australia Day activities.
- Commission study to develop Rapid Creek precinct as a focus area for visitors and local community use.
- Implement tracks, trails, infrastructure and visitor facilities through the Green Corps and Larrakia Nation Projects.
- In conjunction with the AEO develop an annual environment forum for all operators.
- In conjunction with the AEO develop an Environmental Information Booklet for distribution to Airport tenants.

Ongoing Actions

- Continue to develop the Airport Wildlife Hazard Management System in consultation with airport operators-ongoing.
- Enhance ties with the Larrakia peoples and encourage partnership projects focused on environment and Larrakia culture.
- Continue with current levels of commitment to involvement and consultation with environmental, social and industry groups within Darwin. When new opportunities arise, such as the development of new community environmental initiatives, Northern Territory Airports PL aims to be involved where practicable and within the constraints of available resources.



20. Abbreviations and Appendix

The following abbreviations have been used in this document.

AAPA NT Aboriginal Areas Protection Authority
ADG Airport Development Group, the parent company of NTAPL
AEO Airport Environment Officer
AER Annual Environmental Report
AES AES
ALC Airport Leasing Company
ALEC Arid Lands Environment Centre
ANEF Australian Noise Exposure Forecast
ANZECC Australian and New Zealand Environment Conservation Council
APU Auxiliary Power Unit
ARFF Airport Rescue Fire Fighters
ASO Airport Safety Officer
AST Above-ground Storage Tank
AZRI Arid Zone Research Institute, NT Parks and Wildlife Section, DIPE
CAMBA China and Australia Migratory Bird Agreement
CASA Civil Aviation Safety Authority
CSIRO Commonwealth Scientific and Industrial Research Organization
DIA Darwin International Airport
DIPE NT Department of Infrastructure, Planning and Environment
DoTaRS Commonwealth Department of Transport and Regional Services

EMP Environmental Management Program
EMS Environmental Management System
EPBC Commonwealth Environmental Protection and Biodiversity Conservation Act 1999
FAC Federal Airports Corporation
GA General Aviation
GIS Geographic Information System
GPU Ground Power Unit
ISO 14001 Australian and international environmental management systems standard
JAMBA Japan and Australia Migratory Bird Agreement
MDP Major Development Plan
MSDS Material Safety Data Sheet
NLC Northern Land Council
NPI National Pollution Inventory
NTAPL Northern Territory Airports PL
PALC Pilot Operated Lighting Control
RPT Regular Public Transport apron
SOP Standard Operations Procedure
UST Underground Storage Tank
VOC Volatile Organic Carbon
WHMS Wildlife Hazard Management System
WONS Weeds Of National Significance

References

- Airport Development Group, 2003, *Annual Report*
- Alice Springs Airport, 2002, *Minor Variations to the Alice Springs Airport Environmental Strategy*
- Connell Wagner, 1999, *Rapid Creek Flood Study – Revised Final Report*
- Darwin Airport, 2000, *Engine Ground Running Management Plan*
- Darwin International Airport, 2002, *Minor variations to the Darwin International Airport Environmental Strategy*
- DIPE, 2003, *Northern Territory Planning Scheme*
- Northern Territory Government Lands Planning Environment, 1999, *Land Use Structure Plan 1999 and Land Use Objectives*
- Sinclair Knight Merz, 1999, *Darwin Airport Final Master Plan*
- Sinclair Knight Merz, 1999, *Darwin Airport Aircraft Noise Technical Report*
- Sinclair Knight Merz, 1999, *Darwin Airport Final Environmental Strategy*
- Bellio, M.G., Bayliss, P. & Chatto, R., 2004, *Status and Conservation of the Little Curlew (Numenius minutus) on its over-wintering grounds in Australia*
- Firth, R. & Smith, J., Indicus Biological Consultants, 2004, *Darwin International Airport Pty. Ltd. Terrestrial and Aquatic Fauna Assessment*
- Jacka, S., Jacka Consulting, 2004, *The State of Native Vegetation at Darwin International Airport: Review, Reporting and Recommendations for Reserves, Revegetation and Vegetation Management*
- Koulakis, M., 2004, *Darwin International Airport Water Quality Monitoring Summary*

20. Abbreviations and Appendix



- Metcalfe, K., Sinclair Knight Merz, 1999, *Flora and Fauna Baseline Survey for Draft Environmental Strategy Darwin International Airport*
- Smith, J. & Brady C., Indicus Biological Consultants, 2004, *Dingo Control Report for Darwin International Airport*
- Martin, S., Wildman Land Management, 2004, *Soil Erosion Monitoring Report*
- Wildman Land Management, 2002, *Darwin International Airport Weed Management Plan*
- Wildman Land Management, 2002, *Darwin International Airport Fire Management Plan*

Appendix 1

Overleaf, Appendix 1 outlines all of the environmental commitments achieved by Darwin International Airport in the past 5 years. It is divided into the 1999 AES and the 2002 variation.

