



**SGS**  
Economics  
& Planning



## LIVERPOOL RURAL LANDS STUDY

FINAL  
APRIL 2020

Prepared for  
Liverpool City Council

Independent  
insight.



**RMCG**

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**It is noted that the analysis in this report was undertaken prior to the Global COVID-19 Pandemic.**

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# GLOSSARY OF TERMS

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Term	Definition
ANEC 20	Australian Noise Exposure Concept (ANEC) is a noise exposure chart produced for a hypothetical aircraft usage pattern that describe cumulative aircraft noise during a typical day of aircraft operations. The 20 signifies on average 20 or more events where the noise levels are at or greater than 70 decibels which is considered the level where external noise has no impact on amenity inside your property.
DCP	Development Control Plan
Greater Sydney Region	Defined as the Sydney Metropolitan Area by the Greater Sydney Commission districts
GRSP	Greater Sydney Region Plan
LEP	Local Environmental Plans
LUIIP	Land Use and Infrastructure Implementation Plan
Sydney Airport	Kingsford Smith Airport and surrounding precincts
Sydney Greater Metropolitan Area	Includes the Sydney Metropolitan Area including Greater Newcastle and Wollongong
SPUN	Sydney Peri-urban Network
Western Sydney Aerotropolis; or simply the Aerotropolis	Aerotropolis precincts as defined in the <i>Land Use and Infrastructure Implementation Plan</i> released by the Department of Planning and Environment (2018). NB: Does not include Western Sydney Airport.
WSA or Airport	Western Sydney Airport
WSAP	Western Sydney Aerotropolis Plan
WCDP	Western City District Plan

# 1. INTRODUCTION

This section provides an overview of the project background and purpose, and identifies the study area.

## 1.1 Introduction

A core part of this Rural Land Study is to understand the likely effects of the Western Sydney International (Nancy-Bird Walton) Airport project on local agricultural productivity. The project also involves an analysis of current land uses, economic activity, value and contribution to the urban economy, agricultural activity and output, contribution to local and regional food production, rural based tourism, and employment (existing direct and indirect jobs in the rural area).

Building on place-based planning directions from the Greater Sydney Region Plan and WCDP, the study identifies the different landscape qualities of precincts across Liverpool’s rural area, highlighting where the aerotropolis and current local plans diverge.

## 1.2 Project context

Liverpool City Council is undertaking an accelerated review of its *Local Environment Plan 2008* (LEP) to ensure it aligns with the GSRP and the WCDP. This includes preparing several detailed studies to inform the review and interpret local implications of planning priorities listed in the WCDP (see Figure 1 for those relevant to the *Rural Lands Study*).

As part of this process, Council commissioned a Rural Lands Study (this project), to address various actions and requirements set out in the District Plan about rural lands. This work will inform Council’s long-term social, economic and environmental vision for its Local Strategic Planning Statement (LSPS), and inform more detailed planning directions in an updated Liverpool Local Environmental Plan (LEP) (see Figure 2).

FIGURE 1: RELEVANT WESTERN CITY DISTRICT PLAN PRINCIPLES, STRATEGIES AND ACTIONS



Light blue Planning principle related to the Western City District Plan vision

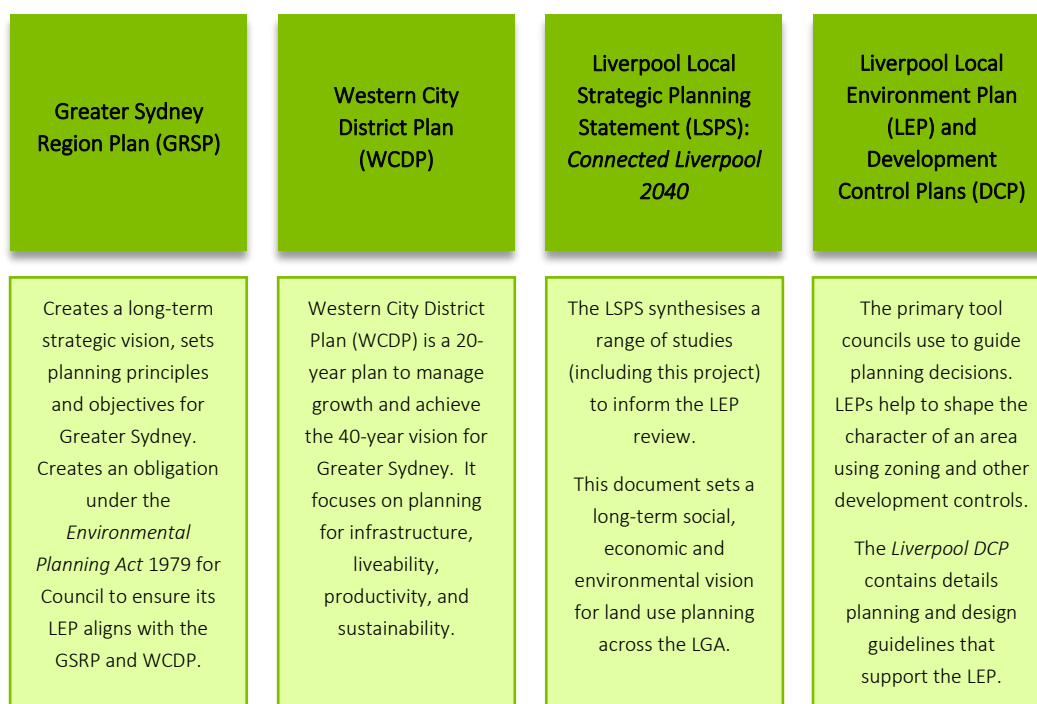
Green Planning priority W8, related objectives and actions

Orange Planning priority W17, related objectives and actions

Source: Western City District Plan, 2018.

\*Planning Priority W8 includes protecting and supporting rural industries. ^Includes Luddenham, in the Liverpool LGA.

FIGURE 2: KEY STRATEGIC DOCUMENTS THAT INFORM THE RURAL LANDS STUDY PLANNING CONTEXT



Source: SGS Economics and Planning, 2020.

### Strategic planning context

The key documents that have informed this Study are the:

- The Western Sydney Airport Land Use and Infrastructure Implementation Plan Stage 1 (LUIIP), 2018
- Draft Western Sydney Aerotropolis Plan, 2019
- Draft Western Sydney Aerotropolis SEPP Discussion Paper, 2019
- Greater Sydney Region Plan, 2018
- Western City District Plan, 2018
- Connected Liverpool (Liverpool City Council’s draft LSPS), 2019
- Liverpool Rural Lands Study (2007, 2012)
- Liverpool Local Environment Plan, 2008
- Liverpool Development Control Plan, 2008.

These documents are discussed in more detail throughout the relevant sections of this report:

- Chapter 2: Overview of the Western Sydney Aerotropolis
- Chapter 3: Policy Context
- Chapter 4: Liverpool Context
- Chapter 5: Agricultural Context
- Chapter 6: Landscape Context.

## 1.3 Methodology

This project has been undertaken from August 2019 to February 2020. Figure 3 shows the project timeline and key tasks.

FIGURE 3: PROJECT TIMELINE AND KEY TASKS



Source: SGS Economics and Planning, 2019.

SGS has undertaken a range of tasks to prepare the Liverpool Rural Lands Study:

- Review the strategic planning and legislative planning context of the rural lands within Liverpool LGA, including the following plans:
  - Metropolis of Three Cities – Greater Sydney Region Plan
  - Western City District Plan
  - Western Sydney Aerotropolis Plan 2019
  - Liverpool Local Environmental Plan 2008
  - Liverpool Rural Lands Studies 2007 and 2012.
- Provide a high-level overview of the Liverpool rural lands, addressing:
  - their context in the metropolitan region and Western City district;
  - physiography and environmental issues; and
  - rural character, culture and functions, including the local rural communities.
- Undertake a detailed desk top analysis of the Liverpool rural lands addressing:
  - current land uses;
  - economic activity, value and contribution to the urban economy;
  - agricultural activity and output;
  - contribution to local and regional food production;
  - rural based tourism; and
  - employment – existing direct and in-direct jobs.
- Analyse future agricultural production and employment potential of the Liverpool rural lands based on current land use controls on 10, 20 and 30 year projections.
- Analyse the contribution of the current Liverpool rural land uses on the biodiversity, sustainability and liveability of the local and metropolitan area.
- Investigate and analyse the impacts and benefits to the local and metropolitan economy, employment (direct and indirect) and food production, arising from the development of the WSA and associated land uses, including residential, as identified in the LUIP and WSAP, addressing likely development phases and timeframes.
- Investigate the opportunities to retain existing rural land uses and how these activities could value-add in social, environmental and economic terms, recognising the development of the Western Sydney International.



## 1.4 Study area

The maps overleaf show how the rural area has been broken up for analysis in this project (Figure 4) and how these rural areas overlap with the planning area for the Western Sydney Airport and its precincts (which are identified in Figure 5).

The distinction between the two planning areas is important to understand when looking at possible outcomes for current rural land within the Western Sydney Airport structure plan area, and for the rural area that does not fall into the Western Sydney Airport and Aerotropolis boundary.

## 1.5 Report structure

The remainder of the report is structured as follows:

**Section 1** presents the review of rural lands in Liverpool, focussed on a review of background documents and data, and previous Liverpool Rural Lands studies (2007 and 2012). It outlines landscape character for the rural lands, based on rural precincts identified in the 2012 study.

**Section 2** focusses on planning for the Western Sydney Airport and Aerotropolis, and considers what impact the airport, Aerotropolis and proposed agri-business precinct may have on Liverpool's rural area.

**Section 3** describes the State and Local policy context.

**Section 4** shows the demographic context for Liverpool, and includes information on housing profile, dwelling type as well as the economic and employment profile.

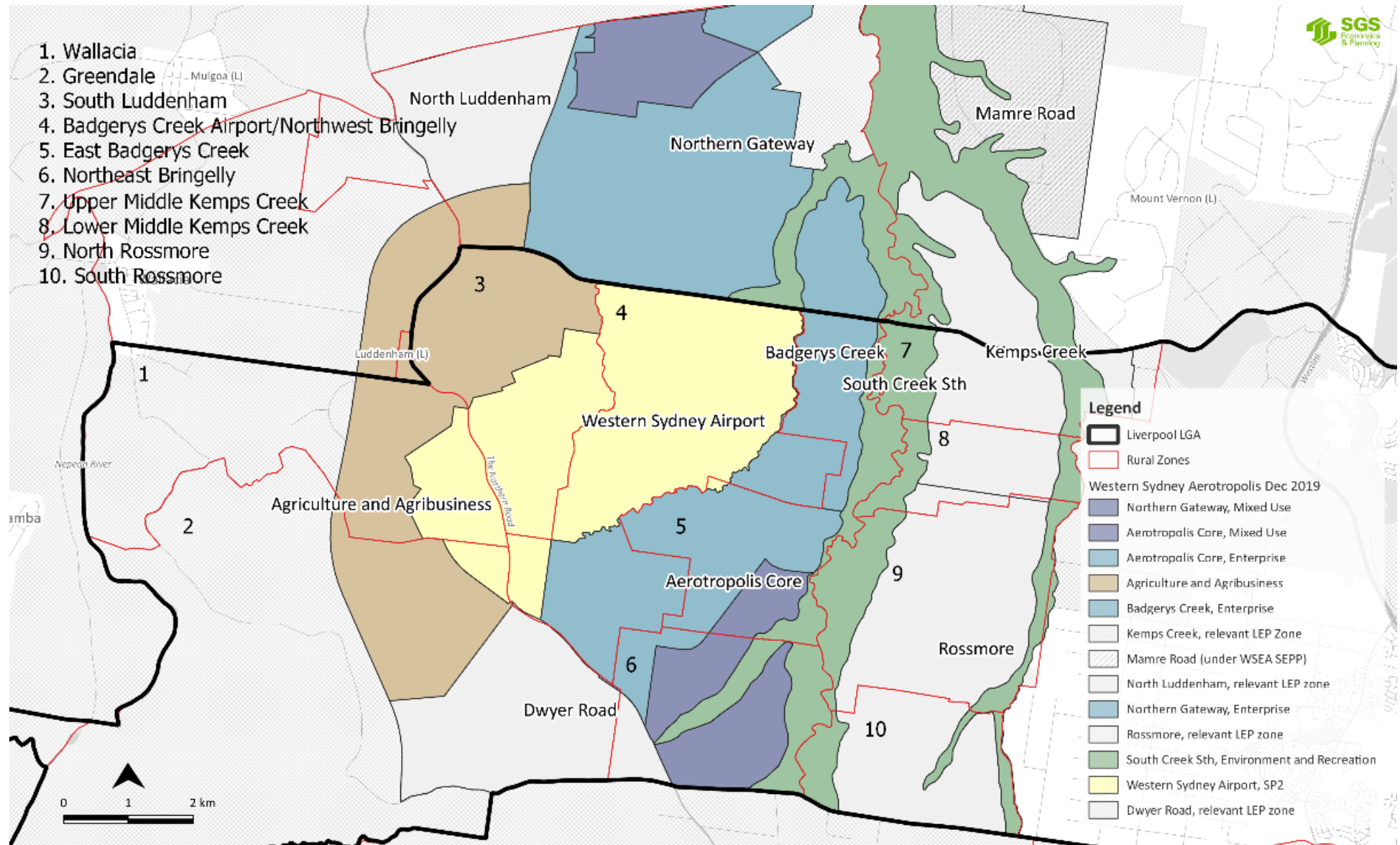
**Section 5** provides a comprehensive overview of the agricultural context, including a discussion on land capacity. Current and future impacts of the Western Sydney Airport are also considered, as are future scenarios. The key findings of the agricultural assessment and implications for the study are discussed.

**Section 6** provides the landscape context for each precinct.

**Section 7** presents a report summary and next steps.



FIGURE 5: LIVERPOOL RURAL AREAS ALONGSIDE THE AEROTROPOLIS PRECINCTS



Source: SGS Economics and Planning, 2019.

## 2. OVERVIEW OF THE WESTERN SYDNEY AEROTROPOLIS

The Western Sydney Aerotropolis was announced in 2016, and the precincts cover a significant part of Liverpool's rural area. As a result, a key focus of this report is to understand how planning for the airport will affect both rural lands within and outside the Aerotropolis boundary. This chapter considers the planning aspirations for the Aerotropolis, and how Liverpool's rural area may be affected.

### 2.1 Introduction

#### Western Sydney Aerotropolis

The proposed Western Sydney Airport and aerotropolis applies to a large part of Liverpool's rural land. The proposal will have a significant impact on the future of the rural area in the LGA. Accordingly, this chapter presents an in-depth review of the NSW Government's *Western Sydney Aerotropolis Plan* (WSAP) (2019) and earlier *Land Use Infrastructure and Implementation Plan* (2018).

The 11,200 hectare Western Sydney Aerotropolis is proposed to become a **significant economic hub for Greater Sydney**, at the heart of the emerging Western Parkland City. An 'Aerotropolis Core' precinct will sit at the centre of the Aerotropolis, containing the new Western Sydney Airport. Its mix of uses, activities, development and places will rely on and be complementary to the operation of the new airport, as a major trade and passenger gateway. Based on the *Western Sydney Aerotropolis Plan* (December 2019), the vision for the Aerotropolis is:

The Aerotropolis accommodates high value jobs closer to where people live. It is an accessible, innovative 24-hour metropolitan centre, connected globally, nationally, locally and digitally.

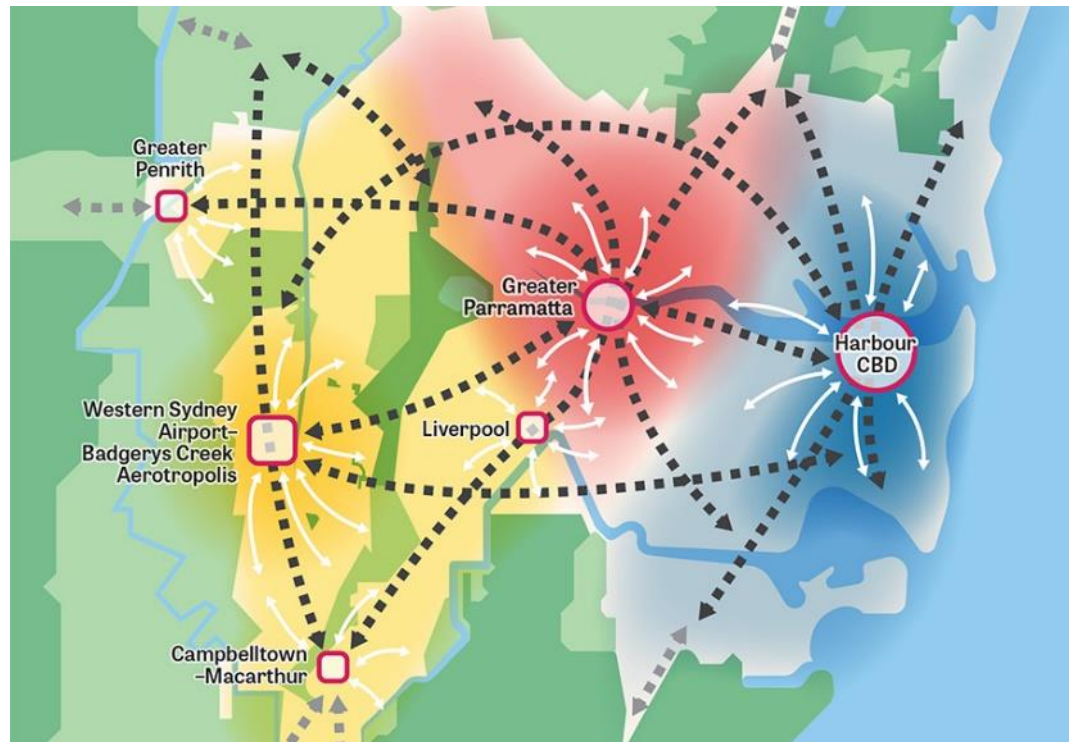
Supporting the vision are several precincts whose core function is to provide housing, employment, and high value agricultural and industrial activity, that could provide diverse export opportunities in the longer-term.

The Aerotropolis is part of metropolitan planning for Sydney underpinned by a need to have multiple 'Sydneys' that serve diverse populations, improve housing affordability and provide better job choice closer to home, for more people in Greater Sydney.

FIGURE 6: WESTERN SYDNEY AEROTROPOLIS



FIGURE 7: HOW THE WESTERN SYDNEY AEROTROPOLIS FITS WITH THE VISION FOR GREATER SYDNEY AS A METROPOLIS OF THREE CITIES



Source: Greater Sydney Region Plan, 2018.

### Planning background

The Aerotropolis is a core action from the *Greater Sydney Region Plan (GRSP)* and *Western City District Plan*.

FIGURE 8: PLANNING PROCESS FOR THE AEROTROPOLIS



Source: Western Sydney Aerotropolis Plan, 2019.

The planning process since 2016 progressed with drafting of the *Land Use Infrastructure and Implementation Plan (LUIIP, Stage 1)* (August 2018). The LUIIP identified the new Western Sydney Airport precinct and surrounding Aerotropolis, containing housing and employment precincts. The LUIIP was prepared in the context that the *Greater Sydney Region Plan* confirmed a second airport in Western Sydney at Badgerys Creek, and created a planning framework to enable the project to commence.

Public consultation on the LUIIP took place over 2019, and in late 2019 the *Draft Western Sydney Aerotropolis Plan (WSAP)*, draft *State Environmental Planning Policy (SEPP) Discussion Paper* and draft *Aerotropolis Development Control Plan (DCP) (Phase 1)* were released. After another round of community consultation, the State government will finalise the *Western Sydney Aerotropolis Plan*, and commence more detailed precinct planning in mid-2020.

Liverpool City Council has a role on the Planning Partnership run by the State government. This is comprised of representatives of all eight Western Parkland City councils as well as Blacktown Council, and representatives from the NSW Department of Planning, Industry and Environment, Transport for NSW, Sydney Water and the Greater Sydney Commission.

However, it will still make a formal submission to the draft WSAP and SEPP for the airport.

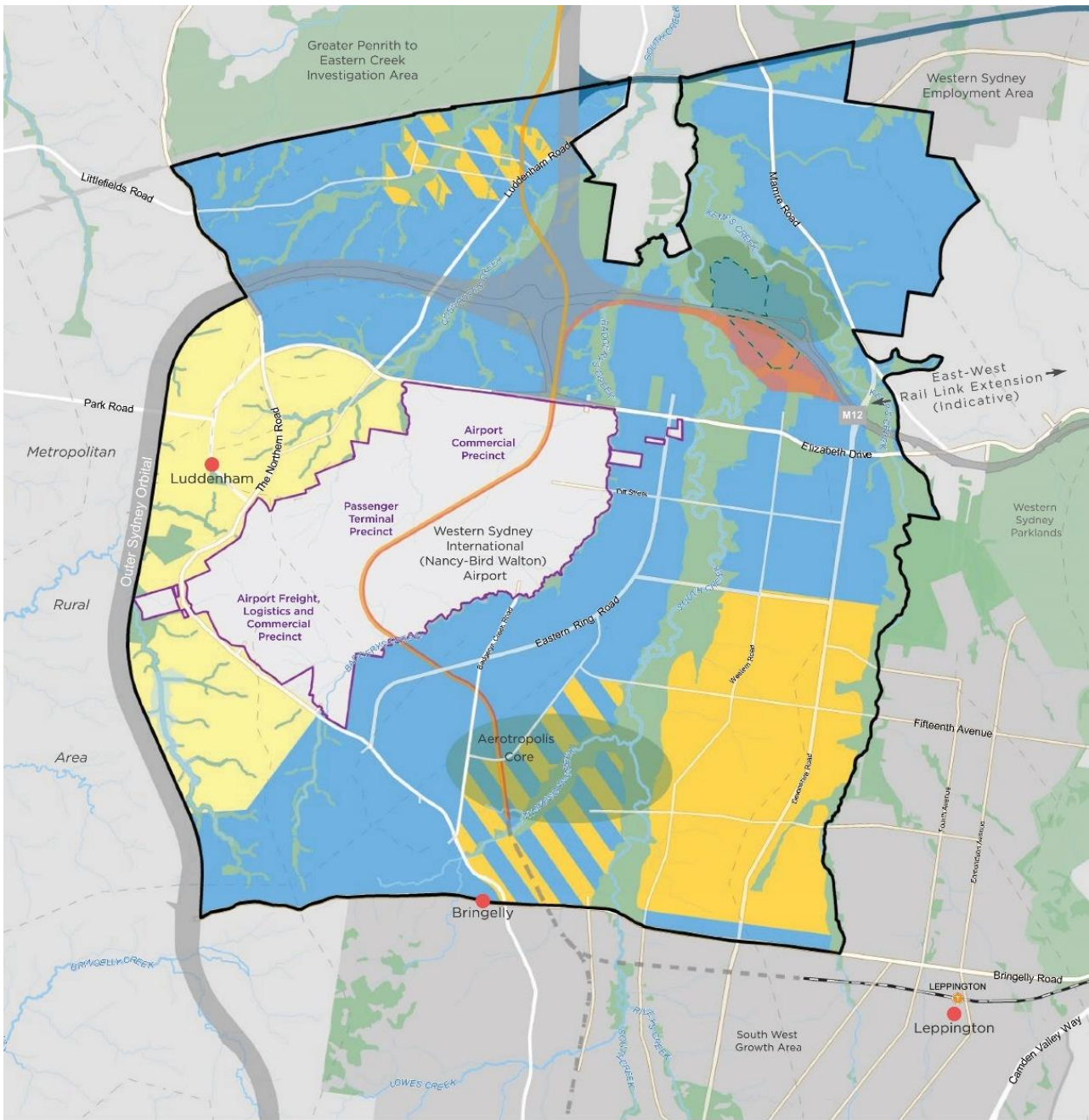
### **Extent of the Western Sydney Aerotropolis Plan**

The *Western Sydney Aerotropolis Plan* applies to a significant part of Liverpool Council's rural area, including successful existing agricultural operations. The plan identifies 10 precincts (see Figure 9), including:

- **Rossmore Precinct** to the south east of the airport which is proposed as a large concentration of mixed living communities and Kemps Creek to the east which is proposed as mixed flexible employment and urban land; and
  - The **Agriculture and Agribusiness Precinct** on the western edge of the airport. This area is proposed to support the transition of existing agriculture in the area, as well as the development of new agricultural opportunities, including an agri-port that will provide for the movement and storage of agricultural commodities.
  - The **Badgerys Creek** precinct currently contains agricultural activity and has been identified for enterprise activities in proposed WSAP zoning. This precinct is on the eastern edge of the airport.
  - The **South Creek-Wianamatta** precinct will become the central element of the Aerotropolis' blue-green grid, running along the South Creek system through the eastern half of the Aerotropolis.

The plan and proposed zoning are further discussed in the next section (Section 2.2).

FIGURE 9: WESTERN SYDNEY AEROTROPOLIS STRUCTURE PLAN

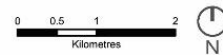


**Structure Plan**  
Western Sydney Aerotropolis

- Western Sydney Aerotropolis
- Western Sydney International (Nancy-Bird Walton) Airport
- Topographic Ridgeline
- Key Network Upgrades
- Regional Parkland (Investigation)
- Critical Utility / Infrastructure (Investigation)

- Proposed Sydney Metro Greater West
- Potential East-West Rail Link, Stabling and Critical Infrastructure
- Proposed Future Rail Links (Investigation)
- Proposed Transport Corridor
- Potential Western Sydney Freight Line Corridor

- Centre
- Agribusiness
- Environment and Recreation
- Flexible Employment
- Urban Land
- Mixed Flexible Employment & Urban Land



Source: NSW Department of Planning, Industry and Development, Western Sydney Aerotropolis Discussion Paper on the proposed State Environmental Planning Policy, (2019).

## 2.2 Planning for the Western Sydney Aerotropolis

The draft *Western Sydney Aerotropolis Plan* (WSAP) was released in December 2019, and is the key guiding document that will link transport investment with sequenced precinct planning for the Aerotropolis. It sets out a vision, precinct-specific land use policies and proposed infrastructure. The plan defines and will support detailed precinct planning, to facilitate development in the Aerotropolis and guide public investment in major infrastructure.

There are three documents that advance planning for the Aerotropolis:

- The draft *Western Sydney Aerotropolis Plan* (WSAP)
- *Western Sydney Aerotropolis Discussion Paper on the Proposed SEPP*.
- The draft *Aerotropolis Development Control Plan*.

A summary of each document, and its implications for this *Rural Lands Study*, is outlined in this section. The sequence and relationship between plans are shown in the diagram below, highlighting the current stage.

### Western Sydney Aerotropolis Plan, December 2019

The Western Sydney Aerotropolis straddles the Liverpool and Penrith LGAs. The plan sets out precinct priorities for each part of the Aerotropolis, and planning priorities and objectives were informed by local planning. For the Liverpool LGA, the following LSPS priorities were identified as relevant, from *Connected Liverpool 2040*:

- **‘Planning Priority 2:** A rapid smart transit link between Liverpool and Western Sydney International Airport – the FAST Corridor will connect Liverpool to the Aerotropolis and Airport.
- **Planning Priority 13:** A 24-hour Western Sydney International Airport growing to reach its potential – through the Planning Partnership, Council will ensure the Airport’s curfew-free status is protected.
- **Planning Priority 16:** Rural lands are protected and enhanced – an updated Rural Lands Study and protected agricultural land will support the rural economy, ecosystem services and natural landscapes.’

The WSAP aligns with the *Greater Sydney Regional Plan* objectives and directions, creating a more detailed series of planning principles for the Aerotropolis. In its revised format (building on the LUIP Stage 1), a draft *State Environmental Planning Policy (Western Sydney Aerotropolis)* (SEPP) has been proposed (outlined in more detail in the following section).

The WSAP contains draft precinct plans, which show where new zones are to be applied based on the SEPP, as well as the location (in most cases still high level) of planned infrastructure and the vision and preferred land uses for each precinct. It sets parameters for appropriate, shorter-term development outcomes, while seeking to preserve longer-term opportunities.

In summary:

- Rural uses will be directed west of the airport
- The mixed-use component of the Aerotropolis core will be located outside of the noise exposure contour
- 80 per cent of the land will be used for employment services
- Residential development will be outside of the 20 ANEF<sup>1</sup> area.

The Aerotropolis Structure Plan (Figure 9) identifies the land uses proposed for the Aerotropolis, as set out in WSAP. The Liverpool City Council boundary is along Elizabeth

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<sup>1</sup> For land use planning around airports, Australia has adopted the *Australian Noise Exposure Forecast* (ANEF) system, which describes cumulative aircraft noise for an ‘average annual day’. An aircraft noise exposure level of less than 20 ANEF is considered acceptable for the building of new residential dwellings (Department of Infrastructure, Regional Development and Cities, 2019). Some jurisdictions include further noise attenuation requirements based on sensitive land use impacts.



Drive, to the north of the Agriculture and Agribusiness, Western Sydney Airport, Badgerys Creek and Kemps Creek precincts. The Rossmore and Aerotropolis Core precincts are within the Liverpool LGA boundary (Elizabeth Drive forms the LGA's northern boundary).

### Draft State Environmental Planning Policy (Western Sydney Aerotropolis)

A draft *State Environmental Planning Policy (Western Sydney Aerotropolis)* is the proposed statutory planning framework for the Aerotropolis. The SEPP aims to:

- 'manage and sequence growth to reflect demand and infrastructure delivery, and
- recognise existing agricultural and agribusiness land uses to be retained, either into the future or in the interim until transitioning precincts are rezoned.'<sup>2</sup>

The SEPP proposes planning zones that will facilitate development and land use based on precinct-specific controls. The zones will apply to the different Aerotropolis precincts, which overlap with the rural precincts previously identified in Liverpool's 2012 *Rural Lands Study*. The proposed zones that will apply to precincts around the airport are:

- Enterprise Zone
- Mixed Use Zone
- Environment and Recreation Zone
- Agribusiness zone.

In addition, three special zones will be applied to the airport:

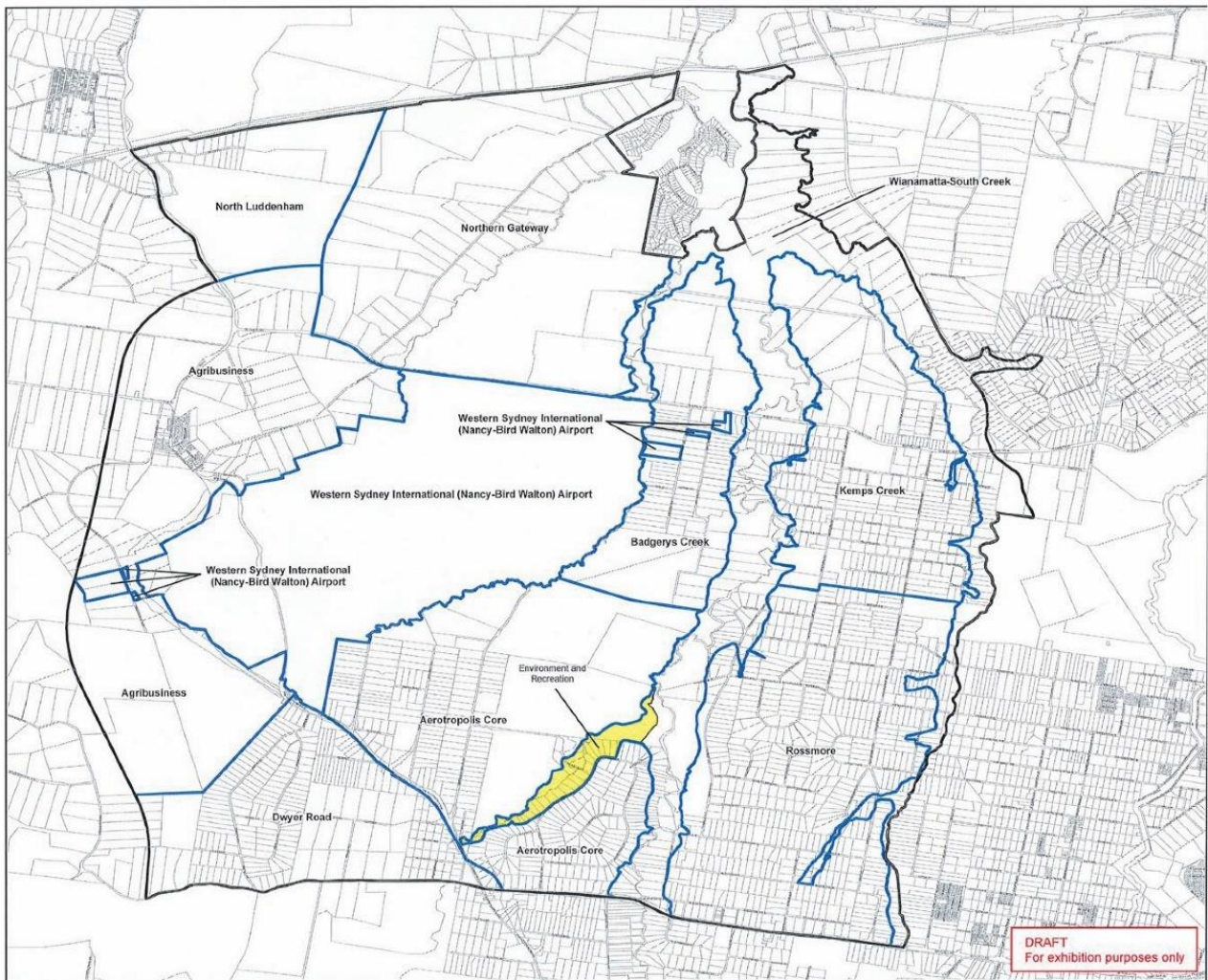
- SP1 Special Activities (Airport) Zone
- SP1 Special Activities Commonwealth Zone
- SP2 Infrastructure Zone.

The Aerotropolis precincts and extent of proposed zones under the new SEPP are shown on maps at Figure 10 and Figure 11. The policy intent is to prepare a flexible policy framework that protects or supports existing land uses, while the precincts are progressively rezoned and as infrastructure is delivered.

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<sup>2</sup> NSW Government, 2019, 'Western Sydney Aerotropolis Discussion Paper on the proposed State Environmental Planning Policy', [https://shared-drupal-s3fs.s3-ap-southeast-2.amazonaws.com/master-test/fapub\\_pdf/A+Aerotropolis/Western+Sydney+Aerotropolis+Discussion+Paper+on+the+proposed+State+Environmental+Planning+Policy.pdf](https://shared-drupal-s3fs.s3-ap-southeast-2.amazonaws.com/master-test/fapub_pdf/A+Aerotropolis/Western+Sydney+Aerotropolis+Discussion+Paper+on+the+proposed+State+Environmental+Planning+Policy.pdf), date accessed 15/01/2019.

FIGURE 10: PROPOSED EXTENT OF THE NEW STATE ENVIRONMENTAL PLANNING POLICY (WESTERN SYDNEY AEROTROPOLIS)



**DRAFT State Environmental Planning Policy (Western Sydney Aerotropolis) 20XX**

**DRAFT Land Reservation Acquisition Map**

**Legend**

- Land Application
- Land Reservation Acquisition**
- Environment and Recreation

Source: NSW Department of Planning, Industry and Development, Western Sydney Aerotropolis Discussion Paper on the proposed State Environmental Planning Policy, (2019).

TABLE 1: PRECINCT DIRECTIONS ACROSS LIVERPOOL'S RURAL AREA AND THE AEROTROPOLIS

Zone	Artist's impression of the precinct vision	Description and zone purpose	Future land uses
<b>Infrastructure Zone (Special Purpose 1)</b>		<p>This zone applies to land under Commonwealth ownership, aimed to protect land which will be utilised for the new airport. While this zone will be identified, the land to which it applies is subject to the planning regime stipulated within the Airports Act 1996 (Cth).</p>	<p>The parcel of land to which this zoning applies was acquired by the Commonwealth Government following initial investigations into the site for a new airport between 1986 and 1991. It has not since changed ownership.</p> <p>Land under this zoning will be utilised for the construction and long-term operation of the new international airport and development ancillary to that purpose on Commonwealth land.</p>
<b>Infrastructure Zone (Special Purpose 2)</b>		<p>This zone will cover land where key infrastructure is planned, including along Northern Road and Elizabeth Road, connecting to the airport (main road and rail corridors)</p> <p>Until the location of proposed rail corridors is confirmed, the zone will restrict development that is not compatible with proposed infrastructure.</p>	<p>Areas under this zoning will become the key connections to and from the Aerotropolis and Airport. This will take the form of major road and rail projects, such as the proposed Outer Sydney Orbital.</p>
<b>Enterprise Zone</b>		<p>The zone will facilitate development for employment uses and will apply to the <b>Northern Gateway, Badgerys Creek</b> and the <b>Aerotropolis Core</b> precincts.</p> <p>Residential uses are not permitted in this zone.</p> <p>Commercial and industrial uses will support the function of the 24-hour air transport hub.</p>	<p>Current zoning for the Badgerys Creek precinct is predominantly RU1 Primary Production. The Aerotropolis Core is mostly covered by RU4 Primary Production Small Lots.</p> <p>The Western Sydney Aerotropolis Discussion Paper indicates that establishing new agricultural uses would be prohibited within this zone, with the exception of existing uses.</p> <p>The intent of this zoning provision is to <i>foster the development of employment lands surrounding the airport and in the Aerotropolis Core</i>. Therefore, the zone will focus on educational, commercial, retail and light industrial land uses.</p> <p>Aircraft noise levels in excess of ANEC 20 will affect the Northern and Eastern sections of the Badgerys Creek and Aerotropolis Core precincts, preventing development of sensitive uses; this may affect the intent that some education-related uses locate in this precinct.</p>

Zone	Artist's impression of the precinct vision	Description and zone purpose	Future land uses
Mixed Use Zone		<p>The Mixed Use Zone will include commercial and residential uses. It will be applied to part of the <b>Aerotropolis Core</b> and parts of the <b>Northern Gateway</b> precincts. The vision for this zone is to create high amenity for residents, with excellent access to public transport, open space and waterways. A key focus is on active transport outcomes, and public squares and a range of uses to support vibrant mixed use areas. Land that is located in 20 ANEC/ANEF will not be zoned as mixed use. <i>Note: Commonwealth-owned land located at Bringelly and zoned SP2 under the Liverpool Local Environmental Plan 2008, is proposed to be zoned for mixed use purposes. The Commonwealth government has agreed to enable the development of this land to help build the Western Parkland City.</i></p>	<p>Areas earmarked for future Mixed Use zoning within the Liverpool LGA are predominantly zoning RU4 Primary Production Small Lots. Rural uses will no longer be permitted. Existing use rights will apply to all current uses. Predominant land uses will transition to residential and ancillary population-serving uses, including retail, community facilities and services etc. A diverse range of urban uses will be permitted, including multiple residential typologies, commercial and light industrial.</p>
Environment and Recreation Zone		<p>The Environment and Recreation Zone will apply to lands that are identified for their biodiversity values. Its purpose will be to support water management, environmental protection, amenity and recreation; it will be applied along the Thompsons Creek and other creekline riparian corridors. The zone will also apply to land affected by a 1:100 year flood AEP. The zone's controls prohibit high-quality native vegetation clearing.</p>	<p>The Wianamatta-South Creek Precinct, which will account for most of the Environment and Recreation Zone, is currently governed by a number of zones, with RU4 Primary Production Small Lots, RE1 Public Recreation and SP2 Infrastructure the most widespread. The future land uses within this zone will be concerned with the preservation and cultivation of natural assets and open space. The scope of permitted uses is quite narrow within this zone, with no residential, commercial, industrial or rural uses permitted. Parts of this zone will be classified for environmental conservation, with additional regulation preventing activities or uses which degrade natural value.</p>
Agribusiness Zone		<p>This zone will permit agricultural uses such as rural industry and intensive plant agriculture. The zone will apply land in the <b>Agribusiness</b> precinct, including Luddenham Village. The zone's purpose is to support the existing agricultural lands as well as delivering fresh produce to domestic and international markets (via the airport). Residential uses will be permitted on land outside the 20 ANEC/AEF.</p>	<p>This land is within the Metropolitan Rural Area (MRA). The existing zoning is RU1 Primary Production and RU4 Primary Production Small Lots. Under current zoning provisions, Extensive Agriculture is not a permissible land use. Current policy supports the long-term retention of agricultural uses, encouraging intensification of agricultural practices. Permitted uses are contained to mostly rural/agricultural in nature, with some scope for warehousing, logistics and other industrial uses. Residential development ancillary to rural uses will be permitted, subject to aircraft noise levels (&lt; ANEC 20). Although Luddenham Village is contained within this zone, the vision for the village itself will be largely determined during precinct planning. Large parts of the Agribusiness Zone are also within the Metropolitan Rural Area (MRA), outside the established and planned urban area.</p>

Source: Western Sydney Aerotropolis Plan, 2019, images sourced from State Government WSAP-related materials published online for each precinct: <https://www.governmentnews.com.au/stage-set-for-aerotropolis-precinct-rezone/>, <https://www.governmentnews.com.au/stage-set-for-aerotropolis-precinct-rezone/>, and [https://www.youtube.com/watch?v=\\_G-OKXusy70](https://www.youtube.com/watch?v=_G-OKXusy70).

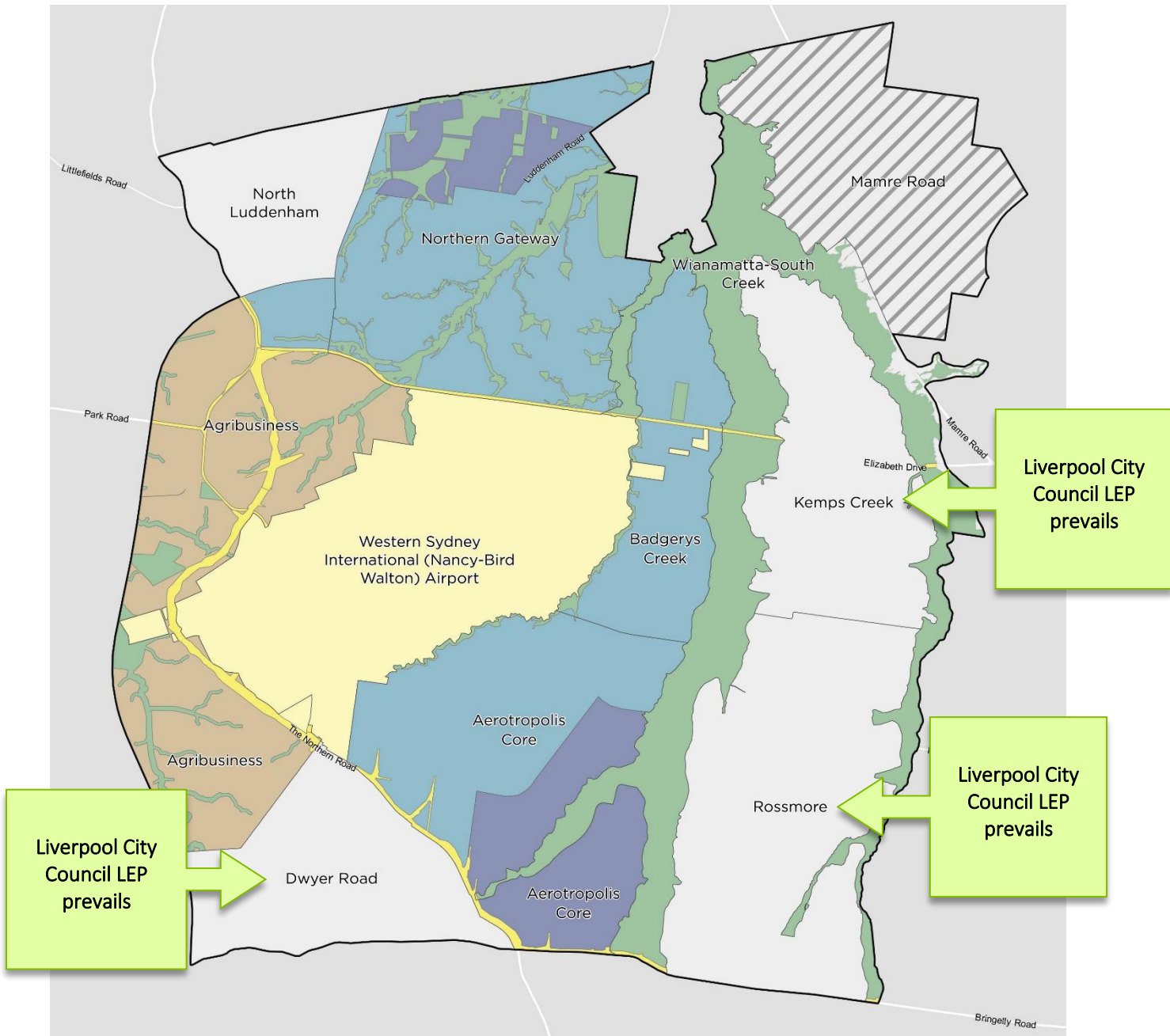
### 2.3 Proposed aerotropolis precincts

The WSAP nominates ten precincts for the Western Sydney Aerotropolis (Figure 11). The draft WSAP contains high level objectives, and proposed zones for each precinct. More detailed precinct plans will soon be developed for each area, containing objectives and recommendations.

