

JANDAKOT AIRPORT

MAJOR DEVELOPMENT PLAN
EXTENSION OF RUNWAY 12/30 AND TAXIWAY SYSTEM

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I. INTRODUCTION

I.1 OVERVIEW

The Jandakot Airport Master Plan 2014 details the planned development of Jandakot Airport over the next 20 years. The aviation development proposed in Master Plan 2014 includes extensions to the two primary runways, construction of a fourth runway, and associated taxiway augmentation to support the runway changes.

Works within the airfield require extensive planning as these activities can cause interruption to existing aircraft operations. Due to this impact on aircraft operations and the high cost of airfield works, the aviation development detailed in Master Plan 2014 will be implemented in stages. This Major Development Plan details the first stage of the Master Plan 2014 airfield works – the extension of runway 12/30 and the taxiway system.

These works are expected to take three years to complete and will require the clearing of 41ha of vegetation, earthworks, installation of services, construction of taxiways, the extension of runway 12/30 and the commissioning of the extended runway. The clearing of the vegetation has been approved by the Minister for the Environment under EPBC 2009/4796.

I.2 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 surveillance and response.

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

I.3 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.4 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.

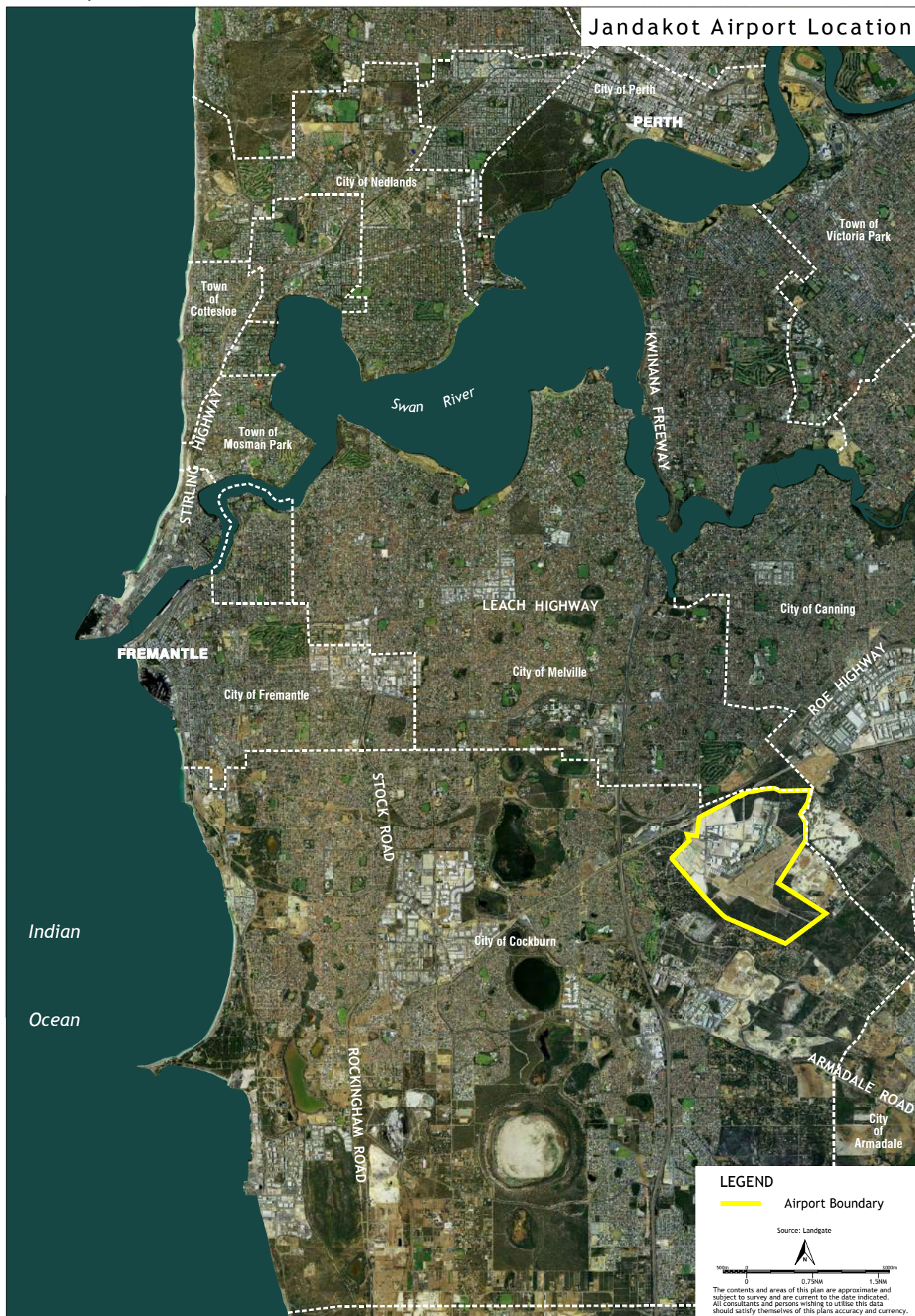
The location of Jandakot Airport, in an aerial photograph context, is shown in Figure 1.

I.5 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 growing 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

FIGURE I - JANDAKOT AIRPORT LOCATION



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.

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 1 km 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 development of the mixed business precincts over the past seven years has attracted leading-edge firms to the airport site. 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.

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 Jandakot Airport precinct currently has 89 businesses on site which directly employ 750 aviation related employees and 400 non-aviation related employees. This equates to a payroll of \$64.22 million and payroll tax of \$3.69 million. The export revenue from international students is valued at \$61 million.

The future development and growth of Jandakot Airport will build on the already significant economic value of the airport estate. Master Plan 2014 proposes major capital works such as the construction of the fourth runway, expansion of aviation-related facilities that includes an additional 10 hectares of land with taxiway access in Precinct 6A, and further development of the commercial estate. It is expected that at the ultimate development of the airport estate, as indicated on the Jandakot Airport Precinct Plan (see Figure 2), there will be 8,050 employees within the airport precinct with payroll value of \$420 million.

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2. LEGAL 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* (the Act) and the following key legislation and regulations:

Airports Regulations 1997;

Airports (Building Control) Regulations 1996;

Airports (Control of On-Airport Activities) Regulations 1997;

Airports (Environment Protection) Regulations 1997;

Airports (Protection of Airspace) Regulations 1996;

Aviation Transport Security Act 2004;

Aviation Transport Security Regulations 2005;

Civil Aviation Safety Authority Manual of Standards Part 139 – Aerodromes; and

Environment Protection and Biodiversity Conservation Act 1999

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.

2.3 MASTER PLAN

Under Section 70 of the Act, every five years each Commonwealth airport is required to produce a final master plan which establishes the strategic direction for efficient and economic development at the airport over the 20 year planning period of the plan. A final master plan is one which has been approved by the Federal Minister of Infrastructure and Regional Development. The airport is required to take into account public comments prior to submitting a draft master plan to the Minister.

In accordance with these requirements, Master Plan 2005 was approved by the then Minister for Transport and Regional Services on 3 January 2006. Master Plan 2009 was approved by the then Minister for Infrastructure, Transport, Regional Development and Local Government on 9 March 2010. The current master plan, Master Plan 2014, was approved by the Minister for Infrastructure and Regional Development on 17 February 2015.

Development at the airport must be consistent with the final master plan. The extension of runway 12/30 has been proposed and documented in Master Plan 2005, Master Plan 2009, and current Master Plan 2014. The taxiway augmentation detailed in Master Plan 2005 was refined for Master Plan 2009, and further amendments made in Master Plan 2014 following consultation with Air Traffic Control and local operators. The construction of the runway 12/30 extension and associated taxiways detailed in this MDP comprise the first stage of the airfield development proposed in Master Plan 2014. The full airfield works documented in each Master Plan are shown in Figures 2 to 4.

FIGURE 2 - MASTER PLAN 2014

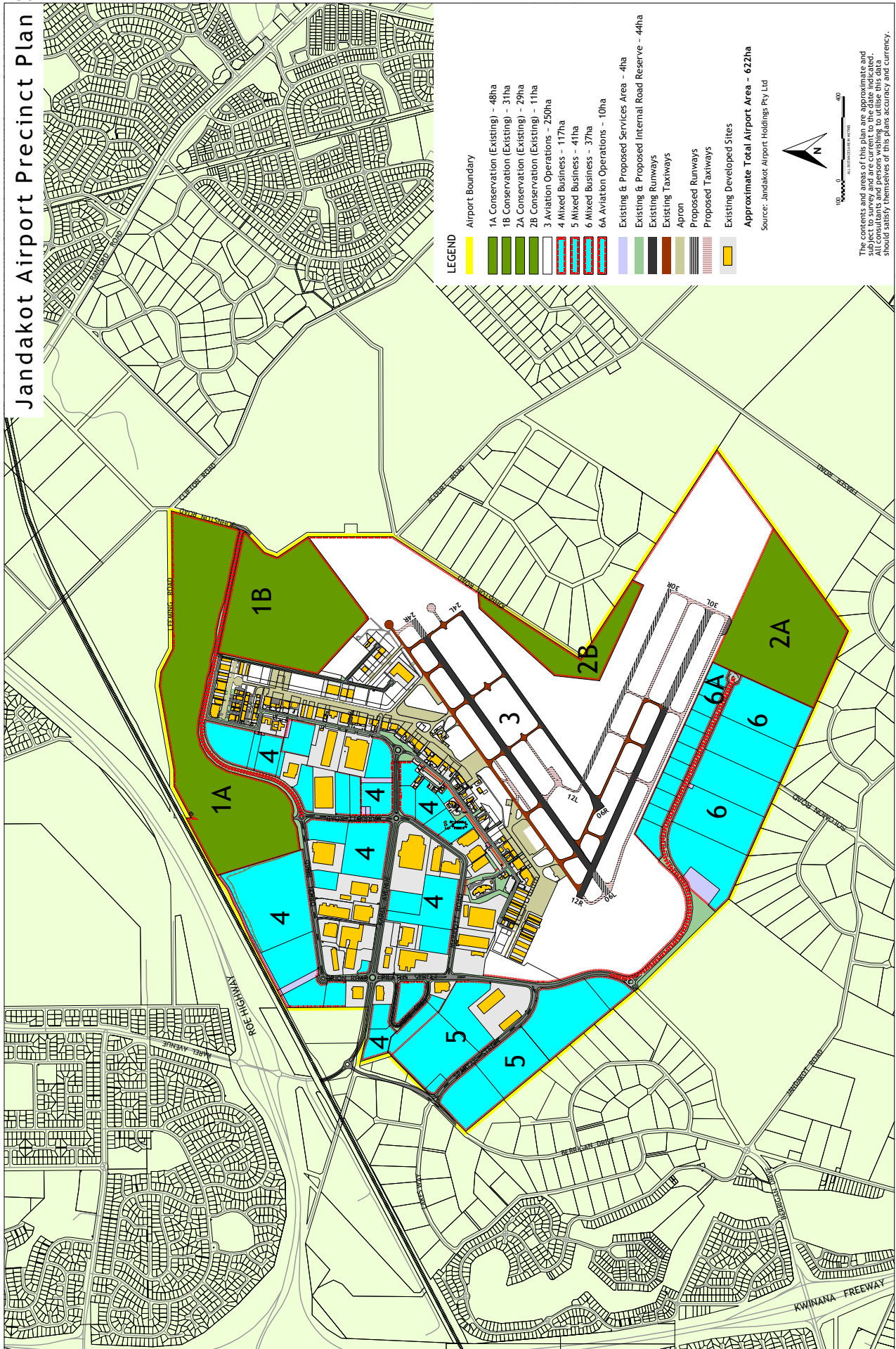


FIGURE 3 - MASTER PLAN 2009

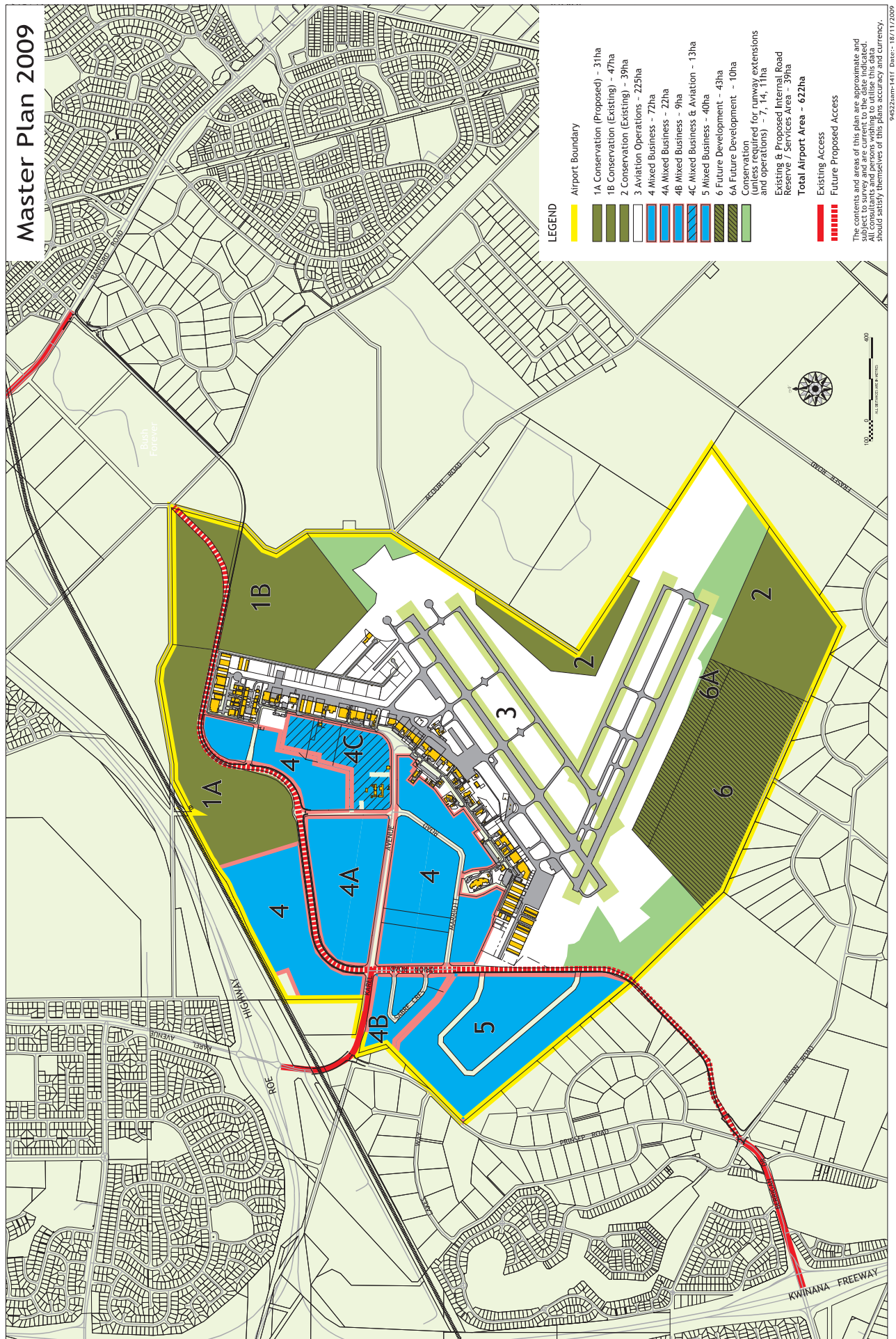
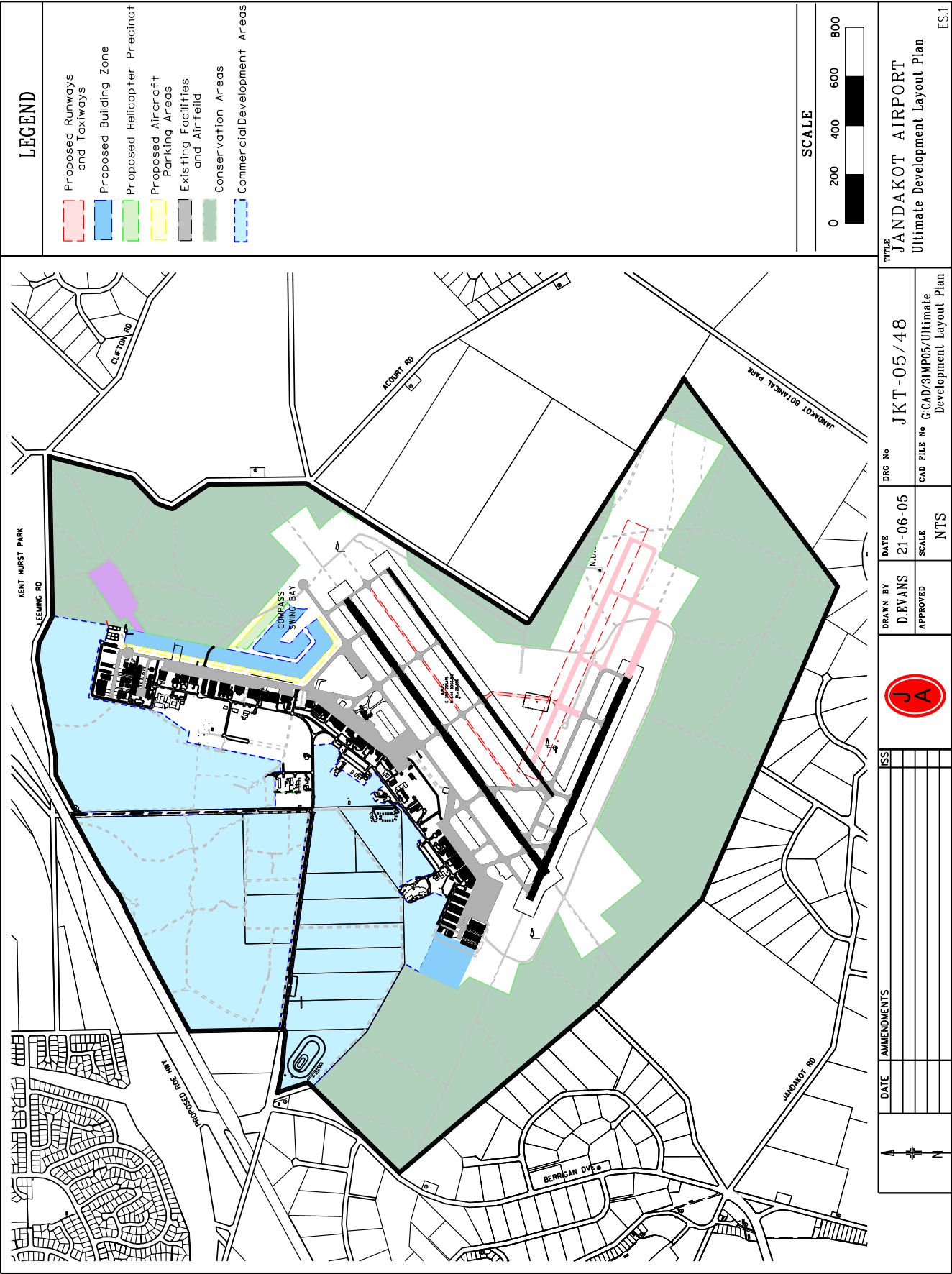


FIGURE 4 - MASTER PLAN 2005



2.4 MAJOR DEVELOPMENT PLAN

Some of the development activities planned for in a master plan may require further consultation and approval. Section 89 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 airfield developments included in this MDP that constitute a major development pursuant to Section 89(1) of the Act are:

(b) extending the length of a runway; and

(m) a development of a kind that is likely to have significant environmental or ecological impact.

The subject of this MDP is the extension of runway 12/30 and the taxiway system. The taxiway works do not constitute a major development as defined by Section 89(1)(f) or (g) of the Act, in that the works will not significantly increase the capacity of the airport and the cost of construction does not exceed \$20 million, but these works are detailed in this MDP for information purposes.

The Act defines a sensitive development as a residential dwelling, community care facility, pre-school, school or other educational institution, or a hospital, and requires the airport-lessee company to justify exceptional circumstances for a sensitive development at the airport. The extension of runway 12/30 and the taxiway system are not sensitive developments as defined by the Act.

The required contents of an MDP are prescribed under section 91 of the Act. These requirements, and the corresponding reference within this MDP, are shown below in Table 1.

TABLE 1 – MAJOR DEVELOPMENT PLAN REQUIREMENTS

ACT SECTION	MAJOR DEVELOPMENT PLAN REQUIREMENT	MDP SECTION
91(1A)	The purpose of a major development plan in relation to an airport is to establish the details of a major airport development that:	2.3, 2.4
	(a) relates to the airport	
	(b) is consistent with the airport lease for the airport and the final master plan for the airport.	2.5
91(1)(a)	The airport-lessee company's objectives for the development	4.1
91(1)(b)	The airport-lessee company's assessment of the extent to which the future needs of civil aviation users of the airport, and other users of the airport, will be met by the development.	5.3 & 5.4
91(1)(c)	A detailed outline of the development.	5
91(1)(ca)	Whether or not the development is consistent with the airport lease for the airport.	2.5
91(1)(d)	If a final master plan for the airport is in force—whether or not the development is consistent with the final master plan.	2.3
91(1)(e)	If the development could affect noise exposure levels at the airport—the effect that the development would be likely to have on those levels.	6.3
91(1)(ea)	If the development could affect flight paths at the airport—the effect that the development would be likely to have on those flight paths.	6.2
91(1)(f)	The airport-lessee company's plans, developed following consultations with the airlines that use the airport, local government bodies in the vicinity of the airport and—if the airport is a joint user airport—the Department of Defence, for managing aircraft noise intrusion in areas forecast to be subject to exposure above the significant ANEF levels.	6.3 & 6.4
91(1)(g)	An outline of the approvals that the airport-lessee company, or any other person, has sought, is seeking or proposes to seek under Division 5 or Part 12 in respect of elements of the development.	2.6 8.1 11.2
91(1)(ga)	The likely effect of the proposed development that are set out in the major development plan, or the draft of the major development plan, on:	9.1
	(i) traffic flows at the airport and surrounding the airport.	
	(ii) employment levels at the airport.	5.15
	(iii) the local and regional economy and community, including an analysis of how the proposed developments fit within the local planning scheme for commercial and retail development in the adjacent area.	n/a – the proposal is not for commercial or retail development

ACT SECTION	MAJOR DEVELOPMENT PLAN REQUIREMENT	MDP SECTION
91(1)(h)	The airport-lessee company's assessment of the environmental impacts that might reasonably be expected to be associated with the development.	8
91(1)(j)	the airport-lessee company's plans for dealing with the environmental impacts mentioned in paragraph (h) (including plans for ameliorating or preventing environmental impacts).	8
91(1)(k)	If the plan relates to a sensitive development – the exceptional circumstances that the airport-lessee company claims will justify the development of the sensitive development at the airport.	n/a – the proposal is not a sensitive development
91(1)(l) 91(1)(3)	Such other matters (if any) as are specified in the regulations. The regulations may provide that, in specifying a particular objective, assessment, outline or other matter covered by subsection (1), a major development plan, or a draft of such a plan, must address such things as are specified in the regulations. Regulation 5.04: For subsection 91 (3) of the Act, a major development plan must address the obligations of the airport-lessee company as sublessor under any sublease of the airport site concerned, and the rights of the sublessee under any such sublease, including: (a) any obligation that has passed to the relevant airport-lessee company under subsection 22 (2) of the Act or subsection 26 (2) of the Transitional Act; or (b) any interest to which the relevant airport lease is subject under subsection 22 (3) of the Act, or subsection 26 (3) of the Transitional Act.	2.5
91(4)	In specifying a particular objective or proposal covered by paragraph (1)(a), (c) or (ga), a major development plan, or a draft of a major development plan, must address: (a) the extent (if any) of consistency with planning schemes in force under a law of the State in which the airport is located; and (b) if the major development plan is not consistent with those planning schemes—the justification for the inconsistencies.	3
91(6)	In developing plans referred to in paragraph (1)(f), an airport-lessee company must have regard to Australian Standard AS2021—2000 ("Acoustics—Aircraft noise intrusion—Building siting and construction") as in force or existing at that time.	6.3

Section 92 requires that the proposed major development plan must be drawn to the attention of the State Government Minister with responsibility for town planning, and be made available for public comment for a period of 60 business days.

