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Defence and Airport Related Employment Zone - Williamtown

Stage 1 - Site Selection Report

January 2008

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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Executive Summary

GHD Pty Ltd was engaged by the Department of Planning on 22 May 2006 to:

1. Undertake a 'desktop study' to delineate an area within which an airport related employment zone at Williamtown might be located (Stage 1);
2. Carry out more detailed investigations to assess the suitability and capability of the subject land for airport related employment related land uses (Stage 2); and
3. Prepare a detailed Structure Plan and a development control framework that will guide the future development of the land in such a way so as to complement the existing and future operational needs of the RAAF Base Williamtown and the Newcastle Airport (Stage 3).

This report documents the findings of the Stage 1 initial investigations, to define the area within which more detailed investigations are to be carried out. The defining factors in the site selection process were:

- The maintenance of the integrity and primacy of the operations of the Williamtown RAAF Base;
- To ensure that options for the extension, duplication or expansion of the airport operations are not jeopardised by the location of the proposed airport related employment zone;
- The constraints on development arising from the existing natural environment (including the protection of valuable groundwater resources);
- The economic benefits of encouraging synergies between the RAAF Base, Newcastle Airport and the proposed airport related employment zone activities;
- The efficient operation of the existing road network;
- The provision of essential services;
- Land ownership and property configurations; and
- Contemporary planning principles in relation to the relationship between and the efficiency of complementary land uses (proximity, functionality, social and economic impacts).

The Selected Site referred to as the "Defence and Airport Related Employment Zone - Investigation Area" was that area deemed to be *potentially* suitable for employment generating development associated with the Newcastle Airport/RAAF Base Williamtown (Figure 11). Subject to endorsement by the Project Control Group (PCG), this area will be the subject of more detailed investigations within Stage 2 of the project.

1. Introduction

1.1 Context

The Department of Planning has recently released the Draft Lower Hunter Regional Strategy, (the Draft Strategy). This document is to operate in conjunction with the proposed Regional Conservation Plan, to provide a framework for the more detailed planning and development of the Lower Hunter Region. The Draft Strategy identifies where future employment lands are to be focussed to meet the demands of the expected population growth for the Region. Logically the land in the vicinity of the RAAF Base Williamtown and Newcastle Airport has been earmarked as having potential for employment generating development.

GHD Pty Ltd was engaged by the Department of Planning on 22 May 2006 to prepare an airport related employment zone Land Use Development Strategy for Williamtown. This is three (3) stage project including:

1. Site Selection;
2. Detailed Investigation; and
3. Development Control Framework (including a Land Use Structure Plan).

The final deliverable is to be a Strategy Document in the form of a Local Environmental Study that consolidates the findings and recommendations of the above investigations. The purpose of the Strategy is to justify the rezoning of the land and to guide future development within the proposed Williamtown airport related employment zone.

1.2 Stage 1 Strategy Objectives

"The principle objective of this project is to develop a land use strategy, which provides practical direction to guide the establishment and development of a regional airport related employment hub focussed around the RAAF Base Williamtown and Newcastle Airport Facility at Williamtown." (DoP)

In achieving this objective, it is of prime importance to recognize that whilst supportive of the Williamtown airport related employment zone, the Department of Defence is resolute in the requirement that the final consolidated strategy ensures only compatible land uses, avoids land use conflict in the vicinity of the RAAF Base Williamtown and ensures that the RAFF Base Williamtown operations are not compromised by urban encroachment. The following client objectives are applicable to Stage 1 of the project:

Stage 1: Site Selection:

I. Identify the regional and local context, existing and potential relationships of the proposed airport related employment zone to the centres of Raymond Terrace, Newcastle and Medowie, including potential links/synergies with the Port or other industries.

II. *Assess the current and potential future (20 -25 years) operational requirements of the RAAF Base Williamtown and Newcastle Airport and the Hunter Water Corporation ground water recharge area requirements, against the possible locations for the airport related employment zone, including the potential to provide a second runway or runway extension if required over the longer term.*

III. *Assess the likely industry synergies and potential employment industrial uses, the required physical connections between the airport related employment zone and RAAF Base Williamtown/NAL and the known broad environmental constraints of the area against potential development opportunities or options.*

1.3 Purpose of this Report

The purpose of this report is to document the findings of the Stage 1 Site Selection investigations and to place limits on the area within which more detailed investigations are to be carried as part of Stage 2.

The first stage of this study was conducted in large part as a 'desktop' assessment, drawing on information from past and current investigations, publicly available State and Local Government planning documents and in consultation with the PCG. The objective of Stage 1 is to clearly delineate the best location for the airport related employment zone primarily based on the physical constraints of the land and the current and future operational requirements of the RAAF Base Williamtown and the Newcastle Airport.

In the second stage of the project, the suitability and capability of the selected land is to be assessed. In considering the future use of the land, a wide range of issues will need to be considered including the preferred land uses, provision of adequate infrastructure, protection of the environment and ensuring the economic viability of the development of the land. Once the physical parameters to development have been established, consideration will then be given to the specifics in the form of a framework for controls on development (Stage 3).

2. Study Area

For the purposes of the Site Selection process the Study Area included is the land generally encompassing the 'medium growth scenario' as identified in the "Newcastle Airport Economic Opportunities Study" (by Halliburton KBR P/L for Port Stephens Council), February 2003. (Refer to Figure 1).

In general terms, the Study Area is situated immediately south of the RAAF Base Williamtown. It is centred over the intersection of Nelson Bay Road (running roughly north-south) and Cabbage Tree Road (running roughly east-west) in Williamtown. The subject land, which has an area of approximately 500 hectares, is generally low lying (flood prone), mostly cleared of vegetation and includes the following land uses:

- The Newcastle Airport (an area of approx. 28 hectares) the subject of a 40 year lease from the Commonwealth Government for civilian airport facilities;
- Residential and rural residential properties with frontages to Nelson Bay Road and Cabbage Tree Road (including a primary school and two service stations); and,
- Rural land used for grazing purposes generally south and in the vicinity of the civil airport and RAAF Base Williamtown facilities.

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Metres
Map Projection: Universal Transverse Mercator
Horizontal Datum: Geodetic Datum of Australia 1994
Grid: Map Grid of Australia, Zone 56

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Study Area

Spatial layers courtesy of Port Stephens Council

12 July 2006

Location of the Study Area

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3. The Site Selection Process

Since the formation of the Newcastle Airport Limited (NAL), a number of studies have been commissioned looking at the viability and future of the NAL and the requirements for the continued operations of the RAAF Base Williamtown. The following studies contribute to the understanding of the economic, social and environmental issues, the legislative requirements, and the physical and environmental constraints relating to the site:

- Newcastle Airport Economic Opportunities Study 2003;
- Draft Lower Hunter Regional Strategy;
- Lower Hunter Economic Centres Study;
- RAAF Base Williamtown State & Local Government Agencies Information Package;
- Newcastle Airport Williamtown (NSW) International Airfreight Hub Feasibility Study;
- Relevant State Environmental Planning Policies, Regional Environmental Plans, NSW Coastal Policy 1997 and S117 Ministerial Directions;
- Port Stephens LEP 2000;
- Draft Newcastle Airport Master Plan;
- Port Stephens Comprehensive Koala Plan of Management;
- Williamtown Salt Ash Flood Study;
- Strategic Guidelines for the Management of Acid Sulphate Soil in the Port Stephens and Anna Bay Catchments;
- Acid Sulphate Soil Occurrence in Port Stephens and Anna Bay Catchments; and
- RAAF Base Williamtown Master Plan.

The following two chapters relate to preliminary investigations including the desktop reviews of these studies, other relevant studies and the mapping available. The preliminary analysis offered in Chapter 4 presents the findings of the preliminary investigations into the planning considerations. Chapter 5 gives an explanation as to the economic considerations and Chapter 6 then relates to the Operational Considerations, detailing the requirements for the RAAF Base Williamtown and NAL.

Chapter 7 contains the preliminary investigations of the physical environment, giving an overview of the issues likely to affect the site selection process. Chapter 8 details the existing infrastructure available and the limiting factors for future development.

Chapter 9 concludes with an explanation of the final selected site and the constraints that have been most influential in the site selection process. The outcome is a reduction of the 500ha study area for the further more detailed investigations. This has been done by selecting a site of approximately 113ha, from the larger area, based on the issues and physical constraints identified.

4. Planning Considerations - Preliminary Investigations

4.1 Planning Context

The RAAF Base Williamtown has been a permanent fighter base since it's construction in 1941. Adjoining the RAAF Base Williamtown and immediately south is the Newcastle Airport (NAL), formed in 1990 when the original owner, the Commonwealth Government signed a 30 year lease with Newcastle City Council and Port Stephens Council agreeing to take full responsibility for the operation, maintenance and development of the civilian airport.

4.1.1 State Environmental Planning Policies

There are no State Environmental Planning Policies (SEPPs) that apply specifically to this site. However SEPP 44 – Koala Habitat Protection requirements (superseded by the Council's Comprehensive Koala Plan of Management) are discussed in Chapter 7.

4.1.2 Draft Lower Hunter Regional Strategy

The site was identified in the Draft Lower Hunter Regional Strategy as a specialised employment centre with potential for employment. This is unlikely to change as studies carried out to assess the appropriateness and effectiveness of an airport related employment zone linked to and related to airport and RAAF Base Williamtown uses, confirm the location and land use.

4.1.3 The Port Stephens Urban Settlement Strategy

The Port Stephens Urban Settlement Strategy looks at the long term settlement pattern for the LGA and defines the guiding principles for the growth of the area. The Strategy recognises the RAAF Base Williamtown is both a significant employer and a strategically significant Commonwealth asset. This long term strategy (currently under review) plans for the continued operation and development of the RAAF Base Williamtown and it's activities.

4.1.4 Current Land Use Zoning

The study area is wholly within the Port Stephens Council LGA and is thus subject to Port Stephens Local Environmental Plan 2000. The area comprises land zoned almost entirely as Zone No. 1(a) (Rural Agriculture "A" Zone). There is a small proportion to the north and generally within the NAL that is within Zone No. 5(a)- Defence Purposes Zone. Figure 2 shows the current land use zones for the study area.

Land owned by the Commonwealth of Australia is not subject to the local government planning requirements and restrictions. This would comprise approximately 50% of the study area.

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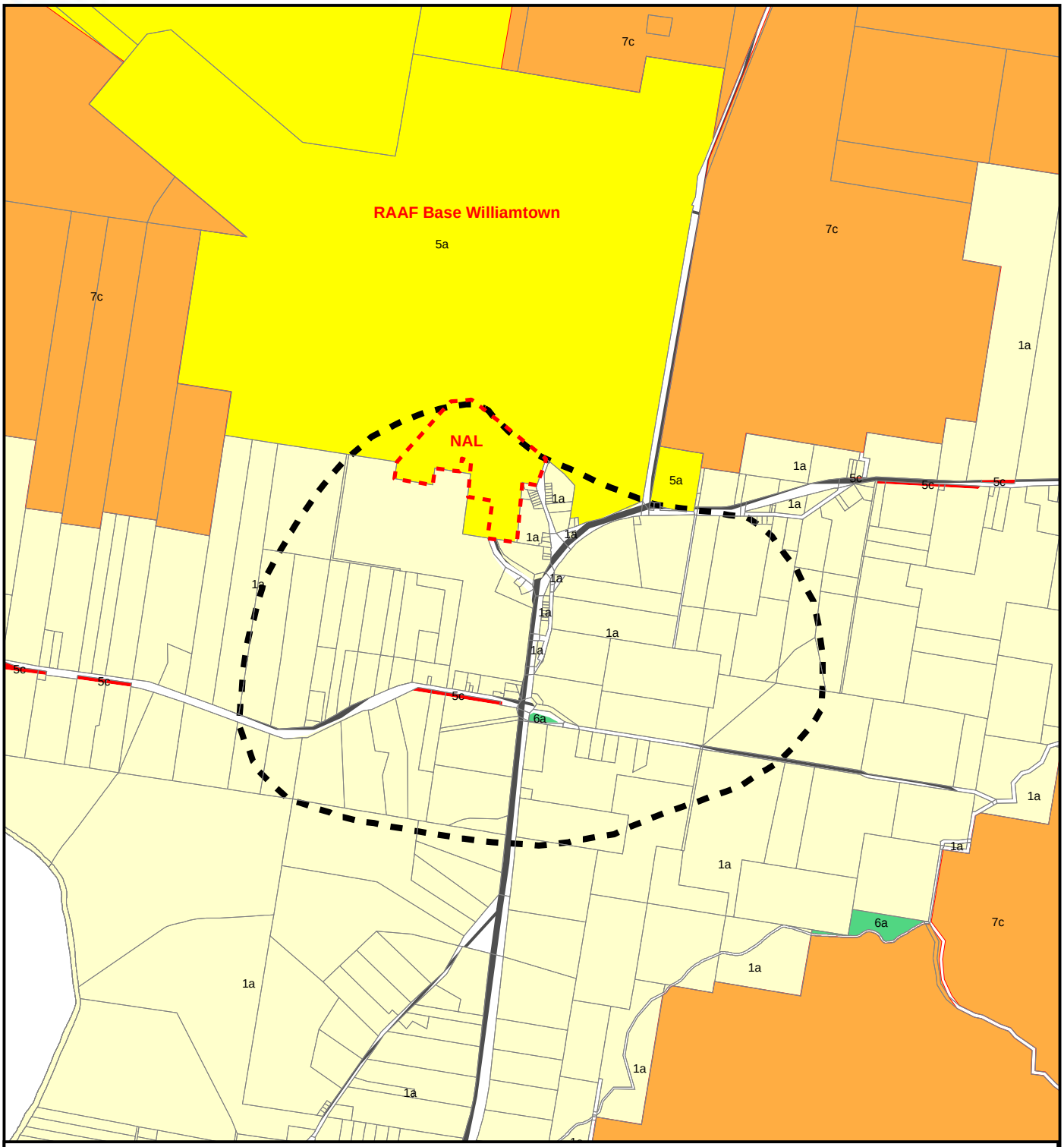

Port Stephens LEP 2000

- (1a) Rural Agriculture
- (1c1; 1c2; 1c3; 1c4; 1c5) Rural Small Holdings
- (2a) Residential
- (2c) Residential
- (3a) Business - General
- (4a) Industrial - General
- (5a) Special Uses - Defence
- (5c) Special Uses - Proposed Road
- (5g) Special Uses - Flood Effected
- (6a) General Recreation
- (6c) Special recreation
- (7a) Environmental Protection
- (7c; 7f1; 7f3) Enviro Protection (water catchment, coastal lands, urban conservation)
- (7w) Enviro protection - Waterways
- Newcastle Airport Limited Boundary

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0 150 300 600 900

Metres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geodetic Datum of Australia 1994
Grid: Map Grid of Australia, Zone 56

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Study Area Cadastre

Spatial layers courtsey of Department of Lands, and Port Stephens Council

12 July 2006

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Land Use Zoning

Rural 1(a) Zone

The Rural 1(a) Zone identifies land of agricultural value, this land is not set aside for rural residential development. The objective of this zone is to protect the rural character of the area and to promote the efficient and sustainable utilisation of rural land and resources by:

a. Regulating the development of this land for purposes other than agriculture by ensuring development is compatible with rural land uses and does not adversely affect the environment or amenity of the locality;

b. Ensuring development will not have a detrimental effect on established agricultural operations or rural activities in the locality;

c. Preventing the fragmentation of grazing or prime agricultural lands, protecting the agricultural potential of rural land not identified for alternative land uses and minimising the cost to the community of isolating and fragmenting such land and of providing public facilities and services to that community;

d. Protecting or conserving soil stability, vegetation, water resources, water quality, valuable resource deposits, and

e. Reducing the loss of life and damage of property caused by flooding.