20. Abbreviations and Appendix



Item#	Category	Hazard	AES Action	2002 Minor Variation	Action
1	Stormwater	Oil – Tenants	<ul style="list-style-type: none"> Check that fuel and oil storage facilities meet best practise with regard to bunding, roofing and spill containment. 	<ul style="list-style-type: none"> Check that fuel and oil storage facilities meet legislation and applicable Australian Standards with regard to bunding, roofing and spill containment. Spills procedure review. Cleanup product review. Facilitate training for relevant staff. 	<p>Completed</p> <p>Completed</p> <p>Completed</p> <p>Ongoing</p>
2	Stormwater	Detergent – Spills	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> Spills procedure review. Cleanup product review. 	<p>Completed</p> <p>Completed</p>
3	Stormwater	Detergent – Wash down – On Apron	<ul style="list-style-type: none"> Encourage tenants to clean vehicles and aircraft in the provided wash bays. Construct new larger aircraft wash bay –July 2002. 	<ul style="list-style-type: none"> Encourage tenants to clean vehicles and aircraft in the provided wash bays. Modify existing wash bay to accommodate all GA aircraft. Airport to educate tenants as to obligations and monitor for non-compliances. Investigate reuse of wastewater vs disposal to sewer. 	<p>Ongoing</p> <p>Completed</p> <p>Completed</p> <p>Completed</p>
4	Stormwater / Erosion	Wash down – In Hangars – No Interceptor	<ul style="list-style-type: none"> As Above 	<ul style="list-style-type: none"> As Above 	
5	Stormwater	Sediment	<ul style="list-style-type: none"> Inspect Drains Allocate Priorities for works Report against priorities Require erosion plans for construction Investigate erosion control strategies Investigate means to control sediment transport. Monitor sediment loads Carry over AES commitments. 	<ul style="list-style-type: none"> Carry over AES commitments. The URS report of 7/2001 outlines the erosion control priority areas and a five-year program of implementation. An annual works program will be carried out to progressively address priority erosion areas identified in this report. Priorities to be reviewed annually. 	<p>Ongoing</p> <p>Annual</p> <p>Annual</p>
6	Flora and Fauna	Sewage –Aircraft Spills	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Directive to be issued that any such spill entering the drainage system will require a pump out at the expense of the responsible party. Investigation into means to prevent spills entering drainage system. Reinforce the compulsory reporting of spills with tenants. Work with the AEO to agree on appropriate scaled responses for different sized spills. 	<p>Completed</p> <p>Completed</p> <p>Completed</p> <p>Completed</p>
7	Stormwater	Fire	<ul style="list-style-type: none"> Liaise with RAAF and ARFF to ensure effective fire control on site. 	<ul style="list-style-type: none"> AES work has been carried out. Ongoing weed and fire control works to minimise both the intensity and frequency of uncontrolled wild fires. 	<p>Ongoing</p>
8	Stormwater	Oil – Aircraft	<ul style="list-style-type: none"> Check that aircraft parking on the general aviation apron do not have excessive oil leaks. 	<ul style="list-style-type: none"> Monitor for leaks from parked aircraft (included in Safety Officers check list). Review of spills procedure. Investigation into improved clean up products. 	<p>Ongoing</p> <p>Completed</p> <p>Completed</p>

Appendix 1 1999 Environment Management Plan and 2002 Minor Variation *continued overleaf*