2.5 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. The lease also requires that any development be in accordance with an approved master plan.

The extension of runway 12/30 and the taxiway system are consistent with Clause 13.1 of airport lease, which requires JAH to develop the airport site with regard to:

- (a) the actual and anticipated future growth in, and pattern of, traffic demand for the airport site;
- (b) the quality standards reasonably expected of such an airport in Australia; and
- (c) good business practice.

There are a number of interests registered on the Certificates of Title for Jandakot Airport which pre-date the lease of the airport site to Jandakot Airport Holdings. These interests are the Shell pipeline easement in precincts 1A and 4, telephone exchange site in precinct 3, Airservices non-directional beacon site in precinct 3, Airservices Air Traffic Control tower site in precinct 3, and the Polytechnic West Training Centre in Precinct 3. None of these pre-existing interests conflict with, or are inconsistent with, the extension of runway 12/30 and associated taxiways proposed in this MDP.

2.6 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 assessed under the EPBC Act as a controlled action as it was considered likely to have a significant impact under sections 18 and 18A (listed threatened species and communities) and sections 26 and 27A (Commonwealth Land) of the Act. The impacts under sections 18 and 18A relate primarily to the clearing of Carnaby's Black-Cockatoo banksia woodland foraging habitat and the endangered orchids *Caladenia hugelii* (Grand Spider Orchid) and *Drakaea elastica* (Glossy-leafed Hammer Orchid). Impacts associated with the endangered orchids are not directly associated with the works proposed under this MDP as the species are not present within the clearing area (Stage 3) identified in the Offset Plan.

EPBC Referral 2009/4796) 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 for the approved action of constructing "a fourth runway and associated taxiways, runway extensions, and clear land for the development of aviation and commercial precincts as described in the Jandakot Airport Master Plan 2009" (see section 8.1 for further information). Approval for clearing the land required for the extension of runway 12/30 and the taxiway system is wholly contained within the EPBC 2009/4796 approval. 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. These documents are all available for viewing and download on the Jandakot Airport website.

EPBC Referral 2013/7032 (Jandakot Airport Precincts 6 and 6A) was approved with conditions by the Department of the Environment in July 2014. The areas relating to EPBC 2013/7032 sit outside of the project area boundaries of this MDP. However, the future aviation development within the cleared Precinct 6A will utilise the adjacent taxiway system being proposed under this MDP in order to access runways and undertake aviation operations.

2.7 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 in force that details aviation security measures applied at the airport to safeguard against unlawful interference with aviation. All activities at the airport, from planning, construction and through to operation, are considered in the airport's risk context statement and the applicable security measures are detailed in the approved Jandakot Airport Transport Security Plan.

Aviation legislation differentiates the requirements for airside (any part of the airport grounds or buildings to which the public does not have free access) and landside (any part of the airport grounds or buildings to which the public does have free access). The works for the extension of runway 12/30 and the taxiway system will take place within the airside boundary. Security arrangements for the airside area will be applied in accordance with the approved Jandakot Airport Transport Security Plan.

A review of the airport's risk context statement will be completed as part of project development to ensure appropriate control of the airside security areas. Approval from the Department of Infrastructure and Regional Development may need to be sought to establish an airside event zone to manage vehicles and persons during the airfield works.

2.8 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.

The NASF guidelines have been considered for the extension of runway 12/30 and the taxiway system as outlined below:

NASF GUIDELINE	MDP SECTION
Guideline A: Measures for Managing Impacts of Aircraft Noise	6.4
Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airports	7.3
Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports	8.1.1
Guideline D: Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation	n/a
Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports	7.2
Guideline F: Managing the Risk of Intrusions into Protected Airspace of Airports.	7.1

3. STATE PLANNING OVERVIEW

3.1 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 land uses within the Jandakot Airport estate are Aviation Operations (260 hectares), Non-Aviation Development (195 hectares), Conservation (119 hectares), and Internal Roads/Services (48 hectares). These land uses 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. The future development of the airport site 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.

3.2 STATE AVIATION STRATEGY

A State Aviation Strategy was prepared by the WA Department of Transport and approved and 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 demands. 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 open skies and good flying weather."*

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

3.3 STATE PLANNING STRATEGY 2050

The State Planning Strategy 2050 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 and sustainable development will be implemented. This strategy does not provide a specific land use plan for the Perth metropolitan area, but rather identifies as a principle the need to provide efficient transport routes and hubs. Specifically, the 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. The Strategy acknowledges that the State's airports provide opportunities to access global trade and resources.

3.4 DRAFT PERTH AND PEEL @ 3.5 MILLION

The draft Perth and Peel @ 3.5 Million document forms the State's high level strategic land use plan that establishes a spatial framework and vision for the future growth of the Perth and Peel regions. The draft Perth and Peel @ 3.5 Million document replaces the Directions 2031 and Beyond – Metropolitan Planning Beyond the Horizon document referenced in the Jandakot Airport Master Plan 2014.

The draft Perth and Peel @ 3.5 Million document anticipates a population of 3.5 million people living in Perth and Peel by 2050. The plan identifies Jandakot Airport as a specialised activity centre, which provides an important and high level logistical function in the metropolitan region.

The extension of runway 12/30 and the taxiway system is consistent with the specialised activity centre status of Jandakot Airport as designated in the draft Perth and Peel @ 3.5 Million document.

3.5 DRAFT SOUTH METROPOLITAN PEEL SUB-REGIONAL PLANNING FRAMEWORK

The draft South Metropolitan Peel Sub-Regional Planning Framework (the framework) forms part of the draft Perth and Peel @ 3.5 Million suite of documents. The framework identifies Jandakot Airport as a specialised activity centre that provides a regionally significant aviation and logistics hub.

The extension of runway 12/30 and the taxiway system proposed in this MDP are entirely consistent with the strategy in that these works represent the continued development of aviation facilities at the airport.

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.

The extension of runway 12/30 and the taxiway system as envisaged under this MDP is consistent with the State Planning Policy 4.3 in that these works comprise the further development of the primary aviation and logistics services function of Jandakot Airport.

3.7 STATE PLANNING POLICY 5.3 – LAND USE PLANNING IN THE VICINITY OF JANDAKOT AIRPORT

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 policy applies the Australian Noise Exposure Forecast (ANEF) contours in conjunction with Australian Standard 2021-2000 'Acoustics - Aircraft noise intrusion - Building siting and construction' (AS 2021) to provide the framework for land use planning and building treatments within the vicinity of an airport. This approach places restrictions on the types of new developments which can be built within the various ANEF contours.

The current SPP 5.3 was endorsed in 2006 and includes the ANEF 2025 Contours prepared for Master Plan 2005. In July 2013 the WA Planning Commission released a draft SPP 5.3 which incorporated the revised ANEF 2029/30 that was prepared for Master Plan 2009. A further draft of SPP 5.3 is currently being prepared to only reference the current ANEF in force at the airport, rather than including the actual ANEF diagram. This will mean that there are no delays between an ANEF being endorsed and subsequent amendment of the SPP to include the updated diagram.

ANEF 2025 included the proposed extension of runway 12/30 and thus land use planning since 2006 has considered

the calculated noise impact of the changed runway operations expected as a result of the works proposed in this MDP.

Further information about the ANEF is provided in Section 6.3.

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. 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 8.8.

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' identification do not prevent the approval of any use on the airport site. The extension of runway 12/30 and the taxiway system are therefore consistent with the provisions of the MRS and compatible with the surrounding zonings.

The Jandakot Airport estate in the context of the MRS is shown in Figure 5.

3.9 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 extension of runway 12/30 and the taxiway system described in this MDP 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.

3.10 CITY OF COCKBURN LOCAL COMMERCIAL AND ACTIVITIES CENTRES STRATEGY

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.

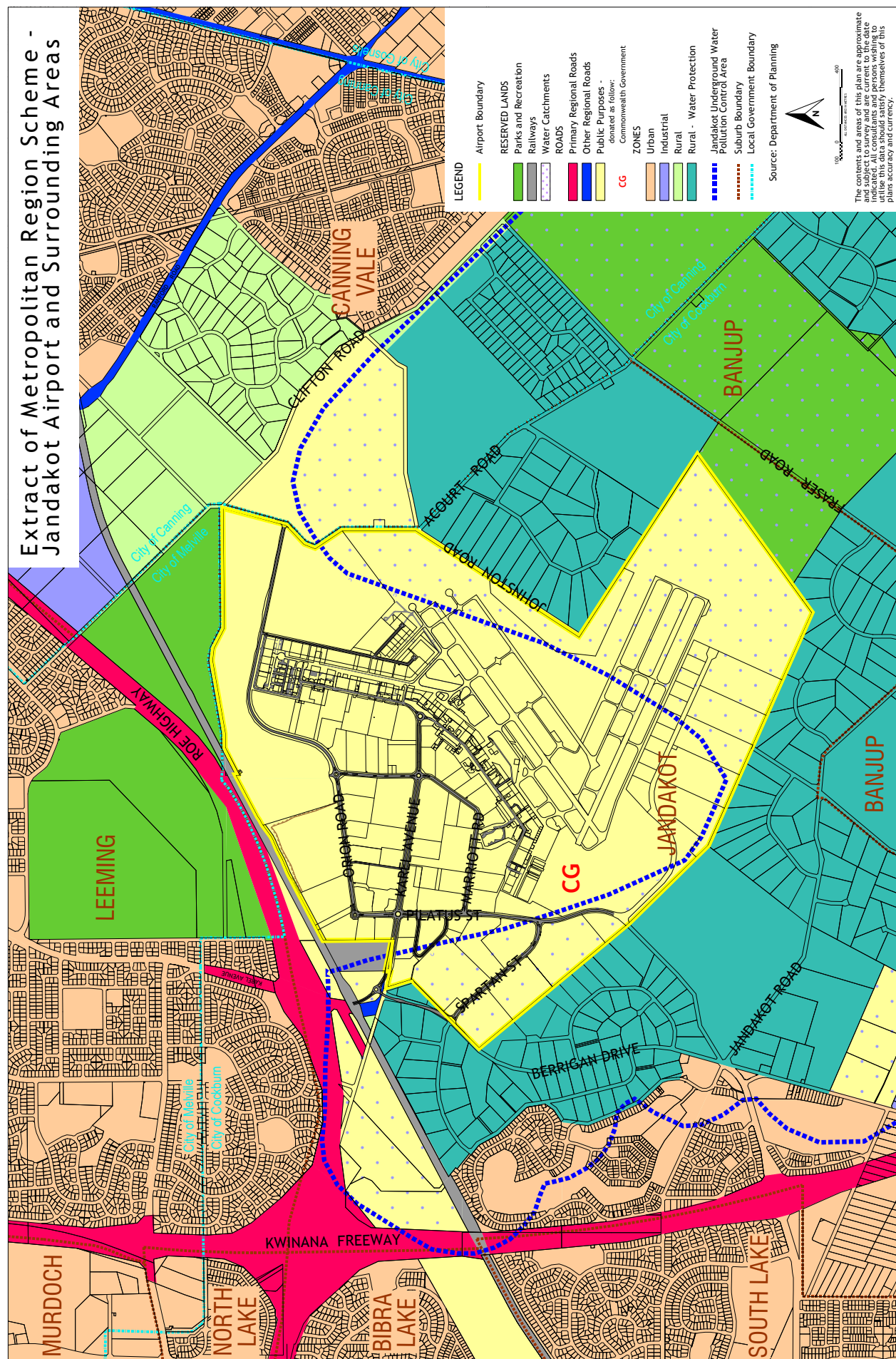
With respect to Jandakot Airport the strategy identifies that the estate provides a strategic employment centre with a high density of jobs in a single location. The strategy notes that the airport (along with other strategic employment centres) is forecast to contain more of the future businesses and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

3.11 PLANNING FRAMEWORK SUMMARY

As demonstrated above, the extension of runway 12/30 and the taxiway system as proposed is entirely consistent with the relevant State and Local Government planning framework, as it represents the further development of the primary aviation and logistics services function of Jandakot Airport, which is what the site is identified for in the planning framework.

FIGURE 5 – METROPOLITAN REGION SCHEME EXTRACT



4. AVIATION DEVELOPMENT

4.1 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.

The extension of runway 12/30 and the taxiway system is the first stage of developing the airport to its full airfield and operating potential.

4.2 JANDAKOT AIRPORT LAND USE

Figure 2 (page 4) identifies the Master Plan 2014 land use precincts for the estate, which are as follows:

- 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%).

JAH is committed to maintaining, upgrading and providing appropriate aviation infrastructure for the airport to operate safely, efficiently and effectively, and 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 and this is not viable for the airport or its tenants.

4.3 CURRENT AIRFIELD INFRASTRUCTURE

Jandakot Airport has a multi-runway configuration, comprising two NE/SW parallel runways and a SE/NW cross runway as follows:

- 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.
- Parallel runway 06R/24L was constructed in 1991 to support the increasing pilot training activities. The 1,150 metre long and 18m wide runway is used primarily for repetitive touch and go circuit operations during daylight hours only (as the runway is not lit).
- Constructed for the opening of Jandakot Airport in 1963, runway 12/30 is currently 990 metres long and 30 metres wide.

The current airfield layout is shown at Figure 6.

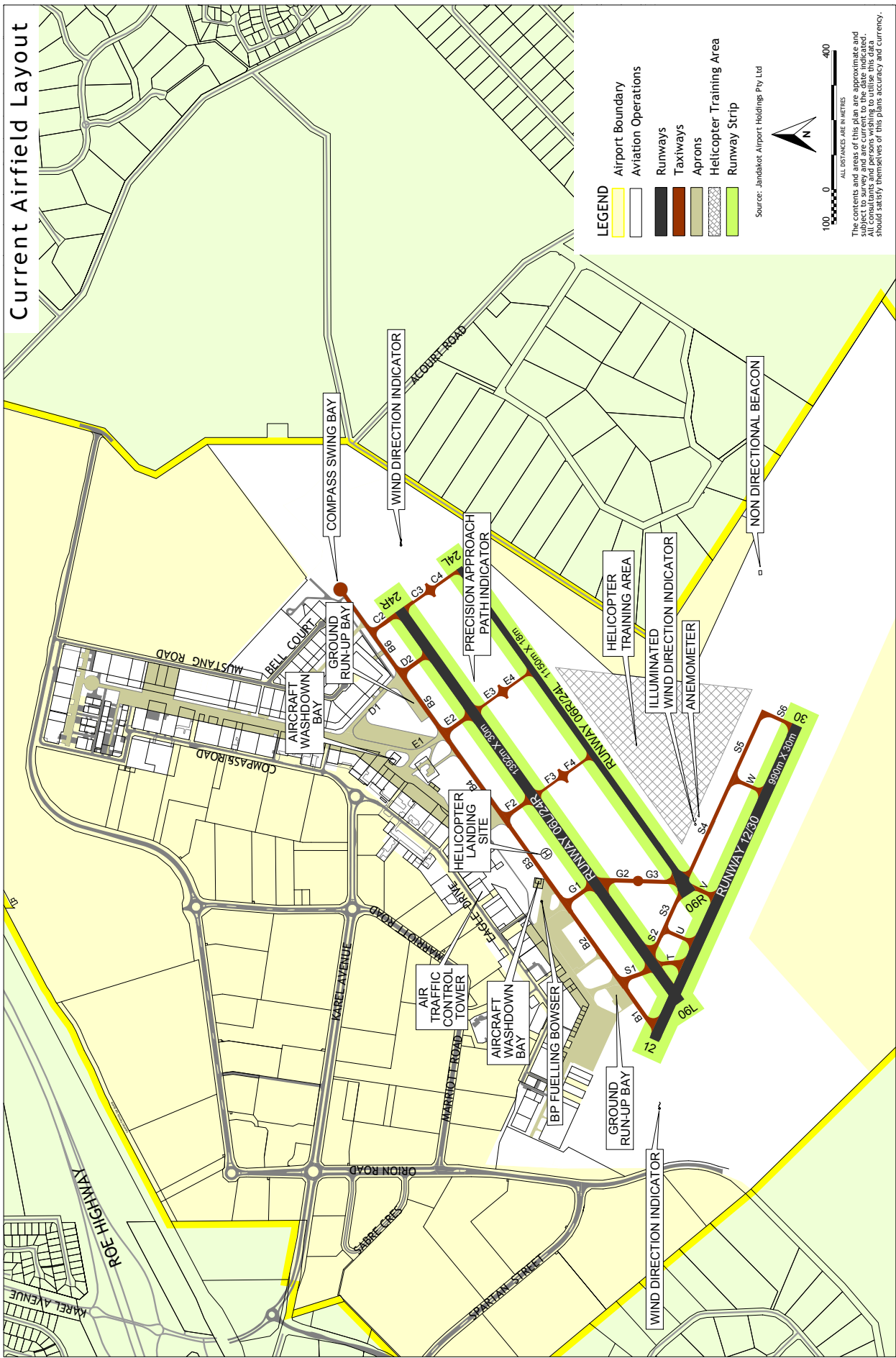
4.4 FUTURE AIRFIELD DEVELOPMENT

Master Plan 2014 details the ultimate layout of the airfield that is proposed to be undertaken within the 20 year planning horizon of the Plan. The purpose of the 20 year planning horizon is to ensure that the future needs are identified and factors such as land use and airspace are adequately protected for the future development.

JAH's vision is to successfully develop and manage Jandakot Airport as a strategically significant aviation hub with a supporting business campus. To achieve this vision, the airfield is proposed to be developed to include a fourth runway, extensions to the two primary runways, and associated taxiways and aviation support facilities as shown in Figure 7 Aviation Development Plan.

The ultimate airfield development proposed in Master Plan 2014 will be undertaken in a staged manner due to operational requirements and financial considerations. This MDP documents the first stage of the planned airfield works, being the lengthening of runway 12/30 and taxiway system.

FIGURE 6 – CURRENT AIRFIELD LAYOUT



4.5 AIRCRAFT ACTIVITY

Jandakot 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 – the Royal Aero Club of Western Australia, Singapore Flying College, and China Southern West Australian Flying College – and additional training organisations that include Polytechnic West, Air Australia International, Minovation, Thunderbird Aero, Cloud Dancer, Jandakot Flight Centre, and the University Flying Club. Heliwest and Rotorvation are the largest providers of helicopter training. There are currently approximately 800 students undertaking fixed-wing aircraft pilot training, resulting in 80,000 flying hours per annum. The training schools estimate that over the next 5-10 years student numbers will increase by 40% and flying hours will reach 126,000 hours per annum.

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 and Medical Air), bushfire surveillance and water bombing, media, aerial spraying and surveying. Other operations relate to private flying and hobby aircraft.

There are also more than 30 aviation support businesses located at Jandakot, providing services such as aircraft repairs and maintenance, avionics, painting and detailing.

MOVEMENTS

Airservices Australia data summarises movements of helicopter, military, fixed wing under 7 tonne maximum take-off weight and fixed wing above 7 tonnes. This data is shown in Table 2.

TABLE 2 - JANDAKOT AIRPORT AIRCRAFT MOVEMENTS

AIRCRAFT WEIGHT/TYPE	2009/ 2010	2010/ 2011	2011/ 2012	2012 / 2013	2013 / 2014	2014 / 2015	2014 / 2015 %
Between 7-136 tonnes	488	880	932	730	716	1,678	.7%
Under 7 tonnes	290,260	245,502	226,460	219,066	215,598	193,982	80.9%
Helicopter	30,702	29,076	31,722	35,284	35,204	44,062	18.4%
Military	28	48	24	48	48	108	0%
TOTAL	321,478	275,506	259,138	255,128	251,566	239,830	

Source: Airservices Australia.

FLEET MIX

Runway pavement strengths at Jandakot Airport are designed primarily for aircraft with a maximum take-off weight of 5,700kg. Aircraft with a maximum take-off weight greater than 5,700kg may operate at Jandakot subject to an assessment of the aircraft's classification number, which expresses the relative damaging effect of the aircraft on a pavement, against the runway bearing strength. Aircraft wingspans are also assessed to ensure the aircraft satisfies taxiway separation requirements. While the runway lengths at Jandakot Airport may be adequate for larger aircraft, the historic taxiway and apron system restricts use of significantly larger aircraft (such as those types used for regular passenger transport operations) due to wingspan clearance requirements.

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).

The number of Pilatus PC-12 aircraft (9-11 seats) has increased significantly over the past few years, with the Royal Flying Doctor Service now operating a fleet of 15 PC-12s. PC-12 movements currently represent 4% of all fixed-wing movements.

Larger aircraft types, such as the Fairchild SA-226 Metro II (18 seats) and the Beechcraft Kingair B200 (13-15 seats), are regularly used for private and commercial charter activities.

Small jets account for nearly 1% of all movements, with this mainly being the Embraer Phenom 100 jets used by China Southern WA Flying College for pilot training activities. Jet activity will increase in 2017 with the introduction of three PC-24 light jets to be operated by the Royal Flying Doctor Service.