Permissible Land Uses

Land uses permissible without development consent include agriculture and flood mitigation works. There is a range of prohibited land uses including commercial premises, industrial development, service stations, shops, urban housing, road transport terminals. Subdivision is generally not permissible with a few exceptions. Land uses not listed as either permissible or prohibited by the planning instrument (LEP 2000) are permissible land uses with development consent (provided the land is not exempt under state or federal legislation). A full list of prohibited uses is provided in Appendix C.

4.1.5 Development Control Plans

The site is subject to a number of Development Control Plans (DCPs) that apply to the whole of the LGA; no site specific Plans apply. Any new zone for employment land should take these plans into consideration. These do not pose any particular concerns for the future development of an airport related employment zone in this location. The following DCPs currently apply generally to guide industrial and commercial development:

- PS2 – Traffic and Parking Guidelines;
- PS3 – Subdivision Guidelines;
- PS4 – Commercial and Industrial Development Guidelines
- PS8 – Guidelines for Exempt and Complying Development;
- PS10 - Building Standards and Notification Procedures for Development Applications; and
- PS11 – Controls for Site Waste Management and Minimisation.

4.2 Surrounding Land Uses

The site is generally surrounded by land zoned for rural purposes to the east, west and south of the site. Immediately north of the subject site the land is zoned Defence Purposes 5(a). Further to the west and north and just outside of the study area there is a large tract of land zoned 7(c) Environmental Protection – Water Catchment. The RAAF Base Williamtown is a significant generator of noise, particularly when considered in association with the Salt Ash Air Weapons Range, located 10 kilometres to the northeast of the RAAF Base Williamtown.

The land in the vicinity of the study area is generally used for rural purposes and has a rural, agricultural character. Grazing lands dominate the landscape with patches of vegetation and sand dunes. In the locality there is a school, a church, numerous rural dwellings, farms, two service stations, a car hire business and other home businesses in the vicinity of the NAL and RAAF Base Williamtown facilities. The airport and RAAF Base Williamtown have a strong presence in this small community.

4.3 Ownership of Subject Lands

The number of owners and the owner's interest in the future development of their land is a factor for consideration when planning for future development. Approximately 50% of the study area is in private ownership and within that area there are 45 landowners.

The largest holding is approximately 80ha and this land adjoins the NAL and RAAF Base Williamtown land. The owner of this larger property, B & M Ellison P/L, has expressed an interest in developing the land.

The Commonwealth Government owns the remaining 50% of the land within the study area, a small proportion of which adjoins the RAAF Base Williamtown and NAL land. The majority of the commonwealth land, about 90% is located to the east of Nelson Bay Road.

4.4 Conclusion in Relation to the Preliminary Planning Investigations

The current land use zoning of the subject land reflects the rural character of the area. To establish an airport related employment zone would require an amendment to Port Stephens LEP 2000. Whilst the character of the area is of a rural nature, the RAAF Base Williamtown has been established since 1941 and it plays a significant role in the locality and region as an employer and nationally as a training base.

There are no significant planning issues that restrict the development of the area for an airport related employment zone. The regional and local planning strategies indicate that such a zone would be appropriately located adjacent to the NAL providing that the RAAF Base Williamtown is not compromised and the development recognises the needs of the community currently located in and around the study area.

Consequently any rezoning to amend Port Stephens LEP 2000 would need to recognise the existing character of the area and ensure that the development of the area was undertaken in a manner that has regard to current and future use of the surrounding land.

5. Economic Considerations - Preliminary Investigations

The Lower Hunter Economic Centres Study and the Draft Lower Hunter Regional Strategy have identified the Williamtown RAAF Base and NAL as a specialised centre with potential to provide additional resource for airport related development. The draft Strategy considers such specialised centres perform vital economic and employment roles within the region.

5.1 The Demand for Airport Related Employment Land

The Newcastle Airport Economic Opportunities Study, 2003 (the Opportunities Study), observed that Newcastle Airport was “land poor” compared to other Australian and overseas examples of similar facilities. This applied to both on and off airport provisions. The report asserted the “lack of land for ancillary development would constrain the diversified growth of the facility”.

It scoped opportunity and land use demand across weak, normal, medium and strong demand scenarios, recommending further investigation of the medium and strong scenarios. These scenarios respectively encompassed 100 hectares (medium) and 832 hectares (strong) of land exclusive of the 28 hectares currently leased to Newcastle Airport (NAL).

The 100 hectares nominated under the medium scenario was linked for foreshadowed core demand characteristics as well as “opportunistic” outcomes. The demand analysis indicated the new “Airport Business and Technology Park” would lever off opportunity stemming from airport activity, existing business and commerce within the region and national and international interest attracted by a “near airport” project.

With the benefit of more contemporary studies and input in the land economics sphere and experience in the marketplace since 2003, it is considered that the circumstances outlined in the Opportunities Study have changed slightly, particularly in the realm of land take up and demand. The rate of change in the industrial land sector has accelerated over the last 3 years. Most change was experienced on larger, planned estates such as Thornton, Holmwood, Cameron Park, Morisset and more lately, Rutherford and Steel River. These present a different opportunity to an estate adjacent to or in immediate proximity of Newcastle Airport/RAAF Base Williamtown.

5.2 Proximity and Synergy Factors

It is considered that the scope of opportunity at Newcastle Airport is more dimensional than other industrial estates. This facet is dependant on a tight locational nexus with the current RAAF and civil airport activity. Land areas isolated or dislocated from airport functions will be more likely to evolve into a “general industry” areas, weakening the scope to benefit from the strictly airport related businesses referred to in the Opportunities Study.

The most optimal and appropriate approach is considered to be the “designation” of at least 100 hectares in immediate proximity or adjacent to the airport. If constraints dictate the land cannot be contiguous, the allocation next to airport to support uses more reliant on direct airport proximity is consistent with the Opportunities Study findings of between 40 and 60 hectares in the medium scenario. The allocation of a nearby but linked yet truncated employment land area of at least 50 hectares is considered justifiable. Figure 3indicates walkable/cycleable catchments within a 400m radius and an 800m radius. This is to illustrate the proximity required to maintain operative synergies between the airport and the airport related employment zone. It is important that the connections between the airport and airport related employment zone be maintained. These catchments aim to demonstrate the proximity necessary for the two operations to ensure they are not dissected.

5.3 Conclusion in Relation to the Preliminary Economic Investigations

Contemporary demand factors indicate that 100 hectares in the context of long term outcomes is modest. This is evident given the scope for civil and Defence aviation industry services activity that demand immediate proximity, as is shown with recent demand and development for car parking at the civil facility. The extension of this characteristic into broader airport services such as car hire, aircraft services (fuel, catering, cleaning) and transport is likely to pressure the NAL landholding and scope for merging this activity into new employment land. Likewise, RAAF Base Williamtown support services often have specialised characteristics and scope to permit “special use areas” close to the base that may, for example, encapsulate additional security, access and proximity requirements that must be accommodated. Every opportunity to realise the synergies between the airport and the airport related employment zone should be capitalized.

It is considered that whilst the market circumstances have been extremely buoyant in recent times, the “non real estate” based motives and drivers identified in previous reports and other studies have underlying strength and basis to underwrite the 100 hectares allocation as a minimum target outcome.

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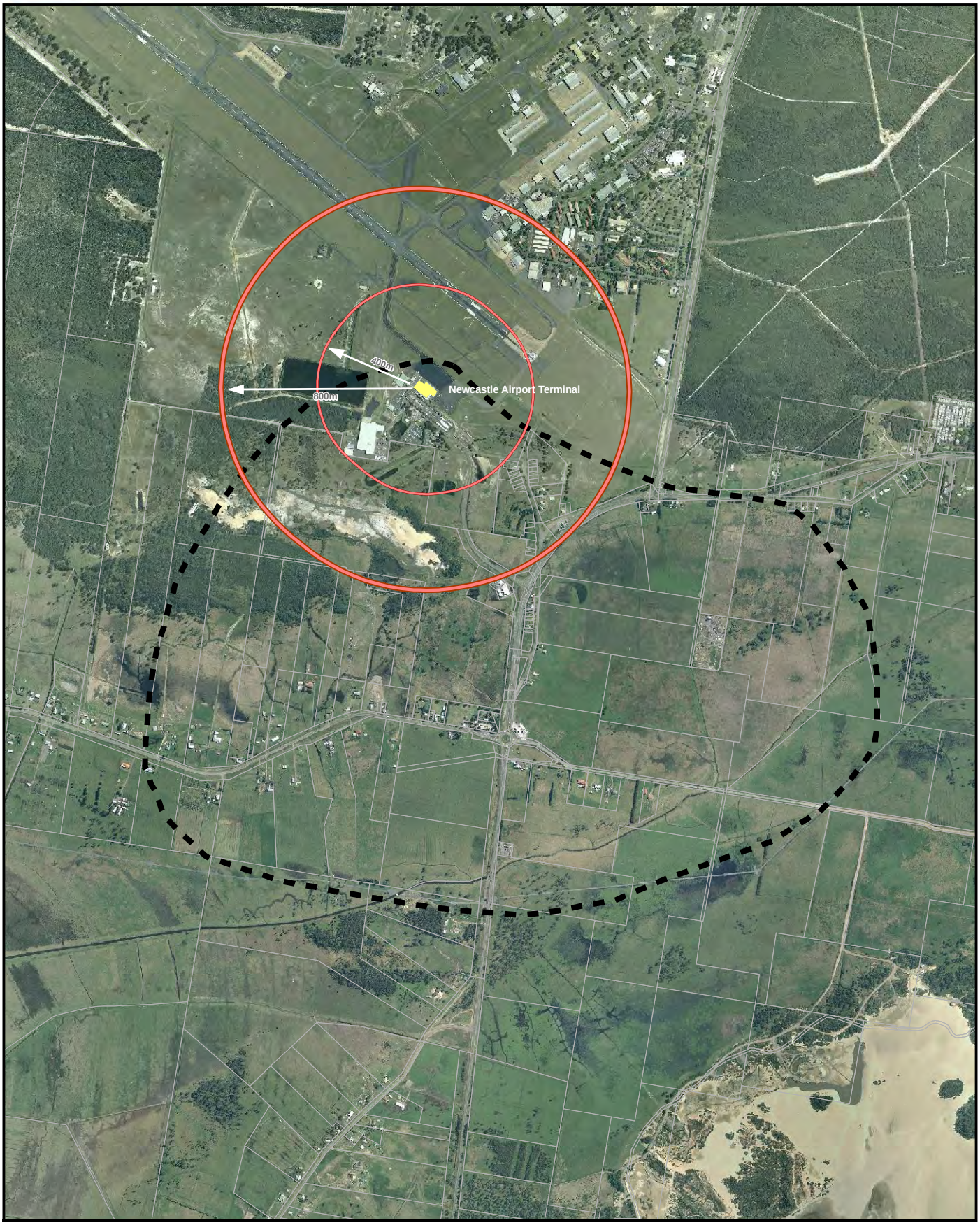

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Grid: Map Grid of Australia, Zone 56

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- Study Area
- Cadastre
- Newcastle Airport Terminal
- 400m Radius - 5min walk
- 800m Radius - 10min walk

Spatial layers courtesy of Port Stephens Council

12 July 2006

Economic Issues - Locational Factors

6. Operational Considerations

6.1 RAAF Base Williamtown

RAAF Base Williamtown, located approximately 15km northeast of the Newcastle CBD, is shown in Figure 4. The Base occupies 800 hectares of land within a perimeter of approximately 14.5km. Defence has leased 28 hectares of land on the southern side of the runway until 2045 to Newcastle Airport Limited (NAL), which operates a civil terminal. The lease defines the sharing of the runway, taxiways and associated facilities.

RAAF Base Williamtown is a major employment generator and economic stimulus in the Lower Hunter Region. It has a Base workforce of over 3600. It injects over $130 million annually in services and wages into the regional economy. The Australian Government continues to build on this investment with over $180 million earmarked for future capital works. The infrastructure of RAAF Base Williamtown represents a long-term investment by the Australian Government, which cannot be easily relocated or rebuilt elsewhere.

6.1.1 RAAF Base Williamtown Operations

RAAF Base Williamtown is a significant element in Australian Defence Force capability and is to be retained by Defence as the long-term home of the fighter/strike and Airborne Early Warning and Control (AEW&C) forces. It is Australia's primary fast jet training Base and is periodically used by all three services. From the mid next decade, Defence expects to introduce into service new air combat capability, which will replace both the F/A-18 and the F-111 Combat Aircraft.

