



JANDAKOT AIRPORT
MASTER PLAN

| 2014

Cover photograph – This photograph captures a Bell 214B helicopter refilling with water during the response to the Banjup/Forrestdale bushfire in February 2014. It is one of the six Bell 214B helicopters operated by McDermott Aviation for the 2013/2014 WA bushfire season. The Bell 214B is the most powerful single engine helicopter in the world. It has a 2,700 litre tank capacity that can be filled from shallow water sources through the high volume probe loading nozzle.

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FOREWORD

We are pleased to present the approved Jandakot Airport Master Plan 2014 which replaces Master Plan 2009 and outlines the strategic direction for the efficient and economic development of Australia's busiest general aviation airport.

Our vision is to successfully develop and manage Jandakot Airport as a strategically significant aviation hub with a supporting business campus.

Jandakot Airport Holdings has successfully implemented Master Plan 2009, making significant infrastructure investment over the past five years to facilitate the development of the airport.

The development of non-aviation land is critical to the future maintenance and provision of aviation infrastructure. It is only through the diversity of income from the development of this land that this infrastructure can be funded.

The major difference of Master Plan 2014 from Master Plan 2009 is the allocation of Precinct 6A for aviation related development and Precinct 6 for mixed business development. The future development of these precincts was proposed in Master Plan 2009. Additionally, this Master Plan includes a review of the taxiway configuration and road access arrangements, aviation operations and commercial development.

A ground transport plan is included in Master Plan 2014 in accordance with the *Airports Act 1996*. Additional points of access to the airport are critical for emergency access and the successful development of the airport.

The Jandakot Airport Environment Strategy is also incorporated into Master Plan 2014 as required by the *Airports Act 1996*.

Master Plan 2014 has been prepared in accordance with the *Airports Act 1996* and is the guiding document for the development of Jandakot Airport for the next 20 years.

In preparing this Master Plan we have undertaken significant consultation with key stakeholders including Federal, State and Local Governments, aviation users and community groups.

Master Plan 2014 provides for the creation of a sustainable balance of aviation and non-aviation sectors of the airport.

John Fraser
Managing Director, Jandakot Airport Holdings

EXECUTIVE SUMMARY

Jandakot Airport is the only general aviation airport in the Perth Metropolitan Region and is an important infrastructure asset for Western Australia. The airport generates substantial economic benefits to the State economy and to the southwest region. Jandakot Airport occupies an area of 622 hectares and is located 16 kilometres south of the Perth Central Business District.

MASTER PLAN 2014

The review of Master Plan 2009 has been undertaken to meet the requirements of the *Airports Act 1996*.

Master Plan 2014 is a review of Master Plan 2009 and retains the principal concepts including the provision of the fourth runway and associated taxiways, aviation land use areas, commercial land use areas and general access arrangements.

Key changes are:

- Refinement of the design of the fourth runway and taxiway augmentation;
- Provision of Precincts 6A (Aviation Operations) and 6 (Mixed Business); and
- Road access to Precinct 5.

AIRPORT VISION

Jandakot Airport Holding's vision is to successfully develop and manage Jandakot Airport as a strategically significant aviation hub with a supporting business campus.

REGIONAL AND ECONOMIC SIGNIFICANCE

The State Government recognises Jandakot Airport as a vital piece of infrastructure. The *Airports Act 1996* encourages the airport to adopt a planning philosophy consistent with that of State and Local Government. Master Plan 2014 has been prepared in close consultation with relevant authorities, with the airport commercial areas adopting the City of Cockburn's planning framework.

The ongoing development and growth of Jandakot Airport will result in the sustained economic significance of the airport operations. Major capital works proposed for the future include the construction of a fourth runway, extensions to the two primary runways, related new taxiways, road access, additional aviation sites and commercial operations.

Jandakot Airport contributes both directly and indirectly to the economy of Western Australia.

FORECAST GROWTH

Jandakot Airport remains the busiest general aviation airport in Australia in terms of aircraft movements, having averaged 255,000 movements per annum over the last three years. The airport could expect to reach the theoretical operating capacity of 460,000 fixed wing and 66,000 helicopter movements per annum within the 20 year planning horizon of this Master Plan.

AIRPORT LAND USE

The Jandakot Airport Master Plan 2014 projects the following land use and proportion of total land area:

- Conservation - 119 hectares (19%);
- Aviation Operations (includes runways and taxiways) - 260 hectares (42%);
- Mixed Business - 195 hectares (31%); and
- Roads and Services - 48 hectares (8%).

AVIATION DEVELOPMENT

The planned configuration of the airfield at the ultimate development of the airport includes the following new works:

- the construction of the fourth runway 12L/30R, which is to be 990 metres in length and 18 metres wide, located parallel to the existing runway 12/30;
- the extension of runway 12/30 (to become 12R/30L) from 990 metres to 1,508 metres;
- the extension of runway 06L/24R from 1,392 metres to 1,600 metres; and
- the augmentation of the existing taxiway system to support the runway developments.

AIRPORT SAFEGUARDING

Aviation operations have been revised for the 20 year planning horizon of this Master Plan and land has been reserved for growth in aviation support facilities. Safeguarding systems such as airspace protection, restrictions to external lighting, bird and animal hazard management and public safety are also outlined and revised where applicable.

NON-AVIATION DEVELOPMENT

A development strategy for the airport's non-aviation land has been established. The non-aviation precincts proposed are broadly consistent with the City of Cockburn's mixed business zone, Directions 2031, and State Planning Policy Activity Centres for Perth and Peel which recognise Jandakot Airport as a 'Specialised Activity Centre'.

The development of non-aviation land is critical to the future delivery of aviation and environment outcomes on the airport as the non-aviation land provides a strategic diversity of income to secure the sustainability of the airport.

GROUND TRANSPORT PLAN

Access to Jandakot Airport is proposed via the following connections:

1. Existing access from Karel Avenue/Berrigan Drive intersection proposed to be upgraded to a signalised intersection;
2. Existing access from Berrigan Drive via Spartan Street (left in/left out only at Berrigan Drive);
3. Proposed South Link road (Pilatus Street) – currently constructed from Karel Avenue to the airport boundary is to be extended to a proposed Jandakot Road/Berrigan Drive/Dean Road signalised intersection. Berrigan Drive will be diverted to form a T-junction with Pilatus Street; and
4. Proposed East Link road – recent consultation with State and Local Governments has resulted in a plan to connect to Johnston Road through the City of Canning waste disposal site to Ranford Road. JAH proposes to extend Orion Road to meet Johnston Road at the boundary of the airport.

SERVICES INFRASTRUCTURE

JAH has invested significantly in the upgrading of services and infrastructure on the airport and will continue to do this to meet the needs of aviation and non-aviation development within the airport.

ENVIRONMENT STRATEGY 2014

The Environment Strategy 2009 for the Jandakot Airport has been updated concurrently with the Master Plan and will act as a guide for environmental management of the airport for the next five years.

The Jandakot Airport Environment Strategy 2014 is now incorporated in Master Plan 2014 in accordance with the changes to the *Airports Act 1996*.

STAKEHOLDER AND COMMUNITY CONSULTATION

Consultation with key stakeholders including airport tenants, State and Local Government and community groups was undertaken during the preparation of Master Plan 2014.

IMPLEMENTATION

Master Plan 2014 will be implemented in a staged manner driven by demand. The fourth runway construction requires approval of a major development plan, in accordance with the *Airports Act 1996*. A review of this Master Plan will be required in 5 years.

I. INTRODUCTION

I.1 JANDAKOT AIRPORT

Jandakot Airport is the main general aviation airport in Perth and is one of the busiest airports in Australia in terms of aircraft movements. The airport operates 24 hours a day, 7 days a week, and is vital to the local and regional economy of Western Australia as it provides facilities for tourism, pilot and aviation training, general aviation, services to resource and pastoral sectors and important emergency services such as the Royal Flying Doctor Service, Police Air Wing, RAC Rescue Helicopter and WA Department of Fire and Emergency Services bushfire response.

Jandakot Airport is a Certified Airport under the Civil Aviation Safety Authority Manual of Standards (MOS) Part 139 - Aerodromes.

I.2 OWNERSHIP OF JANDAKOT AIRPORT

Jandakot Airport is located on Commonwealth Government land.

On 1 July 1998 the Commonwealth Government sold a 50 year lease over Jandakot Airport, with an option of a 49 year lease extension, to Jandakot Airport Holdings Pty Ltd (JAH).

I.3 SITE CONTEXT

Jandakot Airport is located 16km south of the City of Perth and 13km east of the Port of Fremantle. The airport's 622 hectare site is within the boundary of the City of Cockburn. The northern boundary of the airport abuts the City of Melville and the north east airport boundary abuts the City of Canning. Jandakot Airport is located within major population and commercial/industrial areas, providing easy access to the aviation and non-aviation businesses located at the airport. The Jandakot Airport estate in an aerial photograph context is shown in Figure 1.1.

I.4 AIRPORT HISTORY

Plans for Jandakot Airport began in the mid-1950s when it became clear that the capacity and infrastructure of the Maylands Aerodrome was insufficient for the growth in air traffic. Light aircraft operations had continued at Maylands following the relocation of

civilian aircraft services to the Guildford Aerodrome (now Perth Airport) in 1946, but within a decade the aging infrastructure at Maylands was not able to support the light aircraft requirements. Land acquisition for a new general aviation airport began in 1959, with 520 hectares of unproductive farmland in Jandakot acquired before the official opening of Jandakot Airport on 1 July 1963. Over the next 11 years the land size was increased to 622 hectares.

Pilot training has been a main focus at Jandakot Airport since 1965 when the Royal Aero Club of WA (RACWA) relocated to Jandakot from Guildford Aerodrome. RACWA was, and continues to be, the largest pilot training organisation in WA. Jandakot Airport has been utilised for overseas pilot training since the 1970s, with the Aviation Academy of Australia set up to train Air Malawi and Air Zimbabwe pilots and RACWA training Singaporean pilots on a regular basis. In the early 1990s dedicated accommodation and training facilities were constructed on the airport for Singapore Flying College and China Southern WA Flying College. Pilot training activity currently constitutes 80% of all aircraft movements at Jandakot Airport.

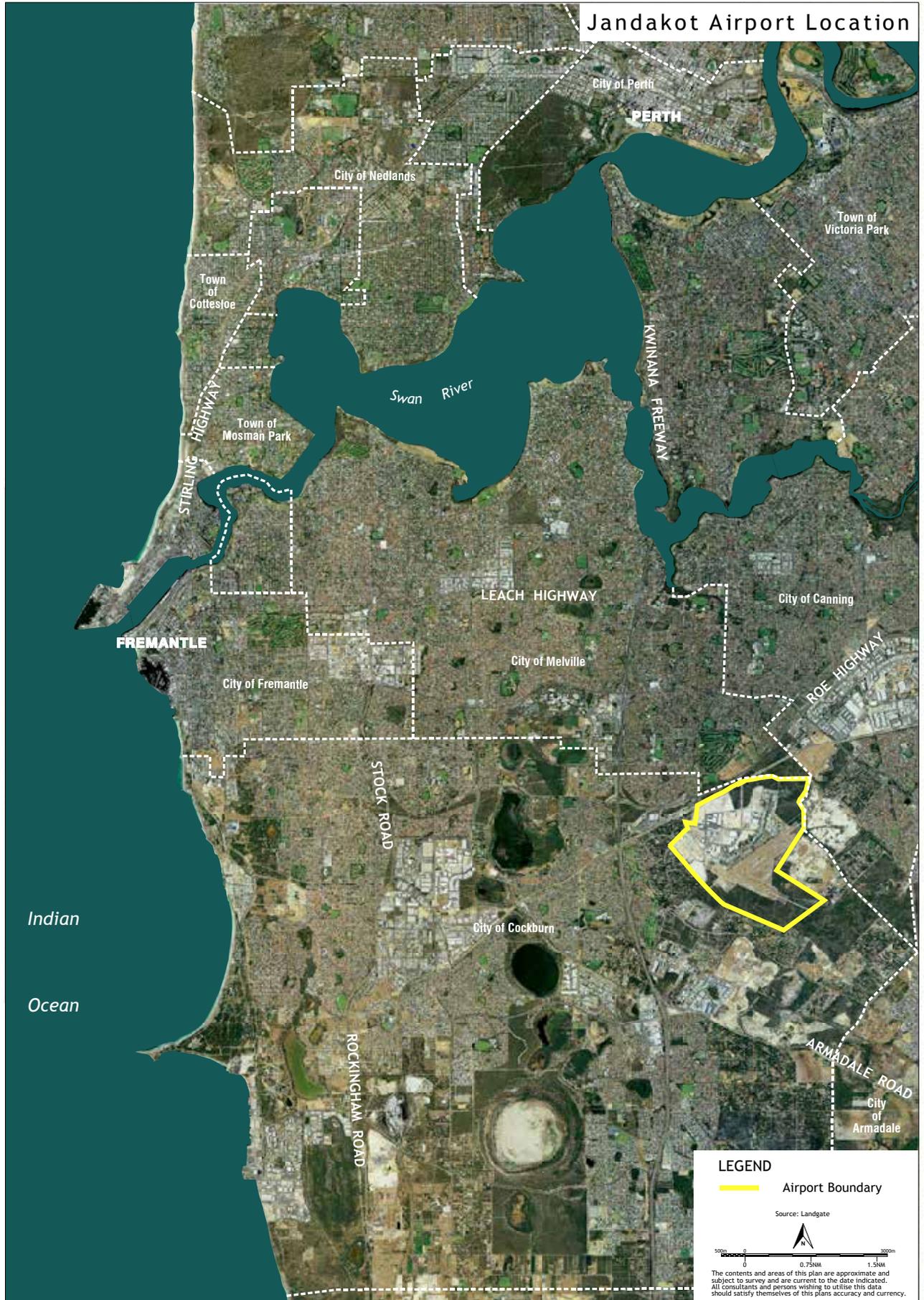
The role of Jandakot Airport as a major aviation training facility was further enhanced in 2010 when Polytechnic West redeveloped its Aerospace Training Centre. In addition to pilot studies, the Aerospace Training Centre provides courses in engineering and aircraft maintenance, ground and cabin crew operations, and airport management.

I.5 PROXIMITY TO OTHER AIRPORTS

Jandakot Airport is situated 19km south-west of Perth Airport, the domestic and international airport serving Perth and the fourth busiest airport in Australia in terms of passenger movements. The volume of commercial pilot training activity at Jandakot Airport is largely as a result of the close proximity to Perth Airport, as pilot training and licensing curriculum require students to be able to fly in and around controlled airspace and have access to a variety of suitable navigational aids.

Serpentine Airport is a small airfield situated 30km south of Jandakot. It has one sealed runway and one grass runway and is used primarily for glider and sports

FIGURE I.1 - JANDAKOT AIRPORT AERIAL PHOTOGRAPH CONTEXT



aircraft. The airport is unsuitable for commercial pilot training activity due to the short runways and lack of navigational infrastructure.

Rottnest Island Airport is a small single-runway airfield servicing the holiday island. Located 34km west of Jandakot, it is used regularly for private operator and charter operations ferrying workers and holiday makers between Perth and Rottnest Island.

Murray Field Airport is a small airfield located 46km south of Jandakot near the township of Mandurah. It is owned and operated by the Royal Aero Club of WA. With one sealed and one gravel runway, it is used primarily for pilot training and private operator use. The limited facilities and lack of navigational infrastructure restrict its use for commercial pilot training activity.

Pearce RAAF Base is located in Bullsbrook, 49km north of Jandakot, and is the main Royal Australia Air Force (RAAF) base in WA. Its primary role is pilot training for both RAAF and Singapore Air Force and it is the busiest RAAF base in Australia in terms of total movement numbers. Civilian aircraft access to the airport is very limited and the airspace surrounding Pearce is restricted military airspace.

RAAF Gingin is a small airfield that is also owned and administered by the RAAF. It is located approximately 40 km north of RAAF Base Pearce and 70km north of Jandakot Airport, and is used mainly for RAAF pilot training.

Bunbury Airport is located 142km south of Jandakot Airport. It has a single sealed runway and is used for general and recreational flight training as well as charters and emergency services.

Busselton Airport is located on the South West coast 180km south of Jandakot. Due to residential developments adjacent to the airport, the City of Busselton has imposed stringent controls on the use of the airport for flight training purposes.

Merredin Aerodrome is located 240km east of Jandakot Airport within the central Wheatbelt area. The aerodrome is operated by China Southern WA Flying College, with training and accommodation facilities provided on site. It is mainly used for initial pilot training, due to the wide open spaces, and students then relocate to Jandakot Airport for the next level of training.

The location of Jandakot Airport in proximity to other airports is shown in Figure 1.2.

1.6 ECONOMIC SIGNIFICANCE OF JANDAKOT AIRPORT

Jandakot Airport is well located with regard to the regional and district road network, which provides direct access to Perth. Kwinana Freeway, the major north-south metropolitan freeway, is located 1km west of the airport, with Roe Highway located immediately to the north of the airport providing a connection to the Kwinana Freeway and the eastern metropolitan region of Perth. Jandakot Airport is a significant infrastructure asset in Western Australia and generates substantial economic benefits to the State and local economy.

