Initial Environmental Review for
Army Aviation Centre, Oakey, Queensland
Defence Reference: DEO-SQ 572/01

Prepared for:

Department of Defence
Corporate Services and Infrastructure Centre - South Queensland
Infrastructure Branch
Building F5
Gallipoli Barracks
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Abbreviations

AACO	Army Aviation Centre Oakey
AGT	Above Ground Storage Tank
AHD	Australian Height Datum
AST	Aboveground Storage Tank
DME	Department of Mines and Energy
DNR	Department of Natural Resources
DPI	Department of Primary Industries
CLR	Contaminated Land Register
CSIC-SQ	Corporate Services and Infrastructure Centre
Defence	Department of Defence
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMR	Environmental Management Register
EMS	Environmental Management System
EPA	Environmental Protection Agency
EP Act	Environmental Protection Act
EPBC	Environmental Protection and Biodiversity Conservation Act
GMP	Ground Maintenance Plan
IER	Initial Environmental Review
ha	hectares
IT	*IT* Environmental (Australia) Pty Ltd
km	kilometre
MSDS	Material Safety Data Sheets
NPI	National Pollutant Inventory
SoR	Statement of Requirement
UST	Underground Storage Tank
UXO	Unexploded Ordnance
RAAF	Royal Australian Air Force
WWII	World War Two

Executive Summary

The Department of Defence (Defence) Corporate Services and Infrastructure Centre – South Queensland (CSIC-SQ) commissioned IT Environmental (Australia) Pty Ltd (*IT*) to undertake an Initial Environmental Review (IER) of the Army Aviation Centre Oakey (AACO) and its satellite facilities Brymaroo, Wyoming and Turkey Hill. The subject properties are located to the north of the township of Oakey in south east Queensland. The IER was completed in accordance with Defence requirements as detailed in the following documents:

- correspondence dated 2 July 2001 (Defence Reference DEO-SQ 572/01);
- Task Description and Statement of Requirement (SoR) for Development of an Initial Environmental Review (Phase 1 of Environmental Management Plan Development) for the Army Aviation Centre, Oakey, July 2001;
- Attachment A to the SoR (Scope of Initial Environmental Review); and
- Annexure B to the SoR (Task Description).

The objective of this IER was to identify all aspects of the facility's operations (both past and present) and non-Defence activities (past, present, sanctioned or otherwise) that occur on AACO, Brymaroo, Wyoming and Turkey Hill that have an impact or a potential to impact the environment (on- and off-site). For the purposes of this IER, and as defined by Defence, the term "environment" encompasses all aspects of human surroundings, including the natural, cultural, social and built environments.

A risk analysis and issue prioritisation has been undertaken in accordance with Environmental Risk Management – Principles and Process (HB203:2000) developed by Standards Australia 2000, and based on AS/NZS 4360:1999. The risk analysis incorporates an overview of environmental impacts or potential environmental impacts.

Based on the results of IER assessment and risk analysis *IT* conclude the following.

An EMP and other environmentally related management documents exist for AACO. Unfortunately these documents have not been used to their full potential and most staff at AACO are unaware of their existence. Implementation procedures for the future environmental management plans need to be carefully assessed and incorporated into site inductions and training of staff.

The risk analysis process identified the following risk categories according to the Standards Australia (2000) Environmental Risk Management – Principles and Process.

Extreme Risk – requiring immediate action:

- trichloroethylene bath and penetrant line spills unable to be contained with potential discharge to stormwater; and
- noise generated by aircraft within the flight training area.

High Risk – senior management attention needed:

- waste UST associated with building C22 which filled up during heavy rain;
- waste hydrocarbon UST located on the northern side of the tarmac used to collect spills from tankers and disposal from hangers are too small;
- toxic waste treatment plant processing of wastes and irrigation of processed water on site;
- former reverse osmosis toxic waste disposal facility;
- burial of wastes including aircraft and other waste material both on and off site;
- the intercept within the D Block compound discharging waste oil to unknown location;
- waste oil within the wash down bay spilling into the intercept that is not maintained;
- storage and use of hazardous materials at the museum facility including greases, solvents and some paints;
- storage of hazardous materials within building C22 including solvents, corrosives, adhesives, resins, engine coolant, certrex 70, hydraulic oil and detergent with potential for uncontained spills;
- storage of transformers within D Block compound with one showing visible signs of leakage;
- storage of hazardous materials at the fire station which are uncontained and visible hydrocarbon stains;
- UST's located to the north of building C26 containing diesel, leaded and unleaded petrol that have not been pressure tested for leakage and refuelling area discharging to stormwater;
- storage of hazardous materials in building C11 including paints, thinners and solvents with the potential to discharge to stormwater;
- vehicle refuelling area at Brymaroo which is not adequately maintained;
- the community consultation process due to the nature of the operations;
- discharge of potentially contaminated stormwater runoff to off site areas; and
- contamination of groundwater and potential contamination of useable groundwater resources.

Moderate Risk – management responsibility to be specified by Defence:

- disposal of hydrocarbon liquid wastes from the museum as herbicide on weeds within the museum complex;
- storage and use of hazardous materials at the museum facility including greases, solvents and some paints;
- storage of hazardous materials within buildings C1 and C3 including oils, aircraft fuels, solvents, cleaning products and corrosives;
- storage of hazardous materials and use at the military police compound including paints, fuel, oils, ethanol, kerosene and detergent;
- storage of hazardous materials in buildings B1, B2 and B3 including kerosene, oils, fuels, adhesives and paints;
- storage of hazardous materials at building C7 including fuels, oils, hydraulic oils and greases;
- storage of hazardous materials at building B52 (flight simulator) including hydraulic oil, paint, adhesives, acetone, solvents and resins;
- storage of hazardous materials in building B22 including oils, paints, solvents and cleaners;

- clearance or modification of a plant (ecological) community, listed as an Endangered Ecological Community under the provisions of the EPBC Act and the Qld Vegetation Management Act, situated on land within or immediately adjacent to the boundaries of the Turkey Hill facility;
- clearance or modification of a plant (ecological) community, listed as an Endangered Ecological Community under the provisions of the Qld Vegetation Management Act, situated on land within the boundaries of the Brymaroo facility;
- the former wash point to the north of the tarmac which was used for washing aircraft with BNB3200 has the potential to be contaminated as the chemical used is reported by Defence to be hazardous to the environment;
- the aircraft refuelling pads at Brymaroo are internally draining but discharge is not contained;
- hydrocarbon disposal points and collection UST for buildings C1 and C2 has the potential to contaminate surrounding soil and water resources or release waste hydrocarbon products if it is not appropriately maintained;
- maintenance work on aircraft is undertaken in a number of locations across AACO and has the potential for spillage or leakage of oils and fuels;
- storage and shut down procedures of aircraft can result in the leakage or discharge of fuel, oils and greases;
- hot refuelling of aircraft is undertaken on unsealed areas but due to the design of the hot refuelling system no fuel can be spilt for health and safety reasons although the nature of operations pose a moderate risk to the environment;
- museum staff indicated that areas of AACO and surrounding properties may have been used as firing ranges and therefore there is potential for UXOs;
- exhausts from workshops or other hazardous operations that do not contain dust collection of filtration systems has the potential to impact air quality; and
- exhaust from operating aircraft.

Low Risk – manage by routine procedures:

- fire management;
- cultural heritage;
- disposal of dog wastes to the sewer;
- disposal of medical waste;
- disposal of solid wastes;
- storage of hazardous materials within buildings C8 and C9 (minor quantities only);
- storage and dispatch of hazardous materials from building C43;
- storage of hazardous materials within building C13 which is designed for the storage of liquid hazardous materials;
- AGT of aviation turbine fuel and other hydrocarbons products at the fuel farm;
- AGT of aviation turbine fuel at Brymaroo;
- diesel AGT at Turkey Hill;
- clearance of flora listed as threatened flora, under the provisions of the EPBC Act or the Qld Nature Conservation Act, during any future expansion/modification of Defence operations that involve clearance of existing remnant/regrowth vegetation;
- clearance of flora listed as threatened flora under the provisions of the EPBC Act or the Qld Nature Conservation Act, during control of weed species;
- soil erosion.

Based on the results of the IER and risk analysis *IT* recommend the following additional works for development of the EMP:

- assessment of liquid waste disposal and wash down bays;
- assessment of areas of buried wastes;
- upgrading of the facility containing the trichloroethyene bath and the penetrant line;
- removal of the leaking transformer from D Block compound;
- biannual pressure testing of USTs;
- assessment of hazardous material storage areas;
- assessment of both surface and groundwater;
- surveys to confirm the precise location and extent of threatened plant (ecological) communities that are known to occur on and adjacent to AACO and its satellite properties;
- surveys to confirm the presence or absence of threatened flora species;
- surveys to assess the likely presence or absence of threatened fauna species;
- assessment of noise throughout the flight training area; and
- upgrading of the aircraft refuelling areas at Brymaroo to incorporate spill interception and containment system.

1 Introduction

The Department of Defence (Defence) Corporate Services and Infrastructure Centre – South Queensland (CSIC-SQ) commissioned IT Environmental (Australia) Pty Ltd (*IT*) to undertake an Initial Environmental Review (IER) of the Army Aviation Centre Oakey (AACO) and its satellite facilities Brymaroo, Wyoming and Turkey Hill. The subject properties are located to the north of the township of Oakey in south east Queensland (Figure 1). The IER was completed in accordance with Defence requirements as detailed in the following documents (included as Appendix A):

- correspondence dated 2 July 2001 (Defence Reference DEO-SQ 572/01);
- Task Description and Statement of Requirement (SoR) for Development of an Initial Environmental Review (Phase 1 of Environmental Management Plan Development) for the Army Aviation Centre, Oakey, July 2001;
- Attachment A to the SoR (Scope of Initial Environmental Review); and
- Annexure B to the SoR (Task Description).

Effective management of the environment contributes positively to the Defence charter 'to maintain and develop capabilities for the self-reliant Defence of Australia and its security interests' by enabling the sustainable and cost-effective use of resources. Equally, Defence has a duty to Government and the Australian public to ensure its activities are undertaken in an environmentally and ecologically sustainable manner.

1.1 Objective

The objective of this IER was to identify all aspects of the facility's operations (both past and present) and non-Defence activities (past, present, sanctioned or otherwise) that occur on AACO, Brymaroo, Wyoming and Turkey Hill that have an impact or a potential to impact the environment (on- and off-site). For the purposes of this IER, and as defined by Defence, the term "environment" encompasses all aspects of human surroundings, including the natural, cultural, social and built environments.

An IER is prepared as the first stage of the overall Environmental Management Plan (EMP) for AACO, Brymaroo, Wyoming and Turkey Hill. The finalised EMP will be the key document used by the relevant Corporate Services Infrastructure Centre - Manager Infrastructure (CSIS-MI) to determine permissible uses on the subject Defence Properties. Therefore it is essential the EMP be formulated on the basis of providing the comprehensive detail required to ensure Defence can manage environmental and heritage issues on a day to day basis.

1.2 General IER Methodology

As stated above, the IER is the first of three phases in developing an EMP (where Phase 2 is completion of additional work identified in the IER, if required, with Phase 1 and 2 forming the basis for Phase 3).

The IER is a scoping exercise involving the collection, review, analysis and consolidation of relevant existing technical and environmental information in relation to the facility. This information is then used to identify existing and potential environmental impacts related to AACO, Brymaroo, Wyoming and Turkey Hill.

The benchmark for determining environmental impacts (and, therefore, environmental management prescriptions) is to be based on Defence obligations and responsibilities in relation to:

a) Commonwealth/State legislation;
b) Commonwealth/Defence policy and instructions;
c) maintenance of the environment to sustain long-term Defence use; and
d) Defence's due diligence ("good neighbour") policy on compliance with relevant legislation and recognition of regional planning and community related environmental issues/values.

To adequately address the above obligations and responsibilities, Defence has stipulated the IER protocol should be broad in scope and consider a wide range of potential issues in accordance with (but not limited to) the following categories.

- The facility's Environmental Management System (EMS) including the existence of appropriate documentation and acknowledgment of responsibilities under the EMS.
- Management documentation.
- Sustainable use of the facility.
- Pollution/contamination prevention and management.
- National Pollutant Inventory (NPI) reporting requirements.
- Community relationships.
- Compliance with relevant Commonwealth and State legislation and national environmental protection measures.

The IER was then prepared in a manner that allows:

- identified environment/heritage issues/aspects of AACO, Brymaroo, Wyoming and Turkey Hill to be measured/quantified and ranked according to their significance; and
- setting of targets and measurement of improvements in subsequent phases of the EMP process.