Of the ten proposed, seven precincts that are relevant to *Liverpool Rural Lands Study*. The intent of these of the precincts is briefly summarised below, alongside the local planning principles (where available) from Liverpool City Council’s 2012 *Rural Lands Study*.

The state and local planning context for Liverpool’s rural area is presented in Chapter 3 of this report.

FIGURE 11: WESTERN SYDNEY AEROTROPOLIS PRECINCTS AND PROPOSED ZONES



Source: Western Sydney Aerotropolis Plan, 2019.

- Agribusiness
- Enterprise
- Environment and Recreation
- Mixed Use
- Special Purpose 1
- Special Purpose 2
- Relevant LEP Zone
- Mamre Road (under WSEA SEPP)

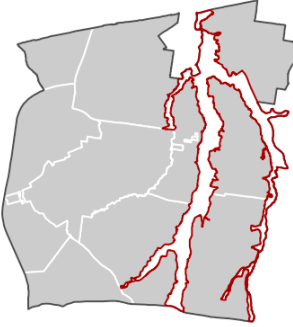

## Aerotropolis precinct vision and aims in State and local policy

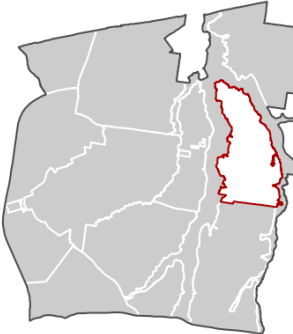
The table below provides an overview of the current Aerotropolis vision, and aims, for each precinct, compared to Liverpool directions set out in the Rural Lands Study 2012. It includes any directions arising from the draft LSPS (Connected Liverpool 2040). Further information about precinct-specific land uses permitted under the draft SEPP (Western Sydney Aerotropolis) zones for each precinct is attached at Appendix 1.

It should be noted that the 2012 *Rural Lands Study* was written without certainty surrounding the future of the Badgerys Creek Airport. During the study’s preparation, the Federal Government had indicated an intention not to proceed with construction of the airport on this site, leading authors of the 2012 study to recommend that Council seek removal of ANEF contours. However, the study notes that Badgerys Creek was still the most probable site for a new airport should one be developed, due to its proximity to the M7 motorway and South West Rail Link. Council’s 2019 LSPS review, *Connected Liverpool 2040*, recognises the Western Sydney Aerotropolis and key infrastructure precincts; where relevant these overlap an existing rural area, those priorities have been listed in the table.

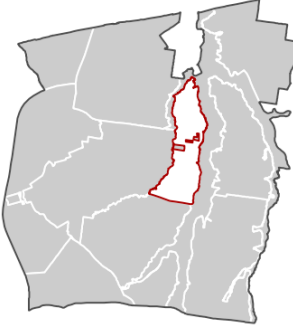
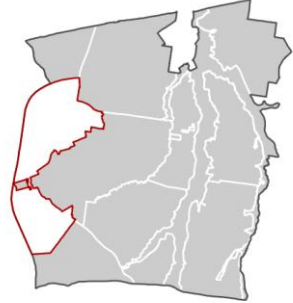
TABLE 2: PLANNING FOR EACH AEROTROPOLIS PRECINCT, ALONGSIDE LIVERPOOL CITY COUNCIL OBJECTIVES

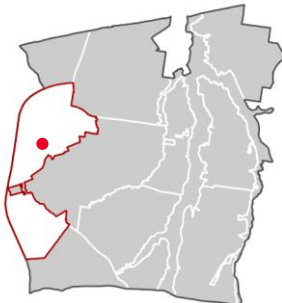
Location	Aerotropolis policy	Rural Lands Study (2012)	Draft LSPS, other local strategy/policy
<b>Aerotropolis Core</b>			
Precinct vision: <i>The Aerotropolis Core will be a diverse, dynamic and sustainable global airport city.</i>			
 <p><b>Total area:</b> 1,382 ha</p>	<p><b>Draft SEPP:</b> Special Purpose 1 (Airport), Enterprise, Mixed Use  <b>Planned role:</b> Metropolitan core  <b>Jobs:</b> +50,000—60,000  <b>Residents:</b> +20,000—24,000  <b>Dwellings:</b> +8,000 homes  <b>Timeframe:</b> Identified by the Aerotropolis Plan as an initial precinct, to be developed surrounding a new Sydney Metro station, set to be opened in 2036.</p> <ul style="list-style-type: none"> <li>Major metropolitan 24-hour, vibrant global centre and robust economy built around professional services, high technology-advanced manufacturing, research, training, education and creative industries</li> <li>Aerospace and defence land use cluster on airport fringe</li> <li>Aviation-related industries</li> <li>Tourism/conference centre at airport</li> <li>STEM education</li> <li>Significant residential development capacity in areas adjoining the precinct outside the Aerotropolis</li> <li>Residential development, retail, sports facilities, commercial offices, health services, to achieve a high-amenity precinct for business and residents</li> <li>Area of Commonwealth-owned land within the mixed-use precinct (to be developed and designed by the Aerotropolis Authority)</li> <li>Infrastructure (to be investigated): Rapid bus connections to Liverpool, Greater Penrith, Blacktown and Campbelltown–Macarthur, rail connections to St Marys, Parramatta, Leppington and Macarthur</li> </ul>	<p><b>Liverpool Rural Precinct:</b> Airport</p> <ul style="list-style-type: none"> <li>The Aerotropolis Core is in the Badgerys Creek Airport rural precinct</li> <li>Few land use constraints identified that would development feasibility (e.g. noise exposure impacts)</li> <li>Moderate agricultural capacity</li> <li>Class 3 soil capability</li> <li>As recommended, a 10-hectare minimum subdivision lot size has been applied to ensure consistency with other RU4-zoned land (Small lot primary production)</li> </ul>	<p><b>Current zone:</b> Special Activities, Large Lot Residential, Primary Production Small Lots</p> <p>Draft LSPS:</p> <ul style="list-style-type: none"> <li>Planning Priority 2: A rapid smart transit link between Liverpool and Western Sydney International Airport – The FAST Corridor will connect Liverpool to the Aerotropolis and Airport</li> <li>Planning Priorities 11,12 and 13 focus on leveraging the airport’s development to generate employment and develop employment lands surrounding the airport</li> <li>Planning Priority 12 focuses on ensuring the airport’s curfew free status is protected</li> <li>Advocacy for an Aerotropolis stop on future railway extensions.</li> </ul>

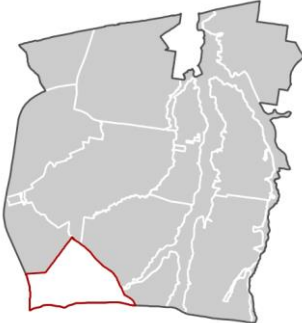
Location	Aerotropolis policy	Rural Lands Study (2012)	Draft LSPS, other local strategy/policy
<b>Wianamatta-South Creek</b>			
 <p><b>Total area:</b> 1,392 ha</p>	<p><b>Draft SEPP:</b> Environment and Recreation  <b>Planned role:</b> Recreational area / conservation zone.  <b>Jobs:</b> Minimal  <b>Residents:</b> 0  <b>Timeframe:</b> Identified by the Aerotropolis Plan as an initial precinct, it will define the structure of the Aerotropolis.</p> <ul style="list-style-type: none"> <li>Green-blue spine within the Environmental Zone and Recreation Zone</li> <li>Preserve and enhance the South Creek waterway through maintenance and planning</li> <li>Plan follows the 1:100-year flood extent with a wider application to enable space for recreation uses</li> <li>Focus on landscape and environmental values/health (tree canopy, waterway, riparian, reforestation), along the Wianamatta-South Creek Catchment</li> <li>Focus on Elizabeth Drive as the main approach to the Airport</li> <li>Fifteenth Avenue to be upgraded to an attractive landscaped boulevard</li> <li>Scope for restaurants and cafes, community and cultural facilities as well as open space and recreation land uses</li> </ul>	<p><b>Liverpool Rural Precinct:</b> Airport, Kemps Creek, Rossmore</p> <ul style="list-style-type: none"> <li>Land fragmentation should be avoided in this area</li> <li>Minimum lot size was retained as per the lot size controls in the Liverpool LEP 2008 (Refer to Chapter 3)</li> </ul>	<ul style="list-style-type: none"> <li><b>Current zone:</b> Primary Production, Primary Production Small Lots, Infrastructure, Special Activities</li> </ul> <p>Draft LSPS:</p> <ul style="list-style-type: none"> <li>Designated as a protected green corridor within the Draft Structure Plan</li> <li>Planning Priority 14: Bushland and waterways are celebrated, connected, protected and enhanced.</li> </ul>
<b>Rossmore</b>			
	<p><b>Draft SEPP:</b> (Relevant LEP Zone)  <b>Total area:</b> 1,361 ha  <b>Jobs</b> – N/A  <b>Population</b> – N/A  <b>Time frame</b> – Not an initial precinct, timing of delivery will be determined by the timing of infrastructure provision and the amount and nature of development in adjoining areas following the airport’s opening.</p> <ul style="list-style-type: none"> <li>Mixed-use precinct will provide social, cultural and connected active streets</li> <li>The area will be used to support existing agricultural operations as interim uses</li> <li>Housing and jobs provided around centres</li> <li>Flexible employment lands for aerospace, defence and high technology industries with a campus-style setting along with freight and logistics</li> <li>Fifteenth Avenue as a shaded landscaped transport boulevard with public transport priority</li> <li>Local employment and live/ work opportunities in local centres and along key corridors such as Fifteenth Avenue</li> </ul>	<p><b>Liverpool Rural Precinct:</b> Rossmore</p> <ul style="list-style-type: none"> <li>Avoid land fragmentation</li> <li>Support ongoing activities in line with the existing zone</li> <li>Minimum lot sizes should be retained at 10 ha, as per the lot size controls in the Liverpool LEP 2008</li> </ul>	<p><b>Current zone:</b> Primary Production Small Lots</p> <p>Draft LSPS:</p> <ul style="list-style-type: none"> <li>Planning Priority 2: A rapid smart transit link between Liverpool and Western Sydney International Airport</li> <li>Planning Priority 16: The Rural Lands are protected and enhanced.</li> <li>On the route of the Fifteenth Avenue Smart Transit Corridor.</li> <li>Designated as within the Aerotropolis in the Draft Structure Plan, despite not being an initial precinct. This area will not fall (initially) under the jurisdiction of an Aerotropolis SEPP, and Council should therefore continue planning for the future on the basis that development control will fall under Council jurisdiction (see Chapter 6 and 7).</li> </ul>

Location	Aerotropolis policy	Rural Lands Study (2012)	Draft LSPS, other local strategy/policy
	<ul style="list-style-type: none"> <li>Higher-density development along Fifteenth Avenue transport nodes, recognising its role as a centre serving corridor</li> <li>Desired land uses: Residential, Small and medium enterprises, Creative industries, High technology industries, Urban services, Community and cultural facilities, Market gardens, Local health and education, retail, open space, schools</li> <li>Strategic direction advocates for “flexible zones” to achieve the precinct vision</li> </ul>		
<b>Kemps Creek</b>			
	<p><b>Draft SEPP:</b> (Relevant LEP Zone)  <b>Total area:</b> 906 ha  <b>Jobs –</b> N/A  <b>Population –</b> N/A  <b>Time frame –</b> Not an initial precinct, timing of delivery will be determined by the timing of infrastructure provision and the amount and nature of development in adjoining areas following the airport’s opening.</p> <ul style="list-style-type: none"> <li>Liverpool City Council will progress the planning for Kems Creek</li> <li>Employment precinct will aim to attract industries that are looking for more affordable out of centre accommodation</li> <li>Smaller innovative industries and creative industries</li> <li>Mixed business area</li> <li>Aerospace, defence and high technology industries with a campus style setting along with freight and logistics</li> <li>Small and medium enterprises, Creative industries, High technology industries, Urban services</li> <li>Proposed M12 Motorway and east-west rail link, including a potential stabling and maintenance facility</li> <li>Focus on connections between Kems Creek and precincts to the west, with cycle paths and the extension of the local road network.</li> </ul>	<p><b>Liverpool Rural Precinct:</b> Kems Creek</p> <ul style="list-style-type: none"> <li>Avoid further land fragmentation</li> <li>Minimum lot sizes should be retained at 10 ha, as per the lot size controls in the Liverpool LEP 2008</li> <li>Impending release as part of SWGC</li> </ul>	<p><b>Current Zone:</b> Primary Production Small Lots</p> <p>Draft LSPS:</p> <ul style="list-style-type: none"> <li>Planning Priority 14: Bushland and waterways are celebrated, connected, protected and enhanced.</li> <li>Planning Priority 16: The Rural Lands are protected and enhanced.</li> <li>Designated as within the Aerotropolis in the Draft Structure Plan, despite not being an initial precinct. This area will not fall (initially) under the jurisdiction of an Aerotropolis SEPP, and Council should therefore continue planning for the future on the basis that development control will fall under Council jurisdiction.</li> </ul>



Location	Aerotropolis policy	Rural Lands Study (2012)	Draft LSPS, other local strategy/policy
<b>Badgerys Creek</b>			
	<p><b>Draft SEPP:</b> Enterprise  <b>Total area:</b> 612 ha  <b>Jobs:</b> 9,000 – 11,000  <b>Population:</b> 0  <b>Timeframe:</b> An initial precinct used to support the infrastructure that enables the construction of the Airport and Aerotropolis. Some land uses, buildings and structures may be temporary in the short to medium term and transition to higher order uses in the longer term.</p> <ul style="list-style-type: none"> <li>▪ Range of employment uses that do not require public transport</li> <li>▪ Uses that will benefit from being close to airport and the new centres</li> <li>▪ Early release to ensure that infrastructure is delivered to support the airport</li> <li>▪ Desired land uses: Defence and aerospace, advanced manufacturing activity, high technology industry, airport supporting development, local retail, Aerotropolis-enabling industries, modernised resource recovery industries, light industrial, social infrastructure</li> <li>▪ Interface treatments may be required between existing rural industries and new land uses until they either transition to other uses or are modernised to co-exist with adjoining land uses</li> <li>▪ Opportunity for heavier industries which require larger buffers to more sensitive uses</li> </ul>	<p><b>Liverpool Rural Precinct:</b> Airport (part) (Badgerys Creek)</p> <ul style="list-style-type: none"> <li>▪ Retain existing RU1</li> </ul> <p>This will provide greater redevelopment opportunities for the South West Growth Corridor</p>	<p><b>Current Zone:</b> Special Activities, Primary Production</p> <p>Draft LSPS:</p> <ul style="list-style-type: none"> <li>▪ Planning Priority 16: Rural lands are protected and enhanced – an updated Rural Lands Study and protected agricultural land will support the rural economy, ecosystem services and natural landscapes</li> <li>▪ Planning Priorities 11,12 and 13 focus on leveraging the airport’s development to generate employment and develop employment lands surrounding the airport</li> <li>▪ Planning Priority 12 focuses on ensuring the airport’s curfew free status is protected.</li> </ul>
<b>Agriculture and Agribusiness Precinct</b>			
	<p><b>Draft SEPP:</b> Agribusiness, Environment and Recreation  <b>Total area:</b> 1,572 ha  <b>Jobs</b> – 8,000 to 10,000  <b>Population</b>– minimal  <b>Time fame</b> – An initial precinct, with current agricultural uses will be maintained, and then gradually developed and intensified following commencement of Airport operations.</p> <ul style="list-style-type: none"> <li>▪ Notes productive soil and ‘reliable water supply’</li> <li>▪ Support the transition of existing agriculture in the area</li> <li>▪ Development of new agricultural opportunities (including an Agri-port) that will provide for the movement and storage of agricultural commodities</li> <li>▪ Dairying, poultry farming, intensive horticulture, food processing and food research and technology</li> <li>▪ Potential for fresh food markets that benefit from connections to the Airport</li> <li>▪ Residential uses are only permissible if ancillary to agriculture</li> </ul>	<p><b>Liverpool Rural Precinct:</b> Agriculture and Agribusiness</p> <ul style="list-style-type: none"> <li>▪ Land use patterns should reflect agricultural industries</li> <li>▪ Minimum lot sizes should be retained at 40 ha, in line with the controls of the LEP 2008</li> <li>▪ Continue to pursue the State and Federal Government regarding future land use options for the Badgerys Creek Airport land reservation</li> </ul>	<p><b>Current zone:</b> Primary Production and Primary Production Small Lots</p> <p>Draft LSPS:</p> <ul style="list-style-type: none"> <li>▪ Planning Priority 16: Rural lands are protected and enhanced. Reiterates the value of agricultural enterprise in light of the airport’s construction, highlighting the role of the Agribusiness precinct.</li> <li>▪ Planning Priorities 11,12 both reference the opportunities for agribusiness in light of the airport’s development.</li> </ul>

Location	Aerotropolis policy	Rural Lands Study (2012)	Draft LSPS, other local strategy/policy
	<p>Planning for this precinct has changed direction since the LUIIP:</p> <ul style="list-style-type: none"> <li>▪ Agricultural and Agribusiness precinct should be complementary and not diminish or impact ongoing agriculture/industry operations and clusters</li> <li>▪ Agricultural viability is important now and into future</li> <li>▪ Planning must consider biosecurity, water supply/demand and access, competition and land use conflicts</li> <li>▪ Transition of existing agricultural lands to alternative uses is not envisaged in current planning</li> <li>▪ These issues will be considered as long-term planning for the Aerotropolis is reviewed and monitored</li> </ul> <p>In the WSAP:</p> <ul style="list-style-type: none"> <li>▪ Agribusiness precinct area reduced to account for the Dwyer Road Precinct, to support airport functions</li> <li>▪ Desired land uses: High technology Industry, Commercial offices, Small and medium enterprises, Urban services, Warehousing and logistics, Food technology and research, Food production and processing, Agribusiness and Fresh food produce markets</li> </ul>		
<b>Luddenham Village</b>			
	<p><b>Draft SEPP: Agribusiness</b></p> <ul style="list-style-type: none"> <li>▪ Establish and understand the rate of change and expectations of the local community of the area</li> <li>▪ Understand How the communities would like to ‘integrate with the Aerotropolis’</li> <li>▪ Protect the character and history of the Luddenham Village</li> </ul>	<p><b>Liverpool Rural Precinct: Luddenham</b></p> <ul style="list-style-type: none"> <li>▪ Luddenham village boundary should be maintained within the R2 (Rural landscape) zoning limits</li> <li>▪ Potential expansion of R5 and RU4 Zones to the South once ANEF contours are deleted.</li> <li>▪ It is recommended that zoning limits not be expanded within the village or to the South/East unless ANEF contours are deleted</li> <li>▪ Scenic value of hills to the East is noted.</li> </ul>	<p><b>Current zone:</b> Large Lot Residential, Neighbourhood Centre</p> <p>Draft LSPS:</p> <ul style="list-style-type: none"> <li>▪ Marked as a retail centre within the structure plans.</li> </ul>

Location	Aerotropolis policy	Rural Lands Study (2012)	Draft LSPS, other local strategy/policy
<b>Dwyer Road Precinct</b>	 <p><b>Draft SEPP:</b> (Relevant LEP Zone)  <b>Total area:</b> 748 ha  <b>People</b> – N/A  <b>Jobs</b> – N/A  <b>Timeframe</b> – Not an initial precinct, Dwyer Road will gradually transition from agricultural to flexible employment uses over time.</p> <ul style="list-style-type: none"> <li>Support the operations of the precinct and transition from agriculture to flexible employment uses</li> <li>Encourages future application of ‘flexible zoning’ to achieve strategic outcomes</li> </ul> <p>Consider the existing rural village character of Bringelly, and manage the interface with the South West Growth Area.</p> <p>It should be noted that a portion of the Dwyer Road Precinct is within the MRA. This produces some inconsistency within the aerotropolis policy over whether land use will be intensified or retained.</p>	<p><b>Liverpool Rural Precinct:</b> Bringelly</p> <ul style="list-style-type: none"> <li>Rezone land from RU1 to RU4, applying a minimum subdivision lot size control of 10 Ha.</li> <li>This is supported as only a small part of the precinct is affected by the ANEF contours.</li> <li>Land is also only marginally affected by land use constraints in terms of flooding and environmental significance.</li> </ul>	<p><b>Current Zone:</b> Large Lot Residential, Primary Production, Primary Production Small Lots</p> <p>Draft LSPS:</p> <ul style="list-style-type: none"> <li>Planning Priority 16: Rural lands are protected and enhanced – an updated Rural Lands Study and protected agricultural land will support the rural economy, ecosystem services and natural landscapes</li> <li>Planning Priorities 11,12 and 13 focus on leveraging the airport’s development to generate employment and develop employment lands surrounding the airport</li> <li>Planning Priority 12 focuses on ensuring the airport’s curfew free status is protected</li> <li>Designated as within the Aerotropolis in the Draft Structure Plan, despite not being an initial precinct. This area will not fall (initially) under the jurisdiction of an Aerotropolis SEPP, and Council should therefore continue planning for the future on the basis that development control will fall under Council jurisdiction.</li> </ul>

Source: SGS Economics and Planning, 2019, based On the WSAP (2019), Rural Lands Study (2012), Liverpool Draft LSPS (2019).



Rail connections to WSA and Aerotropolis will provide an impetus for business location and economic development. However, this will only be fully realised if it provides fast connections to existing economic centres and the population.

### Other public transport

Rapid bus links are also planned between WSA, the Aerotropolis and Liverpool, Greater Penrith and Campbelltown-Macarthur. These are intended to connect the existing major centres of the Western Parkland City with the emerging centres of the Aerotropolis and WSA, especially until the North-South Rail Line is built. The *Western Sydney City Deal* commits to the delivery of these bus lines by the time the Airport opens in 2026.

In addition, Liverpool City Council has proposed the Fifteenth Avenue Smart Transit (FAST) Corridor. This will aim to bring fast and regular transport between the Western Sydney Airport and Liverpool (see Figure 13).

FIGURE 13 ARTISTS IMPRESSION OF LIVERPOOL'S FAST CORRIDOR



Source: Liverpool City Council, 2018

### Roads

Major new road connections to WSA will increase the accessibility of the Airport to much of Western Sydney. This is required to provide access to populations who will not be able to take public transport to the Airport, noting that many people drive to Sydney Airport despite its railway line. Major roads will also be required to make the Business Development Lands at the Airport attractive for industrial and logistics uses.

The NSW Government is currently planning for and constructing new roads under a program called the *Western Sydney Infrastructure Plan*. This program includes:

- The **M12 motorway**, which would connect the M7 to WSA and the Northern Road. According to the preliminary design released by Roads and Maritime Services in December 2018, an airport interchange design is being developed from a spur leading south from the M12. A grade-separated interchange will be provided with the M7 at Elizabeth Drive and a signalised intersection connection with the Northern Road between Eaton Road and Littlefields Road.

- An **upgrade of The Northern Road** to re-route it around WSA and to increase its capacity with at least two travel lanes each way from Macarthur to Penrith. This would improve access for buses to the Airport and would connect to the proposed Business Park access.
- An **upgrade of Bringelly Road** to increase its capacity, which would service growth areas near the Airport, including the Aerotropolis.
- The **Outer Sydney Orbital (M9)** is a proposed motorway which would connect the North-West Growth Area with the South-West Growth Area and Hume Motorway, with potential long-term extensions to the Central Coast and Wollongong.
- An **interchange is planned with the M12** immediately north of the Airport. The first stage of this project from the Great Western Highway to the Aerotropolis is identified in *Future Transport 2056* as a project for investigation in 10-20 years, and the later stages as a visionary project with a 20+ year timeframe.
- The NSW government has exhibited a **proposed corridor for the Outer Sydney Orbital** which is designed to accommodate up to four traffic lanes in each direction and three freight lines.
- *Future Transport 2056* also discusses an **extension of the M5 motorway** from the interchange with the M31 and M7 at Prestons to the Outer Sydney Orbital. This is classified as a *visionary project* with a 20+ year timeframe.

### Freight

The major roads proposed and planned around the Airport are intended to serve a freight transport function as well as increasing accessibility around WSA. The Outer Sydney Orbital corridor has also been designed to accommodate a freight railway line along its length, which would provide a dedicated freight corridor between the different strategic employment precincts in Western Sydney including around the future Airport.

A further freight line connecting the Outer Sydney Orbital corridor to the existing freight rail network is planned. A corridor from the M7 to the Outer Sydney Orbital has been exhibited, which would lie immediately south of the Warragamba Pipeline. The design and alignment of this line east of the M7 has not yet been determined.

*Future Transport 2056* also discusses a potential intermodal terminal near WSA which would connect to the nearby freight rail network. If paired with the Maldon-Dombarton rail line, which is identified for investigation in 10-20 years, this would provide rail straightforward rail freight access to both Port Kembla and Port Botany. In combination with the Airport's potential freight role, this would make the area attractive for large-scale logistics uses.

### Water and wastewater and recycled services

With regards to water, wastewater and recycled services, Sydney Water is finalising the site selection, financing and delivery of the Upper South Creek Water Factory with associated Resource Recovery Plant and corresponding network location requirements. The plant, once reached an appropriate scale, is expected to produce recycled water appropriate for agricultural, industrial, open space irrigation and residential dual reticulation.

## 2.5 Potential impacts on agricultural land

The following impacts have been identified as a result of the analysis conducted by SGS Economics and Planning, and RMCG.

### Current agricultural activities in the Liverpool rural area

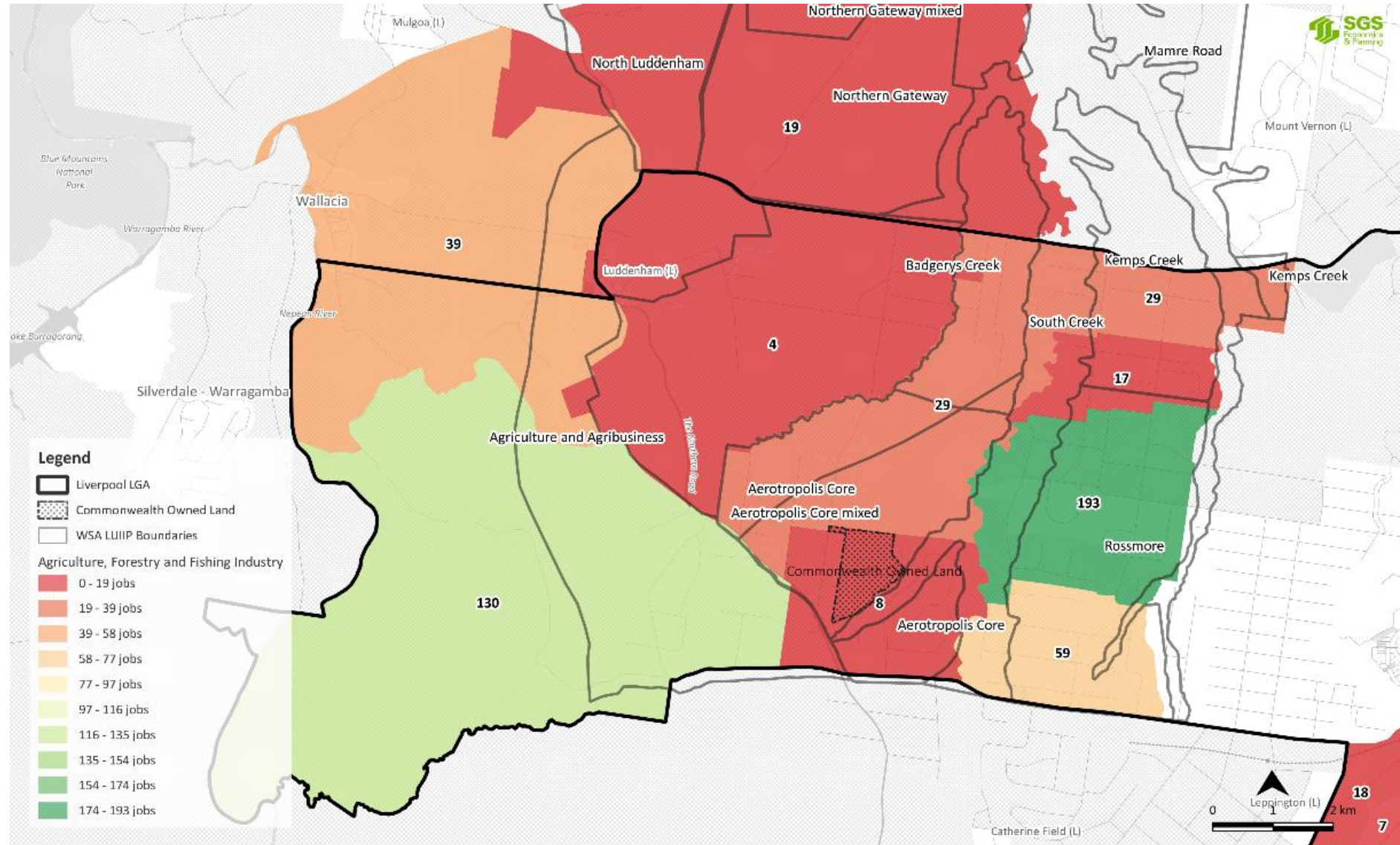
The economic and employment profiles of Liverpool's rural area are presented in Section 4.2 of this report. Detailed information about each agricultural subsector is also set out in Chapter 5.

Within Liverpool's rural area:

- Construction and Agriculture are rural Liverpool's industry strengths. Employment numbers are high for Site Preparation Services in Northwest Bringelly, and for Mushroom and Vegetable Growing in Rossmore. Greendale has a mix of agricultural activities including Dairy Cattle Farming, Poultry Farming and Mushroom and Vegetable Farming. There is also a high presence of Poultry Processing jobs in East Badgerys Creek. These two industries are also projected to grow.
- Land zones influence activity across the rural area. Most of the Construction jobs (40 per cent) are currently located on land zoned for Large Lot Residential, while most Agriculture, Forestry and Fishing jobs (23 per cent) are within the Primary Production Small Lots-zoned areas.
- Agriculture has flow-on effects to other industry sectors. While most of the output is exported, it also has strong links with Manufacturing, Retail Trade, Accommodation and Food Services and Wholesale Trade.
- Kemps Creek, Rossmore and East Badgerys Creek have the greatest soil capability, while Wallacia and Greendale are more limited.
- In contrast, Wallacia and Greendale have the greatest soil fertility. The eastern and central parts of rural Liverpool have moderately low soil fertility.
- The eastern strip of rural Liverpool is more 'agriculturally intensive'. Residential and farm infrastructure or grazing native vegetation makes up most of the land. The eastern end (Rossmore and Kemps Creek) has more intensive irrigated perennial and irrigated horticultural uses.
- Planning for the Aerotropolis forecasts high and diverse job growth. Industries such as Retail Trade, Transport, Postal and Warehousing, Professional, Scientific and Technical Services and Accommodation and Food Services are projected to grow significantly in South Luddenham and Greendale, while eastern rural Liverpool will see continued growth primarily in Construction and Agriculture, Forestry and Fishing.

Overleaf, the maps show the highest number of agricultural jobs are in the Rossmore, Agriculture and Agribusiness, Aerotropolis Core precincts. Below (and described in further detail in Appendix 1), the map shows the variety of agricultural activities currently occurring across the Liverpool rural area.

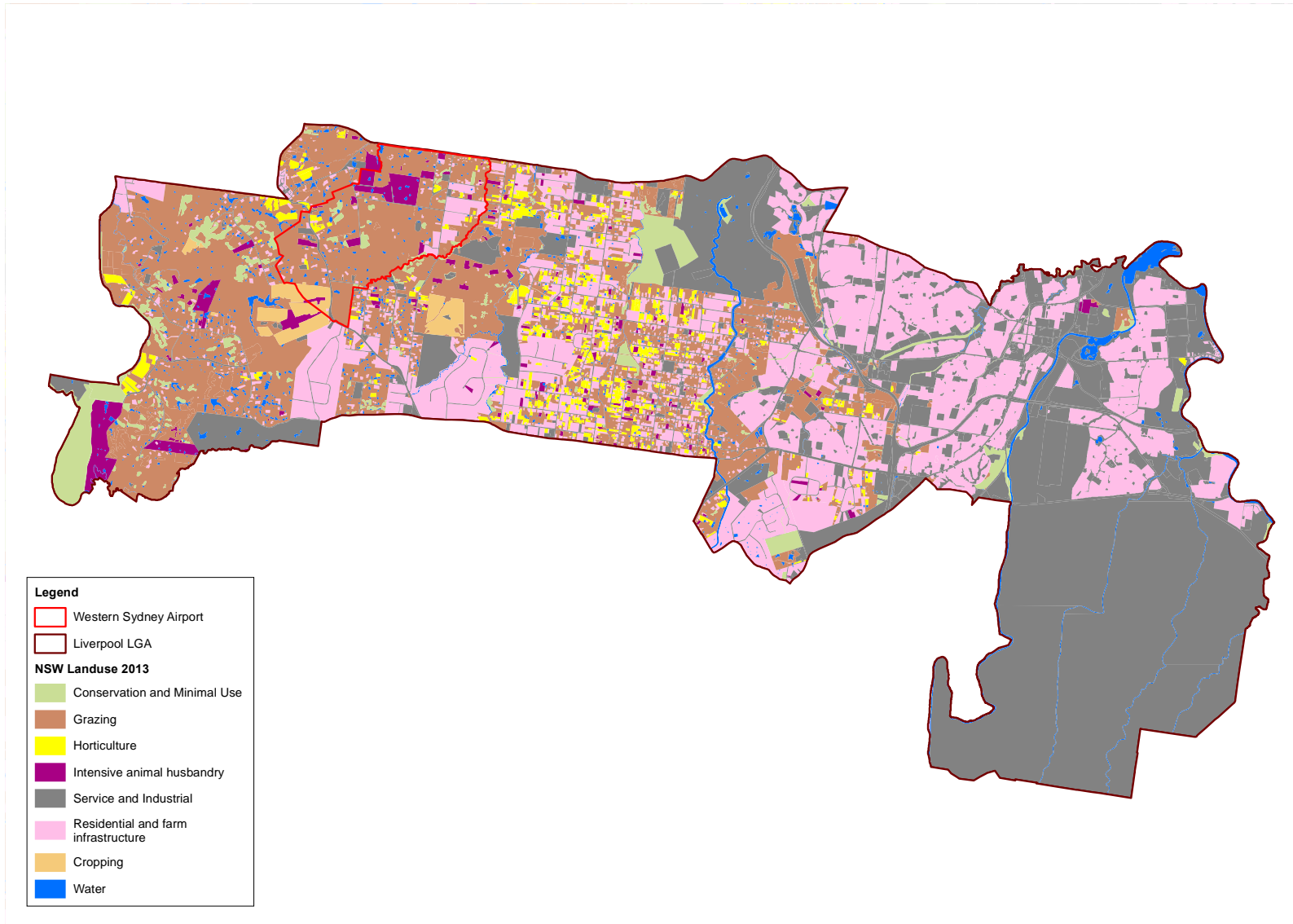
FIGURE 14: NUMBER OF JOBS IN AGRICULTURE ACROSS THE LIVERPOOL RURAL AREA



Source: SGS Economics and Planning, 2019.



FIGURE 15: LAND USE ACROSS THE LIVERPOOL LGA\*



Source: RMCG, based on the NSW Landuse dataset, 2013.

\*Note: Maps detailing the land use by precinct across the rural area are included in Appendix 1.

## Urban encroachment

The impacts on agriculture and the agricultural value chain from urban encroachment and fragmentation are well-documented. They include:

- An ‘impermanence syndrome’ for commercial agriculture<sup>4</sup> as:
  - The price of land increases fuelling land speculation
  - Tracts of farmland become isolated
  - Farmers are deterred from investing in their operations as they anticipate the conversion of their land out of commercial agriculture resulting in an absence or certainty in their industry.
- Loss of critical mass of commercial farms and farmers to sustain an agricultural industry and value chain as higher land prices act as an inducement to sell or commercial agriculture is substituted for sub-commercial agricultural activities. This places a strain on remaining farmers to survive and reduces opportunities for commercial farmers to expand businesses, further exacerbating conversion of agricultural land to non-agricultural uses.
- A reduced ability for farmers to generate sufficient income to sustain a standard of living or provide for retirement such that they speculate in their land rather than farm it.
  - Rural land use conflict as new migrants in an agricultural landscape have an expectation of an emission-free rural environment, and often don’t anticipate the likely odour and dust emissions, and spraying activities that occur in fully functioning agricultural areas.

In the peri urban region, these changes may take place over several decades as urban release areas are identified well ahead of urban development.

## Future scenarios

As outlined in the above discussion, the Aerotropolis plans identify job targets and set land aside for both agricultural and non-agricultural uses. Significant infrastructure projects are also identified (Figure 12, earlier in this section); all of which will influence land values across the Liverpool Rural Area.

According to work undertaken by RMCG for the agricultural investigation, over the next 10 years it is envisaged that the commercial agricultural industry will gradually withdraw from the Liverpool LGA.

Where the transition out of agriculture will occur and the rate at which it takes place will depend on the proximity to urban and infrastructure development and individual business circumstances. In the eastern precincts transition is already underway and under the current policy setting will continue. Some business owners in non-initial precincts may cease commercial horticultural production and wait to capitalise on future urban development or they may ‘soldier on’ and wind back production over time. Others wishing to continue in the industry are more likely to transition out of Liverpool LGA to a less constrained rural area. The rate of transition in western precincts will be slower as agricultural businesses benefit from larger properties and less disruption from urban encroachment. Land speculation is, however, likely to be a key consideration in future business plans.

The proximity to the airport is not a significant enough lever on its own to attract new industry investment. New investment in soil-based horticulture is unlikely due to the lack of suitable land and an affordable water supply in the proposed agriculture precinct. There is some potential for new generation protected cropping in large scale glasshouses, (some new developments are up to 30 ha in size) that enable year round production of large volumes of

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<sup>4</sup> Lennon, N (2004) The costs of hobby farming: A literature review.

commodities as well as freight, logistics and cold storage for distribution interstate and export.

These changes, alongside macro trends in agriculture production, are further discussed in Chapter 5.

### Key findings:

- The WSAP outlines potential transport and social infrastructure to be delivered for the Aerotropolis but does not commit to developing it.
- The WSAP acknowledges the importance of preserving and enhancing the natural assets, particularly of Wianamatta and South Creek.
- Existing infrastructure and current land holdings and ownership patterns will have an impact on the form and function of the Aerotropolis particularly in the interim when development is beginning to occur.
- Planning for the Aerotropolis notes the importance of exploring in how the existing community of Luddenham would like to integrate into the Aerotropolis.

### Implications

State Government planning policy sees the Aerotropolis as Western Sydney's future economic heart, which will see the area transform in the years to come. The Aerotropolis has been committed to via the Western Sydney City Deal, which is also intended to spur on economic activity from businesses wishing to invest early.

A tension exists between retaining current environmental, social and economic values and respecting the environmental and cultural heritage constraints while allowing the region to transform into the Aerotropolis in the future.

The precincts defined by the WSAP Structure Plan show a clear direction for where the Aerotropolis should arrive at, however there is a need to map the path between these outcomes and how the Rural Lands are currently operating.

As highlighted in the WSAP, the Agribusiness precinct should be complementary and not impact upon the viability of effective ongoing agriculture and industry operations within the surrounding area, both now and into future. Despite this, findings from the agriculture assessment (Chapter 6) suggest that both the poultry and fruit and vegetable industries will be significantly impacted by the scale of infrastructure investment, urban encroachment and changing land prices influenced by the Aerotropolis projects and accompanying development. Furthermore, RMCG found that new investment in soil-based horticulture is unlikely due to lack of suitable land and an affordable water supply in the new agriculture precinct.

For poultry, it is unlikely that there will be a poultry industry in the City in 20 to 30 years' time. New investment is unlikely as major processors are investing in regional areas of the state such as Tamworth and the proximity to the airport is not a significant enough lever for industry investment due to other significant downside factors. There may be some opportunity for freight, logistics and cold storage for distribution interstate and export in the agribusiness precinct.

There are opportunities for agricultural industries which can occur on industrial land (such as mushrooms, grown commercially in sheds). However, it is noted that this type of land use would not be permissible under the draft SEPP for the Western Sydney Aerotropolis currently on exhibition; something Council may wish to explore further with the Western Sydney Planning Partnership. Additional discussion regarding zoning and the planning context is included in the next chapter.

# 3. POLICY CONTEXT

This section provides an overview of State and local government strategy that is relevant to the rural lands study.

## 3.1 Introduction

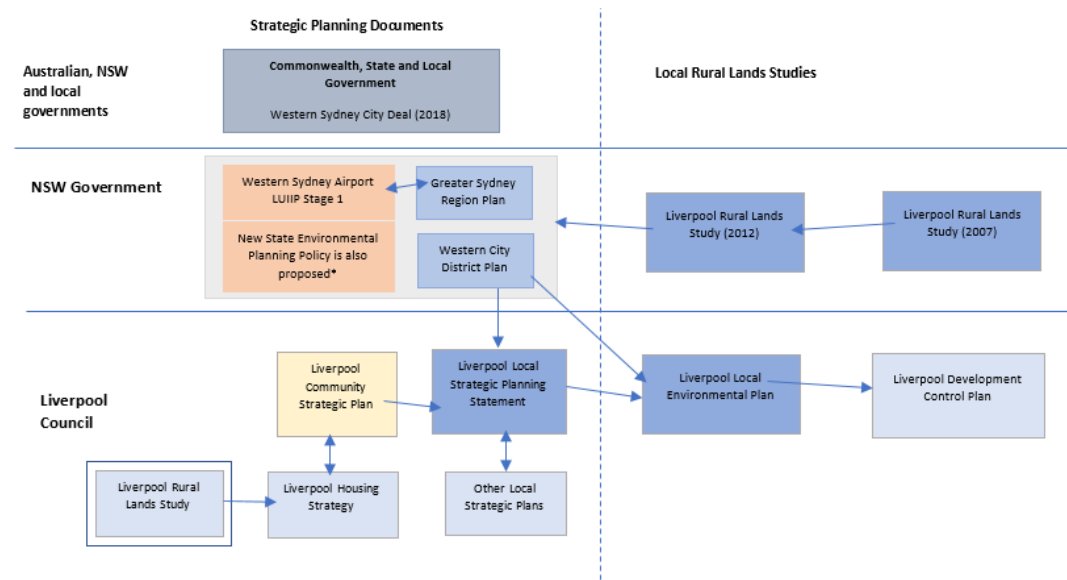
This section includes a review of Council’s past Rural Lands Studies (2007 and 2012) and considers the recommendations of those reports in the context of the Western Sydney Aerotropolis Plan.

It also considers the implications of other State government documents such as the Metropolis of Three Cities and Western City District Plan, which set directions for local planning in rural areas.

The following State policy documents were reviewed:

- Greater Sydney Regional Plan (2018)
- Western City District Plan (2018)
- Western Sydney City Deal (2018)
- Western Sydney Aerotropolis Plan (2019)
  
- The following key strategic documents have been reviewed from Liverpool Shire Council:
- Liverpool Local Environmental Plan (2008)
- Liverpool Development Control Plan (2008)
- Liverpool rural lands study (2007)
- Liverpool rural lands study (2012).

FIGURE 16: PLANNING POLICY FRAMEWORK



Source: SGS Economics and Planning, 2019

### 3.2 State government policy overview

The state government planning policy framework sets a very high-level vision for planning across the Western City District. However, as set out above the creation of a Western Sydney Aerotropolis Authority under the City Deal process, and preparation of the LUIP, has significant implications for Liverpool City Council and management of the rural lands.

Key policies from the GSRP and WCDP that will influence this project are the directions which require land management, landscape units and place-based planning principles to be applied to planning for rural areas. An added layer of complexity is that the Aerotropolis precinct and planning for this area sets out a vastly different vision to the presumed ongoing agricultural land use across the broader Metropolitan Rural Area (the rural areas within Greater Sydney).

