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Bringing ideas to life

Kalgoorlie-Boulder Airport Master Plan

2018-2032

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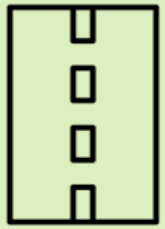
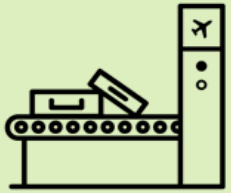
THE IDEAS

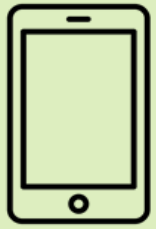


Incrementally develop airfield to enable different routes, more often whilst increasing the airports efficiency

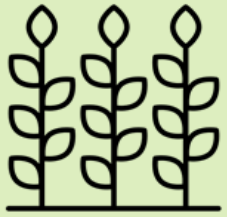


Build on the existing terminal facility to increase capacity and improve amenities for a better passenger experience

Introduce retail options beyond security screening, adding variety and quality to food, beverages and other purchases



Invest and implement next generation airport technologies such as check-in kiosks to ease the way passengers travel through the airport



Safeguard high intensity agriculture to bring the taste of Kalgoorlie-Boulder from farm to table, around Australia and the world

Take advantage of the abundant sun in Kalgoorlie-Boulder to safeguard a renewable energy precinct, enabling reliable and affordable green energy

THE NUMBERS

270,000

Passengers in FY18

375,000

Forecast Passengers in FY32

3,700

RPT Movements in 2017/18

5,000

Forecast RPT Movements in 2031/32

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SCALE

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Kalgoorlie Airport Master Plan

2032 Master Plan

FIGURE 3

Introduction

2 Introduction

The objective of the 2018-2032 Master Plan update includes:

- Developing an airport plan with a layout that yields optimum airport capacity within available land to meet future demand and international aviation operating standards;
- Address delay and processing times associated with different facilities and components in the Master Plan that impact capacity; and
- Safeguard land use across the airport precinct and develop options to best utilise the land.

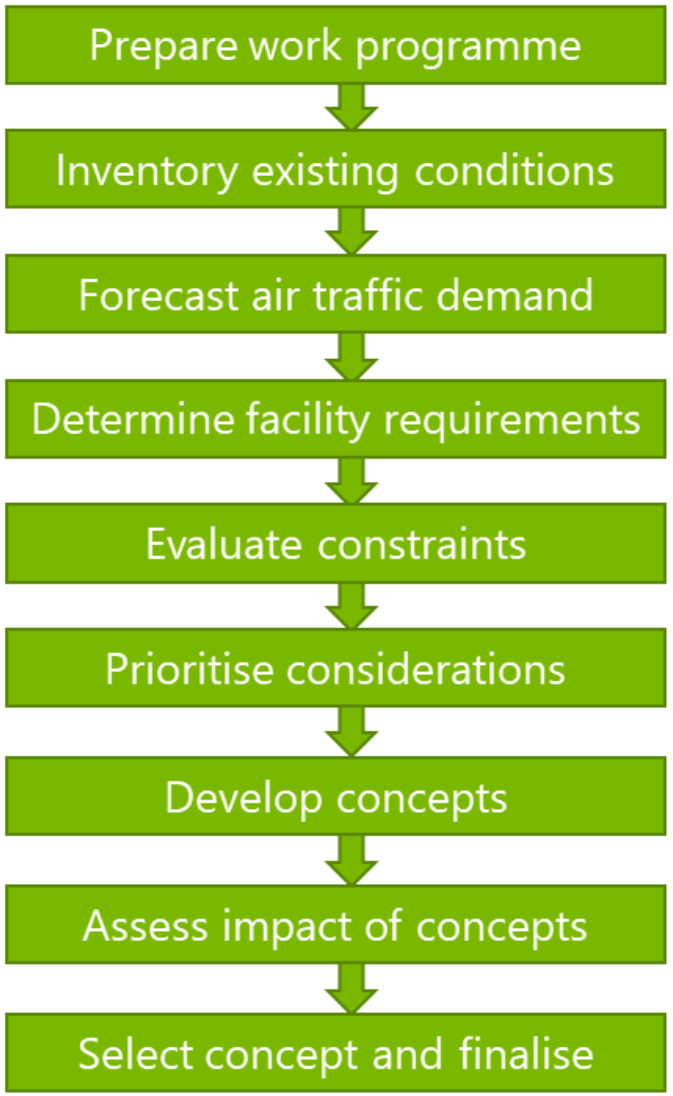
The vision of this Master Plan update is to guide future infrastructure and facility development programmes in a logical, sustainable and cost-efficient manner.

In developing the plan, consideration has been given to:

- Alignment between capacity enhancement programmes and the Master Plan;
- Engagement of the Kalgoorlie-Boulder community, airline and airport stakeholders; and
- Flexibility in plans to enable staged and incremental development commensurate with forecast demand.

The process of developing this Master Plan is shown in Figure 2-1. The following chapters are a culmination of this process for the Master Plan review and delivery of the ultimate layout plan of the airport.

Figure 2-1: The Kalgoorlie-Boulder Airport Master Plan Process



2.1 The Master Plan Programme

The Master Plan has been prepared by Aurecon Australasia in partnership with the City of Kalgoorlie-Boulder who are the owners of Kalgoorlie-Boulder Airport.

The pre-planning aspects to the Master Plan assessed the key airport drivers on which the plan is based on. This includes:

- Changes in type and nature of aircraft traffic;
- Assessment of existing demand and capacity;
- Identification of new capacity and capabilities by the airlines;
- Changes in the type of aircraft and fleet mix;
- Consultation with the airport community;
- Changes to national, regional and local planning regulations; and
- City of Kalgoorlie-Boulder objectives and strategies.

2.2 Inventory of Existing Conditions

An evaluation of the whole of airport operations in its existing condition has been considered. This includes all relevant processes, functional space and qualitative evidence gathering to determine the current state of operating conditions at Kalgoorlie-Boulder Airport. Airfield, terminal, parking and surface access was considered from an aviation operations perspective. Additionally, current commercial operations at the airport from various business users of the precinct was evaluated. The inventory of existing conditions forms the baseline of future airport development plans for both aviation and commercial operations at the airport.

2.3 Forecast Air Traffic Demand

Aurecon engaged Tourism Futures International (TFI) engaged to provide air traffic forecasts for Kalgoorlie-Boulder Airport (KGI) from FY19 through to FY34. This report summarises both the influences on traffic growth in the short, medium and longer term, and the latest traffic forecasts for Kalgoorlie-Boulder Airport. The forecasts provided in this report assume that there are no capacity constraints (airline or airport) during the forecast period.

In developing the forecast for air traffic demand at KGI, various macro, national, regional and local economic data and assumptions were considered.

2.4 Determining Facility Requirements

Existing and future facility requirements at the airport were determined by developing a design-day flight schedule as at FY18 and forecasted in line with passenger growth. The design day was determined by identifying a typical busy day at Kalgoorlie-Boulder Airport from historical trends. The methodology used to determine the design day is based on the International Air Transport Association's (IATA) *Airport Development Reference Manual 10th Edition*. In summary, the design day was identified as the *second busiest day in an average week during the peak month*. From determining the busy day, the peak hour was selected for facility requirements and sizing purposes. The facility requirements are similarly guided by IATA standards with some adjustments for operational realities at Kalgoorlie-Boulder Airport.

2.5 Evaluating Airport Constraints

By combining stakeholder engagement of airport users and facility requirements. Constraints in the existing and future operations have been evaluated. The approach to the evaluation is consistent with major airport function including directional passenger and baggage flows in addition to user qualitative statements. The development plans considered in this Master Plan address the constraints, which include:

- Congestion and long queues at the security screening point within the terminal;
- Inadequate space within the departures lounge;
- Inadequate toilet amenities;
- Depth of the terminal inadequate for footprint expansion;
- Limited retail and food and beverage options for passengers and other airport users; and
- Decentralised General Aviation precinct and associated airfield infrastructure constraints.

2.6 Prioritising Airport Constraints

This Master Plan considers a staged development concept with a view to addressing immediate issues earlier and within the existing facilities. The key principles in prioritising solutions include:

- Optimising existing processes and functions to increase throughput or storage capacity;
- Appropriate capital investment for maximum capacity gains by re-engineering internal walls and boundaries;
- Option to adopt next generation airport technology to further throughput and storage capacity;
- Option to preserve essential amenities such as family areas and trolley availability;
- Expanding footprint only when the existing areas have been sufficiently utilised and demand for new developments is identified; and
- Expanding footprint sufficiently to limit operational disruption due to construction works.

2.7 Developing and Selecting Concepts

Various iterations of development options have been considered for all parts of the airport. An impact analysis of the options was considered before selecting a preferred development option. In assessing the development scenarios, benefits and disadvantages were considered based on:

- Circulation and flow of aircraft, passengers, bags and vehicles;
- A sense of place associated with appropriate sizing;
- Throughput and storage capacity benefits or losses;
- Optimised commercial outcome to increase benefits from precinct development; and

- Safeguarding for an ultimate airport layout that is flexible in its response to the changing demands of the City Kalgoorlie-Boulder and the region.

Economics and Air Traffic Forecast

3 Economics & Air Traffic Forecast

3.1 Approach to Forecasting Traffic

The City of Kalgoorlie-Boulder is Western Australia's largest inland city and Australia's largest outback city. At the confluence of the Great Eastern and Goldfield Highways and 600km east of Perth, Kalgoorlie-Boulder is the gateway to the eastern states of Australia. The city is strategically placed as a multimodal transport hub connecting minerals and agriculturally rich regions of Western Australia to the east coast and the world.

The city is a global leader in mining with vast reserves of gold, nickel, cobalt and lithium. There are 108 mining operations within the city's economic zone with another 697 new operations under consideration. Top destinations for mineral exports is Asia with India, China, Korea and Singapore being major trade partners.

On the back of mining, there is a thriving and specialised knowledge economy. The Western Australian School of Mines is located at the heart of Kalgoorlie and is currently ranked 2nd globally for mineral and mining engineering. Trade schools such as the local campus of Central Regional TAFE offer broader employment pathways for a vibrant services industry.

The tourism industry plays an important role in the Kalgoorlie-Boulder economy and is forecast to grow. The City is the identity of the Goldfields region and it is famous for its unique 'Gold Rush' history and the 'Super Pit', an amazing active example of efficient open cut gold mining. There were 283,000 visitors to Kalgoorlie-Boulder in 2017, contributing $157 million to the economy.

The city has continued to industrialise with 370 hectares of proposed new industrial land available for development.

Air traffic at Kalgoorlie-Boulder Airport("KGI") has fluctuated through its history. Whilst a large number of factors generally influence traffic growth at an airport one of the main drivers for KGI is the mining sector. This is likely to continue although the strategy to broaden the economic base has been developed in the document *Growing Kalgoorlie-Boulder – Planning for Growth Under the Regional Centres Development Plan* (April 2017). According to the document Kalgoorlie-Boulder's future will:

" .. build on its rich mineral resources and specialist expertise to maximise the subsequent benefits for the region and for WA. The future will see a more diversified economy and a Kalgoorlie-Boulder no longer perceived as 'just a mining town' but a welcoming, sustainable, inclusive, vibrant and resilient regional city."

The Plan outlines the vision for the region and indicates a number of areas for further growth and development including education and tourism.

Mining will however remain at the core and investments in mining will underpin economic growth and traffic growth at KGI. Whilst gold and nickel developments have been significant contributors to growth in the past, lithium mining will provide opportunities for the future.

The air traffic forecasts generated are to inform this Master Plan. As the Master Plan is primarily a land use document where staging is not the primary focus, it is essential to review the outlook periodically as part of specific investment decisions. Forecasting for an airport such as KGI with its

fluctuating growth and heavy dependence on mining projects is challenging. For this reason, a Central, Low and High forecast has been prepared. Whilst forecast traffic growth over the period to FY34 ranges between -0.2% and 3.1% the outcome could be a significant decline if some of the existing mines close, the population declines and/or FIFO workers are replaced by residents.

The forecasts have been prepared based on a number of economic drivers:

- Economic growth – the forecast has used WA State Final Demand per capita as a key economic driver. Whilst it would also be useful to include Kalgoorlie-Boulder Gross Regional Product (GRP) as a driver, data and forecasts for this variable are limited. The forecast has also included the level of unemployment as a factor influencing growth (again the WA aggregate rather than just for Kalgoorlie-Boulder has been used).
- Oil prices have an influence on airline costs and influence airlines' decisions as to the routes they operate. Increasing oil prices will have a negative influence on traffic growth into the future.
- As indicated above mining developments and commodity prices will influence growth at KGI. The forecast has included projections of gold production in the traffic model and has allowed for growth in lithium.
- The population of the KGI catchment has been included as a driver of growth at KGI.

A summary of assumptions for key drivers, along with their historical performance, is provided in Table 3-1 A discussion of these drivers follows.

Table 3-1: History and Projections for Traffic Drivers

Parameter	FY03 to FY15	FY16 to FY18	FY19 to FY25	FY26 to FY34
State Final Demand	6.3%	-4.1%	2.8%	2.5%
WA Population	2.2%	0.8%	1.6%	1.4%
Oil Price (inflation adjusted)	10.8%	-8.3%	3.0%	3.0%
Gold Production	0.0%	2.2%	0.0%	1.0%
Unemployment Rate WA	4.7%	6.2%	5.4%	5.3%
Kalgoorlie-Boulder Region Population	0.3%	-1.2%	0.6%	0.7%

Note that in the *Growing Kalgoorlie-Boulder* documents, two specific future scenarios were prepared:

- A Base Case Outlook: Limited change in commodity prices and therefore limited investment in gold and nickel projects. Under this Base Case Scenario, the Kalgoorlie-Boulder economy is expected to record "sub-par rates of growth" over the period to 2029-30, with mining production declining as the number of operating mines declines.
- An Upside Growth Outlook: Based on higher commodity prices and consequent mining project developments. For this scenario new mines become operational and the Kalgoorlie-Boulder economy is expected to generate positive growth rates of 3.1% per annum from 2024-25 through to 2029-30.
- Central, High and Low forecasts have been prepared based on variations in driver assumptions.
- The first of the *Growing Kalgoorlie-Boulder* scenarios could result in a decline in traffic growth at KGI over time, an outcome that would be

below the Low forecast. The second scenario could be expected to generate traffic outcomes somewhere between the Central and High forecast.

3.2 Traffic Projections

Table 3-2 shows the passenger movement forecasts (they are also presented in Figure 3-1.

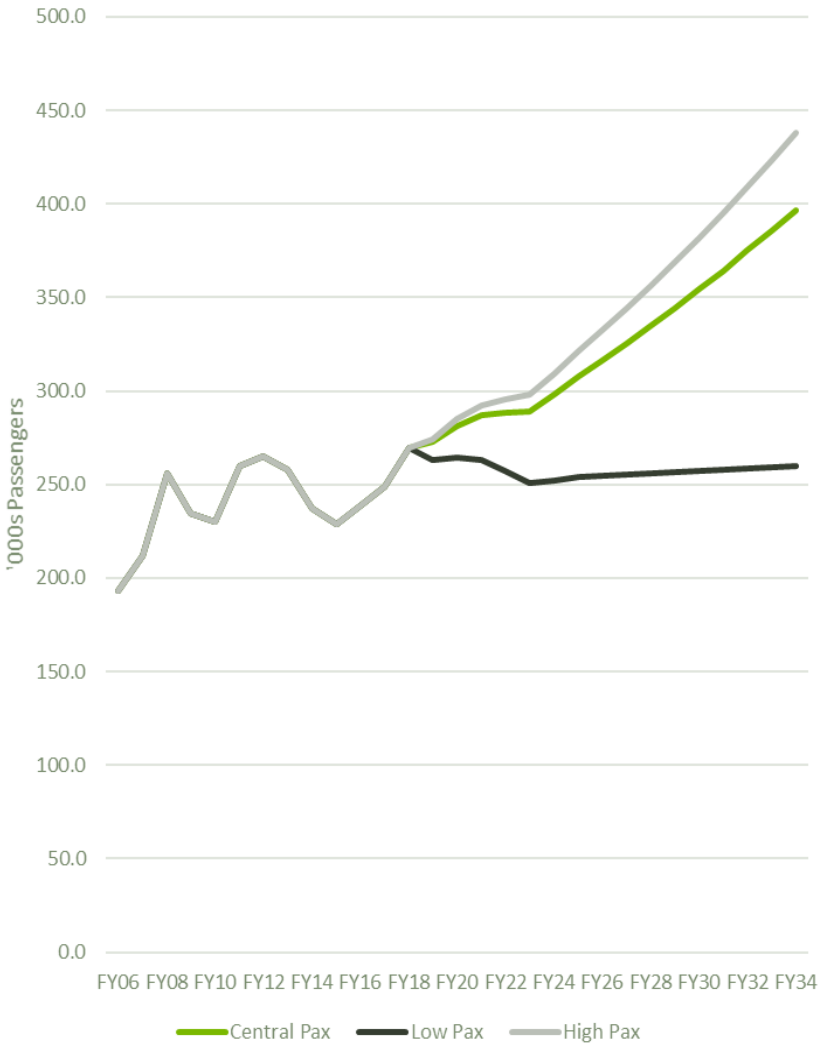
They show the passenger movements of 270,000 in FY18 and a range between 260,000 and 438,000 by FY34.

These passenger forecasts are used to generate aircraft movement forecasts. The expectation would be that there would be an ongoing mix of smaller jet aircraft serving KGI with the maximum aircraft size remaining as larger narrow-body aircraft.

Table 3-2: KGI RPT Passenger and Aircraft Movements - History & Projections to FY34 ('000s Movements)

Year end 30 June	Passenger Movement (000s)			Aircraft Movement (000s)		
	Central	Low	High	Central	Low	High
2002	149			3.3		
2012	265			2.8		
2018	270			3.7		
2024	298	252	309	4.0	3.4	4.1
2034	397	260	438	5.1	3.5	5.6
CAGR						
2002 to 2012	5.9%			-1.5%		
2012 to 2018	0.3%			4.3%		
2018 to 2024	1.7%	-1.1%	2.3%	1.5%	-1.3%	2.1%
2024 to 2034	2.9%	0.3%	3.5%	2.6%	0.2%	3.2%
2018 to 2034	2.4%	-0.2%	3.1%	2.1%	-0.4%	2.7%

Figure 3-1: KGI Passengers FY06 to FY18 and Projections FY19 to FY34



3.3 Market Segmentation and Traffic History

3.3.1 Kalgoorlie-Boulder Airport Data

Forecasts were prepared with data available from Kalgoorlie-Boulder Airport to 2017/2018.

In addition to the KGI data, domestic data (for passengers and aircraft movements) is regularly published for the top routes in the BITRE publication *Australian Domestic Airline Activity*. This data is published as traffic on board by stages and includes all traffic on each flight stage between two directly connected airports. It thus includes domestic transit passengers.

A second BITRE publication used is *Air Transport Statistics: Airport Traffic Data* which contains a time series of annual airport traffic data for Australian airports that receive more than 7,000 revenue passenger movements annually.

Table 3-3 provides the airport-assembled data for the financial years shown.