The Airservices data identifies an average of 800 movements per year for aircraft with a maximum take-off weight above 7 tonnes, with a significant increase experienced in 2014/2015. The majority of these movements are the Airtractor 802A used for fire-fighting response during the bushfire season. Due to nearly half of the Airtractor's maximum weight being the water load it carries, the landing weight of the aircraft is under 4,000kg.

Helicopter activity has increased substantially over the past decade, with 44,062 helicopter movements reported in 2014/2015 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 50% of all helicopter activity is conducted by Robinson R22 types (2 seater single engine), with a further 20% 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. 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.

4.6 MOVEMENT CAPACITY

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

Movement capacity is impacted by many factors. Airspace considerations include separation distances between aircraft, effect of weather conditions, aircraft type (jet, propeller or helicopter) and performance. Capacity is also impacted by the number of runways, efficiency of the taxiway system to get aircraft to and from runways, and the location of the taxiway exits which determine how quickly an aircraft can vacate the runway after arriving.

The maximum theoretical operating capacity of Jandakot Airport, at its ultimate development (including the proposed fourth runway), was identified in Master Plan 2014 as 460,000 fixed-wing movements and 66,000 helicopter movements per annum.

The extension of runway 12/30 has no impact on the movement capacity of the airport. The current length of runway 12/30 is not able to easily accommodate some aircraft types, particularly on a hot or humid day where a longer runway distance is required for take-off and landing (hot air is less dense, resulting in less lift and a slower climb performance) and in wet weather which reduces braking ability. By providing a runway length sufficient for use by all aircraft in all weather conditions, the runway extension provides safety and efficiency benefits by avoiding delayed operations caused by contra-flow traffic movements and complexities for Air Traffic Controllers in managing concurrent aircraft operations across two runway directions. The extension of runway 12/30 is also required to be completed prior to the future extension of runway 06L/24R, as proposed in Master Plan 2014, so that a suitable alternative runway is available for aircraft operations while the runway 06L/24R extension works are being completed.

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5. THE DEVELOPMENT IN DETAIL

5.1 OVERVIEW

The works proposed in this MDP are shown on Figure 8 and comprise:

- Extension of runway 12/30 from 990m to 1,508m;
- Construction of new taxiways K, VI, V2, XI, YI and sealing of taxiway U; and
- Installation of a wind-direction indicator for runway 30.

5.2 RUNWAY 12/30

Runway 12/30 is used for aircraft operations in north-westerly and south-easterly wind conditions.

Runway 12/30 was 762m in length and 30m wide when it was sealed in 1964, and then extended a further 228m to the current 990m length in 1972/1973.

Master Plan 2005 provided for the extension of runway 12/30 to 1,390m in length, while Master Plan 2009 and Master Plan 2014 have provided for an extension to 1,508m length to align the extended runway 30 threshold with the proposed parallel fourth runway threshold. This MDP details the extension of runway 12/30 from 990m to 1,508m.

5.3 NEED FOR RUNWAY 12/30 EXTENSION

Runway selection is determined by wind direction and strength as pilots prefer to take-off and land into the prevailing wind. During Air Traffic Control tower operating hours, the Air Traffic Controllers stipulate which runway direction is to be used. When the tower is closed, the pilot will determine which runway to use based on the direction and speed of the wind. Runway directions will change throughout the day due to the constantly changing wind conditions.

Less than 15% of all movements are on runway 12/30 due to the weather conditions at Jandakot favouring use of the 06 or 24 directions. 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 south-easterly winds which are experienced mainly in the morning periods between October and December, and early afternoon from January to March. The runway 30 direction

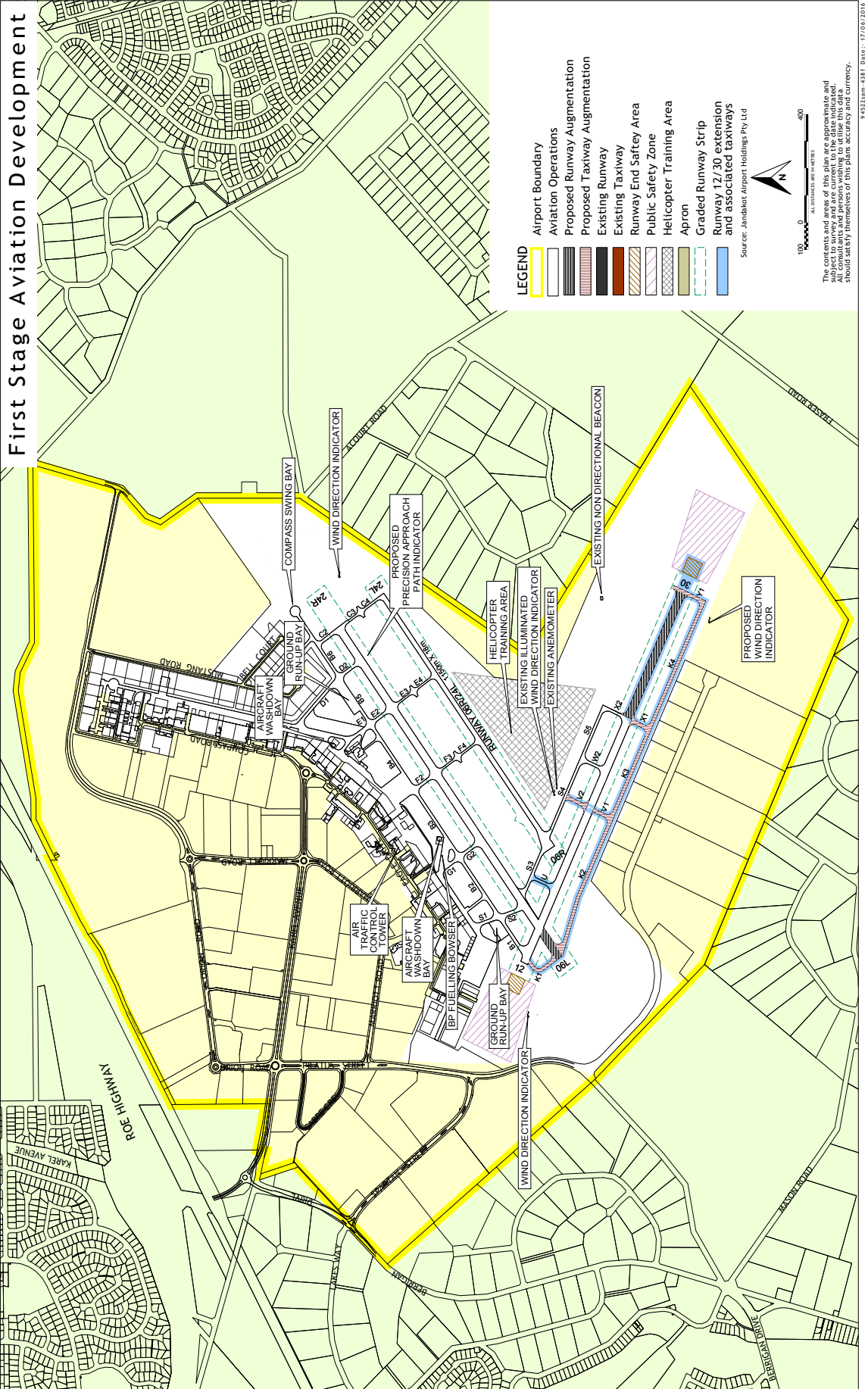
is generally used in north-westerly winds experienced prior to and during periods of stormy weather and when frontal systems approach from the west. Currently less than 6% of all movements use the runway 30 direction.

The current length of runway 12/30 is not able to easily accommodate some of the larger and/or faster aircraft types, particularly on a hot or humid day where a longer runway distance is required for take-off and landing (hot air is less dense, resulting in less lift and a slower climb performance) and in wet weather which reduces braking ability. Due to the runway length not being suitable, these aircraft operators request use of primary runway 06L/24R even when the 12 or 30 directions are in use. This results in traffic management complexities for Air Traffic Controllers in having to coordinate aircraft operations in two runway directions simultaneously.

Each runway direction has a set flight path pattern to provide a standard track to be followed by aircraft when taking off or landing. The primary purpose of the set flight path is for safety – by having a consistent flight path pattern pilots will know where to expect, see and avoid other aircraft traffic. One of the main safety impacts of having aircraft use two runway directions simultaneously is that the flight paths for runway 12/30 conflict with the flight paths for runway 06L/24R. In addition, runway 06L/24R intersects with runway 12/30 and aircraft need to taxi along a portion of runway 12/30 to get into position for a full length take-off on runway 06L.

Jandakot Airport currently has an average of 700 movements per day. However, in favourable weather conditions for pilot training activities, the peak daily movement level can exceed 1,200 flights. While less than 15% of all movements use runway 12/30, when north-westerly and south-easterly wind conditions are experienced this can amount to 500 daily movements for runway 30 and up to 650 daily movements for runway 12. The complexities of facilitating aircraft in two runway directions simultaneously adds to the already heavy workload of the Air Traffic Controllers in coordinating and separating the high volume of traffic at Jandakot.

FIGURE 8 – AIRFIELD WORKS FOR RUNWAY 12/30 EXTENSION



An extension to runway 12/30 provides significant safety benefits by facilitating all code 2B aircraft types on this runway even in hot, wet or windy weather, thereby avoiding delayed operations due to conflicting flight paths and complexities for Air Traffic Controllers in managing concurrent aircraft operations across two runway directions.

5.4 TAXIWAYS

Taxiways have two distinct functions – getting aircraft from a parking area to a runway and getting aircraft off a runway and to a parking area. Air Traffic Control cannot clear an aircraft to land or depart if the runway is occupied by another aircraft, so getting aircraft off the runway as quickly as possible is crucial to the efficient operation of an airfield. The different aircraft types all have different runway length requirements, and there will generally be multiple taxiways along a runway to enable an aircraft to enter the runway at the required take-off position and to exit the runway as soon as practical after landing.

The International Civil Aviation Organization outlines planning principles for the design of taxiways. These principles include keeping taxiway routes as simple as possible to avoid pilot confusion, using straight runs of pavement wherever possible, and avoiding crossings of runways and other taxiways wherever possible in the interests of safety and to reduce the potential for significant taxiing delays.

The taxiway design for the ultimate airfield layout shown in Master Plan 2014 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.

The taxiway works proposed in this MDP are shown in Figure 8 and include:

- Construction of new taxiway K (comprising sections K1, K2, K3 and K4);
- Construction of new taxiways V1 and V2;
- Construction of new taxiway X1;
- Construction of new taxiway Y1;
- Sealing of existing gravel taxiway U; and

- Removal of existing taxiways T and V.

Up to 500 aircraft are based at Jandakot Airport. During favourable weather conditions for pilot training activities, demand for runways is extremely high and there can be a large volume of aircraft requiring ground (taxiing) and airspace coordination. The most efficient taxiway design for the nature of Jandakot Airport activity is a race-track design that permits arriving and departing aircraft to utilise different taxiway routes. This avoids head-to-head conflicts, bottlenecks and taxiing delays. The race-track design also reduces the demands on the air traffic controllers to continually have to hold or reroute aircraft that are operating in different directions along the same taxiway.

Taxiway K will accommodate aircraft using runway 12/30 and will also serve the aviation development of Precinct 6A detailed in Master Plan 2014. For runway 30 departures, departing aircraft would use taxiway K while arriving aircraft would use taxiway S.

Existing taxiways T and V are 'runway incursion hotspots' due to pilot confusion when intersecting with the runway 06L and 06R thresholds. A runway incursion is defined by the International Civil Aviation Organization as *"Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft"*. 'Hot spots' are particular locations where there is a cluster, or repeated, occurrence of incursions. Reducing the number of runway incursions is paramount to improving runway safety and as a result these taxiways will be removed as part of this stage of works. The sealing of existing gravel taxiway U and construction of new taxiway V2 will replace taxiways T and V (refer to Figures 6 and 8).

5.5 PLANNING STANDARDS

The Convention on International Civil Aviation, signed in Chicago on 7 December 1944 (the "Chicago Convention"), came into force on 4 April 1947. This Convention establishes rules of airspace, aircraft registration, and safety, so that international civil aviation can develop safely and efficiently. Australia is a signatory to the Chicago Convention, and as such, Australia's aviation safety regulatory system is based upon the international standards, recommended practices and procedures adopted by the International Civil Aviation Organization.

The Civil Aviation Safety Authority is responsible under Section 9(1)(c) of the *Civil Aviation Act 1988* for developing and promulgating clear and concise aviation safety standards through the *Civil Aviation Safety Regulations 1998*. The technical requirements that are determined to be necessary for the safety of aerodromes and air navigation are detailed in the Manual of Standards Part 139–Aerodromes. These standards are generally based on the international standards developed by the International Civil Aviation Organization.

The International Civil Aviation Organization defines a two part Aerodrome Reference Code to categorise aircraft types for the purpose of establishing whether a particular aircraft is able to use a particular airport.

The Aerodrome Reference Code has two elements - a numeric code based on the Reference Field (runway) Length for which there are four categories, followed by a letter code based on a combination of aircraft wingspan and outer main gear wheel span. A critical aircraft of Code 2B has, and continues to be, used as the basis for planning the layout of the primary runways 06L/24R and 12/30 and associated taxiways at Jandakot Airport. This category includes aircraft with a wingspan of 15m up to but not including 24m. A typical Code 2B aircraft in widespread use in Australia are the Fairchild Metro II and Beechcraft 1900, both of which are twin engine turbo-prop aircraft with a passenger carrying capacity of up to 19.

RUNWAYS

A runway can be used in both directions and is named for each direction separately. Runways are named by a two-digit number between 01 and 36 which corresponds to the runway's magnetic bearing in decade degrees. Runway 12 has magnetic bearing 116° and runway 30 has magnetic bearing 296°. For parallel runways, where multiple runways are positioned in the same direction, each runway is identified by appending L (left), C (centre) or R (right) to identify its position. The parallel runway system 06/24 at Jandakot is identified by the left and right positions.

In addition to the Aerodrome Reference Code category, a runway is also defined by the type of flight approaches available through navigation aids. A distinction is made between precision (glideslope guidance provided) and non-precision (no glideslope guidance), and instrument (instrument procedures served by navigational aids) and non-instrument (visual approach procedures only). Primary runways 06L/24R and 12/30 are classified as Code 2 non-precision instrument, and parallel runway 06R/24L

is classified as Code 1 non-instrument. The Manual of Standards Part 139 defines the different design standards for each aerodrome reference code classification.

The International Civil Aviation Organization describes a 'runway' as a "defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft". For the safety of aircraft operations, a pavement runway will be surrounded by cleared, smooth and graded areas that are kept free from any obstacles that might impede the an aircraft if it undershoots or overruns the runway. A Code 2B non-precision instrument runway has the following characteristics:

- Sealed runway width not less than 23m;
- Graded runway strip width not less than 90m;
- Graded runway strip to extend beyond end of the runway or any associated stopway for at least 60m;
- Runway end safety area (RESA) length not less than 60m (being twice the width of the runway);
- Clearway (obstruction free rectangular plane at end of runway) with a length not more than half the length of the take-off run available on runway and width not less than 80m; and
- Take-off splay diverted outwards at 10% from the end of the strip, with a vertical slope of 4% for a distance of 2,500m.
- Approach splay diverted outwards at 15% from the end of the strip, with a vertical slope of 3.33% for a distance of 2,500m.

TAXIWAYS

The taxiway lengths for the works shown in this MDP comprise:

construction of new taxiway K	K1 – 163.7m K2 – 552.4m K3 – 364.4m K4 – 518.3m (total taxiway length 1,598.8m)
construction of new taxiway V1	92.5m
construction of new taxiway V2	105.2m
construction of new taxiway X1	92.5m
construction of new taxiway Y1	92.5m
sealing existing gravel taxiway U	105.2m
removal of existing taxiways T and V	-

Typical Code B standards require a taxiway width of 10.5m.

The proposed taxiways have been given assumed designations for planning purposes as shown in Figure 8. The final taxiway designations may be changed in consultation with Airservices Air Traffic Control and local operators as part of the detailed design, and pending recommendations of the International Civil Aviation Organization's review of standardised naming conventions for taxiways to help reduce runway incursions.

5.6 PAVEMENT STRENGTH

The bearing strength of an aerodrome pavement is expressed as a pavement classification number. Aircraft can operate unrestricted on a runway pavement that has a pavement classification number rating equal to or greater than the aircraft classification number. The aircraft classification number value expresses the relative damaging effect of the aircraft on a pavement for the specified standard subgrade strength. Runway 12/30 has a pavement classification number value of 11 and comprises flexible high strength pavement to accommodate tyre pressure of 1,000 kilopascals (145 pounds per square inch). The extension of runway 12/30 will be constructed to the same pavement rating specifications as the existing length of runway.

5.7 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.

Air Traffic Control is administered by Airservices Australia from a control tower located centrally along the airfield apron.

The current hours of operation of the Air Traffic Control tower are:

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

The Air Traffic Control tower is currently operational for over 95% of all movements. There is no change to the current operating hours expected as a result of the extension of runway 12/30 and taxiway system.

The airport continues to operate while the Air Traffic Control 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.

5.8 TOWER LINE OF SIGHT

The Air Traffic Control 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. The proposed airfield works comprise the extension of runway 12/30 by 518m to the east and new taxiways to the south-east. Unobstructed line of sight will be maintained from the ATC Tower eye level to all of the new taxiways and to a distance of 300m from the extended runway 30 threshold in accordance with Manual of Standards Part 172 requirements.

5.9 AIRFIELD LIGHTING

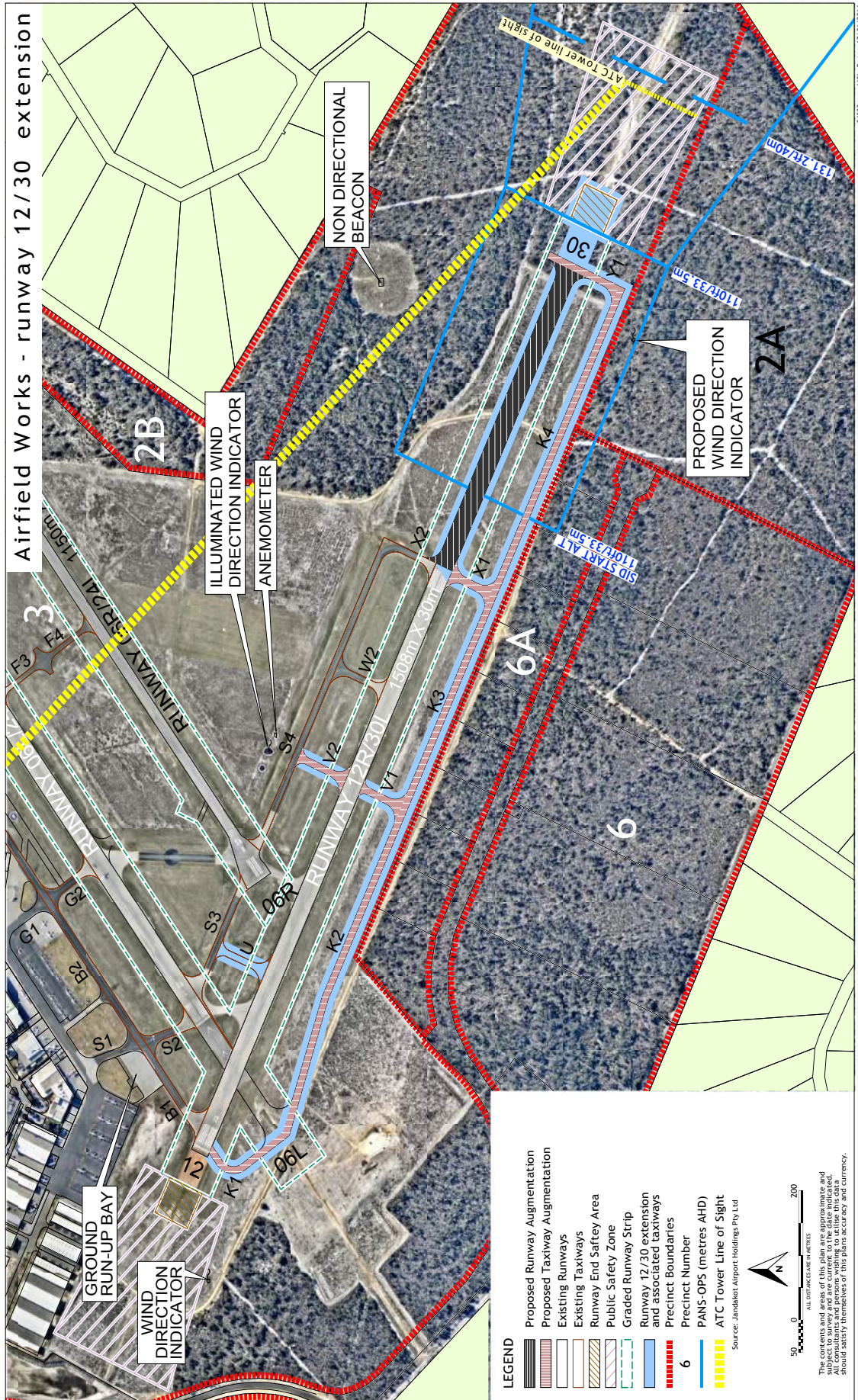
Runway 12/30 is equipped with low intensity runway edge lighting and associated taxiways are equipped with centreline and holding point lighting. The existing longitudinal spacing of the runway edge lights is 90m intervals. The Manual of Standards Part 139 requires the runway edge lighting to be upgraded to 60m intervals at the next replacement or improvement of the edge lighting system, and these lighting works are included in the detailed scope of works for the extension of the runway 12/30.

Taxiway and taxiway exit lighting will be installed on the new taxiways in accordance with the Manual of Standards requirements.

5.10 WIND INDICATOR

A wind indicator, or windsock, provides pilots with a visual representation of the wind direction and velocity. There is currently an illuminated wind indicator located north of taxiway S4, and non-illuminated wind indicators located close to the runway 24 thresholds and near the runway 12 threshold. An additional non-illuminated wind indicator is proposed to be located 100 metres upwind of the extended runway 30 threshold, as shown in Figure 8.

FIGURE 9 – AIRFIELD WORKS



5.11 HELICOPTER 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 8). An auto-rotative aiming point is identified by an asphalt marker within the training area.

Unless otherwise directed by Air Traffic Controllers, 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 Air Traffic Control workload and approval. Similarly, the runway 06R/24L strip can be utilised for helicopter training activities when the 12/30 runway is in use, allowing three helicopters to conduct training at a time. However, when runway 12/30 is in use 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 control and appropriate separation of helicopter training activity.