*For the Rural Lands Study and planning at the local government level, the implications of the State policy context are:*

- *State planning policy states the natural and scenic landscape functions of rural areas are to be protected and enhanced, for their intrinsic value.*
- *The GSRP and WCDP require the various roles of rural areas to be identified by Council, then strategies outlined to protect, enhance and manage these areas in line with overarching objectives from those State-level plans.*
- *The role of the rural area is not to transition into residential areas and accommodate population growth; rather, agricultural productivity and mining (where relevant) opportunities should be preserved. The focus of the rural area is to respect environmental constraints, while retaining social and economic value through the land rural land uses (and supporting uses – for example, tourism, recreation) allowed there.*
- *As rural lands surrounding the urban parts of Sydney are diverse, the GSC propose a place-based framework so that planning policies can be identified based on identified values that relate to a local area. The place-based framework requires Council to identify the economic, social and environmental values of its rural areas, using identified ‘landscape units’ to highlight different locations across the rural area that are unique, based on the interplay between landform, land uses, development. These qualities are then used to identify different challenges and opportunities that underpin localised planning policies.*
- *The potential for land use conflicts throughout peri-urban rural areas is high. To manage these conflicts and protect ‘Right to Farm’ principles, rural areas need policy direction that enables careful management to retain the identified cultural, social and economic values (as outlined above).*
- *Planning for rural areas must consider the changing nature of agriculture and farming in the Sydney Basin, and the economic challenges for communities that may have ageing and declining populations. With the Western Sydney City Deal and Aerotropolis, this challenge is even greater for Liverpool City Council.*
- *The Western Sydney City Deal introduces a vision for transformative development in Western Sydney, which must be considered alongside other policy visions for preservation and enhancement of agricultural activities and landscape values across Liverpool’s rural area. This proposed transformation means Liverpool City Council must consider how to plan for two vastly different agricultural areas – one that will transition to the Aerotropolis and Agribusiness precinct, while the other (may) remains a conventional rural area.*
- *WSAP provides a strategic direction intended to catalyse economic development at the Aerotropolis, however there are many uncertainties (for example, will jobs target be achievable?) due to the preliminary stage of planning and uncertainty regarding infrastructure delivery.*
- *This Rural Lands Study process will help Council explore how to balance and manage these tensions across Liverpool’s rural area, alongside any anticipated impacts of the Aerotropolis.*

## Does the draft WSAP address Council's feedback on the LUIIP Stage 1?

In its submission to the LUIIP Stage 1, Council emphasised that while it supports the economic imperative of the airport and the growth that it may create within the LGA, it does not support the extent and application of proposed land use zones in their current form. Council was also seeking clarity regarding the emerging governance structure and the approach to community consultation, which remains unclear under the new Draft WSAP (hasn't changed).

In its LUIIP submission, Council recommended amendments to the plan, to ensure that planning for and implementation of the Aerotropolis is staged in a way that is sustainable, and responsive to local context of the area.

In some instances, Council's feedback was not addressed and no changes were made. These are as follows:

- Environmental sustainability priorities will give developers and the council options to not uptake sustainable development such as the implementation of green roofs.
- Best practice examples suggest that council and stakeholders must have a clear commitment to successfully implement solar and green roofs into development and ensure that there are incentives.
- High level Precinct Plans/visions still suggest that some residential development may occur within 1km of the airport, within land identified for the new Mixed Use Zone (albeit with height and noise attenuation requirements, especially for land affected by an ANEF of 20 or higher).
- The precautionary noise principle should be taken, to ensure that the airport is set back at least 5 kilometres from residential development. This would require removing residential development from the commercial core of the aerotropolis.
- Locating residential development away from the airport will also ensure that the airport will be able to expand in the future and not face the challenges currently felt by the Sydney Airport.
- Given the above, the suggested location of residential development conflicts with the plan's intention to create a centre that promotes an active and healthy lifestyle.
- Locating residential development away from the core will also ensure that environmental pollutants are diminished at a higher rate. Poor air quality and traffic congestion would thus be mitigated.
- More clarity has been provided around land use tables for each new zone in the draft SEPP, however the vision for Kemps Creek, Rossmore and Dwyer Road has been pushed back through the non-initial precinct planning designation meaning Council's Rural Lands Study should fill the gap about what happens in these locations over the short-medium term (see Chapters 4-7).
- Although the WSAP acknowledges that growth of the airport will be slow, meaning industrial development will happen gradually at the airport, it designates certain precincts where agriculture should continue in the short term, while clearly identifying land for urban uses and development, creating a tension around certainty for current landowners and businesses.
- Agriculture is seen as an existing interim use in Rossmore and Kemps Creek but the reality of the Aerotropolis planning and current infrastructure construction means transition is already visible in these eastern rural precincts (see Chapter 6).
- The importance of new local infrastructure for existing centres with new rail lines has been overshadowed by WSAP activity, creating a logical sequencing of development challenge in existing and establishing growth areas.

### 3.3 Local government policy setting

This local policy review focusses on those relevant to Liverpool's rural lands, and any pertinent legislative requirements in the Liverpool Local Environmental Plan (LEP) and the Development Control Plan (DCP).

In Liverpool's rural area, the current local policy context is based on the 2012 Rural Lands Study. Most land falls within the Primary Production, or Primary Production Small Lots, zone. In the southern part of Greendale and the western parts of South Luddenham, some land is also set aside for Large Lot Residential.

There are three infrastructure precincts across the rural area: in Greendale, Northeast Bringelly and East Badgerys Creek. The Badgerys Creek Airport precinct has been rezoned for Special Activities but is currently surrounded by land for which the primary purpose is agriculture (Primary Production Zone).

*Key considerations are:*

- *The Liverpool LEP permits uses such as dual occupancies through Clause 7.24, which allows for some residential intensification on RU1 and RU4 zoned land. This flexibility may lead to greater residential and agricultural land use conflicts, as the purpose of the zone is to support primary production on agricultural land. A starting point to understand the impact of this policy on land use conflicts would be to examine the take-up rate over recent years and review proliferation of dual occupancies across the rural area.*
- *The suite of rural zones that apply across the Liverpool LGA contain several 'non-rural' uses that provide an important support to nearby urban areas (for example, dog- and cat-boarding services, waste recovery, mining for construction materials and bed-and-breakfast accommodation). For the Rural Lands Study, some analysis has been undertaken to understand (at a high level) the extent of other non-rural uses and their impact on broader agricultural activities. For further information, refer to Section 4.2 and Section 5.*
- *Council's submission to the LUIP suggests that there are many social, environmental and economic factors that need to be managed and assessed further to ensure the sustainable development of the aerotropolis. This submission is further discussed in Appendix 1.*
- *In its LUIP submission, Council suggested a staging plan should be established that enables other land use and development patterns (including ongoing agricultural uses) to occur in the event the proposed airport does not proceed, or where the number of jobs achieved is lower than the current plans anticipate.*
- *Considering impacts of the WSAP on rural lands, the Draft WSAP plan contains significantly more detail regarding its commitment to economic (circular economies) and environmental sustainability, where the draft LUIP provided limited details regarding sustainability.*
- *Current rural policies and zones within the DCP and LEP were prepared prior to the airport announcement. The airport announcement significantly changes land values across the rural area (especially in the immediate surrounds), especially as significant infrastructure is delivered.*
- *Given the flexibility that currently exists within the rural zones (in terms of land use), some non-rural uses that have been limited until now could become more prevalent in future; especially where the land use may benefit from connections to the airport and Aerotropolis precincts (for example, enhanced freight connections).*
- *There is a need to identify where some transition is acceptable, or where greater protection of rural lands is required; this includes considering whether the current zoning would remain appropriate as the airport progresses.*
- *As the rural zones are closed, any land use not specified in the RU1 Primary Production item 2 or 3 is prohibited. In future, there may be scope to explore what other uses could be*

*permitted within the RU1, to facilitate additional activities in line with the land around the Western Sydney Airport and Aerotropolis.*

Principles and recommendations relating to the second-last dot point are included at Section 7, on page 109.

### 3.4 Past Rural Lands Studies

The *Liverpool Rural Lands Study 2012* updated a 2007 study that had been prepared to inform the preparation of the *Liverpool Local Environmental Plan 2008*. It identified precincts across the rural area, responding to plans for the South West Growth Centre and Airport reservation, which at the time was uncertain (since confirmed as the Western Sydney Aerotropolis area in the 2018 LUIP and 2019 WSAP).

The plan considered emerging uses and pressures affecting Liverpool's rural areas, and examined the ongoing viability of agriculture, especially related to pressure for rural lifestyle housing and the nearing urban growth front. It highlighted that:

- 'Any future study needs to balance the needs for urban sprawl (230 000 of Sydney's new dwellings are to be provided Greenfield areas over the next 20 to 30 years), landowners seeking highest and best use of rural land, visual and scenic qualities, the demand for fresh produce and agricultural uses, extractive industry and environmental constraints.
- Overall, the greatest pressure on rural land and its character in Liverpool is attributed to the push for rural lifestyle housing. The demands for additional housing rights may somewhat erode the qualities of rural areas that attract residents to the area in the first place.'

When the 2012 Study was prepared, land had already been identified for a future airport at Badgerys Creek, however at the time directions from the Minister suggested the airport may not go ahead. Regarding agriculture, the Study found:

- 'Large scale agricultural production was generally confined to land along the Nepean River and the large holdings of the Leppington Pastoral Company.
- There are also a number of smaller agricultural business that produce a high per centage of Sydney's perishable vegetables.
- However, the majority of the study area was not being used for economic agricultural purposes.
- Regardless of the number of lots being used for agriculture, the importance of agriculture within the Sydney basin, from an economic and food supply point of view, is considerable and thus future planning should restrict the ability for subdivision and increased development potential from areas adjacent to significant agricultural pursuits and on land that is Class 1 or Class 2 agricultural capability.'

The Study concluded:

- 'The proposed changes to planning policy seek to better balance the challenges facing rural lands which include the use of land for primary production, extractive industry and recreational pursuits, protecting land with scenic qualities and environmental constraints whilst allowing some reasonable development types such as dual occupancies.
- Other challenges include the relatively recent proliferation of cemetery proposals and the delivery of new neighbourhoods within the Liverpool Rural Lands Study 2012 South West Growth Centre. The importance of the rural areas for fresh food production is reiterated and is the extractive potential for land as outlined in SREP 9.'

#### Agricultural viability

The previous Rural Lands Studies acknowledged the difficulty of maintaining agricultural viability on fragmented land subject to peri-urban pressures and residential encroachment.



Even in 2007, these effects were being felt. At the same time, Commonwealth land around Badgerys Creek had already been set aside with the suggestion of a second airport for Sydney, and agricultural productivity was significantly reduced, with several farms reporting they were in a stage of 'run off.'

- The 2007 Study focussed on the south-west growth area, and the potential development of a Badgerys Creek Airport.
- The Commonwealth land around Badgerys Creek had an impact on agricultural productivity, and agricultural industries were in decline.
- This decline was caused by several factors, including residential/urban encroachment (limiting emissions necessary for commercial-scale farms), and challenges with land fragmentation and lot sizes too small to enable further intensification (in the case of market gardens).
- In 2012, the Rural Land Study recommended retention and enhancement of agricultural lands.
- A wider range of non-agricultural uses were permitted in rural lands after 2012, with zoning changes introduced. This responded to peri-urban pressures across the Sydney Basin, and further enabled the transition towards greater residential and light industrial activities in the eastern rural lands.

As highlighted earlier, strong policy commitment and planning for a Western Sydney Airport is now intensifying existing challenges to agricultural viability across Liverpool's rural area. This has implications for this project and this update to the Rural Land Study:

- Overall, Agriculture in peri-urban areas is impacted by demand for rural residential, and rural lifestyle housing which impacts the economic sustainability of traditional farming.
- The Western Sydney Airport is expected to emphasise this pattern even more into the future.
- Nutrient run off will increase with agricultural intensification, in the areas which do remain viable or change their business model to a more industrial, intensified approach. If this intensification becomes a broader trend, there may be implications for catchment management and water quality across the LGA. This should be further considered in light of the agribusiness precinct and widescale protected agriculture which could arise in the proposed Aerotropolis Agribusiness precinct.
- Further information may be required to understand the water scarcity challenges and catchment management issues that could arise from emerging intensive agriculture practices in future.
- Agricultural lands should be recognised for their economic value, as well as their intrinsic and landscape values.

## 4. LIVERPOOL CONTEXT

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This section presents a summary of current conditions in the Liverpool LGA, highlighting the current demographic and economic profile of the rural area.

### 4.1 Demographic context

#### Introduction

There are currently 211,502 people living in the Liverpool LGA (at the 2016 Census). By 2041, the forecast population will be 357,644, a 70 per cent change over the period 2019-2041.<sup>5</sup> The greatest amount of population growth is forecast to occur in growth area suburbs, Austral, the Liverpool CBD and surrounds, and Edmondson Park. Due to planning for the Western Sydney Airport and the South West Growth area, substantial growth is also forecast in the Metropolitan Rural Area, around +3,000 people by 2040. Within the Liverpool Rural Area, this growth is likely to be concentrated within the Western Sydney priority growth area, north of Leppington.

Figure 17 depicts the distribution of population growth expected in the Liverpool LGA. It shows that the 'growth' suburbs (including Greendale, Badgerys Creek, Bringelly, Cecil Park, Kemps Creek, Luddenham, Rossmore, Silverdale, and Wallacia) are projected to grow by approximately +29,000 people, while Austral is expected to grow by +23,300 people. Comparatively, established areas (e.g. the Liverpool CBD and surrounds) are expected to grow by +17,000 people, as well as host up to 15,000 tertiary students.<sup>6</sup>

#### Housing profile

There are approximately 65,000 homes within the Liverpool LGA. By 2041, this number is projected to grow to 123,000 homes, a 90 per cent change over the period 2016-41.<sup>7</sup> The greatest household growth is forecast to occur in the growth suburbs (+11,000), Austral (+9,000), the Liverpool CBD and surrounds (+8,500) and Edmondson Park (+6,300).

Figure 18 depicts the distribution of household growth expected in the Liverpool LGA. It shows that some parts of Liverpool's rural area are projected to grow significantly.

#### Dwelling types

Figure 19 depicts the current dwelling types and size across the Liverpool LGA. When viewed with Figure 18, it shows that most of the growth is expected to occur in parts of the LGA that are currently rural or semi-rural; there are currently fewer homes in those locations compared to the eastern side of the Liverpool LGA.

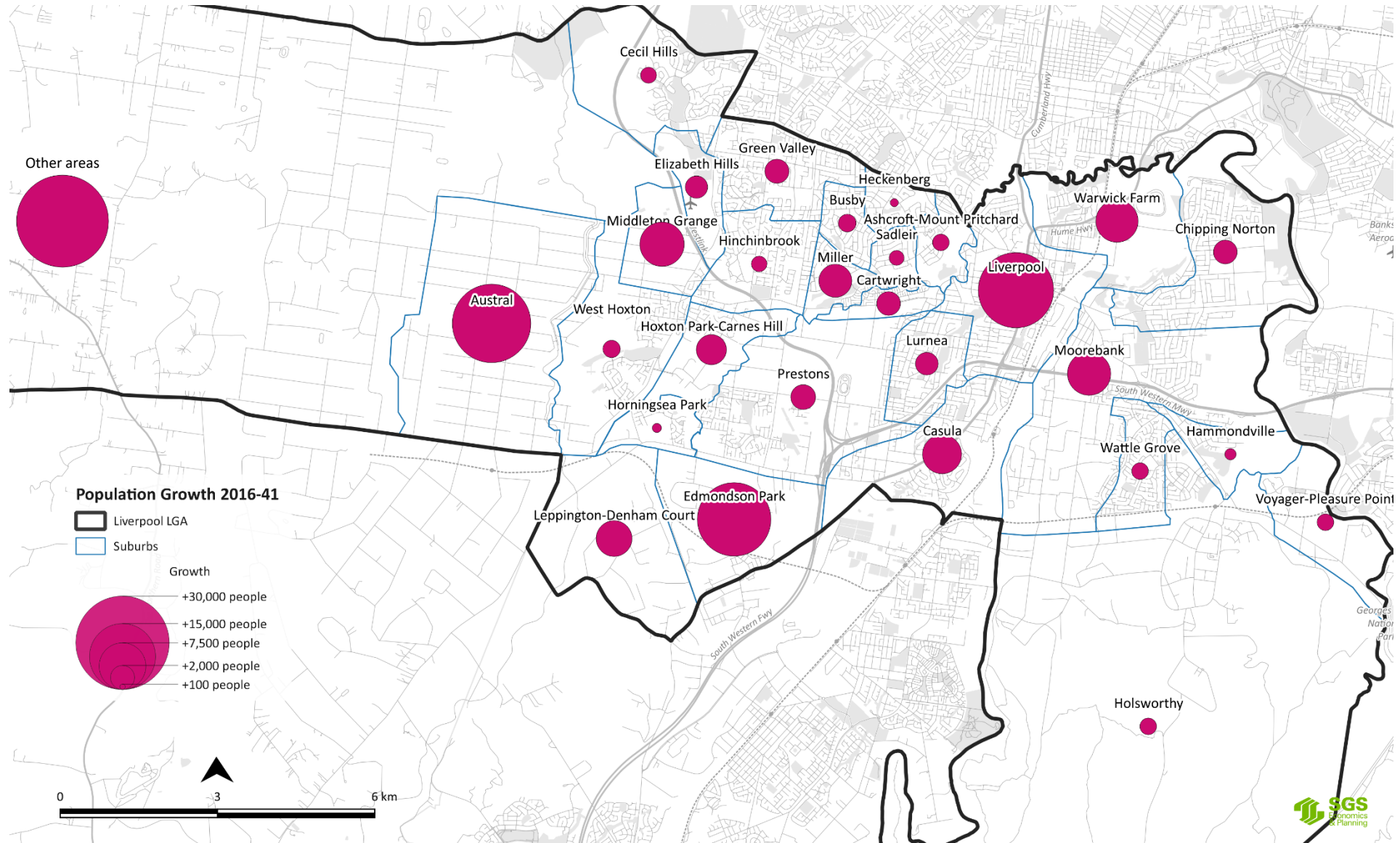
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<sup>5</sup> Travel Zone Projections, TZP 2016 v1.51

<sup>6</sup> Greater Sydney Commission, *Liverpool Collaboration Area Place Strategy*, December 2018.

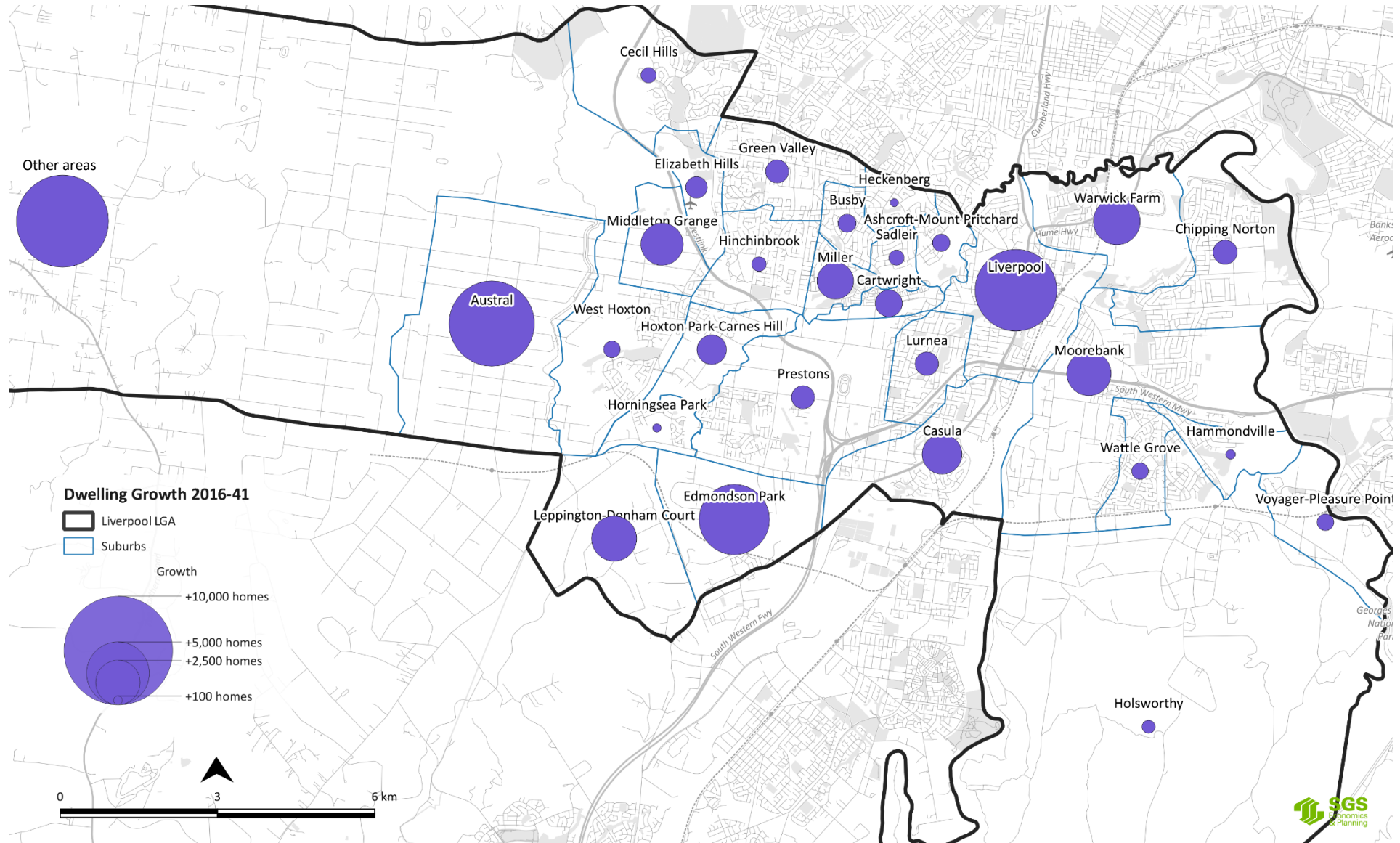
<sup>7</sup> Travel Zone Projections, TZP 2016 v1.51

FIGURE 17: LIVERPOOL LGA POPULATION GROWTH 2019-41



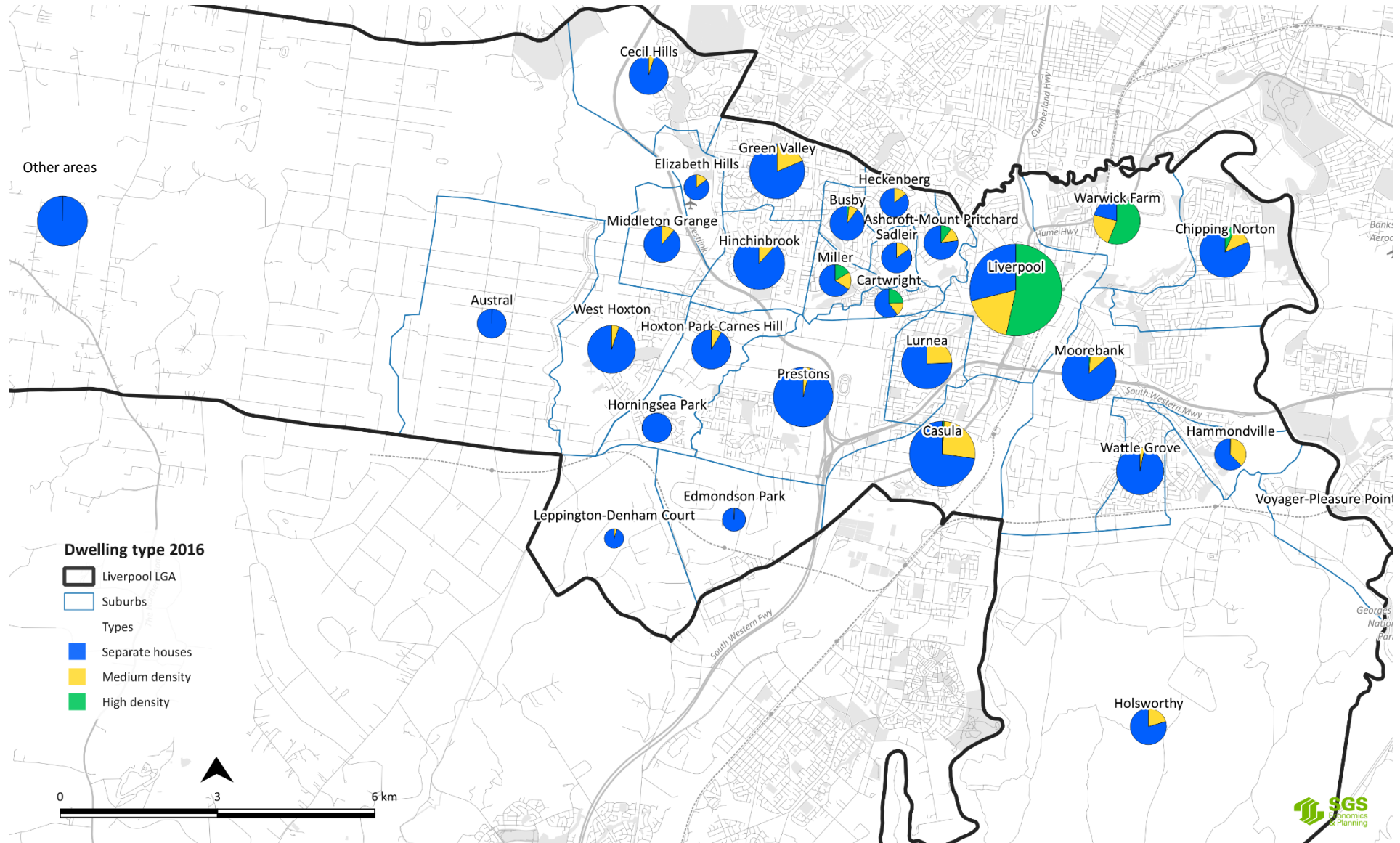
Source: SGS Economics and Planning, based on data from Travel Zone Projections TZP 2016 v1.51

FIGURE 18: LIVERPOOL LGA HOUSEHOLD GROWTH 2016-41



Source: SGS Economics and Planning, based on data from Travel Zone Projections TZP 2016 v1.51

FIGURE 19: LIVERPOOL LGA DWELLING TYPES (2016)



Source: SGS Economics and Planning, based on data from Profile.id, 2016.

## 4.2 Economic and employment profile

### Economic profile

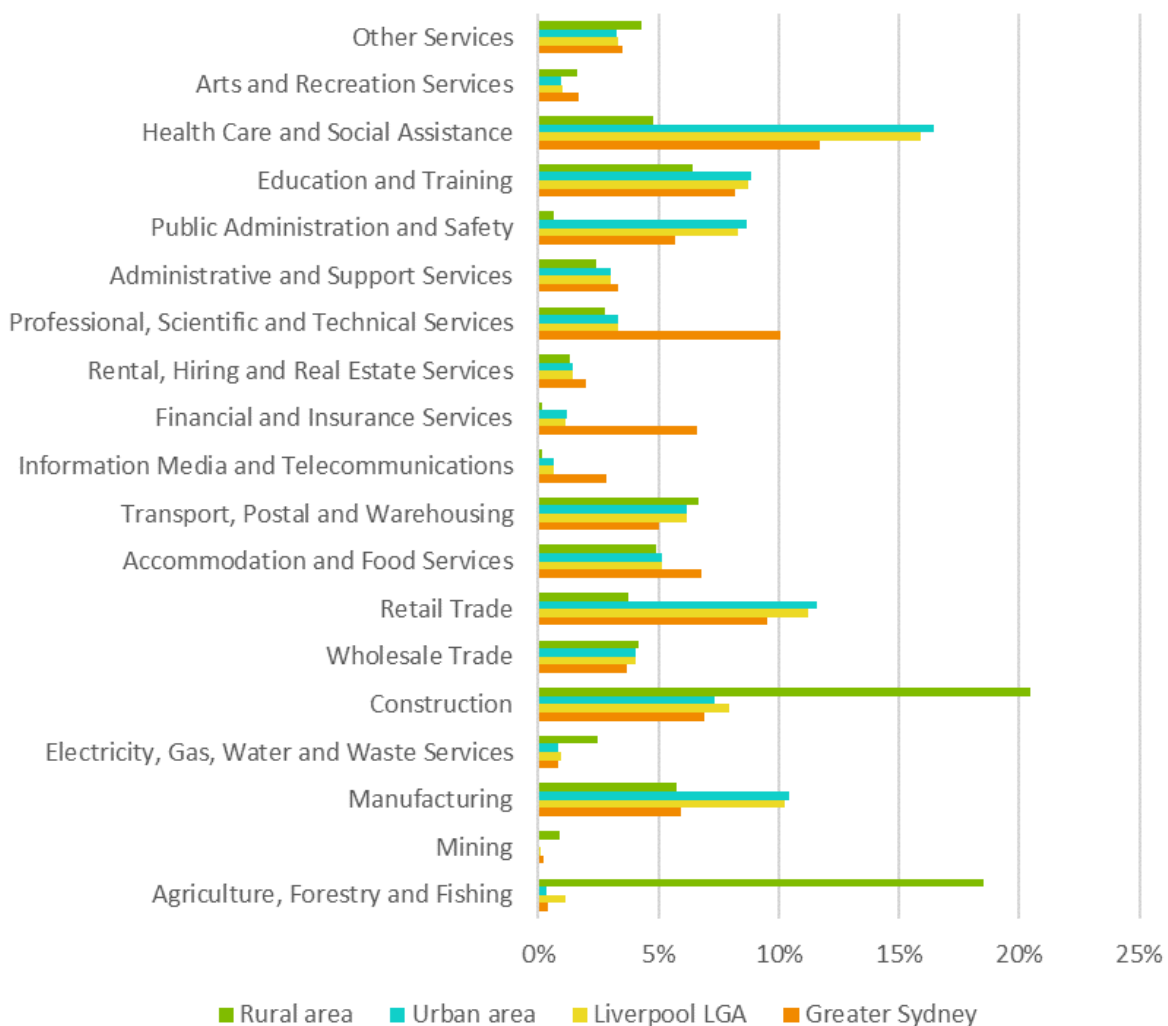
#### Industry Analysis

There were 68,923 jobs in the Liverpool LGA as of 2016, of which 96 per cent are located in the urban areas (65,835 jobs) and 4 per cent (3,088 jobs) in the rural areas.

**Liverpool's largest economic strength is Health Care and Social Assistance**, making up 16 per cent of jobs in the LGA. This is followed by Retail Trade (11 per cent) and Manufacturing (10 per cent). However, the employment dynamics between the urban and rural areas of Liverpool are different. Comparatively speaking, Health Care and Social Assistance only makes up 5 per cent of jobs in the rural area.

As noted previously, there are approximately 3,088 jobs in rural Liverpool. Construction is the largest 1 digit ANZSIC Industry of Employment in the rural area, making up 20 per cent of rural jobs. **Agriculture, Forestry and Fishing makes up 19 per cent of rural jobs**, while the other larger industries in the rural area have a significantly lower share of jobs; Transport, Postal and Warehousing (7 per cent), Manufacturing (6 per cent) and Education and Training (6 per cent).

FIGURE 20: EMPLOYMENT INDUSTRIES (2016)



Source: ABS Census Table Builder (2016)

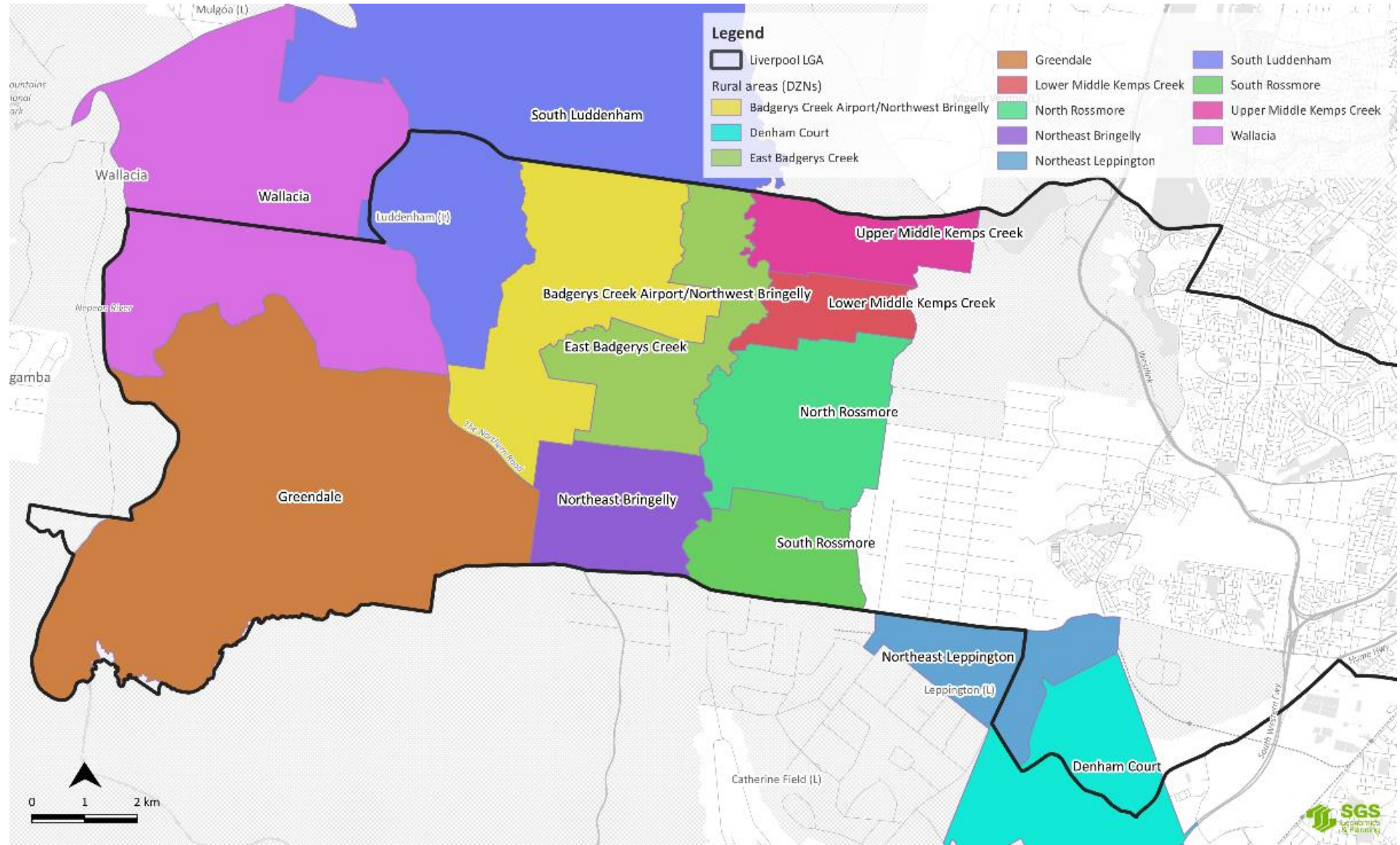
*ANZSIC Industries of Employment* is a standardised system used in Australia and New Zealand, to classify the industries in which people work. At a 1-digit level (broad industry categories like 'manufacturing' in the previous table), the information is not detailed or targeted enough to understand the different characteristics across the rural areas and between the rural and urban areas of Liverpool. As such, they have been used sparingly throughout this section. SGS has included tables and analysis where relevant in order to avoid an excessive overload of information.

### **Economic strengths in the rural area**

To understand economic strengths across different locations in Liverpool's rural area, small area analysis was undertaken using 'destination zones' (DZN) (an ABS spatial unit). Those zones are used by the ABS based on employment patterns across Australia.

Figure 21 shows the DZNs in Liverpool's rural areas. Throughout this section, the DZNs have been combined to provide more meaningful data, such as Badgerys Creek Airport/Northwest Bringelly. Where there is a distinctive economic strength in a single zone, it is kept separate.

FIGURE 21: RURAL DESTINATION ZONES (DZNS) IN LIVERPOOL



Source: SGS 2019



For Liverpool, the economic strengths of the rural areas vary across the different Destination Zones.

Table 3 shows the total number of jobs in each of the rural Destination Zones. It shows that South Luddenham has grown the most in the five years between 2011-16 (+195 jobs) followed by North Rossmore (+166), and Greendale (+126). Greendale and South Luddenham fall within areas that have been identified for longer-term agricultural use in the State government's plans for the Western Sydney Aerotropolis (see Chapters 2 and 4).

Areas that have been identified for greater change under the Aerotropolis plans have also declined the most in terms of jobs: Northeast Leppington has declined the most (-37 jobs) as well as Badgerys Creek Airport/Northwest Bringelly (-16 jobs).

TABLE 3: RURAL DESTINATION ZONE EMPLOYMENT 2011-16

Rural Destination Zone	2011	2016	Change 2011-16	% Change 2011-16
Denham Court	121	178	57	47%
South Luddenham	214	409	195	91%
Wallacia	319	342	23	7%
Greendale	209	335	126	60%
South Rossmore	160	242	82	51%
Northeast Bringelly	146	199	53	36%
North Rossmore	260	426	166	64%
East Badgerys Creek	113	167	54	48%
Lower Middle Kemps Creek	115	154	39	34%
Upper Middle Kemps Creek	239	318	79	33%
Northeast Leppington	153	116	-37	-24%
Badgerys Creek Airport/Northwest Bringelly	218	202	-16	-7%
<i>Total</i>	<i>2,267</i>	<i>3,088</i>	<i>821</i>	<i>36%</i>

Source: ABS Census TableBuilder 2016

As noted previously, Construction (632 jobs) is the largest industry of employment in rural Liverpool. *Northwest Bringelly* contains more of these jobs than any other rural area (92 jobs in total), mostly in Site Preparation Services (38), Concreting Services (16) and Road and Bridge Construction (10).

*North Rossmore* (87 jobs in total) also has a relatively high number of Construction jobs, mostly in Electrical Services (20) and Plumbing Services (14). It is noted that as construction is often a footloose industry (meaning that a person in construction can work across the city), construction jobs as per Census data should be considered in light of this. They may not be representative of the type of industry permanently in a particular part of the rural Liverpool area.

**Agriculture, Forestry and Fishing (572 jobs) is also an economic strength of the rural area and the industry most reflective of the region's character.** These figures are shown in Table 4: Agriculture, Forestry and Fishing subset industries in rural Liverpool, below.

*North Rossmore* has a significantly higher number of these jobs (193 jobs) relative to the other rural regions, mostly in Mushroom and Vegetable Growing (155 jobs). *Greendale* also has a relatively high number of Agriculture, Forestry and Fishing jobs (130 in total). This is mostly in Dairy Cattle Farming (65), Poultry Farming (28), and Mushroom and Vegetable Growing (15).

While Mushroom and Vegetable Growing is the largest 3-digit subset of Agriculture, Forestry and Fishing in rural Liverpool (308 jobs), at a 4-digit level, Vegetable Growing (Outdoors) has a significantly higher number of jobs than Mushroom Growing (198 compared to 87 jobs). Apart from North Rossmore and Greendale, *South Rossmore* (43 jobs) and *East Badgerys Creek* (21 jobs) also have a relatively strong number of Vegetable Growing jobs.

There are only 15 jobs in Nursery and Floriculture Production in rural Liverpool, where the larger majority are in *Northeast Leppington* (8 jobs).

TABLE 4: AGRICULTURE, FORESTRY AND FISHING SUBSET INDUSTRIES IN RURAL LIVERPOOL

Industry of Employment	Wallacia-Greendale	South Luddenham	Badgerys Creek Airport/ Northwest Bringelly/ East Badgerys Creek	Northeast Bringelly	Rossmore	Kemps Creek	Denham Court/ Northeast Leppington	Total
Agriculture, Forestry and Fishing, nfd	-	-	-	-	-	-	-	4
Agriculture, nfd	10	-	-	-	16	5	5	37
Nursery and Floriculture Production	-	-	-	-	3	4	8	15
Mushroom and Vegetable Growing	24	5	34	8	202	30	5	303
Fruit and Tree Nut Growing	7	-	-	-	5	-	-	7
Sheep, Beef Cattle and Grain Farming	12	8	-	-	3	4	-	23
Dairy Cattle Farming	65	-	-	-	-	-	-	72
Poultry Farming	45	9	16	-	12	3	-	86
Other Livestock Farming	4	-	-	-	-	-	4	9
Agriculture and Fishing Support Services	-	-	3	5	6	-	-	14

Source: ABS Census TableBuilder (2016)

In terms of **Transport, Postal and Warehousing** (205 jobs in total), the majority of them are in the Road Freight Transport industry (160 jobs). They are dispersed widely across rural Liverpool, but mostly in *Lower Middle Kemps Creek* (31), *Greendale* (23) and *Northwest Bringelly* (22).

TABLE 5: TRANSPORT, POSTAL AND WAREHOUSING SUBSET INDUSTRIES IN RURAL LIVERPOOL

Industry of Employment	Wallacia-Greendale	South Luddenham	Badgerys Creek Airport/ Northwest Bringelly/ East Badgerys Creek	Northeast Bringelly	Rossmore	Kemps Creek	Denham Court/ Northeast Leppington	Total
Transport, Postal and Warehousing, nfd	4	-	6	-	-	-	-	13
Road Freight Transport	37	9	25	11	25	46	6	155
Road Passenger Transport, nfd	-	-	-	-	-	5	-	5
Scenic and Sightseeing Transport	-	-	-	3	-	-	-	3
Postal Services	3	-	-	-	3	-	-	11
Courier Pick-up and Delivery Services	4	-	-	-	-	-	-	14
Other Warehousing and Storage Services	-	-	-	-	-	3	-	4

Source: ABS Census TableBuilder (2016)

There are interesting trends in the **Manufacturing** sector of rural Liverpool (157 jobs in total). While they are widely spread, there are relatively more jobs in *Upper Middle Kemps Creek* (40) and *East Badgerys Creek* (39) (Table 6).

In Upper Middle Kemps Creek, over half of the Manufacturing jobs are in Primary Metal and Metal Product Manufacturing (21). In East Badgerys Creek, all the Manufacturing jobs are in Poultry Processing (39). This strong alignment with food production indicates the existence of localised value chains between producers and food manufacturers.

In the **Education and Training** sector in rural Liverpool (198 jobs in total), most of the jobs are in School Education (172), particularly in *Upper Middle Kemps Creek* (65), *South Rossmore* (43) and *Wallacia* (38).

TABLE 6: MANUFACTURING SUBSET INDUSTRIES IN RURAL LIVERPOOL

Industry of Employment	Wallacia-Greendale	South Luddenham	Badgerys Creek Airport/ Northwest Bringelly/ East Badgerys Creek	Northeast Bringelly	Rossmore	Kemps Creek	Denham Court/ Northeast Leppington	Total
Food Product Manufacturing	4	5	39	-	5	-	-	55
Manufacturing, nfd	-	4	3	-	-	7	-	22
Textile, Leather, Clothing and Footwear Manufacturing	4	-	-	-	-	-	-	6
Wood Product Manufacturing	-	-	5	3	-	-	-	13
Basic Chemical and Chemical Product Manufacturing	5	-	-	-	-	4	-	6
Non-Metallic Mineral Product Manufacturing	-	-	-	7	-	-	-	12
Primary Metal and Metal Product Manufacturing	-	-	-	3	-	21	-	24
Fabricated Metal Product Manufacturing	4	4	-	-	-	3	-	12
Transport Equipment Manufacturing	-	-	-	-	13	5	-	17
Machinery and Equipment Manufacturing	3	-	-	-	-	-	-	5
Furniture and Other Manufacturing	-	-	6	-	-	-	-	4

Source: ABS Census TableBuilder (2016)

## Tourism

Western Sydney currently delivers \$4.2 billion in visitor expenditure.<sup>8</sup> to the NSW Visitor Economy. According to the *Western Sydney Visitor Economy Strategy (2017/18-2019/20)*, almost half of the domestic and international visitors to Western Sydney are there to visit family and friends.

Around 62 per cent of visitor nights spent in Western Sydney were international visitors, with the remaining 38 per cent domestic stays. For international visitors, most (45 per cent) were visiting family, or on holiday (41 per cent). For domestic visitors, 47 per cent were visiting family, 29 per cent holidaying and 18 per cent travelling for businesses.<sup>9</sup>

Total expenditure across Western Sydney (including the Liverpool LGA) was \$4.2 billion million in 2016, with 44 per cent coming from domestic overnight visitors, 34 per cent from international overnight visitors, and 22 per cent from daytrips.

Tourism Australia collects LGA-based data for tourism activity with minimum threshold for international and domestic figures; however, this data is not currently available for Liverpool as an individual LGA.<sup>10</sup> Based on issues and opportunities highlighted in the *Western Sydney Visitor Economy Strategy*, and other technical work in this Study, recommendations for Liverpool's tourism market are included in Section 7 on page 109.