Table 3-3: Passenger Movements (000s) and RPT Aircraft Movements

	Financial Year End							CAGR 2013 - 2018
	FY12	FY13	FY14	FY15	FY16	FY17	FY18	
Passengers								
From KGI – RPT	253,264	249,050	218,035	221,357	233,793	244,913	266,195	1.4%
From KGI-Charter			6,037	7,591	4,587	3,693	2,677	
From KGI – Total			244,072	228,948	238,380	248,606	269,008	
BITRE Domestic RPT Total*	264,889	257,970	237,396	228,189	234,504	244,472	265,008	0.5%
Aircraft								
BITRE Domestic RPT	2,848	3,770	3,753	3,457	3,508	3,483	3,490	-1.5%
From KGI – Total		12,224	11,860	12,010	11,494	11,070		
From KGI – Pax Aircraft								

Notes: *FY18 KGI estimate from BITRE based on data to May 2018. **FY18 estimate of Pax Aircraft for KGI based on data to May 2018. Source: KGI, BITRE data

3.3.2 Longer Term History

Figure 3-2 shows the annual passenger movements (and annual change in passenger movements) for KGI over the period from FY80 to FY18. The long-term data used to construct the chart is sourced from the BITRE. Three periods of growth in the history shown:

- FY80 to FY90 - trend growth over this period amounted to 12.2% annually: The decline ending this growth period included the impacts of the 1989/90 Domestic Pilot's dispute and economic recession;
- FY91 to FY02 - trend growth over this period amounted to 8.7% annually: The decline from FY99 began because of economic issues, a slowdown in mining activity and the collapse of Ansett; and
- FY03 to FY15 - trend growth over this period amounted to 4.1% annually: This period witnessed the recovery from the loss of Ansett and strong growth in commodity prices and mining investment. Thus, over the nearly 40 years shown in Figure 3-2 the growth is strong but with significant interruptions. The downturns were significant with around five to six years to recover to previous levels.

In reviewing the major airline route for Kalgoorlie, to/from Perth, note changes in average aircraft size as shown in Figure 3-3:

- FY85 to FY95: Smaller aircraft types – turboprop – aircraft were used to serve the routes;
- FY96 to FY05: An average 80 seats per aircraft during this period, this includes larger turboprop and smaller jet aircraft;
- FY06 to FY14: A significant increase in the average number of seats to 126 with larger jet aircraft serving the route on peak days; and
- FY15 to FY18: With the reduction of growth post mining-boom the smaller jet aircraft (F100s and B717) are the main aircraft types.

Figure 3-2: KGI Passenger Movements and Annual Change in Passenger Movements, FY80 to FY18

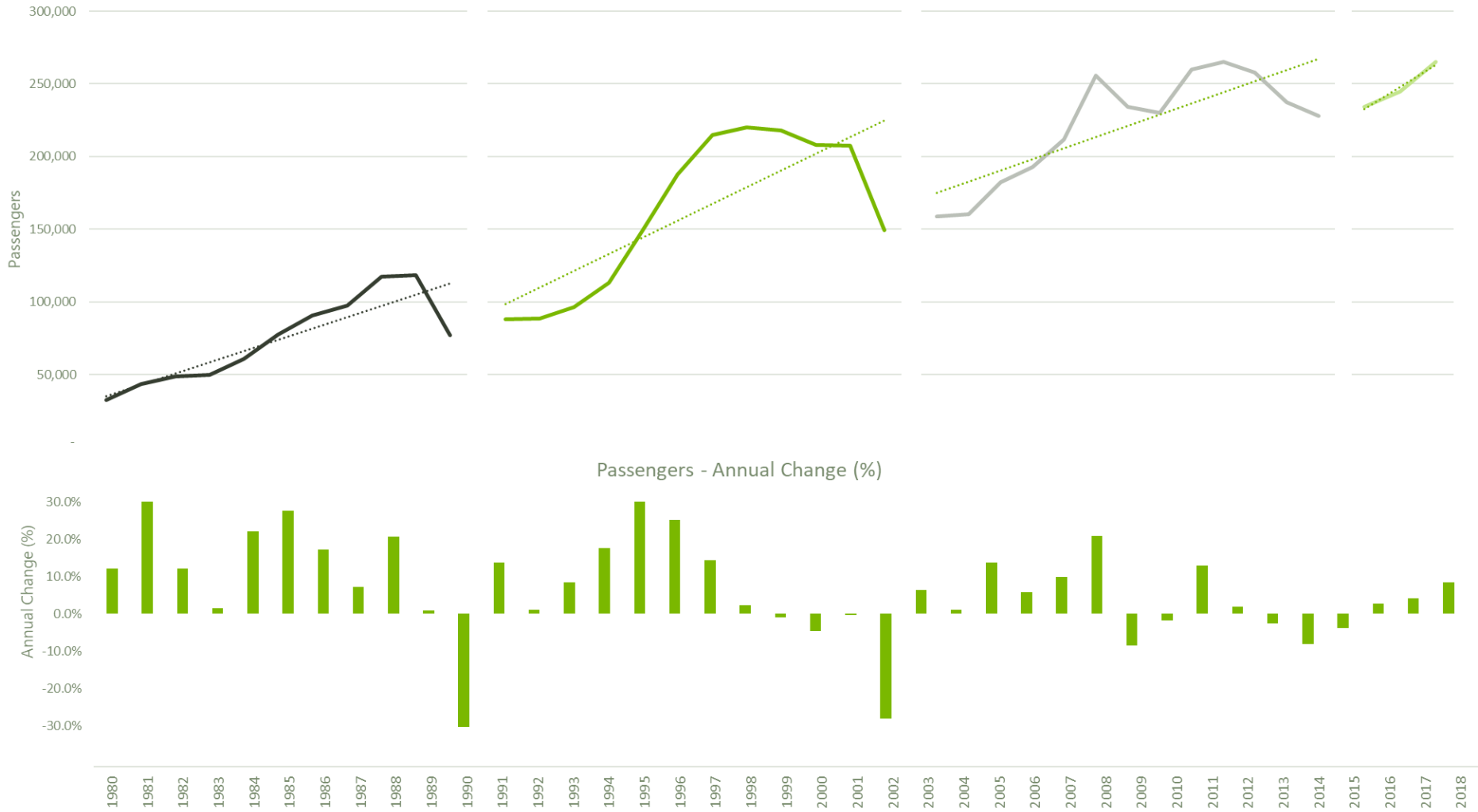
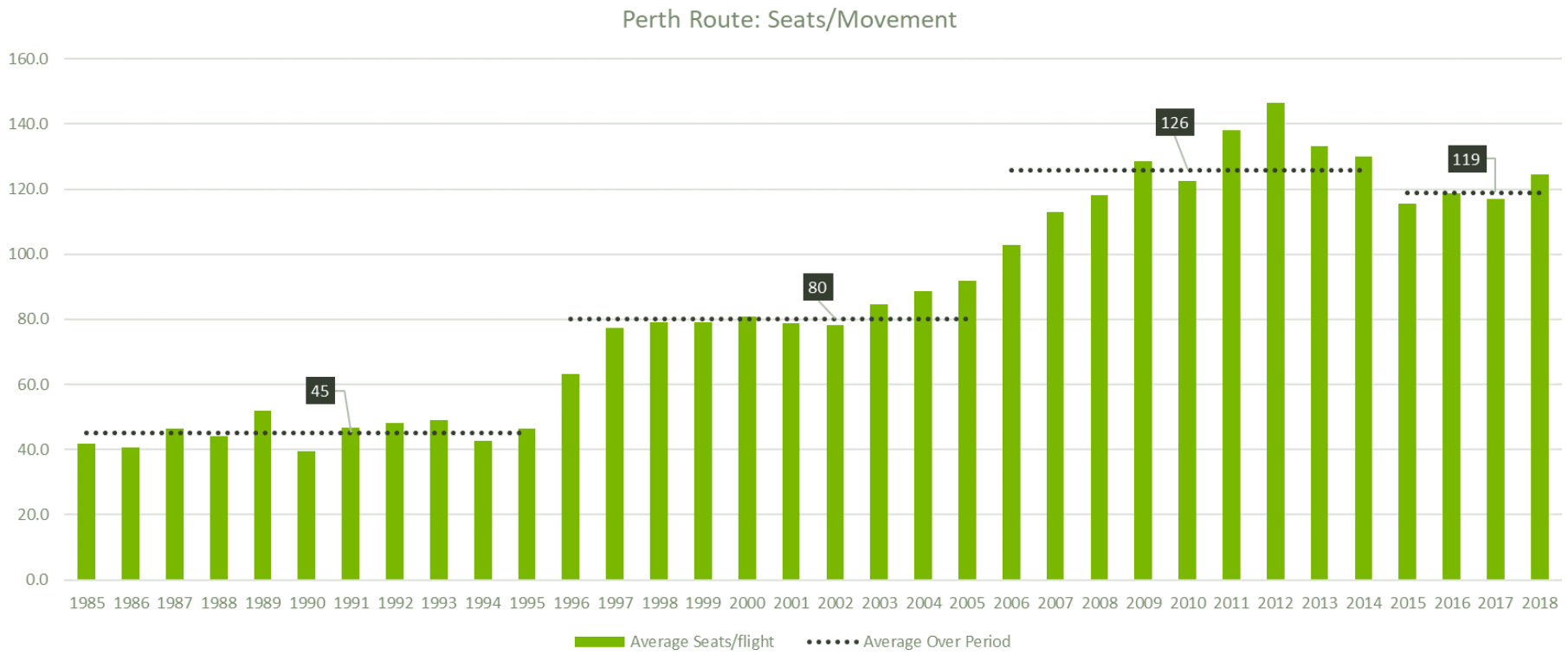


Figure 3-3: Average Number of Seats Per Flight, Perth-Kalgoorlie Route FY85 to FY18



Market Segmentation

The preferred approach to a forecasting assignment is to segment the market for an airport and to assess key drivers for each segment. In the case of Kalgoorlie Airport detailed market segmentation was not available. The forecast has estimated a segmentation using the National Visitor Survey (NVS) and International Visitor Survey conducted by Tourism Research Australia (TRA). This is a national survey of characteristics of domestic travellers and information about destination visited, length of stay and mode of travel.

The NVS has several limitations when used at the small area or regional area level. Sample sizes fall and statistical sampling error increases. As a result of these issues for the Kalgoorlie/Boulder area the approach

adopted was to establish rolling averages of NVS data over four years thus increasing sample sizes.

Table 3-4 shows the results of the visitor analysis with 80% of visitors originating within WA, 16% from interstate and just 4% from international markets. Based on NVS/IVS data, the forecast estimates that 30% of these visitors arrive by airline services.

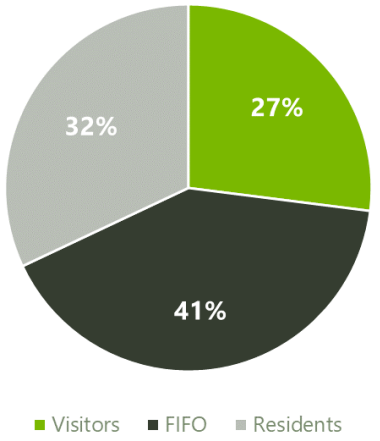
It is estimated that the number of Fly-in-Fly-Out (FIFO) travellers at around 3,000 per year (generating around 75,000 passenger trips). On this basis, estimated passenger shares at KGI as shown in Figure 3-4Error! Reference source not found.: 41% visitors other than FIFO, 32% for FIFO and 27% KGI residents.
City of Kalgoorlie-Boulder Council (CKB) has indicated that:

- 454,900 visitors travel annually (by all transport modes) to Kalgoorlie's economic and tourism zone resulting in an estimated 2,464,000 visitor nights;
- 133,000 of annual visitors are estimated to stay in hotels (or similar) resulting in 730,000 visitor nights;
- Visitors record an average stay of 5.4 nights each with an average $191 spend per day;
- For visitors by all modes of transport the travel purposes are: 59% business, 19% leisure or holiday, 14% visiting friends or relatives and 8% other; and
- During iconic events in Kalgoorlie-Boulder, hotel occupancies often hit 100%.

Table 3-4: Visitor Segments for Kalgoorlie Airport,

Visitor Segment	Visitors ('000s)	Visitor Share
Intrastate	280	80%
Interstate	52	16%
International	13	4%
TOTAL	325	100%

Figure 3-4: Passenger Segment Shares



3.4 Business Environment

3.4.1 Australian & WA Economic Outlook

The Australian economy grew by 2.1% during FY17, down from 2.8% during FY16 and the lowest rate of growth since FY09, pointing to the ongoing adjustment to the end of the mining investment boom. Economic growth in FY17 was largely driven by consumption, both government and household. Gross fixed capital formation made no contribution to growth, with the impact of public sector capital expansion cancelled out by a decline in private works.

The Australian Government, in its Budget Outlook 2018-19, forecasts real GDP growth for FY18 at 2.75% and at 3.0% for each of FY19 and FY20. Business investment was expected to grow at a slightly stronger pace and the negative impact from the decline in mining investment to diminish, supporting overall economic growth. The Government noted that commodity prices remained a key uncertainty to the outlook.

In its most recent outlook (August 2018) the Reserve Bank reports that the Australian economy has expanded by 3.1% per cent over the year to March 2018, driven by growth in exports, non-mining business investment and public demand. Consumption growth remained steady. However, mining investment has continued to fall, by an estimated -16.4% during the year to March quarter 2018 as construction work on the remaining LNG facilities continued to approach completion. The Reserve Bank expects mining investment to decline further beyond the June 2018 quarter, before stabilising and then gradually increasing as firms invest to sustain production. While the year-ended GDP rate is expected to remain a little above estimate of potential growth, a continuing source of uncertainty stems from continued low growth in household income and high levels of household debt impacting the outlook for household consumption.

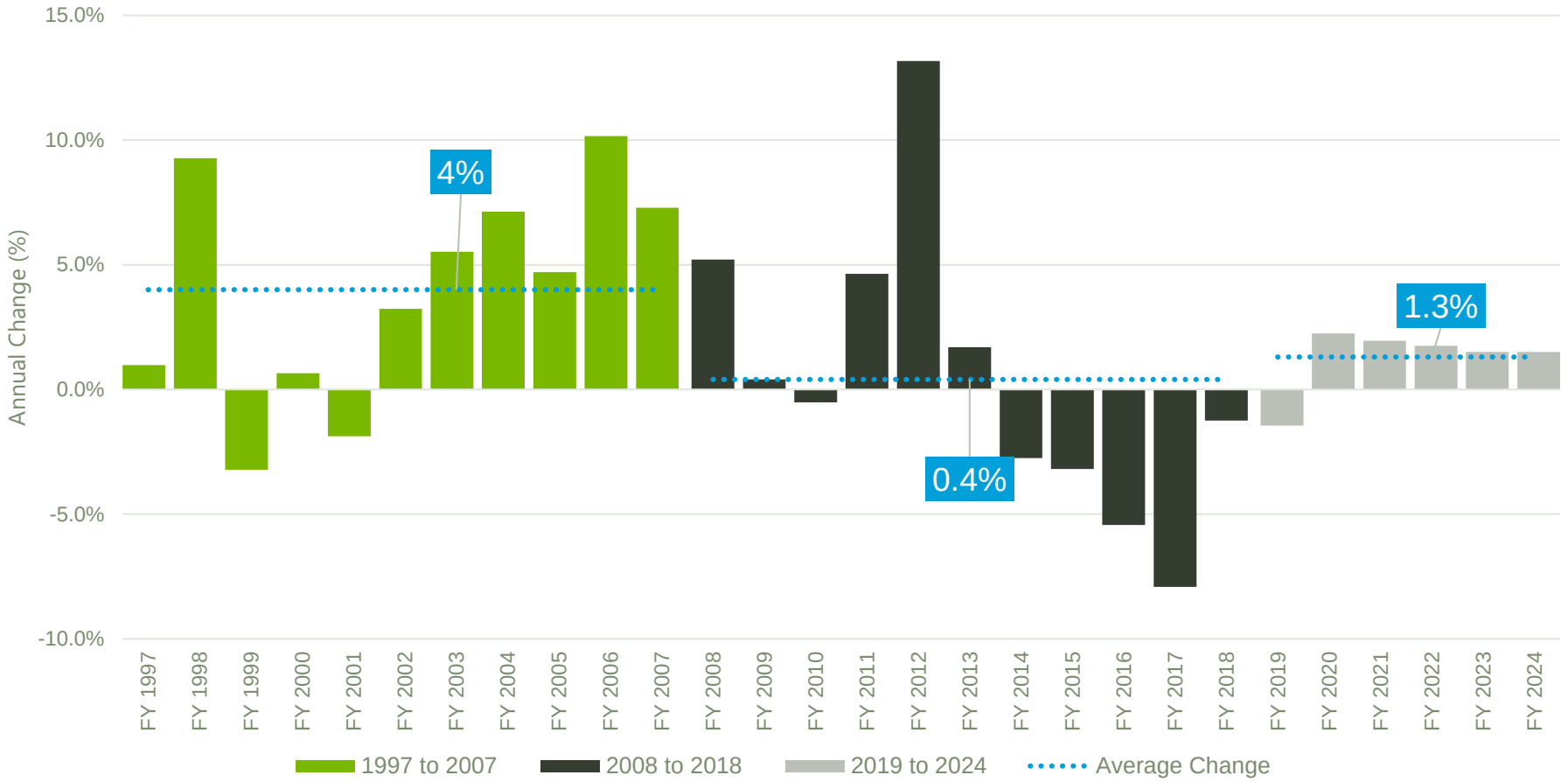
The Western Australian economy, as measured by Gross State Product (GSP), declined by -2.7% during FY17, impacted by a large fall in construction spending on the State's major LNG projects, which contributed to a -28.6% decline in business investment and which was only partly offset by the 7.3% increase in net exports. The State had averaged 4.9% annual growth in GSP over the previous ten years, largely attributed to mining investment.

The economy as measured by GSP is expected show a return to growth in FY18, with the WA Government in its 2018-19 Budget estimating an increase of 2.5%, followed by a forecast growth of 3.25% in FY19:

- The economic growth is based on expected strong growth in export volumes as the State's iron ore and LNG operations boost production;
- The unemployment rate is forecast to fall to 5.75% in 2017-18 and remain steady at this rate in 2018-19, down from a recent peak of 6.2% in 2016-17. With employment growth expected to continue over the forward estimates period, the unemployment rate is forecast to fall to 5% by 2021-22.
- Population growth is expected to remain at 1% in 2017-18 and 1.2% in 2018-19 gradually increasing to 1.8% in 2020-21 and 2% in 2021-22; and
- The Budget points to the largest uncertainty being the level of business investment in the short-term, specifically the magnitude and timing of LNG construction expenditure, as key projects enter the final stages of construction.
- While business investment is projected to return to growth from 2019-20 onwards, supported in large part by projects needed to sustain

current operations in the iron ore and Liquified Natural Gas (LNG) sectors, growth is expected to be modest relative to the previous upswing, with investment returning to more "normal" levels.

Figure 3-5: Annual Change in Western Australian State Final Demand Per capita Actual Growth to FY17, Estimated for FY18 and Projections to FY24



A significant point for KGI is that the business investment outlook hinges on several prospective projects being realised and also the expectation that projects not yet identified will emerge. If this does not occur, business investment may be lower than forecast.

Additionally, WA State Final Demand (SFD), which is an indicator of domestic demand conditions, had declined by -7.2% during FY17, the fourth consecutive year of decline. The WA Government in its 2018-19 Budget, estimates SFD to continue to contract for the fifth and sixth consecutive years in FY18 and FY19, before showing recovery from FY20.