Currently, RAAF Base Williamtown accommodates the command, operational and support elements to sustain the major training and operational flying activities of Air Combat Group's tactical fighter force component operating F/A-18 and Hawk aircraft. The base also accommodates the Surveillance Control Group and Combat Support Group, which will in the near future include the AEW&C aircraft. The Base also accommodates the Australian Defence Force (ADF) Warfare Centre and the Air Defence Eastern Regional Operations Centre.

The Base has an inextricable link with Salt Ash Air Weapons Range, which is the Base's major training support facility for aircraft air-to-ground bombing and gunnery training. A major air-to-air training area is located off the nearby coast.

Core activities undertaken at the Base comprise aircraft operations (including training), aircraft maintenance, air defence and control, operational support and the provision of infrastructure support services. A range of ground units and civilian support services provide logistical support to the operational squadrons.

In addition to the core operational capabilities, the Base contains various facilities for Defence and civilian personnel including sporting and recreational, childcare, medical and dental and living accommodation.

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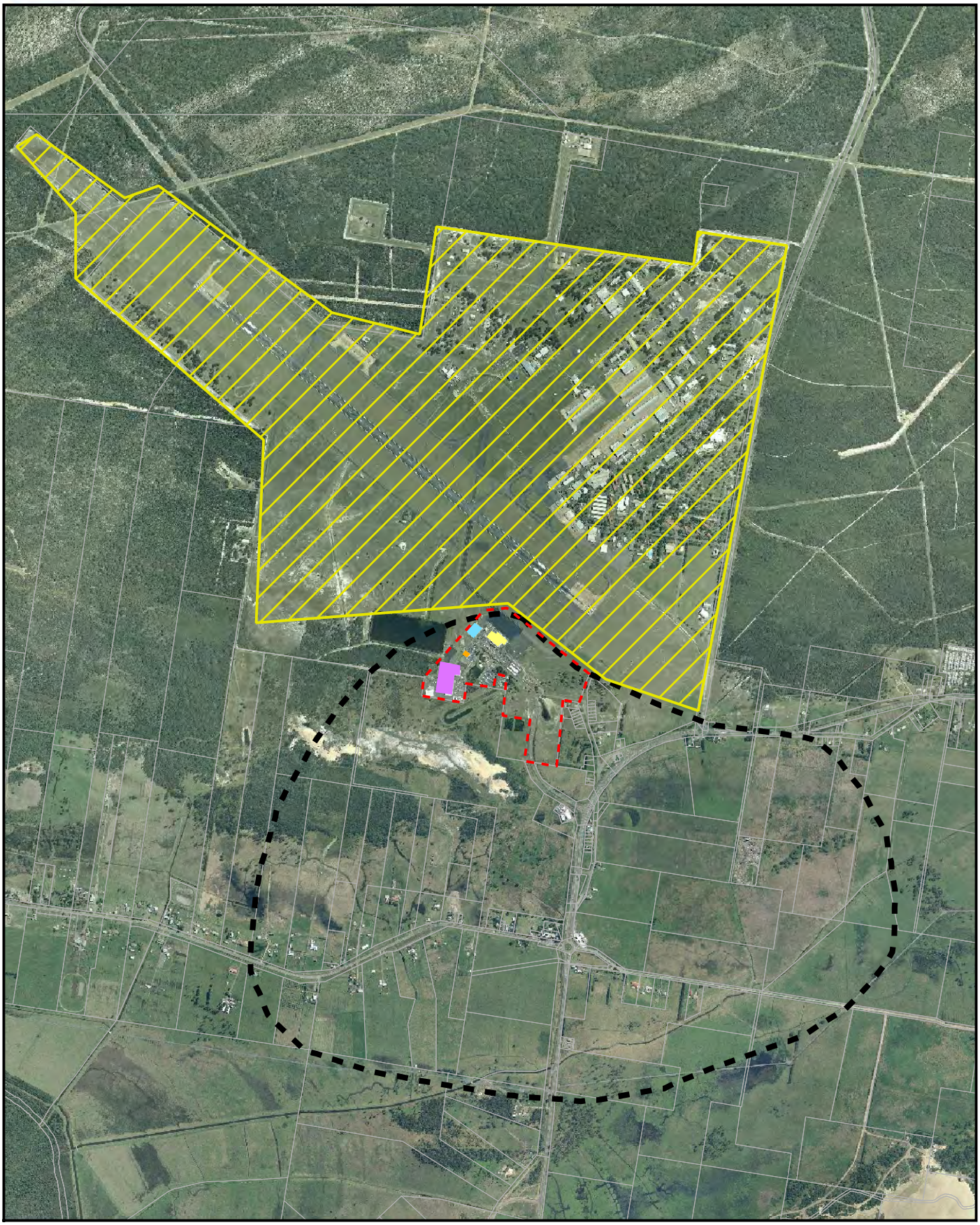

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Metres

Map Projection: Universal Transverse Mercator
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Grid: Map Grid of Australia, Zone 56

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- Study Area
- Cadastre
- RAAF Base Williamtown
- Newcastle Airport Limited (NAL)
- British Aerospace
- JetStar
- Newcastle Airport Terminal
- Newcastle Helicopters

Spatial layers courtesy of Port Stephens Council

12 July 2006

Location of NAL & RAAF Base Williamtown

6.2 Newcastle Airport Limited (NAL) Operational Requirements

The Newcastle Airport (NAL) is located approximately 15km northeast of the Newcastle CBD, New South Wales. The location of the airport is shown in Figure 4. It is situated on 28ha of Commonwealth land, adjacent to RAAF Base Williamtown.

Managed by NAL (joint partners Newcastle City Council and Port Stephens Council), the land is leased from the Department of Defence for the purposes of civilian air travel. This 40 year lease began in June 2005 and defines the sharing of the runway, taxiways and associated facilities. NAL has flights operated by Jetstar, Virgin Blue, QantasLink, and Brindabella Airlines.

The NAL terminal is located on the southwestern side of the runway indicated in Figure 4. New terminal facilities were commissioned on 9 November 2005 to cope with future demand and security requirements. In addition, the Australian airports industry has recently named the NAL Australian Regional Airport of the Year 2005.

6.2.1 NAL Operations

It is important any future Airport Related Employment Zone does not jeopardise the long term expansion opportunities for the airport. For this reason it is important to understand the current situational requirements of the airport and any likely changes or issues effecting the continued operation of the airport. The following operational requirements and issues currently apply:

- Operational hours under the lease are 0600 to 2200, maximum of 6 movements per hour (i.e. 1 every ten minutes);
- There are air space/flight path issues associated with not only the runway but also the Salt Ash Air Weapons Range;
- Concern with any land uses that might impact on RAAF aircraft such as: lighting, emissions, structures, bird strike;
- NAL Lease up to 2045;
- Defence own considerable land (including the NAL site) in the area;
- Expansion of hours of operation and/or frequency of civil flights would be of concern to the RAAF/Defence. Implications for air space, emergency services, air traffic control, additional noise. RAAF operations must have priority;
- Current sewer facility has no problems and can continue to cope with long term demand. If reticulated sewer becomes available, connection would be made. There is no commitment to funding of the trunk main system. A business case would have to be prepared for consideration; and
- Current road network has inherent problems and needs investigation.

Newcastle Airport predicted 660,000 passenger movements in 2005. This figure was revised in April 2005 to 720,000, a figure later realised with passenger movement figures of 757,145 at the beginning of 2006. This equates to an additional 296,781 people moving through the terminal building, an increase of 65% on 2004 figures of 460,364 (NAL, 2006).

At present aircraft movements are restricted to 5,800 movements per month. Current movements are closer to 5,000 per month, an increase of approximately 1000 movements compared to this time last year. One of the main concerns for the operation of the airport is carparking, however an additional 600 car park spaces are expected this year with the NAL predicting 840,000 passenger movements this year 2006. Another issue for the NAL is future funding of infrastructure and who will lead changes necessary for the continued growth of the facility and any support industries and employment zone.

In order to plan for the future growth and continued operations of the airport, the NAL are in the process of completing a Master Plan for the airport.

The Master Plan is to have a 20 year horizon. It will aim to optimise the available land with careful planning to ensure compatibility between operational and commercial demands. The Master Plan will bring together the demand modelling for aviation and commercial growth with the means of ensuring the protection of the primacy of RAAF Base Williamtown assets and operations.

NAL promotes additional commercial development associated with the airport. A Master Plan for the continued operation of the airport is underway with a draft imminent. The Master Plan will address the distribution of power within the precinct and also the maintenance of a continuous quality supply. The NAL would like to see land in the vicinity appropriately zoned to enable the type of development that would accommodate support industries for the airport.

6.2.2 Future Runway Planning Investigations

As part of the scope of works brief for the land use study DoP requested GHD to ensure that the area chosen for the economic exclusion zone did not preclude any future developments or extensions to runways. So whilst this plan examined options for runway extensions or duplication, it was done so as part of the validation of the chosen area not impacting and future requirements.

Any future considerations for increased runway space would require the full support of Defence.

The purpose of this assessment is to ensure that the selected site for the RAAF Base Williamtown/Newcastle Airport, Airport Related Employment Zone does not preclude options for a second runway or extended runway and that all decisions incorporate the long term needs and opportunities for both RAAF Base Williamtown and NAL.

A feasibility study for a second runway at the RAAF Base was commissioned by the Department of Defence in 1998 (Kinhill, June 1998). This report noted, inter alia, that the existing runway orientation meets the 95% wind useability criteria and that a cross-runway or realignment of the main runway is not required.

Discussions with the Department of Defence staff, including RAAF Williamtown (as represented by the Base Commander) raised further matters. These organisations have positions on the Project Control Group.

At the Project Control Group Meeting on 1 June 2006 Defence made the following relevant points:

- The existing runway is part of RAAF Base Williamtown and is owned by the Department of Defence;
- Defence activities and operations take primacy over civil airspace use. This will remain the case indefinitely;
- Defence does not require a second runway nor an extension to the existing runway. The length of the existing runway is adequate for current or future Defence capabilities. In the past, Defence had preliminary investigations undertaken as part of the RAAF Base Williamtown Master plan 2002 with regard to extending the 12/30 runway or installing a cross runway however it was found that a cross-runway or realignment of the main runway was not required;
- Defence identified that the width of the existing runway pavement may be increased to accommodate future capability; and
- The issue for Defence is the impact a second runway/extension to the existing runway will have on operational capability due to an expectation that this will permit an increase in civil airspace usage. An increase in civil airspace usage is unlikely to be supported by Defence due to impacts on capability.

Furthermore, at a meeting on 21 June 2006 between the consultants (GHD) and the Department of Defence held at Newcastle Airport, the following relevant points were made by Defence

- Duplication of the existing runway would increase airspace usage to such an extent as to provide likely operational difficulties for the RAAF;
- The continued use of the Salt Ash Air Weapons Range for existing purposes is intended;
- Opportunities to reduce security risks to the RAAF Base tenancy usage are favourable; and
- The RAAF considers its future operational requirements to be contained within the currently defined parcel of Defence owned land.

Other considerations relevant to this study were derived from direct discussions with Newcastle Airport Limited (NAL). NAL has a position on the Project Control Group of this Study. A meeting between the consultants (GHD) and NAL, held at Newcastle Airport on 21 June 2006 made the following relevant points:

- The basis for design of future airport master planning options was the Boeing 787 design; and
- The NAL Master Plan essentially considers a three-tiered approach when examining its Master Planning Options. These being:
  - **Primary usage** - those operations requiring direct access to taxiways or aprons (air side access);
  - **Secondary usage** – those operations that do not require air side access however are directly supportive in nature to air side activities; and

– **Tertiary usage** – those activities that are supportive to the general airport precinct however their location directly adjacent to the airport is not imperative.

It is essential that the site selection process of this study does not adversely effect future options for the expansion of runway capacity at RAAF Base Williamtown/ NAL. To ensure this, an analysis was undertaken of likely expansion options and governing regulations in order to provide a level of assurance that the selected area did not impact on future expansion. This report should be read in conjunction with the detailed accompanying report relating to expansion options undertaken by GHD as part of this study.

6.2.3 Future Runway Dimensions

Future runway dimensions have been considered taking into account the regulations, publications and guidance referenced in the attached Runway Future Planning Allowance Assessment Report (completed as part of Stage 1 of this study). The Site Selection Process for the Airport Related Employment Zone aims to ensure future runway expansion options are not precluded. To this end the following dimensions have been used for planning purposes:

Length

- Runway 3500m;
- Stopway 305m at each end;
- Public Safety Area 1500m at each end of Stop way; and
- Length Total = 7110m for the purposes of restrictions on any built environment.

Width

- 1035m minimum between parallel runways, and
- A cleared 300m buffer area around the total length of runway 7110m.

6.2.4 Runway Master Planning Options

Investigations contained in the attached report identified five runway master planning options for a second runway or runway extension at RAAF Base Williamtown (RAAF Base). This desktop assessment excludes detailed consideration of environmental issues, site conditions and detailed design/ layout for these options. The five identified options are listed below:

- Extension of Runway 12/30;
- Construction of a second runway to the north of the existing Runway 12/30;
- Construction of a second runway to the south of the existing Runway 12/30;
- Construction of a parallel runway to the south-west of the existing Runway 12/30; and
- Construction of a cross runway.

6.2.5 Extension of Runway 12/30

This option would involve lengthening the existing runway. The length of existing Runway 12/30 is 2,438m; it is 45m wide and capable of accepting operations by A320/B737/B707 without restrictions. Larger civil aircraft such as the B747/B767/A380 and future B787 require a longer runway for maximum all-up-weight operations.

A number of runway extensions were investigated in preparing the 2002 RAAF Base Williamtown Master Plan,. These investigations showed that an extension to the northwest (NW) was not possible due to the proximity of Raymond Terrace. For this reason, any extension of the runway to the NW has not been considered in this study. Any extension of the runway to the southeast would require the relocation of Medowie Road and Nelson Bay Road.

Further analysis work would need to be undertaken as to the operation feasibility of any extension to runway 12. This may include the impacts of the threshold of runway 30 moving relatively closer to the higher ground associated with the barchan dunes of the nearby coastal fringe impacting with runway 30 approaches by military aircraft in emergency configurations.

Analysis of the operational requirements for large aircraft identified that the needs could be accommodated from the existing runway length and significant cost of a runway extension to the southeast could not be justified. The 2002 RAAF Base Williamtown Master Plan therefore retains the existing runway orientation and length.