If an IER determines the information currently available is insufficient to allow an accurate assessment of the potential risks associated with particular environmental aspects of the sites, more detailed environmental assessment(s) may be required. These additional assessments would build upon the findings of the IER and lead to the preparation of an EIA Report.

If an IER does not identify a need for further (immediate) data generation (baseline studies), the EMP development process will proceed to completion with the IER, or the IER as developed, as the basis for preparation of Phase 3 (a and b).

1.3 Research and Consultation (Scope of Work)

IT's approach to the IER was structured to collate all available information on environmental aspects of AACO, resulting in a summary of the current and potential environmental aspects identified and their relative magnitude and risk ranking.

In order to meet the stated objective and requirements stipulated in the tender documents, the following basic scope of work was completed:

- initial liaison and documentation review;
- site audit;
- data analysis and preliminary risk analysis; and

- reporting and provision of recommendations.

The research and consultation involved in these tasks are discussed in detail in the following sections.

1.3.1 Initial Liaison and Documentation Review

As per Section 6.2 of the SoR, a start up meeting with the CSIC site contact was held on 3 September 2001. This meeting was used to coordinate liaison with identified stakeholders through the REO, and to acquire existing reports and related documentation for AACO, Brymaroo, Wyoming and Turkey Hill. The documents provided by Defence are listed below:

- ENE-04 Results of Energy Audit Conducted at Oakey Army Aviation Base Oakey, RMS Development Engineers (1998).
- ENV-02 The Management of Introduced Pest Mammals – Darling Downs Military Area, Animal Control Technologies P/L (1997).
- ENV-05 Investigation into waste Disposal Practices Oakey Army Aviation Base and its Effects on Groundwater Quality and Drinking Water Quality for the Oakey Army Base and Township of Oakey, D.J. Bristow LT. (1991).
- ENV-07 Report of Phase 1 Investigation and Testing for Projects F5DD125 and F5DD131 BASC Darling Downs Army Airfield, Oakey, DJ Douglas and Partners Pty Ltd (1995).
- ENV-08 Additional Soil Testing for Project F5DD131, DJ Douglas and Partners Pty Ltd (1995).
- ENV-10 Koala Habitat Survey Oakey Army Airfield, Sinclair Knight Merz (1995).
- ENV-12 Army Pollution Audits, Kinhill (1991).
- ENV-13 Health and Safety and Environmental Management Plan, Thiess Environmental Services.
- ENV-17 Waste Audit, Dames and Moore (1998).
- ENV-18 Environmental Management Plan, Sinclair Knight Merz (1996).
- ENV-35 Noise Surveys of Army Aviation Centre Oakey, National Acoustic Laboratories (1994).
- ENV-37 Remediation of Old Fire Training Area, Thiess Environmental Services (1997).
- ENV-38 Environmental Planning Considerations – Republic of Singapore Air Force Helicopter Training Facility.
- ENV-42 The Ecology of the Koala at the Army Aviation Centre Oakey, Go Ishigame (University of Queensland) (1997).
- HER-01 Review of the Status and Value or Army's Historic Buildings Vol 1.
- HER-03 A Preliminary Cultural Heritage Assessment of the Army Aviation Centre Oakey, John Richter (1997).

The following subtasks were then undertaken.

- Review of documentation provided by Defence as listed above.
- Interviews with stakeholders as authorised by Defence, including neighbours, local council(s), and relevant regulatory authorities.
- Review of relevant legislation and local government requirements.
- Desktop research, including the following:
  - local and regional geological and hydrogeological conditions (maps, aerial photographs, and publications and discussions with local offices);

- the National Parks and Wildlife Service's Wildnet database, which contains records concerning the location of previous sightings of threatened fauna throughout south east Queensland;
- the Queensland Herbarium's HERBRECS database, which contains records concerning the location of previous sightings of threatened flora throughout south east Queensland;
- the Queensland Herbarium's Remnant Regional Ecosystems Maps;
- the Environmental Protection Agency's (EPA's) review of the conservation status of Queenslands Bioregional Ecosystems; and
- lists of threatened species and ecological communities that are maintained, by the Commonwealth Department of Environment and Heritage, pursuant to the *Environmental Protection and Biodiversity* (*EPBC) Act.*

1.3.2 Site Audits

Although the pre-tender site inspection provided important preliminary information regarding activities and potential issues, more detailed and focussed audits of all aspects of AACO, Brymaroo, Wyoming and Turkey Hill was the integral part of the IER. The site audits included the following.

- Pre-audit notification of site management, through the CSIC Regional Environmental Officer, of the proposed timing and format of the site inspection.
- Entry meeting at AACO on 3 September 2001 with relevant personnel to discuss the requirements of the IER.
- Site inspections on 15, 16, 17 and 19 October 2001, including detailed observations of all site facilities and relevant activities. The checklists provided in Attachment A of the tender documents were referred to as the basis of the site inspections, but were expanded where appropriate if other issues were identified.
- Interviews with relevant site personnel.
- Viewing of all relevant plans, permits, licenses and other documentation.
- Exit meeting with CSIC on 25 October 2001.

Consultation was only undertaken with the permission of CSIC-SQ. Contact details for AACO personnel, surrounding land users and regulatory authorities that were interviewed in relation to the IER were supplied by the CSIC-SQ. Information obtained from AACO personnel included the nature of operations, on site environmental records and past activities and incidents.

1.3.3 Data Analysis and Preliminary Risk Analysis

The internal and external environmental issues/aspects identified in the previous tasks were ranked according to their significance using a Preliminary Risk Analysis (per AS/NZS 4360). The risk analysis procedure used was in accordance with the Standards Australia (2000) Environmental Risk Management – Principles and Process (HB203:2000) which are based on AS/NZS 4360:1999. The tabulated issue identification and risk ranking is included in the Tables section of this report.

In this task *IT* also reviewed AACO's chemical use against the National Pollutant Inventory (NPI) list and with specific reference to the NPI Emission Estimation Technique Manual for Defence Facilities (March 2000).

1.3.4 Reporting and Recommendations

The above tasks have culminated in this report presenting the results of the IER and Preliminary Risk Assessment. As stipulated in the SoR, this report includes an Executive Summary of the key points of the report, together with brief statements covering the background of the facility, basis for the report and summary of findings. The IER report adheres to the content, format and presentation requirements listed in Sections 3.6 through 3.13 of the SoR.

Further studies recommended within Section 9 have been accompanied by the following:

- justification for the recommendation; and
- detailed scope(s) of work for any recommended further studies.

Recommendations resulting from this IER are presented in a form suitable for insertion in a SoR for Phase 2 of the EMP process.

2 Site Information

2.1 Local and Regional Location

This IER covers AACO and its satellite properties at Brymaroo, Wyoming and Turkey Hill.

AACO

AACO is located on the western side of the Great Dividing Range to the north of the township of Oakey and the Warrego Highway and approximately 35 km north west of Toowoomba. Oakey Creek is located approximately one kilometre (km) to the south of AACO and drains to the north west, while to the north of the site is Doctors Creek which drains to the west for approximately 14 km before draining into Oakey Creek. AACO is generally flat and is at an elevation of approximately 400 metres above Australian Height Datum (AHD). Land use to the north, east and west of the site is generally agricultural with predominantly beef and grain production. To the south of AACO is the township of Oakey consisting of residential and medium to light industrial facilities.

Turkey Hill

Turkey Hill is a raised area located approximately eight kilometres to the north of AACO. The highest point of the site is at an elevation of approximately 537 metres AHD.

Brymaroo

Brymaroo is located approximately 20 kilometres to the north west of AACO and to the south of Cain Creek. The site is generally flat and approximately 400 metres AHD.

Wyoming

Wyoming is located to the west of Irvingdale and approximately 30 km to the north west of AACO. The site and surrounding area is flat and at an elevation of approximately 380 to 400 metres AHD. Myall Creek is located to the south of Wyoming.

2.2 Brief History

The Oakey airfield was first developed as a Defence site during World War II (WWII) as a Royal Australian Air Force (RAAF) Base. In 1948 the facility was turned into a civilian airfield until 1969 when the Defence purchased the site for the development of AACO. It is believed that prior to development of AACO the area was used for agricultural purposes including grazing and grain production.

2.3 Total Area Under Investigation

Figure 1 illustrates the location of AACO and the surrounding satellite properties. Figure 2 shows the property boundaries of AACO. The total area of AACO and satellite properties is approximately 1,218 hectares (ha).

2.4 Description of Areas / Sub Areas

AACO's layout is shown in Figure 2. AACO is the major base with the following satellite facilities:

- Turkey Hill used for an unmanned communications tower;
- Wyoming Airfield used by the Republic of Singapore Armed Forces; and
- Brymaroo used for training in emergency landings and fire hazard training.

AACO

The following units are stationed at AACO:

- Republic of Singapore Airforce Oakey Detachment;
- Headquarters Aviation Support Group;
- Headquarters Army Aviation Training Centre;
- School of Army Aviation – Oakey;
- Rotary Wing Aircraft Maintenance School;
- Aviation Support Group Workshop;
- 1st Aviation Regiment 11;
- Corporate Services and Infrastructure Centre;
- 44th Military Police Oakey;
- Defence Relocation Shopfront Toowoomba;
- 44 Wing Atc Flight Oakey;
- Bureau of Meteorology;
- Defence Information Systems Office – Darling Downs;
- Haden Contractors Facilities; and
- Army Aircraft Logistic Management Squadron.

The buildings located at AACO site the following:

A1 Dog Kennel
A2 Dog Kennel
A3 Administration
A4 Training Area
A5 Demountable Admin Building
A6 Pergola
A7 New Guard House
A15 Explosives Store
A16 Outdoor Chapel
A21 Officers Mess
A21A Officers Mess Store Shed
A22 Carport
A23 Carport
A31 Fuel Tanks
A32 Oil Storage
A33 Bulk Storage
A34 Fuel Complex Administration
A35 Tanker Storage
A36 LPG Storage
B1 Aircraft Shelter
B2 Aircraft Shelter
B3 Workshop
B4 Control Tower
B4A Fire Station
B5 Pergola
B6 Admin/Training Facility
B6A Demin Plant
B7 POL Store
B8 Radar Approach Building
B9 Fire Station Training Facility
B10 Store
B11 Centre HQ/Training Facility
B12 Unit HQ/Administration
B13 Old Guard House
B14 Administration
B15 Equipment Store
B16 Ambulance Shelter Bays
B17 Training Room Fire Station
B18 Store
B19 Weights Room
B20 Transport Office
B21 Transport Office
B22 Flammable Gas Shed
B25 Q Store
B26 Admin Building
B27 Admin Building
B30 Boiler Room
B31 Ration Store
B32 Sleeping Accommodation
B33 Kitchen/Dining
B34 Sleeping Accommodation
B35 Change Room
B36 Medical Centre
B37 Swimming Pool Complex
B38 Canteen
B39 Assembly Hall/Gymnasium
B40 RAMS HQ/Administration
B41 Sewerage Pump Station
B42 Sports Pavilion
B43 Toilet Block
B44 MEA/Defcredit
B45 DCSO
B46 AALMS Building
B47 Double Garage
B48 Single Garage
B49 Plant Nursery
B50 Pergola
B51 Community Centre
C1 Workshop
C2 Blackhawk Hanger
C2A Flight Line Office
C3 Aircraft Shelter
C4 Aircraft Shelter
C5 Aircraft Shelter
C6 Administration
C7 Hanger
C7A RAMS Workshop
C8 EIR Workshop
C9 Store
C10 Showers, Ablutions, Latrines
C11 Paintshop
C12 Store
C13 Store/POL/Paint
C14 Gas Store
C15 Battery Shop
C19 Store Hazardous Goods
C20 Unit Q Store
C21 Administration
C22 Aircraft Workshop
C23 NDI/Fibreglass/hydraulic RPR
C25 Shelter
C26 Administration
C27 VEH Shelter
C28 VEH Shelter
C29 Service Station
C29A Flammable Materials Store
C29B Toilets
C31 Pumphouse/Fire Suppression
C33 Administration
C34 Store Hanger
C35 Store Hanger
C36 Store Hanger
C37 Engineering Shop
C38 Store Hanger
C39 Store Hanger
C40 Store Hanger
C41 Museum
C42 Unit Canteen
C43 RPS Warehouse
C46 Water Tower Reservoir
C47 Sergeants Mess
C48 Store Shed
C49 Tennis Pavilion
C50 Carport
C61 Blackhawk Wash Point
D1 Carport
D2 Admin/Unit Workshop
D3 Chemical Store
D4 Storage Shed
D5 Plant Nursery
D6 Storage Shed
D8 Oakey Civil Aviation Terminal
D9 Store Hazardous Goods
S1 OPS/Line
S2 Maintenance Hanger/Workshop
S3 Storage Hanger
S4 POL Store
S5 Pumphouse
S6 A/C and Compressor Compound

Brymaroo

Brymaroo contains the following:

- two above ground storage tanks (AGT) containing aviation turbine fuel;
- two helicopter concrete refuelling pads;
- fire firefighting infrastructure including a diesel powered water pump and associated day tank, fire fighting foam supplies and infrastructure;
- vehicle refuelling area;
- meals area and building;
- toilets;
- demountable office buildings;
- old farm shed;
- small aircraft control shed;
- water tanks; and
- grass runways.