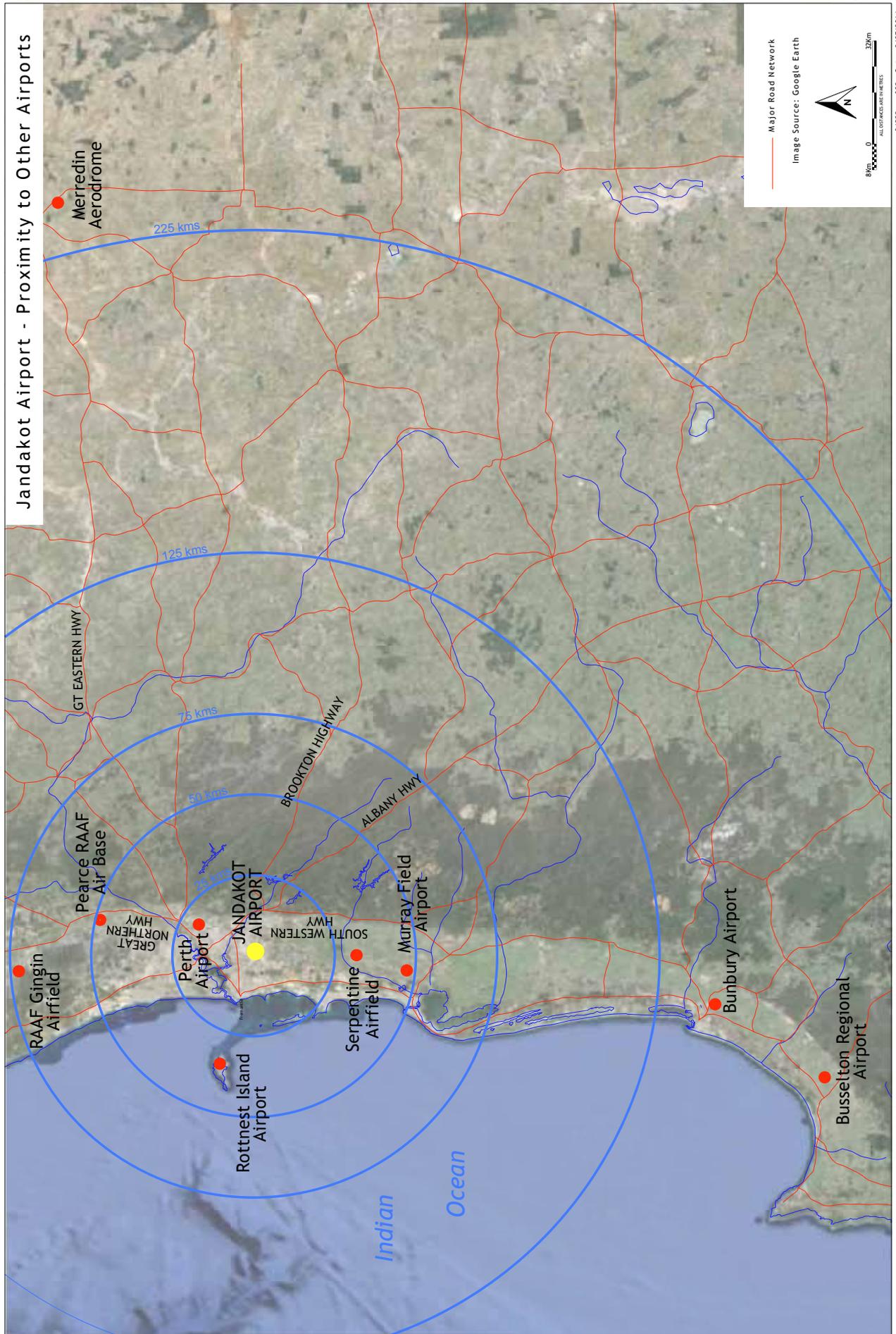
The airport's location has several natural advantages that make it a preferred location for:

- pilot training for domestic and international students;
- servicing the general aviation needs of the metropolitan area, being just 16km south of the Perth CBD;
- supporting the State's regional and remote areas with charter air transport services to the minerals and petroleum sectors;
- servicing the public safety and emergency needs of the State through emergency air transport services;
- capitalising on Western Australia's strong ties, geographical proximity and time zone correspondence to Asia; and
- taking advantage of very favourable climatic conditions and long daylight hours that allow relatively long periods of flying time.

Jandakot Airport has been able to capitalise on the international demand for flight training facilities. The flying schools based at the airport provide substantial export revenue to the State as well as relationship and reputation benefits from the long-term association with major international aviation businesses, including China Southern Airlines and Singapore Airlines.

The development of the mixed business precincts over the past seven years has attracted leading-edge firms to the airport site and generated a number of spin-off service industries such as air tourism and training.

FIGURE 1.2 - LOCATION AND PROXIMITY PLAN



Additional economic benefits have come from the commercial development of non-aviation land over the past seven years. Jandakot Airport currently has an estimated 90,000 square metres of aviation related and aircraft hangar floor space, and an estimated 121,000 square metres of non-aviation floor space, of which approximately 84,000 square metres is warehousing, 21,000 square metres is workshop space, 11,000 square metres is office space and 5,000 square metres is retail space.

The current (2013) economic contributions of Jandakot Airport are summarised in Table I.1:

Table I.1 Current Economic Significance of Jandakot Airport

Number of businesses on site	89
Aviation Related Employees (Direct)	750
Non-Aviation Related Employees (Direct)	400
Payroll	\$64.22 million
Payroll Tax	\$3.69 million
Ex-gratia payment in lieu of rates to the City of Cockburn	\$2 million
Export revenue international students	\$61 million
Total taxation revenue (excluding GST and taxes on profits)	\$13.5 million

Source: MacroPlan Dimasi.

1.7 FUTURE ECONOMIC SIGNIFICANCE OF JANDAKOT AIRPORT

The future development and growth of Jandakot Airport will build on the already significant economic value of the airport estate. Proposed major capital works include the construction of the fourth runway, expansion of the associated aviation development, including an additional 10 hectares of land with taxiway access for aviation development in Precinct 6A, and further development of the commercial estate. These precincts are shown in an aerial photograph context in Figure 1.3.

The development of the fourth runway, associated taxiways and Precinct 6A will allow for additional aviation related businesses at the airport and therefore increase employment and earnings, resulting in consequential higher taxation revenues for government and export revenue from international flight training activities.

Upon the ultimate development of the Jandakot Airport estate, it is estimated that the wages and salaries generated by 8,050 employees across 300 businesses will be in the order of \$420 million, equating to the following estimate of taxes payable:

- \$83 million per year in income tax payable to the Commonwealth Government;
- \$23 million per year in payroll tax payable to the State Government; and
- \$10 million per year payment in lieu of rates to the local City Council.

1.7.1 FUTURE AVIATION DEVELOPMENT

The proposed future aviation related development at Jandakot Airport will mean a significant increase in the economic activity at the site. At full development, estimated within the 20 year period of this Master Plan, it is anticipated that the estate will accommodate approximately 130,000 square metres of aviation-related and aircraft hangar floor space. This increase will come from the development of Precinct 6A which will accommodate approximately 40,000 square metres of aviation-related and aircraft hangar floor space.

This construction is estimated to cost \$50 million and will generate substantial economic activity, including:

- 260 full time annual equivalent jobs in the construction/ development industry;
- \$7 million in wages and salaries paid to construction/ development industry employees; and
- \$4 million in direct and indirect taxes including income taxes on wages and salaries, company tax and other indirect taxes.

The total value-add or contribution to the Western Australian economy that will be generated by the construction will be in the order of \$114 million.

It is estimated that at the full development of the estate the number of aviation related businesses will be around 80, with approximately 950 employees.

1.7.2 FUTURE NON-AVIATION DEVELOPMENT

At full development, it is anticipated that the estate will accommodate approximately 767,000 square metres of non-aviation floor space, comprising 560,000 square metres of warehouse, 140,000 square metres of workshop, 62,000 square metres of office and 5,000 square metres of retail (already constructed) floor space. The construction of the commercial estate, including the supporting infrastructure and buildings, upon full development is estimated to cost \$780 million and will generate substantial economic activity, including:

- 3,700 full time annual equivalent jobs in the construction/development industry;
- \$108 million in wages and salaries paid to construction/development industry employees; and
- \$56 million in direct and indirect taxes including income taxes on wages and salaries, company tax and other indirect taxes.

The total value-add or contribution to the Western Australian economy that will be generated by the construction will be in the order of \$1.786 billion. When the commercial estate is fully occupied it will have the potential to accommodate approximately 220 non-aviation related businesses with approximately 7,100 employees.

1.8 DEVELOPMENT OVER THE NEXT FIVE YEARS

It is forecast that the following floor space could be developed over the five year period of this Master Plan:

- 155,000 square metres of warehouse space;
- 40,000 square metres of workshop space;
- 21,500 square metres of office space; and
- 13,500 square metres of aircraft hangars.

The timing of the non-aviation development will be subject to the market and prospective tenant demand for commercial floor space as experienced in the Perth metropolitan region and is expected to be primarily located within Precincts 4 and 5.

The aircraft hangars will be developed subject to market and tenant demand, and primarily located within Precinct 6A following the construction of the adjacent taxiway.

This level of development over the next five years would employ approximately 2,060 people, generating wages and salaries in the order of \$107 million and equating to \$21 million per year in income tax payable to the Commonwealth Government and \$6 million per year in payroll tax payable to the State Government.

Specifically with regard to the construction stage of this floor space the following can be expected:

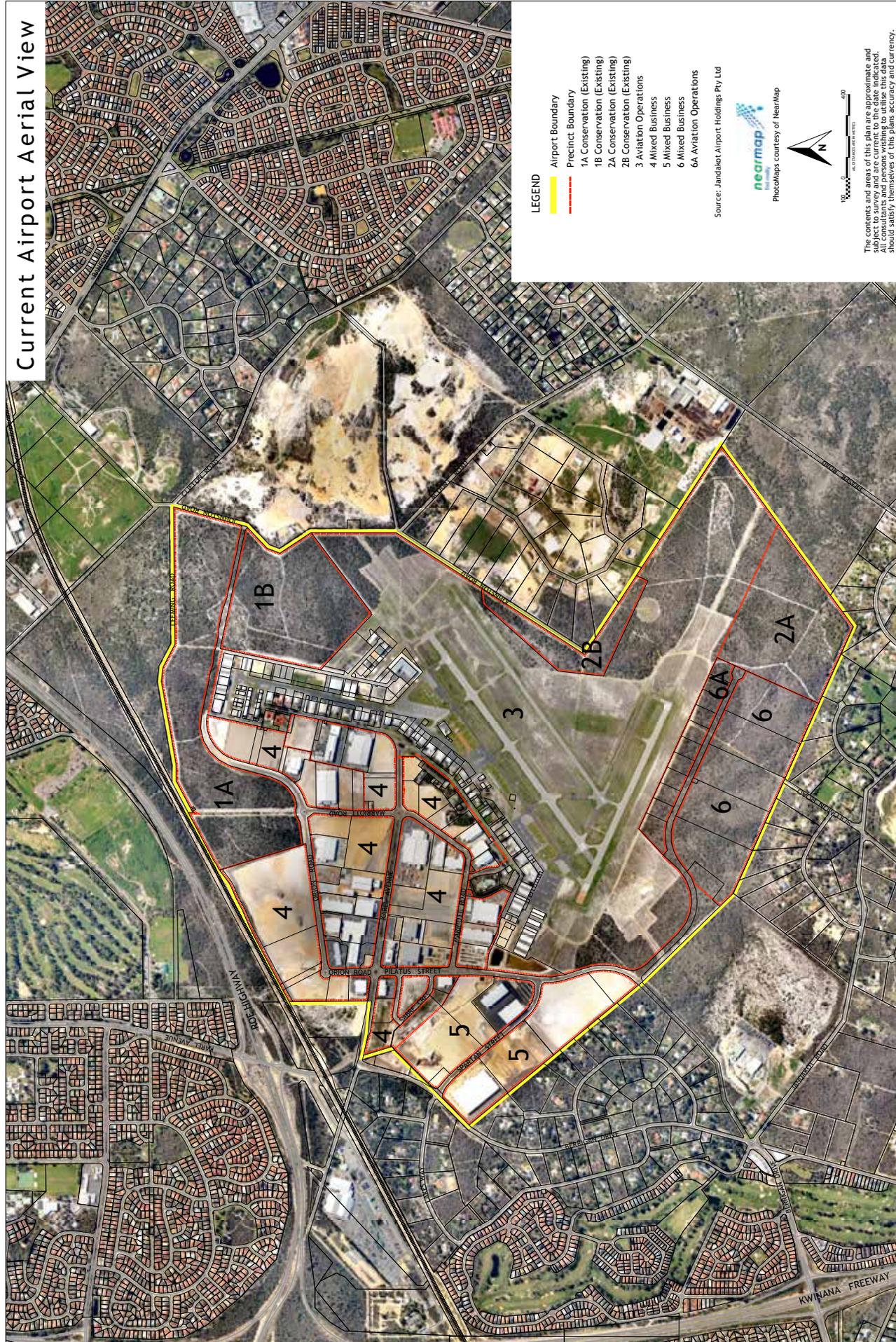
- 1,020 full time annual equivalent jobs in the construction/development industry;
- \$29 million in wages and salaries paid to construction/development industry employees; and
- \$15 million in direct and indirect taxes including income taxes on wages and salaries, company tax and other indirect taxes.

1.9 DEVELOPMENT OBJECTIVES

The following objectives guide the planning and development of the airport site:

- Maintain Jandakot Airport as a leading General Aviation facility through investment in infrastructure necessary to satisfy the forecast operational requirements;
- Enhance the airport's contribution to WA employment and economic growth through appropriate aviation and non-aviation development;
- Encourage sustainable development of the airport land through consideration and integration of environmental, financial and social values and stakeholder interests;
- Ensure the long-term viability and sustainability of the airport and its stakeholders through effective planning, development and management; and
- Provide a safe, secure, reliable and efficient airport operating environment.

FIGURE I.3 - AERIAL PHOTOGRAPH PRECINCT PLAN



2. PLANNING FRAMEWORK

2.1 PLANNING HISTORY

Prior to 1998 Jandakot Airport was owned and managed by the Federal Government. Initially this was through the Department of Civil Aviation, then Department of Transport (1973), Department of Aviation (1982), and finally as a Commonwealth business enterprise managed by the Federal Airports Corporation from 1988 to 1998. The Commonwealth had specific requirements for the approval and subsequent development at airports, with environmental and aircraft noise impacts of proposed developments evaluated by the State Environmental Protection Authority and/or Commonwealth Department of the Environment (or equivalent authority).

Since privatisation of Australian airports commenced in 1996, planning and environmental regulations governing airport development have been significantly enhanced and Jandakot Airport is now subject to the planning framework of the *Commonwealth Airports Act 1996*.

2.2 COMMONWEALTH GOVERNMENT

The Commonwealth Government regulatory framework relative to the planning and development of airports is established by the *Airports Act 1996* and the following key legislation and regulations:

- *Airports Regulations 1997*;
- *Airports (Building Control) Regulations 1996*;
- *Airports (Control of On-Airport Activities) Regulations 1997*;
- *Airports (Protection of Airspace) Regulations 1996*;
- *Airports (Environment Protection) Regulations 1997*; and
- *Environment Protection and Biodiversity Conservation Act 1999*.

2.2.1 AIRPORTS ACT 1996

The *Airports Act 1996* is the principal statute regulating the ownership, management and conduct of the leased federal airports. Part 5 of the Act prescribes a number of controls over land use, planning and building at airports and Part 6 details environmental management.

MASTER PLAN

Under Section 70 of the Act, each Commonwealth airport is required to produce a final master plan. A final master plan is one which has been approved by the Federal Minister of Infrastructure and Regional Development. Prior to submitting a draft master plan to the Minister, the airport is required to take into account public comments. Subsequent development at the airport must be consistent with the final master plan.

Section 70 of the Act requires that the purposes of a final master plan for an airport are to:

- establish the strategic direction for efficient and economic development at the airport over the planning period of the plan;
- provide for the development of additional uses of the airport site;
- indicate to the public the intended uses of the airport site;
- reduce potential conflicts between uses of the airport site, and to ensure that the uses of the airport site are compatible with the areas surrounding the airport;
- ensure that all operations at the airport are undertaken in accordance with relevant environmental legislation and standards;
- establish a framework for assessing compliance at the airport with relevant environmental legislation and standards; and
- promote the continual improvement of environmental management at the airport.

A new master plan is to be developed every five years and must relate to a planning period of 20 years.

Section 71 of the Act requires that a master plan include:

- (a) the airport-lessee company's development objectives for the airport; and
- (b) the airport-lessee company's assessment of the future needs of civil aviation users of the airport, and other users of the airport, for services and facilities relating to the airport; and

- (c) the airport-lessee company's intentions for land use and related development of the airport site, where the uses and developments embrace airside, landside, surface access and land planning/ zoning aspects; and
- (d) an Australian Noise Exposure Forecast (in accordance with regulations, if any, made for the purpose of this paragraph) for the areas surrounding the airport; and
- (da) flight paths (in accordance with regulations, if any, made for the purpose of this paragraph) at the airport; and
- (e) the airport-lessee company's plans, developed following consultations with the airlines that use the airport and local government bodies in the vicinity of the airport, for managing aircraft noise intrusion in areas forecast to be subject to exposure above the significant ANEF levels; and
- (f) the airport-lessee company's assessment of environmental issues that might reasonably be expected to be associated with the implementation of the plan; and
- (g) the airport-lessee company's plans for dealing with the environmental issues mentioned in paragraph (f) (including plans for ameliorating or preventing environmental impacts); and
- (ga) in relation to the first 5 years of the master plan—a plan for a ground transport system on the landside of the airport that details:
 - (i) a road network plan; and
 - (ii) the facilities for moving people (employees, passengers and other airport users) and freight at the airport; and
 - (iii) the linkages between those facilities, the road network and public transport system at the airport and the road network and public transport system outside the airport; and
 - (iv) the arrangements for working with the State or local authorities or other bodies responsible for the road network and the public transport system; and
 - (v) the capacity of the ground transport system at the airport to support operations and other activities at the airport; and
 - (vi) the likely effect of the proposed developments in the master plan on the ground transport system and traffic flows at, and surrounding, the airport; and
- (gb) in relation to the first 5 years of the masterplan detailed information on the proposed developments in the masterplan that are to be used for :
 - (i) commercial, community, office or retail purposes; or
 - (ii) for any other purpose that is not related to airport services; and
- (gc) in relation to the first 5 years of the master plan—the likely effect of the proposed developments in the master plan on:
 - (i) employment levels at the airport; and
 - (ii) the local and regional economy and community, including an analysis of how the proposed developments fit within the planning schemes for commercial and retail development in the area that is adjacent to the airport; and
- (h) an environment strategy that details:
 - (i) the airport-lessee company's objectives for the environmental management of the airport; and
 - (ii) the areas (if any) within the airport site which the airport-lessee company, in consultation with State and Federal conservation bodies, identifies as environmentally significant; and
 - (iii) the sources of environmental impact associated with airport operations; and
 - (iv) the studies, reviews and monitoring to be carried out by the airport-lessee company in connection with the environmental impact associated with airport operations; and
 - (v) the time frames for completion of those studies and reviews and for reporting on that monitoring; and
 - (vi) the specific measures to be carried out by the airport lessee company for the purposes of preventing, controlling or reducing the environmental impact associated with airport operations; and
 - (vii) the time frames for completion of those specific measures; and
 - (viii) details of the consultations undertaken in preparing the strategy (including the outcome of the consultations); and
 - (ix) any other matters that are prescribed in the regulations; and
- (j) such other matters (if any) as are specified in the regulations.

In accordance with these requirements, Jandakot Airport's first master plan, Master Plan 2005, was approved by the then Minister for Transport and Regional Services on 3 January 2006. The second master plan is Master Plan 2009, which was approved by the then Minister for Infrastructure, Transport, Regional Development and Local Government on 9 March 2010. The Jandakot Airport Environment Strategy 2009 was also approved by the Minister on 9 March 2010. As a result of amendments to the *Airports Act 1996* in 2012, the Environment Strategy now forms part of the master plan. This Master Plan 2014 was approved by the Minister for Infrastructure and Regional Development on 17 February 2015.

A complete table of the requirements of the *Airports Act 1996* and associated key regulations, and the references within the Master Plan are contained in Appendix A.

MAJOR DEVELOPMENT PLAN

Some of the development activities planned for in a master plan may require further consultation and approval. Section 88 of the *Airports Act 1996* requires a major development plan (MDP) for designated major airport developments which are then subject to further community consultation, environmental assessment and Ministerial approval. Section 91 of the Act requires an MDP to be consistent with the final master plan for the airport. The major airport developments subject to a MDP include:

- constructing a new runway, or altering a runway in any way that significantly changes flight paths or the patterns or levels of aircraft noise;
- constructing a new building wholly or principally for use as a passenger terminal, where the building's gross floor space is greater than 500 square metres;
- extending a building that is wholly or principally for use as a passenger terminal, where the extension increases the building's gross floor space by more than 10%;
- constructing a new building, where the building is not wholly or principally for use as a passenger terminal and the cost of construction exceeds \$20 million;
- constructing a new taxiway or extending a taxiway, where the construction significantly increases the capacity of the airport to handle movements of passengers, freight or aircraft and the cost of construction exceeds \$20 million; and

- constructing a new road or new vehicular access facility, or extending a road or vehicular access facility, where the construction significantly increases the capacity of the airport to handle movements of passengers, freight or aircraft, and the cost of construction exceeds \$20 million.