In keeping with the requirements of the consultancy brief to not preclude future options, any consideration of an Airport Related Employment Zone should ensure that an extension to Runway 12 is not precluded.

6.2.6 Construction of a Second Runway to the North of existing Runway 12/30

This option considers a second runway to the north of the RAAF Base.

Construction of a second runway to the north of the existing Runway 12/30 would impact the Hunter Water Corporation (HWC) land and the operation of the HWC bores that are located on the land. Additionally, the land to the north of RAAF Base Williamtown is environmentally sensitive, includes areas of native bushland, koala habitat and contains endangered species. Additionally there may be a need to realign Richardson Road. Construction of a second runway to the north of RAAF Base Williamtown would result in significantly longer taxiing for civil aircraft using the second runway if the civilian terminal remains in its current location. Similarly, the operation of RAAF Base Williamtown and Salt Ash Air Weapons Range may be impeded by this option.

Any requirement for a second runway is not in the Master Plans being considered by either Defence or NAL. Any drivers for such an expansion would be come from civil usage rather than military operations and would be far in excess of planned future requirements. Any considerations of such an expansion would most likely be in the realms of a national or international discussion rather than a regional planning consideration over the subsequent 20-30 year time frame.

Due to the above issues, a second runway to the north of RAAF Base Williamtown, whilst technically feasible, is deemed to be a non-viable option, based on economic, environmental and operational constraints. In either case, whether it be viable or otherwise, the location of the currently considered portion of land for the Airport Related Employment Zone, as detailed in the Stage 1 report, does not preclude future runway usage options to the north of RAAF Base Williamtown.

6.2.7 Construction of Second Runway to the South of the Existing Runway 12/30

As distinct from a closely placed parallel runway, this option considers placement of a new runway in the southern portion of the study area.

Construction of a second runway to the south of the existing Runway 12/30 would require the relocation of Medowie Road and Nelson Bay Road, as a minimum. Any consideration of a southern runway option in the study area would likely require a complete relocation and redevelopment of the NAL facility and precinct due to the distances that the runway displacement would be from the existing terminal facilities. Such an option would also need to ensure that HWC land was not impacted.

Any requirement for a second runway is not in the Master Plans being considered by either Defence or NAL. Any drivers for such an expansion would be come from civil usage rather than military operations and would be far in excess of planned future requirements. Any considerations of such an expansion would most likely be in the realms of a national or international discussion rather than a regional planning consideration over the subsequent 20-30 year time frame.

These considerations, when combined with the magnitude of the economic cost of a new runway and associated relocation of the complete NAL facilities and the increased airspace requirements impact on the RAAF, would most likely mean a broad based comparative site analysis would be undertaken on a state wide level, rather than restrict options to within the 5-10 km of the RAAF Base/NAL. Such broad based analysis means that the location of the currently considered area for the Airport Related Employment Zone, as detailed in the stage 1 report, would not affect likely future options for a second runway.

6.2.8 Construction of a Parallel Runway Southwest of Existing Runway 12/30

This option considers a parallel runway located next to the existing runway 12/30.

Construction of a parallel runway to the southwest of the existing Runway 12/30 would require the second runway to be built with a minimum separation distance between the second runway and the existing Runway 12/30. The distance of offset could vary between 760 and 1,035 m, depending on the scenarios, as discussed in the accompanying report. Such a parallel runway, would result in a second runway alignment that requires the infilling of Lake Cochran, demolition of the existing civilian Newcastle Airport precinct (including the civilian terminal), the BAE Systems hangar, the sewage treatment plant and other facilities. Additionally, due to the operational need to de-conflict arriving and departing aircraft, such a runway configuration would result in aircraft tracks that directly overfly Raymond Terrace, resulting in significant aircraft noise impacts on the residents of Raymond Terrace.

Any requirement for a second runway is not in the Master Plans being considered by either Defence or NAL. Any drivers for such an expansion would be come from civil usage rather than military operations and would be far in excess of planned future requirements. Any considerations of such an expansion would most likely be in the realms of a national or international discussion rather than a regional planning consideration over the subsequent 20-30 year time frame.

Due to the cost of relocation of the NAL facilities and the cost of any second runway, this option involves the same discussion points as raised in the above option for a new runway in the south of the study area. For this reason, a parallel runway is not considered a viable option due to economic and operational grounds and thus will not be considered further in the Airport Related Employment Zone investigations.

6.2.9 Construction of a Cross Runway on RAAF Base Williamtown

Construction of a cross north south runway is not considered to be viable, due to its impact on RAAF Base Williamtown and the civilian Newcastle Airport precinct, as a cross runway would require the relocation of a significant number of facilities, which Defence have indicated is out of the question. Additionally, as noted earlier, the existing runway orientation meets the 95% wind useability criteria and that a cross-runway or realignment of the main runway is not required. Similarly, a cross runway would not add significantly to the movements capacity at the airfield. This option will not be considered further in this report.

6.2.10 RAAF Base Williamtown/Newcastle Airport - Airport Related Employment Zone Impacts on a Second Runway or Runway Extension

Extension of Runway 12/30

Analysis of the operational requirements for large aircraft indicates that the existing runway can accommodate these requirements. As such, a runway extension to the southeast is not currently required.

However, to ensure future options for the extension of Runway 12/30 are not excluded, the proposed RAAF Base Williamtown/NAL Airport Related Employment Zone should exclude from any development an area from the existing threshold of runway 30 in a direction of 120 degrees (existing runway alignment), for an aggregate distance of 7110m and width of 300 m. This distance takes into account future runway length consideration of 3500m plus public safety distances along the extended centreline of the runway.

Development in the Airport Related Employment Zone would need to take into account the following limitations and design criteria:

- Protection of operational airspace;
- Plumes;
- Protection of navigation aids, radars and communication systems;
- Aircraft noise;
- Bird hazards to aircraft;
- Emission of airborne particulates;
- Temporary/transient obstructions;
- Extraneous lighting and reflective surfaces; and
- Public safety areas.

Conclusion in Relation to Runway Options

All duplications (constructions of new runways) were considered of such magnitude, cost and possible impact to both RAAF Base Williamtown operations and increased local noise impact as to necessitate wider consideration of available airport relocation options. For these reasons, the current site under consideration as part of the Airport Related Employment Zone study does not preclude future second runway options.

7. Physical Environment - Preliminary Investigations

The following preliminary investigations focus on the study area of approximately 500ha, an area generally identified by the medium scenario identified in a previous Economic Opportunities Study. The aim of these preliminary investigations is to narrow down the area that will be considered in the second stage of the project (anticipated to be an area of approximately 100ha). The following investigations are based on preliminary site inspections and information largely collected in previous studies. For each aspect a literature review is undertaken followed by an analysis and conclusion.

7.1 Potential Acid Sulphate Soils

7.1.1 Literature Review

Most of the study area is overlain by the Tilligerry Mud Member, which was deposited upon the Tomago Sandbeds during the last 3,000 years (Wooley et al., 1995). These alluvial plain soils are dominated by low permeability estuarine clays (Bobs Farm estuarine and Fullerton Cove landscapes), which have been associated with the presence of acid sulphate soils (ASS). The Williamtown ASS Risk map (DLWC, Dec. 1997) indicates a high probability of ASS occurring between 1 and 3m Below Ground Level (BLG) within the site, with disturbance activities such as drainage and excavation potentially leading to environmental degradation of sensitive groundwater and surface water resources.

A study undertaken by Environmental & Earth Sciences Pty Ltd (2000) defined the extent and severity of ASS in the Port Stephens area, and assessed the degree of oxidation and acid production that had occurred up until early 2000. Soils from the single borehole tested for ASS within the study site revealed undetectable levels of actual acidity, but considerable amounts of potential acidity that could be produced if these soils were excavated and/or de-watered.

7.1.2 Conclusion in Relation to the Preliminary Acid Sulphate Soils Investigations

It is expected that potential future disturbance of these soils from development activities could lead to increased acid production and environmental impacts. However the extent and severity of ASS within the study site could not be further assessed or delineated due to the limited amount of quantitative ASS data available.

Given the nearly uniform geology of the area it is highly likely that ASS would present a development constraint over most of the study site.

7.2 Groundwater

7.2.1 Literature Review

The study site lies within the inner barrier dune system of the Newcastle Bight, known as the Tomago Sandbeds. The Sandbeds, with a total area of more than 150 km^2, extend to the east together with the Stockton and Tomaree Sandbeds to form an extensive cover of highly permeable sediments with thicknesses generally greater than 18m (Wooley et al., 1995). The transmissivity in the aquifer is up to 900 m2/day, with vertical and horizontal hydraulic conductivities of up to 1.5 m/day and 15 m/day respectively (Wooley et al., 1995). In over 50% of the study site's area these sandbeds are overlain by the Tilligerry Mud Member, which is dominated by low permeability clay rich soils. The watertable within the study site varies from 0 to 5m Australian Height Datum (AHD), with the regional groundwater flow to the southeast (Wooley et al., 1995).

The Tomago aquifer provides high yields of good quality water, which has been extensively developed by HWC to augment the water supply to the greater Newcastle area. There are currently over 550 abstraction points within the sandbeds, including over 20 pumping stations that have a total abstraction capacity of approximately 150 ML/day. Groundwater extracted from vacuum stations is targeted at 12 to 15m BGL, while borefields target the bottom 6m of the aquifer (between 18 to 24m BGL). The closest bore stations, PS5, PS7, PS9 and PS23, are located less than 3 km to the north of the study site.

The shallow watertable and high permeability of the sandbeds while making the aquifer a good water source, however, also increases its vulnerability to contamination. In the Tomago Tomaree Stockton area, routine monitoring of the hundreds of stations positioned across the area indicates that the quality of groundwater varies significantly throughout the sandbeds. Water pumped from the aquifer system is of low salinity and low in pH (ranging between pH 4 and 6). The concentrations of dissolved iron are high to extremely high, ranging from 0.1 to 100 mg/L (Woolley et al., 1995). The variability in water quality while partially explained by natural heterogeneity within the sandbeds, is thought to be induced by such activities as:

- Urban development;
- Industrial use;
- Sewage disposal;
- Water extraction;
- Heavy mineral mining; and
- Industrial sand mining.

7.2.2 Conclusion in Relation to the Preliminary Groundwater Investigations

The study area does not fall under the HWC Special Areas Regulations (1997), nor does it include HWC freehold land that contains extraction facilities or designated groundwater capture zones. Hence development of this land is not directly impacted by HWC development restrictions. However, the high growth development scenario discussed in the Economic Opportunities Study would be restricted by the presence of land that falls under the HWC Special Areas Regulations (1997), and includes sensitive HWC freehold land that would be critical to the HWC drought and emergency water supply strategies.

7.3 Geotechnical

7.3.1 Literature Review

Reference to the 1:100,000 Newcastle Coalfield Regional Geology indicates Quaternary alluvial/aeolian deposits underlie the site. The majority of the site is typically underlain by gravels, sands silts and clays deposited in either point bar, levee, swamp and/or estuarine environments; whilst the north-western quarter of the study area (adjacent to the airport) is typically underlain by dune and/or beach sand deposits.

Reference to the 1:100,000 Soil Landscapes Map of the Newcastle Region indicates that the site lies largely within the Bobs Farm estuarine and a variant of the Tea Gardens aeolian soil landscape units. These unit boundaries correspond roughly with the geological unit boundaries described above and are shown in Figure 6 –Soil Landscape Units Within The Study Area.

Minor soil landscapes noted within the study area and shown in Figure 2 include the Blind Harry Swamp soil landscape unit associated with the patch of swampy ground near the western margin of the study area and the Shoal Bay aeolian soil landscape unit associated with the exposed dune system west of the airport access road.

The Bobs Farm soil landscape unit incorporates broad inter-barrier estuarine flats on the Tomago Coastal Plain. The topography is characterised by slope gradients less than 1% and elevations between 1m and 3m. Soils within this unit are typically deep (>3m) very poorly drained estuarine mud deposits. Dominant soil materials include organic rich loam (sandy silty clays) overlying and saturated plastic clays. Noted soil limitations within the loam include low wet bearing strength, localised potential acid sulphate soils, very strong acidity to strong alkalinity and salinity; while in the plastic clays soil limitations include those listed above as well as high plasticity, moderate shrink/swell potential, dispersion, very low permeabilities, high aluminium toxicity potential and potential acid sulphate soils.

The Tea Gardens variant (a) soil landscape unit incorporates Pleistocene beach ridges on the Tomago coastal plain. The topography is characterised by slopes typically less than 5% and elevations between 5m and 8m. Soils have generally been re-worked by wind action producing irregular sandy low rises and broad deflation basins and swales. Dominant soil materials include loamy sand and/or bleach sand topsoils overlying loam sand to sand subsoils. Noted limitations include organic soils, extreme acidity, low fertility, high potential aluminium toxicity, high permeability, low wet bearing strength, high erodibility and low available water holding capacity.

1:22,000
0 75 150 300 450 600
Metres
Map Projection: Universal Transverse Mercator
Horizontal Datum: Geodetic Datum of Australia 1994
Grid: Map Grid of Australia, Zone 56

GRID N

LEGEND

Study Area
Main Road
Road

Soil Landscapes

D, Disturbed Area
Sb, Shoal Bay Soil Landscape
ba, Blind Harry Swamp Soil Landscape
bf, Bobs Farm Soil Landscape
tna, Tea Gardens Variant (a) Soil Landscape

Spatial layers courtesy of Port Stephens Council

13 July 2006

Soil Landscape Units

//2212808/GIS/Maps/Report Figures/Fig5_SoilLandscape_120706.mxd

The Blind Harry Swamp soil landscape incorporates waterlogged swales, periodically submerged swamp forest and deflation areas on sands of the Tomago Coastal Plain. The topography of the area is characterised by level to very gentle inclined closed depressions with extremely low reliefs. The dominant soils are organic fibrous peat overlying sand or loamy sand. Noted limitations include low wet bearing strengths, organic soils, very strong acidity, moderate salinity and localised potential acid sulphate soils.