Wyoming

Wyoming did not contain any buildings at the time of inspection although there was visible evidence that buildings had been recently demolished on site. The property contained a grass landing strip and a bitumen taxi way.

Turkey Hill

Turkey Hill contains a radar tower and associated support facilities. Buildings at Turkey Hill include:

- T1 Radar Transmitter Site; and
- T2 Workshop.

Included at the Radar Transmitter Site is a diesel generator and diesel AGT.

2.5 Rationale for Defence Use of the Facilities

As outlined in the SoR the activities undertaken at AACO include aircraft control, storage and maintenance of aircraft and training of personnel. The following types of aircraft are present:

- Aerospatiale Squirrel AS 350-b;
- Nomads (N22b and 24A);
- Bell 206B-1;
- Black Hawk S70-a-9; and
- Iriquois UH-1H.

2.6 Activities Undertaken at the Facilities

As described in the SoR the activities undertaken at AACO include the following:

- testing and maintenance of aircraft;
- training for aircraft technicians;
- vehicle servicing and associated activities;
- waste disposal;
- office accommodation;
- residential accommodation;
- water storage, supply and waste water treatment; and
- communication support.

3 Physical Environment

3.1 Climate

According to information contained on the Bureau of Meteorology Australia Internet site the following weather conditions have been recorded at the Oakey Aerodrome since 1970:

- an average maximum temperature of 25.0 ^{o}C;
- an average minimum temperature of 10.6 ^{o}C;
- on average the hottest month of the year is January and the coldest July;
- average yearly rainfall of 642.4mm; and
- on average the wettest month is December and the driest month is August.

3.2 Topography and Drainage

AACO

AACO is located on the western side of the Great Dividing Range. Oakey Creek is located approximately one kilometre (km) to the south of AACO and drains to the north west, while to the north of the property is Doctors Creek which drains to the west for approximately 14 km before draining into Oakey Creek. In developed areas of AACO, constructed open stormwater drains direct a majority of surface runoff from the site to Doctors Creek. AACO is generally flat and is at an elevation of approximately 400 metres above AHD.

Turkey Hill

This installation is located on the top of a raised area known as Turkey Hill. Drainage is in all directions down the sides of Turkey Hill. The closest creeks to the site are Lagoon Creek to the west and Doctors Creek to the east. Both creeks are approximately 3 km from Turkey Hill. The highest point of Turkey Hill is at an elevation of approximately 537 metres AHD.

Brymaroo

Brymaroo is located to the south of Cain Creek. The site is generally flat and is at an elevation of approximately 400 metres AHD.

Wyoming

The topography at Wyoming and surrounding area is flat. A Myall Creek is located just to the south of the site. Wyoming elevation is between 380 and 400 metres AHD.

3.3 Geology and Geomorphology

The following geology descriptions were derived from the Ipswich 1:250,000 geological sheet (SG56-14) (1973):

- AACO - is underlain by mainly basalt detritus consisting of gravel, sand and mud;
- Turkey Hill – Main Range Volcanics consisting of olivine basalt and a trachyte suite including minor leuco-trachyte and trachyte breccias;
- Brymaroo - Main Range Volcanic consisting of olivine basalt and a trachyte suite including minor leuco-trachyte and trachyte breccias; and
- Wyoming – Gravel, sand, mud from mainly basalt detritus.

3.4 Soil and Current Erosion Status

Based on discussions with staff and on visual observations, AACO site and satellite properties are not subject to significant soil erosion. Some erosion on the banks of the contoured drainage line that collects and removes surface runoff from AACO contains minor rilling and gullying in areas where all vegetation had been removed to allow unimpeded flow of stormwater. However maintenance of these areas was good with any previous gullies and rills having been repaired.

3.5 Water Resources

AACO, Brymaroo, Wyoming and Turkey Hill are located within in the Great Artesian Basin. According to the Groundwater Resources of Queensland Map (1:2,500,000) (1988) the groundwater/aquifer beneath AACO, Brymaroo, Wyoming and Turkey Hill is expected to have the following characteristics:

- produce at rates greater than 15 litres per second;
- have salinity levels between 500-1500 mg/L;
- contained in unconsolidated sediments; and
- is suitable for most purposes but marginal for human consumption and low salt tolerant crops.

Groundwater is used at AACO for irrigation and fire fighting purposes. Domestic water supply and sewage systems are connected to the Jondaryan Shire Council system. A desalinisation plant is present at AACO to treat the groundwater prior to use. Regional groundwater is also utilised by the local community.

To the north of AACO is Doctors Creek and to the south is Oakey Creek. Doctors Creek flows to the west and for approximately 14 km before draining into Oakey Creek, which continues in a westerly direction for approximately 50 km before draining into the Condamine River.

Approximately 20 km to the east of AACO is the Cooby Creek Reservoir, which is located on a tributary of Oakey Creek. The reservoir supplies water to Toowoomba.

The Brymaroo, Wyoming and Turkey Hill are expected to have similar groundwater resources as AACO. The creeks and drainage lines described in Section 3.2 generally drain to the west and connect with the Condamine River.

4 Biological Environment

AACO and its satellite properties at Turkey Hill, Brymaroo and Wyoming are all situated within the eastern sector of the Eastern Darling Downs province of Queensland's Brigalow Belt Bioregion.

The Eastern Darling Downs province comprises spurs and foothills of the main range along the eastern boundary of the bioregion, low hills in the south and the Condamine River plain in the central and western parts. Substrates include Tertiary basalt in the extreme east, Jurassic sediments in the south-east, Triassic-Jurassic sediments in the north-east and alluvial soils of varying age along the Condamine River plain. The vegetation communities of this province are dominated by eucalypt woodlands, brigalow open forest and semi-evergreen vine thickets.

4.1 Plant Community Habitat (Ecosystem Types)

No detailed descriptions of the structure, species composition or extent of the different plant communities that occur on AACO and its satellite properties at Turkey Hill, Brymaroo and Wyoming are available. The plant communities at each of these properties are primarily comprised of:

- remnant and regrowth plant communities dominated by tree, shrub and understorey flora endemic to the locality; and
- maintained grassland within which the original plant communities have been cleared and any regrowth is actively suppressed.

The remnant and regrowth plant communities that occur at AACO and its satellite properties are derivatives of the plant communities (or Regional Ecosystems) that are indigenous to the locality. In this respect Qld Department of Natural Resources and Mines (DNRM) Regional Ecosystem Map (Oakey RE9243) identifies the presence of the several regional ecosystem (or plant community) remnants at or adjacent to AACO and its satellite properties.

AACO

The native vegetation remnants that occur within and adjacent to AACO are derivatives of Regional Ecosystem Type 11.3.2 - woodland to open woodland of *Eucalyptus populnea* on Cainozoic alluvial plains, which has an "Of concern" conservation status at the State level. This regional ecosystem type is not listed as a Threatened Ecological Community under the provisions of the Environment Protection and Biodiversity Conservation Act (EPBC) 1999 (Cth.).

Turkey Hill

There are no native vegetation remnants within the fenced boundaries of the Turkey Hill facility. Outside of the fenced areas there is a remnant of Regional Ecosystem Type 11.8.3 - semi-evergreen vine thicket which may have emergent *Acacia harpophylla, Casuarina cristata and Eucalyptus* spp. on Cainozoic igneous rocks and steep hillsides. This ecosystem type has an "Endangered" conservation status at the State level. This regional ecosystem type is also listed as a Threatened Ecological Community under the provisions of the EPBC Act 1999 (Cth.).

Brymaroo

The remnant and regrowth plant communities that occur at the Brymaroo property are derivatives of Regional Ecosystem Type 11.8.15 - *Eucalyptus brownii* grassy woodland on Cainozoic igneous rocks. This ecosystem type has an "Endangered" conservation status at the State level and is not listed as a Threatened Ecological Community under the provisions of the EPBC Act 1999 (Cth.).

Wyoming

There are no substantial areas of remnant or regrowth vegetation within the boundaries of the Wyoming property.

4.2 Flora

The flora that occurs at AACO and its satellite properties at Turkey Hill, Brymaroo and Wyoming is comprised of a mixture of native and non-native species. Flora species that occur include:

- species that are indigenous to the regional ecosystem types of the locality; and
- species that have been introduced to the locality either in a controlled (ie landscaping) or uncontrolled manner (ie weeds).

No detailed surveys of the flora of AACO and its satellite properties have been documented. As such information concerning the diversity and occurrence of flora species on land forming part of AACO and its satellite properties is currently limited. A formal survey of AACO and its satellite properties would be required to prepare a comprehensive flora species list.

4.2.1 Rare and Threatened Flora

No rare or threatened flora species are known to occur on AACO and its satellite properties at Turkey Hill, Brymaroo and Wyoming. This absence of records is potentially a function of the limited amount of flora survey work that has been carried out at these properties. A targeted search of the remnant and regrowth vegetation that occurs on each of these properties would be required to confirm the presence or absence of any rare and threatened flora species.

In respect of the above the regional ecosystems types that occur on or adjacent to AACO and its satellite properties are known to support a number of rare and threatened flora species. As such there is the potential for the following rare and threatened flora species to occur at AACO and its satellite properties.

AACO

Only one rare or threatened flora species is known to be specifically associated with Regional Ecosystem Type 11.3.2 - Woodland to open woodland of *Eucalyptus populnea* on Cainozoic alluvial plains, - *Eucalyptus brownii* grassy woodland on Cainozoic igneous rocks which occurs at AACO. This species, *Homolopsis belsonii*, is an Endangered species pursuant to the Queensland Nature Conservation Act 1992. *Homolopsis belsonii* is not listed as a rare or threatened species pursuant to the Commonwealth EPBC Act 1999.

Turkey Hill

Rare and threatened flora species, and their conservation status pursuant to the Commonwealth EPBC Act 1999 and Queensland Nature Conservation Act 1992, that may occur within remnant vegetation at or adjacent to the Turkey Hill property are listed in the table below.

SPECIES	REGIONAL ECOSYSTEMS	QNCA Status	EPBC Status
Atalaya calcicola	11.8.3	Rare	
Croton magneticus	11.8.3	Vulnerable	Vulnerable
Ehretia grahamii	11.8.3	Rare	
Wrightia versicolor	11.8.3	Rare	

Brymaroo

No rare or threatened flora species are known to be specifically associated with Regional Ecosystem Type 11.8.15 - *Eucalyptus brownii* grassy woodland on Cainozoic igneous rocks which occurs at Brymaroo.

Wyoming

The limited vegetation that remains at the Wyoming property is unlikely to support any rare or threatened flora species.

4.2.2 Noxious Weeds

No extensive infestations of noxious weeds were observed during a brief inspection of AACO and its satellite properties.

Notwithstanding the above the Darling Downs Logistic Battalion Environmental Management – Ground Maintenance Management Plan (1995) provides a list of weed species known to occur at AACO and other Defence properties on the Darling Downs. These species and their status pursuant to the Qld Rural Lands Protection Act (1985) are detailed below.

AACO

Listed in the table below are weed species that have been recorded at AACO.

COMMON NAME	**BINOMIAL NAME**	**DISTRIBUTION**	**STATUS**
Soft roly poly	*Salsola kali L. var.*	common	
Verbena	*Verbena rigida*	common	
Galvanised burr	*Sclerolaena birchii*	uncommon	
Drooping Prickly pear	*Opuntia vulgaris*	common	P3
Wild turnip	*Brassica rapa spp. sylvestris*	common	
Black roly poly	*Sclerolaena muricata*	common	
Rough sowthistle	*Sonchus asper*	common	
Mimosa bush	*Acacia farnesiana*	common	P1 & P2
Blackberry nightshade	*Solanum nigrum*	common	
Tiger pear	*Opuntia aurantiaca*	limited	P3

Turkey Hill

Listed in the table below are weed species that have been recorded at the Turkey Hill property.