## Land use analysis

In Appendix 1, Figure 70: Land zones in Liverpool shows where land zones apply across Liverpool's rural area. It shows that Upper Middle Kemps Creek, Lower Middle Kemps Creek, North and South Rossmore, and Northeast Bringelly are predominantly zoned for *Primary Production Small Lots*. South Luddenham, Badgerys Creek Airport/Northwest Bringelly, East Badgerys Creek, Wallacia and Greendale are mostly *Primary Production*. Denham Court is mostly *Large Lot Residential* and Northeast Leppington are a mix of *Low Density* and *Medium Density Residential*.

The following chart shows the industries that are most strongly represented in each of the rural zones in Liverpool. It shows:

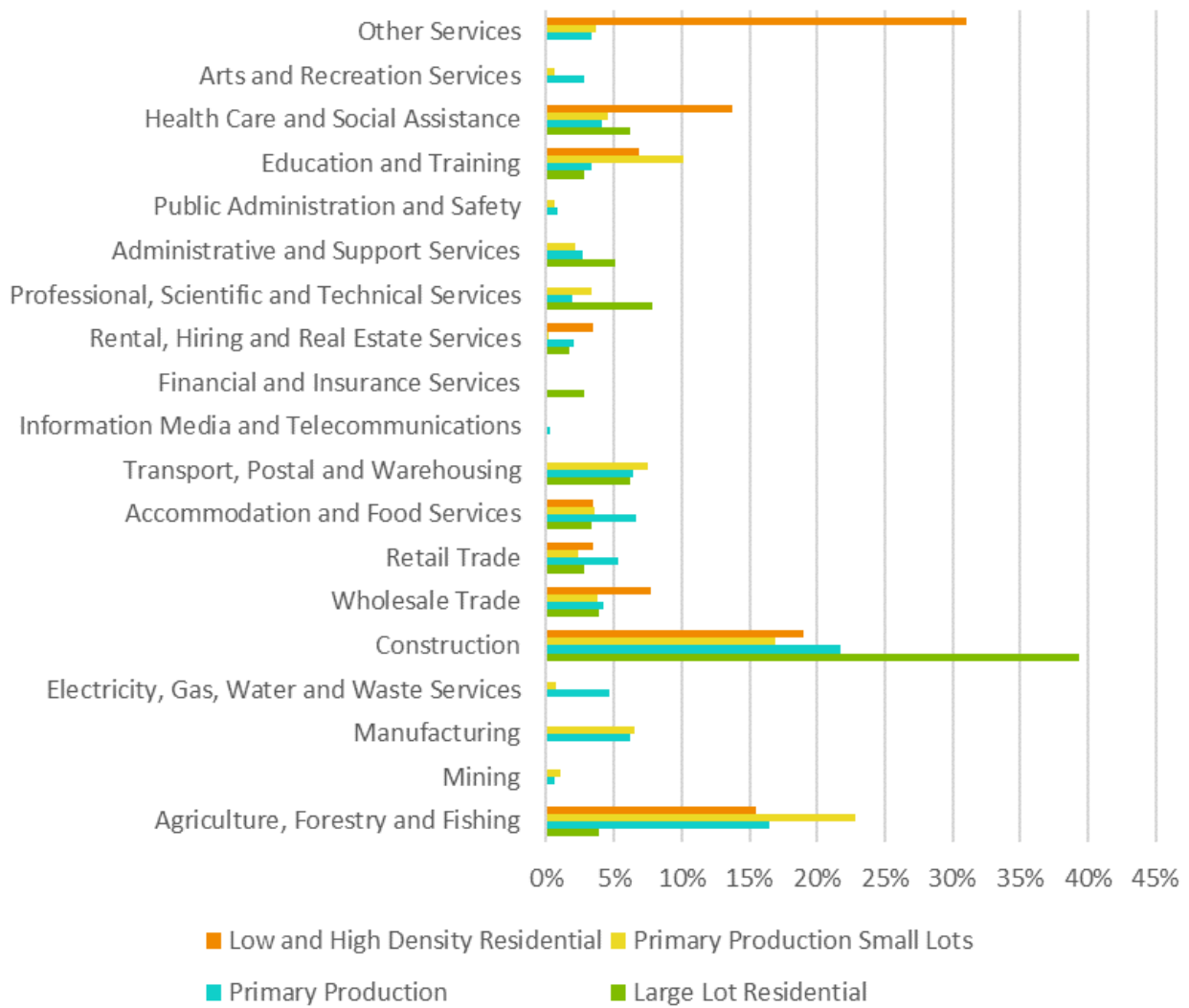
- In the Large Lot Residential Zone (Denham Court), the majority of jobs are in Construction (39 per cent).
- In the Primary Production Small Lots zone, most jobs are in Agriculture, Forestry and Fishing (23 per cent) and Construction (17 per cent).
- This is similar for Primary Production zones, however, there is a greater share of jobs in Construction (22 per cent) compared to Agriculture, Forestry and Fishing (16 per cent).

<sup>8</sup> Destination NSW, *Western Sydney Visitor Economy Strategy*, 2017/18-2019/20.

<sup>9</sup> Based on Destination NSW data.

<sup>10</sup> For further information: <https://www.tra.gov.au/Regional/Local-Government-Area-Profiles/local-government-area-profiles>.

FIGURE 22: ANZSIC EMPLOYMENT BY LAND ZONE



Source: SGS Economics and Planning, based on ABS Census Table Builder (2016).

## Historical change

While Agriculture, Forestry and Fishing and Manufacturing are two of the largest industries in rural Liverpool, they have declined the most in the five years between 2011-16 (-2 per cent and -8 per cent respectively). Construction, however, has grown by +4 per cent. Overall, employment in Liverpool's rural areas has grown by over 800+ jobs in the five years (between 2011-16, based on available ABS data).

Figure 23 shows that Construction has grown the most in rural Liverpool (+270 jobs), followed by Agriculture, Forestry and Fishing (+109) and Education and Training (+69). Manufacturing has declined the most (-123 jobs). Construction should be considered in context, as it may also represent an increase in construction activity in the region, rather than simply more construction companies locating in the area.

FIGURE 23: PROPORTIONAL CHANGE OF EMPLOYMENT (2011-16)



Source: SGS Economics and Planning, 2019, based on ABS Census Table Builder (2011-16).

Looking across the precincts (see Table 7 on page 52), most of the job growth over the five years between 2011-16 has been in *North Rossmore* (+125 jobs). The growth has been concentrated in Agriculture, Forestry and Fishing (+61) and Construction (+52).

Electricity, Gas and Water and Waste Services has grown significantly in *South Luddenham* (+55 jobs), while Construction has grown by +53 jobs in Badgerys Creek Airport/Northwest Bringelly; higher than any other rural Destination Zone. However, Manufacturing has declined significantly in this area (-87 jobs).



TABLE 7: HISTORICAL EMPLOYMENT INDUSTRY CHANGE IN LIVERPOOL RURAL DESTINATION ZONES (2011-16)

Industry of Employment	Badgerys Creek Airport/Northwest Bringelly	Denham Court	East Badgerys Creek	Greendale	Lower Middle Kemps Creek	North Rossmore
Agriculture, Forestry and Fishing	-13	4	7	45	1	61
Mining	2	-	-	-	-	-
Manufacturing	-87	-9	21	2	-21	-1
Electricity, Gas, Water and Waste Services	-	-	-	-	-	-
Construction	53	36	8	32	-8	52
Wholesale Trade	-1	4	-2	-	18	-1
Retail Trade	-3	-5	-	-2	-6	-
Accommodation and Food Services	-	3	-	1	-	6
Transport, Postal and Warehousing	10	2	-8	12	5	8
Information Media and Telecommunications	-	-	-	-	-	-
Financial and Insurance Services	-	-3	-	-	-	-
Rental, Hiring and Real Estate Services	5	-	6	1	-	-1
Professional, Scientific and Technical Services	-1	5	3	-5	18	-5
Administrative and Support Services	-4	9	3	-3	4	6
Public Administration and Safety	-	-7	-	4	-	-
Education and Training	-	5	-3	-	3	7
Health Care and Social Assistance	13	-7	4	8	1	2
Arts and Recreation Services	0	-	-	-	-	-
Other Services	-3	-13	-	-2	11	-9
<b>Total</b>	<b>-29</b>	<b>24</b>	<b>39</b>	<b>93</b>	<b>26</b>	<b>125</b>

Industry of Employment	Northeast Bringelly	Northeast Leppington	South Luddenham	South Rossmore	Upper Middle Kemps Creek	Wallacia
Agriculture, Forestry and Fishing	-1	-15	-7	-2	13	16
Mining	-	-	8	-	3	-
Manufacturing	-16	-6	-3	-2	1	-2
Electricity, Gas, Water and Waste Services	-	-	55	-	-25	-
Construction	12	10	31	9	22	13
Wholesale Trade	1	-9	-3	-7	6	-10
Retail Trade	-	-26	17	1	2	-4
Accommodation and Food Services	-3	-26	21	5	29	-12
Transport, Postal and Warehousing	3	-11	-4	2	10	10
Information Media and Telecommunications	-	-3	4	-	-	-
Financial and Insurance Services	-	-	-	-	-	-
Rental, Hiring and Real Estate Services	-	4	-	-	-	-1
Professional, Scientific and Technical Services	5	-	4	-3	-1	-3
Administrative and Support Services	-3	-4	12	3	6	10
Public Administration and Safety	-	-	-3	8	-	4
Education and Training	7	4	3	27	12	4
Health Care and Social Assistance	4	6	1	20	0	-13
Arts and Recreation Services	3	-	17	-3	-14	-2
Other Services	8	36	13	7	1	11
<b>Total</b>	<b>20</b>	<b>-18</b>	<b>166</b>	<b>65</b>	<b>65</b>	<b>21</b>

Source: ABS Census TableBuilder (2011 and 2016)

## Employment profile

### Economic contribution

Agriculture, Forestry and Fishing is a \$204 million industry in Liverpool in terms of its regional output in the wider economy. However, compared to the other industries within Liverpool, it is second from last in terms of value. It has strong supply chains links within the industry itself (\$18 million), as well as with Manufacturing (\$10 million) and Wholesale Trade (\$8 million) amongst others.

At a fine grain level, 'Other Agriculture' (outside of poultry, livestock, sheep, grains, beef and dairy cattle) in Liverpool has strong supply chain links, whether that be within or outside the Liverpool LGA, with Agriculture support services (\$6 million), Wholesale Trade (\$5 million), Water Supply, Sewerage and Drainage Services (\$3 million), Printing (\$2 million), Petroleum and Coal Product Manufacturing (\$2 million) and Professional, Scientific and Technical Services (\$2 million).

Poultry and Other Livestock relies upon Other Agriculture (\$1.83 million), Road Transport (\$1 million), Wholesale Trade (\$1 million), Water Supply, Sewerage and Drainage Services (\$1 million), and Other Food Product Manufacturing (\$1 million).

The economic geography of supply chain links remains unclear given the ABS publishes industry to industry links without geographies.

Table 8 highlights the supply chain links from highest to lowest in terms of \$ value of regional output. 'Upstream' refers to the material inputs needed for production, while 'downstream' (Table 9) is the opposite end, where products are produced and distributed.

TABLE 8: UPSTREAM INDUSTRIES OF AGRICULTURE, FORESTRY AND FISHING IN LIVERPOOL (1 DP)

'From Industry'	Output (\$ million)
Agriculture, Forestry and Fishing	17.5
Manufacturing	10.2
Wholesale Trade	8.3
Construction	6.1
Electricity, Gas, Water and Waste Services	5.7
Transport, Postal and Warehousing	4.7
Professional, Scientific and Technical Services	3.6
Financial and Insurance Services	2.8
Rental, Hiring and Real Estate Services	2.1
Retail Trade	2.1
Other Services	1.8
Administrative and Support Services	1.4
Accommodation and Food Services	0.5
Information Media and Telecommunications	0.2
Public Administration and Safety	0.2
Mining	0.1
Arts and Recreation Services	0.1
Education and Training	0.0
Health Care and Social Assistance	0.0

Source: SGS 2019 using ABS National Accounts 2015-16

Table 9 depicts the downstream industries which receive value from the outputs produced in the Agriculture, Forestry and Fishing industry in Liverpool. It shows that the majority goes to exports (\$58 million), Manufacturing (\$49 million) and households (\$48 million).

TABLE 9: DOWNSTREAM INDUSTRIES FROM AGRICULTURE, FORESTRY AND FISHING IN LIVERPOOL (1 DP)

'From Use'	Output (\$ million)
Exports	58.3
Manufacturing	49.1
Households	47.5
Agriculture, Forestry and Fishing	17.5
Retail Trade	7.0
Private (Gross Fixed Capital Formation)	6.6
Accommodation and Food Services	4.6
Wholesale Trade	2.4
Government (Gross Fixed Capital Formation)	2.3
Rental, Hiring and Real Estate Services	2.2
Construction	1.6
Health Care and Social Assistance	1.4
Arts and Recreation Services	0.8
Transport, Postal and Warehousing	0.7
General Government (Gross Fixed Capital Formation)	0.6
Public Administration and Safety	0.4
Other Services	0.4
<i>Total</i>	<i>... 203.9</i>

Source: SGS 2019 using ABS National Accounts 2015-16

Overleaf, Table 10 identifies output by industry production, consumption, capital expenditure and regional exports. It incorporates the information contained in Table 8 and Table 9 specific to Agriculture, Forestry and Fishing in the Liverpool LGA as well as other industries.

The breakdown of these categories by industry assists in identifying where local businesses expend capital and links that expenditure to increases in productivity. For Table 10, it should be noted that:

- **Total demand** (\$ million) is the sum of supply chain, final consumption expenditure (households and government), and gross fixed capital formation (private, public enterprise, and general government) (these columns are presented in an expanded table at Appendix 3).
- **Exports** is the value (\$ million) of goods/services produced in the Liverpool LGA that are sold outside the region (domestic and international).
- **Total supply** (\$ million) is the sum of total demand and exports.

By value, the largest industry in the Liverpool LGA is Rental, Hiring & Real Estate Services with a total supply of \$4,340M, however, it has comparatively lower demand at \$1,803M with the remaining \$2,537M being exported.

The industry with the lowest supply was identified as Arts and Recreation Services with approximately \$34M in exports from a total supply of \$174M, meaning most of the production was absorbed in the Liverpool LGA. Construction has a similar scenario, where almost all of its expenditure and capital is absorbed locally (\$1,950M).

Agriculture, Forestry and Fishing had a total supply of \$204M with an export value of \$58M. A total \$146M was absorbed locally within the Liverpool LGA, suggesting local value chains are strong within the LGA. A more detailed version of this table is included in Appendix 3.

TABLE 10: LIVERPOOL LGA OUTPUT BY INDUSTRY SECTOR (\$M), 2015-16

Source	Total demand	Exports	Total supply = Total supply + exports
Agriculture, Forestry & Fishing	146	58	204
Mining	21	4	24
Manufacturing	1,203	2,054	3,257
Electricity, Gas, Water & Waste Services	435	30	464
Construction	1,950	7	1,957
Wholesale Trade	822	397	1,219
Retail Trade	818	112	930
Accommodation & Food Services	343	79	422
Transport, Postal & Warehousing	725	688	1,413
Information Media & Telecommunications	203	61	264
Financial & Insurance Services	348	172	520
Rental, Hiring & Real Estate Services	1,803	2,537	4,340
Professional, Scientific & Technical Services	562	57	619
Administrative & Support Services	486	19	505
Public Administration & Safety	844	886	1,731
Education & Training	540	155	695
Health Care & Social Assistance	1,066	245	1,312
Arts & Recreation Services	140	34	174
Other Services	329	74	403
Compensation of employees	5,443	0	5,443
Gross operating surplus & mixed income	4,247	0	4,247
Taxes less subsidies (products)	271	0	272
Taxes less subsidies (production)	371	0	371
Imports	10,976	280	11,256
<b>Total Production</b>	<b>34,094</b>	<b>7,948</b>	<b>42,043</b>

Source: ABS Census TableBuilder (2016) and ABS National Accounts (2015-16).

Note: Industries shown are ANZSIC 1-digit.

## Cross-industry linkages

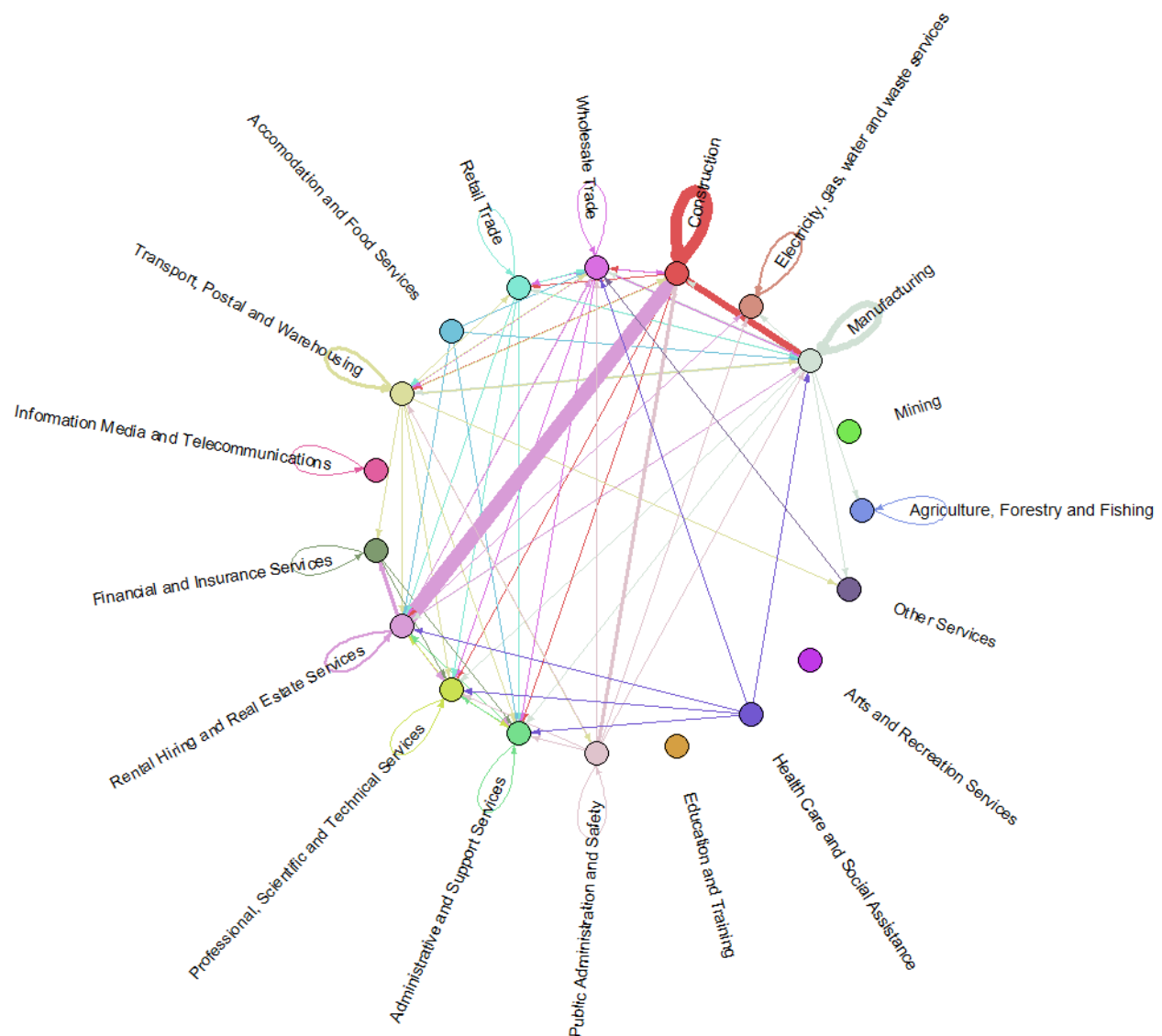
Figure 24 maps the cross-industry linkages in the Liverpool LGA. It weights higher output values with the thickness of the links above a threshold value (in this case, \$15 million and above) to identify significant regional industry flows.

The data in the figure below shows that there are strong connections between Construction and Rental Hiring and Real Estate Services, as well as Manufacturing. This is reflected Table 10, which shows that most capital investment is captured within the industry flows (demand).

Agriculture, Forestry and Fishing has strong links within its own industry, and Manufacturing.

Other connections of note include multiple flows from and to the Wholesale Trade industry and many flows towards Professional, Scientific and Technical Services.

FIGURE 24: VALUE ADDED WEIGHTED SUPPLY CHAIN BY INDUSTRY, 2015-16 VALUES (LIVERPOOL LGA)



Source: SGS 2019 using ABS National Accounts 2015-16

## Industry linkages in the local economy

The Input-Output (I-O) Model is a tool which quantifies the linkages of all sectors in a given economy, measuring the relationships and inter-dependence between industries in the economy. It was the model used to generate Table 8. The model also identifies buyer and supplier linkages in the local economy, highlighting those industries with the greatest economic 'multipliers'.

The I-O Model measures the effects of additional development in a particular industry. For every dollar or unit of output from one industry there are flow-on effects to other industries in the form of goods and services required. The focus of this analysis is on the local 'multiplier' effects associated with an increase in production in a particular industry.

*Multipliers* are measures of the total impact on all industries in an economy arising from changes in the output of a particular industry. For example, an increase in output of the Construction industry (i.e. more houses) would have a flow-on effect to industries related to construction. The I-O model framework enables identification of those industries that have the biggest 'bang for the buck,' in terms of value-add and employment per additional unit of output. Multipliers derived from the model estimate three key measures:

- Output (or income);
- Value-added Gross Regional Product (GRP); and
- Full time equivalent (FTE) jobs.

Below, Table 11 shows the input-output multipliers for industries within the Liverpool LGA at across different industries (1-digit ANZSIC) level. The table highlights the industries that have the largest effects on the overall economy of Liverpool (green being the highest, red being the lowest) for each multiplier. *Unfortunately, the I-O Model can only be aggregated at an LGA level and is not able to separate urban and rural Liverpool economies.*

The multipliers can be interpreted in the following ways:

- **Output Multipliers:** For every additional dollar earned in Construction, the level of regional output increases by \$1.95.
- **Employment Multipliers:** At present each \$1 million increase in the output in Retail Trade, 10 jobs will be generated.
- **Value Added Multipliers:** For every extra dollar of output generated in the Administrative and Support Services industry, total regional income and gross operating surplus will increase by \$1.03.

**For Agriculture, Forestry and Fishing, each \$1 million increase in its regional output generates 4 jobs.**

*Economic contribution* is one measure of importance. While other industries in the Liverpool LGA have greater economic contribution through these measures, not all parts of an LGA can (or should) accommodate the highest value uses. This is partially because there is not the demand; but also, in acknowledgement that cities and regions require a diversity of land uses to support the ongoing sustainability of populations and economies.

TABLE 11: MULTIPLIER EFFECT (ECONOMIC VALUE CREATED BY JOBS) LIVERPOOL LGA (2016)

Industry of Employment	Output Multiplier	Employment Multiplier	Value Added Multipliers
Agriculture, Forestry and Fishing	1.66	4	0.68
Mining	1.63	3	0.63
Manufacturing	1.54	3	0.45
Electricity, Gas, Water and Waste Services	1.87	3	0.75
Construction	1.95	4	0.58
Wholesale Trade	1.79	4	0.81
Retail Trade	1.83	10	0.99
Accommodation and Food Services	1.79	10	0.79
Transport, Postal and Warehousing	1.86	5	0.81
Information Media and Telecommunications	1.70	3	0.67
Financial and Insurance Services	1.69	4	0.99
Rental, Hiring and Real Estate Services	1.41	1	0.86
Professional, Scientific and Technical Services	1.88	6	0.93
Administrative and Support Services	1.88	6	1.03
Public Administration and Safety	1.76	7	0.92
Education and Training	1.71	4	1.01
Health Care and Social Assistance	1.70	10	0.94
Arts and Recreation Services	1.57	6	0.49
Other Services	1.53	7	0.56

Source: SGS Economics and Planning 2019.

Note: Conditional formatting (colour scales) has been applied for each column and not collectively across the whole table, in order to allow for distinctions to be made within each multiplier instead.

## Agriculture and the Liverpool economy

SGS conducted a wider literature review to provide further validation of the value or significance of Liverpool's agricultural lands in the local or wider economy, and observe trends. This analysis is further expanded and updated by RMCG within the Agricultural Lands review in Chapter 5.

The review found that Liverpool supplies poultry and eggs, vegetables, flowers and dairy to the Sydney market and beyond. Specifically, Hoxton Park as a market gardening area as well as a major transportation base, supplies 5 per cent of the tomatoes at the Sydney Markets in Flemington annually (based on 2013 data).<sup>11</sup> This is significant given there are other major tomato producing regions in regional Australia such as Guyra. Austral-Leppington provides 1.1 per cent of leafy or stem vegetables (including asparagus, cabbages, cauliflowers, broccoli, lettuce, spinach and artichokes), and 12.5 per cent of mushrooms and truffles. Furthermore, Liverpool farmers want to be at the forefront of a nationwide push into advanced food manufacturing, with the development of a 'high tech agri-food precinct' within the Liverpool LGA, supported by the Future Food Systems Cooperative Research Centre (CRC). The CRC is a Commonwealth initiative, with research and capability programs which aim to support participants in taking new products to market and creating supply chains between farm and consumer.

Intensive horticulture under greenhouse production is prevalent in the rural areas but on a relatively small and dispersed scale, aside from one major dairy operator (Leppington Pastoral Company Dairy).<sup>12</sup> Further development of the agricultural industry in rural Liverpool is threatened by the lack of secure and suitable water resources.

There may be potential for greater food-related economic opportunities given rural Liverpool's close proximity to the Western Sydney Aerotropolis. This includes food markets, agribusiness education, food related research and development and food related tourism. Indeed, since the WSAP update in December 2019 these concepts underpin the vision for the Agriculture and Agribusiness precinct to the Airport's immediate west.

Liverpool is also one of more than 70 partners in the newly formed *Future Food Systems Cooperative Research Centre*. This attempts to future-proof the agriculture industry and create jobs by improving efficiency of energy resources, reducing costs to make agriculture profitable and competitive into the future, and becoming a food hub of researchers, growers and manufacturers.

### Land capability and soil fertility

Figure 25 shows the level of land capability in rural Liverpool; this is further explored by RMCG's work in Section 5.5. *Land capability* is the inherent physical capacity of the land to sustain a range of land uses and management practices in the long term without degradation to soil, land, air and water resources. Failure to manage land in accordance with its capability risks degradation of resources both on- and off-site, leading to a decline in natural ecosystem values, agricultural productivity and infrastructure functionality.

The dataset uses an assessment of soil against eight key soil and landscape hazards:

- Water erosion
- Wind erosion
- Salinity
- Topsoil acidification
- Shallow soils/rockiness
- Soil structure decline
- Waterlogging
- Mass movement.

Each hazard is given a rating between 1 (best, highest capability land) and 8 (worst, lowest capability land). The final capability class is then based on the most limiting hazard. More

<sup>11</sup> [http://www.uws.edu.au/\\_data/assets/pdf\\_file/0010/482518/Sydney\\_Markets\\_Report.pdf](http://www.uws.edu.au/_data/assets/pdf_file/0010/482518/Sydney_Markets_Report.pdf)

<sup>12</sup> <https://www.nswfarmers.org.au/UploadedFiles/NSWFA/Poily%20Industry/NSWFAFoodEconomy.pdf>



detail on the use of the land capability dataset is available on the Department of Planning, Industry and Environment's website.<sup>13</sup>

Liverpool has a mix of Class 2 to Class 8 land. Class 2 (i.e. slight but significant limitations) is capable of a wide range of land uses and land management practices. Included in Class 2 is very good cropping land (i.e. cereals, oilseeds and pulses) and viable agricultural uses that involve cultivation, such as vegetable and horticultural production.

At the other extreme, Classes 7-8 (i.e. extremely severe and severe limitations) are generally unsuitable for any type of cropping or grazing because of its limitations. It may be too steep, rocky, swampy or fragile for grazing. More detail on descriptions and land management considerations for each class can be found in Appendix 4.

Over the following pages, Figure 25 shows that there are some very severe and extremely severe limitations in parts of Greendale and Wallacia, while the eastern parts of rural Liverpool contain fewer constraints (East Badgerys Creek and Northeast Bringelly). Land in the precinct identified for Agribusiness and Agriculture (WSAP, 2019) is subject to very severe (Class 6) limitations in the north, with slight but significant limitations (Class 2) in the south.

Figure 26 indicates estimated inherent soil fertility in rural Liverpool. *Inherent fertility* is a relative indicator of the soil's capacity to retain and release nutrients for uptake by plants, and is associated with clay and organic matter content. It was derived from a lookup table system linking a fertility class to a particular soil type (Great Soil Group), which was then attributed for each soil map unit. The lookup table can be found in Appendix 5.

It shows that Wallacia, Greendale and South Luddenham have high soil types with high fertility, while the eastern end of rural Liverpool is comparatively lower.

There is a conflict between land capability and soil fertility in parts of rural Liverpool. This is because land capability essentially measures the resilience of a parcel of land relative to a number of hazards, while inherent soil fertility only looks at the type of soil on the parcel of land. It is possible to have fertile soil sitting in unsuitable land formations, such as steeply sloped land or in areas highly subject to land and wind erosion. This is the case in parts of Wallacia and Greendale in rural Liverpool when comparing Figure 25 and Figure 26.

SGS has created several maps that outline how land in rural Liverpool is being used for food production, forestry, nature conservation, infrastructure and urban development. These are provided in the Appendix 1. The maps indicate that most land in rural Liverpool is residential and farm infrastructure or grazing native vegetation. In the eastern end of rural Liverpool (Rossmore and Kemps Creek), there is much more intensive, irrigated perennial and irrigated seasonal horticultural uses. In the western end of rural Liverpool, there are pockets of reservoir/dams scattered throughout the region.

The future of agriculture based on structural market changes, the impact of the Western Sydney Aerotropolis Plan, and underlying soil and land capability, is further explored in analysis conducted by RMCG; see Chapter 5: Agricultural context.

### Forecast change in employment

The Western Sydney Aerotropolis covers a significant portion of Liverpool's rural areas, to the west of existing residential growth areas. As outlined in Chapter 2: Overview of the Western Sydney Aerotropolis, plans for this area have the potential to change the employment landscape of rural Liverpool significantly by 2036. Figure 27 indicates how the Aerotropolis fits within rural Liverpool's rural areas.

TPA (within Transport for NSW)<sup>14</sup> provides employment projections based on the best available data, trends and an understanding of policy/structural changes. It shows that rural Liverpool will grow by +31,903 jobs in the 20 years between 2016 and 2036. This represents

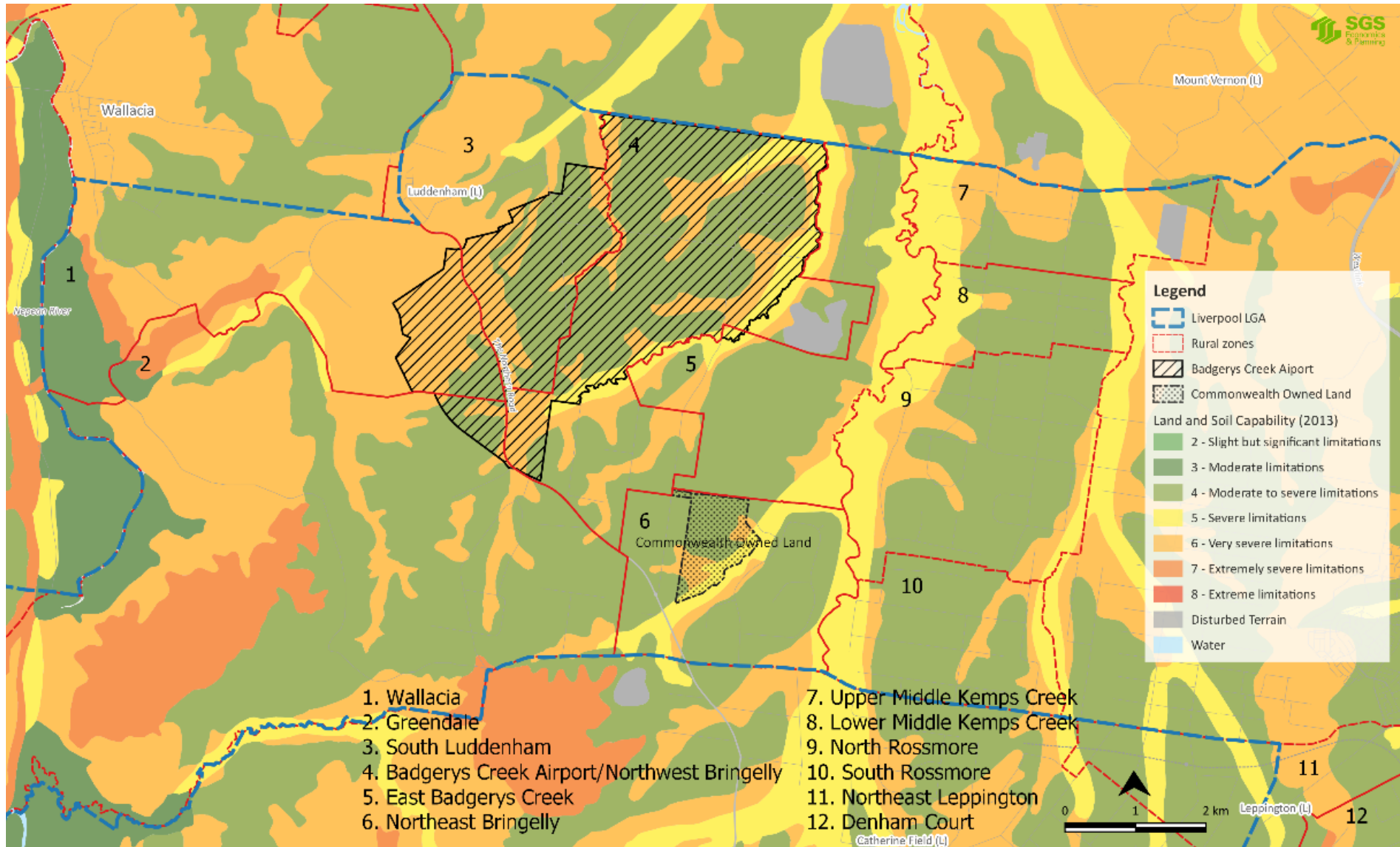
<sup>13</sup> <https://data.nsw.gov.au/data/dataset/land-and-soil-capability-mapping-for-nsw4bc12>

<sup>14</sup> Transport for NSW, *Forecasts and Projections (Travel, population, workforce and employment projections)* (2016), <https://opendata.transport.nsw.gov.au/dataset/employment-projections>.

an increase of +783 per cent. Comparatively speaking, urban Liverpool is expecting +20,098 jobs, representing a +110 per cent increase on current levels. The Greater Sydney average growth rate from 2016-36 is expected to be +36 per cent.

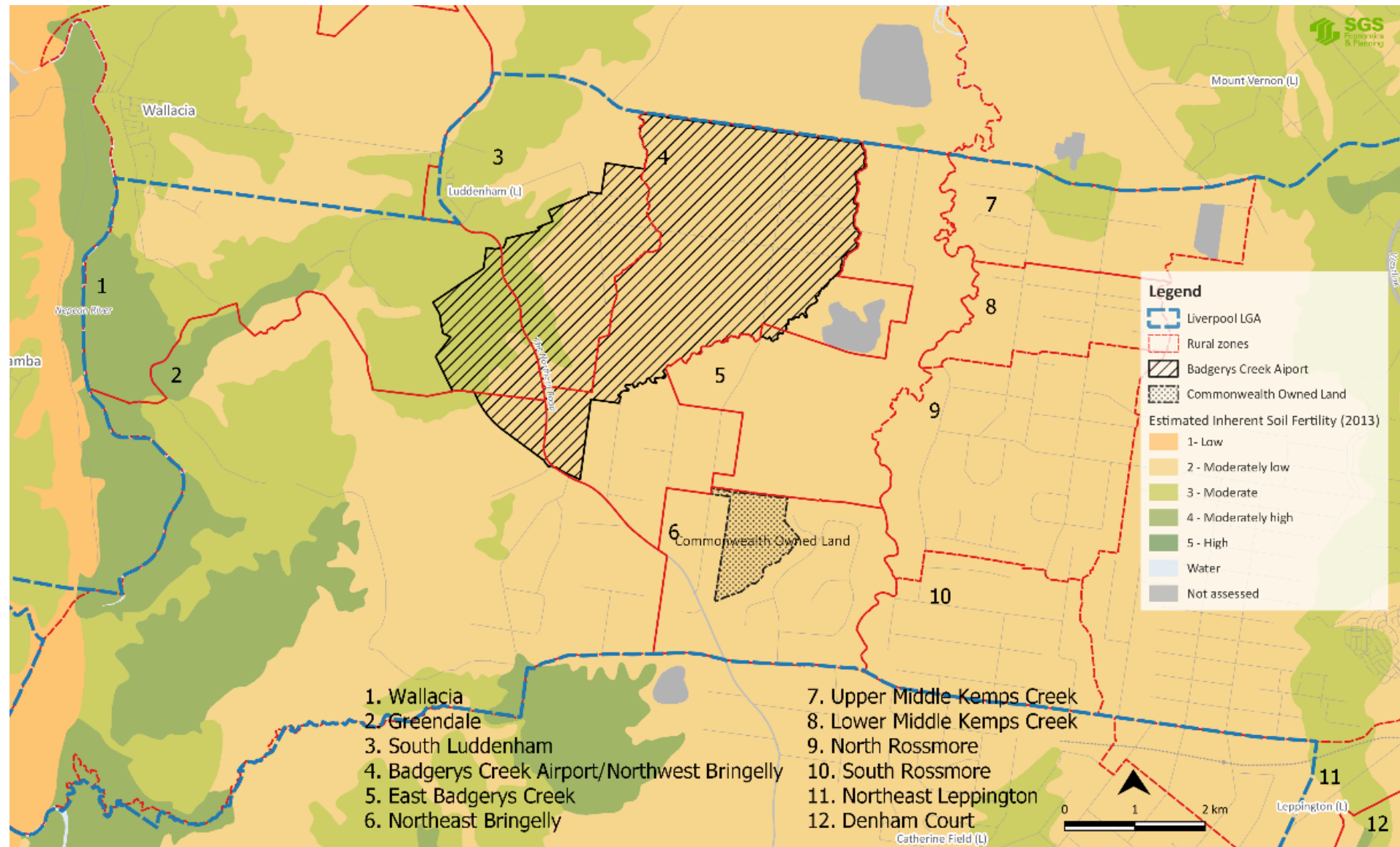
Table 12 depicts forecasted industry changes from 2016-36. It shows that Professional, Scientific and Technical Services is expecting to see the highest job growth compared to any other industry in rural Liverpool (+4,446) followed by Transport, Postal and Warehousing (+4,446) and Retail Trade (+4,322).

FIGURE 25: LAND CAPABILITY IN RURAL LIVERPOOL



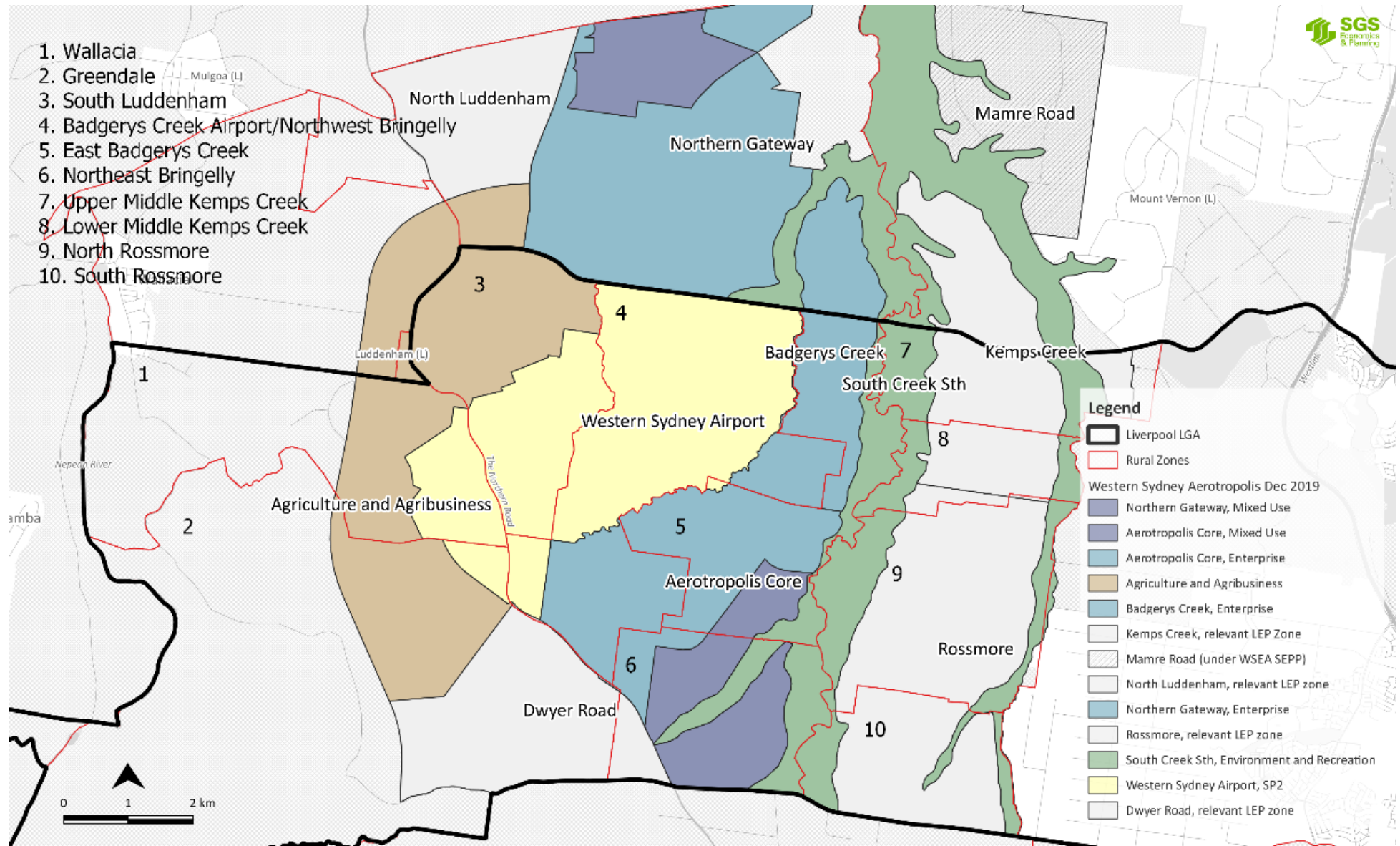
Source: Department of Planning, Industry and Environment 2017

FIGURE 26: ESTIMATED INHERENT SOIL FERTILITY IN RURAL LIVERPOOL



Source: Department of Planning, Industry and Environment 2017

FIGURE 27: PROPOSED AEROTROPOLIS PRECINCTS AND THE LIVERPOOL RURAL AREA



Source: SGS Economics and Planning, based on the WSAP, 2019.

TABLE 12: FORECAST EMPLOYMENT INDUSTRY CHANGE (2016-36)

Industry of Employment	Rural area	Urban area	Liverpool LGA	Greater Sydney
Agriculture, Forestry and Fishing	-93	31	-62	-1,630
Mining	22	-	22	1,127
Manufacturing	514	-119	395	5,184
Electricity, Gas, Water and Waste Services	195	163	358	9,638
Construction	2,139	1,997	4,136	55,955
Wholesale Trade	2,113	411	2,524	25,507
Retail Trade	4,322	2,689	7,011	75,741
Accommodation and Food Services	2,795	1,691	4,486	59,113
Transport, Postal and Warehousing	4,446	1,230	5,676	34,792
Information Media and Telecommunications	445	417	862	12,340
Financial and Insurance Services	1,421	393	1,814	66,869
Rental, Hiring and Real Estate Services	1,246	522	1,768	18,431
Professional, Scientific and Technical Services	4,463	1,881	6,344	182,453
Administrative and Support Services	1,309	353	1,662	16,198
Public Administration and Safety	547	323	870	64,486
Education and Training	1,567	3,362	4,929	97,554
Health Care and Social Assistance	1,588	3,857	5,445	113,114
Arts and Recreation Services	545	279	824	21,201
Other Services	2,319	618	2,937	39,537
<b>Total</b>	<b>31,903</b>	<b>20,098</b>	<b>52,001</b>	<b>897,610</b>

Source: ABS Census TableBuilder (2016), TZP2016 v1.51

The industries expecting the largest job increases in rural Liverpool are Professional, Scientific and Technical Services (+4,463 jobs), Transport, Postal and Warehousing (+4,446) and Retail Trade (+4,322). In each of these three industries, the area expected to experience most the growth is *South Luddenham*, followed by *Northeast Leppington* (in terms of Professional, Scientific and Technical Services and Retail Trade).