The Shoal Bay soil landscape unit incorporates Pleistocene sand sheets and low dunes on the Tomago Coastal Plain. The topography of the soil landscape includes inclined sand sheets, low undulating dunes with slope gradients typically less than 15% and local relief less than 10m with minor swampy areas occurring in depressions. Dominant soils include sands and loamy sands. Landscape limitations include high wind erosion hazard, non cohesive soils, localised steep slopes and ground water pollution hazards.

The site visit confirmed the presence of all four soil landscape units noted above. The approximate unit boundaries based on published mapping and site observations are shown in Figure 5– Soil Landscape Units for the Study Area. The Blind Harry Swamp landscape appeared to occupy a slightly larger area than mapping indicated, however, access to this area was limited due to the high water table and waterlogged nature of the area.

Shallow hand auger drilling confirmed the presence of organic clay soils in the Bobs Farm soil landscape units at the southern margin of the B&M Ellison Pty Ltd property close to Cabbage Tree Road. Similarly, hand auger drilling within the Shoal Bay soil landscape confirmed the presence of aeolian sand and silty sand.

A disused roadway, partly paved in areas, was observed within the B & M Ellison Pty Ltd. property towards the northeastern corner of the adjacent Mr R P Drysdale property. The roadway extends across the northern section of the B & M Ellison Lot running in an approximate northwest direction and included fill materials consisting of highly weathered carbonaceous siltstone which appeared moderately compacted. Similar material was observed in a nearby stockpile. An existing dam was observed in the disturbed area incorporating the NAL.

7.3.2 Conclusion in Relation to the Preliminary Geotechnical Assessment

The preliminary geotechnical assessment is based on the available soil landscape data and would need to be ‘truthed’ by preliminary subsurface investigations (proposed as part of the Stage 2 work). This would confirm the extent to which the general limitations, identified for each broad soil landscape unit, apply for specific parts of the site.

The soil landscape units identified (Figure 5), present significant limitations to development for urban/industrial development within the study area. The limitations to such development are detailed below:

The Bobs Farm Unit presents generally high limitations for development including flooding, waterlogging, potential acid sulphate soils and high foundation hazard. The high limitations extend to earthworks within this unit, which would be affected by high water tables and high plasticity (and potentially reactive) subsoils.

The Tea Gardens Units present generally moderate limitations for development. Limits to development include high foundation hazards in waterlogged swales and high wind erosion hazard. The sandy soils could present difficulties for earthworks operations, particularly in the silty strata.

The Blind Harrys Swamp Unit presents a severe limitation to development as soils are generally waterlogged, highly organic and possess a low weight bearing strength, resulting in obvious constraints to foundations and earthworks.

The Shoal Bay Unit presents only moderate limitations to development, similar to those of the Tea Gardens unit.

7.4 Hydrology, Flooding and Drainage

7.4.1 Literature Review

The WBM Williamtown Salt Ash Flood Study (April 2005) investigated the flood and drainage behaviour of the Williamtown/Salt Ash catchment. This study included the examination of Windeyers Creek, Moors drain, Tilligerry Creek, Fullerton Cove and the Hunter River.

Design Flood Maps generated as part of this investigation, indicate the extent and level of flooding that would result from a number of scenarios. The various scenarios include local catchment rainfall, tidal effects and flooding from the Hunter River with the break out occurring south of Raymond Terrace. These design flood maps were reviewed to allow for a determination of flow direction over the site.

Further examination of the site was undertaken using mapping. A variety of available contour data was used to generate a digital terrain model of the area. From this, the flow direction and consequently flow paths were generated.

A comparative analysis of the flow paths determined from the design flood maps and those generated from GIS was undertaken. This comparison found that both methods produced the same general flow direction and paths.

Figure 6 demonstrates the flow paths and areas mapped as flood prone throughout the site and surrounding it. The figure also indicates that flows to the north of Cabbage Tree Road generally traverse from west to east with the area to the north west of Cabbage Tree and Nelson Bay Roads being inundated on a regular basis. With consideration given specifically to local catchment rainfall, the area of inundation for minor events is only marginally less than in the larger storm event.

To the east of Nelson Bay Road, flows generally traverse in a southerly direction and eventuate at Fullerton Cove. The area of inundation resulting from local catchment rainfall is again only marginally less for a minor event than it is for a major event.

Examination of the Flood Depth and Water Velocity maps generated as part of the Williamtown Salt Ash Flood Study indicate that for the 100 year storm event the flow velocities generally range from between 0.1m/s and 0.3m/s with some localised areas generating velocities up to 0.6m/s. The corresponding flow depths at these locations range from between 0.25m and approximately 0.5m with a maximum of 0.75m.

With consideration given the worst case of 0.6m/s at 0.75m depth, the velocity/depth product was determined to be 0.45m^2/s. The limit for this product is generally nominated as 0.4m^2/s for safety purposes with an upper limit of 0.6m^2/s also being considered acceptable in 100 year storm events. This implies that under the existing flooding conditions there are no significant safety issues.

The site is subjected to regular inundation and has a number of flow paths that are not generally well defined. Provided allowance was made for the inclusion of defined flow paths, select placement of fill could be undertaken to create areas for buildings while maintaining flow paths and existing flood conditions.

7.4.2 Conclusion in Relation to the Preliminary Hydrology, Flooding and Drainage Investigations

Any development of the subject area could incorporate flow paths by aligning a number of proposed roads within the study area with the existing flow paths. This would enable the roadway to act as a more defined flow path. The configuration of these flow paths would be such that the required velocity/depth product was maintained ensuring no increase in safety risk. A further option could be to incorporate a series of lakes within the layout, providing detention storage and allowing for some level of control to be applied to flows within the site.

With consideration given to the above findings, the limitations placed on the development of the site in respect to flooding are minimal. While the area is subjected to regular inundation, the placement of fill required to achieve the desired flood-free floor level, could be done in such a manner as to have negligible impact on the existing flooding conditions.

7.5 Preliminary Ecological Assessment

7.5.1 Literature Review

The desktop literature review aims to identify threatened species and/or endangered ecological communities listed under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and NSW *Threatened Species Conservation Act 1995* (TSC Act) previously recorded within the locality or that may have the potential to occur at the site. Material reviewed included available previous studies conducted in the area, relevant planning documents and database searches of State and Commonwealth threatened species records including:

- Department of Environment and Conservation (DEC) Threatened Species Database - searched for threatened species previously recorded in the locality (i.e. 10 km radius) (DEC 2006);
- The Department of Environment and Heritage (DEH) online database for Matters of National Environmental Significance (DEH 2006); and
- Lower Hunter Central Coast Regional Environment Strategy (2003) (LHCCREMS).

7.5.2 Limitations

Given the assessment was based on a desktop review of previous information and no site inspection has been undertaken, there is the potential for additional threatened species to those listed on the database searches to occur at the site. The type and extent of vegetation communities may also differ once ground verified. Furthermore, in areas where no past vegetation mapping has been undertaken an assessment of the likely habitat has been based on aerial photography.

7.5.3 Literature Review Results

The results of the DEC threatened species database search are shown in Figure 7 and Figure 8. Figure 7 gives the results for a 10km radius and Figure 8 offers the results for the study area. A brief assessment of the potential for threatened species to occur at the site is provided below. A number of Matters of National Significance listed under the EPBC Act also have the potential to occur within the locality including:

- One threatened ecological community; and
- Thirty-seven threatened species.

The following references were used to assist in the identification of any regionally significant vegetation communities mapped for LHCCREMS within the study area:

- Port Stephens Council (PSC) State of the Environment Report (PSC 2004); and
- LHCCREMS Community User Guide for Regional Vegetation Maps (http://www.hccrems.com.au/biodiversity/user_guide.html, 2003b).

7.5.4 Vegetation Communities

LHCCREMS mapping identified four vegetation communities in the study area, depicted in Figure 9. These communities and their characteristic canopy species are detailed in Table 1. Based on the LHCCREMS mapping and information from PSC regarding which LHCCREMS map units are likely to correspond with State and Commonwealth listed Endangered Ecological Communities (EECs) (PSC 2004), there is the potential for two EECs to occur in the study area, namely:

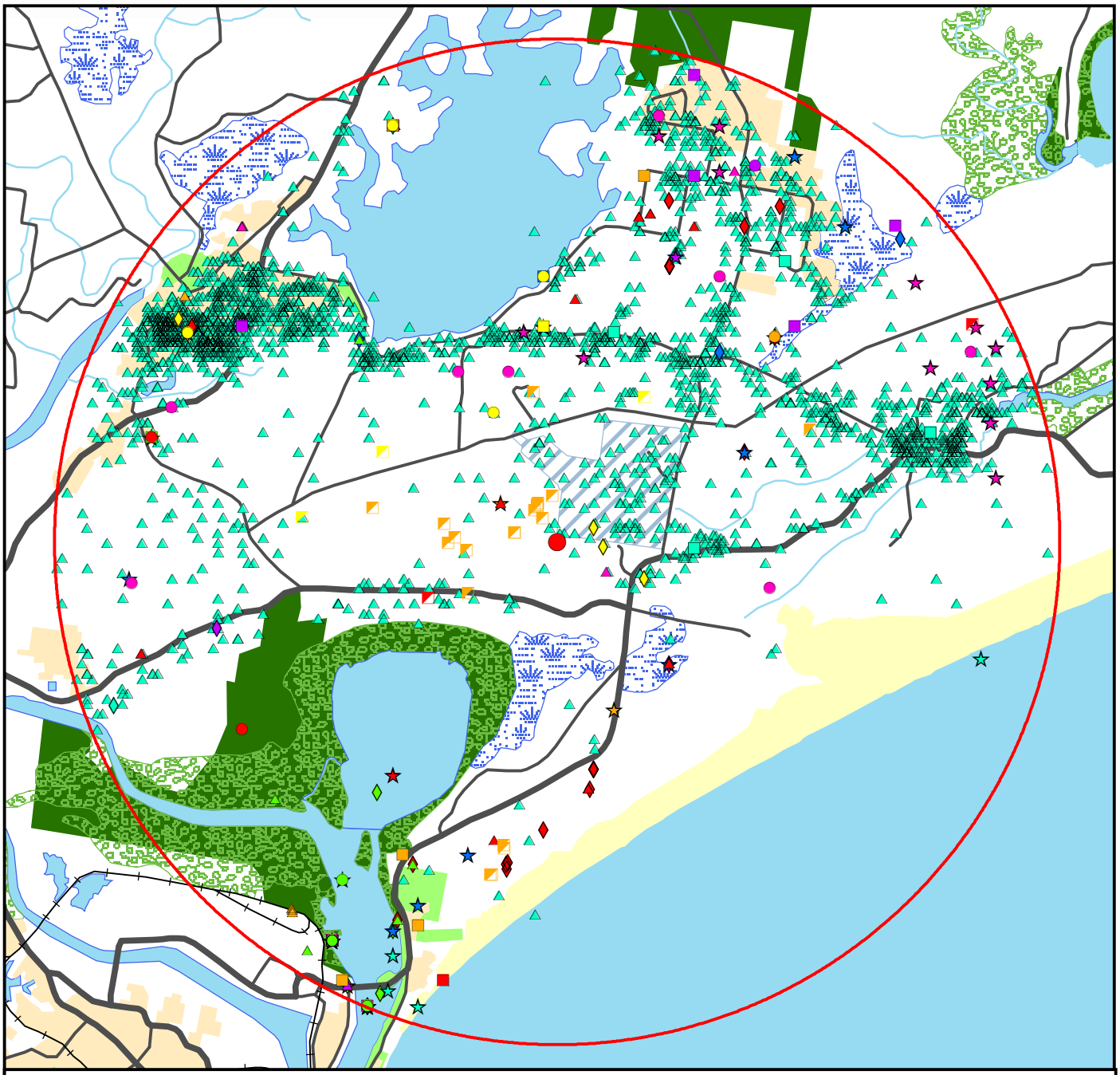
- Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions; and
- Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions.

DEH also identified one critically endangered ecological community as potentially occurring within the area, namely, White Box / Yellow Box / Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

Table 1 Description and Preliminary Analysis of Significance of LHCCREMS Vegetation Communities Mapped for the Study Area

LHCCREMS Map Unit	Map Unit Name	Canopy Species	Possible Endangered Ecological Community	Regionally Vulnerable Vegetation Communities	Regionally Specialised Vegetation Communities	NPWS Significant Vegetation Communities
34	Coastal Sand Wallum Woodland / Heath	*Banksia aemula / Corymbia gummifera / Angophora costata*				
37	Swamp Mahogany Paperbark Forest	*Melaleuca quinquinervia / Eucalyptus robusta / Casuarina glauca*	Swamp Sclerophyll Forest on Coastal Floodplains	X		X
40	Swamp Oak Rushland Forest	*Casuarina glauca / Melaleuca ericifolia / Baumea juncea*	Swamp Oak Floodplain Forest		X	X
36	Tomago Sand Swamp Woodland	*E. parramattensis subsp decadens, Leptospermumn polygalifolium*		X	X	

GHD CLIENTS | PEOPLE | PERFORMANCE



Threatened Flora

- Eucalyptus camfieldii
- Eucalyptus parramattensis decadens
- Rulingia prostrata

Threatened Fauna

- Australasian Bittern
- Black Bittern
- Black-necked Stork
- Black-tailed Godwit
- Blue-billed Duck
- Broad-billed Sandpiper
- Brown Treecreeper
- Brush-tailed Phascogale
- Bush Stone-curlew
- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Eastern Freetail-bat
- Emu
- Freckled Duck
- Glossy Black-Cockatoo
- Great Knot
- Greater Broad-nosed Bat
- Green and Golden Bell Frog
- Grey-crowned Babbler
- Grey-headed Flying-fox
- Koala
- Large-footed Myotis
- Lesser Sand-plover
- Little Bentwing-bat
- Little Tern
- Masked Owl
- Osprey
- Painted Snipe
- Pied Oystercatcher
- Powerful Owl
- Regent Honeyeater
- Spotted-tailed Quoll
- Squirrel Glider
- Superb Fruit-Dove
- Swift Parrot
- Terek Sandpiper
- Turquoise Parrot
- Wallum Froglet
- Wompoo Fruit-Dove
- Yellow-bellied Sheathtail-bat

1:120,000

0 600 1,200 2,400 3,600

Metres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geodetic Datum of Australia 1994
Grid: Map Grid of Australia, Zone 56