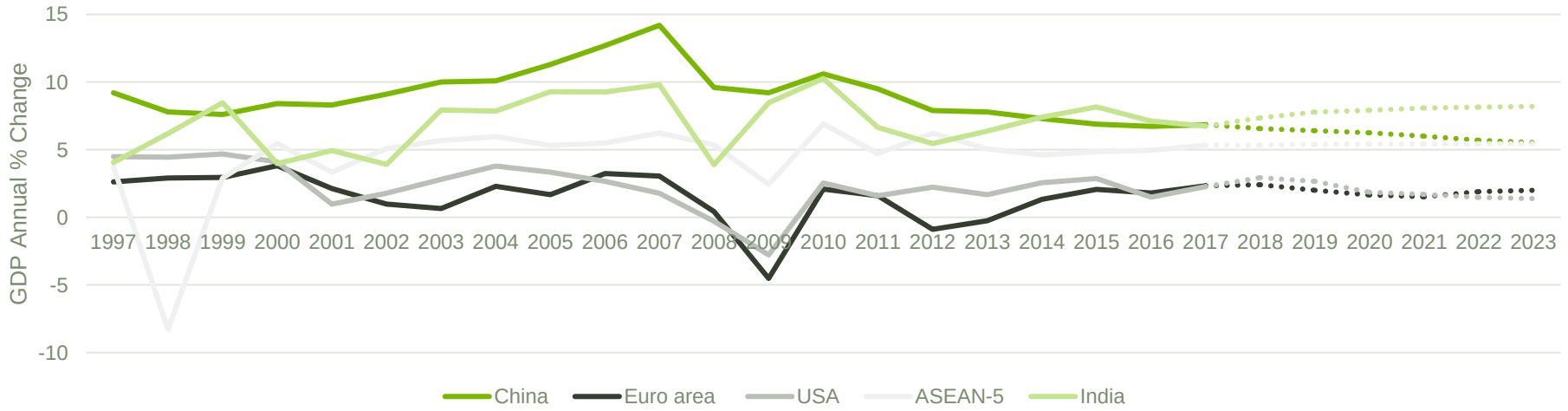
The latest International Monetary Fund (IMF) projections, released in April 2018, indicate that world growth, after strengthening in 2017 to 3.8% (the strongest growth since 2011), will pick up further to 3.9% over this year and next. The IMF reports that 2017 had seen a notable rebound in global trade driven by an investment recovery in advanced economies, continued strong growth in emerging Asia, an upswing in emerging Europe, and signs of recovery in several commodity exporters. Growth over 2018 and

Figure 3-5 shows the annual change in WA domestic demand per capita over the period since FY97, with projections through to FY24.

3.4.2 International Economic Outlook

2019 is expected to be supported by strong momentum, favourable market sentiment, accommodative financial conditions, the domestic and international repercussions of expansionary fiscal policy in the United States, and the partial recovery in commodity prices.

Figure 3-6: GDP Growth to 2017 and IMF Projections to 2023



Over the medium term, global growth is projected to decline to about 3.7%. Prospects for the advanced economies are expected to remain subdued once the cyclical upswing and US fiscal stimulus have run their course. On the other hand, growth in the emerging market and developing economies is expected to benefit from the gradual recovery in commodity exporters and from the projected increase in India's growth (both

providing some offset to China's gradual slowdown and emerging Europe's return to its lower-trend growth).

Overall the IMF considers that while risks to the outlook are broadly balanced for the immediate future, thereafter they remain skewed to the downside. Notable negative risks to activity include a potential increase in financial vulnerabilities, a shift toward inward-looking policies and a worsening of geopolitical tensions.

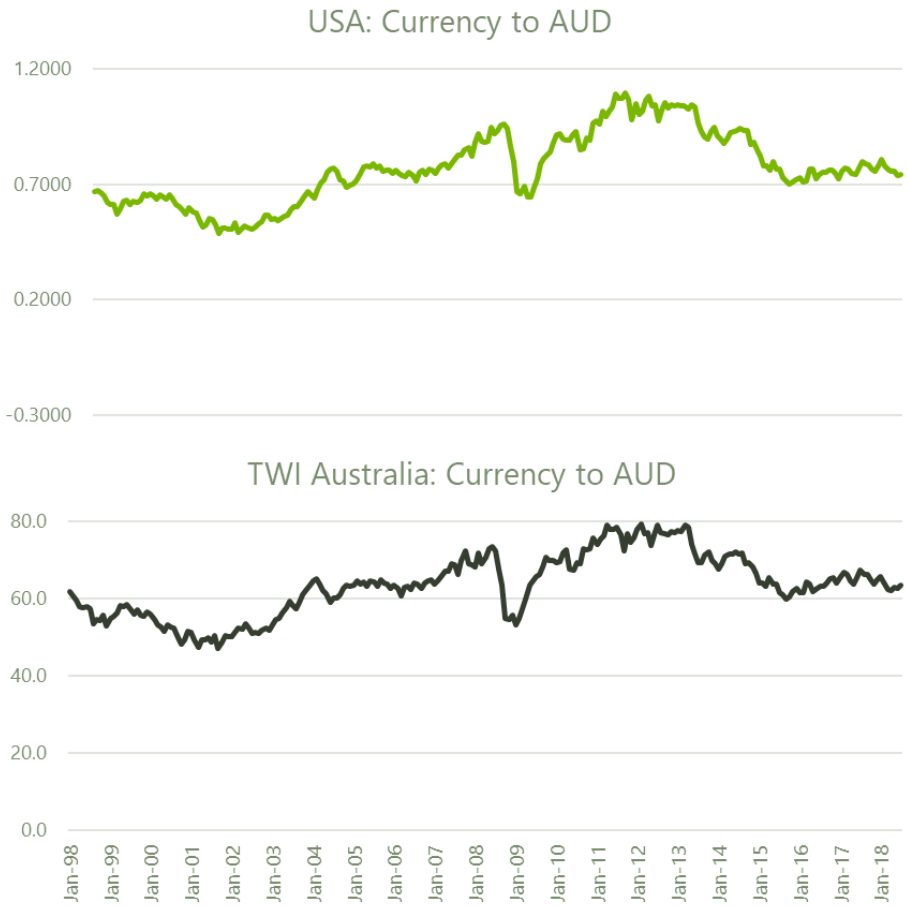
Figure 3-6 shows annual economic growth rates for selected countries from 1997 through to 2017, together with IMF projections to 2023. This suggests ongoing demand for key commodities.

3.4.3 Exchange Rates

Exchange rates have a significant impact on the composition of international visitor growth in the short to medium term. Exchange rates and differential inflation rates impact upon the price of Australia as a destination relative to competing destinations. A fall in value of the Australian dollar increases the cost of overseas travel by Australians but decreases the cost for overseas visitors for travel to and within Australia. Note that such a fall can also have a positive impact on domestic travel as Australian resident travellers choose to holiday domestically rather than abroad.

The Australian dollar remains around its long-term average rate against the USD, as shown in Figure 3-7. At these rates Australia's cost competitiveness in attracting inbound visitors is maintained. In addition, these levels should prove stimulatory for interstate and intrastate domestic travel.

Figure 3-7: Australia's Trade Weighted Index and Value to the USD: January 1998 to April 2018

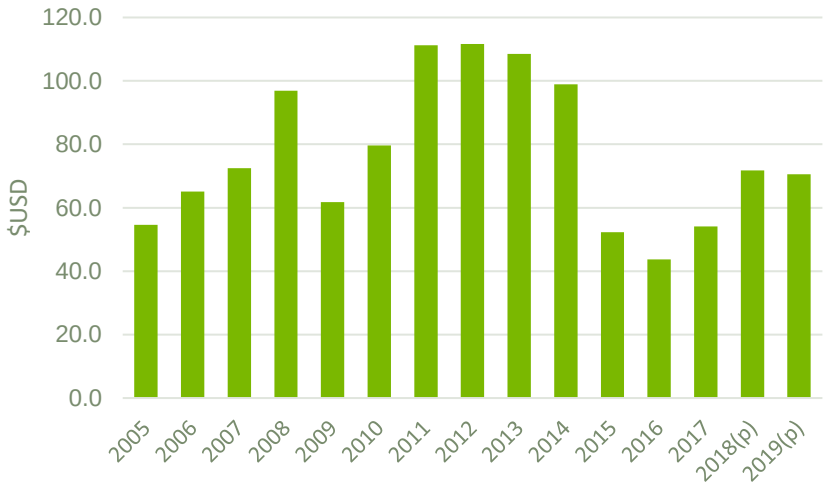


Source: TFI based on Reserve Bank of Australia.

3.4.4 Oil Prices

The average annual Brent crude oil price increased during 2017 to an estimated US$54 a barrel, up from the 2016 12-year low of US$44 a barrel. The US Energy Information Administration (EIA) reports that crude oil supply and demand indicators suggest that global petroleum inventories are declining and projects further increases in Brent spot prices, to average around US$71 a barrel in 2018 (Figure 3-8).

Figure 3-8: Crude Oil Prices: Average Annual Price (USD) to 2017, 2018 & 2019 Projections



Note: (p) projected price at May 2018. Source: US Energy Information Administration (EIA).

In its longer-range projections, presented in the February 2018 Annual Energy Outlook (AEO), the EIA is projecting that crude oil prices will rise at a faster rate in the near term than in the long term, attributed to weak near-term investment coupled with strong demand. In real terms, the Brent crude oil price (Reference case) is projected to increase to around US$90 per barrel by 2028 and to US$104 per barrel by 2038 (all in 2017 dollars).

This represents an average annual increase of 5.1% through to 2028, followed by an average annual increase of 1.4% through to 2038.

The AEO also presents Low and High Oil Price cases which reflect differing assumptions about US resources and technology and global market conditions. Under Low and High Oil Price cases, the nominal price of Brent crude oil per barrel ranges widely from US$38 to US$177 in 2028 and from US$43 to US$206 in 2038.

The forecast assumes a recovery in oil prices consistent with the AEO Reference Case (an increase of around 3.0% per annum in real terms over 2017-2038).

3.4.5 Mining Industry Outlook

The Western Australian resources sector is a key driver of the State economy. The WA Department of Mines, Industry Regulation and Safety (DMIRS) reported that the resources sector accounted for 90% of the State's income from total merchandise exports during FY17. At the same time the economic impact of the mining industry on the State's GSP was estimated at 29%.

The value of sales by the State's mineral and petroleum industry reached $105 billion during FY17. The Goldfields-Esperance Region accounted for $9.7 billion of these sales (9.2% of the State total), with the immediate Kalgoorlie-Boulder LGA accounting for $2.4 billion. Gold contributed $7.1 billion (73%) and Nickel/Cobalt a further $2.0 billion (21%) to the value of sales in the Goldfields- Esperance Region.

The DMIRS reports that the number of principal gold projects increased State-wide from 33 in 2014-15 to 43 in 2016-17 due to the

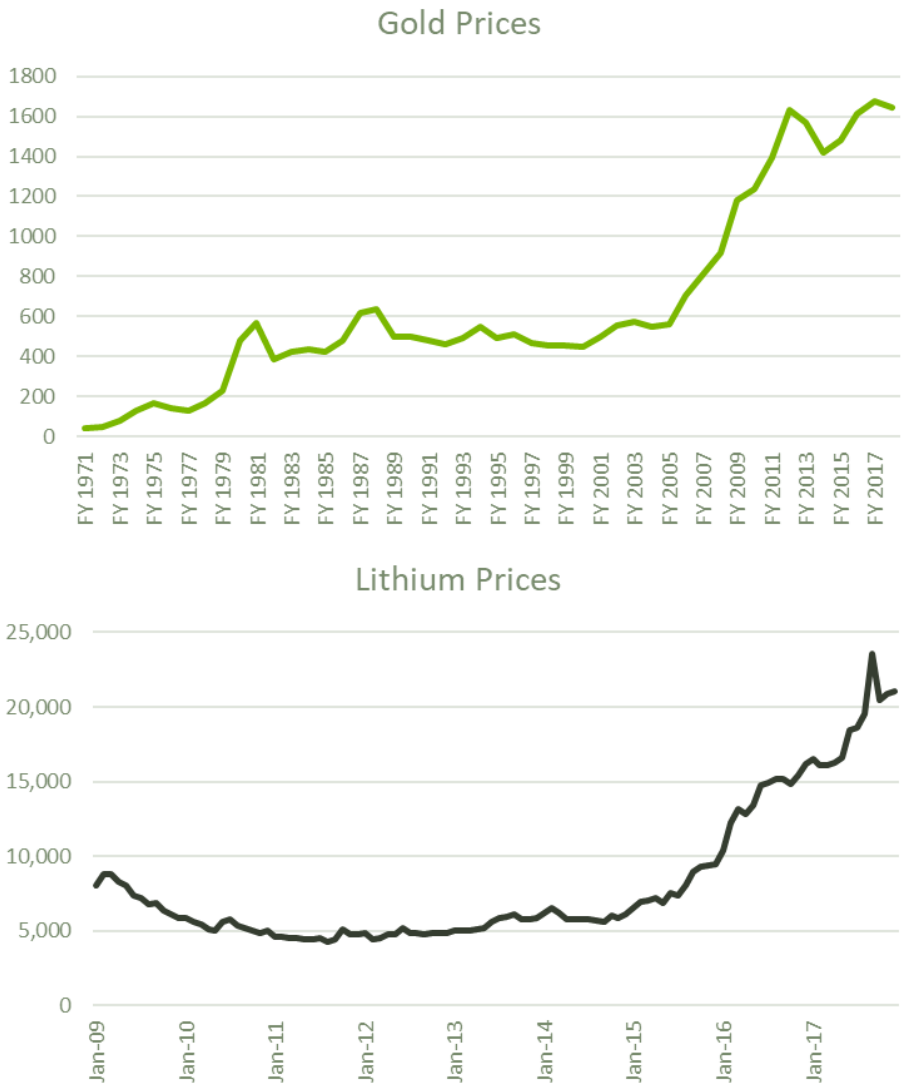
commencement of new operations, including the exploratory work undertaken at the Kalgoorlie North project.

As of March 2018, Western Australia had an estimated $1.5 billion worth of gold projects in the pipeline (up from $1.2 billion at September 2017), with $800 million worth committed or under construction and $700 million planned or possible.

The Australian Office of Chief Economist[1] (OCE) indicates that while the rising US dollar and higher real US Treasury bond yields are expected to weigh on gold prices over the next two years, rising inflation and growing investor caution are expected to raise the demand for gold as an inflation hedge and a safe haven. Globally, 53% of gold is used for jewellery, with China and India the key consumer markets, and 25% for coins and bars.

Figure 3-9 shows the annual performance of Gold prices over the period since FY72 and the monthly performance for Lithium prices since January 2009. Gold prices increased rapidly post FY05 but have plateaued since FY12 and limited increases are forecast over the next five years. Lithium prices have increased since FY16 and are projected to increase further.

Figure 3-9: Gold Prices and Lithium Prices in Australian dollars



Source: Reserve Bank of Australia.

In its latest longer-term outlook[2] the OCE is forecasting:

- Australian gold mine production to increase by 3.8% annually, to reach a peak of 322 tonnes in 2019-20. Higher production will be driven by several new projects, including Gold Roads' Gruyere project west of Kalgoorlie. Australian mine production is then projected to decline by 5.6% annually to 271 tonnes in 2022–23, with several mine closures and declining ore grades as mature assets approach their end of life.
- Australian nickel production is expected to increase swiftly given Australia's substantial resources and the current good price outlook, supported by higher stainless-steel production in China and Indonesia and rising battery use. Nickel and cobalt exploration expenditure has increased significantly with most of this expenditure in Western Australia. Open pit production at BHP Billiton's Yakabindie mine in the Northern Goldfields region could commence from 2021.

3.4.6 Population

Population is an important longer-term influence on traffic growth. The latest population projections published by the Western Australian Planning Commission were prepared with estimated resident population figures for June 2013 forming the base year (median series shown in Table 3-5). Medium-term projections to 2026 are available for the State and for sub-regions, with long-term forecasts from 2031 to 2061 available for the State as a whole. These projections show:

- The population of the Kalgoorlie-Boulder LGA growing from 32,200 in 2011 to between 34,800 and 39,300 by 2026 (CAGR of 0.5% to 1.3%). Note however that the medium level projection for 2016 at 34,650 is around 12% above the actual estimated resident population for that year - the actual estimated resident population for the Kalgoorlie-Boulder LGA for 2016 was 30,900, representing a decline of -4.2% over 2011 compared with the projected growth of 7.6%.
- The Perth region, accounting for around 75% of the Western Australian population, is forecast to grow from 1.75 million in 2011 to between 2.37 million and 2.61 million people by 2026 (CAGR of 2.1% to 2.7%); and
- Western Australia's population grows from 2.35 million in 2011 to between 3.14 million and 3.41 million by 2026 (CAGR of 1.9% to 2.5%), and then to between 3.84 million and 4.35 million by 2038 (CAGR of 1.7% to 2.0%). Note that the medium level projection for 2016 at 2.66 million is around 4% above the actual estimated WA resident population for that year.

The State medium level projection for 2038 (4.07 million) is around 10% lower than the latest Series B ABS projection for the same year (4.54 million).

In the decade to 2013, the Western Australian population increased at an average annual rate of 2.5%. This rate is projected to decline over the projection period, to 1.4% per annum (medium series) over the last five years of the forecasting period to 2038.

The latest ABS projections of State populations, released November 2013, cover the period 30 June 2013 to 2061 with estimated resident population figures for June 2012 forming the base year. Over the forecast period to 2038 the ABS projections (Table 3-5) show:

- The population of the Greater Perth area growing from 1.90 million in 2012 to between 3.33 million and 4.20 million (medium level of 3.75

million) by 2038. This represents a CAGR of between 2.2% and 3.1% over the period.

- Western Australia's population growing from 2.43 million in 2012 to between 4.10 and 5.03 million by 2038 (CAGR of 2.0% to 2.8%);
- The proportion of residents concentrated in the Greater Perth area increasing from 78% in 2012 to around 83% by 2038; and
- During this period Australia's population is projected to grow by between 1.2% and 1.7% per year. Western Australia's share of the Australian population increases from 11% to 14%.

Note that the CAGR in the estimated resident population of WA over the five years to 2017 of 1.2% is significantly below the ABS projected growth for 2011 to 2016, CAGR of 3.2%, and that of the WA Government, 2.6% (Table 3-5). The latest ABS figure for the estimated resident population of WA at June 2017 is around 9% below the ABS Series B projection for that year, and around 6% below the WA Tomorrow medium series projection.

Table 3-5: Population Projections for Western Australia to 2038

Population at 30 June	**Estimated Resident Population**			**Projections for Specified Years ('000**				**CAGR Projections**		
	2016 ('000)	2017 ('000)	CAGR 2012-2017	2016	2021	2026	2038	2011-2016	2016-2026	2026-2038
				WA Govt – Medium Series (2013 base year)						
Metropolitan Perth				2,002	2,245	2,489	n.a.	2.8%	2.2%	n.a.
Other WA				676	731	786	n.a.	2.2%	1.5%	n.a.
WA	**2,559**	**2,580**	**1.2%**	**2,677**	**2,976**	**3,274**	**4,071**	**2.6%**	**2.0%**	**1.8%**
Kalgoorlie (LGA)	**30.9**	**30.7**	**-1.4%**	**34.7**	**35.9**	**37.0**	**n.a.**	**1.5%**	**0.7%**	**n.a.**
				ABS – Series B (2012 base year)						
Greater Perth	2,022	2,043	1.5%	2,181	2,532	2,889	3,754	3.5%	2.4%	2.2%
Balance WA	536.9	537.2	0.2%	575	626	675	782	2.0%	1.3%	1.2%
WA	**2,559**	**2,580**	**1.2%**	**2,756**	**3,158**	**3,564**	**4,536**	**3.2%**	**2.2%**	**2.0%**

Note: May not add due to rounding. Source: ABS 3101.0 Australian Demographic Statistics; ABS 3218.0 Regional Population Growth, Australia; Western Australia Tomorrow, Population Report No. 10, Medium-term Forecasts for Western Australia 2014-2026 and Sub-regions 2016-2026, and Population Report No. 9, Long Term Population Forecasts for Western Australia, 2031 to 2061 (July 2015); ABS 3222.0 Population Projections, Australia, 2012 (base) to 2101 (November 2013

National Domestic Airline Capacity

In the near-term, domestic airline capacity is expected to decline with delays in delivery of new generation aircraft. As a key driver to airport operations, the basis of this Master Plan update considers these changes to the domestic airline market and development options.