5.12 PUBLIC SAFETY ZONES

The purpose of a public 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 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 public safety zones was undertaken by JAH as it is expected that a public safety zone 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 public safety zone 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 public safety zone that extends 300m from the end of the runway strip. Based on this criteria, the runway 12/30 public safety zones are contained within the airport boundary.

5.13 SITE SERVICES

The following site services will be provided for the runway 12/30 extension and new taxiways:

- Electrical services will be installed for the runway and taxiway lighting. The existing electrical infrastructure has sufficient capacity for the new lighting.
- Water reticulation is not provided within the aircraft manoeuvring (runway and taxiway) area. Bore water is used to maintain grassed runway and taxiway strips.
- Stormwater drainage for the taxiways and runway extension will be designed to match existing taxiway and runways. As the Jandakot Airport geology is extremely porous sand, no piped drainage is required for the taxiways and runways.
- The areas around the taxiways and runway extension will be planted with grass to match the existing surfaces.

5.14 DESIGN AND CONSTRUCTION PROCESS

The design and construction of the runway 12/30 extension and new taxiways is expected to take three years to complete. An outline of the design and construction process is as follows:

- Specialist engineers will be engaged for the preparation of the detailed design documentation.
- The technical documentation will be issued to experienced civil contractors for tender.
- While the works are out to tender, an application for a works permit (under the *Airports (Building Control) Regulations 1996*) will be submitted for approval (see section 11.2).
- A Method of Works Plan will be developed in consultation with the civil contractor(s), Air Traffic Control and local operators. This Plan will detail the arrangements for carrying out the components of the airfield works (see section 7.5).
- Construction will commence on approval of the works permit. The construction will entail vegetation clearing, earthworks and construction of the runway extension and new taxiways.
- On completion of the works, and prior to opening the extended runway for aircraft operations, the extended runway 12/30 will be commissioned by the Civil Aviation Safety Authority (see section 11.3).

It is anticipated that the vegetation clearing will take approximately 3 months, the earthworks 24 months and the taxiway and runway works a further 6 months to complete. Commissioning of the extended runway is expected to take 3 months.

5.15 ECONOMIC CONTRIBUTION OF WORKS

This construction proposed within this MDP is estimated to cost \$4 million and will take approximately three years to complete following approval of this MDP.

A considerable portion of this cost is attributed to wages for the construction workforce that will be employed to complete the preparation and construction of the runway 12/30 extension and associated taxiways. Due to the nature of the work, the design, construction and commissioning phases of the extension of runway 12/30 and new taxiways will provide approximately three years of employment

activity. This workforce may not be full-time and personnel levels will vary during the different phases to suit requirements. Initial employment estimates are 14 full-time personnel for the vegetation clearing, 20 full-time personnel during the earthworks stage, and up to 30 personnel on site daily during the construction of the runway extension and new taxiways.

The airfield works will not result in an increase in employment numbers at the airport when operational as the works are primarily being undertaken to increase the efficiency and safety of the airfield for aircraft operators.

The extension of runway 12/30 and the taxiway system will not directly alter the economic benefit of the airport at a regional or state level. However, it is the first stage of works required for developing the airport to its full airfield and operating potential.

5.16 METHOD OF WORKS PLAN

A formal risk assessment will be completed in line with Jandakot Airport's safety management framework. Preliminary assessments indicate that there are no risks to aeronautical use that cannot be mitigated or are so high as to prevent the extension of runway 12/30 and taxiway system.

The formal risk assessment will form part of the Method of Works Plan. The Method of Works Plan is required by the Civil Aviation Safety Authority under the Manual of Standards Part 139 and is developed in consultation with Air Traffic Control, local operators and the civil contractor(s) as part of the process for establishing the detailed programme of construction works. The extension of runway 12/30 will require full closure of the runway and establishment of a displaced runway threshold for certain periods of the works. To minimise disruption to operators it may be necessary to conduct some construction activities outside of peak movement periods. The Method of Works Plan will detail the arrangements for carrying out the components of airfield works including expected runway closures, displaced runway 30 threshold, night works, alternate arrangements and procedures for operators during the works, and stakeholder notification methods such as advisory emails and Notice-To-Airman (NOTAM) pilot notification.

An initial review of the works indicates the following airfield impacts. The anticipated runway closures will be a total of 30 hours duration and will be planned to occur on days and at times that minimise disruption to aircraft operators.

Taxiway K1	Displaced threshold runway 12. Night works for sections within runway 06L/24R flight strip (with works to cease for aircraft operations requiring runway 06L/24R).
Taxiway K2	West section will require displaced threshold runway 06L. Depending on the equipment used, instrument flight approach and departure procedures for runway 12/30 may not be available.
Taxiway K3 & K4	Depending on the equipment used, instrument flight approach and departure procedures for runway 12/30 may not be available.
Taxiway U	Closure of runway 12/30 Night works.
Taxiway V1 & V2	Closure of runway 12/30.
Taxiway X1 & Y1	Displaced threshold runway 30.
Runway 30 extension	Displaced threshold runway 30.

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6. FLIGHT PATHS AND AIRCRAFT NOISE IMPACTS

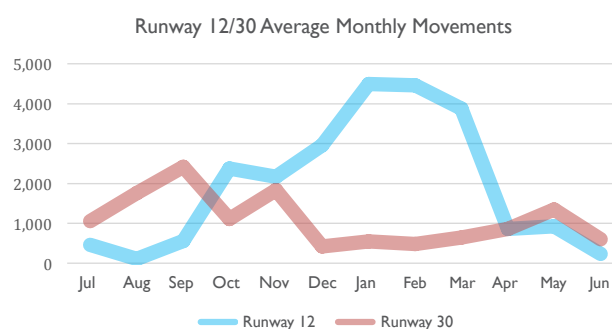
6.1 MOVEMENTS

Less than 15% of all movements are on runway 12/30 due to the weather conditions at Jandakot favouring use of the 06 or 24 directions. 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 south-easterly winds which are experienced mainly in the morning periods between October and December, and early afternoon from January to March. The runway 30 direction is generally used in north-westerly winds experienced prior to and during periods of stormy weather and when frontal systems approach from the west. Currently less than 6% of all movements use the runway 30 direction.

As detailed in section 5.3, the current length of runway 12/30 is not able to easily accommodate some of the larger and/or higher-performing (faster) aircraft types. The extension to runway 12/30 will result in all code 2B aircraft types being able to use this runway in any weather condition.

The change in movements using runway 12/30 once extended has been calculated as an additional 0.7% of overall movements using runway 12, and an additional 0.5% of overall movements using runway 30. Based on current movement levels, this would result in an increase of 1,680 annual movements for runway 12 and 1,200 annual movements for runway 30. The actual impact may be slightly lower as fixed-wing aircraft engaged in emergency response activities, such as the Airtractor bushfire water-bombers and Royal Flying Doctor Service, may continue to request use of the runway that provides the quickest arrival or departure for priority flights, regardless of the runway direction in use.

Due to the seasonal use of runway 12/30, based on the current average monthly runway use data, this would result in an additional 200-300 movements per month (daily average <10 additional movements) between December and March on runway 12, and an additional 100-220 movements per month (daily average <8 additional movements) between August and November on runway 30.



6.2 FLIGHT PATHS

The *Airports Act 1996* requires that an MDP identify the effect of the proposed development on flight paths.

Flights are defined by two types of aircraft operations: instrument flight rule (IFR) or visual flight rule (VFR) procedures. Visual flight rule procedures require the pilot to fly by sight and use visual landmarks to determine the flight path, with information published to advise what altitude the aircraft needs to achieve by the specified landmarks. Instrument flight rule procedures provide instructions for pilots based on information derived from the cockpit equipment, such as making direction changes at specific altitudes.

TABLE 3 – AIRCRAFT MOVEMENTS BY RUNWAY DIRECTION

MOVEMENTS BY RUNWAY DIRECTION								
Annual Movements	Runway 06		Runway 24		Runway 12		Runway 30	
2011/2012	99,712	39.9%	111,455	44.6%	24,850	10.0%	13,655	5.5%
2012/2013	88,355	35.7%	127,363	51.4%	20,325	8.2%	11,605	4.7%
2013/2014	72,784	30.8%	119,072	50.4%	26,588	11.3%	17,588	7.5%
2014/2015	78,561	34.5%	117,453	51.6%	22,109	9.7%	9,402	4.1%
Annual average use	84,853	35.3%	118,836	49.5%	23,468	9.8%	13,062	5.4%
Average with runway 12/30 extension	83,171	34.6%	117,635	49.0%	25,149	10.5%	14,263	5.9%

The rate at which an aircraft can climb is dependent on variables such as wind strength, total payload/weight, and aircraft engine type, so every aircraft will perform differently. The actual flight track flown is also affected by, but not limited to, factors such as the pilot's familiarity with the area, air traffic management requirements, and meteorological conditions. Although the term 'flight path' is commonly used and the tracks are shown as thin straight lines on maps, in reality an aircraft's flight path occupies a three-dimensional region of space or set area and the resulting flight corridor can be a few kilometres wide.

REPORTING WAYPOINTS

Class D Airspace procedures allow aircraft to enter and leave the Jandakot Control Zone from any direction. However, due to the large volume of traffic at Jandakot Airport, Air Traffic Control requires aircraft to track via specific entry and exit waypoints so that aircraft segregation and clearances can be appropriately managed by the Air Traffic Controllers.

The main departure tracks from Jandakot are northwest via the Fremantle golf course, southeast via Armadale and south via Yangebup and Thompson Lakes. The main inbound tracks are via Canning Bridge, Forrestdale Lake and Adventure World. Jandakot Airport has a high volume of aircraft movements and the established flight tracks are designed to achieve efficient traffic segregation. These locations are selected because they are prominent landmarks that assist with visual navigation. As these waypoints are used for coordinating aircraft traffic into and out of the Jandakot Control Zone (3 nautical mile radius of the airport), there is no impact from the proposed runway 12/30 extension.

IMPACT ON VISUAL FLIGHT RULE PROCEDURES

Approximately 95% of aircraft operations at Jandakot Airport are conducted under visual flight rule conditions. When departing, pilots are required to make the first prescribed turn when they reach 500ft. The exact location of an aircraft when it reaches 500ft varies significantly, depending on aircraft performance, payload (operating weight), wind speed and weather conditions, and pilot competence. For arrivals, pilots are required to turn for the base leg (prior to the straight in final approach) when the threshold of the runway they are landing on is at a 45 degree angle behind them. This turning point will also vary between different aircraft and different pilots, depending on aircraft performance, wind conditions and pilot familiarity

in completing the landing check-list. In addition, the mix of aircraft in the circuit can also impact on where aircraft are positioned, as to maintain appropriate sequencing the faster aircraft will need to fly wider circuits than the lower-performance aircraft.

There are no changes to the runway 12 flight paths under visual flight rule conditions as the runway threshold (starting and ending position) has not changed.

The visual flight rule conditions for runway 30 operations are minimally impacted. The extended length of the runway will mean that aircraft are departing runway 30 from a further 518m east of the current threshold, and will thus reach 500ft altitude level much earlier. More aircraft will be conducting the prescribed altitude turn within the airport boundary, and this will result in aircraft being at a higher altitude over the impacted residential areas to the south-west, west and north-west of the airport. For runway 30 arrivals, due to the strong north-westerly winds that exist for runway 30 to be in operation, the majority of aircraft currently conduct a low approach from the edge of the Jandakot Control Zone and the impact of the extended runway 12/30 is expected to result in aircraft being only 50ft-100ft (15m-30m) lower than current operations over Jandakot Regional Park and the residential areas located in between the airport and Nicholson Road.

IMPACT ON INSTRUMENT FLIGHT RULE PROCEDURES

Instrument flight rule procedures are based on the aircraft requiring the full length of the runway, with the departure track starting from the end of the sealed runway and approach tracks ending at the runway threshold.

There is no change to the location of the runway 12 threshold and therefore no change to the runway 12 arrival or departure instrument flight paths.

For runway 30 instrument departures, as the length of the runway has been extended and the take-off run has increased, aircraft will be at a higher altitude sooner and will be making any required direction changes earlier. The majority of these direction changes will now be conducted within the airport boundary, resulting in aircraft being at a higher altitude over the impacted residential areas to the south-west, west and north-west of the airport.

For runway 30 instrument arrivals, the runway threshold will be extended by 518m to the east. This will result in aircraft

being at a lower altitude over Jandakot Regional Park and the residential areas located in between the airport and Nicholson Road. Similar to visual flight rule procedures, the impact of the extended runway 12/30 is expected to result in aircraft altitude being only 50ft-100ft (15m-30m) lower than current operations.

The extension of the runway 12/30 is therefore not expected to result in any noticeable change to the instrument flight altitudes or flight paths.

Prior to the commissioning of the runway extension (see Section 11.3), Airservices Australia will recalibrate the runway 30 instrument approach landing and standard instrument departure procedures via a flight test. This will determine any required procedure changes.

NIGHT OPERATIONS

Jandakot Airport operates 24 hours per day, 7 days per week. During the day aircraft in the Jandakot Control Zone operate up to 1,500ft. However, during night operations the lowest safe altitude around Jandakot Airport for arriving and departing aircraft is above 1,500ft. For night operations pilots are not required to track via the visual flight rule waypoints, and will instead plan to use preferred flight paths that maintain the appropriate terrain clearances. Aircraft operations above 1,500ft require a clearance from Perth Air Traffic Control to climb into and descend from Perth Controlled Airspace, and the runway in use in Perth will therefore determine the track Perth Air Traffic Control approve or assign to aircraft operating into and out of Jandakot. This results in some different flight tracks being used for night operations, as shown in the following illustrated flight path diagrams. Aircraft conducting operations solely within the Jandakot Control Zone (i.e. circuits) will remain under 1,500ft.

ILLUSTRATED FLIGHT PATHS

Figures 10 to 13 display the flight paths for runway 12/30 operations. Because the actual flight tracks flown vary substantially between different aircraft, there is no demonstrable difference between the current operations on runway 12/30 and the future operations once the runway 30 threshold is extended. These flight paths present the main flight corridors expected to be used by the majority of aircraft operations.

6.3 AIRCRAFT NOISE

One of the most obvious impacts of airport operations on the surrounding community is aircraft noise. While the Jandakot Airport site was originally farmland, the close proximity of Jandakot to the Perth CBD and the rapid population growth in Perth has resulted in residential communities becoming established around the airport.

The *Airports Act 1996* requires that an MDP identify the effect of the proposed development on noise exposure levels, and the airport's plans for managing aircraft noise intrusion in areas forecast to be subject to exposure above the significant ANEF levels.

ANEF

The Australian Noise Exposure Forecast (ANEF) is a noise chart used for land use planning purposes in Australia. The ANEF displays the predicted noise exposure levels for aircraft movements 20 years into the future. The ANEF is a scientific measure that takes into account meteorological conditions at the airport, forecast aircraft movement volume and frequency, allocation of these movements to flight paths and distribution over the day and night time periods, and the noise signature (intensity, duration and tonal content) and performance characteristics of the specific aircraft types. An ANEF is required to be updated at least every five years, in conjunction with the Master Plan update, and be endorsed for technical accuracy by Airservices Australia.

The ANEF chart illustrates noise contours plotted at 20, 25, 30, 35 and 40 ANEF units. The contour plot is the calculated total noise energy at that given point on the ground on an annual average day. The higher the ANEF value, the greater the expected exposure to aircraft noise in that area. Properties located within the ANEF 20 contour and above may have zoning and development restrictions placed on the land, noise insulation included as a condition of planning approval, and/or notification of the likely presence of aircraft noise on the land title.

Noise levels over particular periods vary due to prevailing winds, traffic demand and times of operation. Australian Standard 2021-2000 Appendix A states that the actual location of the 20 ANEF contour is difficult to define accurately because of variations in aircraft flight paths, pilot operating techniques and the effect of meteorological and terrain conditions on noise propagation. For that reason, the 20 ANEF contour is shown as a broken line on ANEF plans.