An MDP for the ALDI Distribution Centre, within Precinct 4, was released for public comment in March 2014 and approved by the Minister for Infrastructure and Regional Development on 12 August 2014. An MDP for the Kmart Distribution Centre, located within Precinct 5, was released for public comment in August 2014 and approved by the Minister on 12 January 2015.

2.2.2 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the key environmental legislation of the Commonwealth Government that provides a framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, defined in the EPBC Act as matters of national environmental significance.

In addition, the EPBC Act confers jurisdiction over actions that have the potential to have a significant impact on the environment where the actions affect, or are taken on, Commonwealth land or are carried out by a Commonwealth agency.

EPBC referral 2009/4796 (Jandakot Airport Expansion, Commercial Development and Clearance of Native Vegetation, WA) was approved with conditions by the then Minister for Environment, Water, Heritage and Arts in March 2010. This approval allows for clearing of native vegetation within Precincts 1B, 3, 4 and 5 to enable the development of commercial development and the proposed airfield development as detailed in Master Plan 2009 and this Master Plan 2014. The conditions of approval include the development and implementation of various management plans, including an Offset Plan, Conservation Management Plan, Construction Environmental Management Plan and Groundwater Management Plan. All of these plans have been developed and implemented (refer Chapter 9).

EPBC Referral 2013/7032 (Jandakot Airport Precinct 6 and 6A) was approved by the Department of the Environment in July 2014. This approval is for the clearing of native vegetation within Precincts 6 and 6A for mixed business and aviation developments. The conditions of approval include the acquisition of offset land, the development and implementation of a Construction Environmental Management Plan, and measures to protect the Jandakot Groundwater Mound.

2.2.3 AVIATION TRANSPORT SECURITY ACT 2004

Jandakot Airport is a category 6 security controlled airport under the *Aviation Transport Security Act 2004* and *Aviation Transport Security Regulations 2005*. This legislation requires Jandakot Airport to have an approved Transport Security Plan that details how aviation security measures are managed at the airport to safeguard against unlawful interference to aviation. All activities at the airport, from planning, construction and through to operation, are subject to the security assessments and controls detailed in the security legislation and the Jandakot Airport Transport Security Plan.

2.2.4 NATIONAL AIRPORTS SAFEGUARDING FRAMEWORK

The National Airports Safeguarding Advisory Group was established to prepare a National Airports Safeguarding Framework (NASF). The NASF is a national land use planning framework that aims to:

- improve community amenity by minimising aircraft noise-sensitive developments near airports including through the use of additional noise metrics and improved noise-disclosure mechanisms; and
- improve safety outcomes by ensuring aviation safety requirements are recognised in land use planning decisions through guidelines being adopted by jurisdictions on various safety-related issues.

The national land use planning framework will ensure future airport operations and their economic viability are not constrained by incompatible residential development and activities.

The draft NASF was released for public comment in March 2012 and endorsed by Commonwealth, State and Territory Ministers at the Standing Council on Transport and Infrastructure meeting in May 2012.

JAH supports the measures to improve the long-term safety and viability of Jandakot Airport and has considered the NASF guidelines in Chapter 8.

2.3 STATE GOVERNMENT PLANNING FRAMEWORK

The State Government recognises Jandakot Airport as a vital piece of infrastructure and has identified the airport as a 'specialised activity centre', as outlined in Section 2.3.6. As the land on which the airport is located is owned by the Commonwealth Government and the airport is subject to Commonwealth legislation, State planning laws do not apply to the airport site. However, the Act and subsidiary regulations require that a master plan, where possible, describe proposals for land use planning and zoning in a format consistent with that used by the State or Territory in which the airport is located. Where possible, this Master Plan has considered State planning requirements and has incorporated zone and land use descriptions derived from the surrounding local government planning frameworks.

The developments anticipated at Jandakot Airport will complement the existing and future land uses in the surrounding locality and are considered to be consistent with the respective local government land use zones. This future development will epitomise the activity centre and employment generation objectives of the State Government as identified in the planning framework.

State Government planning is controlled by the Western Australian Planning Commission, which, with the professional and technical support of the Department of Planning, administers the Metropolitan Region Scheme and publishes policies on a wide range of planning matters. The State Government has recently progressed the implementation of a State Aviation Strategy.

2.3.1 STATE AVIATION STRATEGY (2015)

A draft State Aviation Strategy was prepared by the WA Department of Transport and released for public comment in September 2013. The final State Aviation Strategy was published in February 2015. The State Aviation Strategy is the first developed for Western Australia and is aimed at supporting the economic and social development of WA through the provision of

safe, affordable, efficient and effective aviation services and infrastructure. It seeks to respond to current opportunities in the State's aviation infrastructure, airport governance and levels of aviation service competition.

The Strategy proposes a suite of actions whereby the State will work in partnership with airports, regional shire councils, airlines and the resources and energy sector to ensure adequate services continue to meet demand. The Strategy is designed to provide a sound framework for policy setting, and future planning and investment in Western Australian international and domestic air services and airport infrastructure.

The Strategy acknowledges that *"For several decades, successive WA governments have encouraged the development of aviation training facilities in WA. The objective has been to attract international pilot and other aviation skills training to provide increased economic opportunities for WA's aviation industry and infrastructure."*

A finding of the Strategy is that *"There are opportunities to improve and develop aviation training in WA, building on the State's strong track record and its inherent advantages of clear skies and good flying weather."*

Jandakot Airport has been the largest pilot training airfield in Australia since opening in 1963. With the development included in this Master Plan, the airport will continue to play a significant role in encouraging and enhancing pilot training activities.

2.3.2 DRAFT STATE PLANNING STRATEGY (2012)

The Draft State Planning Strategy 2012 provides the strategic guide for land use planning through to the year 2050 and provides a vision and a set of principles by which coordinated, sustainable development will be implemented. This draft strategy does not provide a specific land use plan for the Perth metropolitan area, but identifies as a principle the need to provide efficient transport routes and hubs. Specifically, the draft strategy seeks to protect land for key transport hubs where air, road and rail transport is integrated and identifies Jandakot Airport as an airport in the Perth region.

2.3.3 DIRECTIONS 2031 AND BEYOND – METROPOLITAN PLANNING BEYOND THE HORIZON

Directions 2031 and Beyond – Metropolitan Planning Beyond the Horizon (Directions 2031) is the State's high level strategic plan that establishes a spatial framework and vision for the future growth of the Perth and Peel regions.

Directions 2031 predicts a population increase of more than half a million people over the next 20 years, growing to a city of 3.5 million people after 2050. The plan identifies Jandakot Airport as a specialised activity centre, which provides an important and high level logistical function in the metropolitan region. Directions 2031 identifies that specialised centres have features in common with other activity centres and which complement, rather than compete, with other activity centres.

The continual development of the airport as envisaged under this Master Plan is consistent with, and represents the implementation of, the specialised activity centre status of Jandakot Airport as designated by Directions 2031.

2.3.4 OUTER METROPOLITAN PERTH AND PEEL – SUB-REGIONAL STRATEGY

The Outer Metropolitan Perth and Peel – Sub-Regional Strategy has been developed in conjunction with Directions 2031 and sets out how the dwelling targets and urban growth for Perth and Peel will occur. This strategy identifies Jandakot Airport as an area providing industrial land releases and states the following for Jandakot Airport:

"As a specialised centre in recognition of the strategic significance of its aviation functions as well as its operations and associated land uses that contribute to local employment and the economic development of the State."

This strategy also identifies a future public transport station to serve the growth in the Jandakot Airport precinct.

2.3.5 ECONOMIC AND EMPLOYMENT LANDS STRATEGY: NON-HEAVY INDUSTRIAL (2012)

The Economic and Employment Lands Strategy: Non-Heavy Industrial has been prepared by the WA Planning Commission to respond to the shortfall of industrial land supply in Perth. This strategy identifies Jandakot Airport as a 'short term (0 to 4 years planning timeframe) potential non-heavy industrial area', with very good vehicle access and approximately 150 hectares of land available for non-aviation development.

The continual development of the airport as envisaged under this Master Plan is wholly consistent with the strategy, resulting in the establishment of an employment hub and full utilisation of developable land not required for aviation purposes.

2.3.6 STATE PLANNING POLICY 4.2 – ACTIVITY CENTRES FOR PERTH AND PEEL

Developed in conjunction with Directions 2031 and the Outer Metropolitan Perth and Peel – Sub-Regional Strategy, State Planning Policy 4.2 – Activity Centres for Perth and Peel (SPP 4.2) identifies Jandakot Airport as a 'Specialised Centre' with a primary aviation and logistic services function.

The policy acknowledges that as Jandakot Airport is subject to Commonwealth legislation, it is outside of the realm of the policy provisions which address activity centre planning requirements. With respect to the 'Specialised Centre' designation, the policy notes that:

"Specialised centres provide opportunities for the development of complementary activities, particularly knowledge-based businesses. A range of land uses that complement the primary function of these centres will be encouraged on a scale that will not detract from other centres in the hierarchy."

The continual development of the airport as envisaged under this Master Plan will enable aviation and logistics related businesses to locate at the airport, taking advantage of the developable land available whilst not detracting from other centres.

2.3.7 STATE PLANNING POLICY 5.3 – JANDAKOT AIRPORT VICINITY (2006)

The State Government recognises Jandakot Airport as a vital piece of infrastructure in terms of the facilities it provides for emergency services, the pastoral and resource sectors and pilot training and tourism. As a result, the Western Australian Government adopted State Planning Policy 5.3 – Jandakot Airport Vicinity (SPP 5.3) in March 2006. SPP 5.3 identified that the airport is an important element of transport infrastructure, servicing both the region and the State as a whole.

The objectives of SPP 5.3 are to:

- Protect Jandakot Airport from encroachment by incompatible land use and development, so as to provide for its ongoing, safe, and efficient operation; and
- Minimise the impact of airport operations on existing and future communities with particular reference to aircraft noise.

The policy seeks to control the zoning, development and subdivision of land outside of Jandakot Airport to protect both the operations of the airport and noise impacts for surrounding residents. The planning policy currently includes the Australian Noise Exposure Forecast (ANEF) 2025 contours from the Jandakot Airport Master Plan 2005, which included the proposed fourth runway.

DRAFT STATE PLANNING POLICY 5.3 – LAND USE PLANNING IN THE VICINITY OF JANDAKOT AIRPORT (2013)

In July 2013 the WA Planning Commission released Draft State Planning Policy 5.3 – Land Use Planning in the Vicinity of Jandakot Airport (Draft SPP 5.3) which incorporates the revised ANEF for the airport that was endorsed by Airservices Australia on 24 July 2009 as part of the approved Master Plan 2009.

Discussions with the Department of Planning have been held regarding the timing of the release of the final SPP 5.3. The ANEF contained within this Master Plan will be included in the final SPP 5.3 that is to be released upon endorsement of the ANEF by Airservices Australia. The ANEF is discussed further in Section 8.2.

2.3.8 METROPOLITAN REGION SCHEME

The Metropolitan Region Scheme (MRS) is prepared and administered by the WA Planning Commission as the principal planning scheme for the Perth metropolitan region. The MRS provides generalised broad scale land use zones and sets out regional reservations.

The whole of the airport estate is reserved for 'Public Purposes: Commonwealth Government' under the MRS, along with the whole of the estate identified as 'Bush Forever Area' as outlined in Section 9.2.1. The western and southern extent of Jandakot Airport is also identified as a 'Water Catchments' reserve overlay (which does not affect the 'Public Purposes: Commonwealth Government' reserve), consistent with the alignment of the Jandakot Underground Water Pollution Control Area outlined in Section 9.2.1.

The MRS does not place any limitations on permissible uses in the designated reservations. That is, under the provisions of the MRS, any use can be approved on any reserved land. The 'Public Purposes: Commonwealth Government' and 'Water Catchments' reservations, and 'Bush Forever Area' identification do not prevent the approval of any use on the airport site.

Current land use zoning and reservations in the area surrounding Jandakot Airport, as depicted in the Metropolitan Region Scheme, include:

- Public Purposes - Special Uses;
- Urban;
- Rural;
- Parks & Recreation;
- Industrial; and
- Rural – Water Protection.

The Jandakot Airport estate in the context of the MRS is shown in Figure 2.1.

2.4 LOCAL GOVERNMENT PLANNING FRAMEWORK

2.4.1 CITY OF COCKBURN LOCAL PLANNING SCHEME NO. 3

The Jandakot Airport estate lies wholly within the boundary of the City of Cockburn. Part of the northern boundary of the estate (Leeming Road and Ken Hurst Park) abuts the southern boundary of the City of Melville, and the western boundary of the City of Canning abuts the north east airport boundary.

The majority of the City of Cockburn local government area is predominantly zoned for residential development, with significant industrial zones and areas reserved for regionally significant open space.

The continual development of the airport as envisaged under this Master Plan is consistent with the aims of the Local Planning Scheme, which seeks to ensure that the development and use of land is appropriate with regard to public amenity, convenience, quality of life, and compatible land uses. This is established by the City of Cockburn's Local Commercial and Activities Centres Strategy outlined below, which identifies Jandakot Airport as a strategic employment centre with a high density of jobs in a single location, where more of the future businesses and jobs are forecast to be located.

The ongoing aviation use and development of Jandakot Airport is also consistent with the Local Planning Scheme, in that land surrounding the airport has been zoned 'Resource' so as to prevent more intensive residential development which may be sensitive to aircraft noise.

2.4.2 CITY OF COCKBURN LOCAL COMMERCIAL AND ACTIVITIES CENTRES STRATEGY (2012)

In December 2012 the Council of the City of Cockburn adopted the Local Commercial and Activities Centres Strategy for the local government area. This strategy was prepared in the context of the WA Planning Commission's Directions 2031 and SPP 4.2 documents and represents the strategic guide for the planning and development of activity centres within the City of Cockburn.

With respect to Jandakot Airport the strategy identifies that the estate provides a strategic employment centre with a high density of jobs in a single location. The strategy notes that the airport (along with other strategic employment centres) is forecast to contain more of the future businesses and jobs within the City of Cockburn.

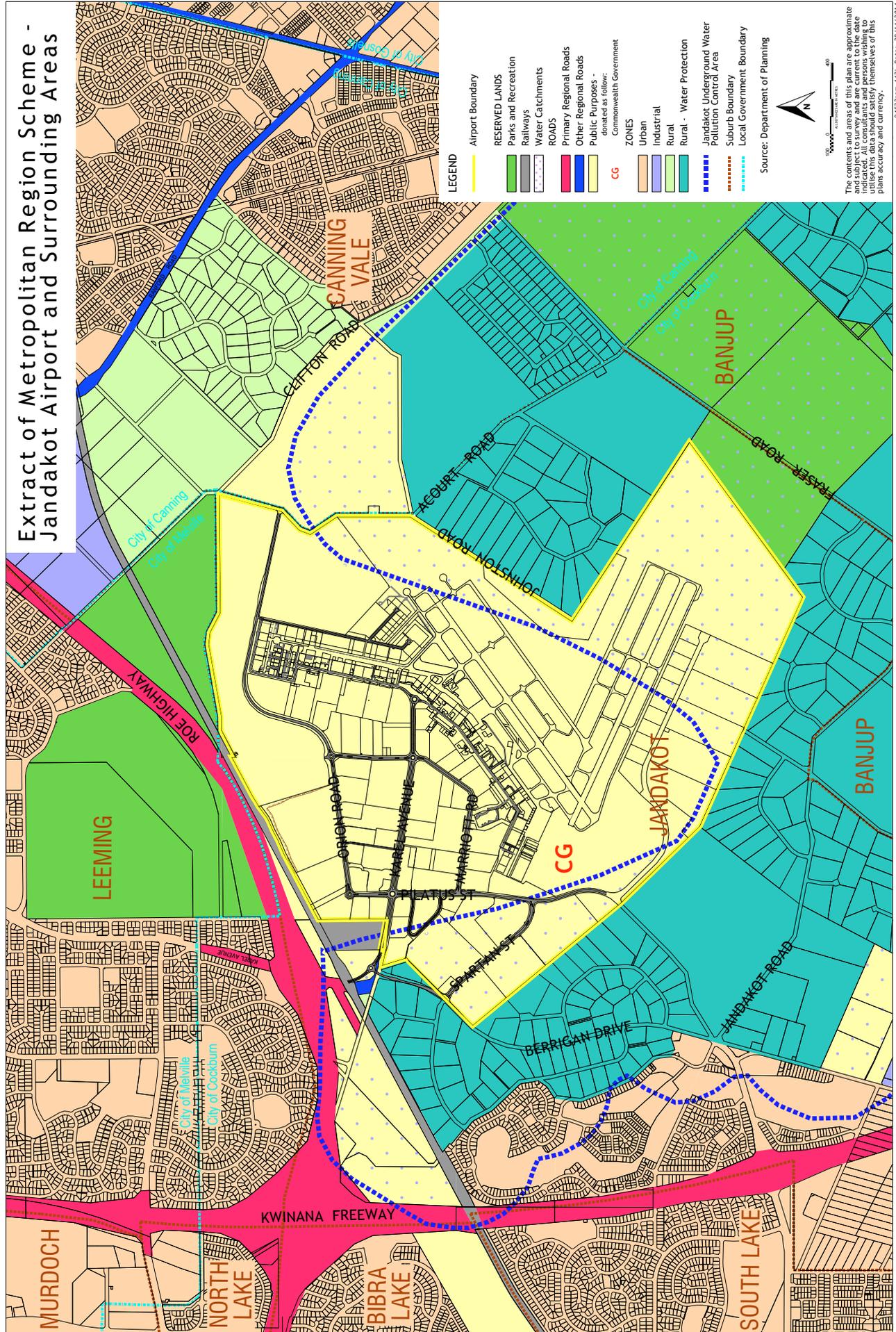
Consistent with the WA Planning Commission documents identified above, the strategy identifies the airport as a specialised activity centre, and notes that as it is subject to Commonwealth legislation, State planning laws do not apply.

2.4.3 PROPOSED PERTH METROPOLITAN LOCAL GOVERNMENT REFORM

In 2013 the State Government announced plans for widespread changes to Perth's metropolitan Local Governments, following the 2012 report of the State Government appointed independent Metropolitan Local Government Review Panel.

The changes to Local Government boundaries were confirmed on 22 October 2014. With effect from 01 July 2015, Jandakot Airport will be located within the expanded City of Melville. The southern and eastern boundaries of the airport will adjoin the merged City of Cockburn and City of Kwinana (to be called City of Jervoise Bay), while the portion of the airport boundary along Johnston Road will adjoin the merged City of Canning and City of Gosnells (to be called City of Gosnells).