GRID N

LEGEND

- Site location
- Site location buffer
- Sand dunes, beach
- Rail
- Main Road
- Road
- Drainage
- Water
- Mangrove
- Wetland
- Restricted Area
- Reserves
- Built area
- Park

Spatial layers courtesy of Geoscience Australia, Department of Environment and Conservation

12 July 2006

DEC Threatened Species Records (2006)

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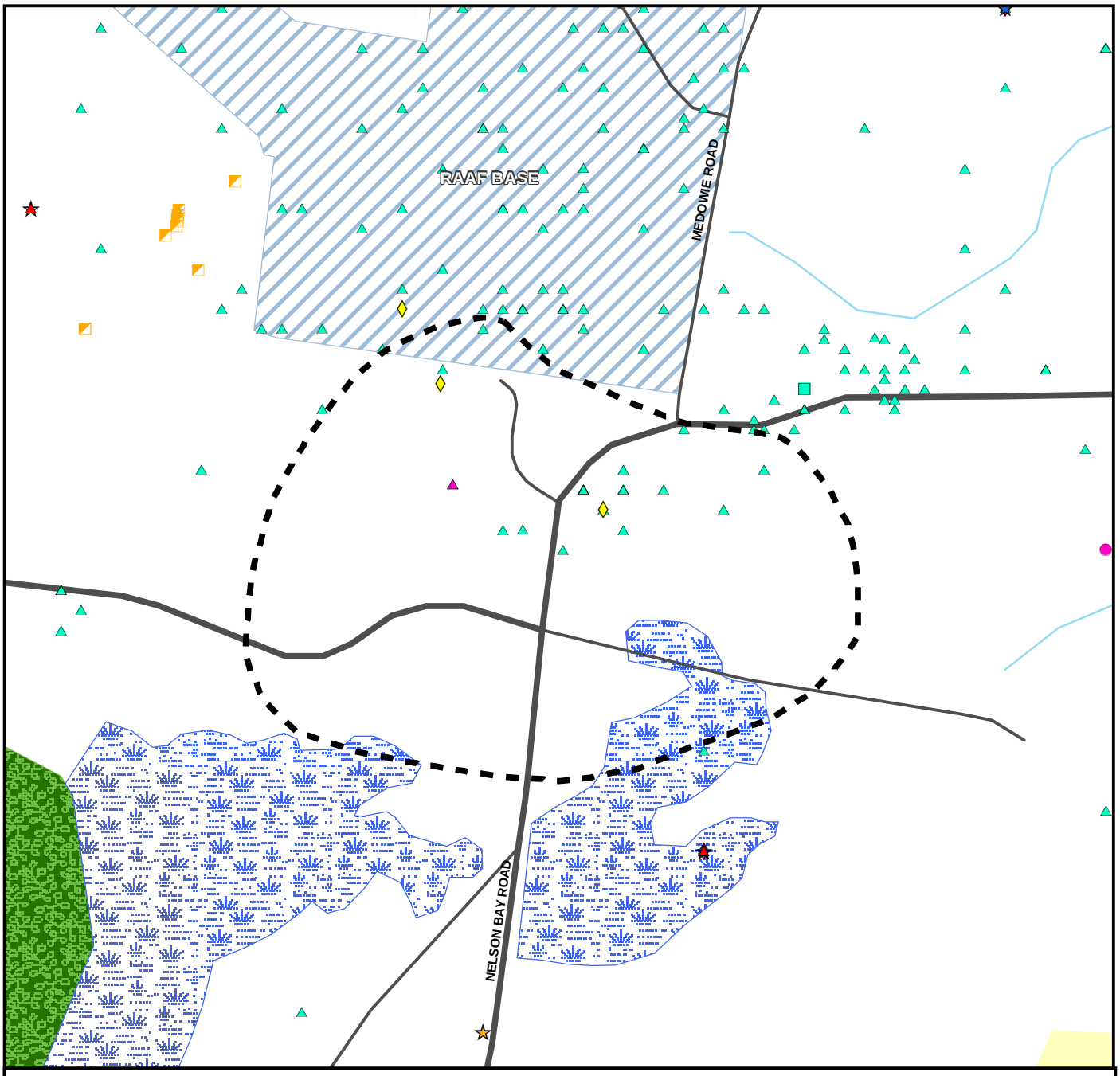

Threatened Flora

- Eucalyptus camfieldii
- Eucalyptus parramattensis decadens
- Rulingia prostrata

Threatened Fauna

- Australasian Bittern
- Black Bittern
- Black-necked Stork
- Black-tailed Godwit
- Blue-billed Duck
- Broad-billed Sandpiper
- Brown Treecreeper
- Brush-tailed Phascogale
- Bush Stone-curlew
- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Eastern Freetail-bat
- Emu
- Freckled Duck
- Glossy Black-Cockatoo
- Great Knot
- Greater Broad-nosed Bat
- Green and Golden Bell Frog
- Grey-crowned Babbler
- Grey-headed Flying-fox
- Koala
- Large-footed Myotis
- Lesser Sand-plover
- Little Bentwing-bat
- Little Tern
- Masked Owl
- Osprey
- Painted Snipe
- Pied Oystercatcher
- Powerful Owl
- Regent Honeyeater
- Spotted-tailed Quoll
- Squirrel Glider
- Superb Fruit-Dove
- Swift Parrot
- Terek Sandpiper
- Turquoise Parrot
- Wallum Froglet
- Wompoo Fruit-Dove
- Yellow-bellied Sheathtail-bat

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0 150 300 600 900

Metres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geodetic Datum of Australia 1994
Grid: Map Grid of Australia, Zone 56

GRID N

LEGEND

- Study Area
- Sand dunes, beach
- Rail
- Main Road
- Road
- Drainage
- Water
- Mangrove
- Wetland
- Restricted Area
- Reserves
- Built area
- Park

Spatial layers courtesy of Geoscience Australia, Department of Environment and Conservation

12 July 2006

DEC Threatened Species Records (2006)

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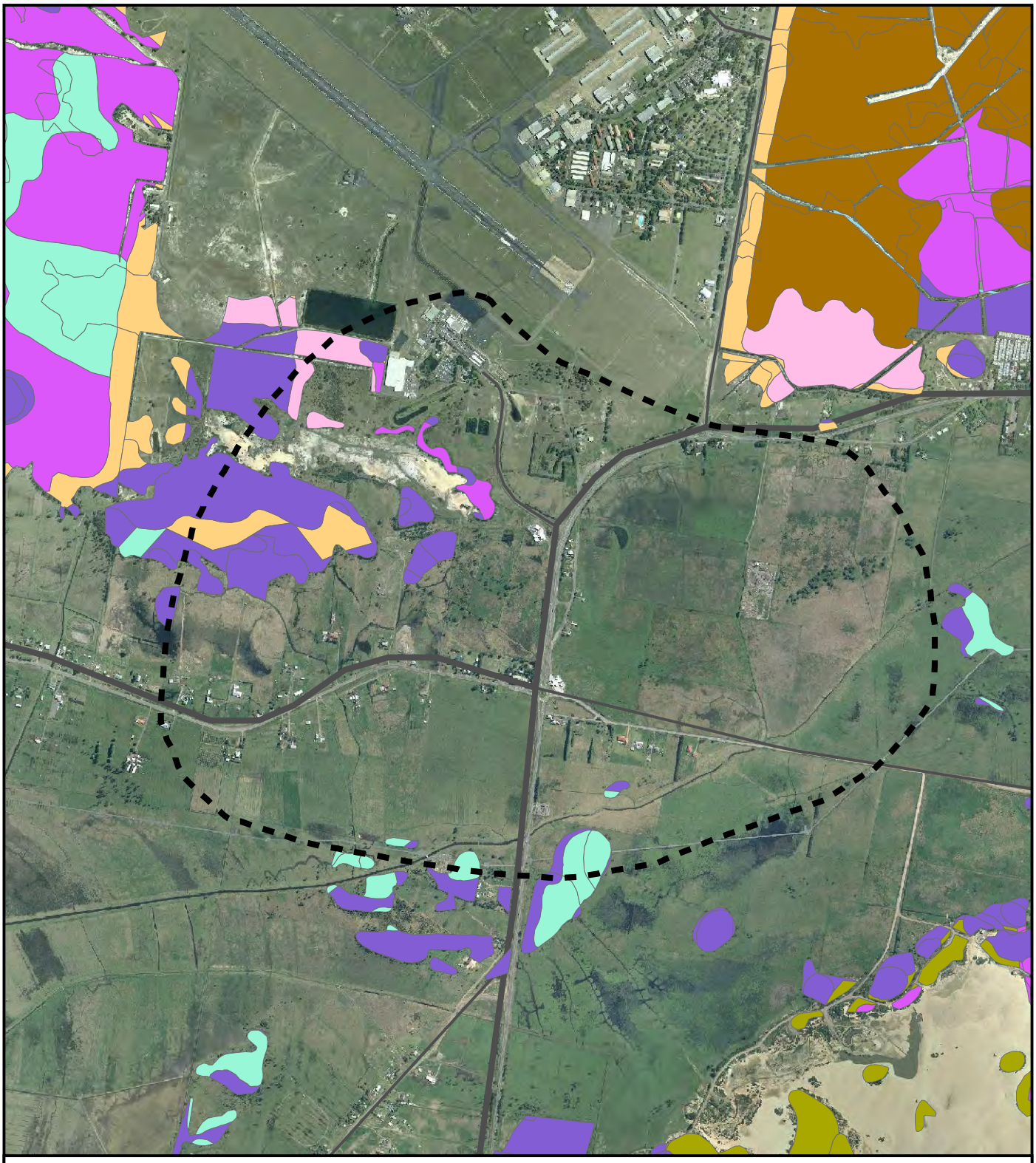

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Spatial layers courtesy of Department of Lands, and Port Stephens Council

12 July 2006

LHCCREMS Vegetation Mapping

7.5.5 Flora

Threatened flora species recorded by the DEC within a 10 km radius of Williamtown, their legal status and likelihood of occurring within the study area are shown in Table 2. This assessment was based on the vegetation mapping of the area and therefore the likely presence of suitable habitat at the site. *Eucalyptus parramattensis ssp decadens* is characteristically associated with the Tomago Sand Swamp Woodland. Given this vegetation community has been mapped by LHCCREMS in the northwest region of the study area there is potential for this species to occur at the site. Sandy soils and woodland areas provide potential suitable habitat for Heart-leaved Stringybark (*Eucalyptus camfieldii*) and the Dwarf Kerrawang (*Rulingia prostrata*) within the study area.

7.5.6 Fauna

Threatened fauna species that have been recorded within a 10 km radius of Williamtown (DEC 2006), or for which potential habitat may exist in the locality (DEH 2006), their legal status and likelihood of occurring within the study area are listed in Table 3. The likelihood of these threatened species occurring at the site was based on the current vegetation mapping and hence likely habitat present. Upon further investigation those species listed as unlikely to occur may indeed be found to have suitable habitat within the study area. Suitable foraging habitat exists for a number of threatened species, most notably the Koala (*Phascolarctos cinereus*), Swift Parrot (*Lathamus discolor*) and Little Bentwing Bat (*Miniopterus australis*), all previously recorded within the study area.

The study area falls within the Port Stephens LGA and consequently *State Environmental Planning Policy No. 44 – Koala Habitat* (SEPP 44) applies. Port Stephens Council has prepared the Port Stephens Council Comprehensive Koala Plan of Management (CKPoM) (Port Stephens Council 2002) which supersedes the requirements of SEPP 44. The CKPoM, along with SEPP 44 aims to encourage conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent population over their present range and to reverse the current trend of Koala population decline.

The CKPoM sets out survey guidelines for Koala Habitat Assessments consisting of a four-step process. This process involves a preliminary assessment in which the presence of habitat, habitat buffers or habitat linking areas is determined. If present, the areas should be mapped. If inconsistencies with the existing LGA vegetation maps arise it is necessary to further identify and describe the habitat in detail. Establishment of the presence of previously unmapped Koala habitat or associated habitat on the site necessitates the consideration of Koala habitat in the assessment of the proposal. The Koala has been recorded within the locality and within the study area, it is therefore likely that there is the potential for the site to support Koala habitat.

Table 2 Threatened Flora Species Recorded Within a 10 km Radius of Williamtown (DEC 2006)

Species Name	Common Name	TSC Act Status	EPBC Act Status	Likelihood of Occurring in Study Area
Eucalyptus camfieldii	Heart-leaved Stringybark	V	V	May occur, potentially suitable heath habitat and sandy soils occur within the study area.
Eucalyptus parramattensis subsp. *decadens*	Earp's Gum	V	V	May occur, Tomago Sand Swamp Woodland vegetation community has been mapped within the study area.
Rulingia prostrata	Dwarf Kerrawang	E	E	May occur, potentially suitable woodland habitat and sandy soils have been mapped within the study area.

E = Endangered, V = Vulnerable, TSC Act = *Threatened Species Conservation Act 1995* , EPBC Act = *Environment Protection and Biodiversity Conservation Act 1999*

Table 3 Threatened Fauna Species Recorded Within a 10 km Radius of Williamtown (DEC 2006)

Species Name	Common Name	TSC Act Status	EPBC Act Status	Likelihood of Occurring in Study Area
Crinia tinnula	Wallum Froglet	V		May occur, suitable habitat includes swamp forest, paperbark and swamp heath.
Litoria aurea	Green and Golden Bell Frog	E	V	May occur if suitable habitat such as water bodies with an open area and areas of in-stream vegetation exist within the study area.
Avifauna				
Botaurus poiciloptilus	Australasian Bittern	V		Unlikely to occur as it prefers large permanent wetlands.
Burhinus grallarius	Bush Stone-curlew	E		May occur, suitable habitat may exist within woodland areas.
Calidris tenuirostris	Great Knot	V	M	Unlikely to occur as it is primarily a coastal species, favouring mudflats, harbours and lagoons.
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	E	May occur if significant stands of *Allocasuarina* feed trees and/or hollow bearing trees are present within the study area.
Charadrius mongolus	Lesser Sand-plover	V	M	Unlikely to occur as it is primarily a coastal species, favouring mudflats, harbours and lagoons.