FIGURE 10 - FLIGHT PATHS 12 DAY

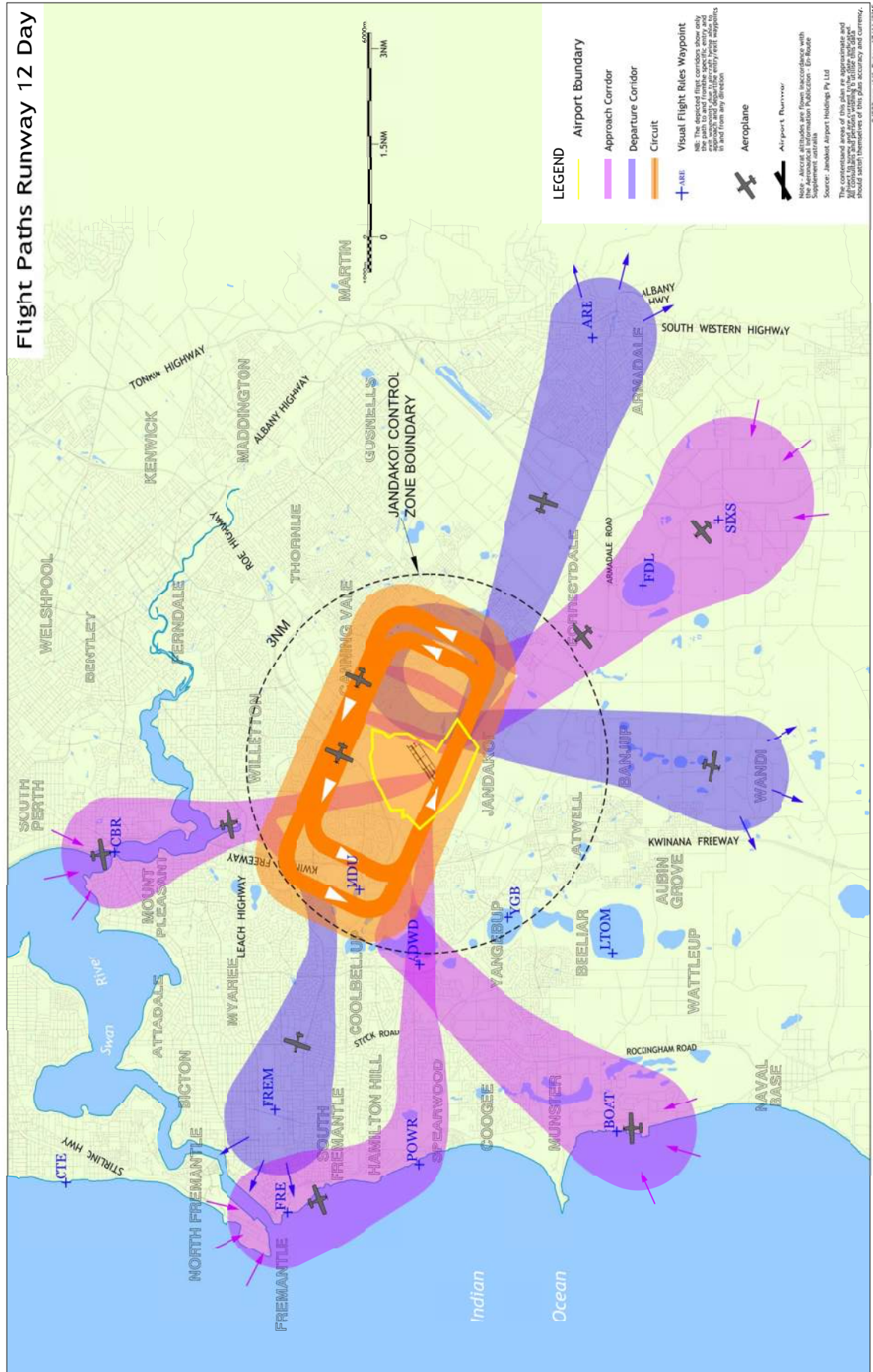


FIGURE 11 - FLIGHT PATHS 30 DAY

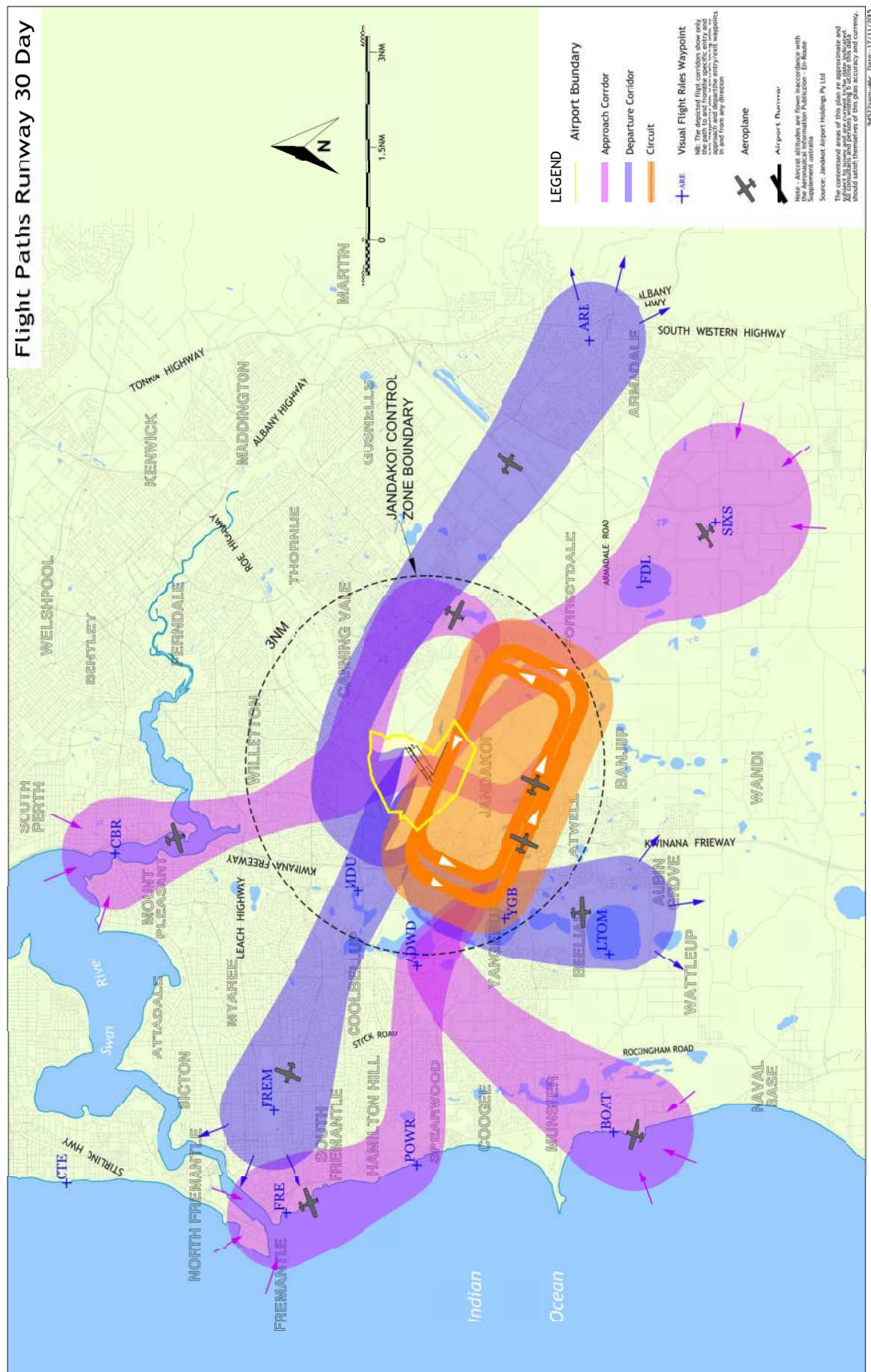


FIGURE 12 - FLIGHT PATHS 12 NIGHT

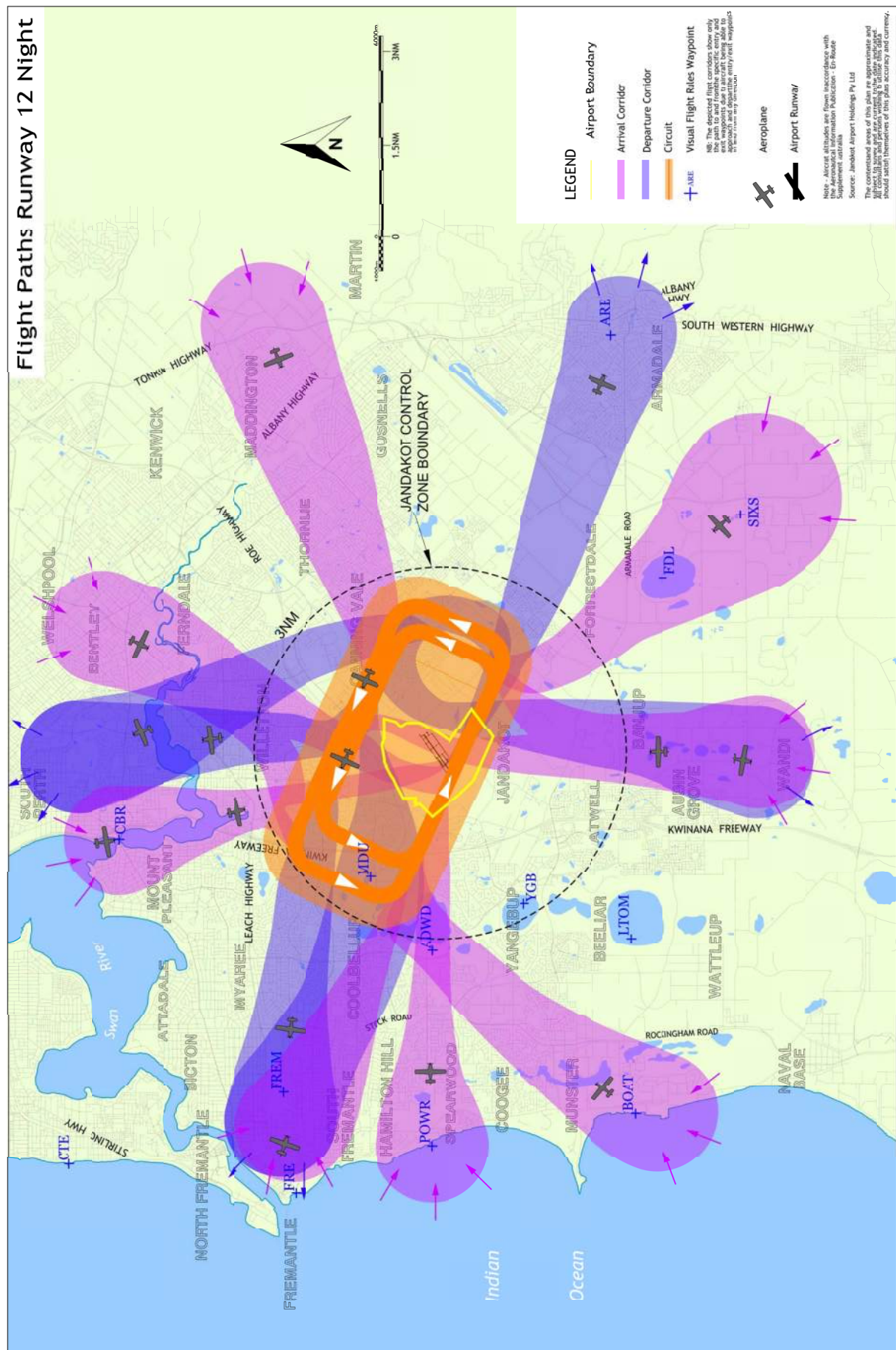
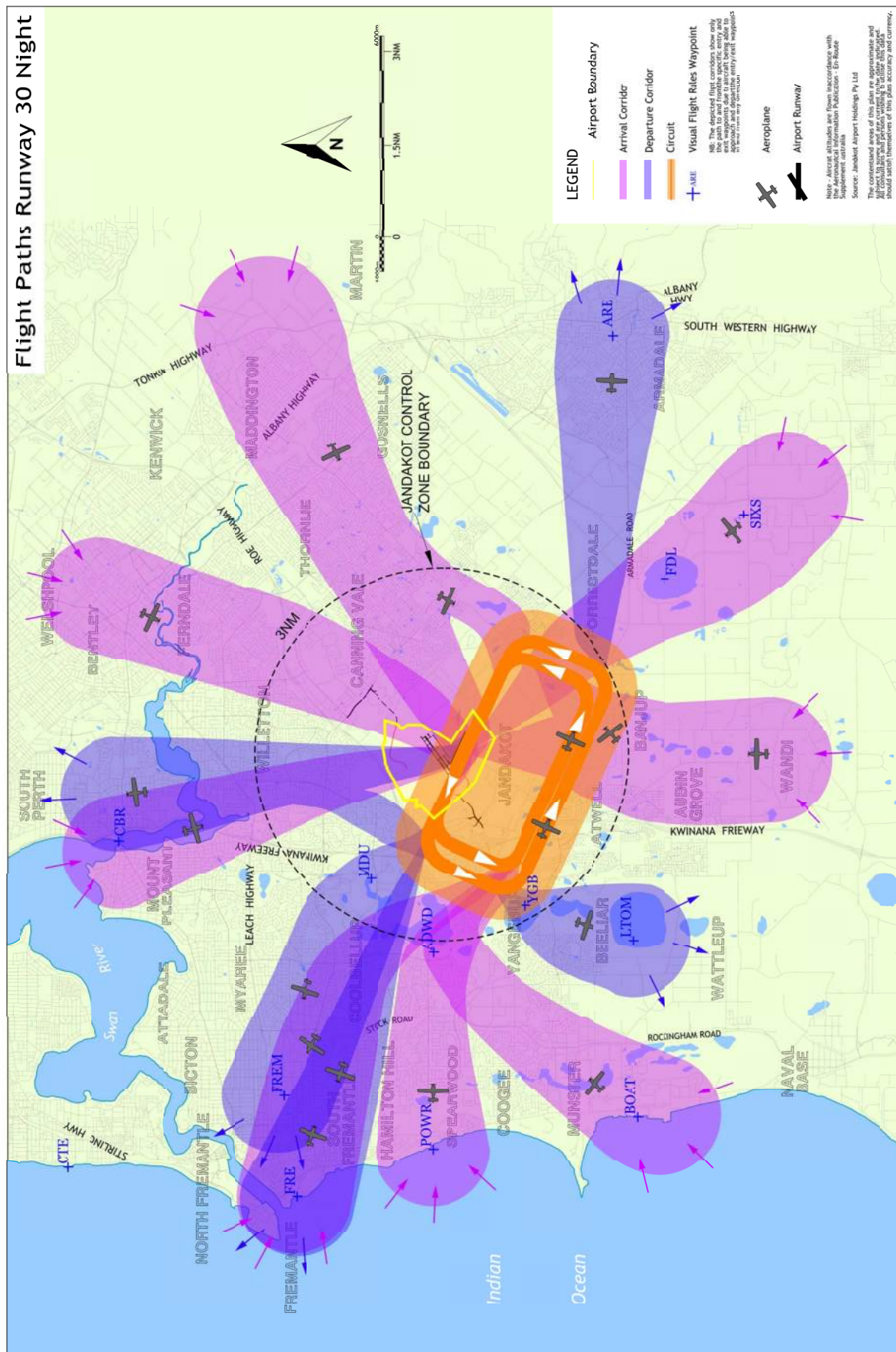


FIGURE 13 - FLIGHT PATHS 30 NIGHT



An Ultimate Capacity ANEF was prepared for Master Plan 2014 to represent an average day when the airport reaches its maximum aircraft operating capacity and is based on the ultimate design of the airfield as presented in Master Plan 2014. The impact of the changed runway 30 threshold was taken into account in the preparation of the Ultimate Capacity ANEF, shown in Figure 14.

EXPOSURE ABOVE SIGNIFICANT ANEF LEVELS

There are no residential houses located within the Ultimate Capacity ANEF 30 Contour. The two small areas where the Ultimate Capacity ANEF 30 Contour extends beyond the airport boundary are to the southwest and the east and relate to the runway 06L/24R and 06R/24L operations. These areas are appropriately zoned under the respective local government town planning schemes and the Metropolitan Region Scheme to preclude the future development of residential houses.

NOISE ABOVE CONTOURS

The Noise Above metric is a frequency based measure of aircraft noise to present the projected number of aircraft noise events on an average day that are above a specific noise level, shown as a N70, N65 or N60 Contour chart.

The N70 Contours display the calculated average daily aircraft noise events above 70 decibels (dbA). A 70 decibel outside noise corresponds to a 60 decibel noise event indoors, which is the noise level specified in Australian Standard AS2021 as the indoor design sound level for normal domestic areas in dwellings that may interfere with activities such as normal conversation and watching television.

The N60 Contours display the calculated average daily aircraft noise events above 60 decibels. A 60 decibel outside noise corresponds to a 50 decibel noise event indoors, which is specified in Australian Standard AS2021 as the sleep disturbance level.

The N60, N65 and N70 contours charts shown in Figures 15, 16 and 17 have been calculated using the ANEF ultimate capacity data, which is when Jandakot Airport will be operating at the maximum number of aircraft movements and the airfield has been fully developed as shown in Master Plan 2014. Contours are shown in intervals from 10 average daily events up through to 700+ average daily events.

It is important to note that the Noise Above charts show the average daily noise events, calculated by dividing the total annual events by 365. For comparison purposes, N60 contours have also been prepared for a Busy Day. The N60 Busy Day diagram, included as Figure 18, depicts the projected amount of noise events for a day where the airport will be operating at its peak daily movement level (i.e. extremely favourable weather conditions for flying training).

These contour calculations have taken into account the airfield development at its ultimate development, including the runway 12/30 extension.

6.4 AIRCRAFT NOISE MANAGEMENT

Aircraft noise management is the responsibility of the entire aviation industry. The range of organisations and agencies involved are detailed in Master Plan 2014 and on the Jandakot Airport website (Aircraft Noise webpage).

FLY NEIGHBOURLY

Fly Neighbourly is a voluntary code of conduct for pilots that was introduced at Jandakot Airport in January 2000. While it is impossible to stop aircraft noise emanating from an airport, Fly Neighbourly recognises that there are opportunities to reduce the effect of aircraft noise on surrounding communities.

Pilots are expected to undertake operations in a manner which is considerate of local residents. However, safety is the primary concern of air navigation and operations, and implementation of the Fly Neighbourly principles is therefore subject to safety and operational considerations as air traffic procedures and instructions must be complied with at all times.

Fly Neighbourly requires pilots to use sufficient runway length and best rates of climb to maximise height over populated areas. High performance and twin-engine aircraft are to conduct full length take-offs where possible. The extended length of runway 12/30 will permit aircraft departing runway 30 to commence take-off a further 518m east of the current threshold and thus achieve higher clearances over residential areas to the west, south-west and north-west of the airport.

Detailed information about Fly Neighbourly is available on the Jandakot Airport website.