FIGURE 2.1 - METROPOLITAN REGION SCHEME EXTRACT



3. JANDAKOT AIRPORT LAND USE

JAH is committed to maintaining and upgrading infrastructure for the airport to operate safely, efficiently and effectively. The cost of this maintenance is not sustainable without diversifying commercial activities to finance the infrastructure investment.

The *Airports Act 1996* provides for the efficient economic development of the airport site and development for additional uses. The Act, and this Master Plan, ensure that development does not conflict with aviation activities.

3.1 JANDAKOT AIRPORT LEASE

On 1 July 1998 the Commonwealth Government sold a 50 year lease over Jandakot Airport, with an option of a 49 year lease extension, to Jandakot Airport Holdings Pty Ltd.

An essential term of the lease is that the lessee must comply with all legislation relating to the airport site, including the *Airports Act 1996*. Whilst the Act requires that JAH operate the airport site as an airport, it also provides for the efficient economic development of the site and for its development for additional uses. The non-aviation development of the airport estate serves a key function in ensuring the economic viability of Jandakot Airport and complements its primary operation as an airport.

3.2 INTERESTS ON AIRPORT LAND

There are a number of existing interests registered on the Certificates of Title for Jandakot Airport which pre-date the lease of the airport site to Jandakot Airport Holdings. These are identified in Appendix B, in accordance with Section 71(5) of the *Airports Act 1996* and Regulation 5.02(3) of the *Airports Regulations 1997*.

3.3 MASTER PLAN 2014

Master Plan 2014 provides the framework for the future development of the airport, taking into account aviation operations, the environment, non-aviation land use, services infrastructure and ground transport. In accordance with the Act, this Master Plan identifies a planning period of 20 years with the Master Plan to be replaced every five years. Master Plan 2014 replaces Master Plan 2009 and fulfils JAH's statutory obligations under the *Airports Act 1996*.

Master Plan 2014 retains the principal concepts and precincts as shown in Master Plan 2009 with the following revisions:

- the refinement of the design of the fourth runway and associated taxiways;
- the provision of Precincts 6 and 6A as 'Mixed Business' and 'Aviation Operations' land use areas respectively along with the provision of internal airport roads to service these precincts, resulting in a 50% increase in land for aviation development;
- a revised alignment of the proposed East Link road; and
- a minor road access into Precinct 5 of the airport via Spartan Street (already constructed).

The precincts and planned development of the airport site is shown on Figure 3.1.

The land use precincts and discretionary land uses for each of the Precincts are outlined in Sections 3.5.3 and 3.5.4.

3.4 JANDAKOT AIRPORT LAND USES

The provision of the fourth runway and minor extensions to the two main runways, the inclusion of Precincts 6 and 6A as development areas and the refinement in the location of the East Link road as shown in this Master Plan 2014 will result in land use within Jandakot Airport being:

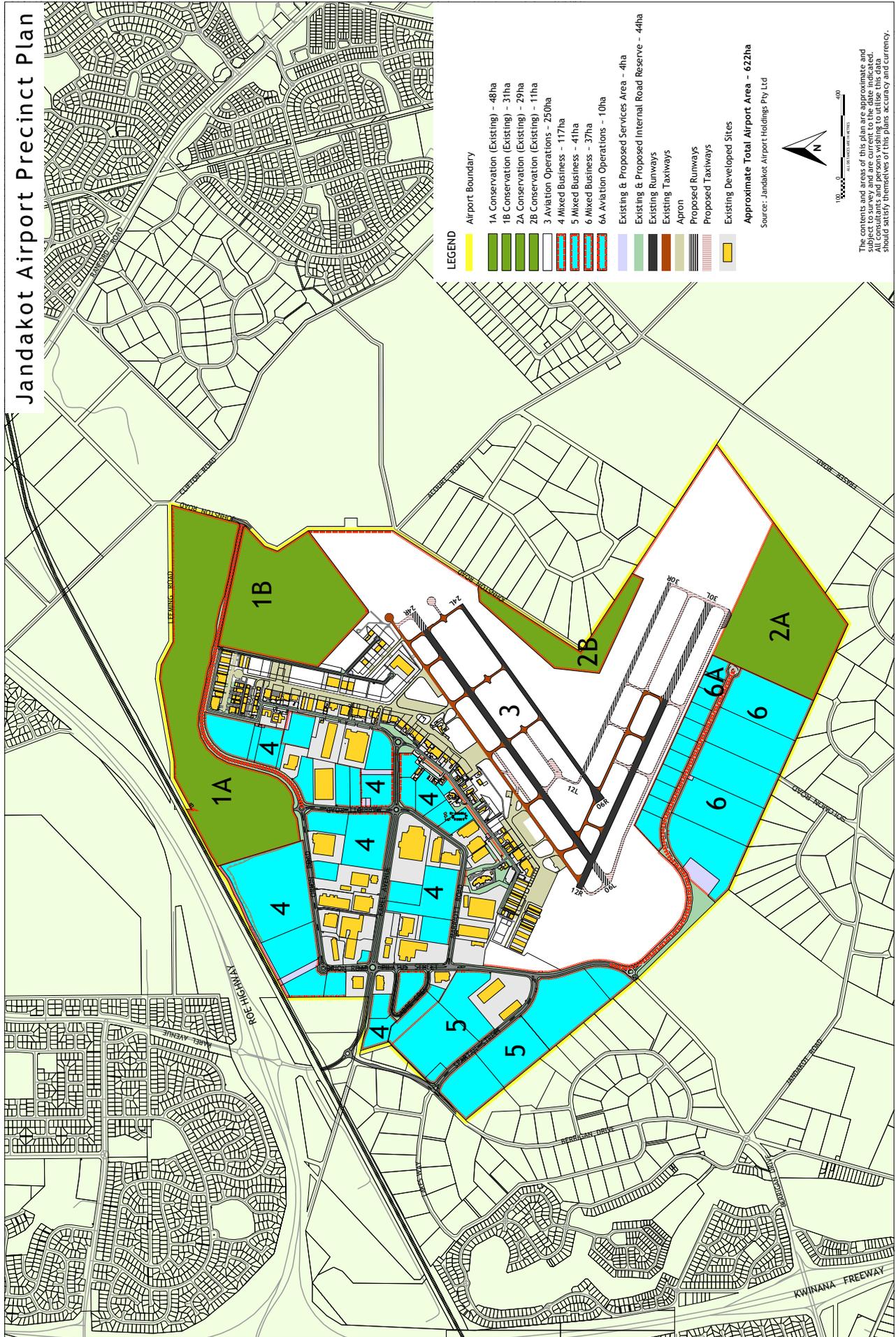
- Conservation – 119 hectares (19%);
- Aviation Operations (includes runways and taxiways) – 260 hectares (42%);
- Non-Aviation Development – 195 hectares (31%); and
- Existing and Proposed Internal Roads and Services Area – 48 hectares (8%).

3.5 LAND USE PRECINCTS

Figure 3.1 identifies the Master Plan 2014 land uses precincts for the estate, which are as follows:

- Precinct 1A (48 ha) – Conservation;
- Precinct 1B (31 ha) – Conservation;
- Precinct 2A (29ha) – Conservation;

FIGURE 3.1 - JANDAKOT AIRPORT PRECINCT PLAN



- Precinct 2B (11 ha) – Conservation;
- Precinct 3 (250 ha) – Aviation Operations;
- Precinct 4 (117 ha) – Mixed Business (Precincts 4A, 4B, 4C and 4 under Master Plan 2009);
- Precinct 5 (41 ha) – Mixed Business;
- Precinct 6 (37 ha) – Mixed Business ('Future Development' under Master Plan 2009); and
- Precinct 6A (10 ha) – Aviation Operations ('Future Development' under Master Plan 2009).

The remainder of the 622ha site is allocated to roads and services.

3.5.1 CHANGES IN LAND USE FROM THE MASTER PLAN 2009

Regulation 5.02 of the *Airports Regulations 1997* requires that a master plan must specify an area of the airport where a change of use is proposed of a kind described in subregulation 6.07(2) of the *Airports (Environment Protection) Regulations 1997*.

The proposed land use precincts are wholly consistent with the land use plan in Master Plan 2009, noting that Precincts 6 and 6A were identified for 'Future Development'. Precincts 1A, 1B, 2A and 2B have been retained as conservation areas, noting that the refined location of the East Link road has resulted in a change to the Precincts 1A and 1B areas, but with no net loss of conservation area across Precincts 1A and 1B. Precincts 4A, 4B, 4C and A, identified for 'Mixed Business' (and 'Mixed Business and Aviation' in the case of Precinct 4C) in Master Plan 2009, have now been consolidated into a single Precinct 4, identified for 'Mixed Business'. A minor boundary realignment between Precincts 3 and 4 along Eagle Drive is also included to provide a straight boundary aligned with the road, removing the multiple steps in the boundary as shown in Master Plan 2009.

These changes in land use precincts and associated land areas from the Master Plan 2009 are identified in Table 3.1.

Table 3.1 Land Use Precincts Comparison

Master Plan 2009 Precinct	Land Area (hectares)	Master Plan 2014 Precinct	Land Area (hectares)
1A Conservation (Proposed)	31 ha	1A Conservation (Existing)	48 ha
1B Conservation (Existing)	47ha	1B Conservation (Existing)	31 ha
1A & 1B Sub Total	78 ha	1A & 1B Sub Total	79 ha
2 Conservation (Existing)	39ha	2A Conservation (Existing)	29 ha
		2B Conservation (Existing)	11 ha
2 Sub Total	39 ha	2A & 2B Sub Total	40 ha
3 Aviation Operations	225 ha	3 Aviation Operations	250 ha
4 Mixed Business	72 ha	4 Mixed Business	117 ha
4A Mixed Business	22 ha		
4B Mixed Business	9 ha		
4C Mixed Business & Aviation	13 ha		
4, 4A, 4B & 4C Sub Total	116 ha	4 Sub Total	117 ha
5 Mixed Business	40 ha	5 Mixed Business	41 ha
6 Future Development	43 ha	6 Mixed Business	37 ha
6A Future Development	10 ha	6A Aviation Operations	10 ha
6 & 6A Sub Total	53 ha	6 & 6A Sub Total	47 ha
Conservation (unless required for runway extensions and operations)	32 ha	N/A Included in Precinct 3	
Existing & Proposed Internal Road Reserve/Service Areas	39 ha	Existing & Proposed Services Area	4 ha
		Existing & Proposed Internal Road Reserve	44 ha
Total Airport Area	622 ha	Total Airport Area	622 ha

3.5.2 CONSERVATION (PRECINCTS 1A, 1B, 2A AND 2B)

Precincts 1A, 1B, 2A and 2B are identified for 'Conservation', with these areas to be conserved with the exception of the land required for the East Link road.

3.5.3 AVIATION OPERATIONS (PRECINCTS 3 AND 6A)

Precinct 3 is set aside for Aviation Operations which comprises the runway, taxiways, aprons, helicopter landing sites and all associated infrastructure required for the current and future movement of aircraft. This Precinct also includes navigation aids, aviation fuel storage, aircraft maintenance facilities, aircraft hangars, and administration offices associated with the operations of aviation related tenants.

The airport has adequate land reserves available to cater for the future expansion of aviation facilities. Expansion of these facilities is concentrated in two main areas, being Precinct 3 and Precinct 6A as shown for development in this Master Plan 2014.

Precinct 6A is identified as additional 'Aviation Operations' land use area, comprising a significant 10 hectare (50%) increase in the land area available for aviation-related development.

It is envisaged that Precinct 6A will be developed for uses that seek to capitalise on access to the future taxiway system to be developed within Precinct 3 as part of the fourth runway and associated airfield augmentation.

Discretionary land uses within Precincts 3 and 6A are Aviation Activity and Aviation Support Facilities.

3.5.4 NON-AVIATION (MIXED BUSINESS) DEVELOPMENT (PRECINCTS 4, 5 AND 6)

Precincts 4, 5 and 6 are identified as 'Mixed Business' land use areas for non-aviation development. This land use area has been based on the 'Mixed Business' zone, as contained in the City of Cockburn Town Planning Scheme No. 3.

PRECINCT 4

The objective of Precinct 4 generally is to provide a mixed use business park-like setting supporting a landscaped entrance to the airport. The Precinct will continue to support warehouse, manufacturing, storage,

office, business and professional services and existing retail type development and land uses, noting that no further retail development is proposed at the airport.

PRECINCT 5

The objective of Precinct 5 is to provide a mixed use business park-like setting and to provide uses appropriate for the Jandakot Underground Water Protection Control Area (JUWPCA) outlined in Section 9.2.1. Precinct 5 will support warehouse, manufacturing and storage type development and land uses that will be generally consistent with the City of Cockburn's 'Mixed Business' zone and will be controlled to prevent impacts to the Jandakot Water Mound.

PRECINCT 6

Similar to Precinct 5, the objective of Precinct 6 is to provide a mixed use business park-like setting and to provide uses appropriate for the JUWPCA (for the eastern half of the Precinct). Precinct 6 will support office, business, professional services, warehouse, manufacturing and storage type development and land uses that will be generally consistent with the City of Cockburn's 'Mixed Business' zone and will be controlled to prevent impacts to the Jandakot Water Mound.

Discretionary land uses within Precincts 4, 5 and 6 are identified in Table 3.2.

Table 3.2 Precincts 4, 5 and 6 Discretionary Land Uses

Animal Establishment	Amusement Parlour
Bank	Betting Agency
Club Premises	Commercial Vehicle Parking
Farm Supply Centre	Fast Food Outlet
Garden Centre	Hardware Store
Hotel/Tavern	Industry – Cottage
Industry – Light	Industry – Service
Market	Motor Vehicle, Boat or Caravan Sales
Motor Vehicle Hire Premises	Motor Vehicle Wash
Motor Vehicle Repair	Lunch Bar
Nursery	Office
Petrol Filling Station	Public Amusement
Reception Centre	Recreation-Private
Restaurant	Service Station
Showroom	Storage Yard
Vehicle – Disused	Veterinary Centre
Veterinary Consulting Rooms	Veterinary Hospital
Warehouse	

3.6 CONSISTENCY WITH STATE AND LOCAL PLANNING FRAMEWORK

Regulation 5.02(2) of the *Airports Regulations 1997* states that “an airport master plan must, in relation to the landside part of the airport, where possible describe proposals for land use and related planning, zoning or developments in an amount of detail equivalent to that required by, and using terminology (including definitions) consistent with that applying in, land use planning zoning and development legislation in force in the State or Territory in which the airport is located.”

Whilst the terminology of land use ‘precincts’ has been used in this Master Plan 2014, consistent with Master Plan 2009, these precincts effectively operate as, and are consistent with, land use ‘zones’, being the terminology used in the State and Local Government planning framework. To demonstrate this, and as stated in Section 3.5.4, the ‘Mixed Business’ Precincts have been based on the ‘Mixed Business’ zone as contained in the City of Cockburn Town Planning Scheme No. 3.

In this regard, where possible the Jandakot Airport land use plan as contained in this Master Plan 2014 has been developed in an amount of detail and using terminology and definitions consistent with that of the Western Australian Planning Commission Model Scheme Text and is also consistent as far as practicable with the local planning scheme of the City of Cockburn.

The Cities of Cockburn, Canning and Melville have been involved in the preliminary consultation at the initiation of the master plan review process. Consultation with the City of Cockburn regarding the envisaged development and land uses for the airport estate, and specifically Precinct 6, as proposed above and consistent with Master Plan 2009, has been ongoing during the preparation of this Master Plan 2014.

3.7 SENSITIVE DEVELOPMENTS

Section 71A of the Act requires a master plan to identify any proposed ‘sensitive developments’, defined as development, or redevelopment that increases the capacity, of the following:

- residential dwelling;
- community care facility;
- pre-school;
- primary, secondary, tertiary or other education institution; and
- hospital.

Sensitive developments are prohibited on Commonwealth leased airports except in exceptional circumstances, and require an airport to apply to the Minister for Infrastructure and Regional Development for approval to prepare a draft major development plan for the proposed development. The Minister may approve the preparation of the draft major development plan only if he or she is satisfied that there are exceptional circumstances that support its preparation.

There are no specific proposals for sensitive developments in this Master Plan 2014.

4. AVIATION DEVELOPMENT

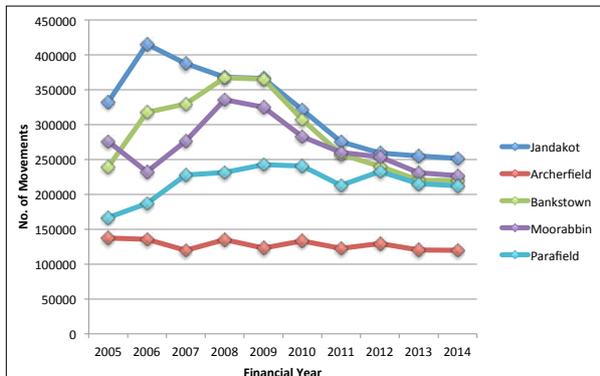
4.1 AIRCRAFT MOVEMENTS

4.1.1 NATIONAL TRENDS

Australia's general aviation aerodromes have shown an average performance over the last few years. Many of the cost pressures that negatively affect general aviation activity remain present, most notably the price of aviation fuel. However, due to the forecast worldwide shortage of pilots, training bases such as Jandakot tend to benefit from an upsurge in flying training activities. Flying training and charters continue to make up the largest categories in the general aviation sectors, whilst other categories such as private and aerial work remain relatively flat. Helicopter activity continues to grow, as evidenced by the increasing proportion of helicopters within the overall Australian general aviation fleet mix.

Figure 4.1 compares the aircraft movements at Jandakot Airport with the other major general aviation airports in Australia over the last 10 years.

FIGURE 4.1 - GENERAL AVIATION AIRPORTS MOVEMENT COMPARISON



Source: Airservices Australia.

4.1.2 JANDAKOT AIRPORT

Jandakot Airport operates 24 hours, 7 days a week. The airport has a significant role as a major training base for both local and international pilots. Flying training activities account for approximately 80% of the annual movements conducted at the airport, with some 60% of movements being repetitive 'touch-and-go' circuit operations.

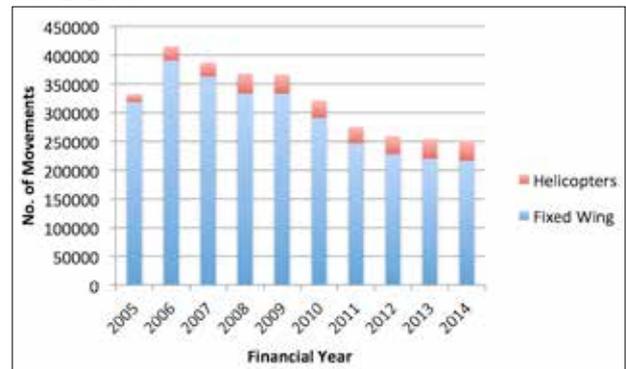
Pilot training is provided by three major flying schools – Singapore Flying College, China Southern West Australian Flying College and the Royal Aero

Club of Western Australia – and additional training organisations that include Advanced Cockpit Flight Training, Polytechnic West, Air Australia International, Minovation, Cloud Dancer, Jandakot Flight Centre, and the University Flying Club. Heliwest and Rotorvation are the largest providers of helicopter training.