3.4.7 Qantas Group

- Qantas Group Domestic capacity for FY18 was down -1.8% on FY17; Qantas/QantasLink capacity declined by -2.4% and Jetstar by -0.6%. Over the two-year period, FY18 over FY16, Qantas Group domestic capacity is down -3.5%. First half FY19 domestic capacity is expected to be flat compared with the same period FY18.
- The "right-sizing" of aircraft on domestic routes continues, down-gauging A330 services to B737-800 services, and B737-800 services to B717 and F100 services;
- Qantas received four new passenger aircraft during FY18, all B787-9s, with one B747-400 retired;
- Replacement of the current Jetstar A320/A321 fleet with NEOs is now to commence from mid-2020 (had previously been deferred from late-2017 until FY19). The first 18 NEOS, all 232-seat A321LRs, are to be delivered over a two-year period. These will replace 22 of the oldest A320/321ceos for use on domestic and international routes; the other A320/321ceos are being refurbished (with an A320 seat increase from 180 to 186). Qantas reports that it retains flexibility with the sequencing of the rest of its NEO order, which currently comprises another 27 A321neos and 54 A320neos (186 seats). The order is primarily focused on aircraft replacement but with scope to allow for growth depending on market conditions.
- Two A320s were transferred from Jetstar to Network Aviation in March 2018 to service the intra WA resources market. The QantasLink/Network Aviation fleet also comprises 20 B717s (12 previously reconfigured to include a business class), 45 turboprops (currently being refurbished) and 17 F100s.

3.4.8 Virgin Australia

- Virgin Australia Domestic capacity was relatively stable during FY18, increasing by just 0.1% over FY17. Tigerair capacity declined by -3.0% over the same period (note that this result includes the three Denpasar services which were operating during 1H17).
- Virgin received five new B737-800s during FY18 (the last on order). With first delivery of the 40 B737MAX aircraft on order earlier delayed from 2018 to the final quarter of CY19, Virgin's next new aircraft delivery, a MAX-8, is expected in November 2019 (FY20);
- Orders for 10 of the B737MAX-8 aircraft have been converted to orders for the MAX-10 variant, with first deliveries to commence in 2022;
- Tigerair's B737s which had operated to Denpasar have been deployed on domestic routes since early 2017. Tigerair surplus aircraft exited the fleet during early-2018, with its A320 fleet reduced to 12 (down from 14); one A320 moved to the Virgin Australia Regional fleet (taking total

to three) and one exited the fleet. Virgin had earlier announced that it was "fast tracking" the replacement of the Tigerair A320 fleet with B737s (previously planned over three years from mid-2016). The current Tigerair B737 fleet remains at three.

- The last of Virgin's E190s exited the fleet in January 2018; 18 had been in the fleet two years earlier;
- ATR operations have been reduced and the Queensland ATR base closed. Six ATR72-500s have now left the fleet, and with two ATR72-600s earlier planned for removal the total ATR fleet would be reduced from 14 (at December 2016) to six;
- The Virgin Australia Regional Airline fleet, comprising 14 Fokker 100s and three A320 aircraft, operates to mine sites and regional destinations across WA including Kalgoorlie, Geraldton, Newman, Karratha, Port Hedland, Broome, Kununurra and Onslow; and
- Virgin Australia had completed its acquisition of Skywest Airlines in April 2013 enabling growth in the fly-in-fly-out and regional markets including Western Australia. In May 2017 Virgin Australia and Alliance Aviation received approval for a five-year strategic partnership to jointly grow their charter businesses.

3.4.9 Alliance Airlines

- Alliance Airlines is a major supplier of FIFO air charter services for the Australian resources industry in addition to providing regular public transport (RPT) services to regional ports and providing services on behalf of Virgin Australia and other operators;
- Four aircraft were added to the fleet during FY18, taking the total to 33 (19 F100s, nine F70s and five F50s). During FY19 another five F100 and four F70 aircraft are to enter service. By the end-FY19 the expected fleet size will increase to 42.
- Alliance expects contract flying to increase during FY19 as extra demand for services are requested from the resources sector. Long term tourism contracts and long term contracted wet lease hours are also expected to increase.

3.4.10 Regional Express (Rex)

- Rex Domestic capacity declined by -3.5% during FY18. Over the same period the load factor on Rex services increased to 61.3%, up from 57.3% in FY17;
- In early 2018 Rex was awarded the regulated Perth-Carnarvon/Monkey Mia route by the WA Government. Rex had commenced service on the WA State Government regulated routes of Perth/Albany and Perth/Esperance two years previous.
- Rex has implemented its Community Fare Scheme on the three WA routes. The Rex Community Fare Scheme results from partnership agreements with local councils and airport owners aiming to ensure fare affordability and to foster passenger growth.
- An additional Saab340B aircraft was acquired for the new WA route, taking the total fleet to 57 at June 2018.

3.5 Kalgoorlie-Boulder Economic Structure & Performance

3.5.1 Economic Structure

Mining continues to play a large role in the economy of Kalgoorlie Boulder. Table 3-6 shows the proportion of jobs by industry for Kalgoorlie Boulder, it is substantially above the overall performance for WA and Australia Goldfields Esperance Development Commission (GEDC), Western Australia and Australia.

Jobs in mining Kalgoorlie Boulder accounted for 22% of all jobs in 2011 increasing to 33% by 2016. Whilst this is lower than for the GEDC Region

Table 3-6: Jobs by Industry for Kalgoorlie Boulder, Goldfields Esperance, WA and Australia, 2011 and 2016

Industry Sector	Kalgoorlie-Boulder		Goldfields Esperance		Western Australia		Australia	
	2011	2016	2011	2016	2011	2016	2011	2016
Accommodation & Food Services	7.8%	8.1%	7.0%	6.9%	7.9%	9.2%	8.9%	10.0%
Administrative & Support Services	3.4%	3.9%	2.6%	3.3%	4.2%	4.7%	4.4%	5.0%
Agriculture, Forestry & Fishing	0.4%	0.3%	5.3%	5.8%	3.2%	3.5%	3.4%	3.6%
Construction	10.6%	9.8%	8.5%	7.8%	13.9%	14.2%	11.3%	12.4%
Electricity, Gas, Water & Waste Services	1.3%	1.4%	0.9%	0.9%	1.5%	1.7%	1.6%	1.6%
Financial & Insurance Services	1.8%	1.3%	1.3%	1.0%	3.4%	3.4%	5.2%	5.2%
Information Media & Telecommunications	1.2%	0.9%	0.7%	0.6%	1.4%	1.4%	2.4%	2.4%
Manufacturing	9.6%	5.9%	8.7%	4.9%	11.0%	8.0%	12.3%	9.3%
Mining	**22.3%**	**32.7%**	**33.6%**	**41.0%**	**8.6%**	**9.4%**	**2.4%**	**2.4%**
Professional, Scientific & Technical Services	5.7%	3.8%	3.7%	2.9%	9.7%	9.2%	10.0%	10.6%
Public Administration & Safety	7.3%	7.3%	6.7%	5.9%	8.4%	8.9%	9.4%	9.7%
Rental, Hiring & Real Estate Services	3.1%	2.5%	1.8%	1.6%	2.3%	2.5%	2.2%	2.5%
Retail Trade	13.0%	11.0%	9.3%	8.5%	13.5%	13.6%	14.4%	14.3%
Transport, Postal & Warehousing	7.6%	8.1%	6.5%	6.8%	6.1%	6.6%	6.5%	6.8%
Wholesale Trade	5.0%	2.9%	3.4%	2.3%	4.7%	3.6%	5.5%	4.2%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Economic Performance

Table 3-7 below shows population, population growth, unemployment rates and annual change (%) for a number of economic indicators for Kalgoorlie Boulder. The performance is highly variable over the period with GRP falling over FY14 to FY16 before a substantial increase in FY17.

The unemployment rate appears to be falling (down to 3.4% in the first three quarters of FY18).

Table 3-7: Population and Economic Indicators for Kalgoorlie Boulder

	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
Population	31,474	31,750	32,208	32,866	33,343	32,566	31,788	30,871	30,695
Population - Annual Change	1.8%	0.9%	1.4%	2.0%	1.5%	-2.3%	-2.4%	-2.9%	-0.6%
Unemployment Rate						4.9%	4.2%	4.5%	3.8%
Annual Change									
Gross Regional Product (GRP)	11.7%	19.8%	11.2%	-33.6%	10.2%	-6.6%	-10.2%	-4.5%	19.3%
GRP per Capita	9.9%	18.9%	9.8%	-35.6%	8.7%	--4.3%	-7.8%	-1.6%	19.9%
Residential Build Approvals	-10.9%	8.4%	-17.8%	-37.2%	28.9%	6.1%	-41.2%	15.5%	-44.2%
Non-Residential Build Approvals	39.1%	37.6%	-0.2%	-18.3%	2.8%	477.8%	-64.5%	-69.8%	-9.5%

Source: Remplan, Australian Bureau of Statistics

3.6 Mining Prospects

The Kalgoorlie Consolidated Gold Mines Pty Ltd (KCGM) Fimiston Open Pit (Super Pit) sits on the outskirts of Kalgoorlie–Boulder and is the largest open pit gold mine in Australia. KCGM Operations also include the Mt Charlotte Underground Mine and the Fimiston and Gidji Processing Plants. KCGM indicates that it has a policy of residential employment[3], supporting around 1,100 direct employees and contractors, and has estimated that it

accounts for 20% of employment in Kalgoorlie-Boulder either directly or indirectly. Data collected by the WA DMIRS indicates that during FY17 KCGM employed an average of 2,328 individual employees on site (1,545 full time equivalents). Workforce numbers are expected to reduce as the mine moves to processing activities only.
KCGM also indicates that it has, by resource industry standards, a high proportion of local suppliers (29% in 2015). Expenditure on local procurement will decrease as the mine moves to processing only.
KCGM has announced progressive updates to the expected end of production at the mine site. The current Life of Mine Plan sees the Mt Charlotte underground mining finishing around 2024 and the Fimiston Open Pit mining around 2026, with mineral processing extended to 2034. The latest five-year extension to closure of the Super Pit from 2021 to 2026 is based on an approved expansion and deepening of the mine, and the Brownhill and Morrison cutback projects (mining in the current Golden Pike area is still expected to finish in 2021). KCGM reports that it continues to look for opportunities to extend the mine life.

The WA State Government has recently announced the creation of a taskforce to capitalise on the opportunities presented by the current lithium boom. The Government notes that Western Australia is the world's leading producer of lithium, uniquely placed to capitalise on the rising growth of battery use and technologies and with potential to increase downstream processing of lithium and other energy materials. A recently released report, '*Lithium Valley: Establishing the Case for Energy Metals and Battery Manufacturing in Western Australia*' published by Regional Development Australia, proposes that increasing the value added to Lithium (and the other battery metals) prior to export, could be the basis for the next stage of industrial development and economic expansion for Western Australia. The potential state-wide industry employment generated through to 2025 is estimated at around 21,500 direct jobs and 53,700 indirect jobs, with an additional 12,300 construction jobs expected to be created.

As at February 2018 there were four WA lithium operating mines, (Greenbushes, Mt Marion, Mt Cattlin and Wodgina) with all lithium exported as concentrate. More recently lithium concentrate

production commenced at Tawana Resources' Bald Hill mine in the Eastern Goldfields region and Pilbara Minerals has produced first concentrate at the Pilgangoora lithium-tantalum project. Kidman Resources' Mt Holland project near Southern Cross is under development, with a proposed refinery to be located at Kwinana.

The Mt Marion mine is located around 40km south west of Kalgoorlie and lithium is seen as important to Kalgoorlie-Boulder's future mining economy:

- Neometals has recently announced plans to build a downstream processing plant in Kalgoorlie-Boulder, at a cost of about $200 million, which is expected to create more than 100 jobs. A memorandum of understanding has been signed with the City of Kalgoorlie-Boulder to assist with connection to infrastructure and procurement of utilities for the plant. A final investment decision for the Kalgoorlie Lithium Refinery project is proposed for mid-2019, with construction commencing during FY19-20 and commissioning in mid-CY2021. Neometals has a 13.8% stake in the Mt Marion Lithium project and a 100% holding of the Mt Edwards Lithium project (south of Mt Marion).
- While Heron Resources had moved its attention away from its proposed Kalgoorlie Nickel Project (85 km north of Kalgoorlie), Ardea Resources, a wholly owned subsidiary of Heron, is advancing its Goongarrie Nickel Cobalt Project (part of the broader Kalgoorlie Nickel Project). Cobalt is a necessary metal for the production of the lithium-

ion batteries. Adrea is proposing an investment decision in mid-2019, with construction commencing during 2020/2021 and production over 2021/2022.

The latest listing of major and energy projects in Australia released by the Office of Chief Economist (December 2017) shows a number of projects in the Kalgoorlie area in varying stages of development. Table 3-8 shows expected employment for these projects for both the construction phase and the operational phase (where available).

Note that there has been a more recent merger announcement by Excelsior Gold and Spitfire Materials – the merger is reported to potentially provide the critical mass required to accelerate development plans of a combined Kalgoorlie North and Aphrodite gold projects, aimed at the creation of a substantial new long-term gold production hub near Kalgoorlie. Note also the change of focus of the Heron Resources project as discussed above.

Table 3-8: Major Minerals Development Projects, Kalgoorlie Area, December 2017

Project	Company	Location	Status	Expected Start-up	Capital Expend.	Employment(c)
Gold						
Aphrodite Gold Project	Spitfire Materials(a)	65km N of Kalgoorlie	New project, feasibility stage	2023+	$0-250m	na
Bullabulling	Norton Gold Fields	70km SW of Kalgoorlie	Redevelopment, feasibility stage	2023	$346m	na
Kalgoorlie North	Excelsior Gold(a)	45km N of Kalgoorlie	New project, feasibility stage	2022	$0-250m	na
Other						
Moonshine Magnetite	Macarthur Minerals	150km NW of Kalgoorlie,	New project, publicly announced	na	$2.5-5b	na
Kalgoorlie Nickel Project	Heron Resources(a)	85km N of Kalgoorlie	New project, publicly announced	na	$472m	1000 (C) 300 (O)

Note: (a) Spitfire Materials acquired the Aphrodite Gold Project in early 2018 following a merger with Aphrodite Gold; Spitfire and Excelsior have announced a recent merger. (d)Ardea Resources, a wholly owned subsidiary of Heron, is advancing its Goongarrie Nickel Cobalt Project (part of the broader Kalgoorlie Nickel Project). (c)Estimated construction employment (C) and operational (O).
Source: Australian Department of Industry, Innovation and Science, Office of Chief Economist.

Existing Operations

4 Existing Airport Operations

4.1 Introduction

The airport provides a key transport link for the mining industry and the distance of the City from the State capital makes air transport a popular means of travel.

In 1992, the City of Kalgoorlie-Boulder constructed a new terminal; two new illuminated runways and associated taxiways; roads and other external engineering works. Several facilities which previously formed part of the old airport (hangars, maintenance sheds, office buildings, etc.) were retained within the new airport boundaries.

The airport has continued to be subject to on-going development. In 1995 the RFDS completed a new airport-based regional administration and operations facility. In 1996 Air BP/Mobil relocated their fuel storage facility to a more central location within the airport and later established a self - service fuel carnet Avgas bowser. Taxiway C has been extended to the full length of Runway 18/36; the terminal has doubled in size, as has the RPT apron; a new freight handling facility has been constructed, and a new airport workshop and maintenance compound has been established. The runway/taxiway lighting system has been upgraded. In 2009 the Qantas Regional Lounge and administration offices were revamped; a new checked baggage screening and baggage conveyance systems was installed; and a common user check-in counter arrangement was introduced. The northern end of Taxiway Charlie has been resurfaced in 2015. In 2016 runway lighting and cabling had been replaced.

Figure 1 and 10 shows the existing airport boundary and terminal areas.

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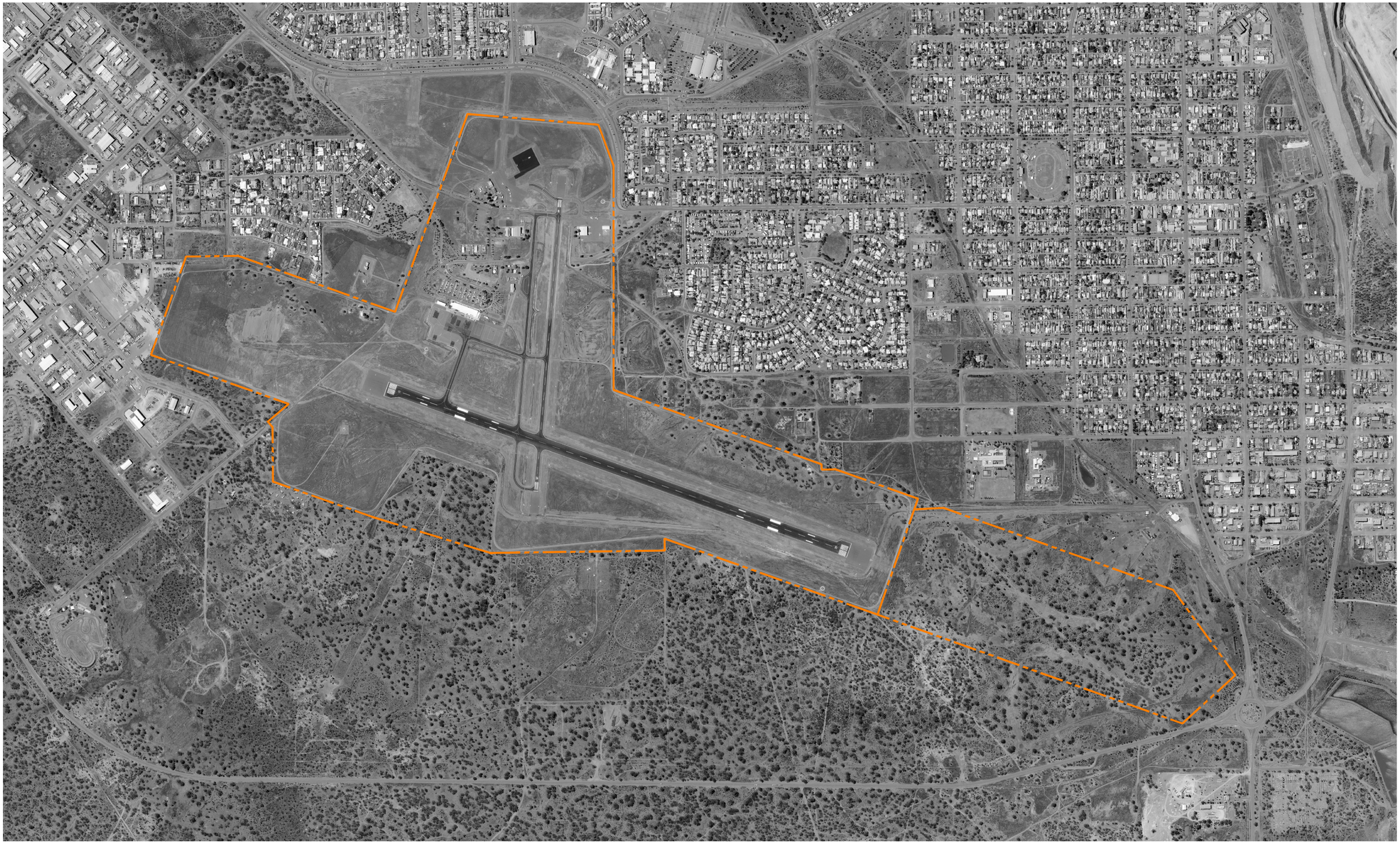