Species Name	Common Name	TSC Act Status	EPBC Act Status	Likelihood of Occurring in Study Area
Climacteris picumnus	Brown Treecreeper	V		May occur, suitable habitat may exist within woodland areas.
Dromaius novaehollandiae	Emu	EP		May occur, suitable habitat present.
Ephippiorhynchus asiaticus	Black-necked Stork	E		Unlikely to occur as it prefers large permanent wetlands.
Haematopus longirostris	Pied Oystercatcher	V		Unlikely to occur as it is primarily a coastal species, favouring mudflats, harbours and lagoons.
Ixobrychus flavicollis	Black Bittern	V		Unlikely to occur as it prefers areas of dense vegetation around terrestrial and estuarine wetlands.
Lathamus discolor	Swift Parrot*	E	E	May occur, has been recorded within the study area previously.
Limicola falcinellus	Broad-billed Sandpiper	V	M	Unlikely to occur as it is primarily a coastal species, favouring mudflats, harbours and lagoons.
Limosa limosa	Black-tailed Godwit	V	M	Unlikely to occur as it is primarily a coastal species.
Neophema pulchella	Turquoise Parrot	V		May occur, suitable habitat may exist within woodland areas.

Species Name	Common Name	TSC Act Status	EPBC Act Status	Likelihood of Occurring in Study Area
Ninox strenua	Powerful Owl	V		May occur, has been recorded previously nearby and may utilise study area if suitable habitat exists.
Oxyura australis	Blue-billed Duck	V		Unlikely to occur as it prefers large permanent wetlands.
Pandion haliaetus	Osprey	V		Unlikely to occur as it is a marine species which may forage across nearby bays.
Pomatostomus temporalis subsp *temporalis*	Grey-crowned Babbler	V		May occur, suitable habitat may exist within woodland areas.
Ptilinopus magnificus	Wompoo Fruit-dove	V		May occur, if fruit-bearing trees are present within forests and woodland areas.
Ptilinopus superbus	Superb Fruit-dove	V	M	May occur, if fruit-bearing trees are present within forests and woodland areas.
Rostratula benghalensis	Painted Snipe	E	V, M	May occur, potential habitat may exist in south east region within marshy areas.
Sterna albifrons	Little Tern	E		Unlikely to occur as it is primarily a coastal species.
Stictonetta naevosa	Freckled Duck	V		Unlikely to occur as it prefers permanent freshwater.
Tyto novaehollandiae	Masked Owl	V		May occur, if suitable areas of woodland for foraging and roosting habitat is present.

Species Name	Common Name	TSC Act Status	EPBC Act Status	Likelihood of Occurring in Study Area
Xanthomyza phrygia	Regent Honeyeater	E	E	May occur, suitable habitat may exist within woodland areas if suitable winter flowering species present.
Xenus cinereus	Terek Sandpiper	V		Unlikely to occur as it is primarily a coastal species, favouring mudflats, harbours and lagoons.
Bats				
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		May occur, suitable foraging and roosting habitat may exist within woodland areas.
Miniopterus australis	Little Bentwing-bat*	V		May occur, has been recorded previously within the study area.
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V		May occur, suitable foraging and roosting habitat may exist within woodland areas and developments.
Mormopterus norfolkensis	Eastern Freetail-bat	V		May occur, suitable foraging and roosting habitat may exist within woodland areas.
Myotis adversus	Large-footed Myotis	V		May occur, suitable roosting habitat may exist within woodland areas and foraging over more open areas with bodies of water.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V		May occur, suitable foraging and roosting habitat may exist within woodland and more open areas.

Species Name	Common Name	TSC Act Status	EPBC Act Status	Likelihood of Occurring in Study Area
Scoteanax rueppellii	Greater Broad-nosed Bat	V		May occur, suitable roosting habitat may exist within woodland areas.
Other Mammals				
Dasyurus maculatus	Spotted-tailed Quoll	V	E	May occur, suitable habitat includes woodland, swamp forest and heath.
Petaurus norfolcensis	Squirrel Glider	V		May occur, if suitable nesting and foraging habitat is present within woodland areas.
Phascogale tapoatafa	Brush-tailed Phascogale	V		May occur, suitable habitat within heaths and forests.
Phascolarctos cinereus	Koala*	V		May occur, has been recorded previously within the study area.
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	May occur, if suitable foraging habitat is present.

E = Endangered, V = Vulnerable, TSC Act = *Threatened Species Conservation Act 1995*, EPBC Act = *Environment Protection and Biodiversity Conservation Act 1999*; * = Species previously recorded within the study area

7.5.7 Conclusion in Relation to the Preliminary Ecological Assessment

The vegetation communities present and previous records of threatened species within the area indicate that there may be potential habitat for a number of threatened flora and fauna species as well as endangered ecological communities within the study area. The areas most likely to contain flora and fauna of value are those that have had the fewest alterations to the natural landscape and that currently contain intact vegetation (e.g. wooded areas). Areas that have been pasture improved and grazed for many years or areas that have had the natural hydrology altered are less likely to contain areas of important flora and fauna. Further on-site investigations are required to verify the presence of suitable habitat for these and other species and the occurrence of any populations, communities or species listed under the TSC Act or EPBC Act.

7.6 Summary of Findings of Physical Environment Investigations

The preliminary assessment of the physical environment of the study area found the following:

1. It is highly likely that acid sulphate soils (ASS) present a development constraint for the low lying land within the study area. An ASS Management Plan will be required with the intention of minimising the disturbance of potential ASS. This Plan would also incorporate appropriate construction methods to minimise potential impacts during the construction stages and in the longer term.
2. No development is recommended in the areas affected by the HWC Special Areas Regulations (1997) nor the sensitive HWC freehold land critical to HWC drought and emergency water supply strategies.
3. Geotechnical issues raised warrant significant further assessment to verify the extent of the identified soil landscape units particularly where moderate and high limitations to future development were identified as likely. This may attract potentially high remediation costs to facilitate future development.
4. Flooding and drainage are issues for further investigation, however the future development of the site is likely to better define the flow paths that occur at present.
5. There may be potential habitat for a number of threatened flora and fauna species as well as endangered ecological communities within the study area. Onsite investigations are necessary to define boundaries for future development and to ground truth the existing mapping available including the koala habitat mapping in the Port Stephens Council Comprehensive Koala Plan of Management.

8. Investigation of Infrastructure Requirements

8.1 Water and Sewerage

Hunter Water Corporation (HWC) undertakes periodic reviews of its water supply and wastewater transportation systems. These reviews identify future potential development and the infrastructure required to service those developments. The Williamtown area has an existing water supply system but is not currently sewered, therefore only a water supply review has been undertaken for this area.

The most recent HWC review identified the Williamtown airport related employment zone area as having potential for future development. The review of infrastructure requirements adopted the high growth scenario for the area to determine future needs. The review found that, with appropriate augmentations, the high growth scenario could be adequately serviced with a water supply system.

No wastewater servicing strategy has been identified by HWC at this time. However discussions with HWC indicate that a strategy is currently underway. This strategy is to be based on the medium growth scenario as significant sections of land within the high growth scenario are owned by the HWC. They would be unwilling to allow development on that land due to its catchment value. Discussions with HWC have indicated that the strategy will include the sewage loads from Williamtown RAAF Base Williamtown and the NAL in addition to the airport related employment zone. At this time no impediments to the provision of a sewerage system have been identified.

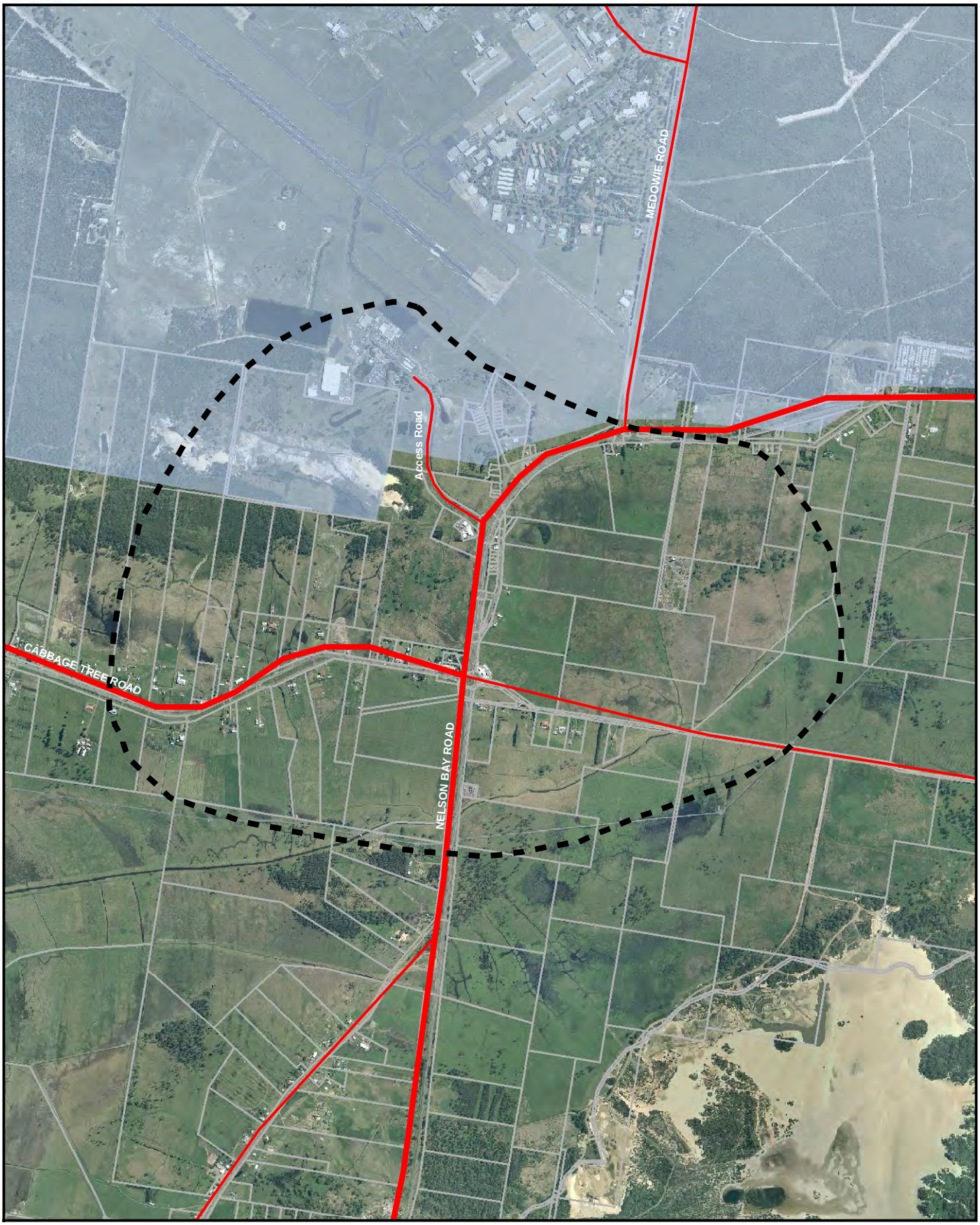
In determining the sewer strategy, HWC are assuming the RAAF Base Williamtown and NAL will connect to the sewer system as soon as it is available. This will provide a significant hydraulic load from the outset to provide more efficient pumping systems back to the Raymond Terrace Wastewater Treatment Works.

At this time HWC do not foresee funding the provision of the water supply system and sewer servicing infrastructure as regional infrastructure. Therefore funding would need to be from external sources (eg. future developers, the Department of Defence and Newcastle Airport Limited, Port Stephens Council, NSW Government).

With regard to land use within the study area, HWC have a Special Area Zone associated within the Tomago Sandbeds, this is shown as the HWC Tomago Special Area in Figure 10. Within this zone, there would be restrictions on land use to ensure that no contamination of the ground water reserves could occur.

8.2 Transport Connections – Road

The regional road network provides an important function in the Port Stephens area servicing commercial, industrial, residential and tourist activities. The road network is crucial as it supplies the only current transport link to Newcastle Airport and RAAF Base Williamtown (there are currently no other transport links to this hub). Figure 10 illustrates the major roads serving the airport related employment zone, RAAF Base Williamtown and NAL in the regional context.



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Grid: Map Grid of Australia, Zone 56

GRID
N

LEGEND

Study Area
Cadastre
Main Road
Road
HWC Tomago Special Area

Spatial layers courtesy of Port Stephens Council

13 July 2006

Transport Connections and HWC Tomago Special Area

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The local road network servicing the hub consists of the following:

- Nelson Bay Road

  This road forms part of the regional road network and is the responsibility of the RTA. It is sealed, generally two-lane, single and dual carriageway with a speed limit of 80 km/h in the rural areas. The section between Cabbage Tree Road and Medowie Road is a divided carriageway. In the long term it is proposed to upgrade this road to be dual carriageway from Newcastle to Port Stephens.

- Cabbage Tree/Tomago Roads

  These are State roads and consist of sealed, two lane single carriageways. Tomago Road connects the Pacific Hwy to Cabbage Tree Road (where the road leaves the Tomago locality and enters Williamtown). It is likely that the airport related employment zone as discussed in this report would necessitate the upgrade of this road from the airport related employment zone to the Pacific Highway.

- Medowie Road

  This local road is the responsibility of Port Stephens Council. It is a sealed, two-lane single carriageway road with a speed limit of 90 km/h. Traffic volumes on Medowie Road between Nelson Bay Road and Richardson Road are in the order of 5,400 vehicles per day. The low, medium and high growth scenarios for this section of road for the next 20-year period are 8,600, 11,000 and 16,500, vehicles per day respectively.

- Richardson Road

  This local road is under the responsibility of Port Stephens Council. It is a sealed, two-lane, single carriageway road. It connects Raymond Terrace with Medowie Road and Nelson Bay Road.

Note: The Pacific Highway is located approximately 5 km northwest of the airport related employment zone. It is the major road transport route along the coast from Sydney to Brisbane.

8.3 Transport Connections – Rail

There has been speculation of the possible rail line through Hexham running north to Medowie. This is not part of any works plan at this stage and such a line is only conceptual at this stage. A connection to rail is likely to see the area become more dimensional, adding to the industry possibilities in relation to freight movement. It would also have the potential of increasing demand for flights by reducing issues relating to parking and accessibility.