Charter and aerial work operations related to agriculture, mining, tourism related activities and rural services have been estimated to contribute about 16% of the total aircraft movements at the airport. Flights related to mining are mainly ad-hoc charters that fly out to remote areas not covered by major airline routes or 'fly-in fly-out' operators. Aerial work services include air ambulance (e.g. Royal Flying Doctor Service), bushfire surveillance and water bombing, media, aerial spraying and surveying. Other operations relate to private flying and helicopter operations.

Figure 4.2 shows the total aviation movements recorded by Airservices Australia for the last 10 years for Jandakot Airport.

FIGURE 4.2 - JANDAKOT AIRPORT TOTAL ANNUAL AIRCRAFT MOVEMENTS



Source: Airservices Australia.

Airservices Australia data summarises movements of helicopter, military, fixed wing under 7 tonne maximum take-off weight and fixed wing above 7 tonnes. These are shown in Table 4.1 for the past five years.

Table 4.1 Jandakot Airport Aircraft Movements

Aircraft Weight/ Type	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2013/ 2014 %
Between 7-136 tonnes	488	880	932	730	716	0.3
Under 7 tonnes	290,260	45,502	226,460	219,066	215,598	85.7
Helicopter	30,702	29,076	31,722	35,284	35,204	13.9
Military	28	48	24	48	48	0.1
TOTAL	321,478	275,506	259,138	255,128	251,566	

Source: Airservices Australia.

4.2 MOVEMENT CAPACITY

Identifying overall future aircraft movement capacity is an important component for planning.

When endorsing the Australian Noise Exposure Forecast (outlined in Chapter 8), Airservices Australia needs to be satisfied that the forecast numbers of aircraft movements, operating times and the aircraft types carrying out operations are not greater than the physical ultimate capacity of the existing or proposed runways.

Jandakot Airport capacity was estimated in Master Plan 2009 as 500,000 fixed-wing aircraft movements per annum with a theoretical capacity of 514,650 fixed-wing aircraft movements per annum once the fourth runway is operational. The airport capacity for rotary-wing operations was estimated in Master Plan 2009 as 76,000 movements per annum.

The movement capacity has been reassessed due to implementation of Class D Airspace procedures by the Civil Aviation Safety Authority on 3 June 2010. The changes involved replacing the Australian-specific general aviation aerodrome procedures with the International Civil Aviation Organization's Class D airspace classification and procedures broadly aligned with the US Federal Aviation Administration's Class D procedures. A major impact of the Class D procedures was to reduce the number of aircraft permitted in the flight circuit in order to increase the separation distance between operating aircraft. The CASA imposed

limitation was six aircraft per circuit area. Though this restriction was later reviewed, Jandakot Air Traffic Control continues to limit the amount of aircraft in the circuit area to a nominal number of eight aircraft for traffic management purposes. This number will vary, dependant on runway availability and other conditions such as weather.

In addition, the majority of helicopter operations have relocated, or plan to relocate, to a new development area located around Bell Court and Mustang Road. Due to the proximity of this area to primary runway 06L/24R, helicopters no longer operate independently of fixed-wing traffic and are sequenced with all other aircraft, resulting in a reduction in the previous forecast capacity of helicopter operations.

The reassessment of the airport's maximum theoretical operating capacity is 460,000 fixed-wing movements and 66,000 helicopter movements per annum. This is a 10.6% reduction in fixed-wing movements and 13.2% reduction in helicopter movements from the Master Plan 2009 assessment.

It should be noted that any future changes to airspace or operational procedures, such as circuit area restrictions or other aircraft separation requirements, will impact the movement capacity of the airport.

4.3 MOVEMENT FORECASTS

Future demand for pilot training is extremely difficult to predict. Student intake is largely driven by the forecast demand for pilots by the airline industry.

Private general aviation operators are also very vulnerable to cost and administrative impacts, with the increasing operating costs and additional regulatory controls being cited as the major reasons for private operators reducing their flying hours.

Air traffic movements at Jandakot Airport reached a peak of 415,284 annual movements in 2005/2006, and declined significantly after the Global Financial Crisis. While the past five years have seen flat movement growth, local training schools have indicated that the demand for pilot training is expected to increase in 2015/2016 due partly to forecast world-wide pilot shortages being attributed to the continued demand for air travel and the aging pilot base. There are currently 800 students undertaking fixed-wing pilot training,

resulting in 80,000 flying hours per annum. The training schools are estimating that over the next 5-10 years student numbers will increase by 40% and their flying hours will reach 126,000 hours per annum.

At an average growth rate of 4.0% per annum for fixed-wing movements and 3.4% average growth rate for helicopter movements, the airport could expect to reach the theoretical operating capacity of 460,000 fixed wing and 66,000 helicopter movements identified in this Master Plan within the 20 year planning horizon. While the assumed average growth rate of 4% is higher than growth rates forecast at similar general aviation airports, the expected student pilot intake, aircraft fleet changes (outlined in the section below) and construction of the fourth runway have been taken into consideration and it is likely that this growth can be achieved. Based on this forecast, by 2026/27 Jandakot Airport could expect similar movement volumes to what was experienced in 2005/2006.

4.4 FLEET MIX

Due to runway and taxiway pavement characteristics, aircraft operating regularly at Jandakot Airport are restricted to types with a maximum take-off weight less than 5,700kg.

Fixed-wing aircraft currently account for 87% of all movements at Jandakot. Over 60% of all fixed-wing traffic is attributed to three of the most popular aircraft types used for pilot training at Jandakot Airport – the Cessna 172 (35% of all fixed-wing movements), Cessna 152 (16% of all fixed-wing movements), and Grob 115 (10% of all fixed-wing movements). Fixed-wing movements have declined substantially from 390,940 in 2005/2006 to 216,362 in 2013/2014 primarily due to a downturn in commercial and private pilot training demand following the Global Financial Crisis.

A number of operators have introduced larger aircraft for private and commercial charter activities, such as the Fairchild SA-226 Metro II (18 seats) and the Beechcraft Kingair B200 (13-15 seats). In 2012 China Southern WA Flying College added Embraer Phenom 100 Jets to its fleet for pilot training activities, and in 2013/2014 replaced all of its Cessna Citation jets with Phenoms. A number of flying schools have indicated that aircraft fleets will be upgraded within the next 5-10 years, and the majority of the upgrades are replacing older aircraft with a similar aircraft type. The number of Pilatus PC-12

aircraft (9-11 seats) has also increased significantly, with the Royal Flying Doctor Service planning to continue adding to its existing fleet of 15 PC-12s. PC-12s are also being operated by Police Air Wing and private charter companies.

Helicopter activity has increased substantially over the past decade, with 35,204 helicopter movements reported in 2013/2014 compared to 13,664 movements in 2004/2005. Demand for commercial and private helicopter pilot training has increased steadily, and circuit operations now represent over 50% of all rotary-wing movements. Nearly 53% of all helicopter activity is conducted by Robinson R22 types (2 seater single engine), with a further 23% attributed to the larger Robinson R44 (4 seater single engine). The high percentage of R22 activity is due to the small helicopters being favoured for pilot training, with circuits accounting for 80% of all R22 activity. In terms of current movements, 40 of the 49 average daily R22 movements are training circuits.

Helicopters are also increasingly being used for emergency services response and support activities. Helicopters are preferred over fixed-wing aircraft due to the immediate deployment capability, manoeuvring flexibility, and ability to be stationary for observation and reporting of events. This includes the Department of Fire and Emergency Services and Department of Parks and Wildlife bushfire season surveillance and incident support operations, Police Air Wing surveillance and incident response, RAC Rescue helicopter medical and emergency response, and seasonal activities such as aerial spraying and summer shark patrols. These operations are generally conducted in the larger helicopter types, such as the Bell 206 JetRangers, Eurocopter AS-350, Eurocopter AS-365, BK-117, Bell 214 and Bell 412. Each of these helicopter types currently has an average of 5 or less daily movements.

4.5 AVIATION DEVELOPMENT

Jandakot Airport Holdings' vision is to successfully develop and manage Jandakot Airport as a strategically significant aviation hub with a supporting business campus.

Since approval of the Master Plan 2009, JAH has continued to develop aviation facilities at the airport. Within Precinct 3 these works include:

- upgrade of sewer and electrical services to Mustang Road and Bell Court;
- new apron for helicopter hangars being constructed in Bell Court and Mustang Road;
- construction of the Police Air Wing hangar facility (Mustang Road);
- upgrade of Compass Road and associated services;
- commencement of an airfield lighting replacement and upgrade project; and
- commencement of an airfield resurfacing programme.

The current airfield layout is shown at Figure 4.3.

Of the 622 hectare land holding, 260 hectares (42%) has been identified in this Master Plan 2014 as being for aviation operations. JAH is committed to providing appropriate aviation infrastructure to accommodate future growth. The growth in aviation infrastructure will need to be undertaken in parallel with increased commercial activity to sustain the economic future of the airport. Without diversifying income to support aviation infrastructure the operating cost of aviation activities would need to increase significantly which would not be viable for the airport or its tenants.

Further aviation development to achieve the vision of a strategically significant aviation hub is proposed to include a fourth runway with associated taxiways and aviation support facilities as described below.

Airport development by 2034 is shown in Figure 4.4 Aviation Development Plan. Primary facilities shown in Figure 4.4 include:

- lengthening of runways 06L/24R and 12/30 (future 12R/30L);
- no changes to runway 06R/24L;
- fourth runway 12L/30R;
- runway end safety areas for runways 06L/24R and 12R/30L;
- existing and proposed taxiways and aprons;
- proposed non-directional beacon relocation site;
- possible future compass swing bay;
- existing and proposed run-up bays;
- aircraft wash bays;

- aviation support facilities (eg wind indicators); and
- conservation areas.

As detailed in Section 2.2.1, a major development plan is required to be prepared for the construction of a new runway and altering existing runways.

A Draft MDP for the construction of new runway 12L/30R, lengthening of existing runway 06R/24R, lengthening of existing runway 12/30 (future 12R/30L) and taxiway augmentation works will be released for public comment on approval of this Master Plan 2014.

4.6 PLANNING STANDARDS

The International Civil Aviation Organization (ICAO) determines international standards and recommended practices for aviation operations. Australia also has its own regulatory requirements pertaining to the operation of aerodromes. These are based on the ICAO standards and recommended practices.

Australia's Civil Aviation Safety Authority (CASA) is responsible under Section 9(1)(c) of the *Civil Aviation Act 1988* for developing and promulgating appropriate clear and concise aviation safety standards through the *Civil Aviation Safety Regulations 1998 Part 139*. CASA prescribes the detailed technical requirements that are determined to be necessary for the safety of aerodromes and air navigation.

The Manual of Standards (MOS) Part 139 – Aerodromes sets out the standards to be adopted for Australian aerodromes. These standards are generally based on the standards and recommended practices set out in ICAO Annex 14. Siting and operating standards for all airfield infrastructure at Jandakot Airport is determined in accordance with MOS Part 139.

ICAO has developed international standard Aerodrome Reference Codes for airport classifications which relate to particular aircraft groupings. These standard groupings are also adopted in MOS Part 139.

A critical aircraft of Code 2B is used as the basis for planning the layout of the primary runways 06L/24R and 12/30 and associated taxiways at Jandakot Airport. A typical Code 2B aircraft in widespread use in Australia is the Fairchild Metro II, which is a twin engine turbo-prop aircraft with a passenger carrying capacity of up to 19. The bulk of Jandakot fixed wing traffic is made up of light single engine types such as Cessna 172 and Piper

PA28 series aircraft which are Code IA types. Code IA aircraft types are adopted for planning the secondary (parallel) runways.

4.7 AIRFIELD INFRASTRUCTURE

4.7.1 RUNWAYS

Jandakot Airport has a multi-runway configuration, comprising two NE/SW parallel runways and a SE/NW cross runway. The new fourth runway will also be SE/NW.

The bearing strength of an aerodrome pavement is expressed as a Pavement Classification Number (PCN). Aircraft can operate unrestricted on a runway pavement that has a PCN rating equal to or greater than the Aircraft Classification Number (ACN). The ACN value expresses the relative damaging effect of the aircraft on a pavement for the specified standard subgrade strength.

Runway pavement strengths at Jandakot Airport are designed primarily for aircraft with a maximum take-off weight of 5,700kg, with capacity to accommodate occasional movements by heavier aircraft on the primary runways. A Pavement Concession may be issued by JAH for aircraft with a maximum take-off weight greater than 5,700kg, dependent on the PCN-ACN assessment of the specific aircraft type and subject to the aircraft wing-span satisfying the taxiway separation requirements.

RUNWAY 06L/24R

Runway 06L/24R is the primary runway and is used for the majority of aircraft operations. Constructed for the opening of the airport in 1963, the runway is currently 1,392m in length and 30m wide. This length is adequate for the current needs of most operators, although some aircraft types may experience payload restrictions on very hot days. Discussions with the Royal Flying Doctor Service and other charter operators have indicated they are considering the acquisition of different aircraft types in the future. For planning purposes, Master Plan 2009 and this Master Plan have allowed for a minor extension at each runway end, thereby providing for an overall length of 1,600 metres.

RUNWAY 06R/24L

Parallel runway 06R/24L was constructed in 1991 to support the increasing pilot training activities. The existing runway length of 1,150 metres and the width of 18 metres is adequate for the touch-and-go circuit training by current types of aircraft used for training and there are no changes to this runway included in this Master Plan.

RUNWAY 12/30

Constructed for the opening of Jandakot Airport in 1963, runway 12/30 is the primary runway used for aircraft operations in north-westerly and south-easterly wind conditions.

The existing length of runway 12/30 (to be redefined as runway 12R/30L when the fourth runway is constructed) is 990 metres and the width is 30 metres.

Less than 15% of all movements are on runway 12/30 due to the prevailing weather conditions at Jandakot favouring use of the 06 or 24 directions. Because of the nature of the wind conditions that exist for operations to revert to the 12 or 30 directions and the extra runway length preferred for pilot training operations, a number of aircraft operators currently request use of runway 06L/24R even when the 12 or 30 directions are in use. In addition, the current length of runway 12/30 is not able to easily accommodate the existing jet operations or some of the aircraft being considered for future use. An extension to runway 12/30 would permit these aircraft to use this runway in lieu of runway 06L/24R, thereby avoiding delayed operations due to the contra-flow traffic movements and reducing the complexities of managing concurrent aircraft operations across two runway directions. For these reasons it is appropriate to retain provision to extend runway 12/30 to an overall length of 1,508 metres, as shown in Master Plan 2009.

Due to the circuit capacity restrictions of single runway operations, use of the 12 or 30 runway directions is currently only implemented when cross-winds exceed 12 knots. Once the fourth runway is operational, the 12/30 direction will be used for a higher proportion of flight movements than currently occurs as the standard cross-wind criterion of 10 knots will be implemented in common with other Class D Airspace airports. In terms of movement numbers, runway 12/30 currently

has an average of 90 movements per day. Once the fourth runway is operational, at the maximum airfield operating capacity there could be expected to be an average of 126 movements per day on runway 12/30 and 189 movements per day (or 94 touch-and-go circuits) on the fourth runway 12L/30R.

RUNWAY 12L/30R

The development of the fourth runway was first proposed by the Federal Airports Corporation in 1986 to support the growth in pilot training activity.

This new runway, to be called 12L/30R when operational, is planned to be 990 metres long and 18 metres wide, located parallel to the existing runway 12/30. This runway will perform essentially the same role as runway 06R/24L, which is touch-and-go circuit training for aircraft under visual meteorological conditions during daytime hours.

Provision of the fourth runway will not significantly add to the airport's overall capacity potential. The fourth runway will add to efficiency and regularity by providing an equivalent level of capacity in any wind condition, with both a primary runway and dedicated parallel training runway that can be used. This will be of significant benefit to the flying training schools that can currently be forced to curtail training activities when the 12 or 30 directions are in use due to the airspace capacity restriction of a single runway operation.

4.7.2 TAXIWAYS

The taxiway system will be augmented to support the fourth runway and extensions to runways 12/30 and 06L/24R.

The taxiway design was discussed in detail with local Air Traffic Controllers and flying schools to determine the most efficient layout. Particular attention has been given to avoiding surface movement conflict points and the potential for head-to-head taxiing conflicts. The taxiway layout also reduces the amount of time runways are occupied by taxiing aircraft.

Taxiways supporting runways 06L/24R and 12/30 (future 12R/30L) will be 10.5 metres wide meeting Code B standards, and taxiways supporting runways 06R/24L and fourth runway 12L/30R will be 7.5 metres wide meeting Code A standards.

The taxiway layout is shown in Figure 4.4 (Note: proposed taxiways have been given assumed designation system. The final taxiway designations will be prepared in consultation with Airservices ATC as part of the detailed design).

4.7.3 RUNWAY END SAFETY AREAS

A runway end safety area (RESA) is provided at the end of a runway strip in the event of an aircraft undershooting or overrunning the runway. MOS Part 139 requires provision of RESAs for new runways and existing runways when lengthened, unless the runway is Code 1 or 2 and is not an instrument runway. Thus RESAs are required for the existing runways 06L/24R and 12/30 (future 12R/30L) at Jandakot Airport when they are extended. The fourth runway will not require RESAs.

As the critical design aircraft is Code 2 for both runways 06L/24R and 12R/30L, in accordance with MOS Part 139, the minimum length of a RESA required is 60m (being twice that of the associated runway width). RESAs must be prepared or constructed so as to reduce the risk of damage to an aeroplane, enhance aeroplane deceleration and facilitate the movement of rescue and fire fighting vehicles. As most aircraft operating at Jandakot Airport have a maximum take-off weight of below 5,700kg, the RESA surface can be grass or gravel with sufficient strength to meet the above requirements.

4.7.4 PUBLIC SAFETY ZONES

The purpose of a public or runway safety zone is to identify an area adjacent to the end of a runway where special considerations might be applied to new developments to minimise the risk of damage by aircraft during landing or take off.

Currently, neither the Australian Commonwealth Government nor the Western Australian Government requires the provision of a public safety area or runway protection zone at the ends of runways at WA airports. The National Airports Safeguarding Advisory Group is considering additional safeguarding guidelines, such as public safety zones, for inclusion in the National Airports Safeguarding Framework, but these additional guidelines have not yet been released for public comment.

A review of existing key requirements for provision of a PSZ was undertaken by JAH as it is expected that PSZ will become a defined requirement in the future and, as such, should be taken into consideration for airfield planning.

The Department of Infrastructure and Regional Development's 'Safeguards for airports and the communities around them' discussion paper proposed that the boundaries of a PSZ would be determined by reference to levels of statistical chance of an accident at a particular location. The number of aircraft movements, and the distance of the location from the critical take-off and landing points, would be considered to model the total statistical chance of a fatal accident at the location over a one-year period. For smaller airports with a high proportion of light aircraft, an option is to use a shorter generic public safety zone in a trapezoid shape, based on a precautionary approach. This is similar to the runway protection zone implemented by the US Federal Aviation Administration (FAA). The US FAA requirements would result in a PSZ that extends 300m from the end of the runway strip. Based on this criteria, all of the public safety zones would be contained within the airport boundary with the exception of a small portion at the north-eastern end of Runway 06R/24L which falls onto land zoned "Rural – Water Protection" under the Metropolitan Region Scheme.