FIGURE 14 - ULTIMATE CAPACITY AUSTRALIAN NOISE EXPOSURE FORECAST

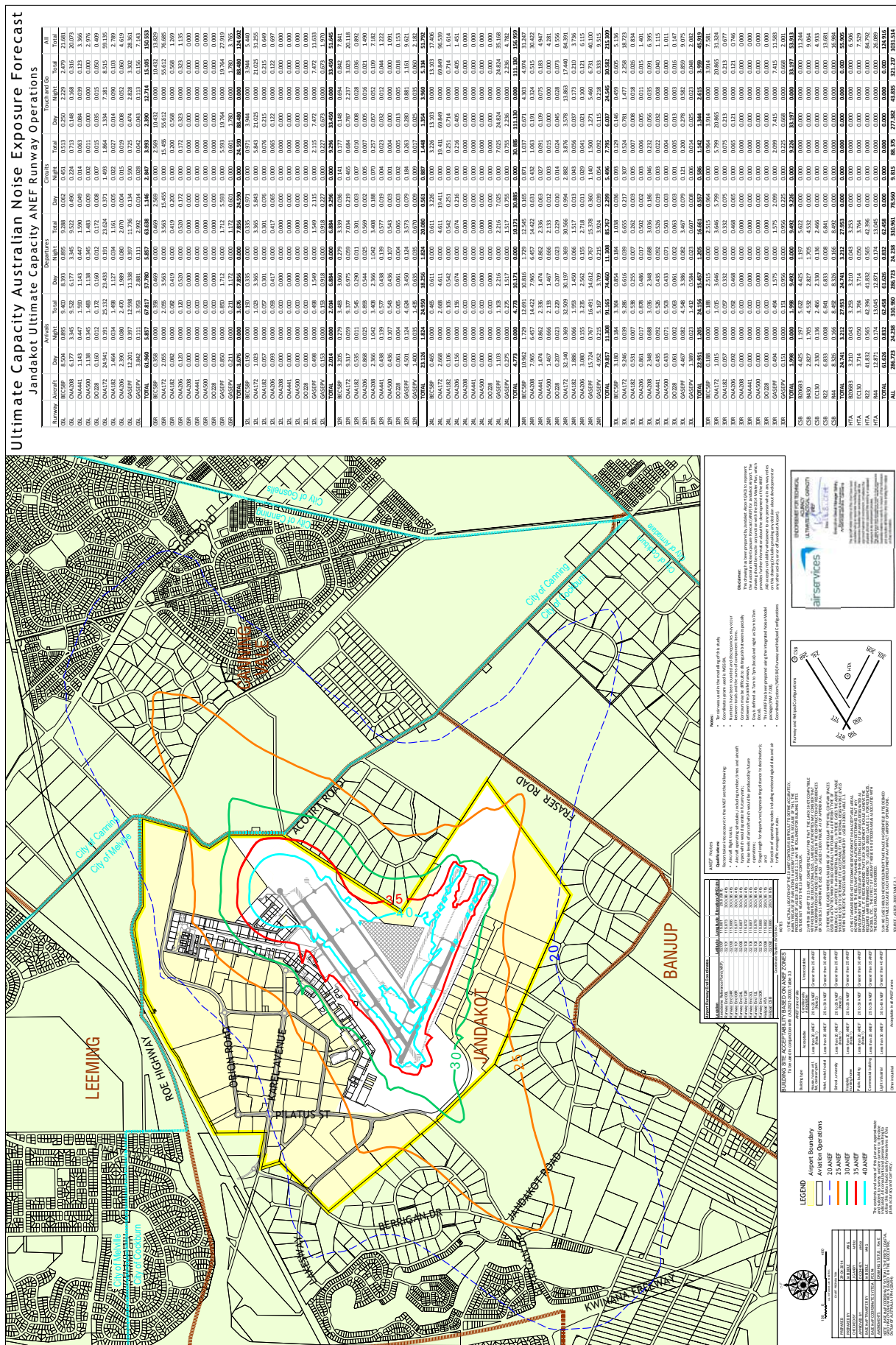


FIGURE 15 – N60

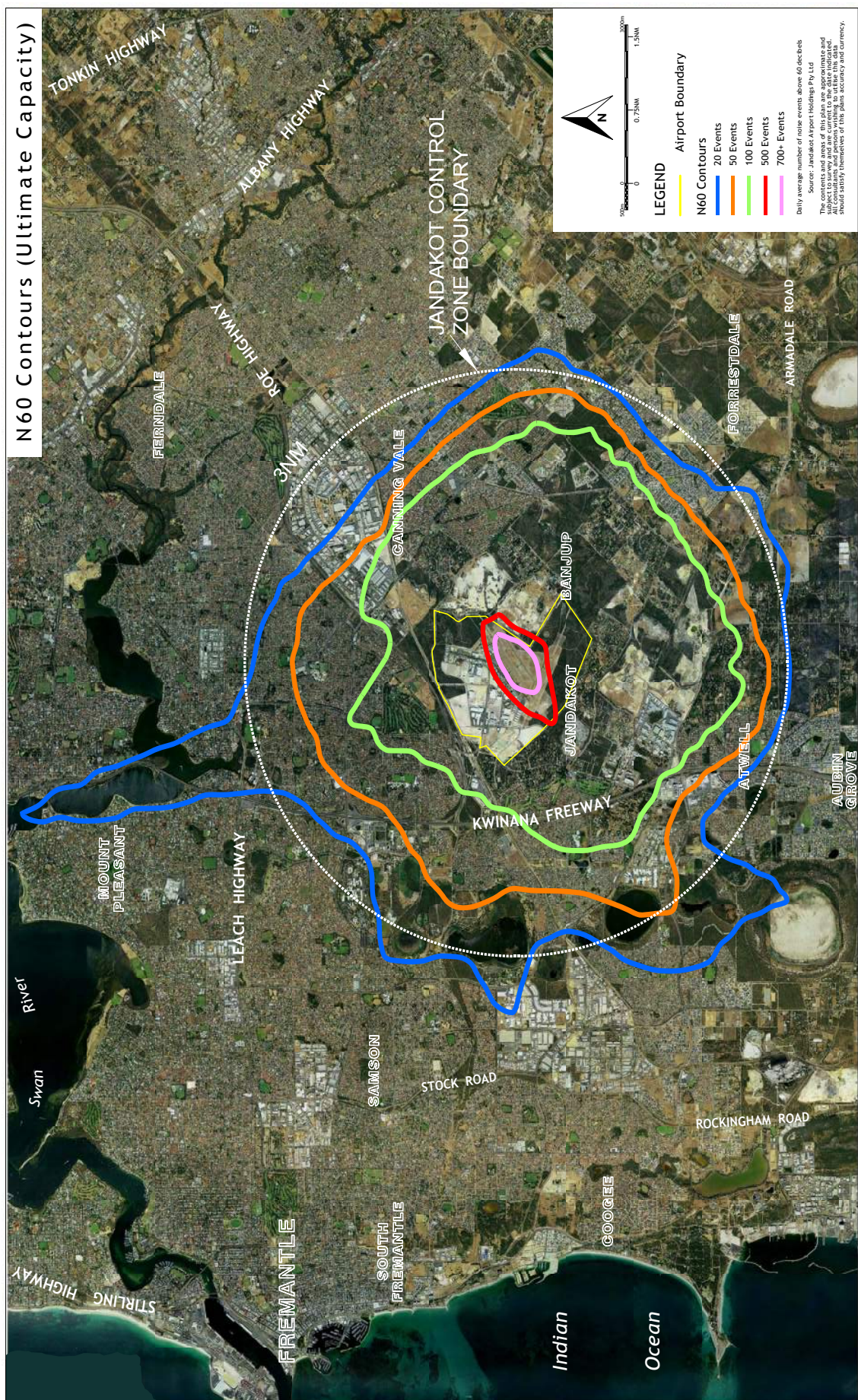


FIGURE 16 – N65

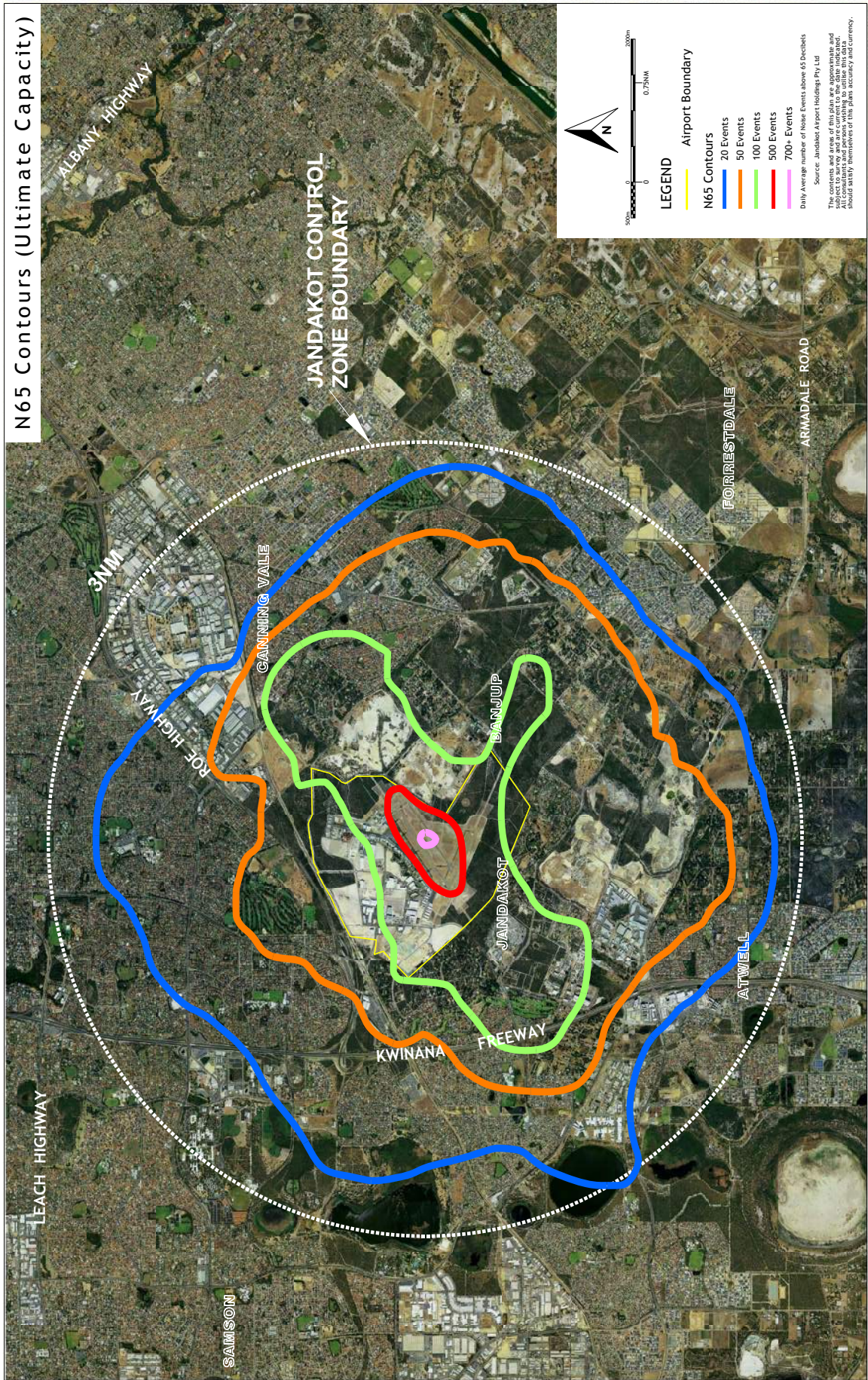


FIGURE 17 – N70

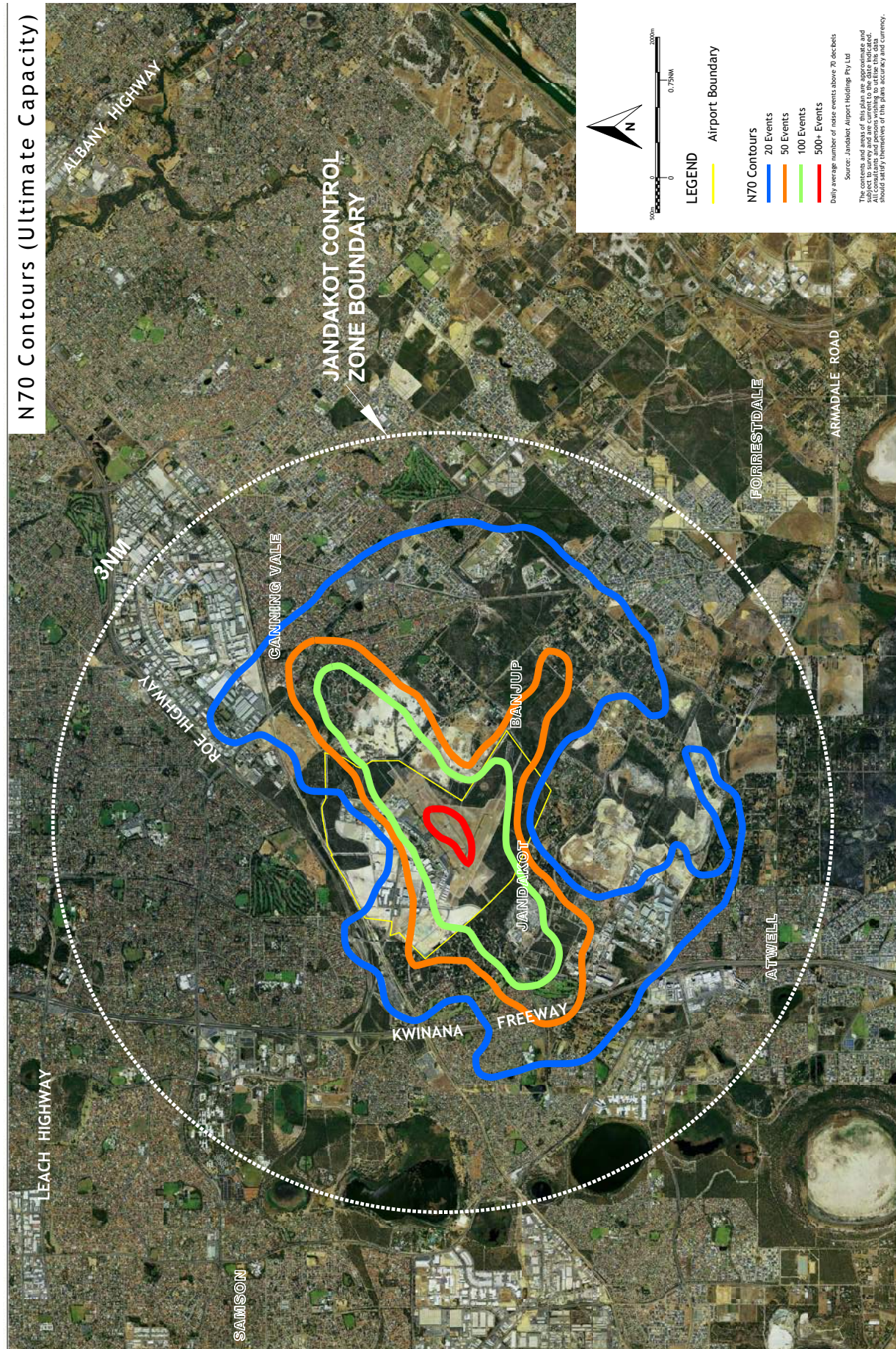
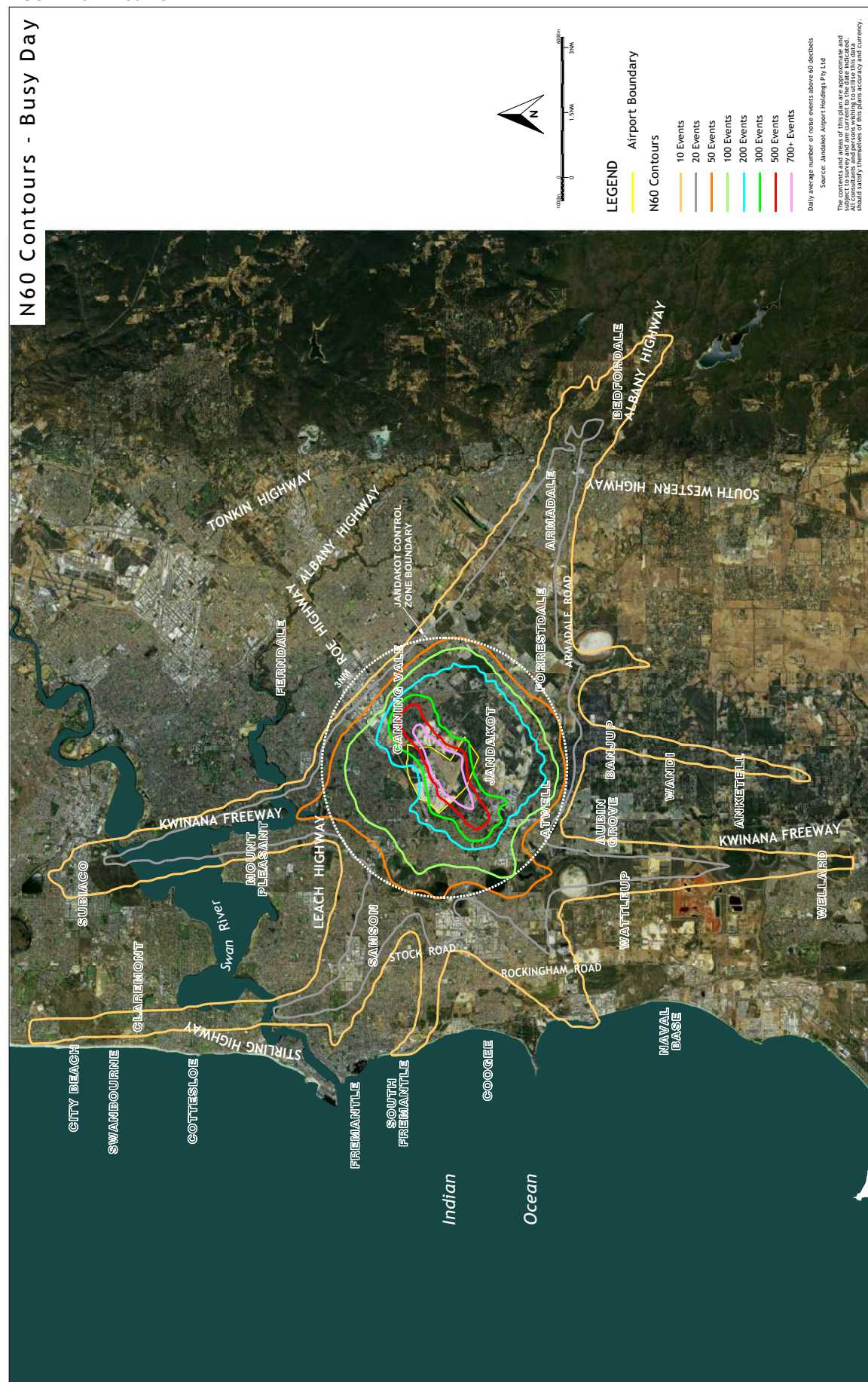


FIGURE 18 – N60 BUSY DAY



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7. AIRSPACE AND AVIATION PROTECTION

7.1 PROTECTION OF AIRSPACE

The Department of Infrastructure and Regional Development protects the airspace around leased Federal airports under the *Airports Act 1996* and the *Airports (Protection of Airspace) Regulations 1996*. Obstructions and obstacles in the vicinity of an airport have the potential to create air safety hazards and to seriously limit the scope of current and future aviation operations into and out of an airport. Whilst the protection of airspace is applied to all stages of flight, it is most critical for arrivals and departures at any airport. During these stages, the aircraft is close to the ground, the pilot's workload is greatest and the aircraft is least manoeuvrable. Since the majority of aircraft accidents occur during these stages, the objective is to provide a safe, predictable environment in which aircraft can land and take-off.

International and national standards have been adopted that define two sets of invisible surfaces to delineate the various airspace obstacle protection areas: the Obstacle Limitation Surfaces (airspace designed to provide protection for visual flying operations, where the pilot is flying by sight), and Procedures for Air Navigation Services - Aircraft Operations surfaces (airspace designed to protect aircraft operating in instrument flying conditions whereby the pilot is relying entirely on the information derived from cockpit navigation instruments). Prescribed airspace is the airspace above any part of either of these surfaces.

JAH, as the aerodrome operator, is required to establish the Obstacle Limitation Surfaces in accordance with Manual of Standards Part 139. As an Obstacle Limitation Surface is prepared for each Master Plan, the airspace requirements for the lengthening of runway 12/30 has been protected since 2009. Figure 19 depicts the Obstacle Limitation Surfaces for the ultimate development of the Jandakot Airport.

The Procedures for Air Navigation Services - Aircraft Operations surfaces (PANS-OPS) are established by instrument procedure designers approved by the Civil Aviation Safety Authority under the *Civil Aviation Safety Regulations* Part 173. The reviews of the PANS-OPS undertaken for Master Plan 2009 and current Master Plan 2014 included the extension of runway 12/30 to the proposed length of 1,508m and have therefore protected the airspace required for this runway extension. Figure 20 depicts the lowest PANS-OPS surfaces for the ultimate

development of the Jandakot Airport and is provided as a guide only to obstacle management within the vicinity of the airport.

CONTROLLED ACTIVITIES

Any activities that could result in an intrusion of prescribed airspace are referred to as 'controlled activities' that can only be carried out with approval. Controlled activities include:

- permanent structures, such as buildings;
- temporary structures, such as cranes; and
- any activities causing intrusions into the protected airspace through glare from artificial light or reflected sunlight, air turbulence from stacks or vents, smoke, dust, steam or other gasses or particulate matter.

Under the *Airports (Protection of Airspace) Regulations 1996*, details of proposed controlled activities must be provided to JAH as the airport-operator company. JAH will complete an initial assessment to determine whether the activity will cause an intrusion into the prescribed airspace for Jandakot Airport and the extent of any intrusion. If there is an intrusion, JAH is required to seek further assessment from Airservices and the Civil Aviation Safety Authority. These comments will then be provided to the Department of Infrastructure and Regional Development to approve or refuse the controlled activity. Controlled activities that are less than 3 months duration may be approved by JAH following assessment by Airservices and the Civil Aviation Safety Authority.

All cranes and construction equipment used for the extension of runway 12/30 and the taxiway system will be subject to the controlled activity assessment prescribed under the *Airports (Protection of Airspace) Regulations 1996*.

7.2 EXTERNAL LIGHTING RESTRICTIONS

The Civil Aviation Safety Authority has the authority, under the *Civil Aviation Regulations 1988*, to control ground lights where they have the potential to cause confusion or distraction (from glare) to pilots in the air. The Civil Aviation Safety Authority has established guidelines, through the Manual of Standards Part 139, on the location and permitted intensities of ground lights within a 6km radius of airports.

FIGURE 19 – OLS

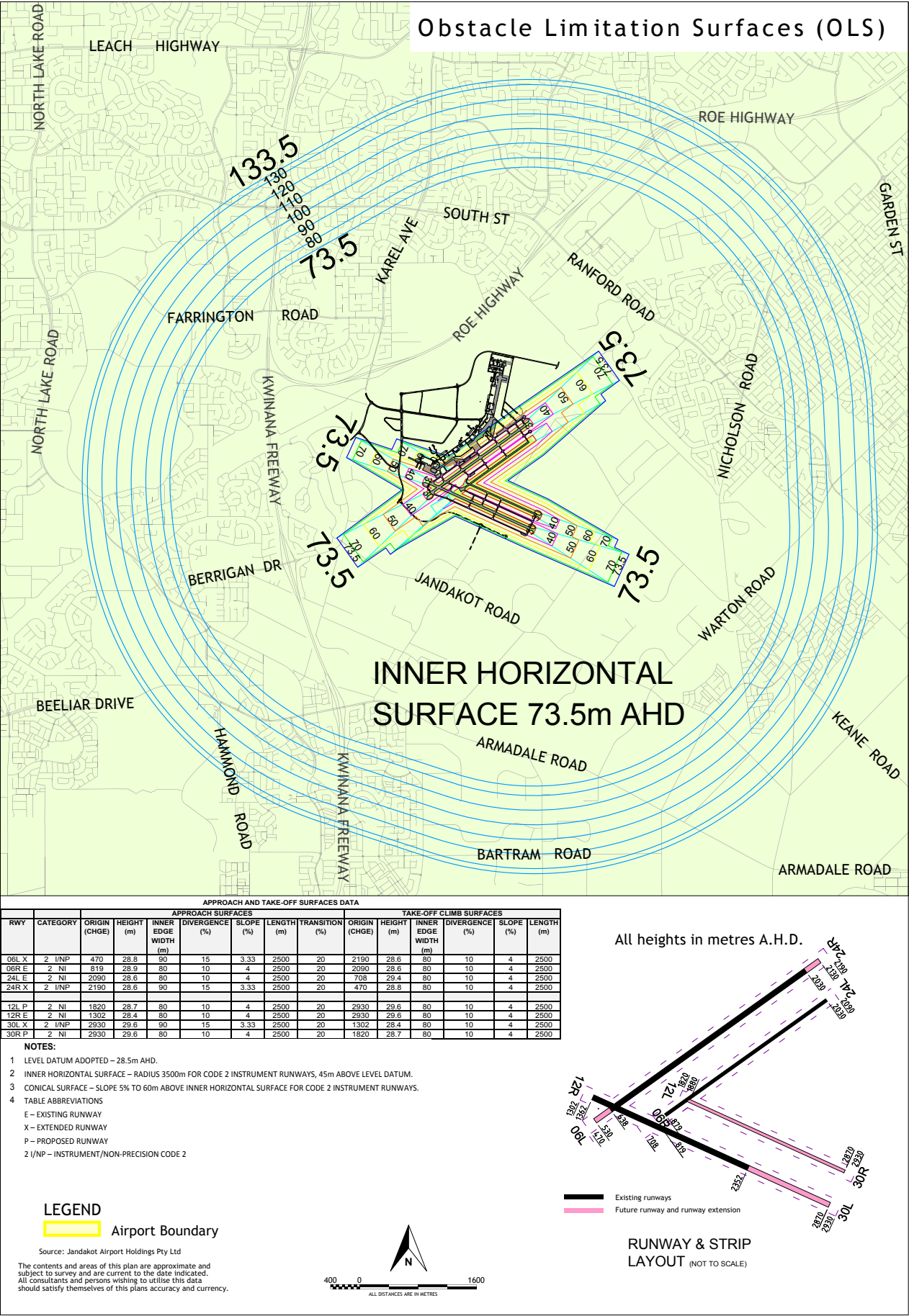


FIGURE 20 - PANS-OPS



Temporary lighting used during construction night works will comply with CASA guidelines to ensure that it does not shine above horizontal or have the potential to cause glare or distraction to pilots.

The clearing and construction works required for the extension of runway 12/30 and building of associated taxiways will be formally assessed by Airservices Australia, but these are not expected to result in an activity or structure that would impact the Non-Directional Beacon or microwave link.

7.3 WINDSHEAR AND TURBULENCE

The location of a significant obstacle, such as a building, in the path of a cross-wind to an operational runway can pose a safety risk to aircraft operations by creating windshear and turbulence. The National Airports Safeguarding Framework 'Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airports' notes that windshear poses the greatest risk on approach, landing and take-off when the aircraft's speed is low and pilot's ability to respond is limited.

There is no construction activity associated with the extension of runway 12/30 and taxiway system that will cause wind shear. There are no existing buildings in the vicinity of the runway extension. JAH will apply the Guideline B criteria to assess whether a proposed development of buildings or structures in the vicinity of the extended runway 12/30 has the potential to create windshear and affect aircraft movements.

7.4 COMMUNICATION, NAVIGATION AND SURVEILLANCE INFRASTRUCTURE

Airservices Australia provides and maintains a Non-Directional Beacon at Jandakot Airport to facilitate location navigation for aircraft arrivals and departures. In addition, a microwave communication link exists between the Jandakot and Perth Air Traffic Control towers. These navigation and communication links rely on the transmission of radio waves that must be protected from structures or obstacles that could cause signal refraction or interference.

The NASF Principles state that Guidelines for the Protection of Communication, Navigation and Surveillance Infrastructure will be considered at a later stage. While these additional guidelines have not yet been released for public comment, consideration is made to protecting this critical infrastructure. Information about relevant developments is provided to Airservices to allow an assessment to be made to ensure that the performance of current and future navigation and communication aids is maintained.

8. ENVIRONMENTAL ASSESSMENT

8.1 LAND USE PLANNING AND CONSERVATION

In accordance with the requirements of the *Airports Act 1996*, Master Plan 2014 identifies areas of high natural conservation values on the Jandakot Airport estate as Conservation Precincts 1A, 1B, 2A and 2B. These Conservation Precincts were initially identified due to their high natural conservation values in Master Plan 2009 and Environment Strategy 2009 following site specific survey work, consultation and liaison with various community groups and Government and indigenous agencies, and consideration of the various State and Commonwealth policies and recommendations.

EPBC 2009/4796

Following approval of Master Plan 2009, *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) 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, allowing for clearing of 167 ha of native vegetation and subsequent development within Precincts 1B, 3, 4 and 5, remains applicable and consistent with Master Plan 2014 and the proposed airfield development detailed within this MDP. All native vegetation clearing required for the proposed extension of runway 12/30 and the taxiway system has been approved under EPBC 2009/4796.

The extension of runway 12/30 and the taxiway system will occur within the Aviation Operations Precinct (Precinct 3), outside of the Conservation Precinct boundaries. The use of this land for aviation purposes was initially embodied within the Master Plan 2005 Land Use Plan. Subsequently this land use has continued in Master Plan 2009 and more recently in approved Master Plan 2014.

The proposed runway 12/30 extension and associated taxiways comprise areas already cleared and 41 hectares of native vegetation identified as Stage 3 clearing in the Offset Plan approved by the Minister for the Environment as a condition of the EPBC 2009/4796 approval, shown in Figure 21.

All EPBC 2009/4796 conditions of approval relating to this MDP will be met by JAH by ensuring:

- Vegetation clearing occurs within approved areas and total vegetation clearing under EPBC 2009/4796 does not exceed 167 ha;
- Approved management plans and strategies required by various conditions of approval are implemented;
- Annual compliance reporting is undertaken.

8.2 ENVIRONMENTAL ASSESSMENT AND MANAGEMENT

The following environmental management approach will be adopted as part of the development of this project:

- Identify potential environmental impacts (construction and operational);
- Design alternate work practices or control measures to eliminate or mitigate impacts; and
- Develop a strategy for monitoring and reporting of commitments to ensure compliance.