9. Conclusions from the Site Selection Process

9.1 Relevant Constraints

The Site Selection Process involved preliminary investigations including the desktop reviews of the studies provided, other relevant studies and the available mapping. This preliminary analysis is an overview of the issues likely to affect the site selection process. The factors influencing the site selection process are listed below:

- Planning considerations;
- Economic considerations;
- Operational considerations - requirements for RAAF Base Williamtown and NAL;
- Physical environment considerations – potential acid sulphate soils, groundwater, geotechnical, hydrology, flooding and drainage, ecology; and
- Infrastructure requirements.

Planning considerations found support for the proposal of an airport related employment zone providing that the new area takes into consideration the character of the existing locality. The economic investigations found that the location of the airport related employment zone would be most effective if it is as close as possible to the existing facilities, is not dissected from these facilities and maintains supportive synergies for the continued operations of the two facilities (RAAF Base Williamtown and airport). This is a significant influencing factor.

The report found the operational considerations of the RAAF Base Williamtown and NAL, important to the longer term viability of the facilities but not a strong influencing factor in the site selection process. A small area of land has been excluded to ensure the extension of the existing runway is still possible. The site selected will not preclude a second runway. The construction of a second runway would only be possible by a reconsideration of the planning of the entire facility arrangements. This would be of such magnitude, cost and potential impact to both RAAF operations and increased local noise impact, as to necessitate wider consideration of available airport relocation options.

The geotechnical considerations raised particular concerns that warrant significant further assessment to verify the extent of the identified soil landscape units. This is important particularly where moderate and high limitations to future development were identified as likely. This may attract potentially high remediation costs to facilitate future development. Vegetation was also found to be a constraining factor that influenced the final boundary of the selected site.

The preliminary investigations relating to potential acid sulphate soils, the Tomago HWC Special Area, flooding, hydrology and drainage, found that whilst these are constraints to development to some extent, they were not found to be significant determining factors in delineating the selected site boundary.

The determining factors are illustrated in Figure 11 - Site Selected for Further Investigation. This indicates the recommended investigation area for the airport related employment zone. The area is 113 ha and subject to PCG endorsement, will be the subject of more detailed assessment in Stage 2 of this project.

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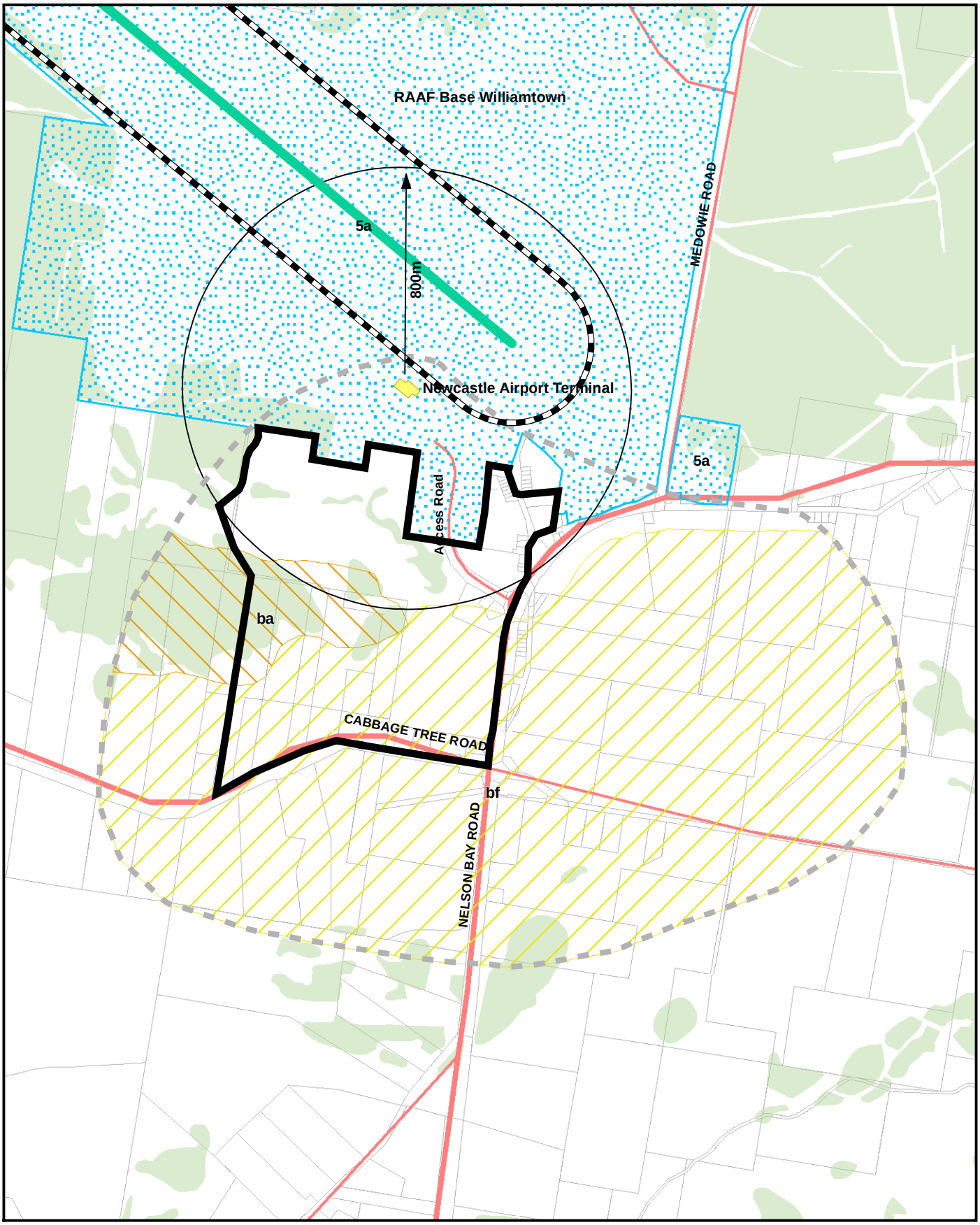

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Metres
Map Projection: Universal Transverse Mercator
Horizontal Datum: Geodetic Datum of Australia 1994
Grid: Map Grid of Australia, Zone 56

GRID N

LEGEND
- Study Area
- LHCCREMS Vegetation
- Cadastre
- Employment Zone - Investigation Area
- 800m Radius - 10min walk
- ba, Blind Harry Swamp Soil Landscape
- bf, Bobs Farm Soil Landscape
- Roads
- (5a) Special Uses - Defence
- Newcastle Airport Terminal
- Existing Runway 12
- Existing Runway Buffer (300m)

Spatial layers courtesy of Port Stephens Council

13 July 2006

Site Selected for Further Investigation

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9.2 Explanation of Boundary Delineation

9.2.1 Hard Constraints to Development

- Department of Defence Land/Newcastle Airport Land – The northern boundary to the recommended Investigation Area is the Department of Defence Land and the Newcastle Airport (which is the subject of a separate Master Plan);
- Ecological Constraints – The LHCCREMS identifies a number of vegetation communities of conservation value (refer to Figure 9). A comparison of the LHCCREMS vegetation mapping with the Port Stephens Council Comprehensive Koala Management Plan mapping suggests that there is a need to retain the substantial stands of vegetation that exist within the Study Area as a potential habitat and food source for the local flora and fauna populations. It is evident from the mapping that recent clearing and sand extraction operations have dissected and isolated a once substantial ecological community. Opportunity exists to reinstate the corridor connections between the two communities and the large areas of vegetation to the west within the Hunter Water Corporation land. As such, it is recommended that the line of vegetation and the area of wetland be the western boundary to the Investigation Area in this location. For the purposes of the investigations, the western boundary of Lot 101 DP 875155 completes the western boundary of the Investigation Area extending to Cabbage Tree Road. Depending on the results of the investigations and the apparent demand for airport related employment land, the proposed airport related employment zone may or may not extend to this property boundary;
- Geotechnical Issues – The "Blind Harry Swamp" Soils Landscape Unit (shown orange striped on Figure 5) has been identified as having severe limitations on development. This Landscape Unit generally correlates with the vegetation boundaries and reinforces the location of the western boundary. Detailed investigations in Stage 2 will help determine the positioning of the western boundary of the employment zone having regard to the constraints this soil landscape may present to future development;
- Cabbage Tree Road – Cabbage Tree Road forms a physical boundary to the south. Land to the south of Cabbage Tree Road is too far distant and would be physically separated from the airport related activities. Dissection of the airport related employment zone by a major road is not desirable and the further distant the development is from the airport the less the potential synergies. Access to the airport related employment zone will be needed from at least two locations for emergency evacuation purposes and to avoid exceeding intersection capacities. Given the role of Cabbage Tree Road as a future transport link to the west, an additional access to the airport related employment zone would logically occur off Cabbage Tree Road (ie. in addition to the existing Airport Access Road); and
- Nelson Bay Road – Nelson Bay Road in this location is a 4 lane divided carriageway with a formal seagull intersection at the Airport Access Road. Direct access onto Nelson Bay Road in this location is prohibited by the RTA. However, the existing old Nelson Bay Road continues to provide access for residents to the east of the new road;

- Airport related employment land was considered to the east of Nelson Bay Road operating off a service road running south and joining Lavis Lane beside the existing service station, having access to the existing roundabout. For the purposes of the investigations, a nominal distance of 100m east of the old Nelson Bay Road alignment was considered. The PCG excluded this area from the final Investigation Area due to it's separation from the main area identified for the establishment of a focussed airport related industry employment zone; and
- Runway Extension Option – Operational standards require a 300 metre buffer from an aircraft runway. This area should be clear of any structures. Should it be determined that an extension of Runway 30 to the south-east is warranted at some time in the future, the area will need to be cleared of any structures. In the interim, compatible development could occur in this location (eg. parking, buildings of a temporary/semi-permanent nature, parkland, recreational/tourist facilities). For this reason, the area affected by the buffer has been included within the airport related employment zone – investigation area.

Appendix A

Abbreviations

Abbreviations Used Throughout the Report

ADFP	Australian Defence Force Publication
AEW&C	Airborne Early Warning and Control
ASS	Acid Sulphate Soils
CBD	Central Business District
DCP	Development Control Plan
DEC	Department of Environmental Conservation
DEH	Department of Environment and Heritage
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
AREZ	Airport Related Employment Zone
HWC	Hunter Water Corporation
LEP	Local Environmental Plan
LGA	Local Government Area
LHCCREMS	Lower Hunter & Central Coast Regional Environmental Management Strategy
MOS	Manual of Standards
NAL	Newcastle Airport Limited
NSW	New South Wales
OLAs	Ordinance Loading Aprons
PCG	Project Control Group
PSC	Port Stephens Council
RAAF	Royal Australian Air Force
SEPP	State Environmental Planning Policy
TSC Act	Threatened Species Conservation Act 1995
WWTW	Waste Water Treatment Works

Appendix B

Land Use Tables for the Rural 1(a) Zone, 5(a) Defence Purposes Zone and 7(c) Environment Protection (Water Catchment) Zone

Extracts from PSC LEP 2000

Zone No. 1(a) - Rural Agriculture "A" Zone

(1) Description of the zone
The Rural Agriculture "A" Zone identifies land which is of agricultural value and land which has not been set aside for rural residential development.

(2) Objectives of the zone
The objective of the Rural Agriculture "A" Zone is to maintain the rural character of the area and to promote the efficient and sustainable utilisation of rural land and resources by:
(a) regulating the development of rural land for purposes other than agriculture by ensuring that development is compatible with rural land uses and does not adversely affect the environment or the amenity of the locality, and
(b) ensuring development will not have a detrimental effect on established agricultural operations or rural activities in the locality, and
(c) preventing the fragmentation of grazing or prime agricultural lands, protecting the agricultural potential of rural land not identified for alternative land use, and minimising the cost to the community of:

(i) fragmented and isolated development of rural land, and
(ii) providing, extending and maintaining public amenities and services, and
(d) protecting or conserving (or both protecting and conserving):
(i) soil stability by controlling development in accordance with land capability, and
(ii) trees and other vegetation in environmentally sensitive localities where the conservation of the vegetation is likely to reduce land degradation or biodiversity, and
(iii) water resources, water quality and wetland areas, and their catchments and buffer areas, and
(iv) land affected by acid sulphate soils by controlling development of that land likely to affect drainage or lower the water table or cause soil disturbance, and
(v) valuable deposits of minerals and extractive materials by restricting development that would compromise the efficient extraction of those deposits, and

(e) reducing the incidence of loss of life and damage to property and the environment in localities subject to flooding and to enable uses and developments consistent with floodplain management practices.

(3) Development allowed without development consent
Development for the purpose of:

- agriculture,
- flood mitigation works authorised by the *Hunter Valley Flood Mitigation Act 1956*,

Exempt development.

(4) Development allowed only with development consent
Subdivision in permitted by clause 12
Any other development not included in Item 3 or 5.
(5) Development which is prohibited

Development for the purpose of:

- boarding-houses,
- brothels,
- bulky goods salesrooms or showrooms,
- bus stations,
- commercial premises,
- depots,
- hazardous industries,
- hazardous storage establishments,
- industries,
- liquid fuel depots,
- material recycling facilities,
- medical centres,
- mortuaries,
- motor showrooms,
- offensive industries,
- offensive storage establishments,
- places of assembly,
- restricted premises
- road transport terminals,
- service stations,
- shops,
- urban housing,
- warehouses.

Subdivision other than subdivision permitted by clause 12.

Zone No. 5(a) - Defence Purposes Zone

(1) Description of Zone
The 5(a) Defence Purposes Zone identifies land required for defence force use.

(2) Objectives of the Zone
The objective of the 5(a) Defence Purposes Zone is to provide for specific defence force and associated uses of land in appropriate locations.

(3) Development allowed without development consent
Development by the Department of Defence for defence purposes.
Exempt Development.

(4) Development allowed only with development consent
Development for the purpose of:

- aircraft maintenance,
- aircraft manufacture,
- airports,
- any activity associated with airports or defence,
- manufacture of components used in aircraft maintenance or manufacture,
- tourist facilities.

(5) Development which is prohibited
Any development not included in Items 3 and 4.

Zone No. 5(a) - Defence Purposes Zone

(1) Description of Zone
The 5(a) Defence Purposes Zone identifies land required for defence force use.