20. Abbreviations and Appendix



Item#	Category	Hazard	AES Action	2002 Minor Variation	Action
9	Stormwater	Oil – GSE / Chemicals – GA / Heli	<ul style="list-style-type: none"> None for GSE oil. Ensure chemicals are correctly stored and transported. 	<ul style="list-style-type: none"> Review AEO Audits and follow up where issues have been identified. Joint investigation with Ansett and Qantas to review GSE maintenance workshops. 	<p>Completed</p> <p>Completed</p>
10	Erosion	Damage to infrastructure	<ul style="list-style-type: none"> As per Item #5. 	<ul style="list-style-type: none"> As per Item #5. 	
11	Erosion	Drain Maintenance	<ul style="list-style-type: none"> As per Item #5. 	<ul style="list-style-type: none"> As per Item #5. 	
12	Bird Strike	Aircraft striking birds	<ul style="list-style-type: none"> Undertake bird management procedures such as reporting the presence of birds, use of Bird Frite or sirens. Modify habitat where necessary to discourage birds (such as eliminating standing ponds of water near aircraft movement areas) Consult with Darwin city council and DLPE to ensure compatible land uses near the airport (e.g. Avoidance of putrescible landfill areas.) Continue to monitor bird numbers and record bird strikes. 	<ul style="list-style-type: none"> Continue with existing Actions. Implement recommendations of Peter Davidson's Bird Hazard Study of 2001. 	<p>Ongoing</p> <p>Ongoing</p>
13	Noise	Aircraft Ground Running	<ul style="list-style-type: none"> Finalise the Aircraft Ground Running Management Plan. Random monitoring of aircraft ground running will be conducted to ensure compliance with the operational procedures. Any complaints received will be investigated and referred to the responsible aircraft operator for explanation. 	<ul style="list-style-type: none"> Regular reviews of Aircraft Ground Running Plan to accommodate changing circumstances and address any deficiencies. Any complaints received will be investigated and referred to the responsible aircraft operator for explanation. Random monitoring of aircraft ground running will be conducted to ensure compliance with the operational procedures. Report non-compliances with regard to the Aircraft Ground Running Plan. 	<p>Annual</p> <p>Continuous</p> <p>Continuous</p> <p>Ongoing</p>
14	Noise	Construction	<ul style="list-style-type: none"> Construction Noise – Contractors will be required to provide project specific environmental management plans. Monitor to ensure compliance 	<ul style="list-style-type: none"> Projects as determined by DIA/AEO/ABC will be required to provide project specific EMPs. Otherwise guidelines in the Darwin International Airport Site Rules for construction will be followed. 	<p>Ongoing</p>
15	Flora and Fauna	Weeds	<ul style="list-style-type: none"> Investigate eradication of weeds or other control measures by reviewing and augmenting current weed management strategy and including it in the flora and fauna management plan. Carry out weed management as required by the strategy. 	<ul style="list-style-type: none"> Weed and fire management program to manage weed infestations. 	<p>Ongoing</p>
16	Hazardous Materials	PCBs	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> AEO to investigate sole suspected PCB in facility operated by RAAF. 	<p>Completed</p>
17	Waste Disposal	Quarantine	<ul style="list-style-type: none"> No Commitment – Only that International Airlines have individual disposal contracts and AQIS regulates disposal. This waste is disposed by incineration. 	<ul style="list-style-type: none"> Check with AQIS that the appropriate procedures are in place for the disposal of quarantine wastes. 	<p>Completed</p>
18	Flora and Fauna	Dumped materials	<ul style="list-style-type: none"> NTAPL will clean up and dispose of any illegally disposed product that currently exists on site. Implement a monitoring system to stop illegal dumping. 	<ul style="list-style-type: none"> Cleanup of newly dumped materials. Signage prohibiting dumping Advise staff and tenants to detect and report instances of illegal dumping 	<p>Ongoing</p> <p>Completed</p> <p>Ongoing</p>

Appendix 1 1999 Environment Management Plan and 2002 Minor Variation *continued overleaf*