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N

SCALE

0 375 750m

Kalgoorlie Airport Master Plan

Existing Airport Boundary

FIGURE 1

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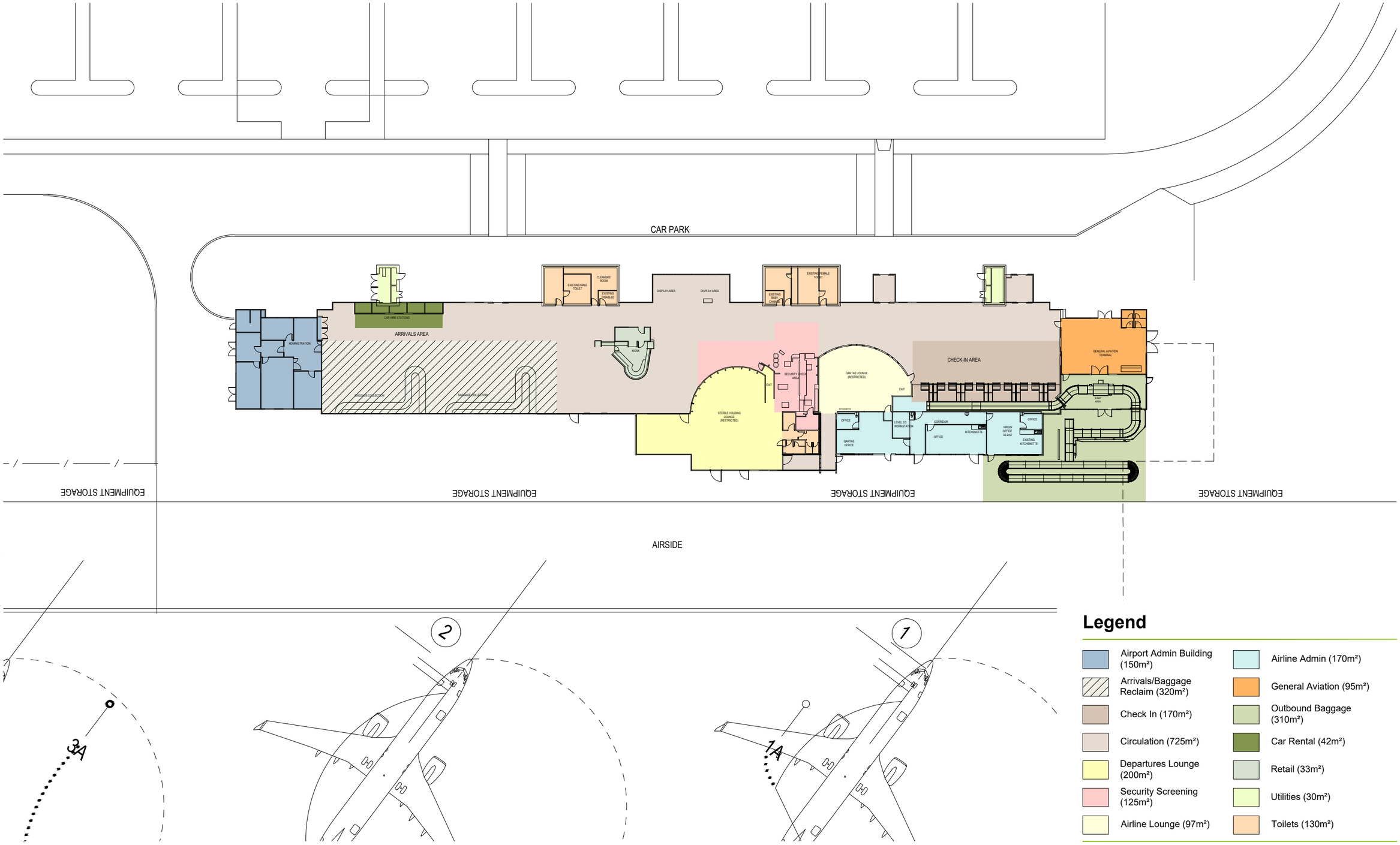

Legend

- Airport Admin Building (150m²)
- Airline Admin (170m²)
- Arrivals/Baggage Reclaim (320m²)
- General Aviation (95m²)
- Check In (170m²)
- Outbound Baggage (310m²)
- Circulation (725m²)
- Car Rental (42m²)
- Departures Lounge (200m²)
- Retail (33m²)
- Security Screening (125m²)
- Utilities (30m²)
- Airline Lounge (97m²)
- Toilets (130m²)

SCALE
0 12.5 25m

Kalgoorlie Airport Master Plan

Existing Terminal Area

FIGURE 10

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There are intermittent helicopter transits through the airport when crossing west coast to east coast. These include Sikorsky Black Hawk and MRH-90 Taipan helicopters operated by the Australian Army.

There is limited use of the aerodrome by private aircraft however the airport plays an important role in facilitating the fly-in fly-out (FIFO) workforce that support mining and associated services around the Goldfields. The remoteness of mine sites necessitates the operation of private airstrips by mining companies. Tropicana Gold Mine east of Kalgoorlie-Boulder is an example of a miner-operated airstrip. The alternative to flying workers directly to airstrips, is a 16-hour bus trip.

With improving transport networks and a pipeline of infrastructure initiatives in the Goldfields region, Kalgoorlie-Boulder Airport is well positioned to be the airfield of choice to service mining operations and an alternative to private airstrips.

In consultation with Qantas Group and Virgin Australia, there are no immediate plans to alter the aircraft mix currently operating at Kalgoorlie-Boulder Airport. Larger Boeing 787 and Airbus A350 aircraft operate routes at Perth Airport which needs to be taken into consideration as Kalgoorlie-Boulder Airport currently acts as an alternate airport for Perth.

4.3 Runways

Kalgoorlie-Boulder Airport operate a two-runway system consisting of the main runway (Runway 11/29) and a secondary cross-runway (Runway 18/36).

Figure 4-2:Existing Runway and Taxiway Configuration

4.3.1 Main Runway 11/29

With an east-west orientation, the main runway is 2,000 meters long and 45 meters wide. There are turning nodes at each end. This runway can facilitate up to and including code D aircraft such as the Boeing 767-300.

The current length of the runway can accommodate smaller, longer-range aircraft capable of flying directly to destinations as far as South-East Asia and New Zealand. These include popular tourist destinations such as Denpasar, Bangkok and Queenstown.

Runway 11/29 has pilot activated Low Intensity Runway Lighting (LISR) and an Abbreviated T-shaped Visual Approach Slope Indicator System (AT-VASIS) located on the left-hand side of both runway approaches.

Radio landing aids for Kalgoorlie-Boulder Airport are available. These are operated by Airservices Australia.

4.3.2 Cross-Runway 18/36

Running a north-south orientation, the cross-runway runway is 1,200 meters long and 18 meters wide.

Like the main runway, Runway18/36 has pilot activated Low Intensity Runway Lighting (LISR) and an Abbreviated T-shaped Visual Approach Slope Indicator System (AT-VASIS) located on the left-hand side of both runway approaches.

It is geometrically suitable for aircraft typically below 5,700 kg Maximum Take-off Weight (MTOW) although planning for obstacle control is based on Code 2 Instrument Non-precision standards.

4.4 Taxiways

Kalgoorlie-Boulder Airport consists of five taxiways of varying operational capabilities.

There are two stub taxiways in Bravo and Echo connecting Runway 11/29 and Runway 18/36 respectively. Taxiway Bravo connects Runway 11/29 to the RPT apron. Taxiway Echo allows access between the RPT apron and GA apron. Figure 4-3 on the right illustrates the layout

The 18-meter-wide Taxiway Bravo is designed to cater for Code C aircraft but can additionally support Code D aircraft. This allows aircraft up to the specifications of a Boeing 767-300 to utilise Kalgoorlie-Boulder Airport as an Alternate Airport subject to dispensation provided by CASA.

The 10.5-meter-wide Taxiway Charlie is designed to cater for Code B aircraft and is a parallel taxiway to Runway 18/36 and extending its full length. This enables light aircraft to retract without interrupting the active movement area.

Taxiway Foxtrot and Golf are situated in the northern end of the airfield precinct servicing general aviation operations conducted by GAS and RFDS. These taxiways are 10.5 meters wide and designed for Code B aircraft.

Taxiway Foxtrot enables access to the northern threshold of Runway 18/36 and links the decentralised operations of GAS flight training school and maintenance hangar to charter services operated from the west of Runway 18/36. The RFDS also operate west of Runway 18/36.

Taxiway Golf provides a secondary link in addition to Taxiway Foxtrot between GAS facilities east and west of Runway 18/36.

All taxiways have taxiway edge lights.

Figure 4-3: Taxiway Bravo and Echo

Aircraft predominantly utilising the northern taxiways are listed in Table 4-2:

Table 4-2: Typical aircraft operations in northern taxiways

Goldfield Aviation Services	Royal Flying Doctor Service
Beechcraft B200 Super King Air	Pilatus PC-12
Beechcraft C90 King Air	
Cessna 402C	
Cessna 310R	
Cessna 172	
Cessna 182T	

4.5 Aprons

Kalgoorlie-Boulder Airport maintain both RPT and GA aprons.

The RPT apron is approximately 27,000m^2 with five narrow-body aircraft parking positions. The apron is capable of two wide-body aircraft parking positions by restricting three narrow-body positions. Table 4-3 illustrates the different bays which either narrow body or wide body aircraft can operate on:

Table 4-3: RPT apron parking mix

Parking Mix	Parking Bay						
	1	1A	2	3	3A	4	5
Narrow body	✓	×	✓	✓	×	✓	✓
Wide body	×	✓	×	×	✓	✓	✓

Examples of typical widebody aircraft are the Airbus A330 and Boeing 787.

There are additional Code B aircraft parking situated east of parking bay one (Figure 4-4). These positions provide additional parking including let down and pick up close to the airport terminal building.

The original airport apron to the north of the terminal have been retained for use by fixed base and itinerant general aviation aircraft and are located at the north western end of runway 18/36. Sealed apron exists in the front of GAS charter services, RFDS and the GAS flight school and hangar facilities.

The RPT and GA terminal apron pavement has an asphalt surface finish. The RPT apron is equipped with floodlights located on the terminal side and south side of the apron providing illumination that meets the regulatory standards.

Figure 4-4: Code B Apron

4.6 Air Traffic Services

Kalgoorlie-Boulder is a non-controlled aerodrome in Class G airspace with a dedicated Common Traffic Advisory Frequency (CTAF) and has a requirement for the mandatory carriage and use of radio; that is, it is designated as a CTAF(R) aerodrome. There is no local radar coverage in the area surrounding Kalgoorlie-Boulder Airport. A Directed Traffic Information (DTI) service is provided from Melbourne Centre by en-route controllers to aircraft operating under Instrument Flight Rules (IFR) who request the service. A flight following service is provided, on request, according to normal controller workload priorities for aircraft operating under Visual Flight Rules (VFR). There is a Bureau of Meteorology tower located west of the terminal.

4.7 General Aviation Facilities

GAS operate regular charter services from the northern apron area, west of Runway 18/36. Also, within this precinct, RFDS maintain a hangar and administrative buildings including a small visitors centre.

East of Runway 18/36 GAS general aviation facilities include a flight school, administrative and maintenance facilities and a hangar.

GAS currently operates 10 aircraft as part of their regular charter services around the region. The Royal Flying Doctor Service (RFDS) operate two aircraft for their medical evacuation operations. These aircraft are maintained at the RFDS Western Operations headquarters at Jandakot Airport in Perth.

Chartair operates services utilising the general aviation terminal located within the existing terminal building, directly adjacent the check-in hall.

4.8 Fuelling Facilities

The fuel facility at the Kalgoorlie-Boulder Airport is operated jointly by Air BP and Mobil. It is located off Taxiway Charlie north of Taxiway Echo. The depot has storage capacity for 75,000 litres of Avgas and 170,000 litres of Jet A1 held above ground in bunded surrounds. There are two refuelling vehicles, one each for the dispensing of Avgas and Jet A1.

4.9 Terminal Facilities

The main passenger terminal is approximately 2,300m^2 accommodating resident, FIFO and business passengers. The building contains all contemporary domestic airport facilities and amenities. These include check-in kiosks, conveyor belt baggage system, security screening, an airline lounge and a food and beverage service. In addition to passenger services, the terminal houses the administrative offices of airlines and airport management. The eastern end of the main terminal building holds a single general aviation zone.

Check-in, baggage handling and boarding processes are handled by Menzies Aviation on behalf of RPT airlines.

4.9.1 Check-In Facilities

There are 10 check-in counters inside the terminal building. Qantas Group and Virgin Australia are allocated four counters each and an additional two counters remain as spares. Table below lists the allocated check-in counters.

Table 4-4: Check-In counter allocations

Qantas Group	Virgin Australia	Spare Check-in Counters
Counters 1 - 4	Counters 7 - 10	Counters 5 - 6

4.9.2 Passenger Security Screening

There is a single security lane operated by third-party security provider MSS Security. An x-ray screening system is utilised for passenger screening prior to entering the gate lounge.

4.9.3 Baggage System

The outbound baggage system is conveyor operated and provides the link between checked bag drop and an outbound baggage carousel. Checked bag screening is conducted by x-ray located in a covered area east of the check-in zone. There are two baggage reclaim units located in the arrivals area of the terminal building.

4.9.4 Departure Lounge

The departure lounge for holding departing passengers located beyond passenger security screening can support up to 100 passengers. There are male and female toilets located in this area.

4.9.5 Airline Lounge

Qantas Group operate a passenger lounge west of the check-in zone. The lounge is open 60 minutes prior each Qantas service. Wireless internet is available for Qantas guests.

4.9.6 Passenger Amenities

A food and beverage kiosk is located landside between departures and arrivals zone. Car rental kiosks are lined adjacent to the baggage reclaim area. There are male, female and accessible toilets located on landside and airside. Additionally, there is a baby change room located in the departures zone.

4.9.7 Back of House Offices and Airport Administration Buildings

Located west of the baggage reclaim area, Kalgoorlie-Boulder Airport management offices are located. Additionally, there are 168m^2 of airline offices occupied by Qantas Group, Virgin Australia and Menzies Aviation.

4.10 Landside Facilities

The main access road to the passenger terminal building is Hart Kerspien Drive. Spurring from Gatacre Drive, it is a 1.3km distance to the terminal kerbside passing residential houses and recreational parks. A roundabout prior to arriving at the terminal car park provides access to the facilities of RFDS, GAS terminal and fuelling facilities.

A ring road circulates traffic past the terminal area as a one-way loop, which transitions from a single lane to three lanes adjacent to the terminal, to provide for two drop off lanes and one passing lane.

At the terminal kerbside, there are taxi pick-up and drop-off zones in addition to loading zones and disabled parking. Bus pick-up and drop-off zones are located adjacent to the terminal kerbside, catering to FIFO bussing services in addition to local bus chartering services.

The public car park charges $10 per day after the first 24 hours and includes 319 spaces. Car rental companies have 107 of these spaces allocated for their operations. There are three entry and egress points to the car park located off Hart Kerspien Drive.

There are car rental facilities located north of the car park.

4.11 Engineering Services and Utilities

The airport building sewerage disposal is via a gravity main which traverses south of the RFDS site, across runway 18/36 to link with the town sewerage disposal system at a point east of GAS administration building. Some existing and new facilities, which are remote from the deep sewer line, retain their own septic systems. All other facilities that are within 200 metres of the deep sewer line are connected.

Water to the airport is distributed from a 150 mm diameter main located on the east side of the airport. It crosses runway 18/36 to service the GA facilities and was an existing service prior to the upgrade of the airport in 1992.

A further distributor was installed from the existing service to provide mains water supply to the terminal building and a 260-kilolitre storage tank used for firefighting and domestic storage.

The tank and associated booster pump delivers water to the terminal and associated new building facilities through separate fire mains at a pressure that meets Building Code of Australia standards. Automatic initiation of fire booster pumps occur on water draw from the storage tank.
In the old airport area, occupied largely by GA tenants, is serviced by upgraded hydrants at mains pressure.
Mains power to and on the airport is reticulated underground. The Western Power underground service enters from the west side of the airport. Where possible, all power, water and sewerage services have been contained within the nominated service corridors.

A solar farm is located near the RPT terminal and additionally, solar panels are fixed on the roof of the RPT terminal.

Airfield Development Plan

5 Airfield Development Plan

5.1 Introduction

Airfield development at Kalgoorlie-Boulder Airport adheres to the planning principle of sustainable, scalable and incremental development to respond to shifts in air traffic demand. The key feature of proposed airfield development is to maximise the existing airfield capacity through operational optimisation before investing in significant capital investment. This operational optimisation is applied throughout the airfield system, from runways to aircraft apron areas.

Airfield demand is forecast to increase overtime and not only in its current composition of aircraft. Larger aircraft are increasingly the norm on east-west airline routes. The response to this trend will require Kalgoorlie-Boulder Airport to enhance its airfield to safely and efficiently facilitate larger and more sophisticated aircraft.

Phased implementation of runway extensions, apron areas, parallel taxiways and holding bays should be considered in order to increase system capacity in a cost-efficient manner as demand requires.

The planning of the airfield system for Kalgoorlie-Boulder Airport considers the following principles:

- A non-asset development plan which aims to maximise capacity of the existing airfield before considering airfield investment
- Incremental and scalable airfield infrastructure investment that remains flexible to the passenger and ATM forecast
- Runway extensions and taxiway development aligned with the appropriate design aircraft, take-off distances and,
- Cost effective development of taxiway infrastructure facilitating efficient aircraft movement throughout the airfield.

5.2 Airfield Planning Parameters

5.2.1 Critical Aircraft

The components of the airfield system are planned based on the operation of the most demanding physical characteristics of a particular aircraft type. This includes:

- Length and wingspan of aircraft for aircraft stand sizing and taxiway separations and,
- Outer Main Gear Wheel Span (OMGWS) for ground-based manoeuvring on airfield pavements

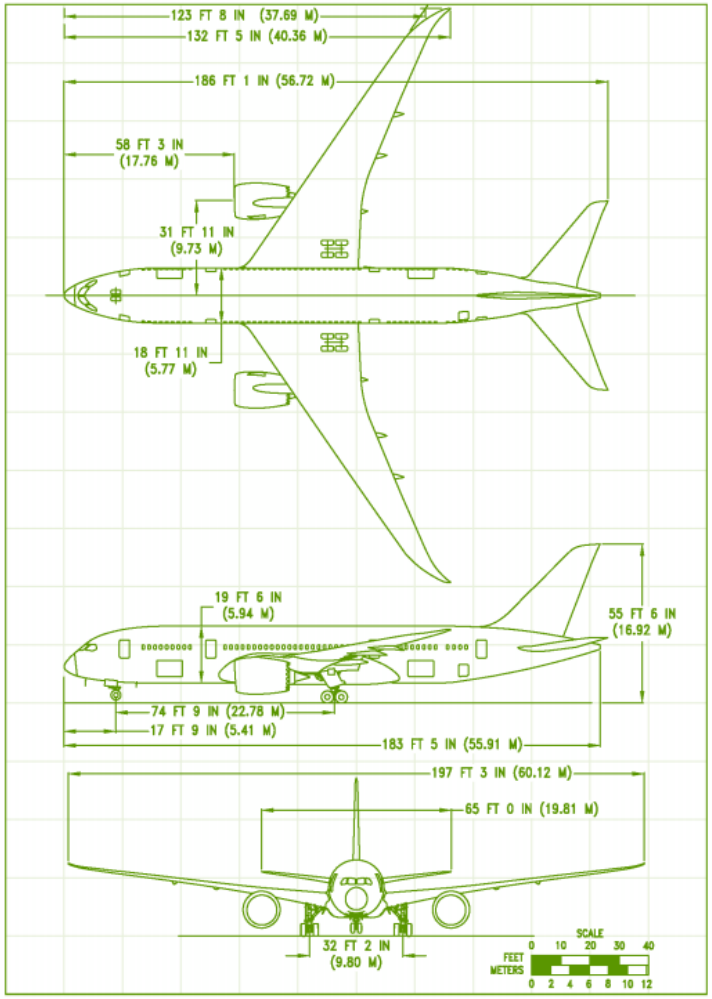
The 2011 Master Plan identified the growth of widebody aircraft in Australia and globally, in particular the more fuel-efficient Boeing 787 and Airbus A350 family. Consequently, the retirement of the smaller Boeing 767 family of aircraft requires the need to plan the airfield with the ability for Kalgoorlie-Boulder Airport as a diversion airfield for Perth.