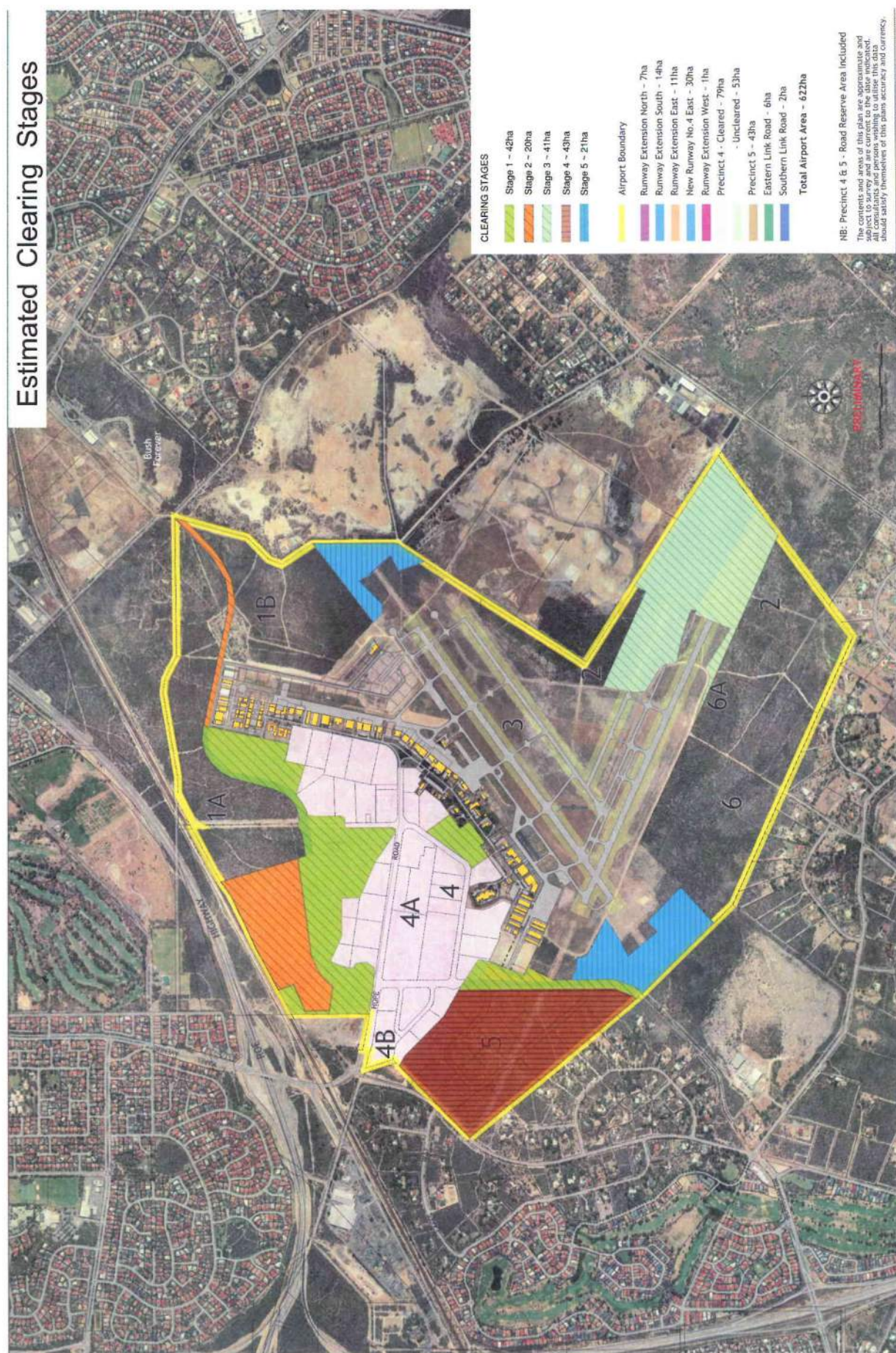
While the major potential environmental impacts and means for dealing with these impacts are identified in this document, details of proposed management actions are provided in the Jandakot Airport Construction Environmental Management Plan.

EXISTING ENVIRONMENTAL MANAGEMENT SYSTEM SUMMARY

This MDP adheres to the JAH Environment Policy, which forms the basis of the JAH Environmental Management System. The policy recognises JAH's responsibility to maintain and protect the quality of the environment in and around its operations. In achieving this, JAH commits to establishing and maintaining a system that strives to:

- Develop and manage Jandakot Airport in an environmentally sound manner;
- Comply with environmental legislation and regulations;
- Work with relevant authorities and the community to identify specific objectives and targets to minimise adverse environmental impacts;

FIGURE 21 - CLEARING STAGES (JANDAKOT AIRPORT OFFSET PLAN)



- Pursue opportunities to promote efficient use of resources and increase recycling;
- Continually measure, monitor, report and improve upon the environmental performance defined by our objectives and targets; and
- Promote the JAH commitment to the environment, employees, tenants, customers and neighbours.

JAH's environmental policies and procedures are updated regularly to reflect changes in legislation, development and information. These are specific management instructions or work instructions for particular issues and include:

- Environmental Management Plans - Policy and Guidelines;
- Landscape Design Guidelines;
- Management of Sewage and Greywater Policy;
- Abrasive Blasting, Stripping and Painting Policy;
- Dangerous Goods and Hazardous Materials Policy
- Aircraft and Equipment Washdown Policy; and
- Storage of Empty Drums and Containers Policy.

AIRPORT MANAGEMENT PLANS

A number of environmental issues at the airport are managed through specific management plans, programs and strategies. Many of these plans, such as the Conservation Management Plan, are linked to EPBC approval conditions and are approved by the Environment Minister. Plans include:

- Conservation Management Plan; which includes:
 - Weed Management Plan;
 - Dieback Management Plan;
 - Bushland Rehabilitation and Revegetation Guidelines;
 - Jandakot Rare Orchid Research Program;
 - Feral Animal Management Plan;
 - Bush Fire Management Plan;
 - Wildlife Fencing and Underpass Strategy; and
 - Heritage Management Plan.
- Local Water Management Strategy;
- Water Efficiency Management Plan;

- Ground Water Management Plan;
- Jandakot Airport Offset Plan; and
- Construction Environment Management Plan for clearing and civil works associated with EPBC 2009/4796 and EPBC 2013/7032.

CONSTRUCTION ENVIRONMENTAL MANAGEMENT

The Construction Environmental Management Plan describes the management strategies that are to be applied to minimise any environmental impacts associated with proposed site works.

The works required to extend runway 12/30 and associated taxiways fall within the scope of EPBC 2009/4796. Condition 8 of the approval required a Construction Environmental Management Plan to be developed. This Plan was initially approved by the Minister for Environment on 10 June 2010. Amendments were made to incorporate the requirements of EPBC 2013/7032 into the management plan, as well as address all potential impacts of works associated with this MDP and submitted in March 2015 to the Minister for Environment for approval prior to the commencement of works.

The Department of Infrastructure and Regional Development, via an appointed Airport Building Controller, regulates many aspects of the construction phase through the *Airports (Building Control) Regulations 1996*. The advice of the Department's Airport Environment Officer is taken into account during this process. Conditions, in addition that those issued under EPBC 2009/4796, may be included in the Building Permit issued by the Airport Building Controller.

8.3 MANAGEMENT OF POTENTIAL ENVIRONMENTAL IMPACTS

The potential environmental impacts associated with clearing and construction activities, as well as the various management and mitigation measures, are detailed within the Construction Environmental Management Plan and other related management plans. Key areas are summarised in Sections 8.4 to 8.13.

8.4 NOISE MANAGEMENT

Heavy earthmoving equipment associated with construction activities have the potential to generate noise within the immediate vicinity of the proposed works. Given the distance from rural residential neighbouring properties and the fact that major regional roads bound the airport, noise is not expected to be an issue for any surrounding landowners. However, compliance with the *Airports (Environmental Protection) Regulations 1997* and the implementation of the Construction Environment Management Plan will be imposed on contractors through administration of appropriate contract documentation. After-hours noise and vibration issues during construction will be addressed in the Construction Environment Management Plan. Mitigation measures will include:

- The majority of construction activities will occur within typical construction working hours (to minimise disruption to aircraft operations some works may be required to occur during night hours);
- Equipment and machinery will be maintained to ensure that noise levels are minimised.

8.5 DUST AND AIR QUALITY

GEOLOGY AND SOILS

The Swan Coastal Plain consists of a series of distinct dune systems aligned approximately north to south and extending from the coast to the Darling Scarp. The Quindalup and Spearwood dune systems lie closest to the coast, with the Bassendean dune system further to the east. Jandakot Airport lies approximately 3 km east of the Spearwood system boundary, within the Bassendean dune system. Bassendean sands are Aeolian, or windborne, soils derived from particles washed up by the ocean and blown by wind to form dunes. These sands are characterised as pale grey, white, medium grained, moderately sorted quartz sand with black heavy minerals scattered throughout (McArthur and Bettenay 1960).

The topography of the airport and surrounding areas is generally flat, with local variations in height of 20m or less. Most of the site has an elevation of 28-30m AHD (Australia Height Datum). High points of 40-45m AHD occur in the south-eastern corner and within Precinct 1A.

DUST AND AIR QUALITY

The two primary causes of potential air quality issues will be emissions from construction machinery and airborne dust (including wind-blown sand). Airborne dust results from clearing activities, the excavation and stockpiling of soil as well as vehicle movement around the site.

Potential impacts of dust and emissions generated through construction include:

- Reduced visual amenity;
- Decline in vegetation health;
- Risk to human health;
- Nuisance to terrestrial fauna; and
- Risk to aircraft safety.

In order to construct the extension of runway 12/30 and taxiway system, it will be necessary to level the site. A significant amount of sand will need to be removed from the airport to create a level platform for the construction of the works. JAH will work with the Commonwealth Government to agree how the removal of this sand will be managed, noting environmental aspects will be addressed via the Construction Environment Management Plan.

The Construction Environment Management Plan requires JAH to minimise (and where possible prevent) dust and particulate matter impacts beyond the construction site boundary. All reasonable and practicable measures will be implemented during the construction and operation phase. Management measures to be implemented prior to construction and for the duration of operation will be compliant with the *Airports (Environment Protection) Regulations 1997* and, where applicable, consistent with the Western Australian Department of Environment Regulation guideline titled 'A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities'.

Specific actions within the Construction Environment Management Plan to minimise dust impacts include:

- Suppression using non potable water;
- Stabilisation (e.g. soil binders, dust retardants, hydromulch);
- Ensuring soils are covered during transport;
- Use dust barriers to limit transport of dust off work areas;

- Restrict high risk activities in unsuitable wind/weather conditions;
- Restriction of construction traffic to designated areas and tracks; and
- Ensure areas cleared, levelled and ready for lot level construction are stabilised (e.g. seeding with a soil stabilising species, soil binders, dust retardants etc.).

8.6 EROSION AND SEDIMENT CONTROL

Jandakot Airport surface geology consists of highly permeable Bassendean Sand with a low level of erosion or sedimentation risk. The site exhibits low relief topography and no surface water bodies exist on site besides damplands. To date, erosion and sedimentation either during or following clearing activities have not been evident.

The extension of runway 12/30 and the taxiway system has little potential to create erosion and sedimentation during the initial construction phase or the subsequent operational phase. Regardless of risk, management strategies for the control of erosion and sedimentation during the construction stages of the proposed development are in the Construction Environment Management Plan, as required under EPBC 2009/4796 conditions of approval.

Water and sediment control measures will include:

- The use of sediment control fences, catch drains and sand bags where high sedimentation and erosion risks are identified; and
- The consideration of sensitive receptors (e.g. residential neighbours) and prevailing weather conditions when establishing stockpiles.

8.7 ACID SULFATE SOILS

Acid sulfate soil risk maps (Essential Environmental 2015) show the location of the runway 12/30 extension and new taxiways is in an area of moderate to low risk of acid sulfate soils occurring within 3m of the natural soil surface but high to moderate risk of acid sulfate soils beyond 3 m of the natural soil surface (i.e. Class 2). A small area of land in the south of the airport in the vicinity of the Precinct 6 and runway 06L extension area border is categorised as 'high to moderate risk of acid sulfate soils occurring within 3m of the natural soil surface' (i.e. Class 1).

The extension of runway 12/30 and the taxiway system will not require deep excavation and acid sulfate soils are not expected to be encountered. Where acid sulfate soils are identified, ASS and Dewatering Management Plans will be developed consistent with the requirements within the Construction Environment Management Plan and Jandakot Airport Groundwater Management Plan.

8.8 WATER QUALITY

Water quality management is intrinsically linked to hazardous material and waste management issues. Key activities that have the potential to impact on water quality include:

- Clearing of vegetation;
- Earthworks;
- Storage and handling of chemicals and hydrocarbons; and
- Dewatering.

If not managed correctly, these activities can impact groundwater quality, potentially resulting in contamination.

WETLANDS AND SURFACE WATER

Within Jandakot Airport there are no natural drainage channels or defined areas of surface water.

The two wetlands that occur on the airport are both Resource Enhancement category wetlands (Damplands) as defined by the Geomorphic Wetlands of the Swan Coastal Plain dataset (DEC 2008). These are located in Precincts 1A and 2A of Master Plan 2014, both of which are designated conservation areas.

There are no wetlands in proximity to the extension of runway 12/30 and taxiway system, and these works do not impact on the mapped wetlands.

STORMWATER AND DRAINAGE

Development increases the area of impermeable surfaces such as roads, car parks, runways and apron areas, which concentrate run-off following a very intense rainfall event. A Local Water Management Strategy (Essential Environmental 2015) has been developed to ensure 'best practice' drainage principles are adopted and maintained across the airport.

Drainage swales and basins have been created in strategic areas of the airport to collect run-off from roads and

other sealed surfaces. Due to the high permeability of the Bassendean soils, run-off is localised and short term as it generally infiltrates very quickly. Water retention and ponding within drainage swales and basins is avoided where possible in order to deter water birds that may pose a bird strike risk to aircraft operations.

In general, stormwater throughout the airport is managed via a combination of soakwells, open drains and swales complimented in areas by an underground pipe drainage network. The design of drainage systems aims to maximise local infiltration i.e. recharge to the ground water system.

Manual of Standards Part 139 defines standards for runway longitudinal slopes and provision of effective drainage in the graded runway strips to avoid water ponding. The extension of runway 12/30 and the taxiway system will provide for the same level of slope and drainage as the existing runway and taxiway system.

GROUNDWATER

Jandakot Airport is partially located on the northern margin of the Jandakot Groundwater Mound, with the crest of the mound located just south of the airport (Davidson 1995).

The shallow sand aquifer covers an approximate area of 760 km², from the Swan River in the north to the Serpentine River in the south. The Jandakot Mound has primarily developed because the rate of infiltration exceeds the rate of horizontal groundwater flow through the aquifer. During the summer periods, when there is little or no recharge, the rate of horizontal groundwater flow exceeds vertical infiltrations resulting in a subsidence of the mound as the water table lowers. Throughout most of the airport site, the unsaturated zone consists of fine grey sands; with occasional coarse white and yellow sands in the central and north eastern parts of the site (Sinclair Knight Mertz 1999).

Groundwater levels at Jandakot Airport are generally shallow (22 to 26m AHD) with little variability in the groundwater levels throughout the year. Groundwater levels generally rise between June and September in response to infiltration from rainfall followed by a recession from September to June, with the seasonal difference typically being less than 2m. A review of historical Department of Water data shows that groundwater levels in the Jandakot area have receded over the last 35 to 40 years. This is supported by Department of Water findings of ground water levels across the Perth region as a whole (DoW 2009).

Groundwater flow direction is south-east to north-west, away from the Jandakot Underground Water Pollution Control Area (JDA 2006).

UNDERGROUND WATER POLLUTION CONTROL AREA

The Jandakot Mound is gazetted as both a Public Drinking Water Supply Area and an Underground Water Pollution Control Area (UWPCA). The Department of Water manages Western Australia's water resources including the Jandakot Mound and restricts land uses that may pose a threat to the quantity or quality of water available from the mound for public water supply.

Within the Jandakot UWPCA, a three-level priority system is used. The priority classifications are determined by land tenure, land use and water flow patterns.

Each priority classification is subject to the following management objectives:

- Priority 1 (P1) classification areas are managed to ensure that there is no degradation of the drinking water source by preventing the development of potentially harmful activities in these areas. The guiding principle is risk avoidance. This is the most stringent priority classification for drinking water sources. P1 areas normally encompass land owned or managed by State agencies, but may include private land that is strategically significant to the protection of the drinking water source (e.g. land immediately adjacent to a reservoir).
- Priority 2 (P2) classification areas are managed to ensure that there is no increased risk of water source contamination/pollution. For P2 areas, the guiding principle is risk minimisation. These areas include established low-risk land development (e.g. low intensity rural activity).
- Priority 3 (P3) classification areas are defined to manage the risk of pollution to the water source from catchment activities. Protection of P3 areas is mainly achieved through guided or regulated environmental (risk) management for land use activities. P3 areas are declared over land where water supply sources coexist with other land uses such as residential, commercial and light industrial development.

Portions of the airport land are within the P1 Source Protection Area of the Jandakot UWPCA as shown in Figure 22, including:

- Conservation Precincts 2A, 2B and a portion of 1B;
- Portions of Precinct 4 and 5, which are already under development;
- Precinct 3, including existing infrastructure and portions of the proposed fourth runway and runway extension; and
- Portions of Precincts 6 and 6A.

There are no wellhead protection zones within or near the project area of this MDP; the closest is at the Glen Iris golf course approximately 800m to the west of the airport boundary.

A groundwater pollution risk assessment and management strategy was presented to the Department of Water as part of the Environment Strategy 2009 and Master Plan 2009. The Jandakot Airport Local Water Management Strategy was reviewed and amended in consultation with the Department of Water in 2015 (Essential Environmental 2015). JAH is committed to continuing to work with the State Government to manage the potential environmental impacts within the UWPCA.

The EPBC 2009/4796 and EPBC 2013/7032 conditions of approval for the clearing of vegetation undertaken in accordance with Master Plan 2009 and subsequently Master Plan 2014 (which include the airfield works contained within this MDP) require the preparation and implementation of a Jandakot Airport Groundwater Management Plan. The Groundwater Management Plan was initially approved in August 2011 by the then Minister for the Sustainability, Environment, Water, Populations and Communities as required by EPBC 2009/4796 Condition 7 and has been subsequently implemented. The Groundwater Management Plan has recently been amended to include the requirements of EPBC 2013/7032 Condition 2 and was approved by the Department of the Environment in July 2015. The Construction Environment Management Plan has been developed to be consistent with the approved Groundwater Management Plan.

As part of the Groundwater Management Plan monitoring program, a network of groundwater monitoring bores has been established in key locations around the airport and sampled regularly for potential contaminants and water quality parameters. To date, monitoring of these 'sentinel' bores has not identified any contamination of the groundwater.

8.9 WASTE MANAGEMENT

Unlike building construction works that can potentially generate large volumes of wastes, clearing and civil works associated with the MDP typically generate relatively small volumes of waste materials. These wastes might include construction waste (e.g. packaging, fencing, wiring, conduit etc.), food waste and contaminated or hazardous materials.

Where waste is not dealt with appropriately, it might result in:

- Risk to aircraft safety and loss of amenity from loose, windblown waste;
- Contamination of surface soil or groundwater; and
- Unnecessary placement of inert or recyclable waste to landfill.

JAH recognises that waste management processes need to be implemented to reduce negative impacts. The Construction Environment Management Plan addresses management of waste streams, including:

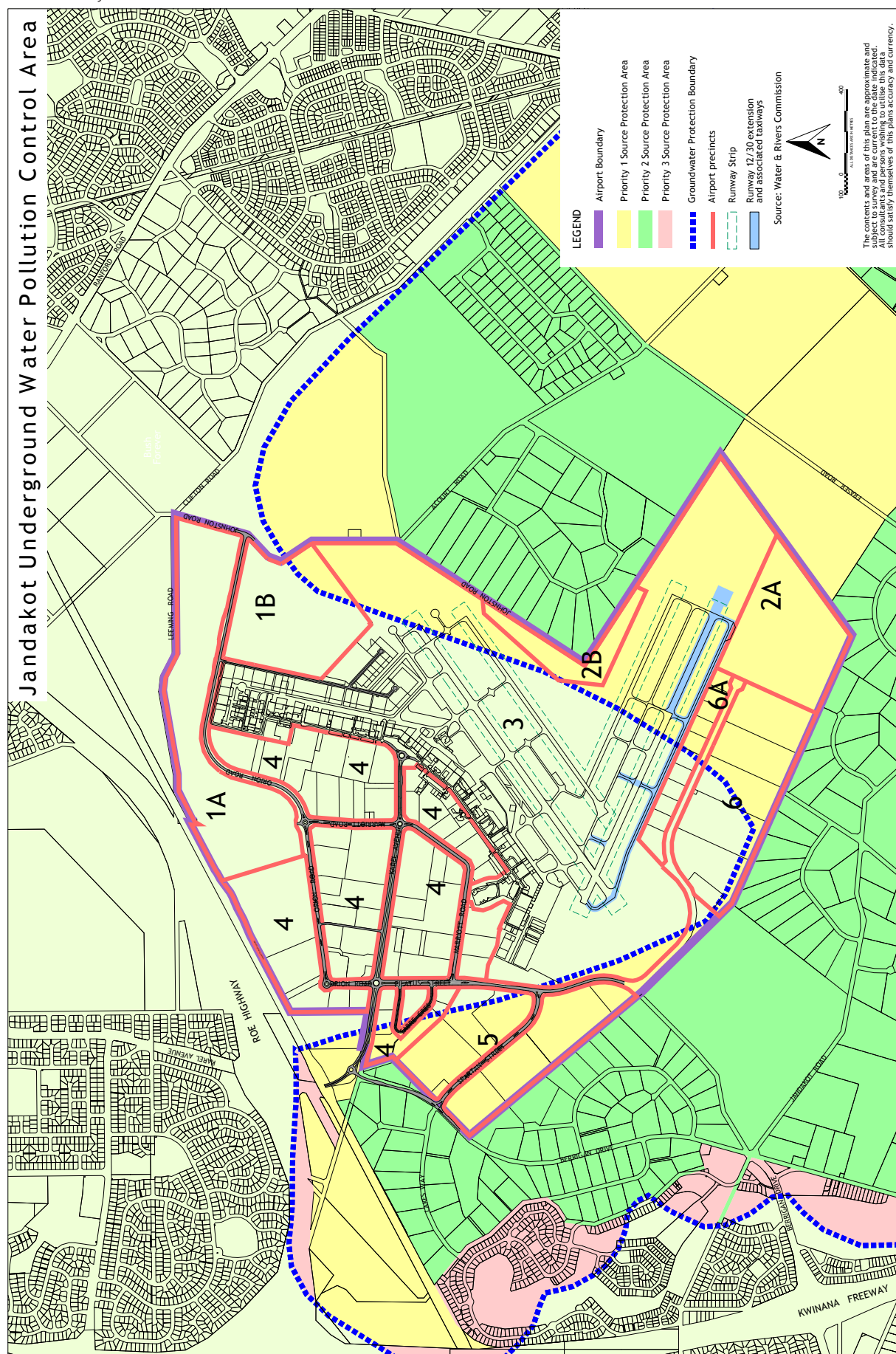
- All wastes from construction activities will be stored in approved designated areas and disposed appropriately;
- Wastes will be recycled wherever it is practical and possible to do so; and
- All volumes of controlled waste (i.e. tyres, asbestos, oils, batteries and other potentially hazardous wastes) are to be managed in accordance with relevant legislation, in particular *Environmental Protection (Controlled Waste) Regulations 2004*.

8.10 HAZARDOUS MATERIALS

Hazardous materials are considered to be those that have the potential to cause alteration to the environment leading to degradation of environmental value if released. Key activities during construction that involve hazardous materials or dangerous goods include:

- Storage and handling;
- Transportation, including delivery and receipt;
- Operations of plant and equipment; and
- Refuelling and lubrication of plant, vehicles and other equipment.

FIGURE 22 – JANDAKOT UNDERGROUND WATER POLLUTION CONTROL AREA



Impacts from dangerous goods if poorly handled are identified on the Material Safety Data Sheet of each product, and might include:

- Explosion and fire leading environmental harm; and
- Contamination of surface soil and infiltration to groundwater.

In addition to requirements detailed within the Construction Environment Management Plan, JAH has a Dangerous Goods and Hazardous Materials Policy which details the requirements for storage and handling of potentially polluting materials at Jandakot Airport.