4.8 NAVIGATIONAL AIDS AND LIGHTING

4.8.1 AIRFIELD LIGHTING

Runways 06L/24R and 12/30 (future 12R/30L) are equipped with low intensity runway edge lighting and associated taxiways are equipped with centreline and holding point lighting. The 06L/24R runway lighting upgrade commenced in 2013.

Existing runway 06R/24L is not lit and therefore only permits operations during full daylight hours. As fourth runway 12L/30R will fulfil the same operational use as 06R/24L (being touch-and-go circuit operations in visual meteorological conditions), runway lighting will not be installed.

4.8.2 NON-DIRECTIONAL BEACON

Airservices Australia provides a Non-Directional Beacon (NDB) at Jandakot Airport to facilitate location navigation for aircraft arrivals and departures. Master Plan 2009 acknowledged that the development of the fourth runway would require the relocation of the NDB.

Airservices undertook a review of NDB locations around Australia and has subsequently taken some NDBs out of service. However, it has been determined that the NDB at Jandakot Airport will need to be retained and upgraded. Due to the runway configuration at Perth Airport and Perth Airport flight tracks, other navigational aids, such as an Instrument Landing System (ILS) or Distance Measuring Equipment (DME), are not considered suitable for Jandakot Airport.

A large part of pilot training syllabus involves flight practice using an NDB. The State Aviation Strategy (outlined in Section 2.3.1) identifies that the lack of access to common use navigation aids, such as an NDB, is a concern to the general aviation sector. Local flying schools have confirmed the importance of the NDB for pilot training activity at Jandakot. In addition, the majority of the aging aircraft fleet at Jandakot are not equipped with suitable equipment for an alternate instrument procedure. It is estimated that the NDB will be required for at least 10 years to allow time for aircraft operators to install newer navigational equipment to suit alternate instrument procedures.

Following analysis of procedural design and engineering requirements by Airservices and JAH, a preferred site for the NDB relocation has been selected in the south-west corner of the airside area as shown in Figure 4.4. The specific requirements for the siting of a NDB are detailed in the Manual of Standards. The main limitations affecting suitable locations for the NDB are the proximity to buildings and equipment such as overhead power and telephone lines, and the Obstacle Limitation Surfaces and Procedures for Air Navigation Services - Aircraft Operations which is the boundary of airspace protected by Commonwealth Legislation from intrusion or interference by anything which could affect aviation safety.

4.8.3 MOVEMENT AREA MARKINGS AND MARKERS

The airport is equipped with the prescribed movement area markings and markers, including a Movement Area Guidance (MAG) signage system. The MAG system is unlit and due to the low volume of movements at night there are currently no plans to provide illuminated signs. Additional MAG signs will be installed as required and in consultation with Air Traffic Control and pilot training schools.

4.8.4 PRECISION APPROACH PATH INDICATOR

The runway 24R approach has a Precision Approach Path Indicator (PAPI), which will be relocated as part of the runway 24R extension. A preliminary review of the Obstacle Assessment Surface for the PAPI relocation has been conducted in accordance with the MOS Part 139 standards and no obstacles were identified.

4.8.5 WIND INDICATORS

Wind indicators are required for runways with non-precision approach operations. The wind indicator, or windsock, provides pilots with a visual representation of the wind direction and velocity.

ILLUMINATED WIND INDICATOR

The illuminated wind indicator, currently located north of taxiway S4, will need to be relocated when the fourth runway is constructed. The illuminated wind indicator will be relocated at least 21.5m north of taxiway S4 in order to comply with clearance requirements from this taxiway and to be below the transitional airspace surfaces associated with runway 12/30 (future 12R/30L) and the fourth runway.

NON-ILLUMINATED WIND INDICATORS

Non-illuminated wind indicators are located close to the runway 24L and 24R thresholds, and near the runway 12 threshold.

4.8.6 AUTOMATIC WEATHER STATION

The Bureau of Meteorology's existing automatic weather station (AWS), which includes an anemometer mast to measure wind speed, is co-located with the Illuminated Wind Indicator.

Construction of the fourth runway will require the AWS to be relocated due to the height of the anemometer mast infringing into the new runway's Obstacle Limitation Surface (transitional surface). Discussions with the Bureau of Meteorology have identified two possible preferred locations which will satisfy the communication and power requirements of the AWS. These locations are the existing Non-Directional Beacon site and the proposed Non-Directional Beacon relocation site. The exact location for the AWS relocation will be determined as part of the detailed NDB relocation design brief.

4.8.7 AERODROME BEACON

An aerodrome beacon is a visual cue for pilots that is required to be visible from all angles of aircraft operations and not shielded by any obstacles. An aerodrome beacon is located on top of the Air Traffic Control tower and is activated by Air Traffic Controllers when required.

4.9 GENERAL AVIATION FACILITIES

4.9.1 APRONS AND AIRCRAFT PARKING

Sealed aprons are provided in front of most existing aircraft hangar building areas. It is a JAH requirement that all new hangar developments provide adequate apron space for aircraft parking.

JAH also provides both hardstand and grass aircraft parking bays at various locations within the apron area. These bays are available for long-term or short-term (casual) aircraft or helicopter parking. Tie-down facilities are provided as required on some hardstand areas.

4.9.2 AVIATION FUEL

The two aviation refuellers operating at Jandakot Airport are Air BP and Shell Aviation. Jet A-1 and AVGAS fuel is mainly provided to aircraft by mobile refuelling vehicles. Air BP also has a fuel storage facility and a dispensing bowser on the southern apron.

4.9.3 COMPASS SWING BAY

Aircraft compass swings are required as a component of some aircraft maintenance activities to determine and reduce magnetic deviation coefficients and record the residual deviations.

The current compass swing bay at the northern end of taxiway B is to be retained. If required in the future, a new compass swing bay could be provided to the north of taxiway C3/C4 (between runways 06L/24R and 06R/24L).

4.9.4 GROUND RUN-UP

Engine ground running is required for pre-flight run-up and for engine testing after maintenance. The airport has two existing designated engine ground run-up bays, with a further two ground run-up bays proposed as part of the works associated with the construction of the fourth runway, extensions to runway 06L/24R and 12/30 and taxiway augmentation.

The existing northern bundled run-up bay is located opposite the north-eastern end of runway 06L/24R, adjacent to taxiway B5. This bay is located close to major aircraft maintenance facilities and is frequently used for engine run-up after maintenance or overhaul.

The existing southern run-up bay is located near the Royal Aero Club of WA building, adjacent to taxiway B1.

An unbundled central run-up bay is proposed between the two 06/24 runways adjacent to taxiway L1 to be used primarily for proposed runway 12L departures.

A fourth possible run-up bay could be provided at the end of new taxiway K to serve aircraft operating on runways 30R and 30L, depending on operator requirements.

The tie down run-up position on taxiway G is no longer used and will be decommissioned when proposed runway 12L/30R is constructed.

4.9.5 AIRCRAFT WASH BAYS

There are two common-user aircraft wash bays which are currently provided free-of-charge to operators. The bays are located on the southern and central aprons, away from the Jandakot Underground Water Pollution Control Area.

4.9.6 NEW DEVELOPMENT

The majority of newly developed general aviation sites are located west of Mustang Road at the north end of the airport. The south eastern end of Mustang Road provides for smaller hangar sites with apron frontage, aircraft parking areas and a central access taxiway.

A dedicated helicopter area has recently been developed in the area north of Bell Court, accommodating hangars for the helicopter operators and training schools and a new Police Air Wing facility for both fixed and rotary wing operations.

Provision has been made at the south-western end of the airport to expand lock-up hangar facilities. Typically, these are constructed in blocks containing five hangars each.

Sites for future general aviation facilities are also proposed on the currently undeveloped area south of runway 12/30 (future 12R/30L), within Precinct 6A identified for 'Aviation Operations' in this Master Plan.

4.10 AIR TRAFFIC CONTROL

Jandakot Airport is designated as a general aviation aerodrome and operates to Class D Airspace procedures. The Jandakot Control Zone encompasses the airspace within a 3 nautical mile radius of Jandakot Airport, with an airspace upper limit of 1,500 ft (457.2 meters) Above Mean Sea Level.

4.10.1 AIR TRAFFIC CONTROL TOWER

Air Traffic Control (ATC) is administered by Airservices Australia from a control tower located centrally along the airfield apron. The interior of the tower was refurbished in 2013.

4.10.2 TOWER LINE OF SIGHT

The ATC Tower is required to be sited in a location that enables clear lines of sight, unimpaired by direct or indirect external light sources such as apron lights, car parking lights, surface traffic and street lights and reflective surfaces. There is no development proposed in this Master Plan that will compromise appropriate lines of sight from the ATC Tower to the aircraft movement areas.

4.10.3 HOURS OF OPERATION

The current hours of operation of the ATC Tower are:

- 7.00 am to 9.00 pm weekdays (or 7.00 am to 8.00 pm June to August only); and
- 8.00 am to 6.00 pm weekends.

The ATC Tower is currently operational for over 95% of all movements. There is no change to ATC Tower operating hours expected as a result of the airfield development as the fourth runway will not be lit and will therefore be used in daylight hours only.

The airport continues to operate while the ATC Tower is closed, with set Common Traffic Area Frequency procedures for pilots to make mandatory radio calls advising their position and to sequence themselves within the Jandakot Control Zone.

4.10.4 NOMINATING DUTY RUNWAYS

Runway selection is determined by wind direction and strength as pilots prefer to take-off and land into the prevailing wind. During ATC Tower operating hours, the Air Traffic Controllers stipulate which runway direction must be used. When the tower is closed, the pilot will determine which runway to use based on the direction and speed of the wind.

Currently the two parallel runways (06L/24R and 06R/24L) are used for approximately 85% of all movements, and runway 12/30 is used for 15% of all movements. While use of the runway 06 and 24 directions is consistent throughout the year, use of the runway 12 and 30 directions is very seasonal. Nearly 95% of all movements in the runway 12 direction occur between October and May due to the easterly winds that favour use of runway 12. The runway 30 direction is generally only used in north-westerly winds experienced during periods of stormy weather (currently less than 6% of all movements use runway 30).

Jandakot Airport procedures will revert to the standard 10 knot crosswind criteria for use of the 12 and 30 runway directions once the fourth runway is constructed, and it is expected that the use of the 12 and 30 runway directions will then increase from 15% to 25% of all movements.

4.10.5 SEQUENCING OF AIRCRAFT

The high volume of aircraft traffic and radio frequency congestion add to convoluted sequencing requirements and instructions when single runway 12/30 is in use. The addition of the fourth runway 12L/30R will minimise and simplify sequence instructions to aircraft as arriving aircraft will no longer be required to be sequenced with aircraft conducting circuits, thereby facilitating additional capacity for training aircraft.

4.11 HELICOPTER OPERATIONS

4.11.1 LANDING SITES

Jandakot Airport currently has a helicopter landing site, located in front of the ATC Tower, which is used mainly for itinerant (casual) helicopter operations. The landing site will be relocated 300m north-east, adjacent to taxiway B4 as shown in Figure 4.4, to make way for a taxiway parallel to B3 that will act as a bypass lane during times of heavy surface traffic. The proposed helicopter landing site remains within line of sight of the ATC Tower.

Until recently, the majority of helicopter movements departed and arrived direct to the operator's hangar apron. A dedicated helicopter area has now been developed around Bell Court and Mustang Road, at the northern end of the airfield, and all major helicopter organisations are expected to relocate into this area within the next 3-5 years. The proximity of this area to the 06L/24R runway requires the majority of helicopter movements to be fully integrated with fixed-wing movements under ATC control.

4.11.2 TRAINING AREA

A dedicated grassed helicopter training area is provided in the area bounded by the runway 06R/24L strip, taxiway S and the airport boundary as shown in Figure 4.4. An auto-rotative aiming point is identified by an asphalt marker within the training area.

Unless otherwise directed by ATC, helicopter operations in the training area are required to be conducted 100m away from the runway and are limited to a maximum height of 200ft (61m) above ground level.

When the 06 and 24 runway directions are in use, helicopter training can also be conducted across runway 30 and out to the south-eastern airport boundary subject to ATC approval. Similarly, the runway 06R/24L strip can be utilised for helicopter training activities when the 12/30 runway is in use. This allows three helicopters to conduct training concurrently, subject to ATC workload and approval.

The runway 06L/24R strip is currently not able to be used due to the runway having to remain available for use by jets and turbo aircraft that are not able to use the shorter runway 12/30. The extension to runway 12/30 will permit use by all types of aircraft and runway 06L/24R will not need to remain available for alternate operations. This in turn will allow the grass runway strip of 06L/24R to be used for helicopter training, which may facilitate capacity for another helicopter to conduct training during peak periods. Helicopter aiming points will be positioned between each of the parallel runway systems to assist with ATC control and appropriate separation of helicopter training activity.

5. NON AVIATION DEVELOPMENT

This chapter outlines a development strategy for the 195 hectares of the airport identified for non-aviation (mixed business) development in Chapter 3. The purpose of the strategy is to provide development direction guided by sound on-airport and off-airport planning principles to achieve the objectives of the Master Plan.

New non-aviation development since Master Plan 2009 was approved includes:

- earthworks and installation of infrastructure for the approved commercial area Precincts 4, 4A and 5;
- the upgrade of Compass Road and associated infrastructure; and
- the construction of the Precinct 5 road link (Spartan Street).

5.1 PLANNING OBJECTIVES

The non-aviation development planning objectives are to:

- Integrate the airport's overall aviation and non-aviation development;
- Accommodate the planning constraints unique to airport property such as aircraft noise modelling and airspace surfaces that place land use conditions and building height limitations on development;
- Respect and integrate the current regional and local planning schemes surrounding the airport with the aviation and non-aviation land uses, as required by the *Airports Act 1996*;
- Respect the planning efforts of airport neighbours such as the City of Cockburn, City of Melville and City of Canning;
- Ensure that development provides a pleasant environment for visitors to, and workers at, the airport; and
- Provide alternative revenue streams to diversify income and reduce the risk of a single source income.

5.2 DEVELOPMENT DRIVERS

5.2.1 COMPETITIVE ADVANTAGE

Jandakot Airport is located 16km south of the Perth city centre and is a short distance from direct access points to Kwinana Freeway and Roe Highway. During off-peak periods, travel time by car is 15-20 minutes to the Perth CBD and 35 minutes to Perth's east, west and northerly suburbs and industrial areas.

Strengths of the Perth metropolitan region and Western Australia that are especially relevant to non-aviation development include:

- Proximity to the south east Asian market - the south east Asian market, despite the current difficult economic conditions, is projected to enjoy strong economic growth in the coming decades;
- Strong resource industries - with the strong mining, agricultural, oil and gas industry base, the economic outlook for Western Australia is strong;
- Good lifestyle - Western Australia enjoys a quality lifestyle;
- Attractive tourist destination - Western Australia is expected to grow as a tourist destination;
- Above average population growth - by maintaining a strong economic base and providing a quality lifestyle, Western Australia is experiencing strong population growth;
- High demand for commercial and industrial property - the Perth metropolitan region is experiencing a shortage of commercial and industrial land. As a result the non-aviation land at Jandakot Airport offers attractive opportunities, particularly given its convenient access to the port of Fremantle and the surrounding major regional and district road systems and its flexibility in providing for larger lot sizes;
- Economic stability - Western Australia's economy remains stable in the current difficult economic conditions being experienced worldwide;
- Political freedom and stability - Western Australia enjoys a stable political and social environment;

- High quality infrastructure - development and growth in the Perth metropolitan region is supported by well managed governance and high quality infrastructure; and
- Educated and skilled workforce - economic growth in the Perth metropolitan region is supported by an educated and skilled workforce.

5.2.2 COMMERCIAL OPPORTUNITIES

Based on the development of Jandakot Airport to date, non-aviation development opportunities on the estate are envisaged to predominantly be warehouse, business, office, workshop and storage type uses. These types of activities are best suited to the constraints of the site, including those associated with airport operations.

5.3 DEVELOPMENT STRATEGY

The 622 hectares of land which comprise the Jandakot Airport estate has been divided into six precincts (plus sub-precincts), as shown in Figure 3.1, with the three land uses as outlined in Chapter 3 being 'Conservation', 'Aviation Operations' and 'Mixed Business'. The use of precincts facilitates the identification of specific activities and assists with the development of programming and marketing.

The precincts have been selected with regard to:

- Location and access;
- High priority conservation areas;
- Aviation constraints (e.g. aircraft noise and airspace requirements);
- Flexibility of use and subdivision; and
- Provision of infrastructure.

5.4 MIXED BUSINESS PRECINCTS

Development on airport land is not subject to State or Local Government planning processes, however, the designation of the Mixed Business Precincts is consistent with the City of Cockburn's 'Mixed Business' zone.

5.4.1 PRECINCT 4

Precinct 4 is located centrally on the airport site, and generally comprises the land on either side of Karel Avenue. This precinct is subject to ongoing

development with approximately 52 hectares having already been developed. Development within this precinct comprises warehouse, manufacturing, storage, business and professional services and retail land uses, including local amenities to service employees located at the airport estate.

DEVELOPMENT OBJECTIVE

The development objective of Precinct 4 is to provide a mixed use business park-like setting, supporting a landscaped entrance to the airport.

DESIRED CHARACTER

The entrance to the airport is currently a landscaped boulevard that will be echoed in the design and landscaping of future development within the precinct. The precinct will take advantage of its location at the entrance by locating most activity generating uses in this position, including the retail land uses already developed that service the employment base located at the airport.

ENVISAGED DEVELOPMENT

It is envisaged that the precinct will continue to be developed with warehouse, manufacturing, workshop, storage, business, professional services and office type land uses. These land uses will be in accordance with those listed as discretionary uses for the precinct in Table 3.2.

5.4.2 PRECINCT 5

Precinct 5 is located in the south-west corner of the airport site. This precinct is subject to ongoing development with approximately 9 hectares of warehouse and storage land uses having already been developed. Development and land uses within this precinct will have regard to the Jandakot Underground Water Protection Control Area, including no bulk chemical storage operations to be located within this portion of the precinct.

DEVELOPMENT OBJECTIVE

The development objective of Precinct 5 is to provide a mixed use business park-like setting, with appropriate land uses having regard to the Jandakot Underground Water Protection Control Area.

DESIRED CHARACTER

Precinct 5 will support warehouse and storage land uses, consistent with the City of Cockburn's 'Mixed Business' zone, with development to be controlled to prevent impacts to the Jandakot Water Mound.

ENVISAGED DEVELOPMENT

It is envisaged that the precinct will continue to be developed primarily with warehouse and storage type land uses. These land uses will be in accordance with those listed as discretionary uses for the precinct in Table 3.2.

5.4.3 PRECINCT 6

Precinct 6 is identified for 'Mixed Business' under this Master Plan, having been identified for 'Future Development' under Master Plan 2009. Development and land uses within the eastern half of the precinct will have regard to the Jandakot Underground Water Protection Control Area, including no bulk chemical storage operations to be located within the JUWPCA portion of the precinct.