Agriculture, Forestry and Fishing is expected to have a net decline of -93 jobs. Upon closer examination, the declines are expected to be greatest in North Rossmore (-134), Greendale (-87) and South Rossmore (-36). *South Luddenham* is expected to have the highest increase of Agriculture, Forestry and Fishing jobs (+142 jobs) followed by *Badgerys Creek Airport/Northwest Bringelly* (+74) and *Denham Court* (+39).

Wholesale Trade jobs are expected to grow significantly in *South Luddenham* (+1,174 jobs). However, job growth in this industry will be dispersed across the rural regions at a lesser scale, with increases in *Greendale* (+362), *Badgerys Creek Airport/Northwest Bringelly* (+247), *Northeast Leppington* (+129), and *East Badgerys Creek* (+79) notable. Wholesale Trade are not projected to decline in any area.

Of all the rural Destination Zones, *South Luddenham* is forecasted for a significantly higher increase of jobs over the 20 years between 2016-36 (+17,669) compared to any other rural Destination Zone. *Northeast Leppington* comes closest (+5,042 jobs), followed by *Greendale* (+3,565) and *Badgerys Creek Airport/Northwest Bringelly* (+3,042).

Within *South Luddenham*, the job growth is expected to be in Retail Trade (+2,845), Transport, Postal and Warehousing (+2,468), Professional Scientific and Technical Services (+1,995) and Other Services (+1,864). Further detail can be found in Table 13.

TABLE 13: FORECAST EMPLOYMENT INDUSTRY CHANGE IN LIVERPOOL RURAL DESTINATION ZONES (2016-36)

Industry of Employment	Badgerys Creek Airport/Northwest Bringelly	Denham Court	East Badgerys Creek	Greendale	Lower Middle Kemps Creek	North Rossmore
Agriculture, Forestry and Fishing	74	39	-17	-87	14	-134
Mining	5	2	-	-	-	-
Manufacturing	298	2	38	7	-	7
Electricity, Gas, Water and Waste Services	-	2	-	148	-	-
Construction	333	59	28	401	40	150
Wholesale Trade	247	8	79	362	60	37
Retail Trade	175	219	-	200	-	4
Accommodation and Food Services	107	145	-	189	-	11
Transport, Postal and Warehousing	1,099	4	7	562	42	29
Information Media and Telecommunications	-	14	-	132	-	-
Financial and Insurance Services	128	41	-	172	-	-
Rental, Hiring and Real Estate Services	11	45	6	116	-	7
Professional, Scientific and Technical Services	308	174	10	590	100	24
Administrative and Support Services	37	42	1	175	6	4
Public Administration and Safety	55	23	-	80	-	-
Education and Training	-	98	-	88	3	7
Health Care and Social Assistance	27	94	9	182	26	70
Arts and Recreation Services	-	45	-	126	-	-
Other Services	138	50	-	122	4	7
<b>Total</b>	<b>3,042</b>	<b>1,106</b>	<b>161</b>	<b>3,565</b>	<b>267</b>	<b>223</b>
Industry of Employment	Northeast Bringelly	Northeast Leppington	South Luddenham	South Rossmore	Upper Middle Kemps Creek	Wallacia
Agriculture, Forestry and Fishing	-10	-4	142	-36	-21	-25
Mining	-	-	27	-	-12	-
Manufacturing	11	1	134	1	17	-2
Electricity, Gas, Water and Waste Services	-	3	36	-	6	-
Construction	149	111	733	46	70	19
Wholesale Trade	-	129	1,174	6	11	-
Retail Trade	2	865	2,845	6	3	3
Accommodation and Food Services	-	495	1,788	6	41	13
Transport, Postal and Warehousing	28	130	2,468	16	35	26
Information Media and Telecommunications	-	234	65	-	-	-
Financial and Insurance Services	-	246	834	-	-	-
Rental, Hiring and Real Estate Services	-	248	811	-	-	2
Professional, Scientific and Technical Services	53	1,191	1,995	2	13	3
Administrative and Support Services	3	249	778	7	3	4
Public Administration and Safety	-	227	156	4	-	2
Education and Training	25	316	879	50	85	16
Health Care and Social Assistance	24	401	672	80	-	3
Arts and Recreation Services	-	93	268	1	11	1
Other Services	7	107	1,864	7	2	11
<b>Total</b>	<b>292</b>	<b>5,042</b>	<b>17,669</b>	<b>196</b>	<b>264</b>	<b>76</b>

Source: ABS Census TableBuilder (2016), TZP2016 v1.51

### Key findings: Liverpool economic and employment profile

Liverpool has an important agricultural sector that significantly contributes to the Sydney Basin food industry. Poultry, mushrooms, nursery, tomatoes, cut flowers, lettuces and strawberries from Liverpool make a significant contribution to overall supply.

Alongside agriculture, the rural area of Liverpool also has a large construction industry, although this is likely driven in part by actual construction (meaning the presence of various jobs during the Census collection may reflect construction work going on rather than a local industry strength), rather than being solely driven by construction businesses setting up operations. Conversely, the urban area of Liverpool's economic strength lies within its existing population serving industries, health care and social assistance and retail.

- **Agriculture is one of rural Liverpool's strengths.** There is a high number of Mushroom and Vegetable Growing jobs in Rossmore. Greendale has a mix of agricultural activities including Dairy Cattle Farming, Poultry Farming and Mushroom and Vegetable Farming. There is also a high presence of Poultry Processing jobs in East Badgerys Creek. These two industries are also projected to grow.
- **Land zones influences present activity.** Most of the Construction jobs (40 per cent) currently take place in Large Lot Residential, while most of the Agriculture, Forestry and Fishing jobs (23 per cent) take place in Primary Production Small Lots.
- **Agriculture has flow-on effects to other industry sectors.** While most of the output is exported, it also has strong links with Manufacturing, Retail Trade, Accommodation and Food Services and Wholesale Trade.
- Kemps Creek, Rossmore and East Badgerys Creek have the greatest soil capability. Wallacia and Greendale have more extreme limitations.
- **Wallacia and Greendale have the greatest soil fertility.** The eastern and central strips of rural Liverpool have moderately low soil fertility. However, parts of Wallacia and Greendale also have constrained land capability. Low fertility is associated with a sandier soil, making it more suited to horticultural crops that don't thrive in clay soils. In these locations, growers can make up for a nutrient shortfall by using fertiliser and frequent watering for soil moisture. Clay soils tend to have higher fertility and better water holding capacity.
- **The eastern strip of rural Liverpool is more 'agriculturally intensive'.** Residential and farm infrastructure or grazing native vegetation makes up the majority of land. The eastern end (Rossmore and Kemps Creek) have more intensive irrigated perennial and irrigated horticultural uses, whereas the western side has more pockets of reservoirs/dams.
- **The Aerotropolis is expecting high and diverse job growth.** Industries such as Retail Trade, Transport, Postal and Warehousing, Professional, Scientific and Technical Services and Accommodation and Food Services are projected to grow in South Luddenham and Greendale significantly, while eastern rural Liverpool will see continued growth primarily in Construction and Agriculture, Forestry and Fishing.



# 5. AGRICULTURAL CONTEXT

This section provides detailed information about the size and value of agricultural activity across Liverpool’s rural lands. It expands on the employment and economic analysis presented in Section 4.2 of this report.

In this section, RMCG has prepared its input to address the following questions:

- What is the current status of agriculture in Liverpool and what contribution does it make to the Sydney Food Bowl?
- What is the likely impact of the Western Sydney Airport/agribusiness precinct on surrounding ag land?
- What is the likely development/role of the agribusiness precinct?

## 5.1 Overview

Agriculture in the Liverpool LGA is part of a significant fresh food industry in the Sydney Basin (Table 14). In 2015-16 the Sydney Basin produced 34 per cent of NSW vegetables, 25 per cent of NSW poultry and 63 per cent of NSW strawberries of which, Liverpool contributed:

- 15 per cent of vegetables including mushrooms, lettuces and tomatoes
- 23 per cent of poultry
- 19 per cent of strawberries.

Liverpool’s top commodities by gross value of agricultural production (GVAP) include poultry, mushrooms, nursery, tomatoes, cut flowers, lettuces and strawberries (Figure 28). Milk is also another important commodity in Liverpool (7.1 million in 2016), however, this is insignificant at the regional or state level.

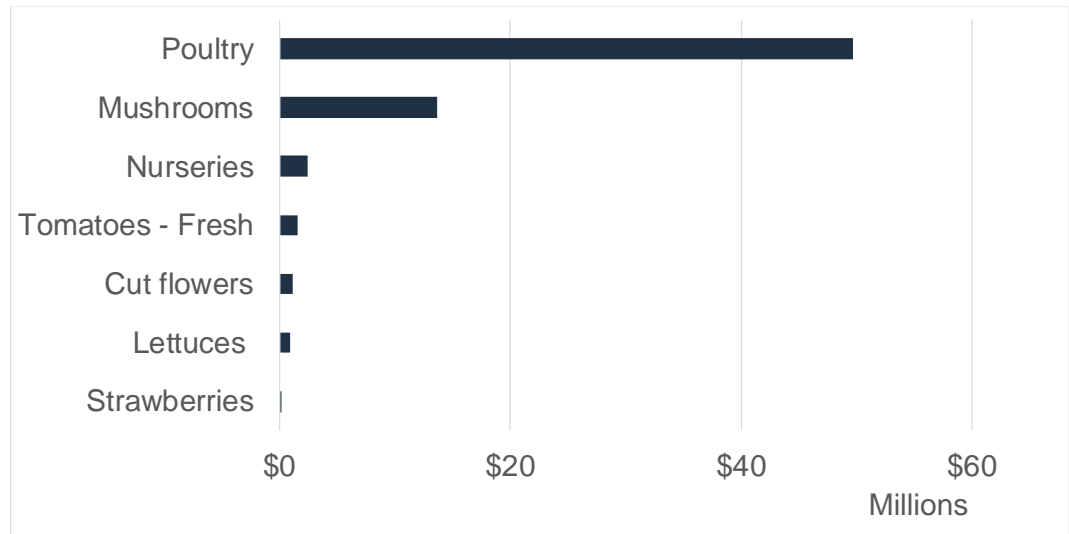
The diversity of agricultural products has reduced over time as production has moved from largely soil-based to protected cropping or ‘indoor’ farming. Commodities that are no longer produced or largely disappeared from the City include: orchard fruit such as nectarines and peaches; livestock such as pig and sheep; vegetables including artichokes, beetroot, butter beans, cabbages, cauliflowers, Chinese cabbage (bok choy and wombok), cucumbers, green peas, onions, parsnips, potatoes, pumpkins, radish, silverbeet, spinach, snow peas, spring onions, swedes, sweet corn, zucchinis, eggplant, leeks and parsley.

TABLE 14. GROSS VALUE OF AGRICULTURAL PRODUCTION IN THE SYDNEY BASIN AND LIVERPOOL

Commodity	Sydney basin as a per centage of NSW GVAP	Liverpool as a per centage of Sydney basin GVAP
Mushrooms	94%	18%
Lettuces	64%	18%
Strawberries	63%	19%
Poultry	25%	23%
Fresh tomatoes	17%	29%
Nurseries	29%	6%
Cut flowers	48%	3%

Source: Australian Bureau of Statistics: Catalogue 75030DO006\_201516, Value of Agricultural Commodities Produced, Australia–2015-16

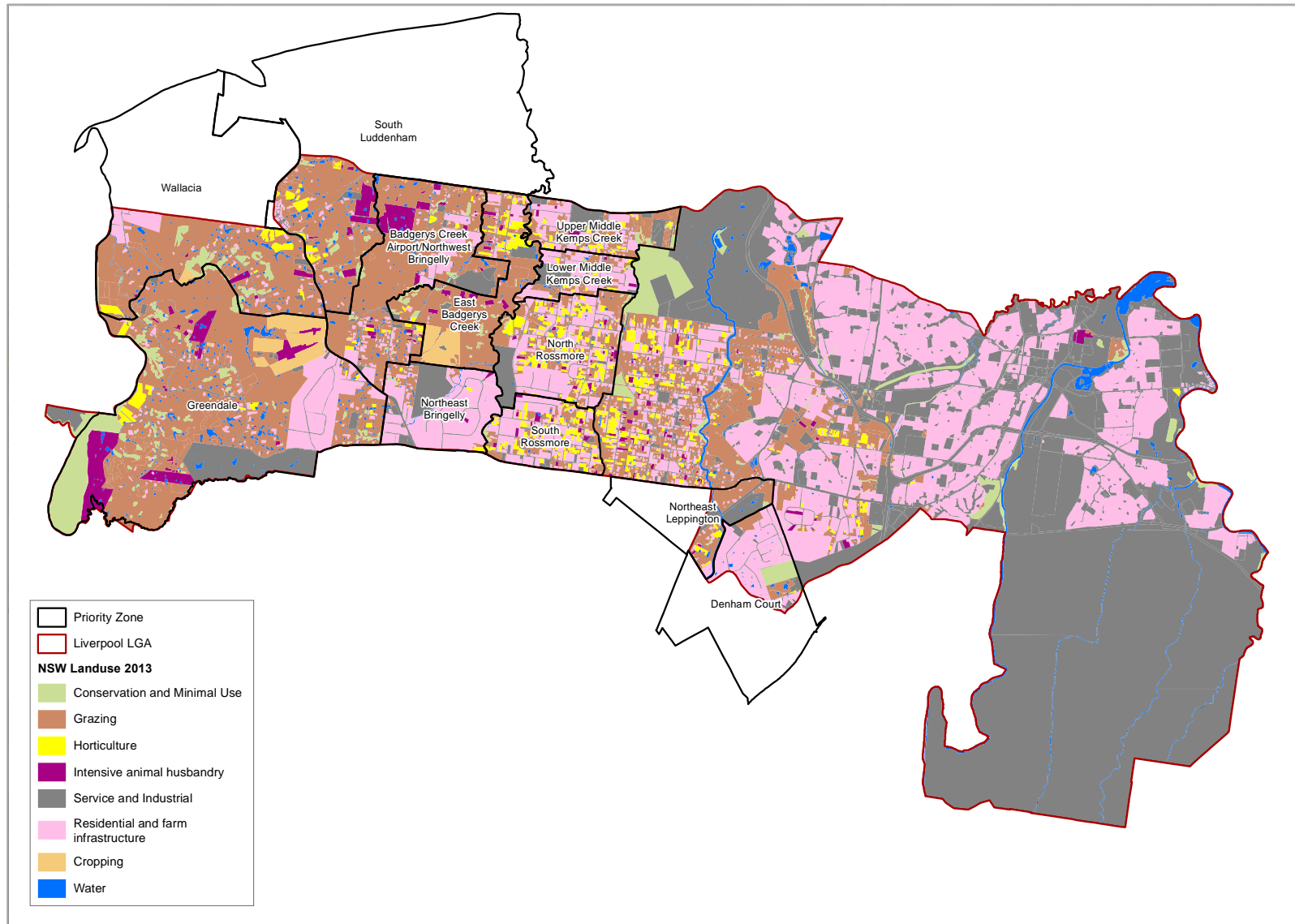
FIGURE 28: GROSS VALUE OF TOP COMMODITIES PRODUCED IN LIVERPOOL



Source: Australian Bureau of Statistics: Catalogue 75030DO006\_201516, Value of Agricultural Commodities Produced, Australia-2015-16

Horticulture is focused in the Austral, Rossmore and Kemps Creek areas. Leppington Pastoral Company is located in Greendale and intensive animal husbandry is scattered across the rural areas (Figure 29 on page 70, and Appendix 3).

FIGURE 29: LAND USE



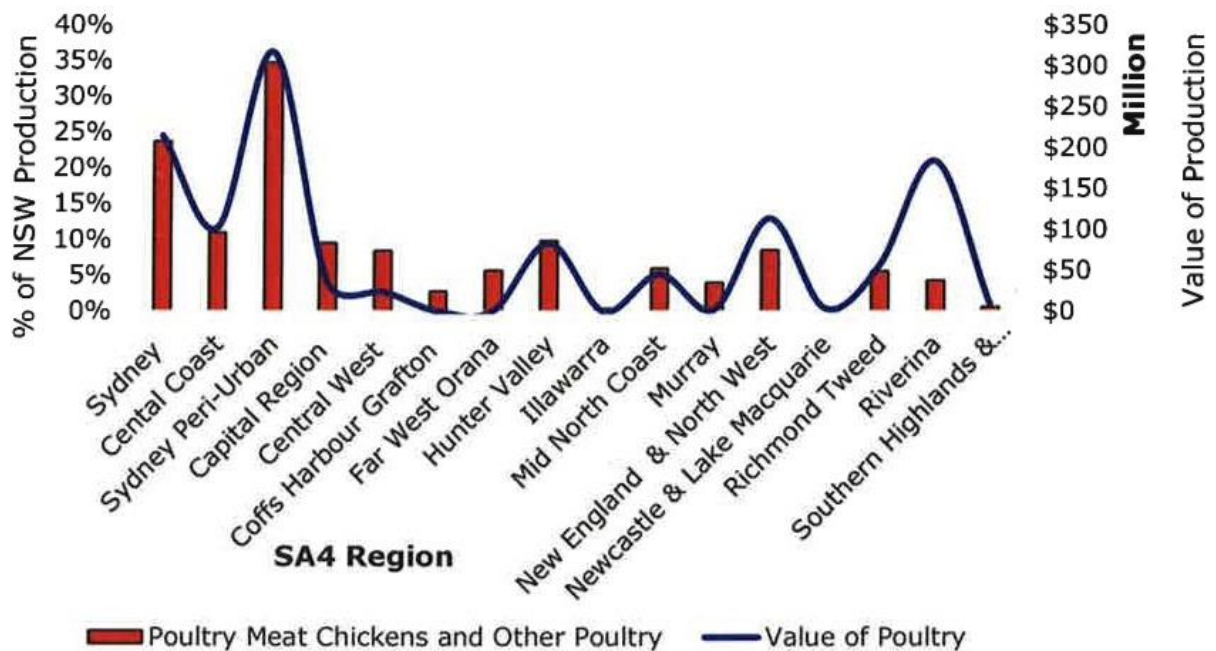
Source: NSW Government Land use dataset, 2013.

## 5.2 Poultry

The poultry meat industry is the largest agricultural commodity sector in the Sydney basin and is also currently, the largest poultry meat cluster in NSW (Figure 30), producing around 25 per cent of the total value of production of poultry meat in NSW. In 2015-16 the Sydney basin produced poultry meat with a farm gate value of \$215 million, of which Liverpool contributed 23 per cent, or just under \$50 million. Poultry meat farms are clustered around Liverpool, Picton and Marsden Park (Figure 33).

The poultry meat industry has increased five-fold in value over the last twenty years, while bird numbers have increased three-fold and property numbers have remained relatively steady (data should be considered carefully due to small sample size). As the price for chicken meat has remained relatively static over the same time period, industry growth is most likely attributed to increase in business scale as well as improvements in productivity and operational efficiency.

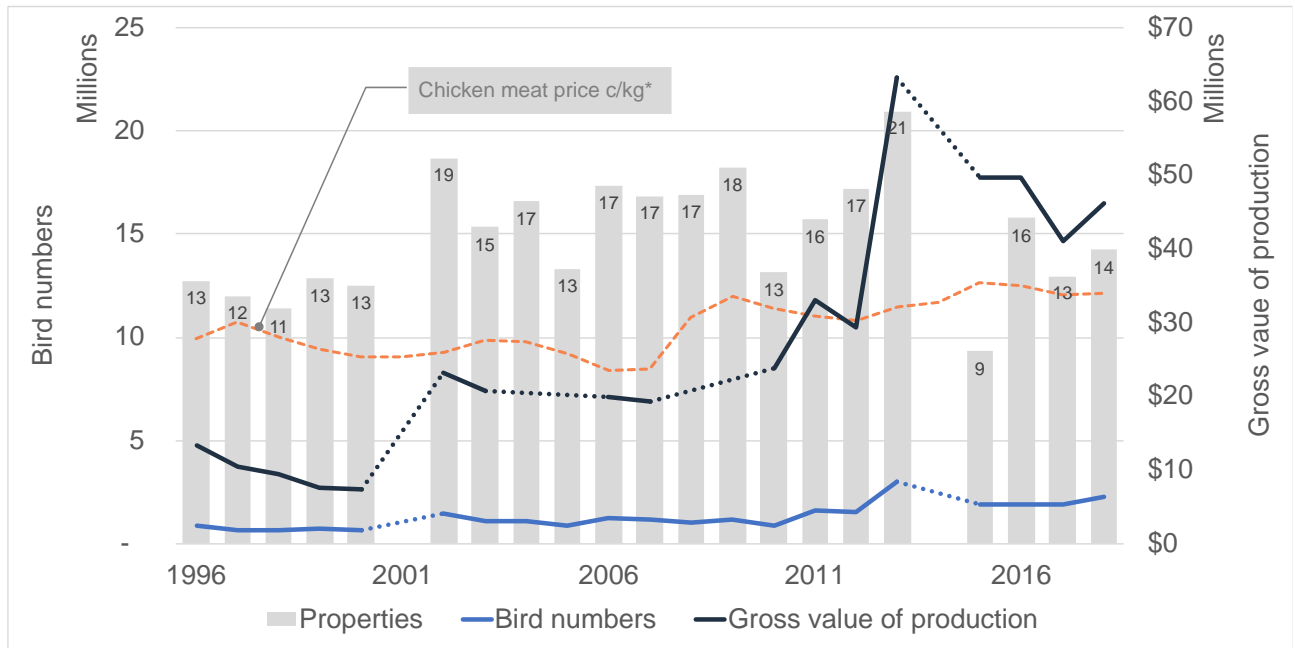
FIGURE 30: NSW POULTRY PRODUCTION BY SA4 REGION



Based on Number of Meat Chickens  
 Source: ABS 7121.0, Agriculture Commodities 2015-16

Source: ABARES Agricultural Commodity Statistics, December 2017. Price estimates are formed by indexing from the December quarter 2007 price for fresh whole chickens. Note price data has been scaled to fit graph and ranges from 99c/kg up to 126c/kg.

FIGURE 31: LIVERPOOL POULTRY MEAT INDUSTRY



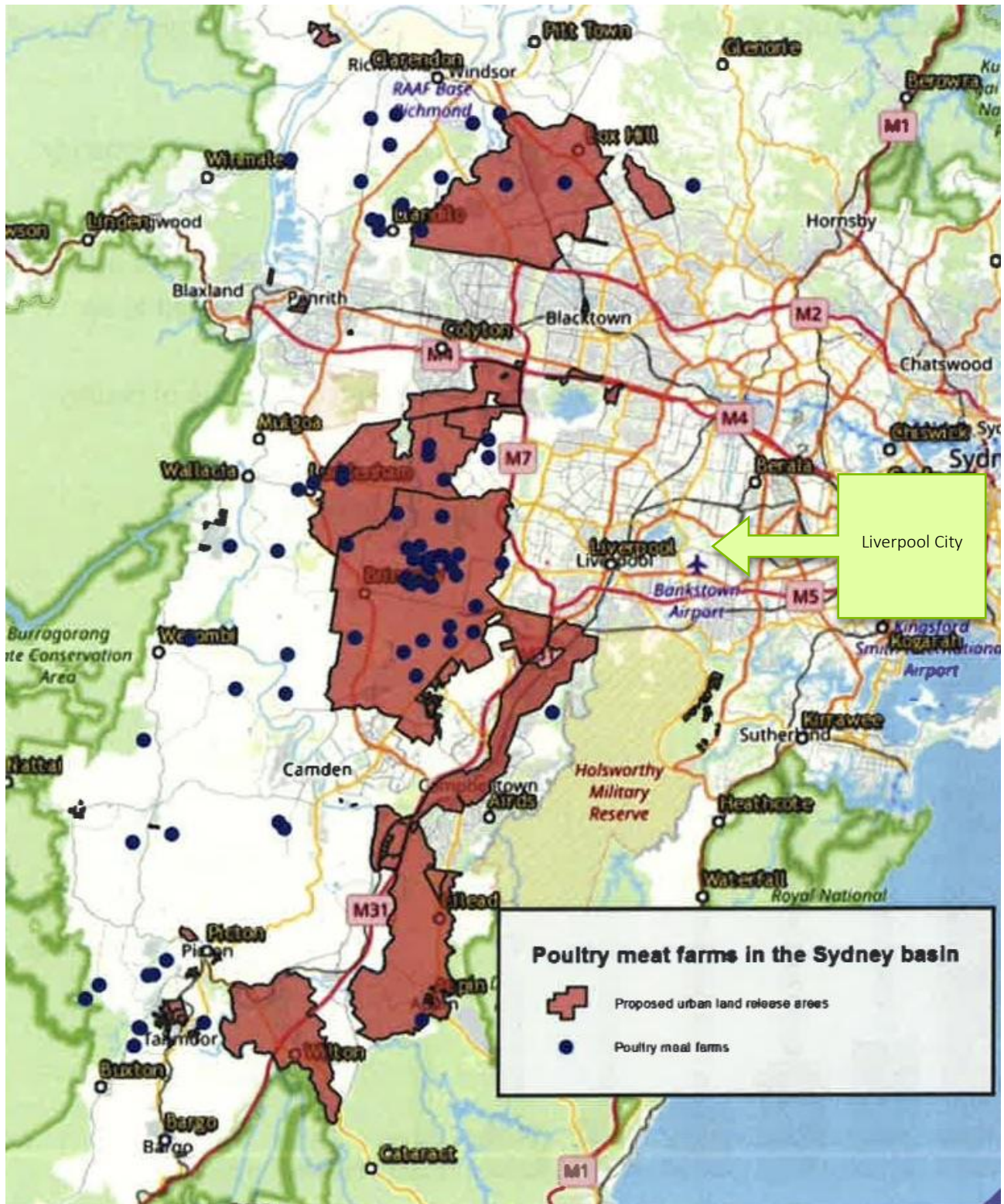
Source: ABARES Agricultural Commodity Statistics, December 2017. Price estimates are formed by indexing from the December quarter 2007 price for fresh whole chickens. Note price data has been scaled to fit graph and ranges from 99c/kg up to 126c/kg.

FIGURE 32: POULTRY (PROBABLY DUCKS) SHEDS



Source: RMCG, 2019.

FIGURE 33: SPATIAL DISTRIBUTION OF POULTRY MEAT FARMS IN THE SYDNEY BASIN



Source: ABARES Agricultural Commodity Statistics, December 2017. Price estimates are formed by indexing from the December quarter 2007 price for fresh whole chickens. Note price data has been scaled to fit graph and ranges from 99c/kg up to 126c/kg.

### 5.3 Fruit and vegetables

The Sydney Basin also hosts a significant fresh produce sector. In 2015-16 the Sydney basin produced 34 per cent of NSW vegetables, of which Liverpool City contributed 15 per cent (of the 34 per cent). Vegetables and fruit produced in the Sydney basin, including Liverpool are primarily perishable, high value products sold into wholesale markets. In 2015-16 the main fruit and vegetables produced in Liverpool by value of production were mushrooms (\$13.7 million), tomatoes (\$1.6 million), lettuces (\$0.9 million) and strawberries (0.1 million).

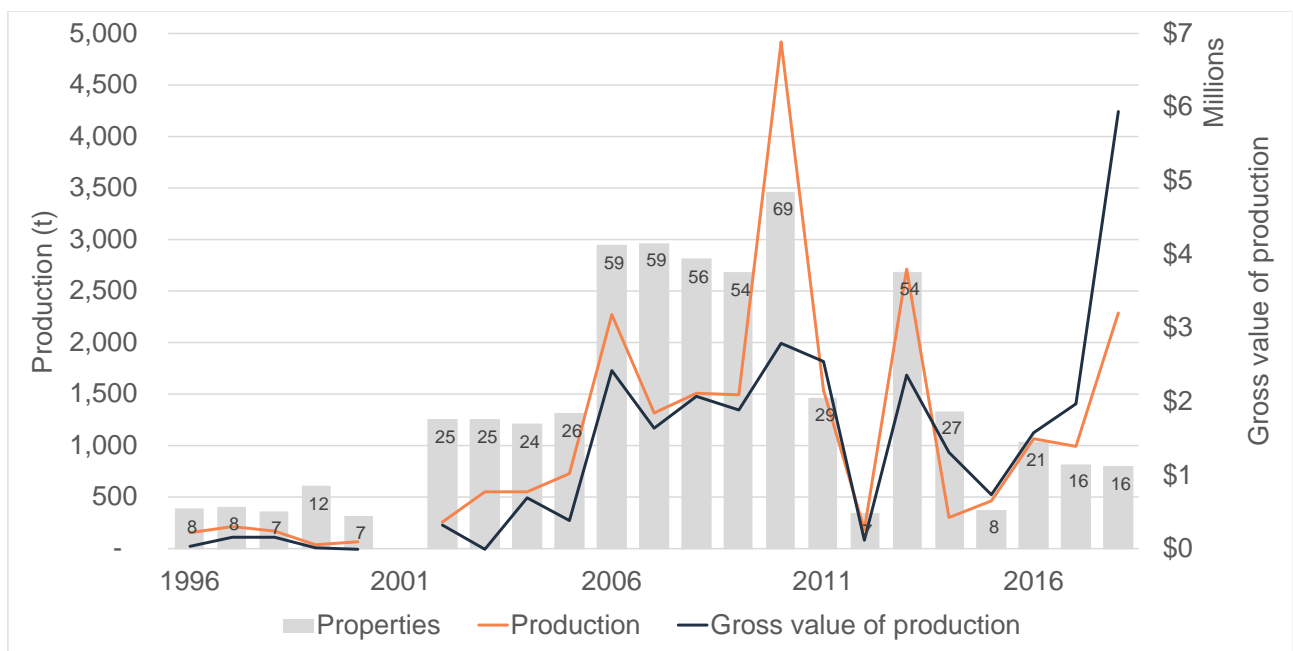
Production of tomatoes (Figure 34), lettuces (Figure 36) and strawberries (Figure 35) is highly seasonal and a mix of soil based and hydroponic growth mediums and protected (mainly plastic tunnels) and unprotected cropping.

Mushroom production is a relatively new industry to the City and has grown substantially over the last 8 years to become Liverpool’s highest value vegetable commodity (Figure 37). In 2015-16 the industry produced 17 per cent of the value of NSW mushrooms. Mushrooms are grown in controlled, fully enclosed environments.

The main fruit and vegetables produced in Liverpool by value of production are mushrooms, tomatoes, lettuces and strawberries. As shown in the figures below, production of tomatoes, lettuces and strawberries is highly seasonal.

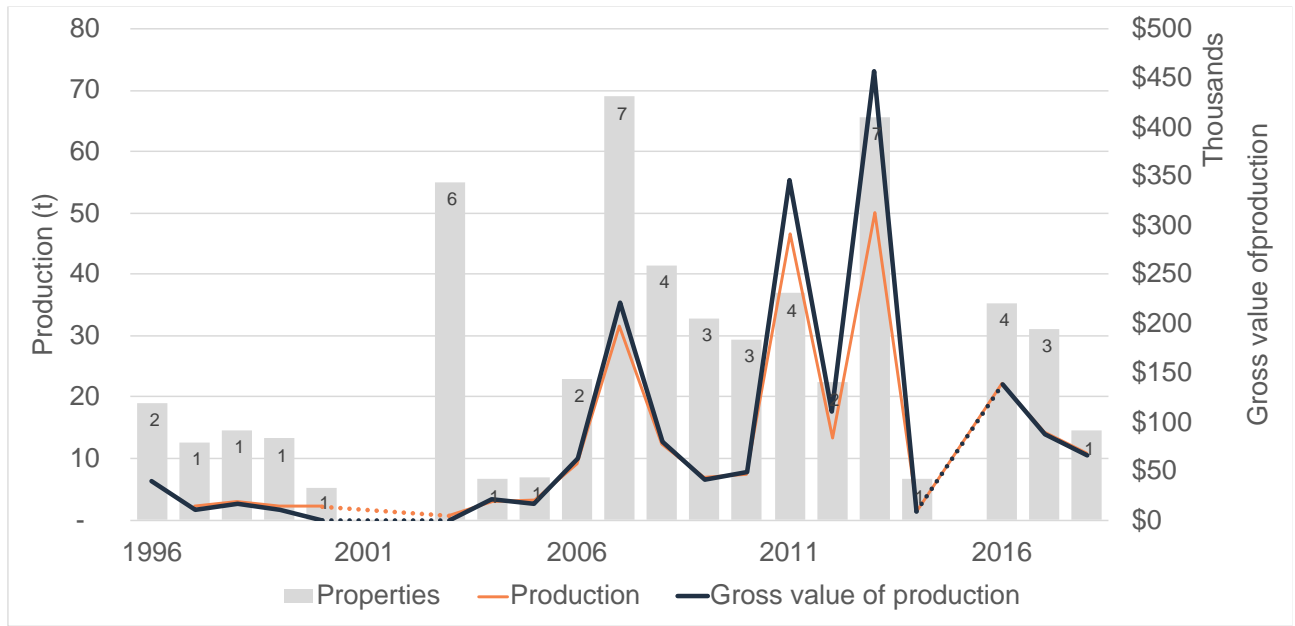
As shown below, the mushroom industry is a relatively new industry to the City and has grown substantially over the last eight years to become Liverpool’s highest value vegetable commodity.

FIGURE 34: LIVERPOOL TOMATO INDUSTRY



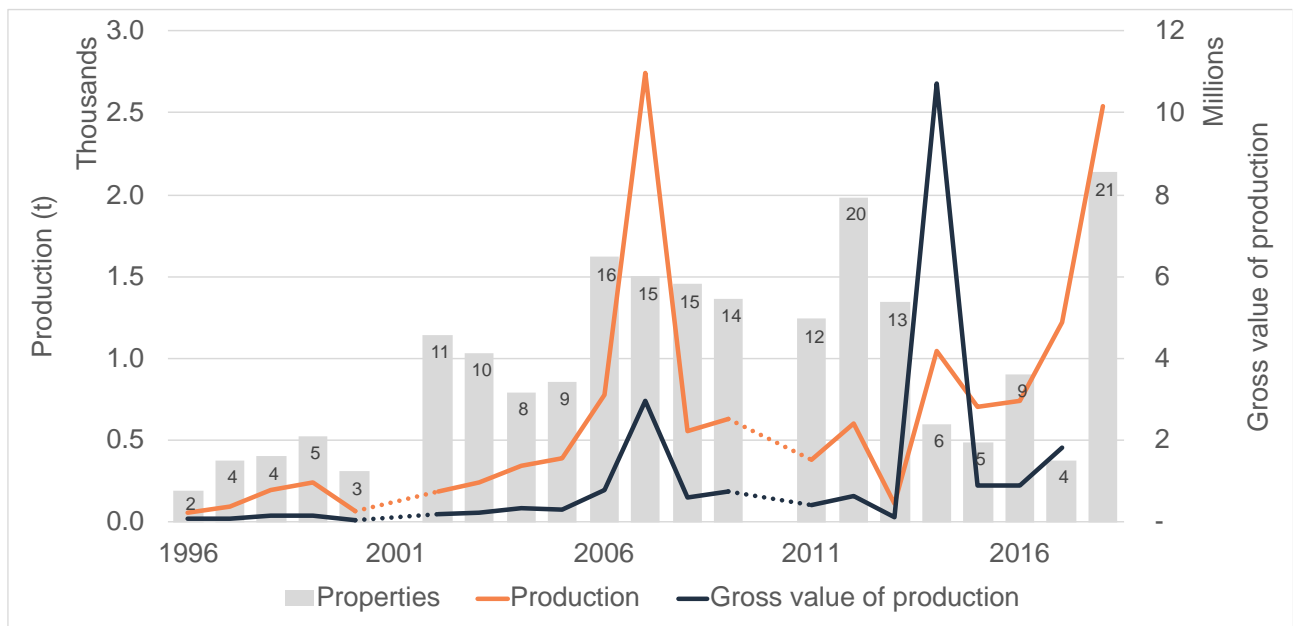
Source: RMCG, 2019.

FIGURE 35: LIVERPOOL STRAWBERRY INDUSTRY



Source: RMCG, 2019.

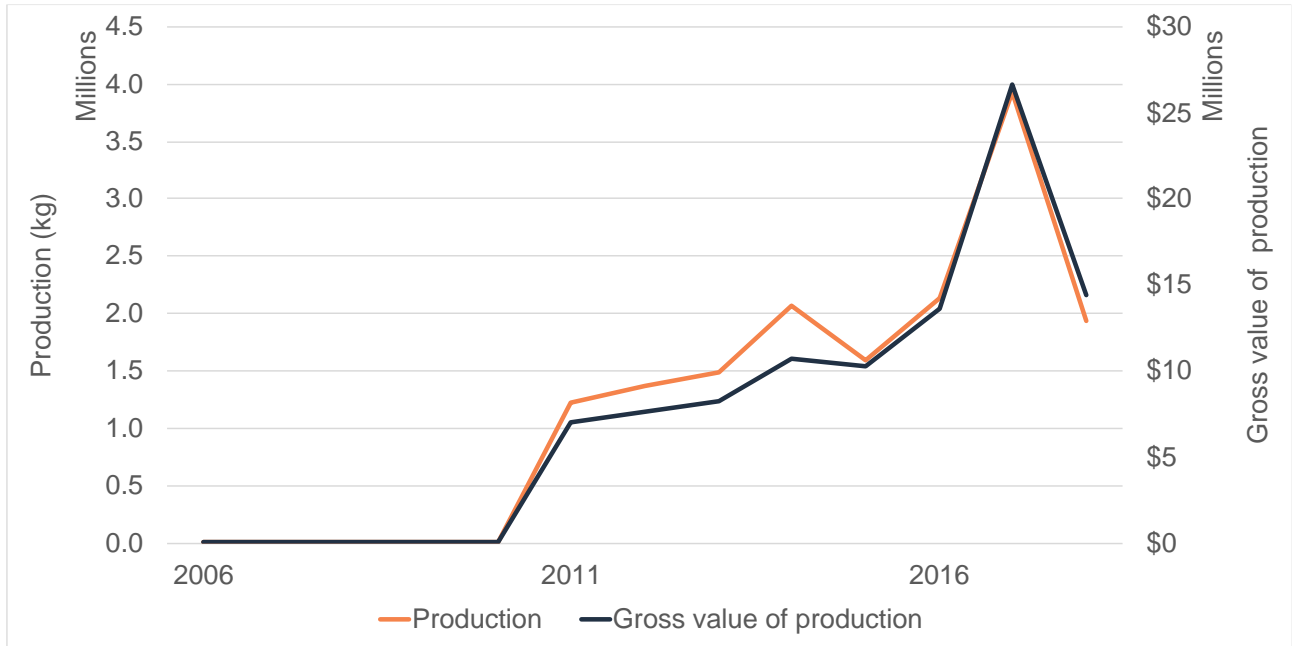
FIGURE 36: LIVERPOOL LETTUCE INDUSTRY



Source: RMCG, 2019.



FIGURE 37: LIVERPOOL MUSHROOM INDUSTRY



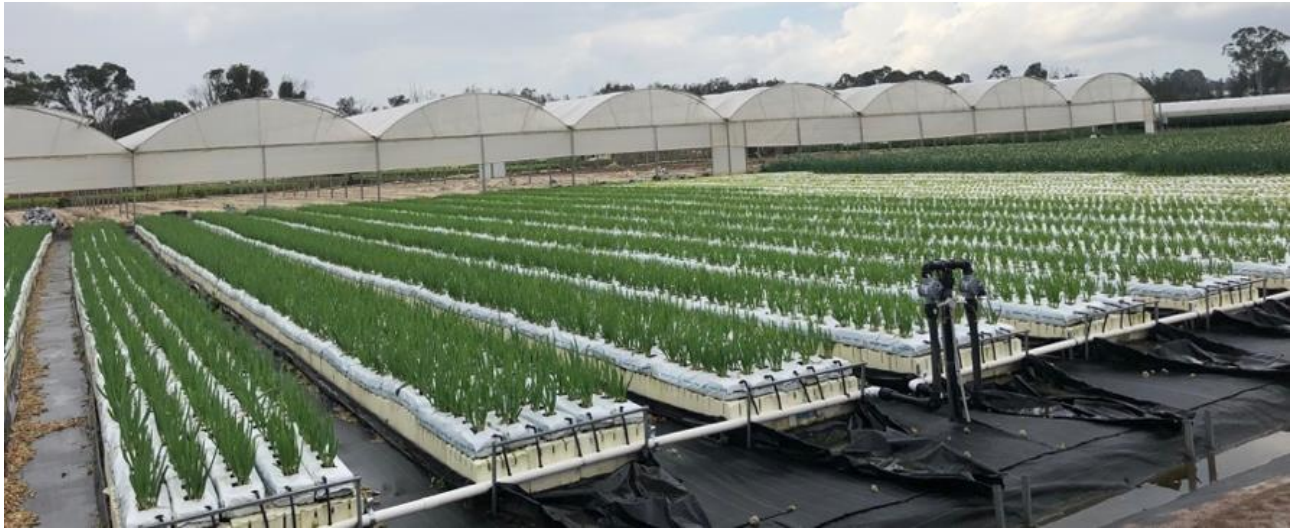
Source: RMCG, 2019.

FIGURE 38: HYDROPONIC LETTUCE UNDER PLASTIC WEATHER PROTECTION



Source: RMCG, 2019.

FIGURE 39: HYDROPONIC SALAD ONIONS



Source: RMCG, 2019.

FIGURE 40: KALE IN SOIL BEDS



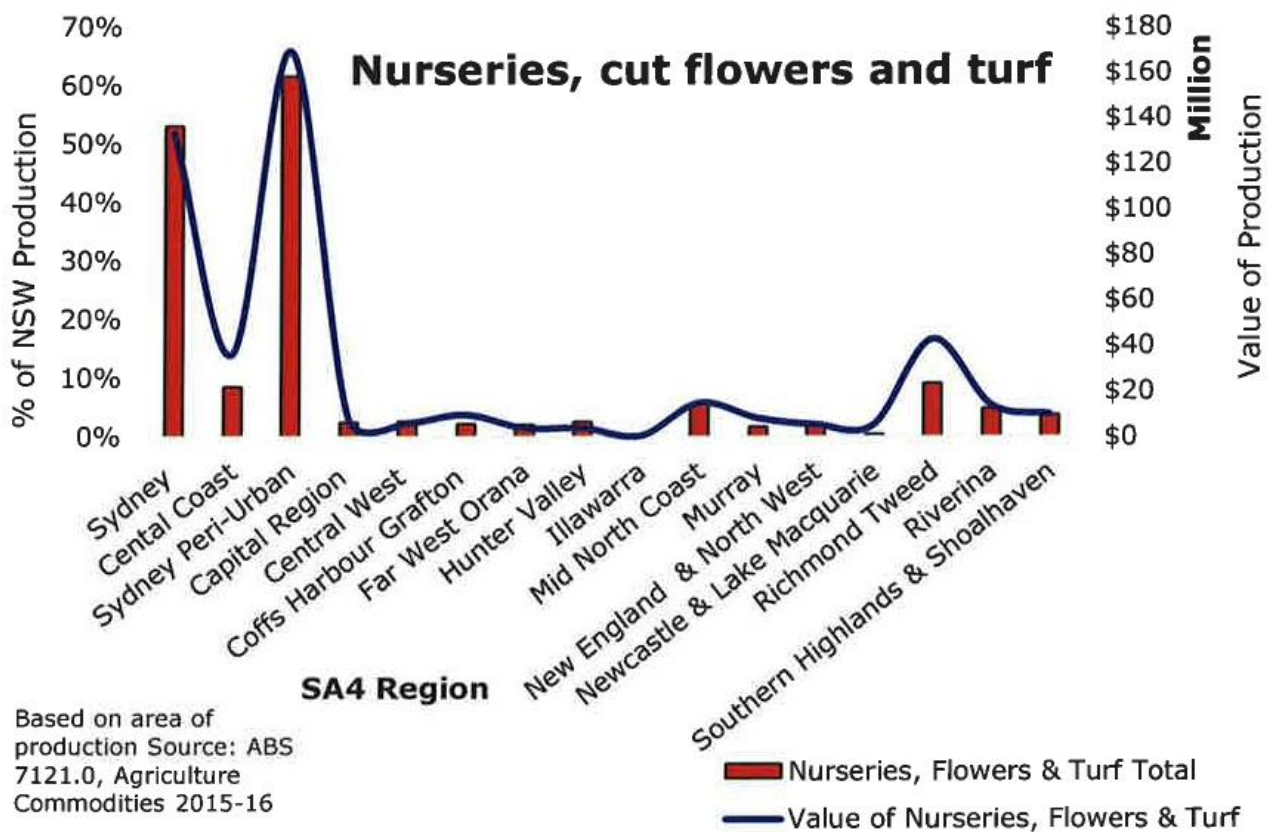
Source: RMCG, 2019.