The critical aircraft for Kalgoorlie-Boulder Airport is the Boeing 787-800 currently operating on the Melbourne-Perth-London route.

As noted in the 2011 Master Plan, a future runway length of 2,200 meters is sufficient for a Boeing 787-800 landing and restricted weight take-off, however further analysis of specific destinations and distances from KGI may offer variations to the future runway length requirements.

Figure 5-1 shows the general dimensions considered for the critical aircraft

Figure 5-1: General Dimensions of a Boeing 787-800



5.2.2 Airfield planning considerations

The airfield planning parameters anticipates the impending amendments to Annexure 14 provisions of the Convention on International Civil Aviation as determined by the International Civil Aviation Organisation (ICAO). This is supplementary to requirements from the CASA Manual of Standards (MoS) Part 139 for aerodromes. Importantly, the definition of the OMGWS which is the distance between the outside edges of the main gear wheels guide the planning principle related to ground based manoeuvring characteristics on the airfield. The airfield planning parameters assume that Kalgoorlie-Boulder Airport operates an ICAO Aerodrome Code 4.

Table 5-1: Airfield Planning Parametersidentifies the key planning parameters for the main runway.

Table 5-1: Airfield Planning Parameters

Criteria	**OMGWS (6m <>9m) ARC 2**	**OMGWS (9m <> 15m) ARC 4**
Applicable runway	Runway 18/36	Runway 11/29
Runway centreline – runway strip	45.0m	150.0m
Runway centreline – taxiway centreline	63.0m	182.5m
Runway width	30.0m	45.0m
Runway shoulder width (each side)	-	7.5m
Taxiway centreline – taxiway centreline	44.0m	76.0m
Taxiway width	15.0m	23.0m

5.3 Interim Airfield Development Plan

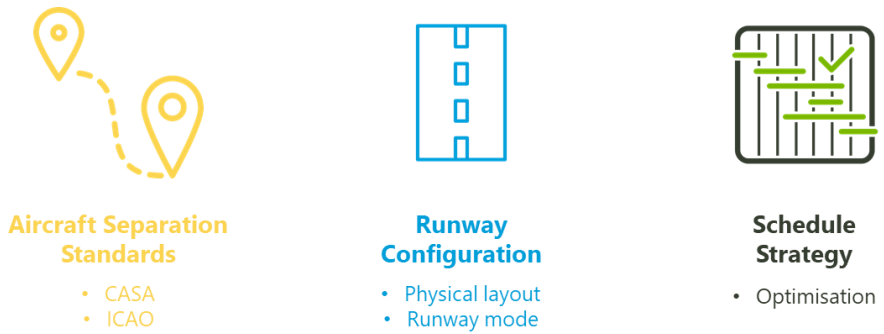
5.3.1 Operational Optimisation

Parallel airline schedules can be cause for congestion and delay at Kalgoorlie-Boulder Airport and this scheduling trend may increase in the long term.

Consistent with planning principles, runway and apron optimisation options have been identified and described in the following sections.

Runway capacity management strategies typically consistent of operational optimisation with respect to aircraft separation standards, runway configuration and schedule enhancement as shown in Figure 5-2 Runway Capacity Enhancement Strategies.

Figure 5-2 Runway Capacity Enhancement Strategies



Kalgoorlie-Boulder Airport has identified options that enhance capacity by implementing these strategies as demand for airspace and the airfield increase gradually.

Smaller capital investment solutions to aircraft apron optimisation solutions include the conversion of the existing power-in power-out operations to a power-in push back method.

Improvements to taxiway flow requires the investment in a parallel taxiway adjacent to Runway 11/29, which will additionally increase the efficiency of runway and apron operations in the longer term.

5.3.2 Main Runway 11/29

Runway expansion is commensurate with demand at the airport and no additional runway is required as part of this Master Plan.

Options are available to extend Runway 11/29 to the east by up to 1,000 metres and to the west by up to 500 metres as shown in Figure 4. To facilitate Boeing 787 and equivalent sized aircraft, an extension to Runway 11/29 by 200 meters is sufficient. The western extension option is possible within the current airport boundary. The benefits of this option are the efficient use of the airfield as it provides the closest distance the existing terminal apron areas and the proposed future apron expansion.

The eastern extension option requires acquisition by the airport of land comprising the former Boulder Golf Course reserve or significant parts thereof. It is understood that Council is supportive of transferring the Boulder Golf Course land to the airport for airport development, including the potential commercial development of land not required for airfield purposes (including possible future Category 1 approach lighting and perimeter road requirements).

5.3.3 Runway 18/36

No additional expansion to Runway 18/36 is required in this Master Plan as GA operations are sufficiently catered by the existing infrastructure.

5.3.4 Taxiways

Shown in Figure 4, a parallel taxiway on the north side of Runway 11/29 is proposed, including entry and exit points at appropriate distances to reduce runway occupancy times and reduced taxi distances to RPT apron. A parallel taxiway development is required when forecast air traffic movement sufficiently creates congestion to the taxiway system and runway occupancy times are higher than the service levels required.

If there is future demand for the facilitation of RPT Boeing 787 and equivalent aircraft, taxiway Bravo will require widening to 23 meters.

Aligned with demand, the development of a runway entry/exit taxiway at the end of the 200-meter extension would provide a circular flow as shown in Figure 2 an option for an additional stub taxiway is available to operate a circular flow within the taxiway system at Kalgoorlie-Boulder Airport.

An extension of Taxiway Charlie parallel to the end of Runway 18/36 is proposed to improve the efficiency of operations for the RFDS, GAS and future charter services in addition to improved access to fuelling facilities.

5.3.5 Aprons

The ultimate layout of the RPT apron for Kalgoorlie-Boulder Airport safeguards for nine Boeing 737/Airbus A320 positions and two Boeing 787 and equivalent aircraft as shown in Figure 4. This equates to approximately 2,000 available seat capacity within the busy hour.

As part of the staging of apron development, operational optimisation of the apron has been considered as an option. Power-in-power-out operations can be converted to power-in-push-back. This geometrical re-alignment of the apron allows for an additional Boeing 737 equivalent stand without significant investment in additional pavement areas. Note that additional ground handling equipment will be required to facilitate power-in-push back operations.

Demand for RPT apron expansion could be generated by charter or airline companies seeking to establish fly-in/fly out operations from a fixed base at Kalgoorlie-Boulder Airport. Under this scenario, there may be a need for consequential investment in associated infrastructure including terminal area and car parking above master planned

The RPT apron has expansion capacity both to the east and the west.

The Master Plan makes provision for expansion of the GA apron areas at the north west of the airport to match a corresponding building area development plan. A range of sites have been identified for private and commercial hangars with specific development size left to be determined by developer demand.

Two major GA apron sites for commercial development have been identified. One is associated with the building area allocation at the north of the airport for the establishment of a consolidated general aviation precinct. The other is south of the RFDS site on the west side of taxiway Charlie.

There is also potential for GA apron expansion on the eastern side of Runway 18/36. Maintaining Code C separation, there is adequate space for a Code B apron and associated aircraft facilities. Potentially up to 15 Code ‘B’ aircraft. This area can also flexibly have applied to a future freight precinct if demand can be established.

5.3.6 Navigational Aids

Precision Approach Path Indicators (PAPI) installations supersede or replace other visual approach slope indicator systems when practicably possible such as T-VASIS. Additionally, Airservices Australia promote the use of Ground Based Augmentation System (GBAS) and future Satellite-Based Augmentation System (SBAS). This system uses both space-based and ground-based infrastructure to improve the accuracy and integrity of basic Global Navigation Satellite System (GNSS) signals, such as those currently provided by the Global Positioning System (GPS). SBAS allows regional carriers who fly turboprop and smaller aircraft to reap the same benefits as larger aircraft without the need to install ILS infrastructure. The Master Plan considers the implementation of SBAS or GBAS when practicably required.

5.3.7 Helicopter Operations

There are intermittent helicopter operations at the airport. Typically, these are part of the Australian Defence Force. These operations can be adequately facilitated on stands 4 and 5 however relocation of helicopter parking should be considered if the power-in-push-back option is implemented at the airport in future.

5.4 Longer Term Airfield Development Plan

Figure 3 identifies and safeguards the airfield to be responsive to air traffic demand at Kalgoorlie-Boulder Airport. Key features of the ultimate layout include:

- Extension to Main Runway 11/29 eastward to a maximum length of 3,500m;
- Rapid Exit Taxiway (RET) on Runway 11 approach on Main Runway 11/29;
- Additional taxiways including a parallel taxiway north of Main Runway 11/29
- Additional narrowbody and widebody capable aircraft parking along the terminal building; and
- Strengthening of Code B aircraft parking area to be capable of facilitating larger Code C aircraft.

5.4.1 Consolidation of Existing General Aviation Precinct to the West of Cross-Runway 18/36

The longer-term development plan for the airfield includes the consolidation of the existing general aviation area occupied by GAS to a new purpose-built precinct to the west of Cross-Runway 18/36 (refer to Figure 5, Landside Development Plan). This will enable the areas along the east side of 11/36 to be developed as a dedicated freight precinct. The benefits of this layout are the economies of scale gained by consolidating to one aviation hub and opening opportunities for logistics businesses to service large scale cargo operations.

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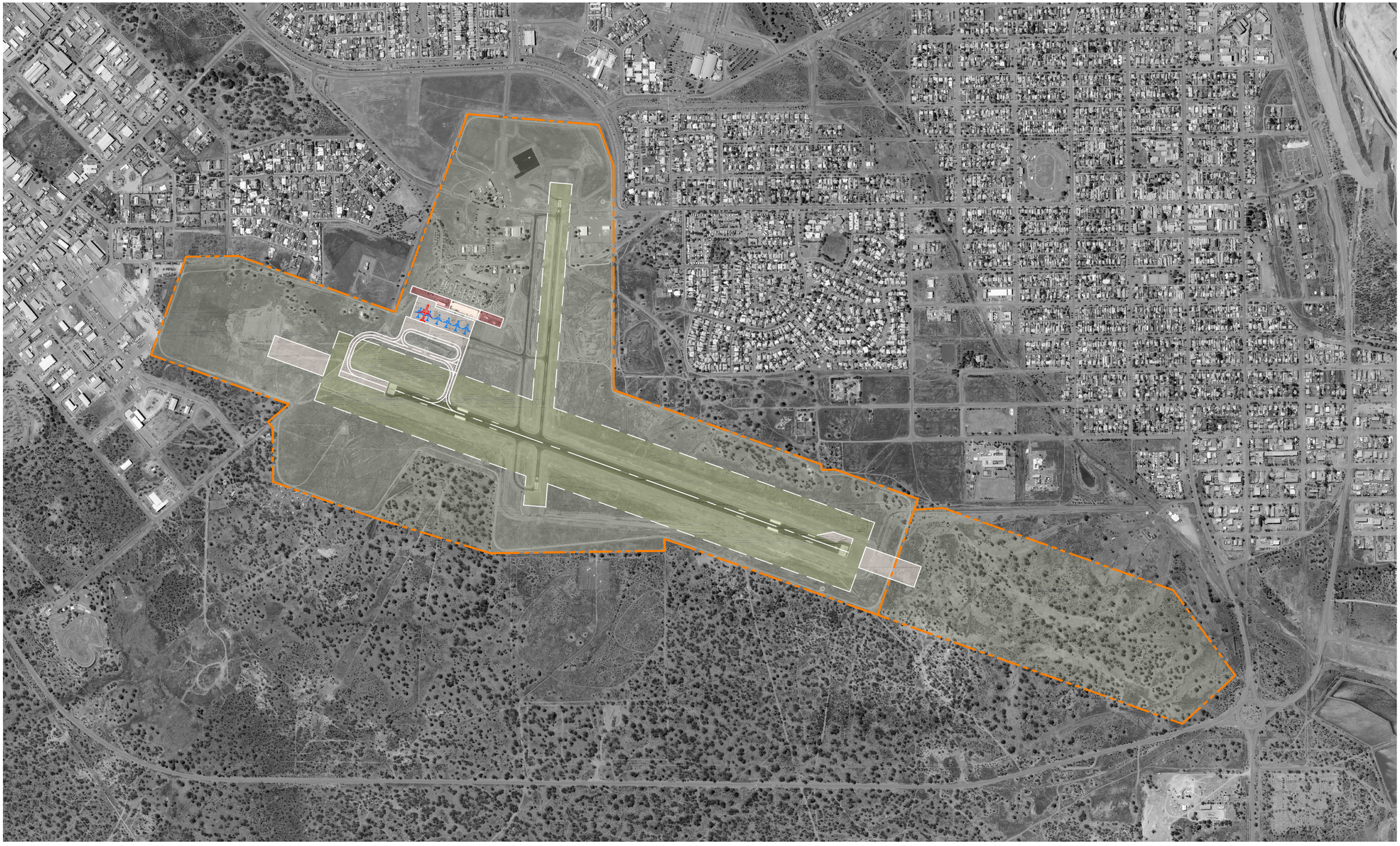

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Kalgoorlie Airport Master Plan

Interim Airport Development Plan

FIGURE 2

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Kalgoorlie Airport Master Plan

2032 Master Plan

FIGURE 3

6 Terminal Development Plan

6.1 Introduction

The guiding principle for terminal planning incorporates spatial optimisation before significant expansion to the terminal footprint. Additionally, staged adjustments to the terminal operations are considered prior to spatial changes. This may involve the adoption of technological enhancements to increase throughput (e.g. self-service check-in kiosks). The objective of the terminal development plan is to respond to forecast busy hour passenger demand. The principles in assessing the busy hour at Kalgoorlie-Boulder Airport applies generally accepted calculations from the International Air Transport Association (IATA).

6.2 Terminal Planning Parameters

Table 6-1 below shows the passenger parameter in assessing the size requirement within the existing, interim and longer-term layout of the terminal. Table 6-2 articulates the passenger demand in the terminal to the spatial requirements of the facility.

Table 6-1: Existing and Forecast Busy Hour Passenger Forecast

Parameter	2018	Forecast 2025	Forecast 2032
Total Passengers	270,000	308,000	375,000
Busy Hour Passengers	210	240	280

Table 6-2: Spatial Requirements - Key Passenger Areas

Parameter	Unit	Existing	2018 Requirement	2025 Requirement	2032 Requirement
Check-In	m^2	170	148	150	155
Security Screening	m^2	120	106	120	140
Departure Lounge	m^2	240	305	350	405
Arrivals Hall	m^2	350	180	205	240

6.3 Interim Terminal Development Plan

Figure 12 illustrates the plan for the interim development of the terminal area to respond to passenger demand and improve user experience.

6.3.1 Check-In and Bag Drop

The increased use of modern technology has changed the way that airports offer processing capability. The traditional airport processes such as check-in and the acceptance of checked baggage have changed significantly. The issuing of boarding passes and the issuing and application of bag tags is ever more frequently being dealt with remotely, giving more control and choice to the passenger. The advantage for all parties is less congestion at the airport due to quicker processing times. Removing processing from the terminal building helps to smooth the flow of passengers and improves the passenger experience holistically.

The next generation of airport processes at Kalgoorlie-Boulder is planned within the context of evolving passenger processing technologies and contemporary models for passenger and baggage check-in. This Master Plan considers reengineering the functionality and flexibility of next generation terminals.

This involves the optimisation of integrated systems of passenger processing that utilises the benefits of current and new technologies to supplement existing terminal process capacity at remote locations.

Existing and forecast busy hour passenger demand for the check-in process indicates adequate functional space and baggage injection points. With this increasing adoption of technology, the vision for Kalgoorlie-Boulder Airport is a shift to embracing self-service solutions and remote processing of passengers through the check-in process. This reduces the need for expansion to the existing check-in area whilst increasing the throughput capacity of the check-in process. In consultation with the airline and travelling community, the airport has reserved the option to implement the following initiatives:

- Conversion of check-in counters to self-service kiosks;
- Automated bag drop units to replace assisted checked bag process; and
- Reconfiguration of queuing areas to optimise passenger flows.

Based on passenger forecasts, an expansion to the check-in zone footprint is unlikely. Airline stakeholder engagement is critical to the implementation of the Interim Terminal Development Plan.

6.3.2 Security Screening

The Kalgoorlie-Boulder Airport vision for security screening is to promote a continuous journey from kerb to airside, where passengers proceed through security with minimal inconvenience, where security resources are allocated based on risk and where airport facilities are optimised.

Existing functional performance of the security screening point at the airport is approaching the threshold for optimal level of service. This congestion is further amplified by the current landside location of the food and beverage amenity which increases peak utilisation of the security screening point. Based on current busy hour passenger forecasts, the security screening point will require expansion by 2025.

Provisions are in place for evolving regulatory requirements related to enhanced screening procedures. The 2018 federal budget proposed the implementation of full body scanners at Australian domestic terminals which have insofar been a requirement at capital city airports with plans for scaling

the requirement to regional airports. The implementation of body scanners is likely to reduce throughput capacity because of longer security processes. There is likely to be increased spatial requirements to accommodate equipment associated to the change.

Kalgoorlie-Boulder Airport anticipates expansion to the security screening zone. The following initiatives have been considered to respond to additional requirements:

- An additional security screening lane to double capacity and enhance passenger experience;
- Provision of areas for implementation of Commonwealth mandated full body security scanners; and
- Reconfiguration of queuing areas to rationalise passenger flows and enhance intuitive wayfinding.

6.3.3 Departure Lounge

According to the IATA terminal guidelines, departure lounge should be an open, generous and unobstructed space. It should provide a calm environment with ample natural light and give passengers the opportunity to see aircraft. The airport's objective for the departure lounge experience includes:

- Adequate space and seating for passengers waiting for their gate;
- Integrated commercial offerings;
- Easily identifiable direct routings to allow passengers access to the gates; and
- Clear and obvious signage with intuitive orientation.

Currently, there is inadequate space to optimally provide an enhanced passenger experience in the departure lounge. In response, the development plan has considered minor adjustments to internal partitions to increase the area within the departure lounge in lieu of landside areas. This includes the relocation of food and beverage offering from landside to the departure lounge with added benefits including:

- Reduced congestion through the security screening point prior to boarding procedures;
- A relaxed and convenient orientation of licenced areas with direct site of aircraft;
- An immersive experience for passengers within the airport environs; and
- Incorporation of food and beverage areas with departure lounge to optimise seating space for passengers.

The plan considers additional toilet capacity airside to offset reduced areas landside. An option is considered for the use of existing toilets by airline lounge passenger to enhance the experience of frequent flyers.