DEVELOPMENT OBJECTIVE

The development objective of Precinct 6 is to provide a mixed use business park-like setting, with appropriate land uses having regard to the Jandakot Underground Water Protection Control Area.

DESIRED CHARACTER

Precinct 6 will support warehouse and storage land uses, consistent with the City of Cockburn's 'Mixed Business' zone, with development to be controlled to prevent impacts to the Jandakot Water Mound.

ENVISAGED DEVELOPMENT

It is envisaged that the precinct will be developed primarily with warehouse and storage type land uses. These land uses will be in accordance with those listed as discretionary uses for the precinct in Table 3.2.

5.5 DEVELOPMENT OVER THE NEXT FIVE YEARS

Over the five year period of this Master Plan, it is forecast that the following floor space could be developed, providing for approximately 1,960 employees:

- 155,000 square metres of warehouse space;
- 40,000 square metres of workshop space; and
- 21,500 square metres of office space.

The timing of this development will be subject to the market and prospective tenant demand for commercial floor space as experienced in the Perth metropolitan region and is expected to be primarily located within Precincts 4 and 5.

The economic benefits of this level of floor space being developed and people employed is outlined in Section 1.8.2.

5.6 SIGNIFICANCE OF NON-AVIATION DEVELOPMENT

As outlined in Chapter 1 it is envisaged that ultimate non-aviation development of Jandakot Airport will occur within the 20 year period of this Master Plan, and will accommodate approximately 767,000 square metres of non-aviation floor space, comprising 560,000 square metres of warehouse, 140,000 square metres of manufacturing, 61,848 square metres of office and 5,000 square metres of retail (already constructed) floor space. Upon this ultimate development it is expected that approximately 7,100 employees associated with non-aviation development will be located on the airport estate.

5.7 CONSISTENCY WITH STATE AND LOCAL GOVERNMENT PLANNING FRAMEWORKS

5.7.1 STATE GOVERNMENT PLANNING FRAMEWORK

The State Government recognises Jandakot Airport as a vital piece of infrastructure and has identified the airport as a specialised activity centre. As the land on which the airport is located is owned by the Commonwealth Government and the airport is subject to Commonwealth legislation, State planning laws do not apply to the airport site.

The State's planning framework encourages the non-aviation development of the airport, with the planning documents outlined in Chapter 2 designating the airport a 'Specialised Activity Centre', with available industrial land that can be developed in the short term to contribute to local employment and the economic development of the State.

The proposed non-aviation development of the airport is consistent with the State planning framework as it will support the growth of the aviation sector of the airport and has identified land uses consistent with the local government planning framework.

5.7.2 LOCAL GOVERNMENT PLANNING FRAMEWORK

The land uses proposed for the non-aviation development ('Mixed Business') precincts on the airport are based on the City of Cockburn's 'Mixed Business' zone to provide a consistent approach to land use planning between the airport and the surrounding area. This approach is consistent with the City of Cockburn's Local Commercial and Activity Centres Strategy (2012) which recognises Jandakot Airport as a Specialised Centre, (as per the State planning framework), and a strategic employment centre that is forecast to provide more businesses and jobs into the future.

5.7.3 SURROUNDING LAND USE

Land located immediately west of the airport is predominantly zoned 'Resource' under the City of Cockburn Town Planning Scheme No. 3. This 'Resource' zoned land is predominantly rural-residential in use and provides protection to the Jandakot Underground Water Protection Control Area. More intense residential development on surrounding land zoned 'Resource' would not be appropriate due to its proximity to the airport and the Jandakot Underground Water Protection Control Area. Roe Highway borders the north of the airport and creates a physical barrier between the airport and residential areas located further north within the City of Melville.

6. GROUND TRANSPORT PLAN

Additional transport links to the Perth Metropolitan Region are essential to maximise Jandakot Airports' potential for aviation and non-aviation land uses.

Since approval of the Master Plan 2005, JAH has contributed \$3.8 million for the construction of a bridge over the Roe Highway railway track to negate the dangerous level crossing that existed at the entrance to the airport. The entry road, Karel Avenue, has been upgraded to a four-lane carriageway with bicycle lanes in both directions. The internal road network has been built to facilitate the development of the airport as provided for in this Master Plan 2014.

6.1 ROAD ACCESS

Jandakot Airport's location enables good access via the surrounding key road network to the wider Perth metropolitan region. However, during morning and afternoon peak periods the road network surrounding the airport experiences significant traffic volumes, primarily due to traditional metropolitan peak periods unrelated to Jandakot Airport traffic, resulting in some of these roads and intersections operating beyond their design capacity.

The key primary distributor roads providing access to Jandakot Airport include Kwinana Freeway, Roe Highway and South Street. Other key distributor roads include Ranford Road, Berrigan Drive, Karel Avenue and Jandakot Road.

Access to Jandakot Airport is currently provided from Berrigan Drive (from the south) or Karel Avenue (from the north). Karel Avenue has been upgraded by JAH from a two-lane undivided road to a four-lane divided road from Marriott Road up to the Berrigan Drive intersection. The section of Pilatus Street from Karel Avenue to Marriott Road is also constructed to this standard. All other roads within the airport boundary are two-lane divided or undivided roads.

Karel Avenue is currently built as a two-lane divided road from Berrigan Drive to Roe Highway.

Berrigan Drive is two-lanes undivided from Karel Avenue to Jandakot Road and then two-lanes divided west of Jandakot Road. Jandakot Road is currently an undivided two-lane road.

Freight traffic is appropriately accommodated on the surrounding road network. Rigid trucks up to 12.5m and semi-trailers up to 19m long (with various other restrictions on maximum load, height, width etc.) are 'as-of-right' vehicles that are generally allowed to use any road in Western Australia without requiring special permits. Almost all roads in WA, except sections of four roads in the metropolitan area, are automatically included in the Restricted Access Vehicles (RAV) Network 1, which is permitted for several vehicle combinations such as short B-doubles up to 20m long (maximum mass 50 tonnes). Roe Highway, Kwinana Freeway, Jandakot Road, Berrigan Drive (east of Kwinana Freeway) and Karel Avenue (south of Roe Highway) are all included in RAV Network 4, which allows 2-trailer vehicle combinations up to 27.5m long and maximum load up to 87.5 tonnes.

6.2 PROPOSED ROAD NETWORK

Access to Jandakot Airport is proposed via the following connections:

1. Existing access from Karel Avenue/Berrigan Drive intersection proposed to be upgraded to a signalised intersection;
2. Existing access from Berrigan Drive via Spartan Street (left in/left out only at Berrigan Drive);
3. Proposed South Link road (Pilatus Street) – currently constructed from Karel Avenue to the airport boundary is to be extended to a proposed Jandakot Road/Berrigan Drive/Dean Road signalised intersection. Berrigan Drive will be diverted to form a T-junction with Pilatus Street.; and
4. Proposed East Link road – recent consultation with State and Local Governments has resulted in a plan to connect to Johnston Road through the City of Canning waste disposal site to Ranford Road. JAH propose to extend Orion Road to meet Johnston Road at the boundary of the airport.

Figure 6.1 shows the current road network, with the proposed road network comprising the roads identified as 'Future District Distributor B'. It is anticipated that all of these road network connections identified as 'Future District Distributor B' will be in place within the 5 year time frame of this Master Plan.

6.3 TRAFFIC GENERATION – FIVE YEAR AND ULTIMATE DEVELOPMENT IMPACT

Traffic generation from the full development of Jandakot Airport as proposed in this Master Plan has been forecast at 23,100 vehicles per day using the Main Roads WA ROM traffic model. This is based on a development scenario that anticipates a gross floor area of approximately 900,000 square metres and a workforce of approximately 8,050 employees at Jandakot Airport, including all aviation and non-aviation related land uses, as outlined in Section 1.8.

The proposed road network on the Jandakot Airport estate has been capacity tested to both the 2034 ultimate development traffic forecast of 23,100 vehicles per day, and the five year development traffic forecast of 5,900 vehicles per day, which has confirmed that the proposed road network can accommodate the forecast traffic volumes.

6.4 TRAFFIC FORECAST

Road modelling has been undertaken for year 2034. The traffic modelling assumes full development of Jandakot Airport by this time.

Figure 6.2 shows the modelled total daily traffic flows at 2034 and the traffic associated with land uses at Jandakot Airport, in the context of the general regional traffic volumes unrelated to Jandakot Airport. This demonstrates that whilst traffic accessing Jandakot Airport uses the surrounding road network it does not materially impact the operation of the surrounding network.

The traffic modelling indicates that Jandakot Airport traffic is anticipated to represent the following proportion of total traffic on key road links in 2034:

- 81% on Karel Avenue extension east of Berrigan Drive (within the airport estate) – 10,900 airport-related vehicles per day out of a total 13,400 vehicles per day;
- 75% on the South Link road (Pilatus Street, within the airport estate) – 7,700 airport-related vehicles per day out of a total 10,300 vehicles per day;
- 63% on the East Link road (within the airport estate) – 2,600 airport-related vehicles per day out of a total 4,100 vehicles per day;

- 38% on Karel Avenue (northwest of Berrigan Drive) – 12,000 airport-related vehicles per day out of a total 31,500 vehicles per day;
- 17% on Berrigan Drive (southwest of Jandakot Road) – 5,800 airport-related vehicles per day out of a total 33,600 vehicles per day;
- 6% on Jandakot Road (southeast of Berrigan Drive) – 1,800 airport-related vehicles per day out of a total 28,200 vehicles per day; and
- 6% on Berrigan Drive (south of Karel Avenue) – 1,200 airport-related vehicles per day out of a total 18,800 vehicles per day.

6.5 ROAD UPGRADES

Traffic modelling indicates significant growth of regional traffic in the vicinity of the airport. A number of upgrades will be required to the existing road network to accommodate the increased traffic demand in this area, primarily associated with the growth of regional traffic unrelated to Jandakot Airport, as demonstrated in Figure 6.2.

The road upgrades required around Jandakot Airport, triggered by regional growth and the airport development, are shown in Figure 6.3 and are summarised as follows:

- Berrigan Drive between Kwinana Freeway and Jandakot Road will be upgraded to four-lane divided road standard. The City of Cockburn has commenced the design of these works;
- Karel Avenue between Berrigan Drive and Roe Highway may be upgraded to a four-lane divided road. Additional investigation by Main Roads WA will determine the Karel Avenue and Roe Highway interchange upgrade requirements. Main Roads WA is responsible for the design and construction of these works, should they be required;
- The East Link road requires a two-lane arterial road with turn lanes at controlled junctions to be built along the Johnston Road alignment to join Ranford Road. JAH will then build the extension of Orion Road to meet Johnston Road at the airport boundary. The State Department of Planning proposes to designate a Regional Roads reservation in the Metropolitan Region Scheme from the airport boundary to Ranford Road wide enough for

this new road to be upgraded to four-lane divided if required in future;

- The South Link road (Pilatus Street) is proposed as a two-lane arterial road with turn lanes at controlled junctions;
- The Berrigan Drive and Karel Avenue intersection will be upgraded to a signalised intersection to replace the existing single-lane roundabout; and
- The intersection of Berrigan Drive, Jandakot Road, the South Link road (Pilatus Street) and Dean Road will be upgraded to a signalised intersection by the City of Cockburn. These works will include the diversion of Berrigan Drive (north) into a T-junction with the South Link road (Pilatus Street).

In addition to the road upgrades above there are other longer term regional road capacity issues on the surrounding regional road network (e.g. Kwinana Freeway, Roe Highway, Ranford Road and Armadale Road capacity). These issues are related primarily to regional traffic generation unrelated to Jandakot Airport and are matters to be resolved by State and Local Governments.

6.6 RESPONSIBILITY AND FUNDING OF ROAD UPGRADES

The proportion of total traffic that is associated with the airport, as discussed in Section 6.4 and shown in Figure 6.2, will provide input in discussions regarding contribution to funding the proposed road upgrades.

6.6.1 EAST LINK ROAD

The East Link road is located on the Jandakot Airport estate and will be constructed and maintained by JAH. The intersection of this road at the airport boundary with Johnston Road (controlled by Local Government) will be determined and agreed through discussions between JAH and the relevant Local Governments. Ownership, responsibility and maintenance of the intersection and Johnston Road (off the airport) will remain with Local Government.

6.6.2 SOUTH LINK ROAD

The South Link road (Pilatus Street) has been built on the Jandakot Airport estate up to the airport boundary. The maintenance of this road within the estate will be by Jandakot Airport. The extension of this road beyond

the boundary of the airport and the intersection with Berrigan Drive and Dean Road/Jandakot Road has been agreed in principle with the City of Cockburn. The ownership, responsibility and maintenance of the road and intersection beyond the airport boundary will remain with Local Government.

6.6.3 BERRIGAN DRIVE (NORTH) AND KAREL AVENUE INTERSECTION

It is proposed that ownership and responsibility for maintenance will remain with the Local Government. Funding of the intersection upgrade will be agreed with the Local Government.

6.7 PUBLIC TRANSPORTATION

6.7.1 BUS SERVICE

In 2011 JAH introduced morning and afternoon weekday shuttle bus transfers between Jandakot Airport and Murdoch Bus/Railway station for aviation students and airport tenant employees. Transperth commenced a public transport bus service into Jandakot Airport in February 2013 with regular weekday services linking the airport to Murdoch Station. As at November 2014 there are 9 daily services from Murdoch Station to the airport and 8 daily services from the airport to Murdoch Station (routes 515 & 516). Demand for the public bus services will be monitored by JAH consultation with Transperth.

6.7.2 PASSENGER RAIL SERVICE

Although current discussions with the Public Transport Authority and State Government indicate that conditions are not conducive to delivering a passenger rail service to Jandakot Airport, JAH has given consideration to how it might be configured at some future date as shown in Figure 6.4. The Public Transport Authority has indicated that passenger rail will not be available for at least 20 years. This view is consistent with the State Government's 'Public Transport for Perth in 2013' document, prepared by the WA Department of Transport, which does not envisage a passenger rail station in the vicinity of Jandakot Airport at the year 2031. However, the document does note plans for a train station "in the longer term" (beyond the planning period of this Master Plan 2014).

6.7.3 PEDESTRIAN/ CYCLIST FACILITIES

The existing paths located at the perimeter of the site include the following:

- A principle shared path located on the north side of the Roe Highway reserve;
- A shared path located on the west side of Karel Avenue, along the bridge over the Roe Highway. North of the Roe Highway the path continues on the west side to up to Farrington Road. There is also a section of shared path on the east side of Karel Avenue south of the Dimond Court intersection; and
- A shared path located on the north side of Berrigan Drive (south of Jandakot Road).

Additional paths will be constructed as part of the ongoing development of Jandakot Airport which will provide a significant and convenient network for pedestrians and cyclists including mid-block and intersection crossings.

6.8 CAR PARKING

The majority of existing building and hangar sites include carparking areas for staff and visitors. It is a JAH requirement that all developments provide adequate carpark facilities within the development site, based on carparking standards similar to City of Cockburn requirements. This practice has resulted in sufficient car parking being provided on the airport estate.