COMMON NAME	BINOMIAL NAME	DISTRIBUTION	STATUS
Spear or Black Thistle	*Cirsium vilgare (savi) ten.*	common	
Verbena	*Verbena rigida*	common	

Brymaroo

The only weed species recorded at the Brymaroo property is Mexican Poppy (*Argemone ochroleuca*), which is not a declared weed species pursuant to the provisions of the Queensland Rural Lands Protection Act (1985).

Wyoming

No weed species have been documented as occurring on the Wyoming property and no weed significant infestations were observed during a brief inspection of this property.

It is considered probable that other weed species may occur or establish at AACO and its satellite properties. Periodic surveys of these properties would be required to detect any existing or recently established infestations of weed species. Weed species that should be targeted during such surveys are those species that have been declared under the provisions of the Queensland Rural Lands Protection Act (1985). A list of declared weed species is provided in Appendix B.

4.3 Fauna

The fauna that occurs at AACO and its satellite properties is comprised of a mixture of native and non-native species. Fauna species that occur include:

- species that are indigenous to the regional ecosystem types of the locality; and
- species that have been introduced to the locality either in a controlled (ie livestock and domestic pets) or uncontrolled manner (ie feral animals).

No comprehensive surveys of the fauna of AACO and its satellite properties have been documented. As such, information concerning the diversity and occurrence of fauna species on land forming part of AACO and its satellite properties is currently limited. The only native fauna species that has been the subject of formal investigation at AACO and its satellite properties is the Koala (*Phascolarctos cinereus*). The Koala is not a rare or threatened species pursuant to the provisions of Commonwealth EPBC Act 1999 and Queensland Nature Conservation Act 1992, although the Queensland legislation recognises the Koala to be a species of cultural significance.

A list of fauna species that have been recorded at AACO and its satellite properties is provided in Appendix B. This list does not include all fauna species that would occur at these properties and formal surveys of AACO and its satellite properties would be required to prepare a comprehensive fauna species list.

4.3.1 Rare and Threatened Fauna

Whilst the regional ecosystems of the locality support a number of rare and threatened fauna species, only one rare or threatened fauna species has been recorded at AACO or its satellite properties. This species is the Squatter Pidgeon (*Geophaps scripta*) which is listed as a Vulnerable species pursuant to the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 and Queensland Nature Conservation Act 1992. The presence of this species at AACO was noted in Attachment F of the Darling Downs Logistic Battalion Environmental Management – Ground Maintenance Management Plan (1995).

The relatively small number of rare or threatened fauna records is potentially a function of the limited amount of fauna survey work that has been carried out at AACO and its satellite properties. It is considered likely that the habitat resources provided by the remnant and regrowth vegetation on AACO and its satellite properties, particularly Turkey Hill and Brymaroo, would be utilised by some other rare and threatened fauna species. An analysis of the habitat values of AACO and its satellite properties for rare and threatened fauna would be required to identify particular areas or aspects of these sites which are of functional value as habitat for specific species of rare or threatened fauna that occur in the locality.

4.3.2 Pest Species, Feral Animals and Vector Control

A number of fauna species that are considered to be pest or feral animals have been identified on AACO and its satellite properties in the following Darling Downs Logistic Battalion documents:

- Environmental Management – Ground Maintenance Management Plan (1995); and
- The Management of Introduced Pest Mammals – Darling Downs Military Areas (1997).

AACO

Pest or feral animals that are known or considered likely to occur at AACO include:

- Fox (*Vulpes vulpes*) – considered likely to be present but not considered to be a significant pest species. Control measures may be required if population levels and impacts increase. Foxes are a Declared (A1 A2 & A3) pest animal in Queensland pursuant to the Rural Lands Protection Act 1985.
- Hare (*Lepus capensis*) – identified as occurring but not considered to be a significant pest species. Control measures may be required if population levels and impacts increase. Hares are a Declared (A1 A2 & A3) pest animal in Queensland pursuant to the Rural Lands Protection Act 1985.
- Feral Cat (*Felis catus*) – identified as occurring but not considered to be a significant pest species. Control measures may be required if population levels and impacts increase. Recommended control measures include trapping and restricting access to food/rubbish bins.
- House Mouse (*Mus musculus*) – identified as occasionally occurring at pest levels. Control measures may be required at times of high population levels.
- Rabbit (*Oryctolagus cuniculus*) – identified as potentially occurring but at low population levels. Not considered to be a significant pest species. Control measures may be required if population levels and impacts increase. Rabbits are a Declared (A1 A2 & A3) pest animal in Queensland pursuant to the Rural Lands Protection Act 1985.

Turkey Hill

No mammal species are recognised as being significant pests at the Turkey Hill property.

Brymaroo

Pest or feral animals that are known or considered likely to occur at the Brymaroo property include:

- Fox (*Vulvas vulvas*) – considered likely to be present and a considerable pest species. Control options (ie baiting) not limited by proximity of residential land uses. Foxes are a Declared (A1 A2 & A3) pest animal in Queensland pursuant to the Rural Lands Protection Act 1985.
- Hare (*Lepus capensis*) – identified as occurring but not considered to be a pest species. Control measures may be required if population levels and impacts increase. Hares are a Declared (A1 A2 & A3) pest animal in Queensland pursuant to the Rural Lands Protection Act 1985.

Wyoming

The Wyoming property was not considered in the documented pest management studies carried out on behalf of the Darling Downs Logistic Battalion. No overt evidence of significant mammalian pest problems were observed during a brief inspection of the Wyoming property.

Pursuant to the Declared Animal provisions of the Rural Lands Protection Act the following management measures are required:

- A1 introduction of these animals is prohibited;
- A2 animals non-native that must be destroyed; and
- A3 keeping and selling is prohibited.

In respect of the above compliance with section 73 of the Rural Lands Protection Act could require implementation of management measures for any existing or future infestations of Declared Animals including foxes, rabbits and hares. A full list of the Rural Lands Protection Act - Declared Animals is provided in Appendix B.

4.4 Ecological Integrity/Biodiversity

The ecological integrity and biodiversity values of AACO, Brymaroo, Wyoming and Turkey Hill are limited by the extent of vegetation clearance and fauna habitat modification that has occurred prior to and as a result of the use of the site for Defence purposes.

Notwithstanding the above it is noted certain areas and aspects of AACO, Brymaroo, Wyoming and Turkey Hill are of recognised biodiversity conservation significance at both the State and Commonwealth levels. These areas and aspects are described below.

AACO

The known presence of remnants of a plant community type that has an “Of concern” conservation status at the State level.

The potential presence of one flora species with an Endangered conservation status at the State level.

Turkey Hill

The known presence of remnants of a plant community type that has an “Endangered” conservation status at both the State and Commonwealth levels.

The potential presence of at least four flora species that are recognised as being rare or threatened at the State level, including one flora species that is also recognised as being rare or threatened at the Commonwealth level.

Brymaroo

The known presence of remnants of a plant community type that has an “Endangered” conservation status at the State level.

Wyoming

No known areas or aspects of formally recognised bidodiversity conservation significance.

In respect of the above it is noted that insufficient information is currently available to confirm:

- the precise boundaries of threatened plant community types at AACO and some of its satellite properties; or
- the presence or absence of individual flora and fauna species that are of formally recognised conservation significance.

In particular the presence of threatened plant communities, flora or fauna at AACO and its satellite properties would have implications for the ongoing management of these properties to achieve compliance with relevant regulatory requirements.

5 Non Defence Impacts

5.1 Pre-existing Impacts Due to Former Site Use/Ownership

Prior to the initial Defence use of AACO, Brymaroo, Wyoming and Turkey Hill it is believed, based on surrounding land uses and discussions with site staff, the areas were used for agricultural purposes. Potential impacts associated with agricultural use include pesticide contamination, burial of wastes and contamination from cattle dips.

Between the time the RAAF operated the current AACO and the time of army occupation, AACO was used as a civilian airport. Based on the expected nature of operations of a civilian airport it is likely that fuel and other hazardous materials would have been stored at AACO. Although no visible evidence of contamination was identified, it is likely that impacts would have occurred during the operation of the civilian airfield. However these impacts may have naturally bioremediated or are unlikely to limit or restrict current or future AACO operations.

Extensive vegetation clearance and fauna habitat removal is likely to have occurred at AACO and its satellite properties prior to the commencement of Defence operations at these properties.

5.2 Infrastructure Development Prior to Defence Use of the Site

The township of Oakey to the south of AACO was developed prior to the development of the site by the RAAF. Access to AACO and surrounding area is via the Warrego Highway, which passes though the town of Oakey. Prior to Defence use of AACO, infrastructure on site would have been limited to farm and residential buildings, dams, roads and other general farming infrastructure. This infrastructure is not likely to limit or restrict current or future AACO operations.

Visible evidence of past infrastructure most likely to be residential and associated farming sheds was visible at Wyoming. All previous infrastructure had been removed.

5.3 Description of Surrounding Area, Tenure and Use

Figure 3 illustrates AACO boundaries and the surrounding properties. The surrounding properties are generally in freehold ownership. The following surrounding land uses were observed at AACO:

- north, east and west – grazing and rural residential properties; and
- south – township of Oakey including residential, commercial and industrial uses.

Land use surrounding the satellite properties was predominantly rural and rural residential.

6 Site Activity Impact and Assessment

6.1 Defence Activity

Each Defence activity identified as having the potential to impact the environment (environmental aspect) are detailed in Table 3. AACO is primarily used as an airport, training and maintenance facility for the aircraft listed in Section 2.5.

6.2 Contamination

Based on the nature of activities at AACO there is significant potential for contamination. The primary areas of contamination identified include the following.

Fuel Storage

Underground storage tanks (USTs) to the north of building C26 include unleaded petrol (13,700L), leaded petrol (9,100L), and diesel (unknown volume). The bowsers and associated infrastructure are located immediately to the north of the USTs. Surface liquid runoff from around the bowsers and refuelling area is not contained and would enter the roadside gutter. Staff interviewed regarding the tanks were not aware of any pressure testing of the tanks. Visible hydrocarbon staining was present in the vehicle refuelling area. The general condition of the facility was poor.

Fuel transport vehicles are used for refuelling of aircraft. The vehicles are parked in a number of locations across AACO including:

- building A35;
- on the roadway adjacent to building A35;
- on the tarmac areas;
- within the concrete sealed and bunded areas located in front of the tarmac; and
- on the grass areas in front of the tarmac.

The staff interviewed indicated they did not know the location of the discharge drain for building A35 but it was likely the facility was connected to the intercept located at the fuel farm to the north of the building.

The concrete bunded area in the front of the tarmac was insufficient to park all of the fuel tankers and the volume of the bund and associated USTs were insufficient to contain the volume of fuel stored within most of the vehicles. At the time of inspection the dipstick of the southern most UST indicated it was full to above the maximum mark.

The remaining areas used for fuel transport vehicle parking are not contained and liquid runoff would enter AACO stormwater drains or surrounding soil.

The fuel farm located on the western side of AACO contains 370,000L of aviation turbine fuel in AGTs within a concrete sealed and bunded area (A31). The tanks and facility at the time of inspection were in good condition and relatively new. Staff interviewed indicated the tanks were tested every two years and the bund valves were kept closed with spilt fuel within the bunds collected by contractors and stormwater released to an intercept located adjacent to the bunded area. The intercept was maintained by contractors every six months or after spills. All refuelling and unloading areas and all infrastructure was contained and runoff was directed to the intercept. Spill clean up kits were present across the fuel farm.

Two aviation turbine fuel AGTs were located at Brymaroo with an estimated combined volume of approximately 55,000L. The fuel storage area was within a locked compound and appeared to be in accordance with relevant Australian Standards. The general condition of the facility was good. As per the fuel farm, site staff indicated the tanks are tested every two years with spilt fuel and intercept maintained and collected by contractors.

A diesel AGT is located within building T1 located at Turkey Hill. The tank supplies diesel to the backup generator located at the facility. The tank is bunded and in good condition. A day tank for the generator is also located within the bunded area and in good condition.

Other Hazardous Material Storage

The nature of AACO operations results in numerous areas being used for the storage of hazardous materials. Table 1 summarises some of the more significant areas for hazardous material storage.

Areas identified by Sinclair Knight Merz (1996) in the Resource Assessment Study of AACO identified the following areas of potential contamination:

- POL store (B7);
- fire training area (no longer in use);
- spoil disposal areas;
- POL storage spills;
- underground fuel and waste oil tanks;
- refuelling areas;
- stormwater drainage;
- fuel storage tanker areas;
- buried stores (including batteries);
- fuel farm; and
- Museum of Australian Army Flying.