20. Abbreviations and Appendix



Item#	Category	Hazard	AES Action	2002 Minor Variation	Action
19	Stormwater	Aviation Fuel Spillage – RPT Apron	<ul style="list-style-type: none"> Ensure that aprons have effective fuel interceptor systems in place. Check that appropriate emergency response and cleanup kits are sufficiently stocked and maintained. 	<ul style="list-style-type: none"> RPT interceptors done Check that appropriate emergency response and cleanup kits are sufficiently stocked and maintained. Spills procedure review. Cleanup product review. 	<p>Ongoing</p> <p>Completed</p> <p>Completed</p>
20	Stormwater	BP UST	<ul style="list-style-type: none"> Check that fuel and oil storage facilities meet best practise with regard to bunding, roofing and spill containment. 	<ul style="list-style-type: none"> Check that fuel and oil storage facilities meet legislation and applicable Australian Standards with regard to bunding, roofing and spill containment. Review company Environmental Management Plan. Require company to notify airport and AEO of any incidents and to supply airport with results of outflow water monitoring. 	<p>Completed</p> <p>Completed</p> <p>Completed</p>
21	Stormwater	Shell UST	<ul style="list-style-type: none"> As per BP UST. 	<ul style="list-style-type: none"> Actions per BP UST 	
22	Stormwater	Sewage – Pump Stations	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> Remote alarms installed to notify staff of any failure of the system. 	Completed
23	Vector Control	Litter	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> Install bins at sites where itinerant rubbish tends to accumulate. Commercial contractor to manage litter situation through regular cleanup works. 	Completed
24	Air Quality	Mosquito Breeding – Drains	<ul style="list-style-type: none"> Review existing drains and structures in which water could collect. Monitor possible mosquito breeding sites. Modify structures or drains to eliminate pooling of water where appropriate. 	<ul style="list-style-type: none"> Review existing drains and structures in which water could collect. Monitor possible mosquito breeding sites. Carry our maintenance works on drains to minimise mosquito breeding. 	<p>Annual</p> <p>Annual</p> <p>Annual</p>
25	Air Quality	Controlled Burning	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> Implement controlled burning program in accordance with documented approval procedure. 	Ongoing
26	Flora and Fauna	Fire Training – Dark Smoke	<ul style="list-style-type: none"> Fire Training – Airservices Australia will be encouraged to develop a management plan for fire training. 	<ul style="list-style-type: none"> This activity is controlled by the "Agreement under Subregulation 4.02(2) Airports (Environment Protection) Regulations 1997 in relation to the emission of dark smoke". –Local Agreement covering Darwin International Airport established between AEO and Airservices Australia. 	N/A
27	Waste Disposal	Introducing weeds	<ul style="list-style-type: none"> No actions in AES. 	<ul style="list-style-type: none"> Weed contractor conducts regular surveys of the site to identify and control new and existing weed infestations. 	Ongoing annual
28	Waste Disposal	Oil and Chemicals	<ul style="list-style-type: none"> Contractors will remove waste oil from airport to off site facility for recycling. Encourage tenants to reduce, reuse and recycle wastes by written notification. Conduct waste audits to be repeated after 2 years. 	<ul style="list-style-type: none"> Contractors will remove waste oil from airport to off site facility for recycling. Work with AEO to educate tenants on their responsibilities to properly dispose of waste oil and chemicals. Report evidence of inappropriate disposal methods to AEO. Regular site inspections with AEO to determine appropriate disposal methods. 	<p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p>
29	Contaminated Land	Sewerage / Septic	<ul style="list-style-type: none"> No actions in AES. 	<ul style="list-style-type: none"> Inspect septic tanks to ensure they are operating effectively. If any problems with the sewage system are suspected these will be investigated fully and repaired as required. 	<p>Annual</p> <p>Ongoing</p>