Circulation flow between check-in and arrivals area of the terminal is severed inside the boundary of the terminal. Flow is retained kerbside for access between the areas. The impact of this change is limited given there is generally little requirement for departing passengers to access the arrivals area and vice versa. The rationale for this consideration relates to departing passenger flows are typically kerbside to airside gates. Arriving passengers generally continue through the arrivals area to car rentals or kerbside.

6.3.4 Airline Lounge

The development plan ensures that maximum value can be extracted for airline lounges and their customers at the airport as part of longer term expansion to the footprint of the terminal. The vision for airline lounges is to ensure a superior product for business and frequent flyer passengers with dedicated amenities and sufficient lettable space. Currently Qantas is the only airline to maintain an airline lounge facility. The airport has safeguarded terminal uses to allow for expansion in the terminal to accommodate additional airline lounge area shown in Figure 12.

6.3.5 Terminal Retail Development

Currently a single kiosk landside serves as the sole food and beverage tenant inside the terminal. In conjunction with the terminal development plan, the retail kiosk will be moved into the departures lounge.

As the terminal expands and develops, additional retail space has been reserved to allow for options to expand food and beverage offering or the inclusion of speciality retail stores.

Note that when the retail kiosk is relocated airside, there will be a requirement for goods screening. This will require security screening staff to be available when supplies are being delivered for the kiosk.

6.3.6 Outbound Baggage

Existing outbound baggage arrangements are adequate in response to demand. The facility has a modern and secure outbound baggage process to allow airlines to ensure efficient baggage make up procedures and a quick turnaround. There is a total of ten injection points for baggage.

6.3.7 General Aviation Terminal

The 24-hour operational status of Kalgoorlie-Boulder Airport is provided through the general aviation terminal. Currently this terminal area is used by charter operator Chartair and other general aviation operators. There is adequate space and processing capacity to enable a sustained operation through the general aviation terminal. This Master Plan envisions no further expansion to the general aviation terminal that is operated by the airport.

6.3.8 Back of House Offices

There are several airline staff offices in addition to rooms used by Menzies Aviation who provide ground handling activities at the airport. The facilities are adequate relative to usage demand. No further expansion is envisioned in this Master Plan horizon.

6.3.9 Baggage Reclaim and Arrivals Hall

The vision for the baggage reclaim and arrivals hall proposes a homogenous, unobstructed, single baggage claim hall, with ample circulation spaces and a central circulation strip leading logically from entrance to exit, taking into consideration not only passengers with baggage, but also passengers without baggage. Additionally, the arrivals hall development plan aims to create a connection between the facility and the city of Kalgoorlie-Boulder by communicating a sense of place.

The Master Plan retains similar sizing of the baggage reclaim and arrivals hall in the immediate and medium term by optimising the arrivals process. This enables the creation of a dedicated arrivals area with adequate space for trolleys and baggage reclaim requirements.

6.3.10 Car Rental

Car rental facilities are located in the arrivals hall of the terminal. Currently, five car rental operators occupy booths adjacent to the baggage reclaim belts. The Master Plan has reserved area along the existing line of booths for further expansion to car rental services within the terminal.

Under the staged development option of the terminal, access from the check-in area of is removed from within the terminal. Access to the car rental area is only available from kerbside entries.

6.3.11 Airport Administration Offices

Airport administration offices are retained in current location in both the staged and terminal expansion option. Access to the facility will continue to be available from within the terminal.

6.3.12 Access to Air Travel for Persons with Reduced Mobility

Kalgoorlie-Boulder Airport fully respects the needs of passengers with reduced mobility and offer the greatest possible travelling comfort. In addition to passengers, the development plan of the terminal is coherent with suitable workplaces to employees with reduced mobility.

The airport development plan is based on today's requirements and considers ageing populations with increasing number of passengers potentially requiring assistance.

Kalgoorlie-Boulder Airport plans with general considerations in place that provide facilities to people with reduced mobility that are:

- Suitably determined and sized to suit the needs of various user groups;
- Located and distributed logically through the terminal;
- Fully compliant with relevant legislation such as Western Australia Disability Services Act 1993 ; and
- Provisioned with staff to support and assist persons with reduced mobility.

This Master Plan considers the access implications for persons with reduced mobility in all development plans. Initiatives to improve access include but are not limited to:

- Appropriate wayfinding and public information signs that meet accessibility requirements;
- Travel distance between key processing areas in both landside and airside areas;
- Accessible toilet facilities that can facilitate wheelchair requirements;
- Installation of ramps in places where level changes are unavoidable; and
- Adequately available car parking bays with limited travel distances for persons.

6.4 Ultimate Terminal Development Plan

Figure 13 illustrates the longer-term terminal development plan.

The long-term development for the terminal combines an expansion to the footprint of the terminal and adoption of next generation technologies. This is to ensure that there is adequate space for the forecasted demand for the facility in addition to smart capacity management of key processing areas. With a focus on passengers and airport customers, the plan aims to ensure that there is a positive experience at Kalgoorlie-Boulder Airport as it is both the first and last impression of visitors and residents visiting the city and the

greater region. Responding to infrastructure expansion triggers, the key long-term expansion initiatives include:

- Extending the terminal towards the aircraft apron area, concurrently or subsequently to power-in-push back configuration of the RPT apron;
- Reintroduction of circulation space between check-in and arrivals areas;
- Next generation technology implementation at check-in and bag injection facilities;
- Safeguard for an additional security screening lane with reserves for full body scanners, walk-through metal detectors and Explosive Trace Detector (ETD);
- Additional queuing area in response to increasing throughput demand for security screening;
- Additional area for toilets in the departures lounge;
- Expanded airline lounge area for the facilitation of new airline lounges;
- Additional area safeguarded for an additional outbound baggage carousel;
- Safeguard for an additional baggage reclaim belt;
- Option to add additional car rental facilities in the arrivals hall; and
- Increased areas for retail offering of both food and beverage and specialised stores (e.g. newsagency, gift shop, etc).

The ultimate terminal development plan is forecast to provide approximately 2,000 seat capacity for Kalgoorlie-Boulder Airport.

The terminal area has been reserved both east and west of the existing boundary. Refer to Figure 5 for an illustration.

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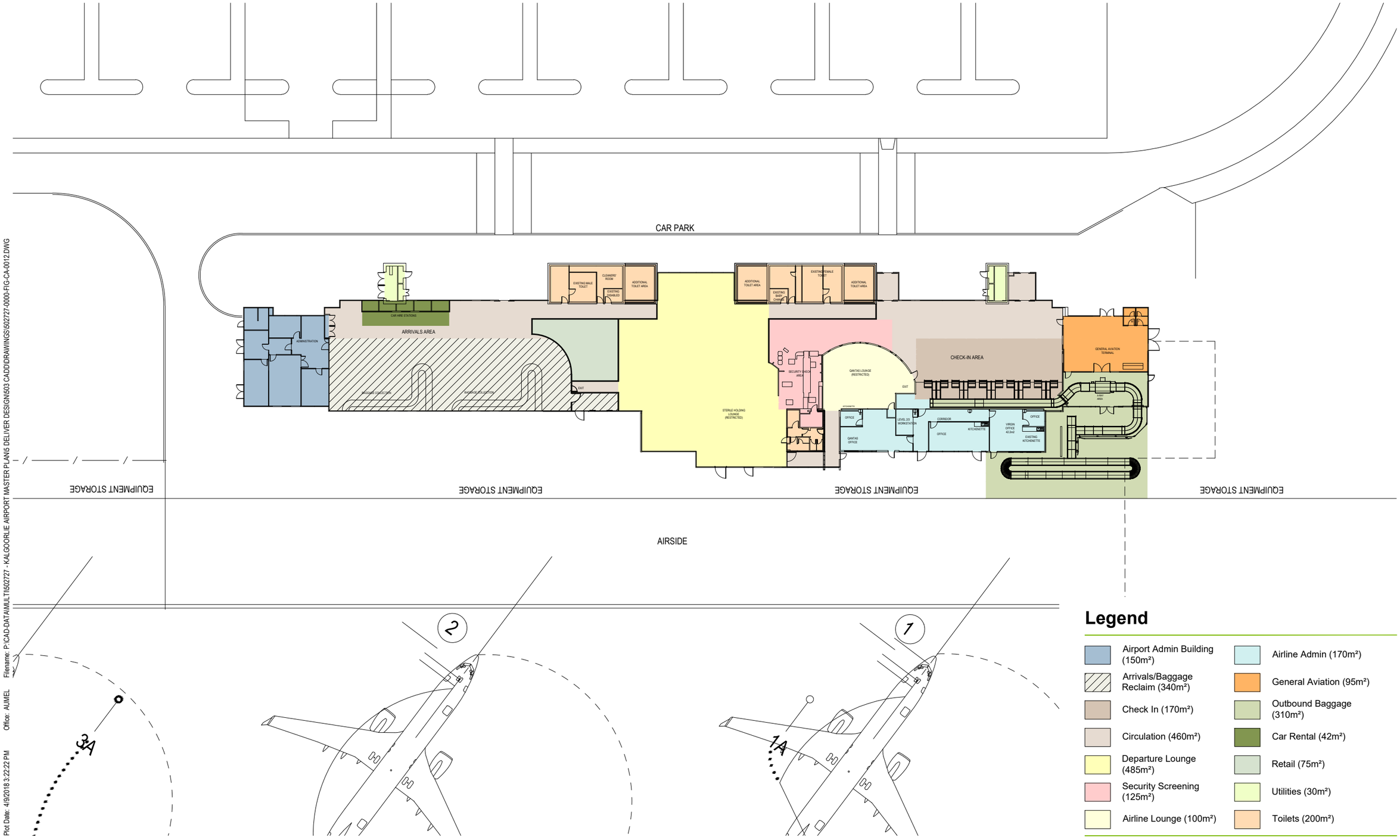

Legend

- Airport Admin Building (150m²)
- Airline Admin (170m²)
- Arrivals/Baggage Reclaim (340m²)
- General Aviation (95m²)
- Check In (170m²)
- Outbound Baggage (310m²)
- Circulation (460m²)
- Car Rental (42m²)
- Departure Lounge (485m²)
- Retail (75m²)
- Security Screening (125m²)
- Utilities (30m²)
- Airline Lounge (100m²)
- Toilets (200m²)

SCALE

0 12.5 25m

Kalgoorlie Airport Master Plan

Interim Terminal Development Plan

FIGURE 12

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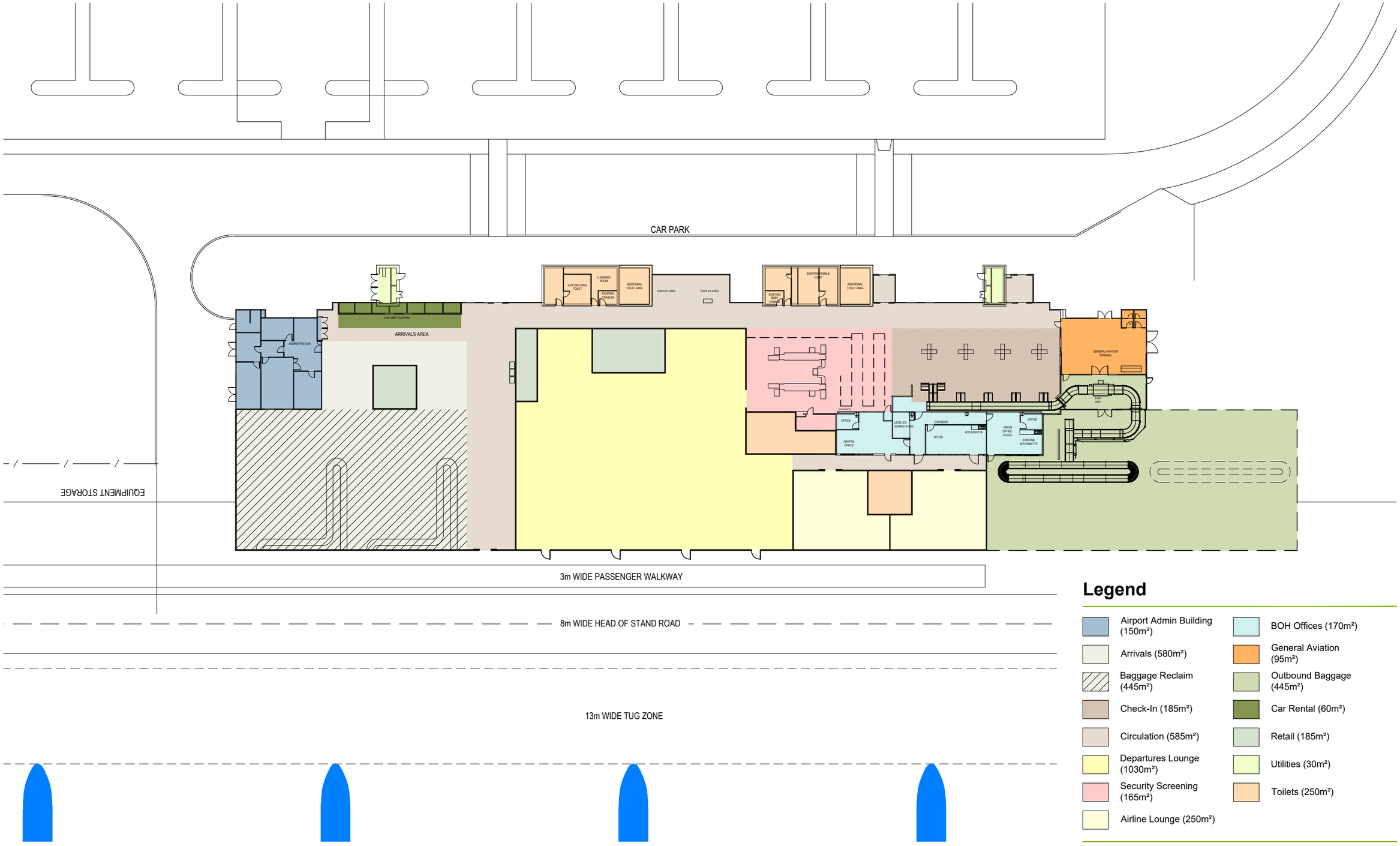

Legend

- Airport Admin Building (150m²)
- Arrivals (580m²)
- Baggage Reclaim (445m²)
- Check-In (185m²)
- Circulation (585m²)
- Departures Lounge (1030m²)
- Security Screening (165m²)
- Airline Lounge (250m²)
- BOH Offices (170m²)
- General Aviation (95m²)
- Outbound Baggage (445m²)
- Car Rental (60m²)
- Retail (185m²)
- Utilities (30m²)
- Toilets (250m²)

SCALE

0 12.5 25m

Kalgoorlie Airport Master Plan

2032 Terminal Development Plan

FIGURE 13

7 Parking and Surface Access Development Plan

7.1 Introduction

Surface access systems logically link the city traffic networks, the airport precinct and the airport traffic networks in a coherent and expandable way, with specific, dedicated and well separated provisions for the various functions and user groups. Surface access is embedded in a strategy to provide a sense of place on the landside campus, not only managing traffic, but also creating places of interest and visual appeal.

Generally, Kalgoorlie-Boulder Airport's surface access system aims to be:

- Clearly organised and considers all applicable traffic flow;
- Optimised vehicle and pedestrian flows;
- Scalable and expandable
- Focus on adequate parking facilities in addition to public transportation; and
- An intuitive and welcoming approach to the airport terminal.

7.2 Surface Access Planning

7.2.1 Main Access Road

Hart Kerspien Drive is the main access road to the landside and terminal facilities of Kalgoorlie-Boulder Airport. The road spurs from Gatacre Drive which in turn provides access to the Great Eastern Highway connecting the airport to the City of Kalgoorlie-Boulder and the greater region. At peak times, Hart Kerspien Drive has adequate capacity to provide efficient access to the kerbside of the terminal facility. Further, access to car rental facilities located north of the terminal precinct is served adequately by the roundabout on the approach from Hart Kerspien Drive. Additional capacity expansion of this road is not envisioned within the development plan.

A road reserve for additional access to the airport precinct is anticipated as an extension north of Greenhill Road. This extension is an enabler to land development to the General Aviation precinct of the airport in addition to providing a secondary route into the RPT terminal area.

7.2.2 Internal Airport Roads

As the commercial precinct expands north of and including the existing car rental facilities, there will be a requirement for additional internal airport roads to service the proposed land uses. This road reserve is shown in white in Figure 5.

7.2.3 Terminal Pick Up and Drop Off

Currently there are pick up and drop off facilities along the terminal kerbside with access to private vehicles and taxis. Adjacent to the taxi and private vehicle zone, there are bays available to buses. Kerbside capacity is adequate and further expansion will likely entail additional pick up and drop off facilities from inside the car park.

7.2.4 Car Parking

Expansion to the existing car park is a staged approach with the western portion of the car park expanded first in line with demand. Further expansion to the car park is considered north of the existing car park. Overall, an additional 15,000m^2 of car parking area has been reserved.

Commercial & Retail Development Plan

8 Commercial & Retail Development Plan

8.1 Introduction

As airports become increasingly integrated with the cities and the regions it serves, there is a growing need to facilitate complimentary commercial developments of the airport to help sustain airport revenue. Commercial developments serve as a function to de-risk passenger and aircraft movement related activities in the airport by diversifying businesses that are independent of air travel. Further synergies are attained from the economic profile of the City of Kalgoorlie-Boulder and the region to extract value from the prosperity of the community and industry. The overall objective is to continue to keep the airport precinct relevant and sustainable with a diversified portfolio of uses that complement aviation growth.

8.2 Airport Precincts and their Commercial Development Options

Figure 6 (at the back of this document) identifies the seven precincts at Kalgoorlie-Boulder Airport. These are:

- Terminal Precinct;
- Aviation Precinct;
- Airfield;
- Future Airfield;
- Freight Precinct;
- Renewable Energy Precinct; and
- Agriculture Precinct.

8.3 Terminal Precinct

The Terminal Precinct is at the core people movement area at Kalgoorlie-Boulder Airport. Refer to Figure 5 for an illustration of the possible development options.

8.3.1 Hotel Precinct

Kalgoorlie-Boulder enjoys a growing Aboriginal and cultural tourism sector and significant business visitation. Tourism is forecasted to experience strong growth in the economic zone. Kalgoorlie- Boulder is also considered the gateway to world-renowned art and natural attractions.

12,500m^2 has been reserved for the development of hotels adjacent to the western end of the terminal. This objective is to facilitate tourism and business travel to the city. This is an optimised location at the core of the airport activities which facilitates efficient transfers and can be integrated with next generation passenger efficiency technologies. This includes but not limited to hotel-based check-in and bag drop opportunities.

8.3.2 Kennels & Cattery (Pet Precinct)

The City of Kalgoorlie-Boulder has relatively high levels of pet ownership. Additionally, noise requirements surrounding an airport due to aircraft movements serve as a logical location for pet hotel opportunities. This is a common development at airports around Australia. Consequently, 8,500m^2 has been reserved for a future kennel and cattery facility.

8.3.3 Service Station

A 5,000m^2 area has been reserved in a suitable location for a service station. The airport has substantial car hire facilities which can be adequately

serviced by a vehicle fuelling facility. Additional benefits of a service station are the fuelling opportunity for passengers, employees and visitors to the airport. The area safeguarded for this use is at the junction of Hart Kerspien Drive and future access roads.

8.3.4 Light Commercial Precinct

Complementing service stations, it is typical to have adjoining light commercial activity. Development options for the 12,500m^2 reserved area includes fast food restaurants, passenger and commercial vehicle servicing facilities and car wash.