D.J Douglas and Partners Pty Ltd (1995) “Report on Phase 1 Investigation and Testing for Projects F5DD125 and F5DD131 BASC – Darling Downs Army Aviation Airfield Oakey” identified the following areas of contamination:

- former toxic waste treatment facility north of the flight line identified as having surface material contaminated above the Department of Environment (1992) environmental investigation thresholds with nickel; and
- between building C37 and C38, which were used to drain engine sumps and contained $C_{10} – C_{36}$ chain length hydrocarbons.

In addition to the above areas the following areas of potential contamination were identified in this IER:

- surrounding the tarmac as aircraft dump approximately one litre of fuel during shut down, with drainage to stormwater;
- surrounding the leaking transformer in the D Block compound;
- in the area of spilt oil and grease in the eastern side of building D2; and
- the area surrounding the mobile diesel generator within the Singaporean facility.

In addition to the above listed areas of identified contamination there is potential for contamination to be present at those locations described in Table 1 that are used for storage of hazardous materials and are not contained, with discharges going to either unsealed ground or stormwater.

6.3 Hazardous Material Management Processes

Due to the nature of the operations at AACO hazardous materials are stored in various volumes across the site. Table 2 summarises a number of these locations and the mitigation measures that were in place at the time of our inspections. In addition to the mitigation measures described in the table, material safety data sheets (MSDS) for all chemicals are kept at AACO and are accessible to all staff.

In the event of a spill the on-site Fire Brigade is contacted and they respond and conduct the clean up operations. The on-site Fire Brigade uses information from the MSDS and the Australian Standard for Initial Emergency Response. All incidents are recorded in detail by the Fire Brigade and the logs kept on site.

In general, signage was present in areas containing hazardous materials. Approximately five buildings are located across AACO that are dedicated to the storage and containment of hazardous materials.

6.4 National Pollutant Inventory Reporting Compliance

As indicated by Defence, no National Pollutant Inventory (NPI) reporting had been conducted for AACO, Brymaroo, Wyoming and Turkey Hill as NPI reporting requirements for Defence have not been finalised. Discussions with Environment Australia indicated the legislation was not in place to enforce NPI reporting of Commonwealth facilities although they were encouraged to do so. CSIC-SQ staff indicated that Defence was working on the NPI reporting issues internally from Canberra.

Based on the activities and materials in the areas where access was provided, thresholds for the following 2001/2002 NPI reporting list substances were likely to be exceeded:

- acetone;
- ethanol;
- methanol;
- methyl ethyl ketone;
- toluene;
- total nitrogen;
- total volatile organic compounds;
- trichloroethylene; and

- xylene.

6.5 Environmental Legislation Compliance

In Queensland relevant environmental legislation is the *EP Act* 1994. Section 22 of that Act states "(t)his act binds all persons, including the State, and, as far as the legislative power of the Parliament permits, the Commonwealth and the other States". Although discussions with the CSIC-SQ staff and the Environmental Protection Agency (EPA) indicated Defence operations are exempt from the *EP* Act requirements, no specific legal authority was cited.

The following Notifiable Activities and Environmentally Relevant Activities (ERAs) under the EP Act were identified:

Notifiable Activities:

- Battery Manufacture or Recycling – assembling, disassembling, manufacturing or recycling batteries;
- Chemical Storage – storing more than 10 tonnes of chemicals;
- Engine Reconditioning Works – carrying out engine reconditioning work;
- Explosive Production or Storage;
- Metal Treatment or Coating – treating or coating metal including spray painting;
- Landfill – disposing of waste; and
- Petroleum Product or Oil Storage – storing petroleum products or oil in USTs with more than 200L capacity.

Environmentally Relevant Activities:

- ERA 11 Petroleum Product Storage (Level 2);
- ERA 17 Fuel Burning (Level 1);
- ERA 18 Power Station (generating power by consuming fuel at a rated capacity of 10 MW electrical or more) (Level 1);
- ERA 23 Abrasive Blasting (Level 1);
- ERA 24 Boiler Making or Engineering (Level 2);
- ERA 25 Metal Surface Coating (Level 1)
- ERA 28 Motor Vehicle Workshop (Level 1); and
- ERA 70 Heliport (Level 2).

Under the EP Act notifiable activities conducted at AACO would result in the properties being listed on the Environmental Management Register (EMR). The Level 2 ERAs conducted at AACO would require approval and the Level 1 ERAs would require a licence pursuant to the EP Act.

Section 4 of the *Commonwealth Places (Application of Laws) Act* 1970 (Cth.) provides that the provisions of the laws of a State apply in accordance with their tenor in relation to each place in that State that is a Commonwealth place. Queensland legislation being the *Rural Lands Protection Act* 1985 (section 73) *Nature Conservation Act* 1992 (section 3), *Vegetation Management Act* 1999 (sections 6, 7(8)), *Sewerage and Water Supply Act* 1949 (section 3 and Standard Sewerage Law 1988, section 28) and *EP Act* (section 22) express an intention to apply to Commonwealth places such as AACO. Whilst relevant Defence and Queensland Government Officers could not cite any specific legal authority for exemption of the operation of the said Queensland legislation to Defence activities at AACO, voluntary or mandatory compliance with that legislation would have some limited implications for Defence operations.

Defence operations at AACO are subject to the provisions of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. Compliance with this legislation requires, subject to certain exemptions, that the approval of the Environment Minister is required in respect of any action that has, will have, or is likely to have a significant impact on a matter of national environmental significance. Matters of national environmental significance include:

- World Heritage properties;
- Ramsar wetlands of international importance;
- listed threatened species and communities;
- migratory species protected under international agreements;
- nuclear actions; and
- the Commonwealth marine environment.

The only potential trigger of the *Environmental Protection and Biodiversity Conservation* (EPBC) Act that is recognised for Defence operations at AACO is the conduct of works that impact on listed threatened flora and fauna species. If listed threatened species do occur at AACO then an assessment of any works with the potential to impact on such species should be undertaken in accordance with the EPBC Act – Administrative Guidelines on Significance prior to the commencement of such works. Where this assessment indicates that a significant impact on a listed species will, or is likely to, occur the approval of the Environment Minister may be required. In this respect we refer to the previous Section 4 hereof.

6.6 Waste Management

The varied nature of operations at AACO include aircraft maintenance and repair, fuel storage, vehicle maintenance, paint workshops, residential dwellings, food preparation, recreational facilities and dog kennels. Therefore the wastes generated at AACO include both solid and liquid hazardous waste, general industrial wastes, domestic wastes, kitchen wastes, recyclable materials and aircraft parts.

Hazardous wastes produced at AACO include waste hydrocarbon products, paints, solvents, processing liquids such as penetrant and trichloroethylene and spilt materials collected by the Fire Brigade. The following hazardous waste collection facilities were identified at AACO.

- Solid waste collection facilities are located within all of the workshops and operational areas. Industrial waste bins are proved by JJ Richards. Facilities were also present for the collection of waste steel and oily rags.
- AACO is connected to the Jondaryan Shire Council sewage system who treat the wastes.
- All replaced aircraft parts are destroyed to prevent possible future use. If the parts are non hazardous they are destroyed on site. Other hazardous materials including helmets containing asbestos and batteries are removed off site for destruction and disposal.

As identified in the D.J Douglas and Partners Pty Ltd (1995) report a former reverse osmosis toxic waste treatment facility was located to the north of the flight line. The contamination previously identified surrounding the former facility would not preclude the use of the site for AACO purposes.

6.7 Current Environmental Management Practices

Of the areas accessed, there was little evidence of documented environmental management practices. AACO staff were not aware of any environmental licenses, trade waste licenses, environmental management registers or correct procedures for the operation and maintenance of the installed pollution control devices.

Thiess Environmental Services and Sinclair Knight Mertz (1996) have both independently developed Environmental Management Plans for AACO. The management plans cover atmospheric emissions, stormwater runoff, plant decontamination, solid wastes, noise, vibration, flora and fauna and construction traffic control. AACO staff did not have knowledge of the plans and therefore the plans were not being effectively used.

In general the current environmental management practices are based on health and safety requirements for the management and cleaning up of hazardous materials.

The Darling Downs Logistic Battalion Environmental Management – Ground Maintenance Management Plan (1995) details the manner by which it is intended to "*provide an efficient reliable service for the general area maintenance of Army properties where required on the Darling Downs Military Areas, and to maintain the grounds in a manner that is acceptable and serviceable for Army operations and training activities in an environmentally responsible manner*". The Ground Maintenance Plan (GMP) specifies guidelines for the conduct of duties such as:

- grass cutting;
- irrigation;
- weed and pest control;
- nursery operation;
- landscaping; and
- area maintenance/cleaning.

The GMP places an appropriate degree of emphasis on the need to comply with relevant standards and "best practice" as they relate to the avoidance on environmental harm. Whilst it is noted in the GMP that the GMP should be reviewed on a regular basis (ie 6 month intervals) no documentary evidence of any such review process was available.

6.8 Future Defence Activities

Defence intends to continue the current use of the facility into the foreseeable future. Some upgrading of the facility is planned although no definite plans were made available. Upgraded infrastructure should be constructed to the relevant Australian Standards and provide suitable storage and disposal facilities for hazardous materials.

Any proposed modifications to, or expansion of, operations at AACO and its satellite properties should be the subject of an assessment of the actual, or potential, impact on listed threatened species or communities in accordance with the EPBC Act – Administrative Guidelines on Significance. Alternatively more detailed information concerning the actual presence of listed threatened species or communities could be collated, related constraints quantified and future modifications to, or expansion of, operations at AACO and its satellite properties planned accordingly.

6.9 Management Structure and Roles

Flow diagrams illustrating the management structure and roles for dealing with environmental aspects at Defence establishments are currently being produced and are in draft form only. The final flow diagrams will be required for the EMP to be effective, by providing a definite path and detailing responsible positions in dealing with relevant environmental aspects.

6.10 Environmental Management Systems and Monitoring Arrangements

As AACO, Brymaroo, Wyoming and Turkey Hill are not required to comply with a majority of the State's environmental legislation no environmental licenses or other environmental approvals have been required and therefore no environmental management systems or monitoring systems are in place. However CSIC-SQ have indicated that standing orders are in place prohibiting the disposal of potentially hazardous materials to stormwater drains and sewage system. CSIC-SQ also indicated the sewage system was sampled and analysed every two months with the results supplied to the Jondaryan Shire Council. Other than one fluoroscene result, CSIC-SQ staff indicated that all results were within recommended guidelines at Oakey.

6.11 Fire Management

As discussed previously, a Fire Brigade is present at AACO. The Fire Brigade has a number of vehicles and are capable of undertaking emergency response to aircraft, hazardous material fires, building fires, bush fires and spill clean ups. A detailed log of all incidents is kept by the Fire Brigade and maintained on site.

The ACCO and its satellite properties have a ground maintenance crew which maintain the gardens and lawn areas in accordance with the GMP. The majority of areas at the ACCO and its satellite properties are mowed and little opportunity is present for accumulation of combustible vegetation matter. Relatively small areas of remnant and regrowth vegetation within or adjacent to the ACCO and its satellite properties may occasionally be subject to uncontrolled bushfires. The GMP does not include controlled burning as part of the management strategy for such areas. Uncontrolled bushfire in the remnant and regrowth vegetation at the ACCO and its satellite properties posses a limited risk to Defence facilities and infrastructure. This is due to the existence of substantial areas of regularly mown grassland and perimeter roadways that act as fire breaks impeding the entry of bushfires originating on adjacent land.

6.12 Cultural Heritage

The following cultural heritage assessments applicable to AACO have been undertaken:

- A study completed by Schwager Brooks and Partners Pty Ltd (1995) Review of the Status and Value of Army's Historic Buildings, Volumes 1 and 2, did not contain or list any buildings at AACO of cultural or heritage significance.

- John Richter (1997) Preliminary Cultural Heritage Assessment of the Army Aviation Centre Oakey found there was little probability of Aboriginal cultural heritage value at AACO.

A Museum of Australian Army Flying is located at AACO. The museum houses and supports the restoration and maintenance of aircraft and memorabilia related to the history of Army aviation.

6.13 Community Consultation

Community consultation is an important component of AACO operations and an appointed person is responsible for handling community consultation issues. Based on the size of the flight training area, community consultation includes several local Councils, and over 300 residents and businesses. The community consultation process at AACO is used as a tool to assist the longevity of the sites operations.

A set procedure and form has been developed for dealing with complaints. Speed in the response of the complaints is not depicted although AACO staff indicated the response time was very important and all efforts were made to respond as quickly as possible.

According to AACO staff, all complaints received were related to noise. Defence aircraft movements are not restricted and therefore helicopters may fly 24 hours per day at low altitudes. Problems have included disturbance of stock and persons within dwellings. In areas in which complaints have been received and have been deemed as noise sensitive, voluntary no-fly zones have been put in place within the designated training area. Where stock had been damaged as a result of operations, local landowners had been compensated.