20. Abbreviations and Appendix



Item#	Category	Hazard	AES Action	2002 Minor Variation	Action
30	Contaminated Land	Minor Site Contamination	<ul style="list-style-type: none"> Update and maintain the contaminated sites register and ensure the register is updated on at least an annual basis. Perform a risk assessment of all contaminated sites (including tenants) to prioritise clean-up actions and plans. Check that contamination on all leased sites is effectively managed. Encourage tenants through written notification to maintain an accurate inventory to identify leakage. Check that appropriate emergency response and clean-up kits are sufficiently stocked and maintained. Supplies to be maintained on a quarterly basis. Ensure all above ground tanks and dangerous goods storage and other potential sources of pollution are sufficiently banded and appropriately managed. Encourage all relevant NTAPL staff, contractors and tenants to have appropriate operating procedures and fuel spill response contingency plans through written notification. Should leakage be detected, encourage tenants to remove tanks and remediate the site to the appropriate contaminant levels. Commitments as per AES 	<ul style="list-style-type: none"> Commitments as per AES Airport will liaise with AEO to classify contaminated sites according to criteria of contaminants, sensitivity of area transportability of pollutants etc. Site register to record any contaminated sites until such time as they are remediated to the satisfaction of the AEO. Where a spill is likely to cause site contamination the spill procedure and reporting will be expanded include remedial action and sign off of the site as no longer contaminated. 	<p>Completed</p> <p>Completed</p> <p>Completed</p> <p>Completed</p> <p>Completed</p>
31	Stormwater	Aviation Fuel Spillage – GA Apron	<ul style="list-style-type: none"> Ensure that aprons have effective fuel interceptor systems in place. 	<ul style="list-style-type: none"> Review spills procedures. Review requirement and responsibility for installation of fuel interceptors with Shell. Conduct risk assessment with Shell to determine appropriate fuel spill mitigation strategy for the GA Apron. 	<p>Completed</p> <p>Completed</p> <p>Completed</p>
32	Stormwater	Wash down – Hire Vehicles	<ul style="list-style-type: none"> Check that airport facilities are properly connected to sewerage system. 	<ul style="list-style-type: none"> AES commitment done. Review all hire car wash down facilities to determine if they manage potential stormwater contaminants effectively. 	<p>Completed</p> <p>Completed</p>
33	Stormwater	Wash down – On pad before connect to sewer	<ul style="list-style-type: none"> Encourage tenants to clean vehicles and aircraft in the provided wash bays. Check that airport facilities are properly connected to sewerage system. 	<ul style="list-style-type: none"> Commitments as per AES Connect wash bay to sewer or investigate reuse or other means of treating wastewater. Investigate most environmentally effective cleaning chemicals for use on the wash bay. Continue ongoing regular maintenance and pump outs of interceptor system. 	<p>Ongoing</p> <p>Completed</p> <p>Completed</p> <p>Completed</p>
35	Stormwater	Ground Fuel (UST) – QANTAS, Car rental facilities	<ul style="list-style-type: none"> Encourage tenants through written notification to maintain an accurate inventory to identify leakage. Determine which underground storage tanks require boreholes and encourage borehole installation. Encourage tenants to perform biannual monitoring of boreholes and undertake integrity testing of tanks if leakage is suspected by way of written notification. Identify clean-up liabilities if contamination is detected at underground storage tanks. 	<ul style="list-style-type: none"> Encourage tenants through written notification to maintain an accurate inventory to identify leakage. Identify clean-up liabilities if contamination is detected at underground storage tanks. Investigate if triple interceptor from this facility is adequate to effectively manage minor fuel spills on the refuelling pad. Any leak or suspected leak is to be promptly reported to Darwin International Airport and the AEO. Any known or suspected incident of water contamination of UST is to be reported promptly to Darwin International Airport and AEO. 	<p>Ongoing</p> <p>Ongoing</p> <p>Completed</p> <p>Ongoing</p> <p>Ongoing</p>

Appendix 1 1999 Environment Management Plan and 2002 Minor Variation *continued overleaf*

20. Abbreviations and Appendix



Item#	Category	Hazard	AES Action	2002 Minor Variation	Action
				<ul style="list-style-type: none"> Continue monitoring of stormwater from the catchment to detect any hydrocarbon contamination. Remind tenants of penalties of failing to report or respond to incidents of hydrocarbon contamination. If leakage is suspected take appropriate action to determine and rectify the issue. 	<p>Completed</p> <p>Completed</p> <p>Ongoing</p>
36	Air Quality	Dust	<ul style="list-style-type: none"> Continue current dust control measures. Construction - Contractors will be required to provide project specific environmental management plans. NTAPL will implement measures. Undertake an investigation to determine methods to control dust. Use practical means for the exclusion of grazing animals on airport lands and leased lands. If applicable apply additional methods to minimise dust. 	<ul style="list-style-type: none"> Dust is not considered to be a significant issue at Darwin International Airport except in association with construction activities. The management of Dust from Construction activities is controlled within the Site Rules. Revegetate bare soil areas of concern. 	Ongoing
37	Air Quality	Spray painting Aircraft	<ul style="list-style-type: none"> Paint Stripping and Painting – NTAPL to manage operations on an ongoing basis. 	<ul style="list-style-type: none"> The NTG Work Health Authority manages OH&S issues associated with these operations. Develop a notification procedure to ensure the Work Health Authority is notified of any issues or incidents on the airport. 	<p>Ongoing</p> <p>Completed</p>
38	Noise	Workshops	<ul style="list-style-type: none"> Stationary Plant and Equipment – NTAPL to encourage tenants and to ensure its own plant and equipment is properly operated and maintained to reduce noise emissions. 	<ul style="list-style-type: none"> The NTG Work Health Authority manages OH&S issues associated with this equipment. Develop a notification procedure to ensure the Work Health Authority is notified of any issues or incidents on the airport. 	<p>Ongoing</p> <p>Completed</p>
39	Waste Disposal	Contaminated Materials	<ul style="list-style-type: none"> Conduct waste audits to be repeated after 2 years. 	<ul style="list-style-type: none"> Replace waste audits with. Contractors will remove contaminated materials from airport to off site facility for appropriate disposal. Work with AEO to educate tenants on their responsibilities to properly dispose of contaminated materials. Report evidence of inappropriate disposal methods to AEO. Regular site inspections with AEO to determine appropriate disposal methods (to replace biannual audits). 	<p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p>
40	Waste Disposal	General	<ul style="list-style-type: none"> No actions in AES. 	<ul style="list-style-type: none"> These wastes should be disposed as per normal domestic wastes. If inappropriate disposal is suspected disposal records will be reviewed. 	<p>Ongoing</p> <p>Ongoing</p>
41	Waste Disposal	Grease Trap	<ul style="list-style-type: none"> No actions in AES. 	<ul style="list-style-type: none"> Contractors will remove grease from airport to off site facility for recycling. Work with AEO to educate tenants on their responsibilities to properly dispose of grease. Report evidence of inappropriate disposal methods to AEO. Regular site inspections with AEO to determine appropriate disposal methods. 	<p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p>
42	Waste Disposal	Construction	<ul style="list-style-type: none"> No actions in AES. 	<ul style="list-style-type: none"> The Darwin International Airport Site Rules document outlines appropriate storage and disposal of these wastes 	Ongoing