8.3.5 Car Rental Precinct

Kalgoorlie-Boulder Airport has a vibrant and established car rental facilities. Given that mine sites are often located at a lengthy distance from the city, car rentals are utilised by mine operators in addition to other industries servicing the vast region. Additionally, with growing tourism in the city and beyond, car rental activities are an important complimentary business to airport services. The development plan reserves 22,000m^2 of land to expand the car hire facilities.

8.3.6 Warehouse Estate

Transport infrastructure and logistics have been identified as a major investment opportunity in the Growing Kalgoorlie-Boulder Growth Plan.

With high levels of local employment, and critical to business connectivity, well developed transport and infrastructure sectors are a key strength of Kalgoorlie- Boulder and will play a major role in the growth of the City and its economic zone.

Complementing the City's growth strategy, warehouse development option to cater for growing logistics activity in the area and the region. Additionally, with opportunities for high intensity agricultural activity close to the landside precinct, refrigerated storage for perishable produce is a viable option.

The development vision for the warehouse estate reserves options for flexible use including a mix of light industrial, retail and commercial facilities. Total area reserved for this use is 9,500m^2.

8.4 Aviation Precinct

The Aviation Precinct allows for the consolidation of aviation related activities within the airport whilst retaining the flexibility of mixed use aviation operations. This precinct can be developed into a general aviation precinct as one of many development options.

8.4.1 Consolidated General Aviation Precinct

Fixed base and general aviation operations at Kalgoorlie-Boulder Airport has been a mainstay of the airport since first operation. Currently, general aviation operates from both the western and eastern areas of the airport precinct along Runway 18/36. A vision for a consolidated general aviation precinct aims to increase efficiency of operators at the airport through economies of scale. Additionally, it is an enabler for flexible land use in the eastern area of the airport currently occupied by the Goldfield Aviation Services Flight School. Development option in a consolidated general aviation precinct include:

- Larger flight training schools;
- Modern classrooms and commercial offices;
- Scalability for the RFDS facilities

- Aircraft maintenance facilities; and
- Rationalised access roads.

8.5 Future Airfield

The airfield reserve is for safeguarding purposes for balancing commercial land use opportunities and responding to air traffic growth. In this Master Plan, there is an option to develop an agriculture precinct within and at the east end of the airfield. However, this Master Plan flags that the agriculture precinct may need to be relocated in the event of an extension to Runway 11/29 eastward.

8.6 Freight Precinct

The eastern section of the airport has access available from a spur road off Burt Street which provides a suitable location for a future freight precinct to service air cargo opportunities. This may include air postal services in addition to common air freight goods such as agricultural produce, pharmaceuticals and mining equipment componentry. Furthermore, a dedicated freight precinct allows flexibility for the expansion of the RPT terminal westward where a small freight facility currently exists. In the interim, the existing general aviation operations can continue until demand is established for the use.

8.7 Renewable Energy Precinct

Kalgoorlie-Boulder is an ideal location for development of alternative and renewable energy sources such as solar. With significant available land, geologically suited environment, favourable climate and high industry electricity demand, Kalgoorlie-Boulder provides ideal conditions for the implementation of renewable and alternative energy products.

Key characteristics related to the development of solar energy include:

- 297 days of sun with 8+ hours of sunshine per day;
- Global Horizontal Irradiance (GHI) >0.9 (very high);
- State government major solar feasibility study in progress; and
- High industry base load electricity demand.

In response to favourable physical and policy conditions the commercial development plan has reserved 125,000m^2 for a renewable energy park which can service the energy consumption of the airport and associated users in addition to possible connection to the grid. The location is south of the main Runway 11/29. Consideration needs to be given to glare and reflection from photovoltaic panels in addition to clearance requirements for runway operations.

8.8 Agriculture Precinct (The Food Bowl)

High intensity sustainable agriculture is a logical application of growth plan priorities for the City of Kalgoorlie-Boulder combining initiatives related to supporting business and industry development with providing energy solutions. National and Western Australian fresh produce is in high demand on the tables and restaurants in Asia. The closer proximity of Kalgoorlie-Boulder Airport relative to major city airports on the east coast of Australia to Asia affords an opportunity to develop an agricultural export market. Furthermore, agricultural activity integrated with the airport provides

superior supply chain opportunities to efficiently deliver farm to table products.

The Food Bowl precinct envisions development options which may include greenhouse facilities powered by renewable energy produced at the airport. The development plan has reserved 180,000m^2 of land east of the existing main runway 11/29 within proximity of road access. Note that in the event of the runway extension requirement to 3,500m, facilities in the Food Bowl precinct will need to be relocated. Based on current demand of aircraft mix, it is unlikely to occur within the horizon of this Master Plan.

8.9 Additional Considerations

The viability of the commercial subdivision and land release based on the development parameters expressed by this Master Plan has not been examined.

A separate market demand analysis should first be undertaken to ascertain the appropriate stage development focus and refine lot sizes, with due consideration of any specific town planning requirements.

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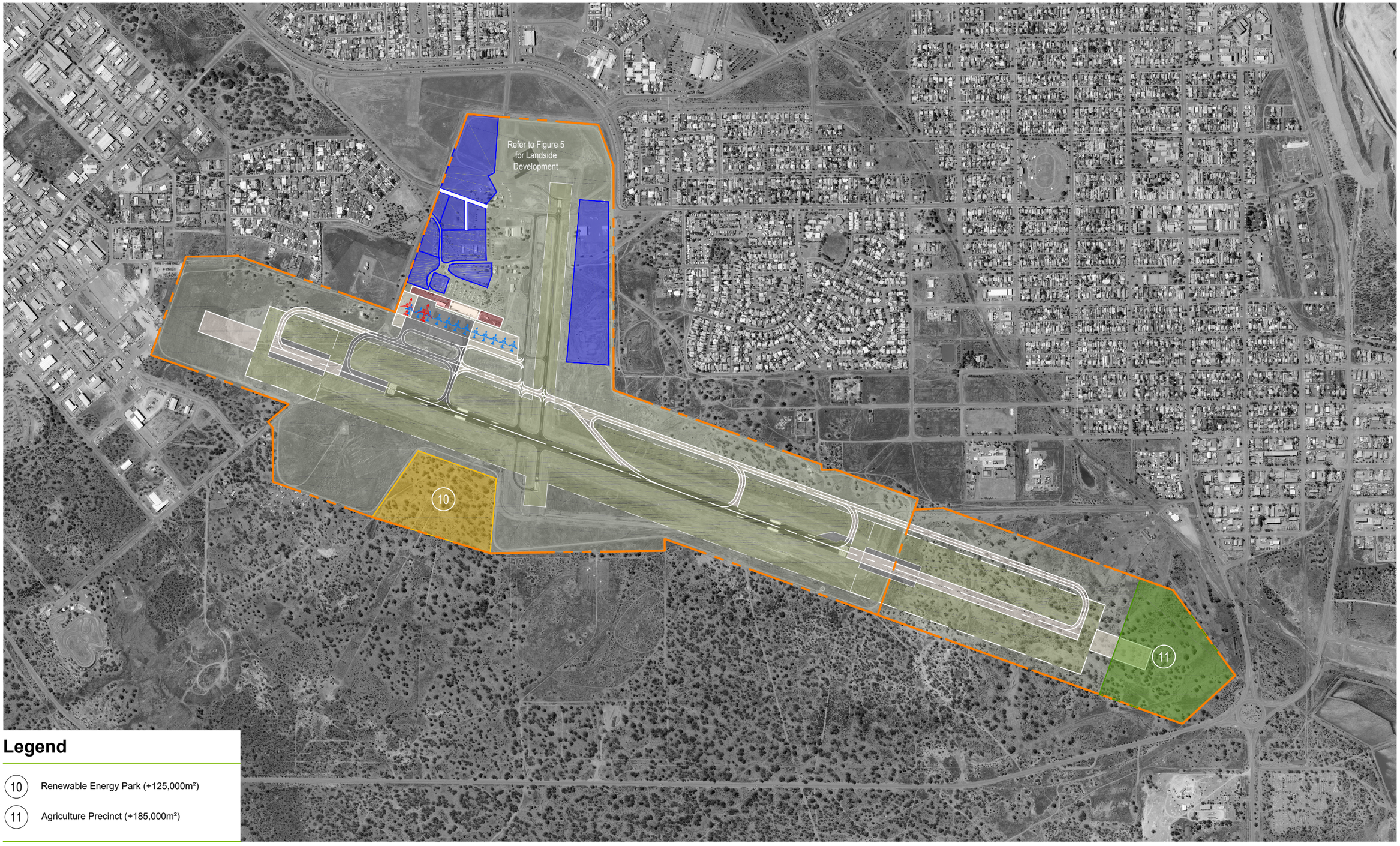

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Legend

- (10) Renewable Energy Park (+125,000m²)
- (11) Agriculture Precinct (+185,000m²)

N

SCALE

0 375 750m

Kalgoorlie Airport Master Plan

Landside Master Plan

FIGURE 4

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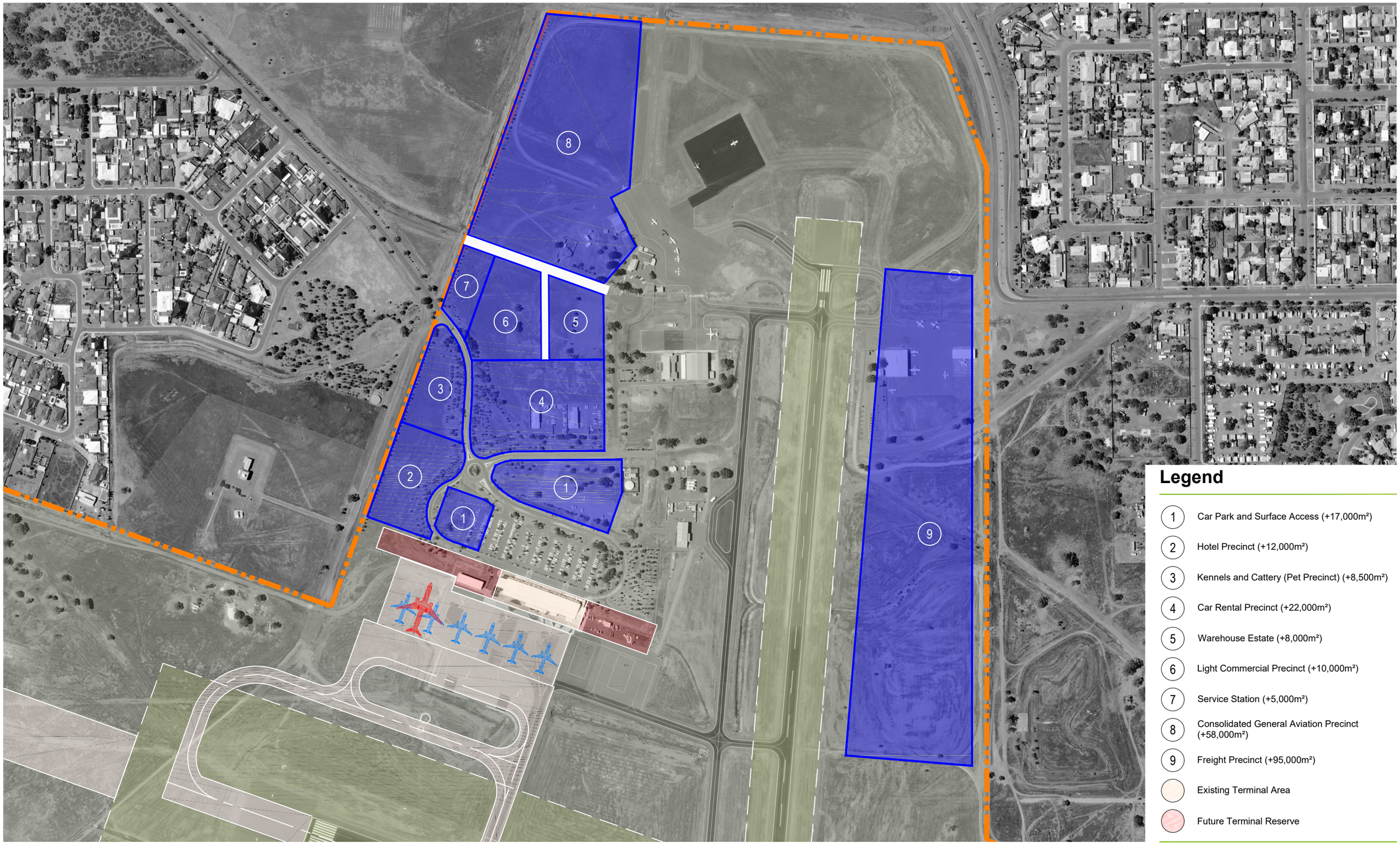

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Legend

1. Car Park and Surface Access (+17,000m²)
2. Hotel Precinct (+12,000m²)
3. Kennels and Cattery (Pet Precinct) (+8,500m²)
4. Car Rental Precinct (+22,000m²)
5. Warehouse Estate (+8,000m²)
6. Light Commercial Precinct (+10,000m²)
7. Service Station (+5,000m²)
8. Consolidated General Aviation Precinct (+58,000m²)
9. Freight Precinct (+95,000m²)
- Existing Terminal Area
- Future Terminal Reserve

N

SCALE

0 125 250m

Kalgoorlie Airport Master Plan

Landside Development Plan

FIGURE 5

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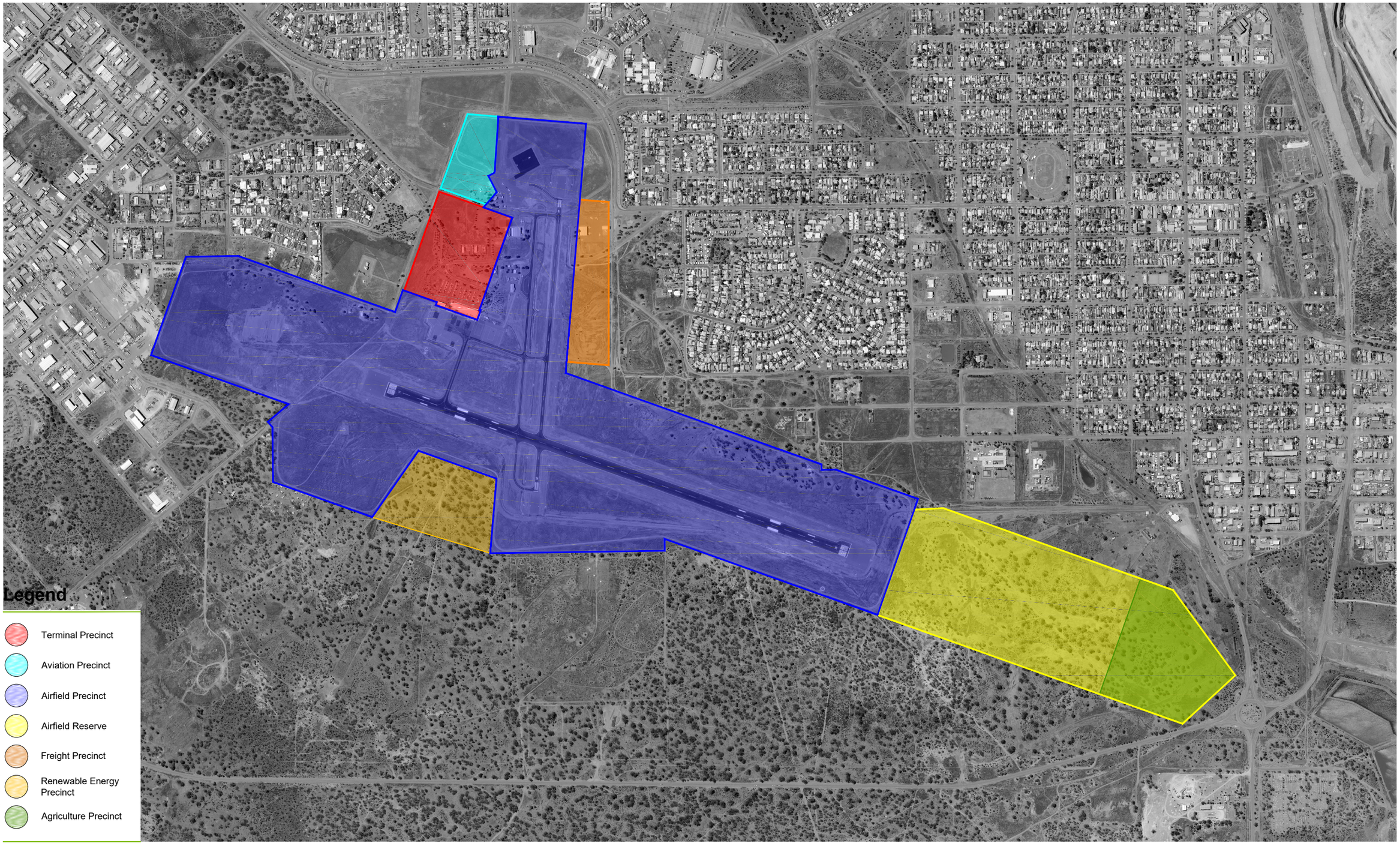

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N

SCALE

0 375 750m

Kalgoorlie Airport Master Plan

Airport Precinct Plan

FIGURE 6

Glossary

9 Glossary

Glossary of Terms		
Item	Term	Definition
1	ABS	Australian Bureau of Statistics
2	AEO	Annual Energy Outlook
3	ATM	Air Traffic Movement
4	AT-VASIS	Abbreviated T-shaped Visual Approach Slope Indicator System
5	AUD	Australian Dollar
6	BITRE	Bureau of Infrastructure, Transport and Regional Economics
7	CAGR	Compound Annual Growth Rate
8	CASA	Civil Aviation Safety Authority
9	CTAF	Common Traffic Advisory Frequency
10	DMIRS	Department of Mines, Industry Regulation and Safety
11	DTI	Directed Traffic Information
12	EIA	US Energy Information Administration
13	ETD	Explosive Trace Detector
14	FIFO	Fly-In-Fly-Out
15	FY	Financial Year

Glossary of Terms		
Item	Term	Definition
16	GA	General Aviation
17	GAS	Goldfields Aviation Services
18	GBAS	Ground Based Augmentation System
19	GDP	Gross Domestic Product
20	GEDC	Goldfields Esperance Development Commission
21	GHI	Global Horizontal Irradiance
22	GNSS	Global Navigation Satellite System
23	GPS	Global Positioning System
24	GRP	Gross Regional Product
25	IATA	International Air Transport Association
26	ICAO	International Civil Aviation Organization
27	IFR	Instrument Flight Rules
28	IMF	International Monetary Fund
29	KCGM	Kalgoorlie Consolidated Gold Mines Pty Ltd
30	KGI	Kalgoorlie-Boulder Airport

Glossary of Terms		
Item	Term	Definition
31	LGA	Local Government Area
32	LISR	Low Intensity Runway Lighting
33	LNG	Liquified Natural Gas
34	MTOW	Maximum Take-Off Weight
35	NEO	New Engine Option
36	NVS	National Visitor Survey
37	OCE	Office of the Chief Economist (Australia)
38	OMGWS	Outer Main Gear Wheel Span
39	PAPI	Precision Approach Path Indicators
40	RET	Rapid Exit Taxiway
41	RFDS	Royal Flying Doctor Service
42	RPT	Regular Public Transport
43	SBAS	Satellite-Based Augmentation System
44	SFD	State Final Demand
45	TFI	Tourism Futures International

Glossary of Terms		
Item	Term	Definition
46	TRA	Tourism Research Australia
47	T-VASIS	T-shaped Visual Approach Slope Indicator System
48	USD	United States Dollar
49	VFR	Visual Flight Rules
50	WA	Western Australia

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