The construction activities will likely require only small amounts of hazardous materials to be used on site, and will primarily be restricted to the on-site refuelling of non-mobile plant and equipment. Contractors that use hazardous materials are required to comply with all relevant legislation (e.g. *Dangerous Goods Act 2004*) and develop a spill control plan.

CONTAMINATION

Contamination at the airport is managed under the Commonwealth's *Airport (Environmental Protection) Regulations 1997*. All areas of confirmed or suspected contamination are reported and recorded on the JAH Contaminated Sites Register, which is a component of the Environmental Site Register. Sites are ranked according to the nature of contamination and risks posed. Where investigation identifies sites as requiring remediation or ongoing monitoring, appropriate plans are developed and implemented in line with the *Airports (Environmental Protection) Regulations 1997*, National Environment Protection (Assessment of Site Contamination) Measure 2013 (ASC NEPM) and the Department of Environment Regulation's Contaminated Sites Management Series Guidelines as appropriate.

There are no known contaminated sites within the areas for the extension of runway 12/30 and taxiway system identified within this MDP.

8.11 FLORA AND FAUNA

Management of flora and fauna issues associated with this MDP are intrinsically linked with the Jandakot Airport Conservation Management Plan and the Construction Environment Management Plan developed to meet Condition 6 of EPBC 2009/4796.

The key activities that have the potential to impact flora and fauna are:

- vegetation clearing;
- earthworks and levelling;
- vehicle and machinery activity;
- waste storage;
- human contact; and
- aircraft movements.

Potential impacts to flora and fauna include:

- loss/damage of permanent Conservation Precincts not intended for clearing;
- loss of listed flora and fauna species;
- loss of biodiversity;
- vegetation and habitat fragmentation;
- weed infestations and pathogen infection;
- dust smothering vegetation;
- fire outbreaks;
- increase in abundance or distribution of feral fauna; and
- destruction and reduction of fauna habitats.

FLORA

The vegetation communities of Jandakot Airport are typical of those associated with the Bassendean Vegetation System of the Swan Coastal Plain, which are essentially low woodland dominated by *Banksia attenuata*, *Banksia menziesii*, *Banksia ilicifolia*, *Eucalyptus tottiana* and *Nuytsia floribunda*, with a dense understorey of *sclerophyll* shrubs (Mattiske 2001).

Two endangered flora species protected under the *Environmental Protection and Biodiversity Conservation Act 1999* had previously been identified as occurring within the Airport site. These are:

- Grand Spider Orchid (*Caladenia huegelii*)
- Glossy-leaved Hammer Orchid (*Drakaea elastica*)

Recent orchid surveys of the airport have not located any *Drakaea elastica* orchids at Jandakot Airport (Mattiske 2010). There are no rare or endangered flora species in proximity to the extension of runway 12/30 and taxiway system.

In conjunction with the approval of the Master Plan 2009 and Environment Strategy 2009, the then Commonwealth Minister for Environment, Water, Heritage and the Arts approved the clearing of native vegetation under the EPBC Act: "To construct a fourth runway and associated taxiways, runway extensions, and clear land for the development of aviation and commercial precincts as described in the Jandakot Airport Master Plan 2009, as described in the referral received on 17 March 2009 (EPBC 2009/4796)." In this regard approval has been provided for the vegetation clearing required for the extension of runway 12/30 and taxiway system.

FAUNA

Species of significance that are known to exist, or potentially exist, at the airport have been addressed within the EPBC 2009/4796 approval. This includes Carnaby's cockatoo, the forest red-tailed cockatoo, quenda and the western brush wallaby. Management of these species at the airport is detailed within the Jandakot Airport Conservation Management Plan, which was developed and approved as a condition of EPBC 2009/4796.

Specific management measures to address the impacts of clearing for the runway development on fauna are consistent with the Conservation Management Plan and addressed within the Construction Environment Management Plan.

BIRD AND ANIMAL HAZARD MANAGEMENT

Birds and animals can pose a serious safety risk to aircraft operations. JAH is required to monitor and control the presence of birds and animals on, or in the vicinity, of the airport in accordance with *Civil Aviation Safety Regulations* requirements. JAH has a Wildlife Hazard Management Plan that defines the methods applied to control birds and animal hazards on airport, as well as a Feral Animal Management Plan to address overabundant native species.

The most significant animal hazards at Jandakot Airport are wallabies and kangaroos, and plover, cockatoo and corella bird types. Existence of these wildlife hazards is published in the En-Route Supplement Australia (AIP-ERSA) pilot guide.

Bird and animal hazard assessment forms a part of each daily airport serviceability inspection by the Aerodrome Reporting Officer. Assessments are also made on the basis of pilot and Air Traffic Control reports. A database is maintained to monitor statistics on bird and animal hazards.

Under the *Air Navigation Act 1920*, aircraft bird and animal strikes are classified as an air safety incident and must be reported to the Australian Transport Safety Bureau.

Monitoring of animal and bird hazards is continually carried out to identify habitats and numbers, with seasonal expert advice sought when necessary. When required, Notices to Airmen (NOTAM) will be issued identifying increased bird or animal hazards. Local councils have been made aware of the potential hazard that birds create on or near an airport. If the need arises, approaches are made to local councils to discuss external planning or developments that may increase bird hazard problems (e.g. location of rubbish tips).

Jandakot Airport utilises a number of management methods to control birds and other animals that pose a risk to aircraft safety. These include:

- Exclusion is typically achieved by fencing. Whilst not generally applicable for bird hazards, fencing is an effective means of controlling wallabies and kangaroos. A combination of permanent and temporary exclusion fencing has been erected to prevent macropods accessing aircraft movement areas. The extension of runway 12/30 and taxiway system will allow for bushland bordering airside areas to be consolidated and additional permanent wildlife exclusion fencing to be erected.
- Deterrence is often the easiest and most effective way of reducing the incidence and severity of bird and other animal strikes. It generally involves removing or managing features of the airport and its surrounds that are attractive to problem bird species.
- Harassment and dispersal of macropods (wallabies and kangaroos) and birds from runways and airstrips is usually the most immediately effective method. Vehicle harassment and the use of bird-frite are utilised for both bird and macropod management.
- In some situations, lethal management methods may be utilised where there is a significant threat to safety and non-lethal methods do not adequately mitigate the risks. When lethal management methods are necessary, JAH obtains approval from the WA Department of Parks and Wildlife and ensures actions are consistent with other Commonwealth regulatory requirement.

The National Airports Safeguarding Framework 'Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of

Airports' acknowledges that new land uses in the vicinity of an airport can significantly influence the risk of wildlife hazards to aircraft operations. Management of activities that may be wildlife attractant are addressed through Operational Environmental Management Plans that are required to be prepared for all new and existing developments within the airport site. When required, approaches are made to local councils to discuss external planning or developments that may increase bird and animal hazards at the airport, such as the location of rubbish tips.

The extension of runway 12/30 and taxiway system will not cause any activities that will be a wildlife attractant. Construction activities will be managed through a Construction Environmental Management Plan.

8.12 DIEBACK

A triennial dieback (*Phytophthora cinnamomi*) survey, including updated mapping, was undertaken in 2014 that confirmed dieback was absent from all areas associated with the extension of runway 12/30 and taxiway system.

The key activities that have the potential to impact dieback management are:

- Vegetation clearing;
- Earthworks and levelling; and
- Vehicle and machinery activity.

Potential dieback impacts include:

- Introduction of dieback to new sites (either on the airport or off-site);
- Loss/damage/change to vegetation and fauna habitats; and
- Loss of biodiversity.

Areas of dieback are managed (and dieback free areas protected) via the implementation of the Jandakot Airport Dieback Management Plan, which is a component of the Jandakot Airport Conservation Management Plan developed to meet condition 6 of EPBC 2009/4796. In addition, dieback management requirements during clearing and civil works are also detailed within the Construction Environment Management Plan developed to comply with Condition 8 of EPBC 2009/4796 and Condition 3 of EPBC 2013/7032.

8.13 HERITAGE

EUROPEAN HERITAGE

Land acquisition for Jandakot Airport began in 1959. No European heritage sites have been registered within the City of Cockburn Local Government Inventory and Heritage List, the State Heritage Register or the Commonwealth Heritage List. There are also no visible signs of European heritage on site.

INDIGENOUS HERITAGE

Surveys to locate potential sites of indigenous significance were undertaken in 1990 and again in 2008 involving archaeologists and indigenous custodians. The 2008 surveys encompassed all areas of development detailed within Master Plan 2014.

Archival research revealed two sites (artefact scatters) which were believed to be within the airport boundary; Site 4309 Princep Road and Site 3513 Lukin Swamp. The 2008 investigation concluded:

- no new ethnographic or archaeological sites were identified
- Site 3513 Lukin Swamp could not be located within Jandakot Airport and previously identified Site 4309 Princep Road is no longer a site within the meaning of Section 5 of the *Aboriginal Heritage Act 1972*
- a Section 18 application is not required for the Jandakot Airport Master Plan to proceed.

Activities that might impact on cultural heritage within Jandakot Airport include:

- Vegetation clearing
- Construction earthworks, including site levelling and trenching.

Impacts of the above activities might include disturbance, damage or loss of previously unknown items or sites of Aboriginal heritage significance in construction areas.

The potential for ground disturbing activities to encounter previously unknown archaeological deposits (which may contain cultural materials) is noted and addressed within the Jandakot Airport Heritage Management Plan and the Construction Environment Management Plan under which works detailed within this MDP will occur.

8.14 MONITORING AND REPORTING

Environmental monitoring and reporting requirements are identified within the Construction Environmental Management Plan. In addition, JAH meets weekly with the Department of Infrastructure and Regional Development's Airport Environment Officer to discuss the environmental management of developments and existing operations. These meetings also address incidents and complaints and the corrective actions undertaken in response. JAH summarises progress towards achieving the objectives as detailed within the Airport Environment Strategy within annual environment reports to the Department of Infrastructure and Regional Development.

8.15 ENFORCEMENT

The commitments made as part of this MDP and the works and operation of the extension of runway 12/30 and taxiway system are enforceable under the relevant legislation including:

- *Airports Act 1996*;
- *Airports (Environment Protection) Regulations 1997*; and
- *Environmental Protection and Biodiversity Conservation Act 1999*.

In addition, Department of Infrastructure and Regional Development's Airport Environment Officer, who is independent to JAH, is employed to monitor, report and take preventative action against any environmental impacts or pollutants.

8.16 CONCLUSION

An environmental review of the extension of runway 12/30 and taxiway system has been undertaken and JAH concludes that with the proposed environmental controls in place, there will be no significant environmental impacts. Additionally, there will be no detrimental impacts on any Conservation Precincts designated under Master Plan 2014.

9. ACCESS AND TRAFFIC

9.1 TRAFFIC ASSESSMENT

The *Airports Act 1996* requires that an MDP identify the effect of the proposed development on traffic flows at the airport and surrounding the airport.

Access to Jandakot Airport is provided from Berrigan Drive (from the south) and Karel Avenue (from the north). Berrigan Drive is two-lanes undivided from Karel Avenue to Jandakot Road and then two-lanes divided west of Jandakot Road. Karel Avenue is currently a two-lane divided road from Roe Highway to Berrigan Drive, and then four-lane carriageway with bicycle lanes in both directions within the airport boundary. Spartan Street provides a left-in and left-out connection to Berrigan Drive. The road hierarchy is shown in Figure 23.

There are no permanent vehicle traffic impacts as a consequence of the proposed airfield works as the development does not include the construction of roads or create a demand for additional traffic on the current road infrastructure.

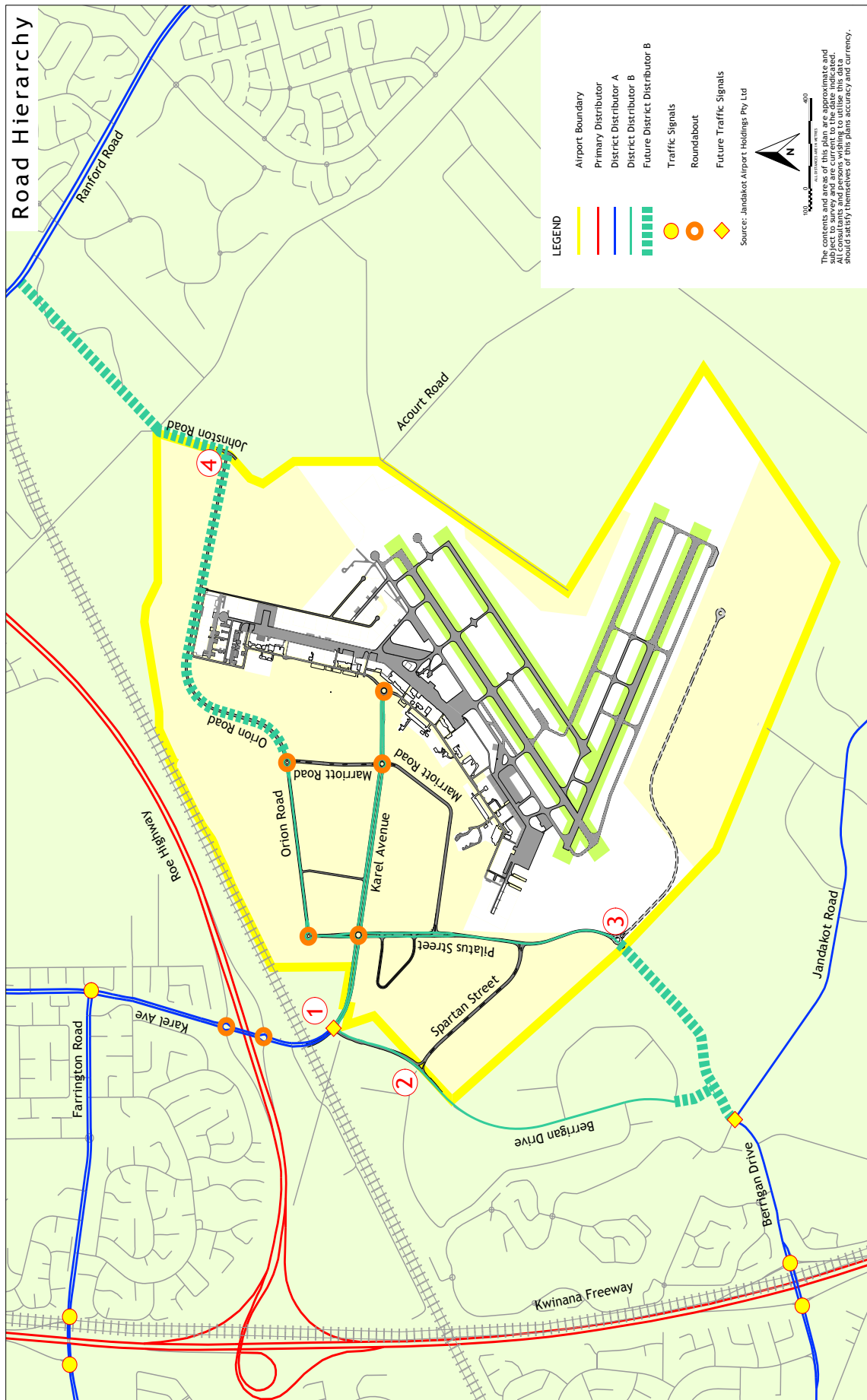
The extension of runway 12/30 and associated taxiways will generate minimal traffic for the duration of the works. Where necessary, the construction traffic will have specific access routes to minimise conflict with other road users and to ensure aircraft operations are not impacted.

As shown in the Road Hierarchy plan from Master Plan 2014 (Figure 23 below), an internal road is proposed to be constructed within the airport boundary to provide access to Precincts 6 and 6A. Construction of this internal road will take place prior to the runway 12/30 extension and taxiway works and will provide access for the construction traffic.

Truck movements during the clearing stage will entail eight movements per day over four weeks. The earthworks involve the removal of approximately 1,500,000m³ of sand. Based on an average of 23m³ of sand per truck load over 280 working days per year, this will require 90 truckloads (180 vehicle movements) per day for two years. The trucks removing sand from the airport site are expected to use Berrigan Drive. As Berrigan Drive is currently carrying 14,500 vehicles per day, the earthworks will increase traffic on this road by 1.2% for the duration of the works. The construction phase is expected to contribute an additional 10 truck movements per day.

Designated areas will be assigned for construction vehicles and construction worker private vehicle parking for the period of works.

FIGURE 23 - ROAD HIERARCHY PLAN



10. CONSULTATION

10.1 STAKEHOLDER CONSULTATION

JAH recognises that the successful development of Jandakot Airport depends on ongoing and productive interaction with the wide range of stakeholders who are impacted by, and who impact, the development and operation of the airport.

This ongoing consultation includes JAH participation in the following forums:

- Jandakot Airport Community Aviation Consultation Group (quarterly);
- Perth Airports Municipalities Group (quarterly);
- Jandakot Regional Park Community Advisory Committee (quarterly); and
- Jandakot Airport Chief Flying Instructor and Chief Pilot meeting (quarterly).

All of the Jandakot Airport master plans have involved consultation with a wide range of stakeholders, including State and Local Government, airport tenants, aircraft operators, and community groups.

In developing an MDP, airports are required to undertake further consultation. The development of the preliminary draft MDP for the extension of runway 12/30 and taxiway system involved further consultation with:

- Department of Infrastructure and Regional Development (Commonwealth)
- Department of the Environment (Commonwealth)
- Airservices Australia – Jandakot Air Traffic Control
- Civil Aviation Safety Authority
- Local flying schools and aircraft operators
- City of Cockburn (Local)

The Jandakot Airport Community Aviation Consultation Group, which comprises representatives from Federal, State and Local Governments, Airservices Australia, aircraft operators, and local community groups, were kept informed about the program and contents of the preliminary draft MDP.

Stakeholder workshops were held with aviation operators to review the proposed airfield layout and operations.

10.2 FORMAL PUBLIC COMMENT PERIOD

In accordance with Section 92(2A)(a) of the Act, the preliminary draft MDP was made available for public comment for a period of 60 business days.

- A public notice advertisement was placed in The Weekend West newspaper on Saturday 19 December 2015, advising that the preliminary draft MDP was available for public comment until 5pm Thursday 24 March 2016. The Weekend West has an average print readership of 621,000 and 174,638 average daily online visitors.
- Printed copies of the preliminary draft MDP were available for viewing and purchase from the Jandakot Airport Management Centre during the public comment period.
- The preliminary draft MDP was published on the Jandakot Airport website for viewing and download, free of charge. During the public comment period there were a total of 455 unique views of the two website pages (Development > Major Development Plans and a home page quick link) publishing the preliminary draft MDP.

As required by the Act, written notice of JAH's intention to give the Minister for Infrastructure and Transport a draft MDP for his consideration was sent to:

- WA Minister for Planning; Culture and the Arts; Science and Innovation;
- WA Department of Planning;
- City of Canning;
- City of Cockburn; and
- City of Melville.

10.3 SUBMISSION OF DRAFT MDP TO THE MINISTER

Under the Act, any comments received during the public comment period must be considered by JAH. Following the public comment period, JAH reviewed and assessed all comments, and where appropriate, amended the preliminary draft MDP to form the draft MDP that was submitted to the Minister for Infrastructure and Transport on 31 March 2016.

As required by Section 92(2) of the Act, the submission of the draft MDP to the Minister for Infrastructure and Transport was accompanied by the following materials:

- copies of all comments received during the public comment period; and
- a written certificate signed on behalf of the airport:
 - listing the names of the people or organisations that provided written comments to the preliminary draft MDP;
 - a summary of the comments received; and
 - evidence that JAH has given due regard to those comments.

10.4 PUBLICATION OF THE FINAL MDP

This MDP was approved by the Minister for Infrastructure and Transport, the Hon. Darren Chester MP, on 15 June 2016.

In accordance with the Act, JAH has undertaken the following notifications:

- published a newspaper notice advising that the MDP for the extension of runway 12/30 and taxiway system has been approved;
- made copies of the approved MDP available for inspection in person at the Jandakot Airport Management Centre; and
- made a copy of the approved MDP available on the Jandakot Airport website.

11. IMPLEMENTATION

11.1 IMPLEMENTATION

The construction of the runway 12/30 extension and associated taxiways is expected to take approximately three years to implement. These activities can be summarised as 3 months for clearing, 24 months for earthworks, and 6 months for construction works. Commissioning of the extended runway is expected to take 3 months.

The stages required for these works comprise:

1. Detailed design documentation for the runway extension and new taxiways.
2. Clearing as per EPBC 2009/4796 approval.
3. Tender of construction works.
4. Appointment of contractors.
5. Issue Method of Works Plan.
6. Commence construction.
7. Commissioning of runway 12/30 extension.

11.2 FURTHER APPROVALS

BUILDING PERMIT

A Building Permit for the construction of the runway 12/30 extension and associated taxiways must be obtained from the Airport Building Controller (ABC) under the provisions of the *Airports (Building Control) Regulations 1996*. The ABC is also advised by the Airport Environmental Officer (AEO). Both the ABC and AEO are independent of Jandakot Airport and are respectively contracted to, and employed by, the Department of Infrastructure and Regional Development.

CONTROLLED ACTIVITY

All cranes and construction equipment used during the clearing of the site and the subsequent construction of the runway 12/30 extension and associated taxiways are subject to the controlled activity assessment prescribed under the *Airports (Protection of Airspace) Regulations 1996*. Details of restrictions, such as equipment operating heights and airfield security and access, will be detailed during the tender process so that these constraints can be taken into

consideration prior to engagement and commencement of works.

11.3 COMMISSIONING

Prior to opening the runway 12/30 extension for use by aircraft, Airservices Australia will conduct a recalibration of instrument approach and landing (IAL) and standard instrument departure (SID) procedures via flight tests.

The Civil Aviation Safety Authority requires that runway extensions undergo commissioning prior to opening the facilities for aircraft operations. Commissioning will be conducted for the runway 12/30 extension to check:

- the aerodrome lighting systems through ground and flight checks;
- runway surface quality for skid resistance and water runoff;
- airfield signage; and
- runway and taxiway markings.

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APPENDIX B – CONSULTANCIES

The following consultancies were used for the specialist input required for the preparation of this MDP.

Aeronautical	Airbiz
	Aviation & Airspace Design Solutions
	Aerodrome Management Services
	Aerodrome Compliance & Civil
Economic	MacroPlan Dimasi
Environmental	ENV Australia and 360 Environmental
Survey and Graphic Figures	McMullen Nolan Group
Town Planning	TPG Town Planning, Urban Design and Heritage

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