AACO staff indicated that they had not received any complaints from government agencies.

6.14 Water Quality

Water quality testing of sewage discharge is undertaken on a bimonthly basis. Discussions with CSIC-SQ indicated that all parameters monitored at AACO other than one floroscene results were within the recommended guidelines.

No other water quality monitoring is undertaken and no other information was obtained regarding water quality.

6.15 Soil Erosion

AACO, Brymaroo, Wyoming and Turkey Hill walk over and discussions with CSIC-SQ staff indicated the sites in their current condition and usage do not result in significant erosion. As the sites other than Turkey Hill are flat and maintained with landscaping or grass, there is little potential for erosion.

Some rilling and gullying was present along the banks of the drainage line at AACO where vegetation had been cleared to allow uninhibited flow of water during runoff events.

6.16 Flora

Current Defence activities at AACO and its satellite properties do not impact significantly upon native flora species and communities. Revegetation works, utilising flora species endemic to local plant communities, have been carried out at AACO and Brymaroo.

Non-native flora, particularly those considered to be weeds, are the subject of works carried out in accordance with the GMP. These works involve a combination of physical, mechanical and chemical control strategies. Some non-target impacts upon native flora, including listed threatened species, may occur during the conduct of works targeted at the control of weed species.

Any expansion or modification of Defence operations in areas that currently support remnant and regrowth vegetation dominated by native flora would potentially impact upon listed threatened flora species.

6.17 Fauna

Current Defence activities at AACO and its satellite properties are unlikely to impact significantly upon native fauna species. A limited number of native fauna species currently utilise most areas of AACO and its satellite properties and their use of such areas is unlikely to be adversely affected by Defence operations. Specific measures have been taken at AACO to manage the contribution that vegetation on AACO makes towards the provision of habitat and movement corridors for the local Koala population.

The management of hazardous materials, including liquid wastes, at AACO and its satellite properties has the potential to effect the qualities of downstream aquatic ecosystems and the fauna that utilise such areas. As noted in Section 6.6, there are or may be deficiencies in the manner by which waste materials are managed that could result in their uncontrolled release into the environment. Any such release(s) has the potential to impact upon the qualities of downstream aquatic ecosystems and the terrestrial and aquatic fauna which utilise affected areas.

The management of some introduced pest mammals at AACO and its satellite properties was the subject of a 1997 report prepared by Animal Control Technologies Pty Ltd. This report identified a number of mammalian species that were potential pest species but did not specify a need for the implementation of any particular control measures. As such it is assumed that pest animal control measures at AACO and its satellite properties would not impact upon native fauna populations.

Any expansion or modification of Defence operations, in areas that currently support remnant and regrowth vegetation dominated by native flora, would potentially impact upon threatened fauna species. The significance of any impacts to threatened fauna species may be considerable given the limited extent of remnant vegetation and fauna habitat that occurs on land adjacent to AACO and its satellite properties. As such it would be appropriate to consider the potential for impacts on threatened fauna prior to undertaking any works that involved substantial clearance of existing vegetation at AACO and its satellite properties.

6.18 Air Pollution

Sources of air pollution generated at AACO and satellite properties include:

- operation of aircraft;
- emergency diesel generators;
- vehicles and other combustion equipment;
- kitchens;
- extractors within workshops;
- use of solvents; and
- petroleum products.

6.19 UXO Contamination

Museum staff indicated that there was possible past use of land surrounding AACO as a firing range by either the airforce or army. No locations or types of firing range activities were identified. No information on potential UXO contaminated areas was identified.

6.20 Noise

Noise from the aircraft within the flight training area result in the most significant impact to surrounding land users and is the source of complaints. Military aircraft are not bound by civil aviation regulations and may fly at low altitude at any time. The predominant impacts from aircraft are on residential properties, stock and wildlife.

Review of the available information, did not identify any past assessments of noise impacts on surrounding land users. An occupational noise assessment has been undertaken for AACO by the National Acoustic Laboratories (1994) *"Noise Surveys of Army Aviation Centre Oakey Qld May 1992 and Feb 1994".* This noise assessment did not include assessment of areas outside of AACO boundaries.

7 Preliminary Analysis of Findings and Review of Issues

A risk analysis and issue prioritisation has been undertaken in accordance with Environmental Risk Management – Principles and Process (HB203:2000) developed by Standards Australia 2000, and based on AS/NZS 4360:1999. The risk analysis incorporates an overview of environmental impacts or potential environmental impacts.

For the purposes of this risk analysis the following definitions apply:

- environmental aspect – element of an organisation's activities, products or services that can interact with the environment;
- likelihood – is used as a qualitative description of probability or frequency i.e. it relates to how likely it is that something will occur;
- consequence – outcome of an event expressed quantitatively, being loss, injury, an expressed concern, disadvantage or gain; and
- risk – chance of something happening that will have an impact on objectives. It is measured in terms of consequences and their likelihoods.

The following tables summarise the Standards Australia (2001) Environmental Risk Management – Principles and Process ranking system.

Qualitative Measures of Likelihood

Level	Descriptor	Description
A	Almost Certain	Is expected to occur in most circumstances.
B	Likely	Will probably occur in most circumstances.
C	Possible	Could occur.
D	Unlikely	Could occur but not expected.
E	Rare	Occurs only in exceptional circumstances.

Qualitative Measures of Consequence

Level	Descriptor	Description
1	Catastrophic	Death, toxic release off-site with detrimental effect, huge financial loss.
2	Major	Extensive injuries, loss of production capability, off site release contained with outside assistance and little detrimental impact, major financial loss.
3	Moderate	Medical treatment required, on-site release contained with outside assistance, high financial loss.
4	Minor	First aid treatment, on site release immediately contained, medium financial loss.
5	Insignificant	No injuries, low financial loss, negligible environmental impact.

To calculate the risk associated with a particular environmental aspect, the consequence and likelihood are used in the following matrix to derive a risk level. The matrix is derived from the Environmental Risk Management – Principles and Process (HB202:2000) developed by Standards Australia (2000).

Qualitative Risk Analysis Matrix: Level of Risk

Likelihood	Consequence				
	Catastrophic	**Major**	**Moderate**	**Minor**	**Insignificant**
Almost Certain	E	E	E	H	H
Likely	E	E	H	H	M
Possible	E	E	H	M	L
Unlikely	E	H	M	L	L
Rare	H	H	M	L	L

Notes:
E = Extreme Risk; immediate action required.
H = High Risk; senior management attention needed.
M = Moderate Risk; management responsibility must be specified.
L = low Risk; manage by routine procedures.

Table 3 summarises the results of the risk management processes.

8 Summary of Issues and Priority

8.1 Fire Management

Fire management environmental aspects associated with AACO, Brymaroo, Wyoming and Turkey Hill in their current maintained condition and with the fire brigade located on site, have been assigned as low environmental risk.

8.2 Cultural Heritage

As the John Richter (1997) Preliminary Cultural Heritage Assessment of the Army Aviation Centre Oakey found there was little probability of Aboriginal cultural heritage value at the site the risk associated with cultural heritage is low.

8.3 Waste Management

In relation to waste management the following risk categories were identified:

High Risk – senior management attention needed:

- waste UST associated with building C22, which filled up with liquid during heavy rain;
- waste hydrocarbon USTs located on the northern side of the tarmac used to collect spills from tankers and disposal from hangers, are too small;
- toxic waste treatment plant processing of wastes and irrigation of processed water at AACO;
- former reverse osmosis toxic waste disposal facility;
- burial of wastes including aircraft and other waste material both on and off site;
- the intercept within the D Block compound discharging waste oil to unknown location; and
- waste oil within the wash down bay spilling into the drain and intercept that is not maintained.

Moderate Risk – management responsibility to be specified:

- disposal of hydrocarbon liquid wastes from the museum as herbicide on weeds within the museum complex.

Low Risk – manage by routine procedures:

- disposal of dog wastes to the sewer;
- disposal of medical waste; and
- disposal of solid wastes.

8.4 Hazardous Material Storage

In relation to hazardous material storage the following risk categories were identified:

Extreme Risk – requiring immediate action:

- trichloroethylene bath and penetrant line spills unable to be contained with potential discharge to stormwater.

High Risk – senior management attention needed:

- storage of hazardous materials within building C22 including solvents, corrosives, adhesives, resins, engine coolant, certrex 70, hydraulic oil and detergent with potential for uncontained spills;
- storage of transformers within D Block Compound with one showing visible signs of leakage;
- storage of hazardous materials at the fire station and presence of visible hydrocarbon stains;
- UST's located to the north of building C26 containing diesel, leaded and unleaded petrol that have not been pressure tested for leakage and refuelling area discharging to stormwater;
- storage of uncontained hazardous materials in building C11 including paints, thinners and solvents with the potential to discharge to stormwater; and
- vehicle refuelling area at Brymaroo which was not adequately maintained.

Moderate Risk – management responsibility to be specified:

- storage and use of hazardous materials at the museum facility including greases, solvents and some paints;
- storage of hazardous materials within buildings C1 and C3 including oils, aircraft fuels, solvents, cleaning products and corrosives;
- storage of hazardous materials and use at the military police compound including paints, fuel, oils, ethanol, kerosene and detergent;
- storage of hazardous materials in buildings B1, B2 and B3 including kerosene, oils, fuels, adhesives and paints;
- storage of hazardous materials at building C7 including fuels, oils, hydraulics and greases;
- storage of hazardous materials at building B52 (flight simulator) including hydraulic oil, paint, adhesives, acetone, solvents and resins; and
- storage of hazardous materials in building B22 including oils, paints, solvents and cleaners.

Low Risk – manage by routine procedures:

- storage of hazardous materials within buildings C8 and C9 (minor quantities only);
- storage and dispatch of hazardous materials from building C43;
- storage of hazardous materials within building C13 which is designed for the storage of liquid hazardous materials;
- AGTs of aviation turbine fuel and other hydrocarbon products at the fuel farm;
- AGTs of aviation turbine fuel at Brymaroo; and
- diesel AGT at Turkey Hill.

8.5 Community Consultation

Due to the nature of AACO's operations and the size of the flight training area, community consultation is of high risk as a result of the consequence for potential mishandling of the community consultation process. Although as a result of the implemented procedures and allocation of staff to handle the community consultation process the "likelihood" of mismanagement of the community consultation process has been rated as unlikely.

8.6 Water Quality

In relation to water quality, many of the risk categories identified have been detailed in the waste management and hazardous material storage Sections 8.3 and 8.4. All waste management and hazardous material storage impacts to the environment have the potential to impact water quality. The following water quality specific risk categories were identified:

High Risk – senior management attention needed:

- discharge of potentially contaminated stormwater runoff to off site areas; and
- contamination of groundwater and potential impact to groundwater users.

8.7 Soil Erosion

AACO, Brymaroo, Wyoming and Turkey Hill in their current condition and use have a low potential for environmental impacts from soil erosion.

8.8 Flora

In relation to flora management the following risk categories were identified:

Moderate Risk – management responsibility to be specified:

- clearance or modification of a plant (ecological) community, listed as an Endangered Ecological Community under the provisions of the EPBC Act and the Qld Vegetation Management Act, situated on land within or immediately adjacent to the boundaries of the Turkey Hill facility; and
- clearance or modification of a plant (ecological) community, listed as an Endangered Ecological Community under the provisions of the Qld Vegetation Management Act, situated on land within the boundaries of the Brymaroo facility.

Low Risk – manage by routine procedures:

- clearance of flora listed as threatened flora, under the provisions of the EPBC Act or the Qld Nature Conservation Act, during any future expansion/modification of Defence operations that involve clearance of existing remnant/regrowth vegetation; and
- clearance of flora listed as threatened flora under the provisions of the EPBC Act or the Qld Nature Conservation Act, during control of weed species.

8.9 Fauna

In relation to fauna management the following risk categories were identified:

Low Risk – manage by routine procedures:

- clearance of habitat for fauna listed as threatened fauna under the provisions of the EPBC Act during any future expansion/modification of Defence operations that involve clearance of existing remnant/regrowth vegetation.

8.10 Air Pollution

In relation to air quality management the following risk categories were identified:

Moderate Risk – management responsibility to be specified:

- exhausts from workshops or other hazardous operations that do not contain dust collection or filtration systems has the potential to impact air quality; and
- exhaust from operating aircraft.

8.11 UXO Contamination

According to museum staff there is potential for past use of some areas around AACO for firing ranges. As no other details on locations or types of firing range activities were identified, the assigned environmental risk associated with potential UXO contamination is moderate.