## 5.4 Ornamental Horticulture

The ornamental horticulture sector in the Sydney basin, including nursery and cut flower production, is an important contributor (around 44 per cent) to the gross value of the NSW ornamental horticulture (Table 14, Figure 41). The Sydney Basin produced 29 per cent of the value of NSW nursery plants and 48 per cent of the value of NSW cut flowers in 2015-16. Liverpool produced 6 per cent of the value of Sydney Basin nursery plants and 3 per cent of the value of NSW cut flowers in 2015-16

In Liverpool, cut flower production peaked between 2006 and 2011, but production levels and the number of cut flower growers have since reduced (Figure 42). By contrast, the area of production and gross value of nursery production has shown, small but steady growth over the last 20 years (Figure 43).

FIGURE 41: NSW ORNAMENTAL HORTICULTURE PRODUCTION BY SA4 REGION



Source: ABS, 2015-16.

FIGURE 42: LIVERPOOL CUT FLOWER INDUSTRY

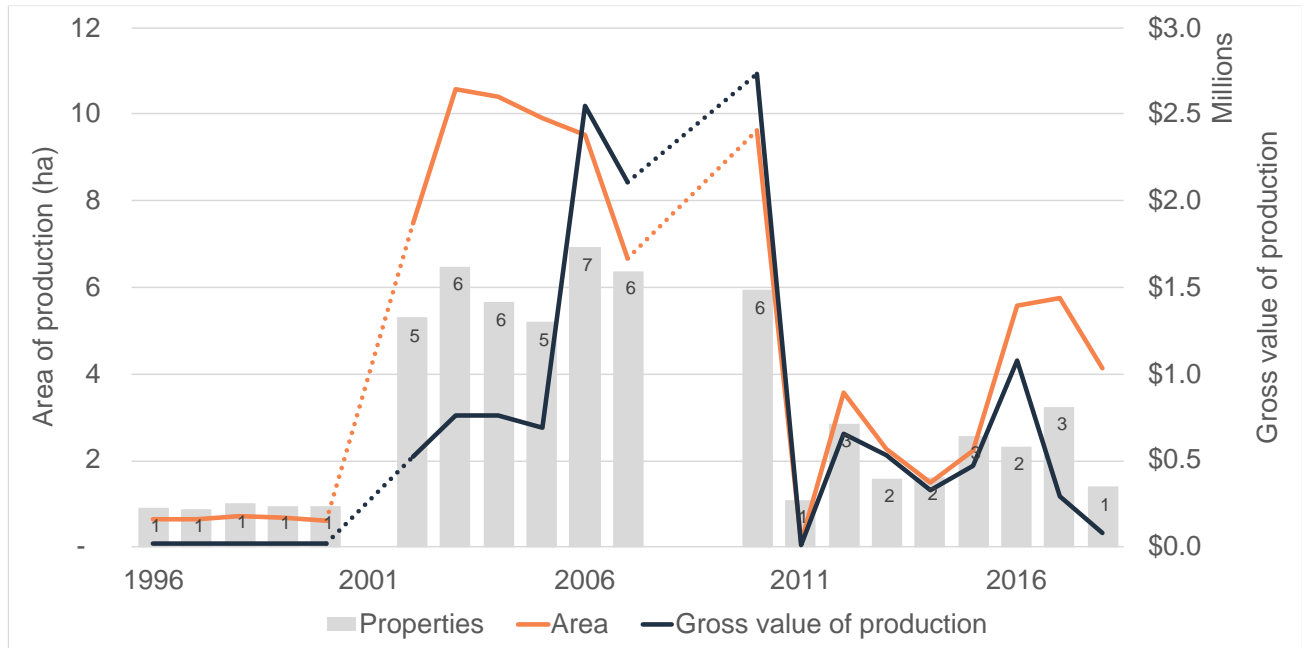
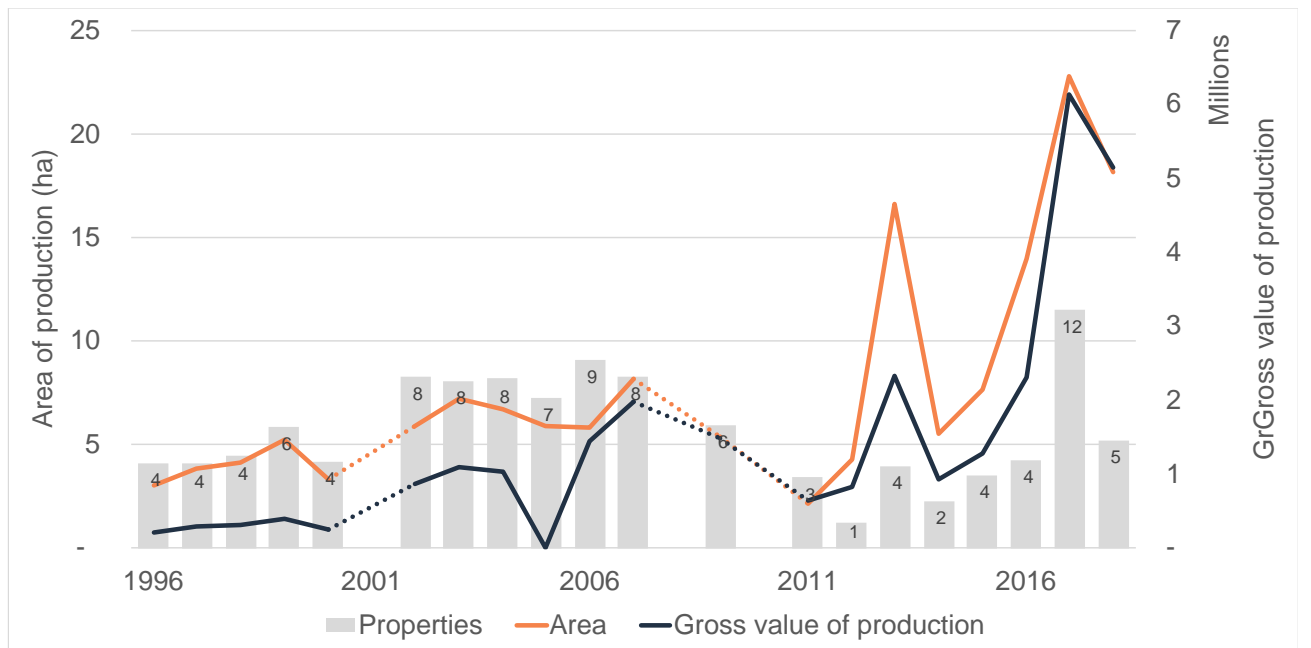


FIGURE 43: LIVERPOOL NURSERY INDUSTRY



Source: RMCG, 2019.

## 5.5 Land capability

An assessment of agricultural capability of land within Liverpool was undertaken, using State-wide land capability data and land ownership data (de-identified).

State-wide mapping of land and soil capability (LSC)<sup>15</sup> classifies land into eight classes (Table 15) based on a range of agricultural practices that can be sustained, ease of management and risk of degradation. The limitations to agricultural use are determined by factors including, but not limited to soil properties and climate. The more limitations for agricultural practices, the higher the classification and the lower the agricultural versatility or value.

The land capability of land in Liverpool reflects the underlying topography comprising a north-south pattern of streams and riparian areas with Class 5 to Class 6, moderate-low to low land capability, interspersed with more elevated land that is mainly Class 4 moderate land capability (Figure 44). Land in the RU1 Zone to the west, is less fragmented but the land capability is mainly low to very low agricultural capability. Land in the RU4 Zone is highly fragmented and has land capability ranging from Class 4 moderate to Class 6 low capability.

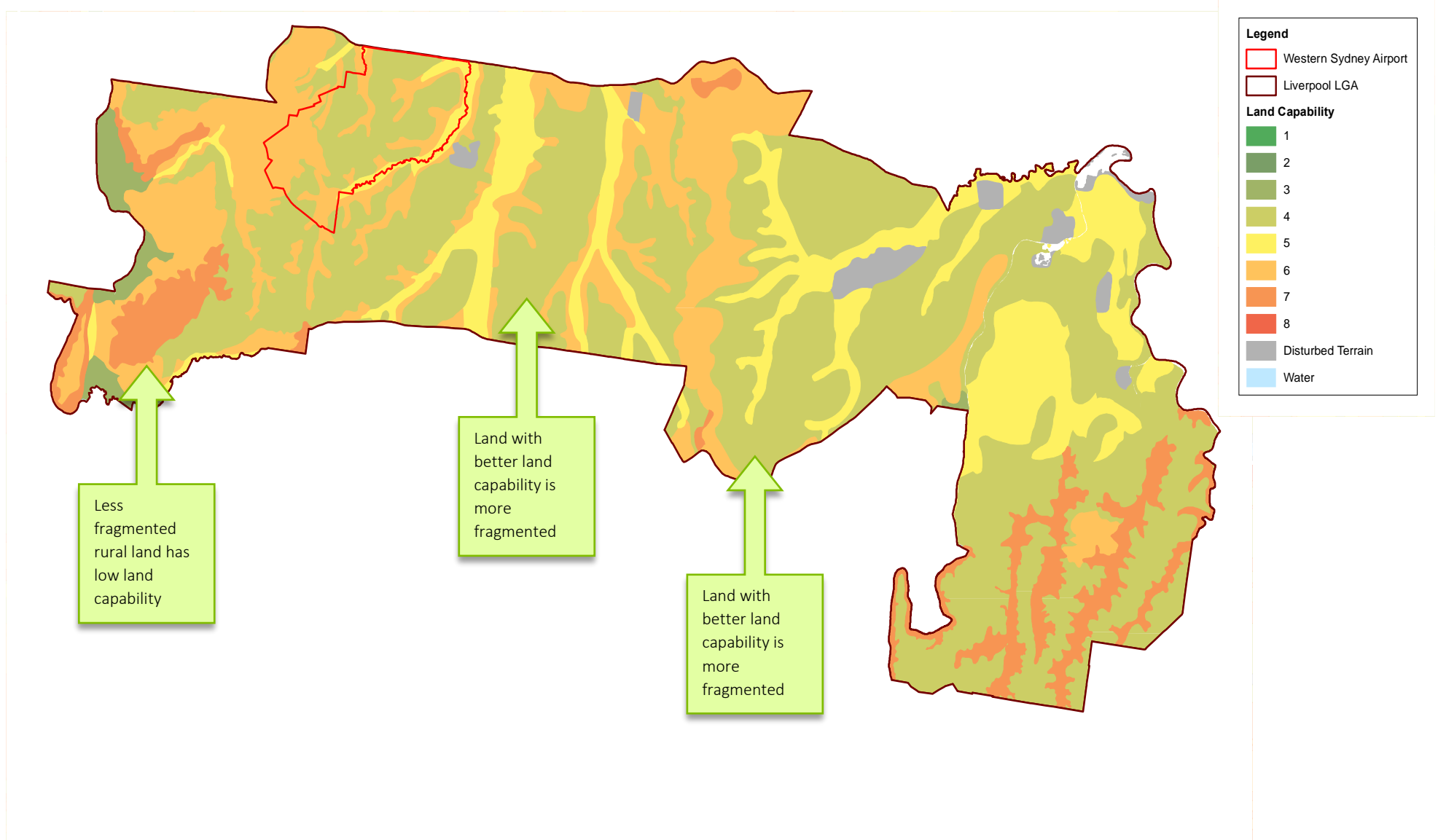
TABLE 15: LAND AND SOIL CAPABILITY CLASS DEFINITIONS

LSC class	General definition
<b>Land capable of a wide variety of land uses (cropping, grazing, horticulture, forestry, nature conservation)</b>	
1	<b>Extremely high capability land:</b> Land has no limitations. No special land management practices required. Land capable of all rural land uses and land management practices.
2	<b>Very high capability land:</b> Land has slight limitations. These can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping with cultivation.
3	<b>High capability land:</b> Land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation.
<b>Land capable of a variety of land uses (cropping with restricted cultivation, pasture cropping, grazing, some horticulture, forestry, nature conservation)</b>	
4	<b>Moderate capability land:</b> Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.
5	<b>Moderate–low capability land:</b> Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.
<b>Land capable for a limited set of land uses (grazing, forestry and nature conservation, some horticulture)</b>	
6	<b>Low capability land:</b> Land has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation.
<b>Land generally incapable of agricultural land use (selective forestry and nature conservation)</b>	
7	<b>Very low capability land:</b> Land has severe limitations that restrict most land uses and generally cannot be overcome. On-site and off-site impacts of land management practices can be extremely severe if limitations not managed. There should be minimal disturbance of native vegetation.
8	<b>Extremely low capability land:</b> Limitations are so severe that the land is incapable of sustaining any land use apart from nature conservation. There should be no disturbance of native vegetation.

Source: Office of Environment and Heritage (2012), Land and soil capability assessment scheme

<sup>15</sup> <https://www.seed.nsw.gov.au>

FIGURE 44: LAND AND SOIL CAPABILITY



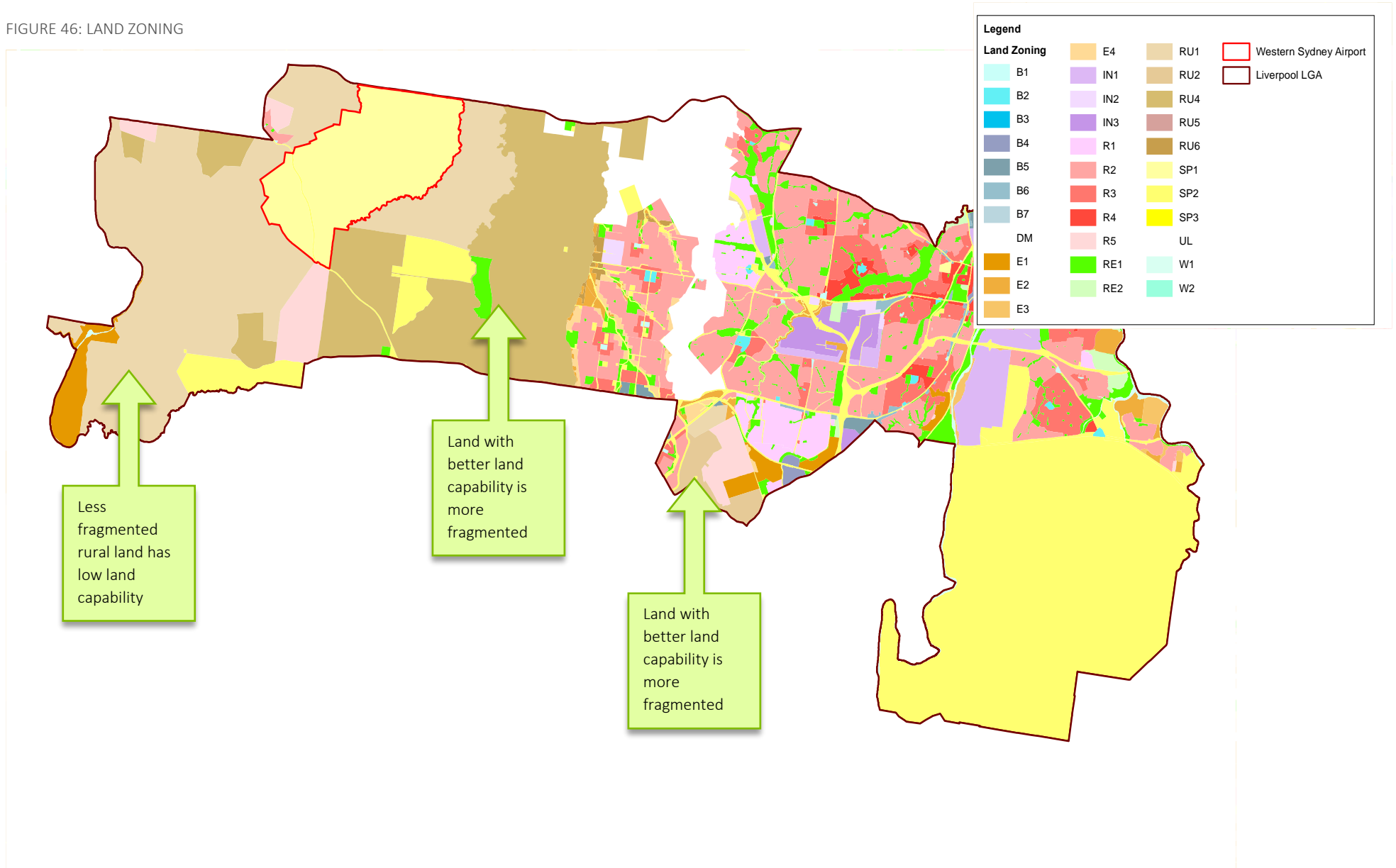
Source: RMCG, 2019, based on various NSW Government datasets.

FIGURE 45: LAND OWNERSHIP



Source: RMCG, 2019, based on various NSW Government datasets.

FIGURE 46: LAND ZONING



Source: RMCG, 2019, based on various NSW Government datasets



## 5.6 Impact of the Western Sydney Airport

### Overview

Western Sydney Airport will enable curfew-free, 24-hour food exports, allowing food to be delivered direct to Asia from farm to table within 36 hours. It will also significantly reduce the cost of freight and logistics for food, which is currently one of the highest cost areas of the sector.

A Pre-Feasibility Study (February 2019) for an agribusiness precinct at the Western Sydney Aerotropolis found that there was sufficient land for a world-class Intensive Integrated Production Hub (IIPH).<sup>16</sup> The IIPH would cover 2,400 hectares. Financial analysis prepared by KPMG indicated that each 500-hectare lot could generate up to \$541m each year and create 2,500 FTE positions. Opportunities were also identified in value-added food services such as food processing, logistics services and tourism. A further 12,000 jobs could be created through a fresh food precinct at the IIPH.<sup>17</sup>

The IIPH would incorporate protected cropping horticulture, energy production systems and efficient use and reuse of water, waste, heat and CO<sub>2</sub>. It would have a circular economy using first-mover technology for globally connected supply chains to achieve climate resilience and food waste minimisation. This would cut food production costs dramatically for businesses choosing to invest in the IIPH.

The Pre-Feasibility Study identifies significant opportunities from growing food demand, particularly from Asia and Middle East. Demand is predicted to increase between 59-98 per cent by 2050 in these regions. The ACEFI will test and confirm this assumption as part of its mandate to develop an export supply and demand matrix for NSW food producers.

### The Western Sydney Aerotropolis Structure Plan

A Structure Plan for the Western Sydney Aerotropolis sets out how the vision and important policy elements will sit within the landscape and how future development at the Aerotropolis could be arranged (Figure 27 in previous section). The Structure Plan will be delivered over the next 40 years with the initial focus being on delivery of the Aerotropolis Core, Northern Gateway, Badgerys Creek, Mamre Road, Agribusiness and South Creek precincts. Construction of major infrastructure such as the airport and upgrade of road and rail infrastructure is underway.

The Structure Plan indicates that the established core agricultural production areas (Rossmore, Kemps Creek) will eventually transition to urban and employment. The Structure Plan proposes that the Agriculture and Agribusiness precinct presents an opportunity for more intensive agriculture and agri-business activities.

Transition of rural land to urban development has commenced in Austral, east of Kemps Creek and Rossmore (Figure 47).

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<sup>16</sup> NSW Government, *Western Sydney Aerotropolis Agribusiness Precinct*, 2019, Available online from: [https://static1.squarespace.com/static/5bdfc609f793922ca1f84a10/t/5c6f3d13652dea1853ec36f5/1550794018022/DPI\\_AerotropolisAgribusiness\\_FeasibilityStudy.pdf](https://static1.squarespace.com/static/5bdfc609f793922ca1f84a10/t/5c6f3d13652dea1853ec36f5/1550794018022/DPI_AerotropolisAgribusiness_FeasibilityStudy.pdf).

<sup>17</sup> KPMG, *A fresh food precinct at the heart of Western Sydney*, 2017, Available online from: <https://assets.kpmg/content/dam/kpmg/au/pdf/2017/western-sydney-fresh-food-precinct.pdf>.

FIGURE 47: RURAL LAND IN TRANSITION, AUSTRAL AND LEPPINGTON



Source: RMCG, 2019.

## Current impacts

The immediate impacts on agriculture of the development proposed by the Western Sydney Aerotropolis are already evident and include:

- Abandoned enterprises
- Transition from commercial scale agriculture to sub-commercial or hobby farming
- Decline in standards of land management
- Land use conflict.

The following photos from the study area illustrate these effects.

FIGURE 48: ABANDONED PLASTIC TUNNELS FOR HORTICULTURE (LEPPINGTON)



- Agricultural enterprises are abandoned
- Lost production and contribution to the value chain
- Remnant plant material may pose a biosecurity risk
- Sub-optimal land management (poor weed control) is a risk for other producers
- Weed and rubbish build up are a fire hazard

FIGURE 49: SUB-COMMERCIAL FARMING (LEPPINGTON)



- Cattle grazing to manage pasture growth
- Hobby farming with minimal contribution to the value chain
- Good fencing is critical to prevent livestock entering local roads and posing a traffic hazard
- Poor land management; over grazing, poor weed and pest control, livestock escape



FIGURE 50: URBAN ENCROACHMENT (TWENTYEIGHTH AVENUE, AUSTRAL)



- Encroachment of sensitive uses such as housing, poses risks to residents (noise, odour, spray drift) leading to restrictions on farm operations such as timing of activities and chemical usage
- Encroachment also encourages speculative behaviour

FIGURE 51: STRANDED AGRICULTURE (ROSSMORE)



- Individual farms and businesses in the value chain become isolated from industry

FIGURE 52: LAND USE CONFLICT (EDMONDSON AVENUE, AUSTRAL)



- Urban development in adjoining areas leads to land use conflict such as rubbish dumping, loss of amenity and contamination of agricultural land

WYNYARD AVENUE, ROSSMORE



- Peri-urban areas commonly attract non-agricultural or rural uses (e.g. religious facilities) that are more appropriate in an urban location but are deterred by high land prices. These increase land use conflict risks.

FIGURE 53: LAND SPECULATION (FIFTEENTH AVENUE, ROSSMORE)



- The transition from rural to urban deters farmers from investing in their operations, and instead, speculating in their land

Source: RMCG, 2019.

## Subsequent impacts

The flow on impacts on agriculture and the agricultural value chain from these initial impacts include:

- An 'impermanence syndrome' for commercial agriculture<sup>18</sup> as:
  - The price of land increases fuelling land speculation
  - Tracts of farmland become isolated
  - Farmers are deterred from investing in their operations as they anticipate the conversion of their land out of commercial agriculture resulting in an absence or certainty in their industry.
- Loss of critical mass of commercial farms and farmers to sustain an agricultural industry and value chain as higher land prices act as an inducement to sell or commercial agriculture is substituted for sub-commercial agricultural activities. This places a strain on remaining farmers to survive and reduces opportunities for commercial farmers to expand businesses, further exacerbating conversion of agricultural land to non-agricultural uses.
- A reduced ability for farmers to generate sufficient income to sustain a standard of living or provide for retirement such that they speculate in their land rather than farm it.
- Rural land use conflict as new migrants in an agricultural landscape have an expectation of a benign rural environment.

In the peri urban region, these changes may take place over a number of decades as urban release areas are identified well ahead of urban development. Ultimately, the commercial scale agricultural enterprises will either exit the industry or area move to another, less constrained rural area. The agricultural industry value chain (e.g. machinery services, production inputs, business services) are also likely to transition out of the area.

## 5.7 Future industry scenarios

### Poultry

The chicken meat industry in Australia is vertically integrated, where companies own or control most aspects of the supply and production chain. Large chicken meat operations such as Baiada and Inghams, may include breeder farms, hatcheries, meat chicken growing farms, primary and secondary processing plants and feed mills. In each chicken producing region, chicken meat processing companies typically locate the various parts of their operations in close proximity to each other. For example, meat chicken growing farms are generally located within 100 km of a processing plant, minimising transport stress on the chickens on the day of processing.

Poultry production requires significant capital investment. The total infrastructure required to support the production of 780,000 meat chickens per week (about 6.7 per cent of current total production capacity of the Australian chicken meat industry) is estimated to be worth in excess of \$525 million, made up of the following major components<sup>19</sup>:

- A primary processing plant capable of handling a volume of 780,000 meat chickens per week would cost in excess of \$200 million, including land and infrastructure.
- Fertile egg production facilities (breeder farms) required to produce 780,000 meat chickens per week would require an investment of the order of \$60 million, while a modern hatchery complex would cost around \$50 million, and a feedmill to produce the volume of feed necessary about \$45 million.
- Meat chicken rearing farms needed to ensure a supply of 780,000 meat chickens per week would require an investment of some \$170 million (equivalent to around 32 average farms with capacity for 240,000 chickens. A farm comprising 6 sheds housing up

<sup>18</sup> Lennon, N (2004) The costs of hobby farming: A literature review

<sup>19</sup> <https://www.chicken.org.au/structure-of-the-industry/>

to 240,000 meat chickens at any one time and producing a total of 1,320,000 birds a year across an average of 5.5 batches would cost somewhere between \$5 m – \$7.5 m, possibly averaging \$5.4 million.

In 2011, 95 per cent of the chicken meat grown and eaten in Australia was produced by seven privately owned Australian chicken meat processing companies. The two largest, Baiada Poultry and Inghams Enterprises, supplies more than 70 per cent of Australia's chicken meat, with the next five companies each supplying between 3–9 per cent of the market.<sup>20</sup> Baiada, Inghams, Cordina and Pepes Ducks all have facilities in the Sydney Basin with birds sourced mostly from within the basin.

The modern specialist poultry industry had its origins in the outer Sydney metropolitan area in the 1950s.<sup>21</sup> Poultry processing plants have historically developed close to markets and labour sources, with many of the largest operations within 100 km of a capital city. Over the past ten years however, industry growth has occurred mainly in regional areas, for example, around Griffith and Tamworth. Baiada is withdrawing operations from the Sydney basin and focussing operations around Griffith and Tamworth. In August 2018, they announced plans to develop a 1.3 million chicken per week hatching facility (over 60 million per annum) to support its breeding farms, broiler farms, stock feed production, chicken processing and livestock processing rendering operations in Tamworth. This was following by an announcement of a \$203 million plan to expand its chicken processing operation in Tamworth.<sup>22</sup> Currently, a million birds a week, are processed at the facility producing 160 tonnes of finished product. The expanded facilities would see that jump to three million birds a week and 240 tonnes of product.<sup>23</sup>

Regional centres have a number of advantages over metropolitan areas including the proximity to cheap sources of protein and availability of affordable land where biosecurity and environmental risks are more manageable. Increasingly, regional centres can provide other industry requirements including guaranteed water supply and electric power, access for heavy transport for feed and live poultry, available labour and available services such as tradesmen. Improved regional transport networks into Sydney and other major distribution centres has also added to the competitive advantage of regional locations.

Australia has strict trade policies and biosecurity measures in place to ensure that the country and its domestic poultry industries are protected from diseases not usually found in Australia. Imports of chicken meat (other than from NZ, or as canned or fully retorted products) were prohibited until 1998, and remain subject to stringent conditions, resulting in very limited imports of processed chicken meat and no imports of fresh chicken meat. This means that virtually all chicken meat eaten in Australia is grown in Australia. Also, almost all chicken meat produced in Australia is consumed locally, with just under 5 per cent being exported. Low export levels are due in part to high local demand, and in part because international demand is largely met by countries which benefit from a lower cost base than Australia's chicken meat producers and are, in some cases, supported by government subsidies. The proximity of Liverpool to the airport is therefore not likely to be a strong lever to retain the poultry industry.

### Fruit and vegetables

Fruit and vegetable growers in Liverpool primary focus on production of high value commodities due to the high price of land, water and small farm sizes. There is also a trend to protected cropping (a generic term to cover all horticultural systems under some form of protection, cover, shade cloth, greenhouse or glasshouse) due to the higher water use efficiency, increased production volumes, reduced production risks and consistent product

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<sup>20</sup> Australian Chicken Meat Federation (2011) The Australian Chicken Meat Industry: An Industry in Profile

<sup>21</sup> Henderson, S and Epps, R (2000) Urban Fringe Land Use Conflict: Two Poultry Case Studies. Rural Industries Research and Development Corporation

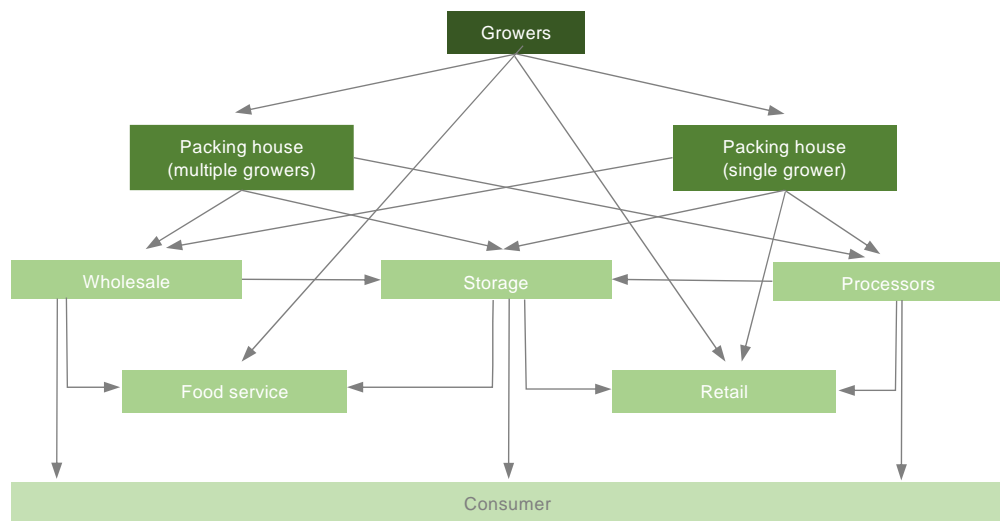
<sup>22</sup> <https://www.chicken.org.au/structure-of-the-industry/>

<sup>23</sup> <https://www.northerndailyleader.com.au/story/6291403/poultry-giants-proposed-200m-upgrade-to-create-700-jobs/>

quality compared to unprotected crops. Use of hydroponic systems was also noted during the field inspection. Hydroponic production systems use less water (this is important in Liverpool where growers use the potable water supply which is very expensive compared to a rural water supply) fertiliser and other inputs compared to soil based systems. The system is more compatible with farming in urban areas than soils based farming as it has fewer environmental impacts. Mushrooms are grown in fully enclosed, highly controlled environments.

Fresh fruit and vegetables can reach the consumer in a variety of ways (Figure 54). Produce can be sold directly to consumers through farmers’ markets and farm gate sales. However, the usual channels from farm to consumer are indirect. Most commonly the produce is packed on-farm or transported to a packing house off-farm that is used by multiple growers. After packing, which may involve washing, trimming and post-harvest treatments, the produce can go directly to retailers, wholesalers, food service or processors. Prior to supply and sale commodities may be stored for periods of time depending on the nature of the commodity and its perishability.

FIGURE 54: VEGETABLE FOOD CHAIN



Source: RMCG, 2019.

Vegetable produce is primarily distributed to local fresh produce wholesalers, retail chains and vegetable processors.<sup>24</sup> These distribution channels account for around 92 per cent of production, while exports make up around 7 per cent of production and 1 per cent is sold direct to consumers.<sup>25</sup> In 2016–17 nearly one-half of all vegetable growers sold their produce to a wholesale vegetable market and on average over the last five years, only 15 per cent of fruit and 32 per cent of vegetables (by weight) were diverted into processing.<sup>26</sup> Very large vegetable-growing farms were more likely to sell their produce directly to processors or retailers such as major supermarket chains, than other vegetable growers. Given the type and volume of fresh fruit and vegetables produced in Liverpool it is considered that the majority would be sold to local fresh produce wholesalers through the Sydney wholesale market.

The majority of Australian vegetable production is sold in domestic markets. Australian grown vegetables account for 85 per cent of vegetable products sold in Australia, with the remaining 15 per cent imported.<sup>27</sup> Australia is a net importer of mushrooms which indicates there is

<sup>24</sup> IBIS World, Industry Report AO113, 'Vegetable Growing in Australia', February 2011, p.18  
<sup>25</sup> ABS Catalogue 5465.0, International Trade, Australia, 2011-12  
<sup>26</sup> Spencer, S & Kneebone (2012) Foodmap: An analysis of the Australian food supply chain  
<sup>27</sup> AUSVEG, Australian Vegetable industry Strategic Investment Plan 2012 – 2017, 2012

room in the market for local production increases.<sup>28</sup> Australia's fresh vegetable export volume is comprised mainly of carrots, potatoes and onions.<sup>29</sup> Currently Coles and Woolworths dominate fresh produce sales in Australia with a combined market share of over 60 per cent. Non-supermarket sales account for less than 20 per cent of the retail sales.<sup>30</sup>

There is opportunity to grow the vegetable export industry. The factors that support the case for growth potential in vegetable export markets are:

- The growing number of middle and upper middle class consumers in Asia and the Middle East.
- The shift in shopping habits from traditional trade to modern trade driving demand for premium, packaged and convenient vegetable products.
- Demand for safe, traceable food from a reliable and sustainable source.
- Trend towards greater consumption of western style foods in food service outlets.

Australian growers have competitive advantages in quality, product integrity/safety, seasonality and location. But growers must compensate for a lack of overall price competitiveness, due to high labour, packaging, high Australian dollar relative to other currencies and energy costs.

Liverpool meets a number of the requirements for a competitive vegetable export industry:

- Suitable climate, access to water and energy, labour, services.
- Excellent transport networks and access to ports and airports

Liverpool does, however, have a number of competitive disadvantages compared to regional NSW, including:

- High cost of water and land
- High costs to manage environmental factors and avoid impacts on neighbours (noise, odour, spray drift etc)
- High risk of encroachment by non-agricultural uses
- Uncertain land use future.

The risk of encroachment of non-agricultural uses and the intention that parts of Liverpool's rural areas, particularly Kemps Creek and Rossmore, are to be developed for urban purposes are significant competitive disadvantages to the horticultural industry, both for established growers and to new investors. Growers are less likely to invest in new technology, production systems and crop types with the prospect that their land will be converted to urban use sometime in the future.

Protected cropping is capital intensive and capital costs are anywhere between \$100 and \$300 plus per square metre, (\$1 million to \$3 million/ha) depending on the sophistication of the greenhouse.<sup>31</sup> The payback period can also vary, depending on the crop types and operating costs, from between 3 years for a simple poly tunnel structure to up to 10 years for a controlled environment glasshouse<sup>32, 33</sup>.

To justify the high capital costs and costs of managing business risks associated with farming in Liverpool, growers require certainty that they will be able to continue to farm for at least the next 10 years. Measures that could be entertained to support agriculture and encourage landholders to continue to productively use their land include:

- Strong policy statement confirming the primacy of agriculture
- Confirm the timeframes when growers can expect the transition to urban development commence

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<sup>28</sup> <https://www.ruralbank.com.au/assets/responsive/pdf/publications/hort-report-feb18.pdf>

<sup>29</sup> <https://www.foodmag.com.au/australian-vegetables-rise/>

<sup>30</sup> J Terry (2017) The Australian vegetable industry - export opportunities Strategies and models for success

<sup>31</sup> [http://www.protectedcroppingaustralia.com/?page\\_id=94](http://www.protectedcroppingaustralia.com/?page_id=94)

<sup>32</sup> Collie Futures – Protected Cropping Prefeasibility Investigation (2018)

<sup>33</sup> Jovicich, E, Collier, A, Wittl, H and White, N (2018) Gap analysis and economic assessment for protected cropping vegetables in tropical Australia



- Introduce or retain measures that follow right to farm principles, including:
  - Allow for heavy vehicle and agricultural traffic movement on local roads
  - Community engagement programs to management expectations of rural living
  - Prevent further encroachment of non-agricultural uses that introduce land use conflict
- Provide opportunities for uses that value add to agriculture and leverage its proximity to urban development such roadside stalls, farmers markets, pick your own,
- Economic measures such as rate rebates to encourage landholders to productively use their land
- Assist growers to secure more affordable water and energy
- Fast track development applications for protected cropping structures and other agricultural improvements
- Facilitate partnerships and projects with growers and the National Vegetable Protected Cropping Centre

### Agricultural opportunities for the Agribusiness precinct

For the Agribusiness precinct, the WSAP vision is to provide the “long-term retention and growth of agribusiness and intensive plant-based agriculture in the Aerotropolis.” It is envisaged that this precinct will “act as a catalyst for agricultural exports from the region and support the existing rural landscape.”

Controlled environment horticulture (CEH) is the most modern and sophisticated form of protected cropping combining high technology greenhouses with hydroponic (soil-less) growing systems. Given the other uses envisaged within the precinct, CEH would seem to be the most appropriate system of intensive plant-based agriculture as they have minimal environmental impacts on neighbours.

CEH makes it possible to consistently and reliably control or manipulate the growing environment and effectively manage nutrition, pests and diseases in crops. However, CEH is viable only for high-value crops and globally, production in these environments has been focused upon the following: tomato, capsicum, lettuce and other leafy greens, cucumbers, eggplant, herbs, and some types of cut flowers. In Australia development of large-scale CEH facilities has been predominantly confined to growing tomatoes.

An assessment of the potential for CEH in NSW, noted the following:

- Large-scale CEH is very capital intensive and the level of investment required means that it is dominated by big corporate entities
- Growth of CEH in the longer term will be dependent on exploiting the growing markets in Asia and Middle East
- The strong potential for expansion into exportable products means proximity to international airport and ports is important
- Large operations are more likely to locate closer to more urbanised areas in order to guarantee labour supply.
- Access to low cost energy is important. Co-location with affordable energy generators would be an advantage.
- Supportive policy is required to minimise the compliance costs associated with approval of new developments
- Access to metropolitan markets and supermarket distribution hubs via a well-maintained road transport network is a vital consideration for large-scale CEH.

The proposed Agribusiness precinct has the potential to meet some of these criteria. The greatest challenge to attracting investment in intensive plant-based agriculture will be the significantly higher cost of land within the Agribusiness precinct compared to regional locations. Recent large scale investment in CEH has occurred in Guyra (Costa Group) and Warragul, Victoria (Flavorite).

FIGURE 55: GLASSHOUSE (16 HA) FOR HYDROPONIC PRODUCTION OF TOMATOES AND CUCUMBERS, NEWCASTLE NSW



## 5.8 Key findings: agriculture assessment

- The poultry industry is dominated by vertically integrated companies that own or control most aspects of the supply and production chain. Bird production is often under contract to meat chicken growing farms. The industry therefore 'moves' with the processor as most poultry farmers are dependent on the contracting processor.
- Industry is generally clustered around a processing facility with birds grown within 100 kilometres/two hours of the facility.
- There are significant upfront capital costs to establishing a poultry farm and investors generally aim to recover debt within a 10 to 15 year time period.
- Regional centres offer significant competitive advantages over metropolitan locations and major players are withdrawing from the Sydney basin in favour of regional cities such as Tamworth and Griffith.
- Most meat is currently consumed locally, and Australia is not competitive in the export market.
- Fruit and vegetable growers in Liverpool focus on high value commodities such as perishable fruit and vegetables due to high price of land, water and small farm sizes
- Use of protected cropping achieves improved production outcomes and efficiencies as well as reduced land use conflict
- Produce is sold primarily into wholesale markets and consumed domestically.

### Implications for the Rural Lands Study

Over the next 10 years it is envisaged that the poultry industry will gradually withdraw from the City. Some business owners e.g. those nearing retirement may cease or reduce production and eventually exit the industry. Others wishing to continue in the industry will look to maximise the capital with which they leave the area and transition to a less constrained rural area.

It is unlikely that there will be a poultry industry in the City in 20 to 30 years' time. New investment is unlikely as major processors are investing in regional areas of the state such as Tamworth and the proximity to the airport is not a significant enough lever for industry investment due to other significant downside factors. There may be some opportunity for freight, logistics and cold storage for distribution interstate and export in the agribusiness precinct.

For fruit and vegetables, over the next 10 years it is envisaged that the industry will gradually withdraw from the City. Some business owners e.g. those nearing retirement may cease or reduce production and eventually exit the industry. Others wishing to continue in the industry will look to maximise the capital with which they leave the area and transition to a less constrained rural area.

New investment in soil-based horticulture is unlikely due to lack of suitable land and an affordable water supply in the proposed agriculture precinct. There is some potential for new generation protected cropping in large scale glasshouses, (some new developments are up to 30 ha in size) that enable year round production of large volumes of commodities. The undulating landform within the agribusiness precinct, however, is not ideally suited to large scale greenhouse construction. The proximity to the airport is not a significant enough lever, on its own to attract new industry investment. There may be some opportunity for freight, logistics and cold storage for distribution interstate and export in the agribusiness precinct.

## 6. LANDSCAPE CONTEXT

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A landscape area is defined by the unique interplay between several elements that make up how a place looks and feels. This is fundamental to the place-based concept of planning: identifying a place based on its look and feel, and preparing policies that support and enhance that sense of place.

Usually landscape character areas are identified based on an assessment of geology, elevation water form, tree cover, land use and built form. For this Study, the landscape character assessment provides a description of the land use and key landscape features of land units specified by Liverpool City and identified in Figure 20. Western Sydney Airport Land is not included in the landscape assessment.

The landscape descriptions draw on spatial assessment and ground survey of the following features:

- Underlying geomorphology, waterway, vegetation and landscape features
- Land use and development patterns
- Policy directions from State (including WSAP) and local plans.

### 6.1 Background and overview of landscape methodology

Defining 'landscape areas' is a technique used to specify the look and feel of different places, based on composite visual features, both natural and resulting from development/subdivision patterns.

The identification of landscape areas in Liverpool's rural areas will enable Council and the community to articulate what is special about different rural places, especially in the context of pressures faced from urban growth and the Aerotropolis precinct. Into the future, landscape areas could be used to inform changes (if any) that may be proposed to the planning zones and other controls in rural areas, to achieve desired outcomes that are in keeping with the vision for each landscape area.

#### Place-based planning

Objective 29 of the *Greater Sydney Regional Plan*, states 'place-based approaches for landscape units within the Metropolitan Rural Area will help manage its environmental, social and economic values and maximise the productive use of the land.' In addition, Action 69 from the *Northern District Plan* directs Council to 'maintain and enhance the values of the Metropolitan Rural Area using place-based planning, to deliver targeted environmental, social and economic outcomes.'

To meet this requirement, Liverpool City Council has commissioned a 'landscape area' assessment as part of the Rural Lands Study. The assessment involved identifying environmental and social values within each distinct part of the rural lands.

The landscape area assessment approach establishes how the underlying landform, geomorphology, vegetation and waterform affects the way a landscape looks and feels. This combined with a review of settlement patterns (land use, development, lot sizes), will form the basis of landscape areas (see Figure 56, overleaf).

## Defining landscape areas

Identifying, documenting and capturing the different social and environmental values of landscapes across the Liverpool LGA is one way of acknowledging and protecting the environment for its intrinsic value, while also enabling current and future communities to enjoy the many wellbeing benefits that flow from contact with natural and productive landscapes alike. The diagram below (Figure 56) illustrates how landscape areas may be defined, based on cultural values and observable qualities.