Appendix 1 1999 Environment Management Plan and 2002 Minor Variation *continued overleaf*

20. Abbreviations and Appendix



Item#	Category	Hazard	AES Action	2002 Minor Variation	Action
43	Stormwater	Aviation Fuel Spillage – Heli Apron	<ul style="list-style-type: none"> Ensure that aprons have effective fuel interceptor systems in place. 	<ul style="list-style-type: none"> Ensure that appropriate fuel spill procedures and mobile spill kits are available on this apron to deal with the size of spill likely to occur here. 	Completed
44	Stormwater	Ground Fuel (UST) – ARFF	<ul style="list-style-type: none"> As Per other Ground Fuel. 	<ul style="list-style-type: none"> Note: New Facility. Encourage ARFF to maintain inventories to detect any potential loss of product from UST. Any leak or suspected leak is to be promptly reported to Darwin International Airport and the AEO. Any known or suspected incident of water contamination of UST is to be reported promptly to Darwin International Airport and AEO. Continue monitoring of stormwater from the catchment to detect any hydrocarbon contamination. Remind ARFF of penalties for failing to report or respond to incidents of hydrocarbon contamination. If leakage is suspected take appropriate action to determine and rectify the issue. 	
45	Stormwater	Cross Boundary	<ul style="list-style-type: none"> No actions in AES. 	<ul style="list-style-type: none"> Maintain working relationship with RAAF and Defence – Infrastructure Division, to work together to evaluate what potential effect this may have on storm water quality. 	Ongoing
46	Stormwater	Biocides / Fertilisers	<ul style="list-style-type: none"> Review the use of pesticides and herbicides on airport. (Completed) 	<ul style="list-style-type: none"> Use these materials in accordance with the directions. Darwin International Airport staff will be suitably trained in the use of these materials. Ensure contractors are suitably trained and licensed to handle the chemicals they use on site. 	Ongoing Completed Ongoing
47	Aboriginal and Cultural Heritage	Destroying Item / Site of significance	<ul style="list-style-type: none"> NTAPL to consult with the Australian Heritage Commission, Department of Environment, sport and Territories, Northern Territory Heritage Advisory Council and other relevant bodies should heritage items be discovered. Work on development should stop if culturally significant artefacts were found. 	<ul style="list-style-type: none"> As per AES Reference in site rules regarding actions in the event of site / object discovery. 	Ongoing Ongoing
48	Vector Control	Mosquito Breeding	<ul style="list-style-type: none"> Monitor possible mosquito breeding sites. Modify structures or drains to eliminate pooling of water where appropriate. 	<ul style="list-style-type: none"> Monitor for potential mosquito breeding containers lying around airport sites (particularly in the wet season). 	Ongoing
49	Energy	Excess consumption	<ul style="list-style-type: none"> Continue to implement recommendations arising from last energy audit. To review the potential for use of renewable energy sources where practicable To encourage tenants to consider energy efficient building design and new technology through building and development approval processes where appropriate. To continue monitoring airport energy consumption. 	<ul style="list-style-type: none"> As Per AES Joined the Greenhouse Challenge Program Johnson Controls and Honeywell have carried out comprehensive energy consumption and systems reviews. 	Ongoing
50	Air Quality	Greenhouse Gases	<ul style="list-style-type: none"> As per Excess energy consumption. 	<ul style="list-style-type: none"> As per Excess Energy Consumption. 	
51	Air Quality	Ozone Depleting	<ul style="list-style-type: none"> Air Conditioning and Refrigeration – NTAPL will carry out audit and will update the FAC Technical Instructions on control of ozone depleting substances. Update inventory of ozone depleting substances. 	<ul style="list-style-type: none"> Darwin International Airport has reviewed it'sits own facilities and has not found any ozone depleting substances in this equipment. The environmental site register will be updated if any new ozone depleting substances come onto the airport site. 	At the time