8.12 Noise

The environmental risks associated with noise emissions from AACO, Brymaroo, Wyoming and Turkey Hill have been assigned as an “extreme risk”. In determining this risk category the flight training area, which extends beyond AACO property boundaries and the potential type of flying activities in this area were taken into consideration. As indicated by AACO community liaison officer all complaints received by AACO were noise related.

8.13 Other Environmental Risks

Other potential environmental aspects and risks identified include the following:

High Risk – senior management attention needed:

- the vehicle refuelling pad at Brymaroo is not suitable for ongoing use;
- the eastern and western wash down bays for aircraft only have gross pollutant traps to collect solids with the remainder of the waste water discharged to storm water;
- vehicle wash bays on the southern side of C28 have been used for servicing of vehicles and at the time of inspection containers of waste oil were overflowing within the wash bays; and
- the parking facilities for fuel tankers and other areas used are either unable to contain sufficient volume or are uncontained with potential for discharge of spilt fuel to the environment.

Moderate Risk – management responsibility to be specified:

- the former wash point to the north of the tarmac which was used for washing aircraft with BNB3200 has the potential to be contaminated as the chemical used is reported by Defence to be hazardous to the environment;
- the aircraft refuelling pads at Brymaroo are internally draining but discharge is not contained;
- hydrocarbon disposal points and collection UST for buildings C1 and C2 have the potential to contaminate surrounding soil and water resources or release waste hydrocarbon products if not appropriately maintained;
- maintenance work on aircraft is undertaken in a number of locations across AACO and has the potential for spillage or leakage of oils and fuels;
- storage and shut down procedures of aircraft can result in the leakage or discharge of fuel, oils and greases;
- hot refuelling of aircraft is undertaken on unsealed areas but due to the design of the hot refuelling system no fuel can be spilt for health and safety reasons although the nature of operations pose a moderate risk to the environment; and
- museum staff indicated that areas of AACO and surrounding properties may have been used as firing ranges and therefore there is potential for UXOs.

9 Requirement for Additional Work (Phase 2)

Based on the results of the risk assessment the following areas of additional work are recommended to better develop an effective environmental management plan.

9.1 Waste Management

Liquid Waste

As six areas of high environmental risk have been identified within the risk assessment, it is recommended that an assessment of liquid waste disposal at AACO be undertaken. The scope of work for assessment of liquid waste disposal should include:

- inspection of intercepts, waste collection tanks and associated infrastructure;
- review of types and volumes of liquid wastes produced at AACO;
- review of waste streams both entering and leaving intercepts and traps;
- assessment of suitability (including capacity) of each intercept and trap for the purpose for which it is used;
- assess maintenance and disposal records; and
- provide within a report, recommendations on upgrades, maintenance procedures and new systems required.

Solid Waste

Museum staff indicated that wastes are buried on the Defence properties and within surrounding areas. Further assessment and documentation of these areas is recommended to ensure that activities do not expose hazardous wastes and the buried wastes are not resulting in environmental harm. The recommended scope of work would include:

- locating and documenting areas with buried wastes;
- use of ground penetrating radar or similar to locate waste disposal areas;
- undertake limited soil and water sampling if potential for environmental impacts is identified; and
- report findings of the investigation detailing location and identified environmental impacts.

9.2 Hazardous Material Storage

The risk assessment of hazardous materials storage and use areas identified the trichloroethylene bath and penetrant line area as an extreme risk as it is currently not possible to contain spills from these areas. The facility containing the trichloroethylene bath and penetrant line requires an immediate upgrade to enable containment and control of spills.

The leaking transformer located within the D Block compound either needs to be removed off site or repaired.

Underground tanks at AACO should be regularly pressure tested to ensure they are not leaking and contaminating surrounding areas. Testing of tank integrity would reduce the risk associated with the USTs.

In general it would be advantageous to conduct a hazardous materials audit of AACO to assess the deficiencies in the areas and practices used for storing hazardous materials. The scope of work for the hazardous materials audit would include:

- inspection of all hazardous material storage areas for compliance with Australian Standards and relevant legislation; and
- preparation of a report on the findings of the current hazardous materials storage areas and provision of recommendations for improvement to these areas.

9.3 Water Quality

No information is available regarding the quality of water discharged from AACO. Due to the nature of activities and processes undertaken at AACO it is recommended that both surface and groundwater quality monitoring be undertaken to assess the potential for impacts. As AACO, Brymaroo, Wyoming and Turkey Hill lie within the Great Artesian Basin surrounding groundwater users may be effected by groundwater contamination. It is recommended that an assessment of water quality be undertaken which may include the following scope of work:

- select suitable location for installation of groundwater quality monitoring bores to target areas of potential impacts;
- drilling and installation of groundwater quality monitoring bores;
- sampling of groundwater on a biannual basis;
- set up a surface water sampling program to collect samples during runoff events at both up and down gradient locations;
- analysis of surface and groundwater samples for a selected range of analytes; and
- prepare a monitoring report interpreting the results and showing any trends over time.

9.4 Flora, Fauna & Biodiversity

Detailed surveys of the flora of the remnant native vegetation that occurs on AACO and its satellite properties should be carried out to confirm the presence or absence of plant (ecological) communities and/or flora listed as threatened flora under the provisions of the EPBC Act, the Qld Vegetation Management Act or the Qld Nature Conservation Act. Insufficient information is currently available in respect of this issue. The collation of additional information would:

- assist in the ongoing management of the vegetation at AACO and its satellite properties in a manner that achieves compliance with the provisions of the EPBC Act, the Qld Vegetation Management Act or the Qld Nature Conservation Act; and
- enable the identification of any legislative constraints to any future expansion/modification of Defence operations that involves clearance of existing remnant/regrowth vegetation.

An assessment of the habitat values of AACO and its satellite properties for fauna listed as threatened fauna under the provisions of the EPBC Act or the Qld Nature Conservation Act should be carried out. The results of this assessment would enable the development of appropriate management strategies for any areas or aspects of AACO and its satellite properties that are of particular significance as habitat for listed fauna species.

9.5 Noise

As the community complaints received all relate to noise emissions from the helicopters within the flight training area, it is recommended that a noise assessment be undertaken to evaluate the exposure of noise to residents, stock and wildlife. The noise assessment would include:

- collection of noise data on the aircraft used;
- selection of noise sensitive receptors and monitoring at these locations within the flight training area; and
- modelling of noise emissions and evaluation of potential impacts.

9.6 Other Areas of Additional Work

Additional work is recommended to assess the suitability and maintenance schedule of the wash down bays for both aircraft and vehicles. The assessment of the wash down bays could be included in the liquid waste assessment detailed in Section 9.1. The assessment of the wash down bays should provide recommendations on upgrades and maintenance requirements of the existing facilities.

Use of the vehicle refuelling pad at Brymaroo should be discontinued as the facility is not functioning appropriately. If vehicles need to be refuelled at Brymaroo then a new facility is required.

The aircraft refuelling pads at Brymaroo should be upgraded to enable the catchment of spills. Currently the internally draining pads are discharged to open ground. Installation and maintenance of an intercept is recommended.

10 Conclusion

10.1 Management Systems

An EMP and other environmentally related management documents exist for AACO. Unfortunately these documents have not been used to their full potential and most staff at AACO are unaware of their existence. In addition to the environmental systems for AACO, the better known and used management systems include those for health and safety, quality and ground maintenance. Standing orders for AACO, Brymaroo, Wyoming and Turkey Hill provide for some environmental management aspects including prohibiting disposal of potentially contaminating materials to stormwater or sewage drains.

Implementation procedures for the future environmental management plans need to be carefully assessed and incorporated into site inductions and training of staff.

10.2 Risk Analysis

The risk analysis process identified the following risk categories according to the Standards Australia (2000) Environmental Risk Management – Principles and Process. The following summarises the results of the risk analysis.

Extreme Risk – requiring immediate action:

- trichloroethylene bath and penetrant line spills unable to be contained with potential discharge to stormwater; and
- noise generated by aircraft within the flight training area.

High Risk – senior management attention needed:

- waste UST associated with building C22 which filled up during heavy rain;
- waste hydrocarbon UST located on the northern side of the tarmac used to collect spills from tankers and disposal from hangers are too small;
- toxic waste treatment plant processing of wastes and irrigation of processed water on site;
- former reverse osmosis toxic waste disposal facility;
- burial of wastes including aircraft and other waste material both on and off site;
- the intercept within the D Block compound discharging waste oil to unknown location;
- waste oil within the wash down bay spilling into the intercept that is not maintained;
- storage and use of hazardous materials at the museum facility including greases, solvents and some paints;
- storage of hazardous materials within building C22 including solvents, corrosives, adhesives, resins, engine coolant, certrex 70, hydraulic oil and detergent with potential for uncontained spills;
- storage of transformers within D Block compound with one showing visible signs of leakage;
- storage of hazardous materials at the fire station which are uncontained and visible hydrocarbon stains;
- UST's located to the north of building C26 containing diesel, leaded and unleaded petrol that have not been pressure tested for leakage and refuelling area discharging to stormwater;

- storage of hazardous materials in building C11 including paints, thinners and solvents with the potential to discharge to stormwater;
- vehicle refuelling area at Brymaroo which is not adequately maintained;
- the community consultation process due to the nature of the operations;
- discharge of potentially contaminated stormwater runoff to off site areas; and
- contamination of groundwater and potential contamination of useable groundwater resources.

Moderate Risk – management responsibility to be specified:

- disposal of hydrocarbon liquid wastes from the museum as herbicide on weeds within the museum complex;
- storage and use of hazardous materials at the museum facility including greases, solvents and some paints;
- storage of hazardous materials within buildings C1 and C3 including oils, aircraft fuels, solvents, cleaning products and corrosives;
- storage of hazardous materials and use at the military police compound including paints, fuel, oils, ethanol, kerosene and detergent;
- storage of hazardous materials in buildings B1, B2 and B3 including kerosene, oils, fuels, adhesives and paints;
- storage of hazardous materials at building C7 including fuels, oils, hydraulic oils and greases;
- storage of hazardous materials at building B52 (flight simulator) including hydraulic oil, paint, adhesives, acetone, solvents and resins;
- storage of hazardous materials in building B22 including oils, paints, solvents and cleaners;
- clearance or modification of a plant (ecological) community, listed as an Endangered Ecological Community under the provisions of the EPBC Act and the Qld Vegetation Management Act, situated on land within or immediately adjacent to the boundaries of the Turkey Hill facility;
- clearance or modification of a plant (ecological) community, listed as an Endangered Ecological Community under the provisions of the Qld Vegetation Management Act, situated on land within the boundaries of the Brymaroo facility;
- the former wash point to the north of the tarmac which was used for washing aircraft with BNB3200 has the potential to be contaminated as the chemical used is reported by Defence to be hazardous to the environment;
- the aircraft refuelling pads at Brymaroo are internally draining but discharge is not contained;
- hydrocarbon disposal points and collection UST for buildings C1 and C2 has the potential to contaminate surrounding soil and water resources or release waste hydrocarbon products if it is not appropriately maintained;
- maintenance work on aircraft is undertaken in a number of locations across AACO and has the potential for spillage or leakage of oils and fuels;
- storage and shut down procedures of aircraft can result in the leakage or discharge of fuel, oils and greases;
- hot refuelling of aircraft is undertaken on unsealed areas but due to the design of the hot refuelling system no fuel can be spilt for health and safety reasons although the nature of operations pose a moderate risk to the environment;
- museum staff indicated that areas of AACO and surrounding properties may have been used as firing ranges and therefore there is potential for UXOs;
- exhausts from workshops or other hazardous operations that do not contain dust collection of filtration systems has the potential to impact air quality; and

- exhaust from operating aircraft.

Low Risk – manage by routine procedures:

- fire management;
- cultural heritage;
- disposal of dog wastes to the sewer;
- disposal of medical waste;
- disposal of solid wastes;
- storage of hazardous materials within buildings C8 and C9 (minor quantities only);
- storage and dispatch of hazardous materials from building C43;
- storage of hazardous materials within building C13 which is designed for the storage of liquid hazardous materials;
- AGT of aviation turbine fuel and other hydrocarbons products at the fuel farm;
- AGT of aviation turbine fuel at Brymaroo;
- diesel AGT at Turkey Hill;
- clearance of flora listed as threatened flora, under the provisions of the EPBC Act or the Qld Nature Conservation Act, during any future expansion/modification of Defence operations that involve clearance of existing remnant/regrowth vegetation;
- clearance of flora listed as threatened flora under the provisions of the EPBC Act or the Qld Nature Conservation Act, during control of weed species;
- soil erosion.