*A landscape area is defined by the unique interplay between several elements that make up how a place looks and feels. This is fundamental to the place-based concept of planning: identifying a place based on its look and feel, and preparing policies that support and enhance that sense of place.*

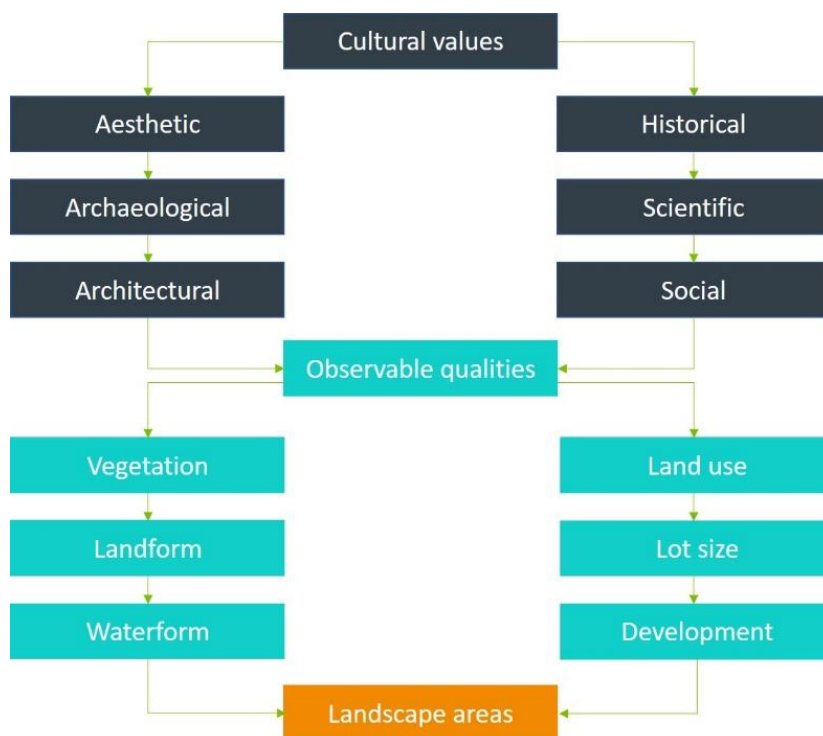
The many benefits of place-based planning and the landscape area approach include:

- conservation of biological values,
- recognition of cultural significance, and
- protection and enhancement of views and vistas that make the Hornsby LGA’s rural areas the iconic places with great local and State significance within NSW and across Australia.

Some places are strongly defined by specific land uses that guarantee and sustain biological diversity. Others (for example) embody an exceptional spiritual relationship of people with nature, and are associated with the minds of the communities with powerful beliefs and artistic and traditional customs.<sup>34</sup>

The cultural values of landscapes may be related to their aesthetic, archaeological, historical, scientific, social, or architectural values, any or all of which could co-exist in the one place. These values may be significant to communities at local, state, national or world (universal) levels.<sup>35</sup>

FIGURE 56: DEFINING AND CHARACTERISING LANDSCAPE AREAS



Source: SGS Economics and Planning, based on various sources, 2019.

<sup>34</sup> United Nations Educational, Scientific and Cultural Organisation (UNESCO).

<sup>35</sup> Heritage Council of Victoria, *Landscape Assessment Guidelines*, 2016. See also: Australia ICOMOS, *The Burra Charter: The Australia ICOMOS Charter for the Conservation of Places of Cultural Significance*, Australia ICOMOS, Canberra, (2013 ed.).

## 6.2 Overview

### Geology<sup>36</sup>

Liverpool City lies within the Sydney Basin Bioregion and Cumberland IBRA<sup>37</sup> sub-region. Geology, landforms and typical soils of the Cumberland subregion include:

- **Triassic Wianamatta Group shales and sandstones.** A downwarped block on the coastal side of the Lapstone monocline. Intruded by a small number of volcanic vents and partly covered by Paleogene and Neogene river gravels and sands. Quaternary alluvium along the mains streams.
- **Low rolling hills and wide valleys** in a rain shadow area below the Blue Mountains. At least three terrace levels evident in the gravel splays. Volcanics from low hills in the shale landscapes. Swamps and lagoons on the floodplain of the Nepean River.
- **Red and yellow texture contrast soils on slopes**, becoming harsher and sometimes affected by salt in tributary valley floors. Pedal uniform red to brown clays on volcanics. Poor uniform stony soils, often with texture contrast profiles on older gravels, high quality loams on modern floodplain alluvium.

### Vegetation

The Cumberland subregion contains the Cumberland Plain, a broad shale basin in Western Sydney. The biodiversity of the shale basin is distinctly different from that of the surrounding sandstone vegetation.

Only about 25 per cent of the original vegetation cover in Liverpool remains (Figure 21), and much of this remaining vegetation is significantly degraded.<sup>38</sup> Riparian vegetation provides important ecological corridors connecting vegetation in the upper catchments through to the Nepean and Georges Rivers.

### Waterways and catchments

Liverpool is located in the catchments of the Georges and Nepean Rivers. The Georges River flows north from the Dharawal and Heathcote National Parks, before it turns south east at Chipping Norton towards Botany Bay. Its catchment flows through a varied landscape from the steep heavily wooded upper reaches near Appin to the urban areas of the lower reaches in the South District.

Woronora Dam, on the upper reaches of the Woronora River, a tributary of the Georges River, is part of Greater Sydney's drinking water supply network. The Nepean River is part of the Hawkesbury–Nepean River catchment, the largest catchment in the Sydney Basin.

At the top of this catchment, the Wollondilly River joins with the Coxs River at Lake Burragorang and flows as the Warragamba River until the Nepean River confluence. From this point, the Nepean River flows through until its confluence with Grose River, after which it is named the Hawkesbury River. The main tributaries of the Nepean River also commence in the Dharawal and Heathcote National Parks.

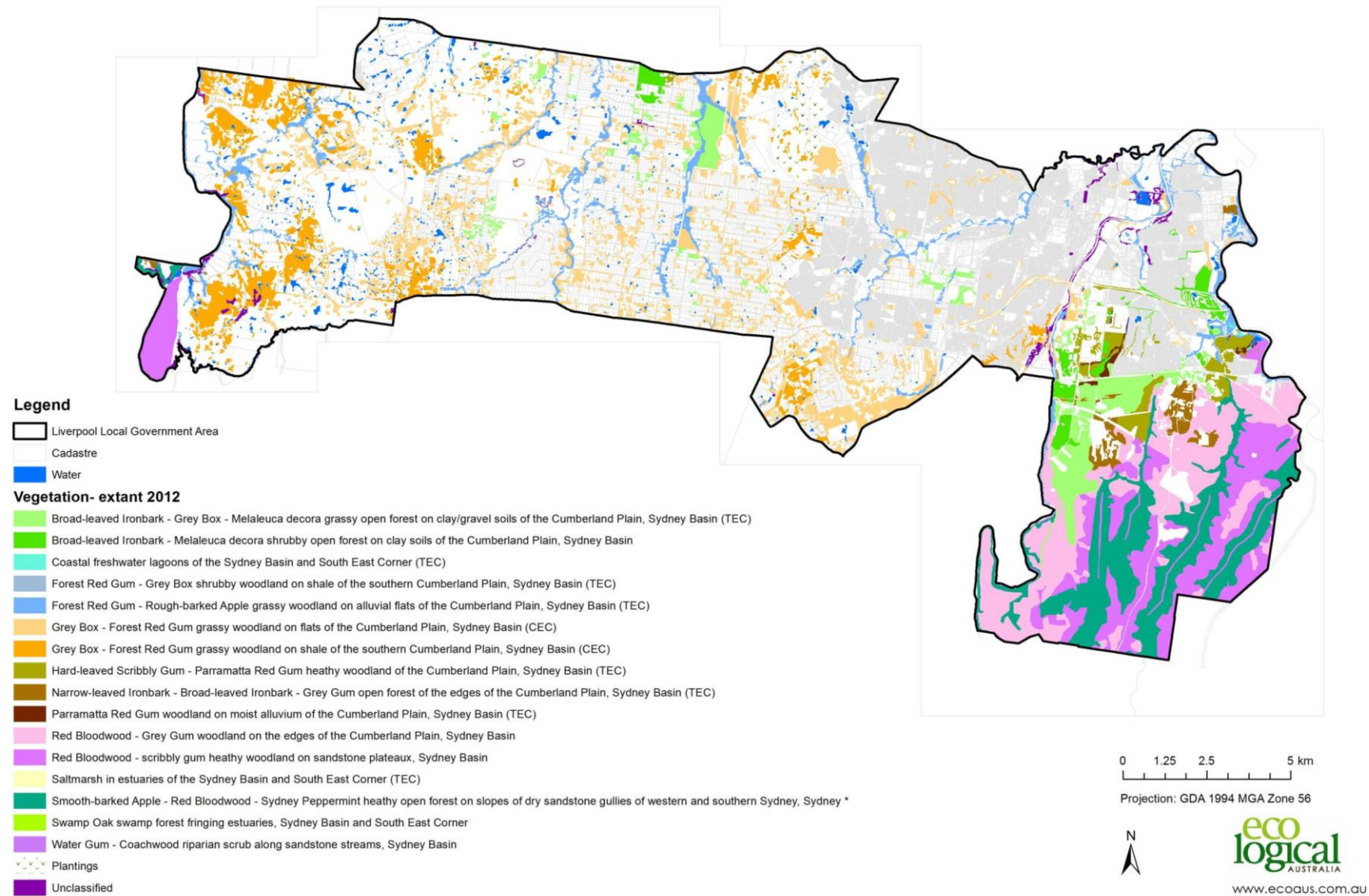
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<sup>36</sup> <https://www.bioregionalassessments.gov.au/assessments/11-context-statement-sydney-basin-bioregion/1121-physical-geography>

<sup>37</sup> Interim Biogeographic Regionalisation for Australia (SEWPaC, 2012)

<sup>38</sup> Liverpool Biodiversity Management Plan 2012

FIGURE 57: VEGETATION COMMUNITIES OF LIVERPOOL CITY

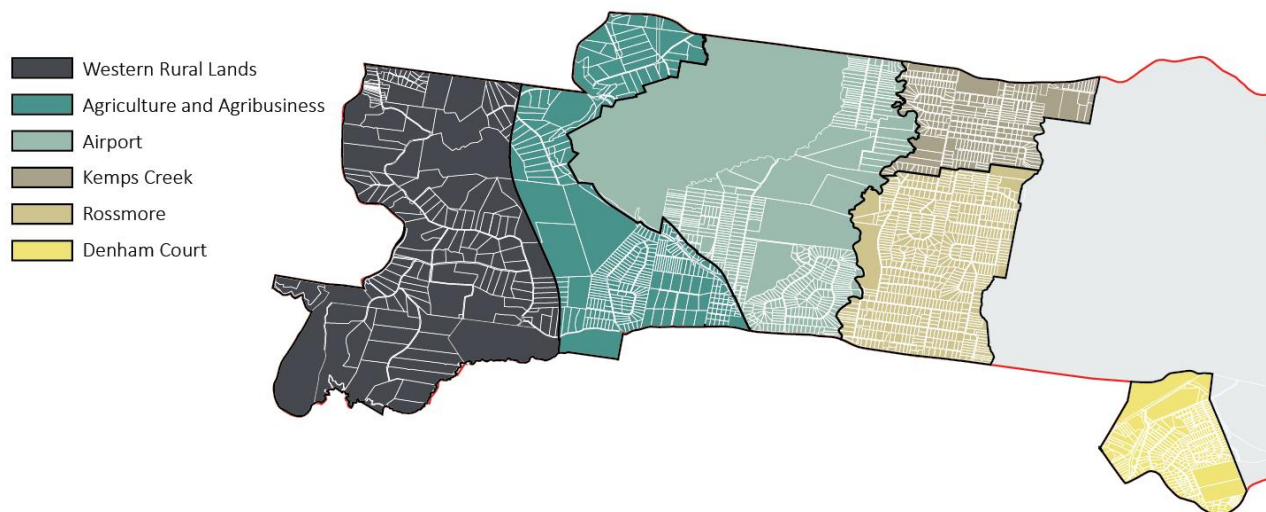


Source: Prepared by RMCG, 2020.

## 6.3 Rural landscape precincts

The rural precincts in Liverpool are:

FIGURE 58: RURAL PRECINCTS



Source: SGS Economics and Planning, based on Liverpool City Council, 2019.

## 6.4 Denham Court

### Description

The Denham Court precinct is generally bounded by the Hume Motorway, Camden Valley Way, Denham Court Road and the South West Rail Link.

Rural land use is predominantly rural residential with well-established homes, significant fences and gardens planted with a mix of native and exotic plant species. Other uses include the Edmondson Regional Park, the Forest Lawn Memorial Park and a number of churches and commercial and retail services on Camden Valley Way. No agriculture was evident.

A rural residential estate in the northern part of the precinct (Cubitt Drive, Culverstone Avenue) and the Upper Canal System or Southern Railway Aqueduct) – gravity water supply for parts of Sydney runs north to south through the precinct.

### View lines and vistas

Long views of the Sydney CBD from properties along Huntingdale Road are afforded by the precincts elevated position. The land is gently undulating and the precinct forms the upper catchment of the Cabramatta Creek.

### Land ownership and characteristics

- Rural land is zoned RU1 – Primary Production and RU2 – Rural Landscape.
- Lots in the precinct are either small, less than 2 ha or between 2 and 10 hectares.
- Land within the RU1 and RU2 zone is being used for rural residential.

### Policy directions from State (including WSAP) and local plans.

- Identifies this area as having a strong scenic character, which should be protected.
- In the northern and western parts of the precinct, some land is identified as a growth area (north-west of Camden Road).
- Further land fragmentation should be discouraged, to protect scenic qualities and due to servicing constraints.



- The topography and scenic qualities across Denham Court vary, and in 2010 land zoning and minimum lot sizes were amended to reflect this; minimum lot sizes vary from 40-120 ha (Camden Road), 1-2 ha in the southern and eastern portions.

### Issues and opportunities

- Mismatch in zone and land use, particularly RU1
- Continued and expanded rural residential with potential for further subdivision of larger lots.
- Land along the Nepean River and other creeklines throughout this area is identified as Environmentally Significant.

FIGURE 59: RURAL RESIDENTIAL USES DENHAM COURT



Source: RMCG, 2019.

## 6.5 Kemps Creek

The Kemps Creek precinct is bounded by Elizabeth Drive, Kemps Creek, South Creek and Fifteenth Avenue. The land is flat. Remnant vegetation is retained along Kemps Creek and South Creek providing linkages between small reserves and stands of remnant vegetation. Land use is a mix of annual horticulture and rural residential. Annual horticulture is mainly undertaken as protected cropping including under plastic tunnels and shade structures both as hydroponic and soil-based production systems.

Land capability is predominantly Class 4 with water for irrigation supplied from the reticulated potable water supply network.

Rural residential properties range from well-established homes, significant fences and gardens planted with a mix of native and exotic plant species to simple homes amongst unimproved pasture through to homes amongst abandoned protected cropping structures.

### Land ownership and characteristics

- Rural land is zoned RU4 – Rural Small Holdings.
- Lots in the precinct are mostly between small between 2 and 10 hectares with some clusters of lots under 2 ha.

FIGURE 60: RURAL USES KEMPS CREEK: RURAL RESIDENTIAL, MUSHROOM FARM, PLASTIC TUNNELS (PHOTOS GOOGLE EARTH, HYDROPONIC LETTUICES)



Source: RMCG, 2019.

### Policy directions from State (including WSAP) and local plans.

- Local plans identify the Kemps Creek precinct as being inside the Western Sydney Aerotropolis boundary.
- In the WSAP Structure Plan, Kemps Creek is shown as *flexible employment* land. The vision imagines Kemps Creek as a future business and mixed use employment precinct, connected to residential communities in the south, the Aerotropolis Core, the airport and other centres like Liverpool CBD. No residential uses are proposed due to potential noise impacts from the airport.
- Despite the long-term vision identified for Kemps Creek, the WSAP identifies it as a non-initial precinct for detailed planning. This means that the current suite of LEP zonings will continue to apply in at least the short- and medium-term while planning and other actions for other initial WSAP precincts commence. The current zoning will be retained until a more detailed precinct plan for Kemps Creek is developed (timeframe unknown).

- In the 2012 Rural Lands Study, strategies were to limit further fragmentation by preserving minimum lot sizes from the LEP 2008 (10-40 ha).
- This precinct is in the *Western Sydney Priority Growth Area*, but now covered by the WSAP draft structure plan.

### Issues and opportunities

- Rural residential development and conflict with agriculture, particularly intensive agriculture.
- Rural residential development driving land use change and competition with agriculture.
- Fragmented land ownership patterns with predominantly 2-3 ha parcels per ownership.
- Land along creeklines throughout this area is identified as Environmentally Significant.

## 6.6 Rossmore

The Rossmore precinct is bounded by Fifteenth Avenue, Kemps Creek Bringelly Road and South Creek. The land is flat. Remnant vegetation is retained along Kemps Creek and South Creek providing linkages between small reserves and stands of remnant vegetation. Land use is a mix of annual horticulture, hobby farming and rural residential. Annual horticulture is mainly undertaken as protected cropping including under plastic tunnels and shade structures both as hydroponic and soil-based production systems.

Land capability is predominantly Class 4 with water for irrigation supplied from the reticulated potable water supply network. Rural residential properties range from well-established homes, significant fences and gardens planted with a mix of native and exotic plant species to simple homes amongst unimproved pasture through to homes amongst abandoned protected cropping structures.

### Land ownership and characteristics:

- Rural land is zoned RU4 – Rural Small Holdings.
- Lots in the precinct are mostly between small between 2 and 10 hectares with some clusters of lots under 2ha.
- Land is mainly held as single lots.

### Policy directions from State (including WSAP) and local plans.

- Identifies Rossmore as part of the Western Sydney Aerotropolis, and does not identify specific future directions for the precinct.
- Strategies identified in the 2012 Rural Lands Study were to prevent limit further subdivision/fragmentation of land due to the impending *South West Growth Corridor* plans; it is now covered by the WSAP extent.
- The WSAP shows Rossmore as being a residential and mixed use area.
- Rossmore is identified as a non-initial precinct in the WSAP, meaning detailed planning for this area (and rezoning) will take place over the longer-term.
- In the Aerotropolis Structure Plan, Rossmore is shown as future urban land.

### Issues and opportunities

- Rural residential development and conflict with agriculture, particularly intensive agriculture.
- Rural residential development driving land use change and competition with agriculture.
- Land along creeklines throughout this area is identified as Environmentally Significant.

FIGURE 61: HOBBY FARMING (CATTLE GRAZING, GOATS) AND HYDROPONIC LETTUCES



Source: RMCG, 2019.

## 6.7 Airport Precinct

The airport precinct is generally bounded by South Creek, Bringelly Road, Elizabeth Drive and the Northern Road. The topography changes east to west from flat to gently undulating to undulating. Remnant vegetation is concentrated along Badgerys Creek and South Creek providing linkages between small reserves and stands of remnant vegetation. Annual horticulture, soil-based and protected cropping is clustered in the north east of the precinct around Lawson Road and in the south between Badgerys Creek Road and Mersey Road.

Land capability is predominantly Class 4 with water for irrigation supplied from the reticulated potable water supply network. There is evidence of transition with some abandoned protected cropping structures.

A rural residential estate is located off Bringelly Road along Kelvin Park Drive. The remaining land is less intensely developed with a mix of livestock grazing, extractive industries, waste processing (Boral site). The Defence Forces and the future airport are major land uses in the precinct occupying significant land area.

There is significant land use change associated with the airport development including new road and light rail infrastructure.

### Land ownership and characteristics:

- Rural land is zoned RU1 – Primary Production and RU4 – Rural Small Holdings.
- Lots in the precinct are mostly between small between 2 and 10 hectares with some clusters of lots under 2ha.
- There are a number of large lots, in the centre of the precinct.
- Land is mainly held as single lots.

### Policy directions from State (including WSAP) and local plans.

- In the 2012 Rural Lands Study, the Airport Precinct was made up of Badgerys Creek and Bringelly.
- Identifies Badgerys Creek and Bringelly as part of the Western Sydney Aerotropolis, and does not identify specific future directions for the precinct.
- For Bringelly, the land was identified as having soils optimal for agriculture, and relatively free from ANEF noise exposure, and extractive industry (SEPP 9), flooding and environmental significance constraints. A new 10 ha minimum lot size was introduced to prevent further land fragmentation.
- For Badgerys Creek, the plan identified most land is owned by the Department of Infrastructure and Transport. The soil in this area has high agricultural capability, and a rezoning proposal was not supported under the 2012 RLS. Some lots also contained extractive industries. A strategy to avoid land fragmentation was also intended to preserve precinct planning for the *Western Sydney Priority Growth Area* (now covered by the WSAP).
- Badgerys Creek is identified as an initial precinct to be planned in the shorter-term under the WSAP; this area will support airport operations and the Aerotropolis Core.

### Issues and opportunities

- Airport development, infrastructure development, residential and rural residential development conflict with agriculture
- Development is driving land use change and competition with agriculture.
- A significant proportion of this area is affected by the ANEF noise contours.
- Land along creeklines throughout this area is identified as Environmentally Significant.

FIGURE 62: INFRASTRUCTURE UPGRADES AND AIRPORT DEVELOPMENT



Source: RMCG, 2019.

## 6.8 Agriculture and agribusiness precinct

The agriculture and agribusiness precinct (now, Agribusiness Precinct and Dwyer Road in the Western Sydney Aerotropolis Plan) is generally bounded by the Northern Road, Greendale Road, Duncan Creek and Elizabeth Drive. Land in the precinct is undulating to gently undulating and land use is mainly broadacre agriculture including grazing and dairy. Significant landholders include Leppington Pastoral, which operates a large dairy (around 2,000 cows) and the University of Sydney which operates the Camden-John B Pye, Wolverton and Coates Park Farms.

A rural residential estate is located in the south east corner of the precinct. Other land uses include livestock grazing and intensive agriculture (poultry). Remnant vegetation is concentrated along waterways, gullies and some ridge tops.

Land capability is predominantly Class 4 in the southern part of the precinct, though water for irrigation is not available. Land capability is generally Class 6 in the northern parts of the precinct.

### Land ownership and characteristics:

- Rural land is zoned RU1 – Primary Production and RU4 – Rural Small Holdings.
- Lot sizes range between 10 ha and over 100 ha.
- Land is mainly held as single lots.

### Policy directions from State (including WSAP) and local plans.

- The 2012 Rural Lands Study examined Luddenham and part of Wallacia within the now Agriculture and Agribusiness precinct.
- Identifies Luddenham as part of the Western Sydney Aerotropolis.
- Half of Luddenham is owned by the Commonwealth Government.
- In the 2012 RLS, strategies for Luddenham were to investigate expanding R5-zoned residential areas south of Adams Road once the government has reduced the ANEF extent and continue to advocate for future land use options working with the State and Federal government around the airport.
- For Luddenham village, strategies were to contain the town within the existing R2 boundary, due to the ANEF noise contours nearby, servicing (sewerage) limitations, and to preserve the scenic qualities of the area.
- In the 2012 RLS, strategies for Wallacia were to continue to advocate for removal of ANEF noise controls in this area, to retain the agricultural potential of land along the Nepean River (by retaining the RU1 zoning) and retain the RU4 zoning.
- Under the 2019 WSAP, this area contains the Agribusiness Precinct, and a new sub-precinct: the Dwyer Road Precinct. The Dwyer Road precinct was formerly part of the Agribusiness and Agriculture precinct, which has now been reduced in area to form the Agribusiness Precinct. The vision for Dwyer Road is to become a “flexible employment precinct adjacent to the major economic centre of the Aerotropolis Core and the Airport.”
- For the Agribusiness precinct, the WSAP vision is to provide the “long-term retention and growth of agribusiness and intensive plant-based agriculture in the Aerotropolis.” It is envisaged that this precinct will “act as a catalyst for agricultural exports from the region and support the existing rural landscape.”
- For the Dwyer Road precinct, flexible employment is envisaged; while “precinct planning will acknowledge the existing rural village character of Bringelly and support current agricultural operations.”

### Issues and opportunities

- Airport development, infrastructure development, residential and rural residential development conflict with agriculture
- Development is driving land use change and competition with agriculture.
- A significant proportion of Luddenham and Wallacia are affected by the ANEF noise contours.
- Land along creeklines throughout this area is identified as Environmentally Significant.

FIGURE 63: CATTLE FEEDLOT



Source: RMCg, 2019.

FIGURE 64: CATTLE GRAZING



Source: RMCG, 2019.

FIGURE 65: LEPPINGTON PASTORAL DAIRY FARM



Source: RMCG, 2019.

## 6.9 Western rural lands

The western rural lands precinct is generally bounded by Greendale Road, Park Road and the western and southern boundaries of the LGA. The topography of the precinct varies with flat to gently undulating land associated with the floodplain of the Nepean River and more steeply undulating land between the Nepean River and Burragorang State Park.

Land uses include annual horticulture on the Nepean River flats, livestock grazing and poultry. Remnant vegetation is concentrated along waterways, gullies and some ridge tops. Bents Basin State Conservation Area is located within the precinct. Land capability ranges from Class 7 through Class 1. Class 1 soils are found on the floodplain of the Nepean River.

This land is also able to access water for irrigation from the Nepean River. Elsewhere the topography and soils generally limit agricultural uses to broadacre grazing and intensive animal husbandry.

The small township of Wallacia is located in the north west corner of the precinct. This precinct retains a rural feel associated with the larger farm holdings and predominantly rural uses.



### Land ownership and characteristics:

- Land zones: RU1 – Primary Production, RU4 – Rural Small Holdings.
- Lot sizes range between 10 ha and over 100 ha.
- Land is mainly held as single lots.

### Policy directions from State (including WSAP) and local plans.

- The 2012 Rural Lands Study examined Greendale and part of Wallacia within the now Agriculture and Agribusiness precinct.
- Identifies Wallacia and Greendale as rural/agricultural land that needs to be protected.
- In the 2012 Rural Lands Study, strategies for Greendale were to limit development potential and retain large minimum lot sizes (40 ha), to protect agricultural land use patterns (including for equine uses), and extractive industry activity.
- In the 2012 RLS, strategies for Wallacia were to continue to advocate for removal of ANEF noise controls in this area, to retain the agricultural potential of land along the Nepean River (by retaining the RU1 zoning) and retain the RU4 zoning.

### Issues and opportunities

- A significant proportion of Greendale and Wallacia are affected by the ANEF noise contours, with the exception of land to the south towards Bringelly Creek.
- Land along the Nepean River, the Gulguer Nature Reserve and other creeklines throughout this area is identified as Environmentally Significant.
- Areas of scenic quality exist on land at the end of Wolstenholme Avenue and Orient Road due, to its slope and high level of visibility.
- Land within Bents Basin National Park is also of high conservation significance.
- Greendale possesses some of the largest landholding within the local government area with many properties in excess of 40 hectares.
- Lots sizes in the northern section range significantly from around 10 hectares (along Greendale Road and Wolstenholme Road) to over 100 hectares.

FIGURE 66: ANNUAL HORTICULTURE, NEPEAN RIVER FLOODPLAIN



Source: RMCG, 2019.

# 7. SUMMARY AND RECOMMENDATIONS

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This section highlights key findings and sets out principles for any future planning to occur in Liverpool's rural area. It also identifies place-based recommendations for each rural precinct, using the landscape areas reviewed in Section 6.

## 7.1 Summary

State government planning policy sees the Aerotropolis as Western Sydney's future economic heart. This will see the area transform in the years to come. The Western Sydney City Deal commits to the Aerotropolis and this deal is intended to spur on economic activity from businesses wishing to invest early. The population of Liverpool LGA is also set to increase by 70 per cent between 2019 and 2041, although most population growth is forecast to occur in growth area suburbs (and not in the rural or Aerotropolis areas). The number of homes within Liverpool's urban areas is projected to increase by 99 per cent between 2016 and 2041.

In the urban area, the key economic strength is Liverpool's existing population serving industries: health care and social assistance, and retail. Generally, health and education jobs are forecast to be the largest growing across Australia; and many of these new jobs will also occur in Liverpool.

Agriculture is a key strength in the rural areas of Liverpool. In the rural area there are a high number of Mushroom and Vegetable Growing jobs, particularly in Rossmore. Greendale has a mix of agricultural activities including Dairy Cattle Farming, Poultry Farming and Mushroom and Vegetable Farming. There is also a high presence of Poultry Processing jobs in East Badgerys Creek. These two industries are projected to grow into the future.

Meanwhile, the Aerotropolis is expecting high and diverse job growth. Industries such as retail trade, transport, postal and warehousing, professional, scientific and technical services and accommodation and food services are projected to grow in South Luddenham and Greendale significantly, while eastern rural Liverpool will see continued growth primarily in construction and agriculture, forestry and fishing.

Large scale investment and planned change aside, Liverpool is facing a number of existing opportunities and challenges. Liverpool has an important agricultural sector that significantly contributes to the Sydney Basin food industry. Poultry, mushrooms, nursery, tomatoes, cut flowers, lettuces and strawberries from Liverpool make a significant contribution to overall regional supply. Bearing this in mind, implementation of the Liverpool Rural Lands Study should involve regional collaboration with adjoining peri-urban councils, for example via the Sydney Peri-Urban Network (SPUN), with Parramatta, Wollondilly and Camden LGAs, to reflect the fact that Western Sydney's productive landscape crosses many local government boundaries.

Liverpool's more agriculturally productive land in the horticultural precinct, is highly fragmented, however, and abuts the edge of the residential growth corridor coming from the east (Kemps Creek, Badgerys Creek and Rossmore). The more rural land to the west, although less fragmented and less under pressure from residential encroachment, is also less agriculturally productive (Wallacia and Greendale).

In support of this, the WSAP emphasises that the rural land around the Aerotropolis Agribusiness precinct should be protected for its ongoing use for industry and agriculture into the future, with uses that complement the Agribusiness precinct and/or benefit from their proximity to the airport (in some areas).

The rural lands of Liverpool also have immense intrinsic value to the environmental and visual landscape. The LGA sits within the catchment of the Georges and Nepean Rivers, and the Nepean River forms the western boundary of Liverpool. There are many waterways and rivers recognised for their environmental significance as green and blue corridors across the LGA; and there is opportunity to further recognise these as places that showcase Liverpool's rural and natural landscapes. Intensification of the rural areas (by industry or residential development) will risk detriment to the natural vistas. It also risks environmental harm caused by elements such as nutrient run off or construction pollutants.

A tension therefore exists between retaining current environmental, social and economic values and respecting the environmental and cultural heritage constraints while allowing the region to transform into an Aerotropolis in the future. The Greater Sydney Region Plan and Liverpool LSPS contain objectives and actions that recognise the importance of retaining the environmental, social and economic values of the rural area. They also acknowledge that managing the rural areas and evolving the city within the outstanding natural and scenic landscapes is critical to the future success of the region, and that there are recreational and tourism opportunities to be realised.

State policy states the natural and scenic landscape functions of rural areas are to be protected and enhanced for their intrinsic value; there is a real opportunity for the landscape values identified in Chapter 6 of this Study to underpin further work for Council and the State government to enhance, protect and promote those values. This is especially important in the Western Rural Lands, given the scale of change forecast for current rural places that will transform to become Aerotropolis precincts.

The Liverpool LEP permits a range of non-agricultural uses including dual occupancies, which allows for greater residential intensification on RU1 and RU4 zoned land. In the context of preserving rural activities in the Western Rural Lands, and managing transition to Aerotropolis uses, this flexibility may lead to greater residential and agricultural land use conflicts, against the core purpose of those zones. There is a need for Council to clarify its vision for the long-term of the Western Rural Lands in this context, and adjustments to land uses permitted under the zones could be explored further. To guide Council, this Section sets out planning principles for the rural area, alongside precinct-specific or place-based recommendations that could inform changes to the LEP. The vision should also be informed by community values identified in the Liverpool draft LSPS, including for a *clean, green, safe, sustainable and vibrant* Liverpool.

The Liverpool Rural Land Study is Liverpool City Council's response to balance and manage these tensions across the rural area. For Council, the long-term future of rural lands outside the Aerotropolis is also a crucial consideration, alongside managing current uses in precincts like Kemps Creek, Rossmore and Dwyer Road where the timeframe for precinct planning is very uncertain. The section below suggests how the path between these outcomes and the way Rural Lands are currently operating, could be navigated.

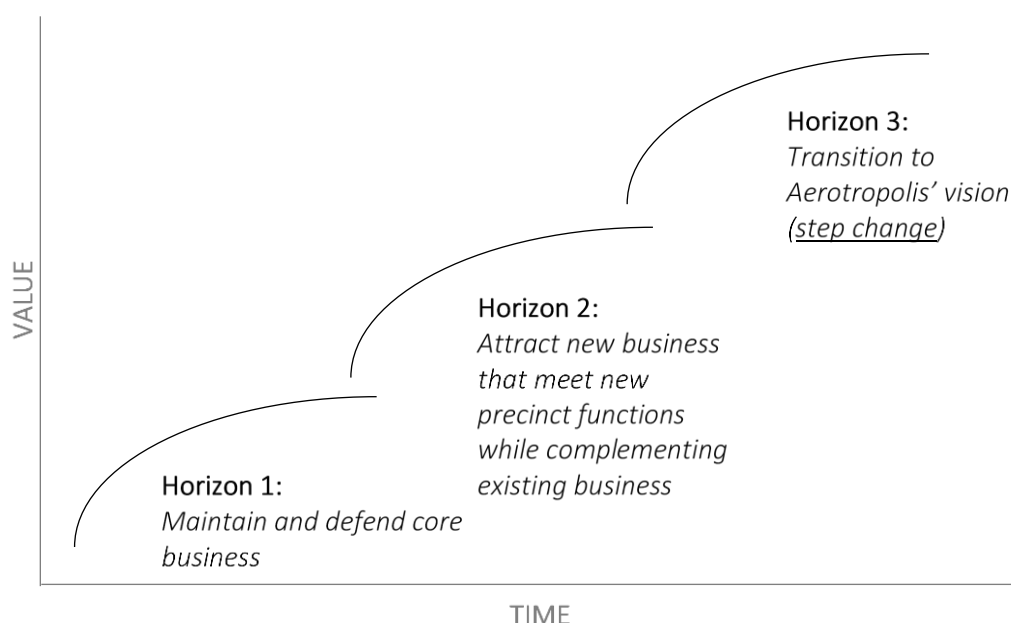
## 7.2 Future directions

The Three Horizons framework is a concept developed by McKinsey to explain the evolution of businesses that seek to retain market presence and relevance. In summary:

- **Horizon One** is what an organisation is currently doing as core business
- **Horizon Two** are emerging opportunities aligned with these core skills that a business may seek to take advantage of, and
- **Horizon Three** is entirely new business.

This framework has relevance to the Liverpool Rural Lands Study and can be used as an organising principle to guide planning for Liverpool's rural area, in the context of the Aerotropolis transition both within and outside the WSA structure plan area, over the short, medium and long-term.

FIGURE 67: THE THREE HORIZONS FRAMEWORK



Source: SGS Economics and Planning, adapted from McKinsey.

### Applying the approach using place-based planning

The Three horizons framework applies at a Western City scale, with the Western Sydney Airport and Aerotropolis providing the catalyst for the region to undergo a step change in role, function and economic contribution. Liverpool's rural lands contribute to this through their partial identification as an Agribusiness Precinct in the WSAP. However, there are significant parts of Liverpool's rural lands that are separate from this transformation process and should be considered at a different scale.

Although the Three horizons framework has a linear approach, planning for Liverpool's rural area in the context of the Aerotropolis should occur in an iterative way. This will involve close collaboration with the Western Sydney Planning Partnership, to ensure Liverpool's local rural economy can remain productive for food production, employment, and as an area that houses several important uses to support the broader city's functioning.

Each step of the approach may take different directions, and could be based on further planning to identify clear visions for each of the rural precincts over the timeframes specified. The basis of such a precinct approach is set out in the place-based recommendations for each landscape area, in Section 7.4. The Greater Sydney Commission's concept of place-based planning is an excellent opportunity to envisage different outcomes based on scenic landscape qualities for each part of the rural land, as outlined in Chapter 6.

This would enable Council to clearly articulate its views for places where there is greater uncertainty in the current draft WSAP, for example Kemps Creek, Rossmore and Dwyer Road. It would also enable Council to leverage infrastructure and investment to elevate other outcomes (such as scenic landscape protection, enhanced tourism activity, biodiversity conservation and innovative land management practices) in the Western Rural Lands precinct.

*The Three Horizons framework is a useful way of articulating how change may take place over time and what interventions may need to occur in order to realise these changes. It is important however to recognise that it may not be desirable for a certain land use to transition. In that light, certain precincts may intentionally not evolve beyond horizon one of two.*

The rural areas outside of the Agribusiness, including Kemps Creek, Rossmore and Dwyer Road (identified for non-initial planning) precinct should, in the short to medium term, perhaps not proceed past Horizon One. That is, their role is to defend what they currently have, especially seeing the agribusiness precinct is likely to target intensive agriculture and food production uses. It is recommended that Council planning seek to maximise flexibility for these precincts to continue to function as rural places, maximising people's opportunities to reinvest in local business important for the Liverpool economy. Without certainty around timing for both the initial and non-initial precincts in the WSAP, land and business owners will be less likely to do so.

Over time, these lands may extend toward Horizon Two, but only insofar as they may become home to those industries displaced by the Agribusiness Precinct that are not suited to this new agricultural function. Revising and reaffirming a place-based vision for Liverpool's rural lands will be crucial to this process as those values may form the basis of decisions in the LEP and DCP, as well as the key concepts Council can advocate for through the WSAP planning process.

### 7.3 Planning principles

This section identifies principles for Council which apply to all planning decisions made about rural land in relation to the development of the Western Sydney Airport Plan. There two overarching principles that should inform the development and refinement of recommendations.

1. **Exercise caution.** The Western Sydney Airport's full impact on surrounding land use will only be realised as the Airport and wider precinct mature over the coming decades. Where future land uses are not clear in the various precincts (particular non-initial development precincts), caution regarding the nomination of permissible and non-permissible land uses should be applied. There is a real risk that by even nominating certain possible future uses in areas that are long-term development prospects may lead to speculation and land value increases which could have flow-on effects to the viability of existing businesses that may be desirable to retain in the short to medium term. The definition of the Dwyer Road Precinct as permitting flexible employment uses has already signalled a change of use to higher value land uses such as industrial.
2. **Provide sufficient flexibility.** In addition to exercising caution, flexibility should be retained in currently productive rural land uses where development opportunities are considered medium to long term. The allowance of existing land use rights in initial precincts is important, however flexibility could be extended to allowing any rural land use rather than just that currently on the site. As an example, this report identifies that there is the potential for the Poultry industry to disappear from this region over the next 20 to 30 years. If this happens sooner, lots should have the potential to transition to other uses such as protected cropping, if they retain the broad principles of the rural zoning that currently applies.

Beyond these broad principles, there are a number of recommendations that come out of this study.

**Ensure clear visions for non-agribusiness precincts**, based on values in each landscape area, and place-based recommendations identified in this study. It is anticipated that those rural lands outside of the Agribusiness precinct do several things:

- Complement the function of those industries that form part of the agribusiness precinct, as part of the wider area's value chain.
- Retain a 'domestic' or local focus within their existing rural character, with a focus on local markets.
- Retain long term flexibility to adapt to the maturation of the Agribusiness Precinct, as well as the area's wider population growth, through the retention of their current character and land use zoning.
- Reinforce their role and purpose as agricultural areas.
- Be able to adapt to potential future displacement in the Agribusiness precinct for those industries that require a Sydney location (and that can transition operations appropriately – based on soil quality, topography and lot size among other things).

**Provide a clear timeframe for non-agribusiness precincts.** For land in the Aerotropolis not identified for agribusiness uses, including Kemps Creek, Rossmore, Dwyer Road, Bringelly and even Badgerys Creek, a clearer timeframe must be established for the WSAP. More clarity is also needed to allow flexibility for existing uses to maintain, enhance and diversify their agricultural activity to ensure that lots do not spend years in limbo as 'land in waiting', to retain their current productive opportunities as the Aerotropolis matures. An important message for rural zoned land in non-initial precincts will also be to reinforce their role as part of the Metropolitan Rural Area across Greater Sydney while they remain rural. This is reinforced by the Greater Sydney Region Plan and Western City District Plan, which discourage urban development and further fragmentation of rural lands.

**Ensure green and blue grid networks are supported.** There are real opportunities to refocus activities in Wallacia and Greendale, west of the Aerotropolis towards the Nepean River, and along green-blue spines of environmental and landscape significance throughout. As more of the LGA urbanises in the long term, protection and enhancement of biodiverse and scenic landscapes will be more important than ever.

**Consider the wider role of Liverpool in the agribusiness industry.** Liverpool City Council could also leverage its role in the newly formed *Future Food Systems Cooperative Research Centre* and within the *Sydney Peri-Urban Network (SPUN)* to identify key projects that would reinforce and support ongoing agricultural and associated activities, given the importance of supporting and maintaining Sydney's food bowl.

**Examine ways that tourism opportunities could be leveraged while addressing actions from the Liverpool Strategic Planning Statement.** 'Holding the line' for primary production across Liverpool's rural area, alongside support for green and blue grid networks, may expand tourism opportunities in Liverpool, where broader State government planning initiatives are currently focussed on Liverpool's urban areas, and the Aerotropolis. The amenity and intrinsic values offered by natural breaks within the rural area, may drive some demand for a tourism destination on the fringe of urban Sydney. There are opportunities to offer ancillary uses to agriculture that may include conference and accommodation space or restaurants that serve farm-grown produce, which would also be easily accessible from the new airport. Many parts of Liverpool's rural area within and beyond the Aerotropolis precincts are within the Metropolitan Rural Area identified in the Greater Sydney Region Plan, where further subdivision and urban development are discouraged, and will retain this role at least until such time as the WSAP is implemented. It is important to reinforce that non-agricultural uses should be ancillary to the primary agricultural and environmental role of the existing land uses. Any ancillary non-agricultural uses should be managed through local planning policy, to

ensure agriculture as a principal use is retained, and non-agricultural uses add value to core business.

**Establish a clear review and monitoring process.** The scale (both in area and timeframes) of the Aerotropolis’ development means that there is uncertainty about when certain precincts will come online and what their role and industry mix will be. It is important therefore that Council reviews the industry dynamics in the Aerotropolis every couple of years to understand whether the implications for Liverpool’s rural lands is changing. This may change the intended role for certain precincts or reinforce the need for retention.