Appendix 1 1999 Environment Management Plan and 2002 Minor Variation *continued overleaf*

20. Abbreviations and Appendix



Item#	Category	Hazard	AES Action	2002 Minor Variation	Action
52	Air Quality	Vehicle Emissions	<ul style="list-style-type: none"> Motor vehicles - A ground management plan is to be prepared. 	<ul style="list-style-type: none"> Motor Vehicle emissions are controlled by State Regulations and are not an area of NTAPL responsibility. 	
53	Air Quality	Aircraft Emissions	<ul style="list-style-type: none"> Aircraft - Auxiliary Power Units (APU) NTAPL will investigate operational and financial feasibility of providing ground power and pre-conditioned air at the terminal gates. If feasible, emissions from aircraft APU could be reduced. 	<ul style="list-style-type: none"> Commitment as per AES Letter sent seeking support from effected airlines. Depending on level of support the investigation will proceed as scheduled. 	<p>Completed</p> <p>Completed</p> <p>Completed</p>
54	Flora and Fauna	Operational	<ul style="list-style-type: none"> Relates only to birds as per Item #13. 	<ul style="list-style-type: none"> Airfield staff work under established procedures that include monitoring for and control of such hazards. 	Ongoing
55	Flora and Fauna	Feral Animals	<ul style="list-style-type: none"> Continue feral cat, rabbit and fox management procedures. 	<ul style="list-style-type: none"> Remove Rabbit and fox reference, as these are not found here. Implement cat and pigeon control as required. 	Ongoing
56	Flora and Fauna	Endangered Species	<ul style="list-style-type: none"> Develop strategy to protect and / or mitigate any impact on any rare and endangered species identified. 	<ul style="list-style-type: none"> The Flora and Fauna Baseline Survey carried out by SKM in association with Kristen Metcalf (March 1999) did not identify any such species and suggested that there would be a low likelihood of any such species occurring on this site. NTU has carried out studies on both flora and fauna on the airport and is encouraged to do so ongoing. Develop this strategy if and when such a species is discovered. 	In the event
57	Hazardous Materials	Dangerous Cargo / Chemicals / Bio Hazards	<ul style="list-style-type: none"> No Action in AES 	<ul style="list-style-type: none"> This is managed by CDIA and the Airlines. Airlines carrying dangerous goods must have a CDIA approved Dangerous Goods Manual referring to the relevant ICAO Regulations. Airline staff required to handle dangerous goods undergo annual dangerous goods acceptance training to enable them to properly manage these cargo. 	Ongoing
58	Hazardous Materials	Asbestos	<ul style="list-style-type: none"> Asbestos register to be updated following each audit. 	<ul style="list-style-type: none"> Buildings suspected of containing asbestos surveyed an asbestos management plan put in place. 	Completed
59	Contaminated Land	Cyclone Dumps and large contaminated sites	<ul style="list-style-type: none"> Determine extent of contamination caused by the landfills. Remediate landfill sites to acceptable levels prior to any construction. 	<ul style="list-style-type: none"> Dump sites have been located. Anecdotal records of dump contents have been collected. A Risk assessment has been carried out with the AEO. Leave dumps untouched until such time as sites are to be developed at this time a full and comprehensive investigation will be carried out. Any large contaminated site arising will be assessed with the AEO and an appropriate approach agreed for ongoing management. 	<p>Completed</p> <p>Completed</p> <p>Completed</p> <p>In the event</p> <p>Until such time</p>

Appendix 1 1999 Environment Management Plan and 2002 Minor Variation