FIGURE 6.1 - ROAD HIERARCHY PLAN

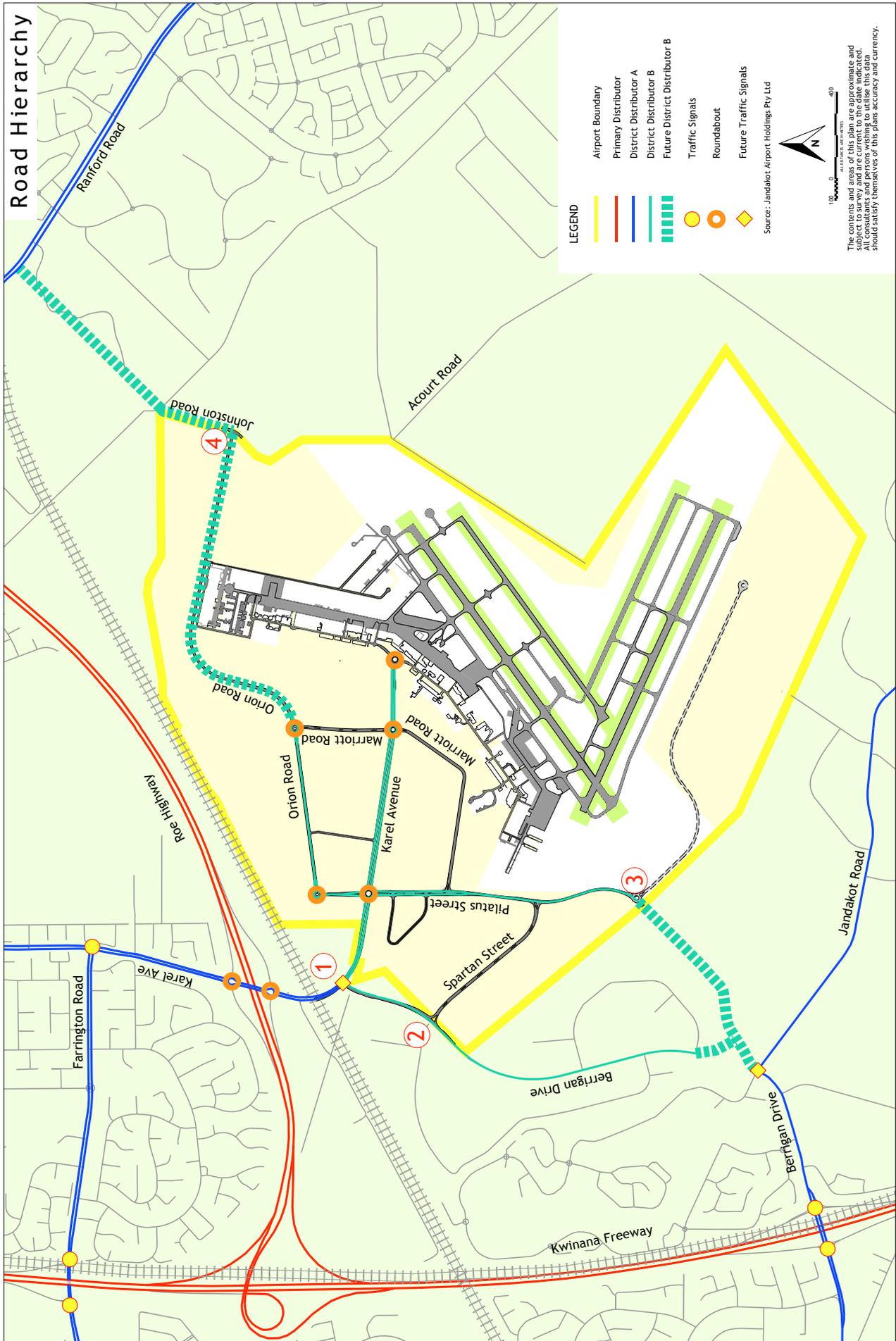


FIGURE 6.2 - FUTURE TRAFFIC FLOWS 2034

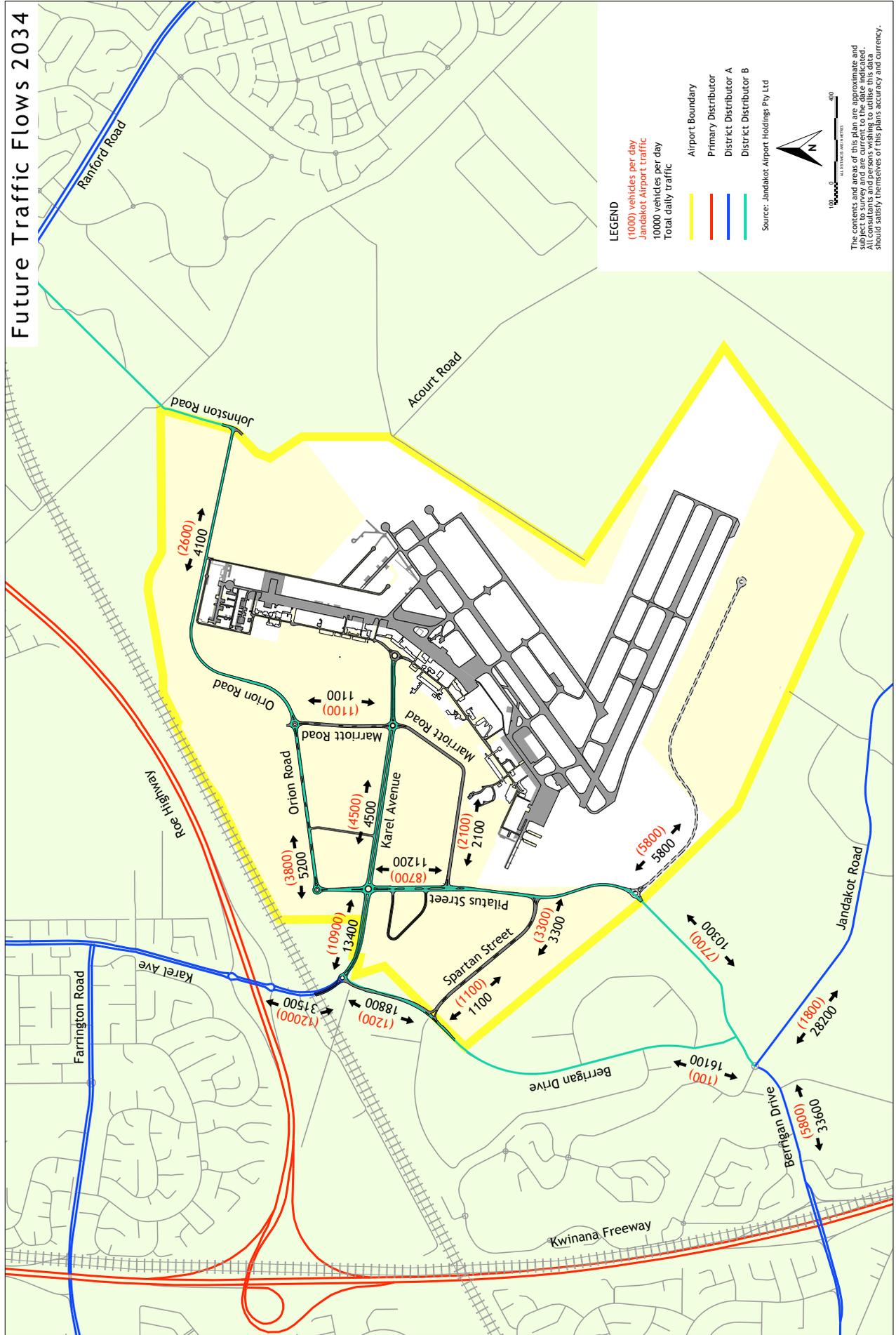


FIGURE 6.3 - FUTURE ROAD IMPROVEMENTS

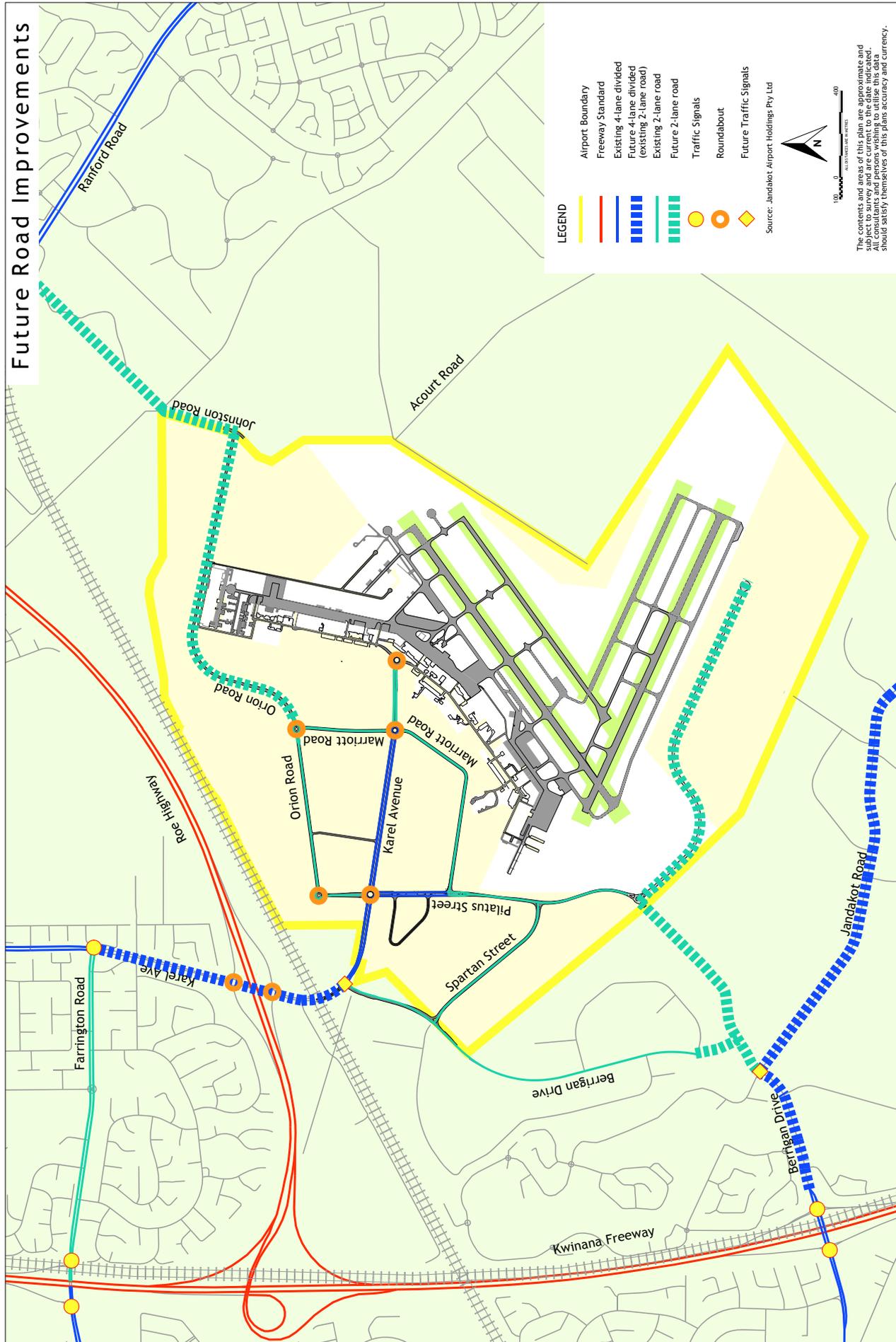
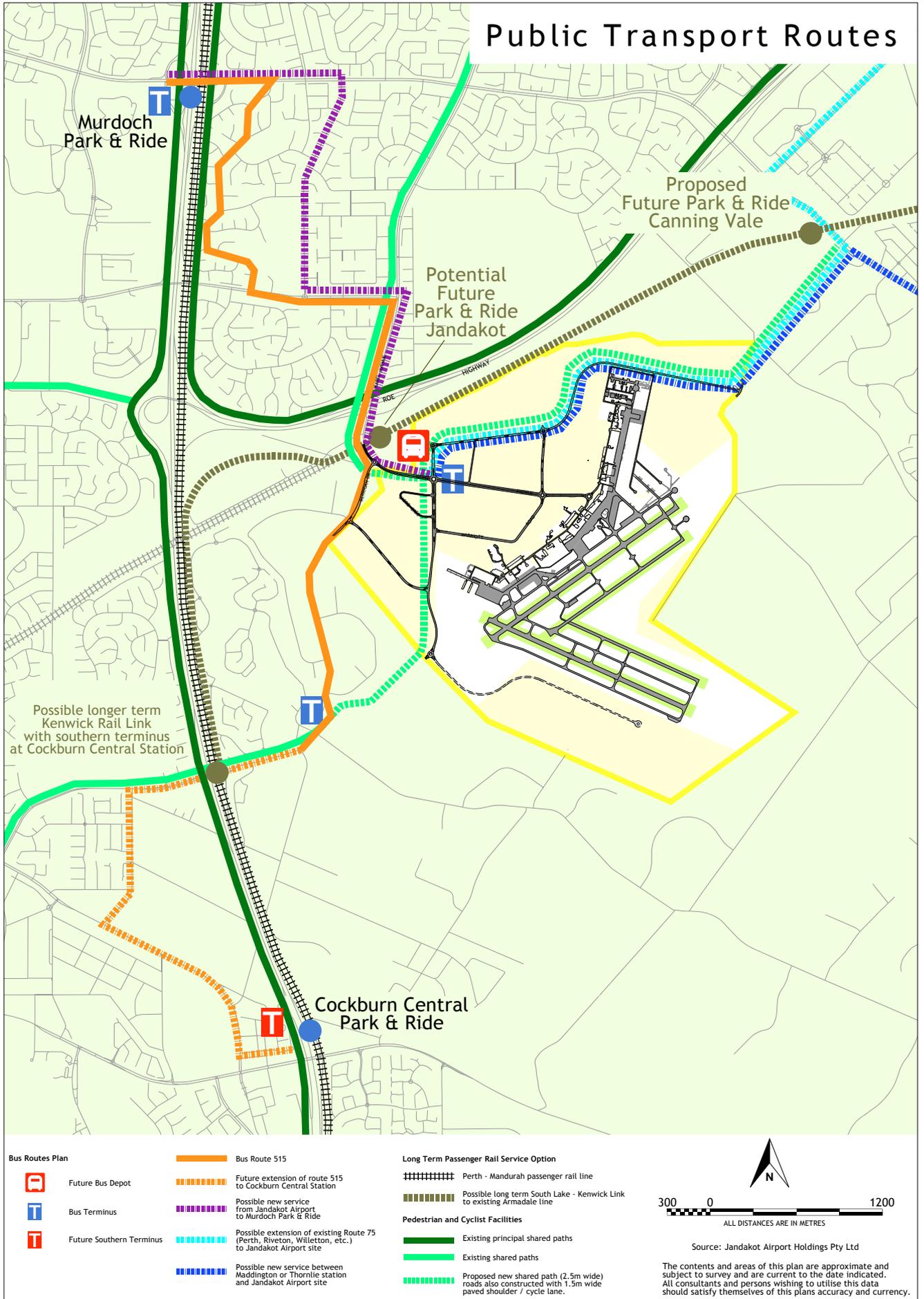


FIGURE 6.4 - PUBLIC TRANSPORT ROUTES



7. SERVICES INFRASTRUCTURE

JAH has invested significantly in the upgrading of services and infrastructure on the airport to meet the needs of aviation and non-aviation development. This investment totals approximately \$50 million in road, water, power, sewer and communications upgrades since the approval of the Master Plan 2005 and a further \$30 million since the approval of Master Plan 2009. Further infrastructure is planned, particularly within Precincts 6 and 6A, to provide for the development shown in this Master Plan 2014.

7.1 WATER SUPPLY SYSTEM

Jandakot Airport is currently serviced by a single 150mm metered connection provided by Water Corporation at the northern boundary of the airport. This metered connection is fed from a DN205 water reticulation main within the railway corridor that abuts a portion of the northern boundary of the airport. From the 150mm metered connection the water is fed via a pipeline that connects into the precinct reticulation network in the vicinity of the Orion Road and Marriott Road intersection.

In addition to the pipework, the current internal water infrastructure also consists of storage tanks connected to the incoming 150mm metered service. These storage tanks are fitted with booster pumps which are subsequently connected back into the internal feeder mainline. The booster pumps have been installed to maintain and regulate the internal mains reticulation pressure head during peak demand periods and fluctuating Water Corporation service pressures/flows.

Fire services (hydrants) are compliant with Australian Standard 2419.1-2005.

An additional connection to the southern end of the airport is being investigated to negate the risk of a single water supply to the airport. This will also service the Precinct 6 development areas via DN200 water mains. The Precinct 6 and 6A water mains are to be connected into the existing Pilatus Street water reticulation network.

7.2 SEWERAGE SYSTEM

Through the adoption of a Local Water Management Strategy, JAH remains committed to controlling domestic wastewater discharges and protecting groundwater resources. This strategy makes provision for existing and proposed leasehold sites to have direct access to an underground wastewater reticulation network where possible. It also considers and expands on wastewater infrastructure currently being constructed.

The existing sewered portion of the airport is serviced by a reticulated sewerage network connected to a Type 40 Wastewater Pumping Station located on Marriott Road. This pump station currently services the existing developed leasehold areas connected into the precinct gravity sewer network. Existing un-sewered leasehold sites manage wastewater disposal via septic tanks and aerobic treatment units.

The continued development of the sewerage system will ensure the progressive redundancy of existing wastewater systems in favour of a reticulated wastewater network where possible.

The reticulation network feeds two underground wastewater pumping stations that are maintained by the Water Corporation. All wastewater is discharged offsite, via an underground pressure main. The Water Corporation have provided approval for discharge into the Bibra Lake main sewer in Farmhouse Drive, Bibra Lake, a distance of approximately 3.5 kilometres.

Precincts 6 and 6A will be serviced with a local precinct gravity sewer network which will discharge into a precinct sewer pump station, located on the eastern boundary of Precinct 6. This Precinct 6 pump station will discharge the sewer via a pressure main into the existing gravity sewer within Orion Road. Once within the existing Orion Road gravity sewer network, it will discharge into the existing Wastewater Pump Station.

The existing sewer reticulation network has been assessed for capacity to facilitate the additional sewer flows anticipated from the proposed development of Precincts 6 and 6A. Based on the envisaged development of this area, the installed sewer gravity mains are suitable to cater for the future developments.

7.3 DRAINAGE SYSTEM

A Local Water Management Strategy has been developed to ensure 'best practice' drainage principles are adopted and maintained across the airport. If required, this strategy will be reviewed to address management issues specific to Precinct 6 and 6A.

As development increases so does the area of impermeable surfaces requiring drainage, infrastructure and management systems to cater for additional volumes of surface runoff.

Due to the high permeability of the underlying sandy soils, run-off is localised and short term as it generally infiltrates very quickly. Ponding rarely occurs and existing stormwater basins are only observed to hold water for short periods after sustained rainfall of high intensity, avoiding the creation of habitats that might otherwise attract water birds. As a result, 'at source' infiltration via soakwells and open drains/swales is typically the most efficient and sustainable means of drainage management.

Stormwater run-off from paved areas in existing older developed areas of the airport, including runways and taxiways is filtered through adjacent grassed areas. This system is complemented by an underground pipe drainage network to prevent ponding over paved areas. The existing underground pipe network discharges to an open drain between the central and southern aprons, which directs flows to the basin at the north eastern end of the airport.

Drainage from aircraft wash bays is managed consistent with the Jandakot Airport Equipment and Washdown Policy, which requires appropriate treatment and disposal of water including the use of approved interceptors and/or separators. Similarly, stormwater drainage from fixed refuelling areas is captured and discharged via purpose built plate separators or interceptor pits.

Stormwater throughout the more recent developments (e.g. Precinct 4 and areas of Precinct 5 outside of the JUWPCA) is managed via a combination of soakwells, open drains and swales complemented by an underground pipe drainage network. The soakwells, open drains and swales aim to maximise local groundwater recharge.

All lot developments maintain onsite attenuation of 1 in 20 year storm events without ponding through use of soakwells or small infiltration areas within their respective lots. Developments are also required to attenuate the 1:100 year/24hr average recurrence internal (ARI) storm event. Larger storm events discharge into road reserves and are directed to open drains/swales and/or drainage basins.

Management of stormwater in proposed developments will be consistent with the measures described above. The principle of 'at source' infiltration will further be promoted via all drainage pits having 'drops' and open bases. Stormwater discharge via the pipe network will be directed to nearby open drains/swales within road reserves, or nearby drainage basins (within 'trapped' drainage catchments).

Stormwater within the proposed Precinct 6 and 6A development will be managed in a manner consistent with the recently developed Precinct 5, guided by the relevant Local Water Management Strategy. As with Precinct 5, portions of Precinct 6 and 6A are located within the Priority 1 Source Protection Area of the JUWPCA (refer to Chapter 9 and Figure 9.1).

Within developments that overlay the JUWPCA, all stormwater collected from roof surfaces, with the exception of that which may be diverted to rainwater tanks, is discharged directly to soakwells within each lease boundary via downpipes in order to facilitate and maximise groundwater recharge. Stormwater from all roads, carparks and external hardstands within the JUWPCA will be discharged via piped drainage networks into drainage basins located outside of the JUWPCA boundary and sized to cater for the 1:100 year/24hr ARI storm event.

7.4 ELECTRICAL POWER SUPPLY

Electricity is supplied to the airport site through two feeders located on Karel Avenue. Since the approval of the Master Plan 2009, the power supply has been upgraded to 22KV high voltage supply.

The overall power demands for the future development of the airport will depend upon the land uses and intensity of development of these areas. Flexibility has been incorporated into the design of the future power distribution network in Precincts 6 and 6A so that there is potential to include additional transformers and a Western Power connection. However there is the ability to service the future development of Precincts 6 and 6A from the existing Western Power connection.

JAH provides and maintains a stand-by power supply by way of an emergency generator for essential services, including the Airservices Air Traffic Control Tower, runway and taxiway lighting, JAH administration and maintenance facilities, and the airside emergency access gate.

7.5 GAS SYSTEM

The airport includes a reticulated gas network throughout most road reserves. The main gas feed into the development is via the DNI60PE pipeline along Karel Avenue, which in turn is connected into the Westnet Energy high pressure main running along the northern side of the railway line that forms a portion of the northern boundary of the airport. The gas is converted from the high pressure to the reticulation pressures at the connection to the high pressure main.

If required, Precincts 6 and 6A will be provided with a reticulated gas network through the road reserves constructed to service the future development of the area.

7.6 COMMUNICATION SYSTEMS

Telstra remain the governing authority for landline telecommunication services throughout the airport. Future development will see the progressive upgrade of Telstra infrastructure to accommodate additional development.

7.7 NAVIGATION INFRASTRUCTURE

JAH will work cooperatively with Airservices Australia to establish cable corridors between infrastructure on the airport to prevent future access and cable location issues. Early consultation is undertaken with Airservices for all proposed ducting work to address future requirements to consolidate or relocate cabling. This is outlined further in Section 8.8.