10.3 Further Research

As detailed in Section 9 the results of the site inspection and the risk analysis the following areas of recommended further research and upgrades to existing facilities are recommended:

- assessment of liquid waste disposal and wash down bays;
- assessment of areas of buried wastes;
- upgrading of the facility containing the trichloroethyene bath and the penetrant line;
- removal of the leaking transformer from D Block compound;
- pressure testing of USTs;
- assessment of hazardous material storage areas;
- assessment of both surface and groundwater;
- surveys to confirm the precise location and extent of threatened plant (ecological) communities that are known to occur on and adjacent to AACO and its satellite properties;
- surveys to confirm the presence or absence of threatened flora species;
- surveys to assess the likely presence or absence of threatened fauna species;
- assessment of noise throughout the flight training area; and
- upgrading of the aircraft refuelling areas at Brymaroo to incorporate spill interception and containment system.

11 References

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IT ENVIRONMENTAL (AUSTRALIA) PTY LTD

Statement of Limitations

IT Environmental (Australia) Pty Ltd has conducted work concerning the environmental status of the property which is the subject of this report, and has prepared this report on the basis of that assessment.

The work was conducted, and the report has been prepared, in response to specific instructions from the client to whom this report is addressed, within the time and budgetary requirements of the client, and in reliance on certain data and information made available to IT Environmental. The analyses, evaluations, opinions and conclusions presented in this report are based on those instructions, requirements, data or information, and they could change if such instructions etc. are in fact inaccurate or incomplete.

IT Environmental will not update the report and has not taken into account events occurring after the time its assessment was conducted.

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IT ENVIRONMENTAL (AUSTRALIA) PTY LTD

Tables

Initial Environmental Review
Army Aviation Centre Oakey

TABLE 1
STORAGE OF HAZARDOUS MATERIALS

Location	Types of Hazardous Materials	Mitigation Measures	Approximate Volumes
Building B3 Metal and Composite Workshop	Storage of glues, resins and solvents.	Storage within a domestic type fridge.	100L
Building B3 Base Services 173	Kero bath.	Within building no drainage.	200L
Building B3 173 Hanger	Oils and paints.	Storage in three flammable goods cabinets.	300L
Building B3 Avionics Workshop	Glues and oils.	Small volumes only stored in fridge.	<50L
Building B3 Base Services Workshop 171	Fuels, oils and paints.	Storage in three flammable goods cabinets.	300L
Building B7 POL Shed	Storage of paints, oils, solvents and cleaning products.	Enclosed, locked, sealed and bunded building.	1,000L
Building B22 Flammable Gas Shed	Compressed gases including oxygen, nitrogen, LPG and acetylene.	Enclosed locked building with separation of non-compatible gases.	NA
Building C11 Paint Shop	Paints, MEK, solvents, wax, sodium chromate, chlorine, paint thinners, toluene, phenol, paint stripping chemicals and light oils.	Storage within building within some flammable goods cabinets and dedicated rooms. Drainage and wastes directed to waste treatment plant.	10,000L
Building C11 Waste Treatment Plant	Oxidising agent, and wastes from paint shop.	Treatment within enclosed system.	Up to 40,000L of paint shop wastes and 600L of oxidising agent.
Building 4A Fire Station	Fuel, oils, fire fighting foam, waste oil and paints.	Some storage within two flammable goods cabinets, cage for petroleum storage and other waste oil storage in areas with non-contained runoff. Visible staining around petroleum storage areas.	1,000L
Building C7 Hanger	Storage of oils, greases and fuels.	Storage in flammable goods cabinets, spill stations and drip trays.	200L
Building B52 Flight Simulator	Storage of hydraulic oil, paint, glues, acetone and other solvents and resins.	Storage within dedicated storage room. No bunding, but spill clean up kits present.	900L
Building A32 Oil Store	Storage of various oils and greases in 40L drums and smaller.	Dedicated building with internal drainage discharging to fuel farm intercept. Spill stations.	5,000L
Building A34 Fuel Laboratory.	Hexane and aviation turbine fuel.	Small volumes only.	<10L
Building A33 Drum Storage.	Fuels and waste hydrocarbon products.	Covered area, sealed with internal drainage to fuel farm intercept.	2,000L
D Block Compound.	Transformers containing oils.	Non PCB containing oils stored on bitumen surface. Visible hydrocarbon staining at the base of one transformer.	<500L
Building A3 Military Police.	Paint, kerosene, fuel, ethanol, oil and detergents.	Flammable goods cabinet and cage on buildings outside concrete apron. Kero drum on grass area.	350L
Brymaroo Fire Fighting Pump.	Diesel.	Within fuel tank and drum located in a covered and concreted area.	350L
Buildings C41, C35, C36, C39, C40, C28, C29.	Storage of oils, greases, paints, cleaning products, solvents.	Two flammable goods cabinets are present on a grassed area for storage of minor paints and oils.	<1,000L
Building C22 Clean Room.	Storage of cleaning products solvents and corrosives.	Corrosive substances cupboard and storage with tanks plumbed to waste tank.	300L
Building C22 Laboratory/Workshop.	Hydrocarbon solvent bath.	Within building, floor drains to stormwater.	200L

TABLE 1
STORAGE OF HAZARDOUS MATERIALS

Location	Types of Hazardous Materials	Mitigation Measures	Approximate Volumes
Building C22 Hydraulic Clean Room.	Hydraulic products, solvents and cleaning products.	Within building with drainage believed to be directed towards the waste collection UST.	200L
Building C22 Vapour Degreaser.	Trichlorethylene.	Within building. No containment surrounding the bath, no spill clean up facilities. Spilt material enters stormwater.	800L
Building C22 Drum Storage.	Turco Transpo G and penetrant.	Within building on drip tray.	450L
Building C22 Bonding Room.	MEK, and other solvents, resins and carbon fibre.	Within building, spill clean up kits, waste liquids disposed of to waste UST and solid wastes off site.	200L
Building C22 General Engineering.	Engine coolant, oils and paints and waste oil.	Within building. Hydrocarbon stained floor, flammable goods cabinet. Staff did not know the destination of drainage.	300L
Building C22.	Machinery oil and fluxes.	Within building, drainage to stormwater.	200L
Building C43 RPS Warehouse.	Various materials as required by AACO operations and waste materials including old batteries, flight helmets containing asbestos and other waste materials requiring destruction and disposal.	Within building.	Changes as per AACO requirements.
Building C14.	Compressed gas cylinders containing nitrogen, oxygen, LPG and acetylene.	Within building with walls separating non-compatible gases.	NA
Building C13 Flammable Goods Store.	Peroxide, corrosives, MEK, hydrocarbon products and paints.	Within building with concrete sealed floor and bunded.	<500L
Buildings C1 and C2 Workshops and Aircraft Parking.	New and used oils, fuel, cleaners and solvents.	Within building, concrete painted floor, spill stations, drip trays, flammable goods cabinets, disposal pit for waste oils, waste collection bins for oily wastes and industrial bins.	500L
Former Aircraft Wash Point to the north of the tarmac.	BNB3200 aircraft wash.	Facility and hazardous material no longer in use. Wastes were collected for off site disposal.	No longer stored.
Building C8 EIR Workshop.	Solvents, hydraulic oil, detergents, paints, mercury, freon, dry ice, and beryllium.	Contained within building with only minor volumes used. Mercury is no longer used. Mercury spill clean up kits were present when in use. Flammable goods cabinets were located on external concrete apron of building for some paints and oils.	500L
Building C9 Store.	Grease, oils and solvents.	Contained within buildings.	200L
Building C15 Battery Shop.	Acids	Contained on covered concrete floor. Drainage to stormwater.	100L
Air Field Generators.	Diesel and oil.	Contained on concrete pad, manually refilled. Some staining surrounding refuelling point.	800L
Buildings C3, C4 and C5.	Oils	Contained within building with concrete floor. Drainage to stormwater.	800L
Building B37 Swimming Pool.	Sodium Hypochlorite and hydrochloric acid.	Stored with in pool complex. Sodium Hypochlorite tank bunded. Storage of acids in flammable goods cabinet.	2,100L
Building D2 Admin Unit Workshop.	At the eastern end of the building was the Serco Sodexho oil store.	A small internal draining concrete pad connected to an intercept. Inspection of the intercept found the intercept was not correctly maintained and that oil was being discharged. Visible grease and oil stains on uncontained surrounding areas.	400L

TABLE 1
STORAGE OF HAZARDOUS MATERIALS

Location	Types of Hazardous Materials	Mitigation Measures	Approximate Volumes
New building in D Block compound.	Pesticides, cleaning products, oil and empty drums.	Within building, drainage to stormwater.	600L
S Block.	Oils, fuel, paints and solvents.	Singaporean facilities were relatively new and in very good condition. Some visible hydrocarbon staining surrounding a mobile generator.	5,000L
Buildings B20 and B21.	Fuel, oil, batteries.	Storage within building and flammable goods cabinet.	1,000L

TABLE 2
HAZARDOUS WASTE COLLECTION FACILITIES

Location	Description
An area on the northern side of the fuel farm and within building A33.	Drums containing hazardous wastes collected on site by the Fire Brigade during spill clean up are stored within the fuel farm area for collection and off site disposal/recycling.
UST associated with buildings C1 and C2.	For the collection of hydrocarbon wastes. Trap located on the southern side of the C1 and C2 buildings. Waste collected by contractors for off site disposal/recycling.
UST located adjacent to building C22.	For the collection of wastes from operations within building C22. Staff indicated there was a problem with the tank as it fills with stormwater during heavy rain. The volume of the tank according to AACO staff was 5,000L. Wastes were removed from the UST by a contractor and taken to the waste treatment facility at building C11.
Toxic Waste Treatment Plant located on the southern side of building C11.	The plant has been designed to treat wastes generated by the paint shop and aircraft workshop. According to AACO staff the facility, which is operated by contractors, undertakes approximately ten treatments a year of approximately 40,000L. The waste water from the treatment plant is used for irrigation on AACO gardens and the solids are collected in 200L drums and removed off site for disposal.
Two USTs associated with refuelling truck bunded parking areas.	The USTs have a capacity of 2,500L each and are used to collect spilt material within the bunded refuelling truck parking areas and for manual disposal of wastes from the B3 Hanger. The bunded areas for refuelling truck parking have a valve that allows the operator to select if the liquid can be disposed of as stormwater or needs to be discharged to the USTs. At the time of inspection the UST dipsticks on the tanks were over the maximum mark. Within the bunded parking area were two trucks containing a total of 22,500L of fuel. Contractors are used as required to remove the collected liquid for off site disposal/recycling.
Fuel Farm Intercept	The fuel farm intercept receives runoff from the fuel farm area, including the AGT bunded area if staff release the valves. The intercept is emptied by contractors and liquids removed off site for disposal.
Intercept located to the south of building C28 associated with the vehicle wash down.	At the time of inspection waste oil had been spilt in one of the wash down bays and the drain running through the wash bay contained oil. AACO staff did not know if the intercept was being maintained.
Intercept associated with oil storage at the eastern end of building D2.	The intercept collects runoff from the internally draining oil storage pad. Inspection of the intercept found oil in all three compartments indicating the intercept was either not functioning or was not being maintained.
Eastern and Western Aircraft Wash Down Pads.	Biodegradable detergents are used for washing down of the aircraft. A basket to collect gross solid pollutants is located within the drain. Drainage from the pad is to the stormwater.
Northern Wash Down Bay collection UST.	A UST was associated with the northern wash down bay where toxic cleaning chemicals were used. The facility is no longer in use. AACO staff indicated the collected liquid waste was taken off site for disposal.

TABLE 2
HAZARDOUS WASTE COLLECTION FACILITIES

Location	Description
Fire fighting foam separators/settling tanks.	Two fire fighting foam separators/settling tanks are present. The large underground tanks are used for the collection of fire fighting foam from the aircraft hangers.
Dog Kennel sewage collection tank.	An underground sewage collection tank associated with the Dog Kennels is located adjacent to building A3. The tank is alarmed and pumps the wastes into the council sewage system.
Oil and Grease Traps associated with kitchens.	Oil and grease traps were present for the collection of kitchen wastes. The traps were serviced by contractors for off site disposal.
Medical waste collection associated with B36.	A collection pit is associated with the dentistry facilities in building B36. Wastes are collected by contractors and removed off site for disposal. Other medical wastes are collected within suitable containers and removed off site for disposal.
Former landfills on the eastern side of AACO.	Kinhill (1991) reported that after World War II waste dumps on the eastern side of AACO were constructed. There is no information on the types of materials buried or where the landfill activities occurred.

Figures

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Appendix A
Defence Requirements

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Appendix B

Supplementary Information Covering Flora, Fauna and Biodiversity Issues

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