## 7.4 Place-based recommendations

TABLE 16: PLACE-BASED RECOMMENDATIONS

Rural precinct	Recommendation
Denham Court	<ul style="list-style-type: none"> <li>▪ Review zoning in Denham Court to consider whether the current configuration reflects rural residential land uses, and where important scenic landscape qualities are to be protected</li> <li>▪ As part of that review, reinforce the precinct’s location within the Metropolitan Rural Area, where maintaining rural landscapes and environmental values is an important planning consideration</li> <li>▪ Review minimum lot size to provide limited opportunity for subdivision of larger lots except where this would reduce the scenic qualities or there are servicing constraints.</li> </ul>
Kemps Creek	<ul style="list-style-type: none"> <li>▪ Introduce a policy statement to confirm the primacy of agriculture in the precinct until detailed planning occurs. This should aim to suppress speculative land investment</li> <li>▪ Confirm the timeframes for detailed planning of the area to encourage growers to continue productively farming their land</li> <li>▪ Consider providing for uses that value add to agriculture and leverage its proximity to urban development such as roadside stalls, farmers markets, pick your own</li> <li>▪ Consider a wider range of uses, where land is no longer suited to agriculture, but further land fragmentation should be avoided. Uses may include garden centre, hardware and building supplies, artisan food and drink, eco-tourism, light industry, local distribution premises, research station, resource recovery facility, self-storage units, storage premises</li> <li>▪ Support the proposed WSAP rezoning along Badgerys Creek and South Creek to protect and enhance environmental and landscape values. In that plan, advocate for land uses that are compatible with and ancillary to environmental and landscape protection and enhancement</li> <li>▪ As part of the Rural Lands Study implementation and working with the Western Sydney Airport Authority, consider what development and land use conditions may be required for development in riparian corridors as distinct from the broader rural area</li> <li>▪ Introduce or retain measures that align with right to farm principles, including: <ul style="list-style-type: none"> <li>▪ Allow for heavy vehicle and agricultural traffic movement on local roads</li> <li>▪ Community engagement programs to management expectations of rural living</li> <li>▪ Prevent further encroachment of non-agricultural uses that introduce land use conflict</li> <li>▪ Encourage ‘Good Neighbour’ programs to engage the community and mitigate land use conflicts</li> </ul> </li> </ul>

Rural precinct	Recommendation
Rossmore	<ul style="list-style-type: none"> <li>▪ Consider measures such as rate rebates to encourage landholders to productively use their land</li> <li>▪ Assist growers to secure more affordable water and energy.</li> </ul> <ul style="list-style-type: none"> <li>▪ Introduce a policy statement to confirm the primacy of agriculture in the precinct until detailed planning occurs. This should aim to suppress speculative land investment</li> <li>▪ Consider providing for uses that value add to agriculture and leverage its proximity to urban development such roadside stalls, farmers markets, pick your own,</li> <li>▪ Consider a wider range of uses, where land is no longer suited to agriculture, such as garden centre, hardware and building supplies, artisan food and drink, eco-tourism, light industry, local distribution premises, research station, resource recovery facility, self-storage units, storage premises</li> <li>▪ Support the proposed WSAP rezoning along Badgerys Creek and South Creek to protect and enhance environmental and landscape values. In that plan, advocate for land uses that are compatible with and ancillary to environmental and landscape protection and enhancement</li> <li>▪ As part of the Rural Lands Study implementation and working with the Western Sydney Airport Authority, consider what development and land use conditions may be required for development in riparian corridors as distinct from the broader rural area</li> <li>▪ Confirm the timeframes for detailed planning of the area to encourage growers to continue productively farming their land</li> <li>▪ Introduce or retain measures that align with right to farm principles, including: <ul style="list-style-type: none"> <li>▪ Allow for heavy vehicle and agricultural traffic movement on local roads</li> <li>▪ Community engagement programs to management expectations of rural living</li> <li>▪ Prevent further encroachment of non-agricultural uses that introduce land use conflict</li> <li>▪ Encourage ‘Good Neighbour’ programs to engage the community and mitigate land use conflicts</li> </ul> </li> <li>▪ Consider measures such as rate rebates to encourage landholders to productively use their land</li> <li>▪ Assist growers to secure more affordable water and energy.</li> </ul>
Airport	<ul style="list-style-type: none"> <li>▪ As this is an initial precinct to be planned in the shorter-term under the WSAP, there are no recommendations for this precinct.</li> </ul>
Agribusiness	<ul style="list-style-type: none"> <li>▪ Introduce a policy statement to confirm the primacy of agriculture in the precinct. This should aim to suppress speculative land investment.</li> <li>▪ Confirm the timeframes for detailed planning of the area to encourage growers to continue productively farming their land</li> <li>▪ Consider providing for uses that value add to agriculture and leverage its proximity to urban development such roadside stalls, farmers markets, pick your own,</li> <li>▪ Introduce or retain measures that align with right to farm principles, including: <ul style="list-style-type: none"> <li>▪ Allow for heavy vehicle and agricultural traffic movement on local roads</li> <li>▪ Community engagement programs to management expectations of rural living</li> </ul> </li> </ul>



Rural precinct	Recommendation
	<ul style="list-style-type: none"> <li>▪ Prevent further encroachment of non-agricultural uses that introduce land use conflict</li> <li>▪ Encourage ‘Good Neighbour’ programs to engage the community and mitigate land use conflicts</li> <li>▪ Consider measures such as rate rebates to encourage landholders that productively use their land</li> </ul>
Dwyer Road	<ul style="list-style-type: none"> <li>▪ Introduce a policy statement to confirm the primacy of agriculture in parts of this precinct, and ongoing large-lot residential activity within the R5 zone, until detailed planning occurs. This should aim to suppress speculative land investment</li> <li>▪ Consider preserving and enhancing the landscape character and environmental values of this area as part of the Metropolitan Rural Area, including in parts of the precinct where land is zoned for residential (R5 large lot residential), in keeping with the direction of the Western City District Plan, until such time as the WSAP takes precedence over planning for this non-initial precinct.</li> <li>▪ Within the RU4 and RU1 zoned land, consider providing for uses that value add to agriculture and leverage its proximity to urban development such roadside stalls, farmers markets, pick your own</li> <li>▪ Outside the R5 zone, consider a wider range of uses, where land is no longer suited to agriculture, such as garden centre, hardware and building supplies, artisan food and drink, eco-tourism, light industry, local distribution premises, research station, resource recovery facility, self-storage units, storage premises</li> <li>▪ Along creeklines, protect and enhance environmental and landscape values. Land uses should be compatible with and ancillary to environmental and landscape protection and enhancement</li> <li>▪ Confirm the timeframes for detailed planning of the area to encourage growers to continue productively farming their land</li> <li>▪ Consider measures such as rate rebates to encourage landholders to productively use their land</li> <li>▪ Assist growers to secure more affordable water and energy.</li> </ul>
Western Rural Lands	<ul style="list-style-type: none"> <li>▪ Introduce a policy statement to confirm the primacy of agriculture in the precinct. This should aim to suppress speculative land investment.</li> <li>▪ Retain large minimum lot sizes</li> <li>▪ Consider policy measures to ensure scenic qualities are retained such as avoiding siting of buildings on crests and ridgelines</li> <li>▪ Consider providing for uses that value add to agriculture and leverage its proximity to urban development and natural assets such as the Gulguer Nature Reserve and Bents Basin National Park such roadside stalls, farmers markets, pick your own and farm stay accommodation</li> <li>▪ Introduce or retain measures that align with right to farm principles, including: <ul style="list-style-type: none"> <li>▪ Allow for heavy vehicle and agricultural traffic movement on local roads</li> <li>▪ Prevent further encroachment of non-agricultural uses that introduce land use conflict</li> </ul> </li> <li>▪ Consider measures such as rate rebates to encourage landholders that productively use their land.</li> </ul>

# APPENDIX 1

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## State planning policy context

### Greater Sydney Region Plan and Western City District Plan

#### Greater Sydney Region Plan (2018)

The *Greater Sydney Region Plan* (GSRP) is the NSW Government's plan for greater Sydney. It provides a 40-year vision to transform Greater Sydney into a 'Metropolis of Three Cities': The Western Parkland City, the Central River City and the Eastern Harbour City. The directions from the GSRP set a high-level framework for Liverpool City Council's future strategic planning work; for example, planning for the metropolitan rural area within the LGA boundary.

The Liverpool LGA is in the Western City Region (alongside the Camden, Campbelltown, Penrith, Fairfield, Blue Mountains, Hawkesbury and Wollondilly LGAs). The GSRP identifies the Western Sydney Airport and Badgerys Creek Aerotropolis as the heart of the Western City which will catalyse infrastructure, business and knowledge-intensive jobs. The GSRP vision for the proposed Aerotropolis is that it will be the heart of the Western City; it suggests that the airport will catalyse economic development and job growth within the Western City region.

The GSRP sets out three major landscape types, which apply to the Liverpool LGA:

- Metropolitan Rural Area: farmland, mineral resources, and distinctive towns and villages in rural and bushland settings, and
- Urban Area: Business districts, industrial areas, quiet neighbourhoods, parks and reserves, waterways and local parks.

Land in Liverpool that is designated as a rural area falls predominantly within the 'Metropolitan Rural Area' (henceforth, rural area) in the GSRP, and a series of objectives relate to how this area is planned. The GSRP also identifies key land uses in rural areas: farmland and mineral resources.

The productivity and sustainability sections of the GSRP set directions for the rural area in the Liverpool LGA. Those directions contain policy objectives and actions to recognise the importance of retaining the environmental, social and economic values of the rural area. Many rural areas within the GSRP are located on the urban fringe, at the transition between urban areas and natural areas. The plan recognises that a key peri-urban planning challenge is to balance the impacts and viability of the many agricultural, non-urban and rural services activities that occur in these locations, between:

- agricultural production (food processing and production),
- resource extraction and mining (especially for construction),
- rural residential settlements,
- biodiversity values which have intrinsic ecological importance, and natural, scenic break for people to engage with their local landscapes.

Several directions, objectives and strategies relate directly to planning in rural areas. The direction (productivity) and its associated *Objective 22: Investment in Business activity in centres* identifies rural towns and villages in the Metropolitan area and recognises the role that they play in supporting local economies, as centres for rural industries, tourism, businesses and providing for the community's daily needs:

- Encourage business growth within rural villages, provided the local character is maintained or enhanced.

- Enhance rural towns and villages as important centres for rural industry, tourism, local character and local services.
- Retain local rural or bushland character.

These objectives are explored in more detail in the Western District Plan; outlined below.

### Western City District Plan (2018)

The Western City District Plan (WCDP) is a 20-year strategy, which sets out actions that will guide State and local government activities, providing more detail as to how Liverpool City Council can to implement the GSRP for the Western District. Local strategic planning and amendments to local planning controls in the Liverpool LGA must be consistent with the WCDP. The WCDP guides strategic land use planning for the Western District and sets the parameters for how councils must plan to manage growth and change within each LGA, including in the rural areas.

The WCDP sets key directions, priorities and actions for zoning in the rural areas. Several planning priorities and associated actions in the WCDP relate to the planning of rural areas; those relevant are summarised below.

#### Actions from the Western District Plan

These actions will guide Council planning for tourism and agricultural production in the Metropolitan Rural Area.

##### Action 36

Protect and support agricultural production and mineral resources (in particular, construction materials) by preventing inappropriately dispersed urban activities in rural areas.

##### Action 39

When preparing plans for tourism and visitation, consider:

Protecting heritage and biodiversity to enhance eco-tourism.

#### Planning Priority W8: Leveraging industry opportunities from the Western Sydney Airport and Badgerys Creek Aerotropolis.

Objective 20: Western Sydney Airport and Badgerys Creek Aerotropolis are economic catalysts for the Western Parkland City.

In a major departure from past planning in Liverpool's rural area, Western Sydney Airport was announced in 2016. The WCDP outlines a vision and details about planning for the airport the surrounding Western Sydney Aerotropolis. The planned Western Sydney Airport is located within Liverpool's rural area and is an important part of the wider Western Parkland City. In addition to the Western Sydney Airport and Aerotropolis, the Western Parkland City incorporates the existing centres of Penrith, Campbelltown and Liverpool (Figure 68: Western Parkland City). The new airport will be at the economic centre of the Western Parkland City.

#### Definition of aerotropolis

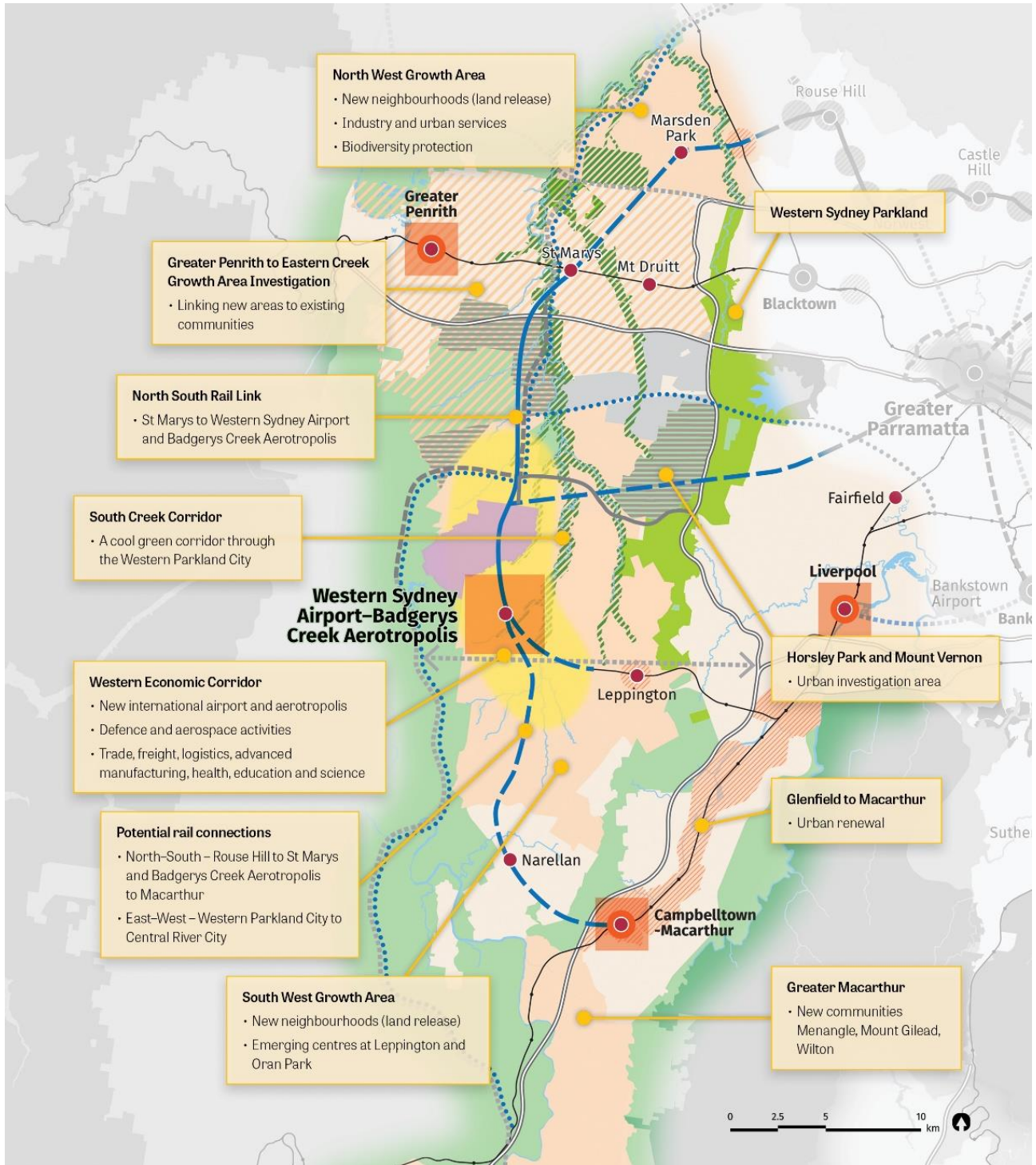
An aerotropolis is defined as "a city or urban area centred around an airport."

The aerotropolis is the catalyst for economic development and metropolitan land use planning for Western Sydney, Liverpool and the NSW Government. The GSRP suggests that the aerotropolis will bring together infrastructure, business and knowledge intensive jobs, centred on the airport and supported by major public transport investment.

*The NSW Government is working towards developing a concept for a potential agribusiness precinct that would look to be located adjacent to the new Western Sydney Airport. This initiative would aim to enhance export capability for farmers in NSW, link agribusiness to new markets, establish capacity for high value intensive agricultural industries, develop facilities to manage biosecurity risk, strengthen agricultural research and education, and help create future jobs and skilled workers to support the precinct and the agricultural sector. (Western City District Plan, p. 75).*

To realise the vision for a Western Sydney Airport, *Western Sydney City Deal* (an Australian Government funding initiative) commitments have been made across all levels of government to facilitate the realisation of this vision. The *City Deal* identifies the airport as a 'collaboration area,' that will be governed by a tri-level governance framework. The *City Deal* will bring together the eight Western City District councils and Blacktown City Council, the NSW Government and the GSC.

FIGURE 68: WESTERN PARKLAND CITY



Source: GSRP, 2018

Objective 24: Economic sectors are targeted for success.

Objective 24 sets out a framework to encourage growing and supporting industry sectors within the Western City District and within the Liverpool LGA. Sited on the alluvial floodplains of the Hawkesbury-Nepean River and several smaller creeks including South West Creek, Liverpool's agricultural lands are an important component of Greater Sydney's food bowl.

The rural area supports several agricultural industries including the production of eggs and poultry, cut flowers, turf and mushroom farms. The agricultural sector in the WCD is supported by a network of education and research and development facilities that focus on agriculture.

**Planning Priority W12: Protecting and improving the health and enjoyment of the District's waterways.**

Objective 25: The coast and waterways are protected and healthier.

The objective emphasises the importance of ensuring that the waterways within the Liverpool LGA and the Western City District are protected and enhanced, through proper land use and development management.

Within the Liverpool LGA, the plan identifies the Hawkesbury-Nepean, Georges River and South Creek as assets that provide important habitats for ecosystems. The plan also recognises the important impact that waterways have on cooling and maintaining the health of biodiversity. Where rural and urban lands intersect, it sets a policy direction that these corridors must be protected.

**Planning Priority W14: Protecting and enhancing bushland and biodiversity.**

Objective 27: Biodiversity is protected, urban bushland and remnant vegetation is enhanced.

The objective outlines the importance of retaining bushland to protect biodiversity and remnant vegetation. The objective suggests that both urban and rural areas have a role in providing habitats. It emphasises that rural areas play a role in minimising the urban heat island effect and are therefore an important asset. The plan suggests that rural and bushland areas be managed through a 'place-based approach,' to ensure that biodiversity is protected, and remnant vegetation is enhanced.

Action 72 identifies Liverpool Council and other State planning agencies as responsible for ensuring that biodiversity is protected and enhanced. State Environment Planning Policies (SEPP) such as *Environmentally Significant Land* (SEPP), *Vegetation in Non-Rural Areas* (applies to some zones that occur in Liverpool's rural area such as Low Density Residential), *Western Sydney Parklands*, and *Georges River Catchment* have stronger influence over biodiversity, ecosystem health and vegetation outcomes than actions in the *Western District Plan*, as they apply to land use and development applications under certain conditions.

#### **Actions from the Western District Plan**

These actions sit under Planning Priority W14 and guide Council planning for development in the Metropolitan Rural Area, and what must be considered.

#### **Action 72: Protect and enhance biodiversity**

Support landscape-scale biodiversity conservation and the restoration of bushland corridors.

Manage urban bushland and remnant vegetation as green infrastructure.

Manage urban development and urban bushland to reduce edge-effect impacts.

**Definition: A place-based approach to planning**

The NSW Government defines a place-based planning approach as “a design-led and collaborative way of examining the complexity of the city by viewing it as a mosaic of different places, each with unique sense of place.”

A place-based approach to planning in the rural areas requires a detailed understanding of how rural areas work, based on input from many stakeholders including the local community. This knowledge is then incorporated into a vision and strategies about how to manage change or protect and enhance valued assets. The vision should be developed with people with local expertise, knowledge and responsibility, including with the local community.

*For this Rural Lands Study, landscape areas will be identified across Liverpool’s rural area.*

Source: Based on the Western City District Plan.

**Planning Priority W16: Protecting and enhancing scenic and cultural landscapes**

Objective 28: Scenic and cultural landscapes are protected.

This planning priority sets a strategic basis for Council to identify, and protect, its scenic and cultural landscapes. It explains that scenic and cultural landscapes are symbols of Greater Sydney and connect the contemporary urban environment with natural and historic landscapes. Their continued protection is important for their aesthetic, social and economic values and for the character of the region. They create a sense of identity, preserve links to Aboriginal, colonial and migrant era heritage and culture, and create opportunities for tourism and recreation. Views and vistas of ridgelines, waterways and the urban skyline help foster distinctive local character and can strengthen an appreciation of Greater Sydney’s landscape.

The rural areas and the Protected Natural Area create a range of attractive visual settings to the north, west and south of Greater Sydney. With rising demand for biodiversity offsets and continuing support for traditional forms of agriculture within the MRA, more opportunities can be realised to protect and enhance natural landscape.

Actions 76 and 77 identify Liverpool Council and other State planning agencies as responsible for protecting and enhancing scenic cultural landscapes. Scenic views must be protected from the public realm.

**Actions from the Western District Plan**

These actions sit under Planning Priority W16 and guide Council planning for development in the Metropolitan Rural Area, and what must be considered.

**Action 76:**

Identify and protect ridgelines, scenic and cultural landscapes, specifically the Scenic Hills, Mulgoa Valley and the escarpments of the Blue Mountains.

**Action 77:**

Enhance and protect views of scenic and cultural landscapes from the public realm.

## Planning Priority W17 Better managing rural areas

Objective 29: Environmental, social and economic values in rural areas are protected and enhanced.

Planning Priority W17 highlights that rural areas play a multifunctional role: they contribute to the agricultural industry, tourism, cultural, extractive industries, landscapes and environmental values.

The policy emphasises that Greater Sydney has enough existing urban land to accommodate housing needs within the current Urban Area boundary, and therefore sets direction to better manage development, and protect scenic qualities, within the rural areas. Importantly, this means the rural areas are not to be seen for potential residential expansion, and their non-urban role and function should be protected. Despite this, the plan emphasises that the Western Sydney Airport will be a catalyst for export within the region.

The plan acknowledges that the Western District's rural areas contribute to habitat, biodiversity, and agriculture. Rural residential development is not supported, unless it can be proven that local character is retained. Liverpool Council and other State planning agencies are identified as being responsible for implementing Actions 69 and 70 (see text box above-right).

Planning Priority W17 contains the following concepts about the role and function of rural areas in greater Sydney; these will inform preparation of the *Liverpool Rural Lands Study*.

- Planning in the rural areas should have a place-based approach (see above), that uses landscape units to help manage environmental, social and economic values, and maximise the productive use of the land.
- Bushland and farmlands are important for the contribution they make to an area's sense of history and character.
- Residential development is not supported in the Metropolitan Rural Area.
- Mineral resources supply construction materials that are vital to building housing infrastructure across Greater Sydney. Local extraction points are of great importance when found in the peri-urban area, to reduce the cost of infrastructure and construction in Sydney.
- It is important to have a plan for rehabilitation and redevelopment of extractive sites once those uses cease.

### Actions from the Western District Plan

These actions sit below Planning Priority W17 and guide Council planning the Metropolitan Rural Area, regarding urban development and desired outcomes.

#### Action 78:

Maintain or enhance the values of the Metropolitan Rural Area using place-based planning to deliver targeted environmental, social and economic outcomes.

#### Action 70:

Limit urban development to within the Urban Area, except for the investigation areas at Horsley Park, Orchard Hills, and east of The Northern Road, Luddenham.



## Western Sydney City Deal

The Western Sydney City Deal is an agreement between the Australian Government, the NSW Government and the eight councils of the Western City District, including Liverpool City Council. The City Deal reinforces the vision for transformative development in Western Sydney set by the *Greater Sydney Region Plan*. It contains commitments from each level of government which seek to facilitate the development of the Western Sydney Aerotropolis, as well as to improve connectivity, liveability, jobs, skills, education, the environment and governance in Western Sydney.

The **Western Sydney City Deal aims to provide over 200,000 jobs** across a range of industries, with development focussed around the Western Sydney Aerotropolis, by 2036. Key aspects of the Deal are:

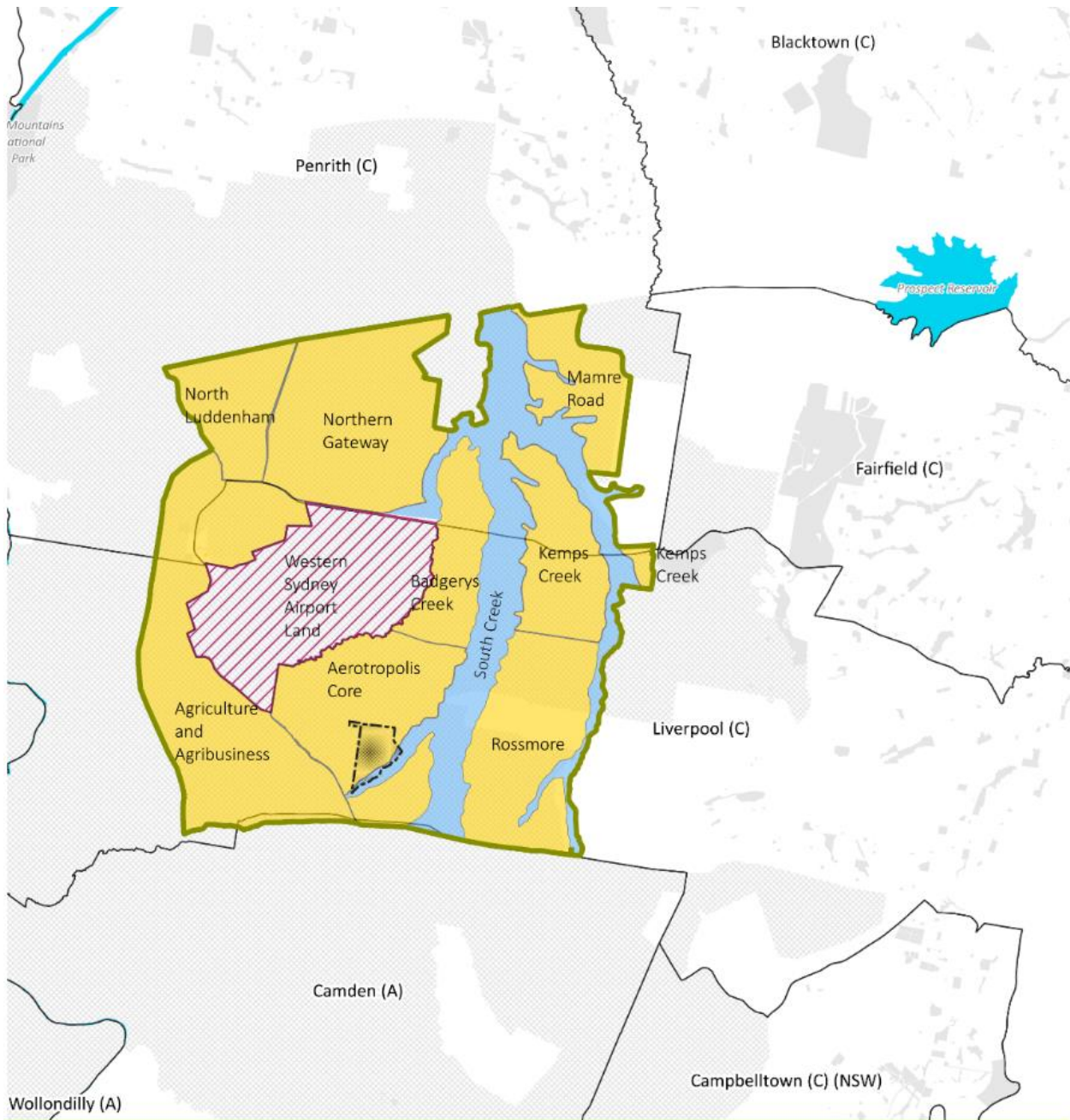
- A STEM University
- High performance secondary schools
- TAFE Skills exchange
- An Aerotropolis Vocational Education and Training
- Sydney Metro Greater West – stage 1 from St Mary’s to Wester Sydney Airport.
- The North-South Rail Link from St Marys to Oran Park.
- Rapid bus between western Sydney Airport, Badgerys Creek Aerotropolis and the North-South Rail Link
- Potential rail connection includes the North-South Rouse Hill to St Marys and Badgerys Creek Aerotropolis to Macarthur
- Train link/mass transit investigation 0-10 years to Campbelltown Macarthur from the Aerotropolis
- An Agri-port at the Aerotropolis (the City Deal sets out the first step for this: to conduct a feasibility study determining the optimum size and location)
- An Aerospace Institute.<sup>39</sup>

The Western City and Aerotropolis Authority was established and committed to by all three tiers of government in March 2018. The authority is tasked with designing and delivering the 114 hectares of Commonwealth-owned land that is located within the Aerotropolis boundary.

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<sup>39</sup>NSWS Government, 2019, ‘Western Sydney City Deal’, <https://www.nsw.gov.au/improving-nsw/projects-and-initiatives/western-sydney-city-deal/>

FIGURE 69: AEROTROPOLIS AND WESTERN SYDNEY AIRPORT GEOGRAPHIC CONTEXT



WSA- Economic and Employment Study

Western Sydney Aerotropolis Context

**Legend**

- Western Sydney Airport
- Local Government Area (LGA)
- Water Bodies
- National Parks
- Rural Area
- Urban Centre and Locality

**Western Sydney Aerotropolis:**

- Aerotropolis Boundaries
- Aerotropolis Precincts
- South Creek (Non-Urban Land)
- Commonwealth Owned Land (Business Park)



Source: SGS Economics and Planning, 2019.

## Western Sydney Aerotropolis

As highlighted in Chapter 2, the Western Sydney Aerotropolis and Airport are being planned under the *Western Sydney Aerotropolis Plan (WSAP)*, released in December 2019. The Plan identifies the location and the structure plan for the proposed Western Sydney Aerotropolis.

The Plan describes the Aerotropolis as a ‘global airport development’ which will catalyse the economic development and support the future population growth in the Western City. The Airport City site will cover 11,200 hectares of land in Liverpool’s rural area.

The WSAP extent spreads to Penrith City Council in the north and Wollondilly Shire Council in the south. The WSAP currently contains high-level structure plans and proposed zoning for precincts across the Aerotropolis. Those plans identify the role and function of each area (presented in Section 2.2 of this document). It emphasises that the Airport City will be leveraged from the nearby metropolitan clusters of Campbelltown, Penrith, Fairfield and Liverpool.

The delivery of the Aerotropolis is being led by:

- Sydney Metro: leading the first part of Stage 1 (the proposed North-South Rail Link).
- New Authority (Western City and Aerotropolis Authority): working with Sydney Metro, State government departments, Liverpool, Penrith and Wollondilly Councils.

Under the City Deal, a Western Sydney Planning Partnership has been established, which includes Liverpool City Council, seven other councils from the surrounding region, the NSW Government and the Greater Sydney Commission. The Partnership is consulting with the Australian Government and is responsible for preparing the rezoning in the initial precincts, that will support the rezoning of remaining precincts in the future. The new Authority will coordinate infrastructure delivery, open space and master planning, alongside Sydney Metro.

Initially the *Land Use and Infrastructure Implementation Plan (LUIIP)* (the previous plan) involved preparation of a new State Environmental Planning Policy (SEPP). As outlined earlier in this document, The SEPP has been drafted, and will impact local land use planning instruments (i.e. LEP and DCP). The Western City and Aerotropolis Authority will govern the Commonwealth Land that falls in the Aerotropolis Core precinct (called the Airport precinct in Liverpool’s 2012 *Rural Lands Study*).

The plan’s vision for governance is:

Every level of planning, development, infrastructure coordination, cross-government collaboration and engagement with landowners, the community and industry, will be underpinned by the plan’s core principles.

The Aerotropolis has an overarching objective to acknowledge the traditional owners of land affected by the WSAP:

### *Recognise Country*

*Acknowledge traditional owners and provide opportunities for Connecting with Country, Designing for Country and Caring for Country in all stages of planning for the Aerotropolis.*

There are four key objective areas in the WSAP, with associated priorities (outlined over the page).

TABLE 17: WESTERN SYDNEY AEROTROPOLIS PLAN: KEY PLANNING PRIORITIES

Direction	Objectives	Priorities relevant to rural lands
<b>Productivity</b>	<ul style="list-style-type: none"> <li>▪ An accessible and well connected Aerotropolis</li> <li>▪ High-value jobs growth is enabled, and existing employment enhanced</li> <li>▪ Safeguard airport operations</li> </ul>	<ul style="list-style-type: none"> <li>▪ Require development up to the 20 ANEC/ANEF contour to adopt appropriate design and construction standards to reduce aircraft noise impacts and prohibit intensification of residential development within the ANEC/ANEF 20 and above contours</li> <li>▪ Require development to accord with the NASF Guidelines.</li> </ul>
<b>Infrastructure and Collaboration</b>	<ul style="list-style-type: none"> <li>▪ Infrastructure that connects and services the Western Parkland City as it grows</li> <li>▪ A collaborative approach to planning and delivery</li> </ul>	<ul style="list-style-type: none"> <li>▪ Adopt a collaborative approach to precinct planning and master planning with all three levels of government, the community, industry and landowners.</li> </ul>
<b>Liveability</b>	<ul style="list-style-type: none"> <li>▪ A collaborative approach to planning and delivery</li> <li>▪ Social and cultural infrastructure that strengthens communities</li> </ul>	<ul style="list-style-type: none"> <li>▪ Celebrate open space areas as places of shared importance to Aboriginal and non-Aboriginal people and maintain important landscapes and views.</li> <li>▪ Acknowledge and celebrate Aboriginal culture, history and heritage, alongside non-Aboriginal heritage</li> <li>▪ Locate health, education, residential and other sensitive land uses away from major road, rail and freight movement corridors</li> <li>▪ Design major streets as green active parkways supporting new technology</li> </ul>
<b>Sustainability</b>	<ul style="list-style-type: none"> <li>▪ A landscape-led approach to urban design and planning</li> <li>▪ A sustainable, low carbon</li> <li>▪ Aerotropolis that embeds the circular economy</li> <li>▪ A resilient and adaptable Aerotropolis</li> </ul>	<ul style="list-style-type: none"> <li>▪ Retain and enhance natural features such as waterways, vegetation and landform and culturally significant landscapes.</li> <li>▪ Retain water in the landscape by maximising permeable surfaces and developing appropriate urban typologies.</li> <li>▪ Orient urban development towards creeks and integrate into the landscape through quality open space, a high degree of solar access and tree canopy.</li> <li>▪ Retain and increase the urban tree canopy and green cover across the Aerotropolis consistent with the Region Plan target of 40 per cent and the Premier’s Priority for Greening our city.</li> <li>▪ Identify and protect scenic and cultural landscapes and develop a street grid based on landforms, with long north– south blocks in urban areas to attain good solar performance, and east–west streets to capture long views to the Blue Mountains.</li> <li>▪ Meet the requirements of the biodiversity conservation program in the Cumberland Plain Conservation Plan and approved strategic biodiversity certification and strategic assessment protecting land with biodiversity value, and provide a sensitive urban interface that supports and enhances corridors and reserves.</li> <li>▪ Retain and protect wetland environments to support plant animal communities and to mitigate wildlife attraction or wildlife strike.</li> <li>▪ Plan for compatible land uses within the floodplain, provide safe evacuation and egress from flood events and consider climate change, culvert blockage and floodplain revegetation.</li> <li>▪ Prohibit cut and fill to alter the 1 per cent AEP flood extent.</li> <li>▪ Design, build and manage flood management assets to benefit native habitat, aesthetics, public recreation and amenity.</li> <li>▪ Protect, maintain and improve the water quality and flow to meet the NSW Government waterway health targets. Protect high value terrestrial and aquatic ecosystems to enhance biodiversity and protect environmental values.</li> <li>▪ Adopt an integrated water management approach that considers urban form and streetscape, trunk drainage land and assets, waterway health and flood management.</li> </ul>

Source: Western Sydney Aerotropolis Plan, 2019.

## Western Sydney Aerotropolis Discussion Paper on the Proposed State Environmental Planning Policy (2019)

A Discussion Paper (released December 2019) for the WSAP provides information about governance arrangements and how to interpret the draft planning policies for the WSAP. The Discussion paper highlights that the Minister for Planning and Public Spaces or the local councils will be the consent authority for development within the Aerotropolis, depending on the nature of the development.

The proposed Aerotropolis zones were reviewed in detail in the previous Chapter (see Section 2.2 and 2.3).

### Precinct planning

According to the discussion paper, precinct planning processes will also incorporate planning for a fuel pipeline to the Airport. Consideration will be given in ongoing planning to appropriate setbacks to the pipeline, suitable adjacent development types and mitigation measures to ensure compatible land use development is planned for; this may also influence rural land uses in the short- to medium-term.

### Private masterplanning

A masterplanning process is included in the WSAP implementation process, which would enable landowners (under limited circumstances) to provide granular details of land use allocation and arrangements across a site. This may lead to the use of other pathways to streamline new land uses and development (e.g. complying development).

According to the Discussion Paper, the existing masterplanning approach will allow “existing rural activities to continue to operate, recognising the longer-term occupation and use of this land for rural-based uses, along with its economic contribution.”

The masterplans would “build on the level of detail shown on the WSAP or relevant Precinct Plan,” but would only be available for sites with a minimum 100 ha.

Importantly for Council, Kemps Creek, North Luddenham and Dwyer Road precincts are exempt from this process.

### Proposed zones

The proposed zones (outlined in the previous chapter) do not contain provision (other than for existing use rights) for agriculture or related rural industries. This effectively means the establishment of new uses in the areas designated for Enterprise (Badgerys Creek and part Aerotropolis Core) and Mixed Use (part Aerotropolis Core) would not be permitted once the draft SEPP zones are adopted. Based on Council’s previous submission to the LUIP Stage 1, this challenges their vision to enable ongoing agriculture to support the local economy in at least the short- to medium-term while Aerotropolis plans are implemented and development commences.

The proposed zones are “closed,” meaning any land use not listed as permitted without consent or permitted (with consent) cannot be applied for, despite any transitional arrangements that could be made otherwise, under a development consent (for example, a time limit on particular uses). This underlines the uncertainty of timing for businesses, as discussed above.

### Existing use rights

Regarding existing use rights, the Discussion Paper states:

*The proposed rezoning will not negatively affect farming operations, including extensive agricultural uses, if such uses have lawfully commenced prior to the commencement of the proposed SEPP.*

The conditions surrounding the draft zones do, however, prevent new rural uses establishing in the planned Enterprise or Mixed Use areas despite uncertain timeframes surrounding implementation and plan realisation. Furthermore, for Kemps Creek, Rossmore and Dwyer Road where the Structure Plan shows these places as urban and mixed use business land, a key challenge to preserving farming operations will be uncertainty around timing for actual rezoning and Precinct Plans to be prepared.

### **Development constraints**

The WSAP Discussion Paper emphasises how the WSA is to be constructed in a greenfields area, creating an urban development zone relatively free from constraints. As a consequence, the precinct planning detail is being progressed using a series of amendments that add detail at each stage.

This is challenging for current landowners and rural activities, as it increases uncertainty around timing and the future designation of land. In the absence of precinct plans for longer-term precincts like Kemps Creek, Rossmore and Dwyer Road, a slow migration of existing land uses may occur as landowners reduce reinvestment in their businesses in the hope of a windfall from rezoning (over an uncertain timescale).

### **ANEF contours**

A key consideration in Liverpool's 2012 Rural Lands Study was the extent of ANEF contours related to airport noise control, and the constraint these contours place on development. Given the proposed 24-hour operation of the planned WSA, the ANEF controls have been made more stringent to ensure residential development beyond the rural area is not impacted. Development within the Aerotropolis precincts has also been designated to avoid disturbance as much as possible and ANEF maps will be updated as the draft WSA SEPP progresses. Due to likely noise pollution, this reinforces the State government's direction towards industrial uses around the airport.

The SEPP Discussion Paper highlights factors related to the airport that may be a consideration for rural land uses, depending on the timing of each precinct:

- glare from artificial light or reflected sunlight
- air plumes from stacks, vents or plumes
- development or construction activities including the use of cranes that extend into prescribed airspace (subject to temporary exemptions operating prior to the commencement of Airport operations)
- development located in the windshear assessment area
- uses that incorporate lighting that could cause distraction to pilots.

### **Liverpool City Council submission to the LUIP (2018)**

Liverpool City Council is part of the Western Sydney Planning Partnership set up to implement the Aerotropolis. As part of the current planning process, Council submitted a response to the form and direction of the *LUIP Stage 1*, raising its views on the economic, environmental and social impacts of the Western Sydney Aerotropolis on the surrounding rural area. Council suggested that their concerns could be addressed with several amendments; the key aspects of their submission are summarised below.

Council supports the:

- economic job growth and the education opportunities that the airport will deliver,
- a mixed-use Kemps Creek precinct which will provide key open space. However, Council advocates for additional east-west corridors to be included in the plan (no east-west links are currently proposed), and
- restoration and investment into the creek tributaries that surround airport.

Council raised the following concerns:

- provision of infrastructure is slow, existing centres that have new rail lines within the LGA have been neglected and left by the State government, and
- the plan should understand what types of land uses will strengthen and support the development of the airport.

Council does not support the planned location for residential development within the Aerotropolis core. It raised the following concerns:

- Plans indicate that residential development is located within the aerotropolis core (1km from the airport); the airport will create negative environmental externalities which may lead to health impacts,
- The suggested location of residential development conflicts with the plan's intention to create a centre that promotes an active and healthy lifestyle,
- the precautionary noise principle should be taken, to ensure that the airport is set back at least 5 kilometres from residential development. This would require removing residential development from the commercial core of the aerotropolis,
- locating residential development away from the airport will also ensure that the airport will be able to expand in the future and not face the challenges currently felt by the Sydney Airport, and
- locating residential development away from the core will also ensure that environmental pollutants are diminished at a higher rate. Poor air quality and traffic congestion would thus be mitigated.

Council suggested that the governance of the plan could be problematic and create a top-heavy framework. It recommended that:

- there must be a clear governance structure,
- the Western Sydney Planning Partnership should be the responsible authority that makes evidence- and place-based development guidelines (for example, establishing the height and density of the new precincts within the aerotropolis),
- clarity be given around planned community consultation processes, as it is currently unclear how this will occur,
- LCC has received feedback from concerned residents who are confused about the community consultation process but doesn't have a clear pathway to engage and advocate for greater community involvement, and
- the department and the Aerotropolis Authority engage with residents who are impacted by the project, particularly in the rural lands.

Other suggestions made to improve the LUIP and the potential airport's impacts:

- the environmental and sustainability of the LUIP could be taken further and that it should be the 'greenest airport in the world,' and
- strong connections to the city should be provided so if the Aerotropolis does not proceed, or does not achieve job growth aspirations, alternative land uses and/or development patterns (including continuing to have a second airport) will be possible.

Council advocated for a precautionary approach to rezoning agricultural land, as:

- agricultural lands contribute to Liverpool's economy,
- the growth of the airport will be slow this will mean that industrial development will happen gradually at the airport,
- agricultural lands in peri-urban areas contribute to providing environmental amenity and resilience in cities, and
- rural lands can be used a 'holding zone' as they are compatible with airport operations; ensuring that agricultural jobs are supported in the shorter-term, and that there is flexibility in the future.

## How the plan addresses Council's comments

Council raised concerns in a previous submission. Council did not support that there were:

- No east west links in the plan.
- Response: the blue and green corridor. Do not link the east and west in the draft WSAP (2019).
- That the uptake of infrastructure was slow.
- Response: Commitments made by the state government suggest that infrastructure delivery will remain slow. Potential transport corridors such as connections to Macarthur and Campbelltown are mentioned in policy. The Liverpool City Council prefers a FAST Corridor. The government has not committed to providing this infrastructure.
- That residential development is planned for the Aerotropolis Core.
- Response: Residential development is planned for the aerotropolis core. The plan emphasises that significant residential development capacity in adjoining areas outside of the aerotropolis will mean that residential development will not occur within the short to medium term. Further the plan suggests that there will be a total of 8,000 homes at full development. The land use table suggests that residential development will be in the form of medium density housing, mixed use buildings and residential flat buildings.
- The governance of the plan is lacking.
- Response: The governance of the plan remains the same. The department and the Aerotropolis authority are the primary actors who engage with residents who are impacted by the project, particularly in the rural lands.
- That Environmental sustainability is lacking.
- The environmental sustainability of the plan is focused around the Wianamatta – South Creek precinct that will form a clear north south blue green corridor. Clear linkages to the east and west through a blue green corridor are not identified in the plan.
- The plan commits to NSW net zero emissions target. This target means that the aerotropolis will be net zero for 2050. There are no commitments to reduce emissions earlier than 2050 in the plan.
- The airport will not be the green city in the world. It will follow suit with other cities to become net zero by 2050.
- The plan will meet the NSW government waterway health targets.
- The plan aims to embed circular economy principles into the city. Despite this there are no priorities which identify how this will be facilitated in the development. The plan states that the circular economy principles include:
  - installing solar rooftops and solar gardens models for new residences
  - using smart grid technologies, with onsite battery storage
  - considering electric vehicle charging stations during precinct planning
  - if green infrastructure such as rooftop solar cannot be built upfront, incorporating the ability for future provision.
  - The plan also supports circular economy uses and Circular economy enabling infrastructure (see text box which contains definition of circular economy).
- Precautionary approach to rezoning agricultural lands should be undertaken.
  - The plan recognises that Supporting existing rural industry during the gradual transition to other employment uses” in Badger’s Creek, Agribusiness precinct.
  - And that supporting existing agricultural operations as interim uses” in Dwyer Road, Rossmore is important.



## Local planning context

### Liverpool Local Environmental Plan (2008)

The Liverpool LEP provides the statutory basis for development and land use within the Liverpool LGA. A summary of the zones applied within the Rural Lands Study investigation area is included below.

The zones are based on the NSW Government *Standard Planning Instrument*, which is a template used by all councils when preparing planning legislation. The following section contains a list of rural and non-rural uses permitted in each zone, along with a comparative analysis of Local Environmental Objectives and Planning Standards.

This review of the LEP will articulate the permissible uses under the relevant land use zones and provide this with an accompanying map illustrating the location of these zoned lands, as well as any other relevant planning controls.

### Planning zones within the Liverpool rural area

The purpose of the **RU1 Primary Production** zone is to encourage and support the development of sustainable primary production which maintains and enhances the natural resource base. The Standard Planning Instrument supports this through standardised objectives, which are presented overleaf in Table 18.

The **RU2 Rural Landscape** zone identifies the importance of maintaining the rural landscape character of the land. These zones are also to be used for extensive agriculture. Like the RU1 zone, the RU2 zone includes additional non rural uses relate to tourism.

The purpose of the **RU4 Primary Production Small Lots** zone is to identify land that should support sustainable primary industry and 'compatible uses' (for example, community facilities and places of public worship are permissible in the RU4 zone). The primary production small lot zone also supports intensive small lot agriculture.

The **E2 Environmental Conservation** zone seeks to conserve environmental landscapes and support ecosystem services. A focus of the zone is to ensure that the catchment water quality is maintained and improved.

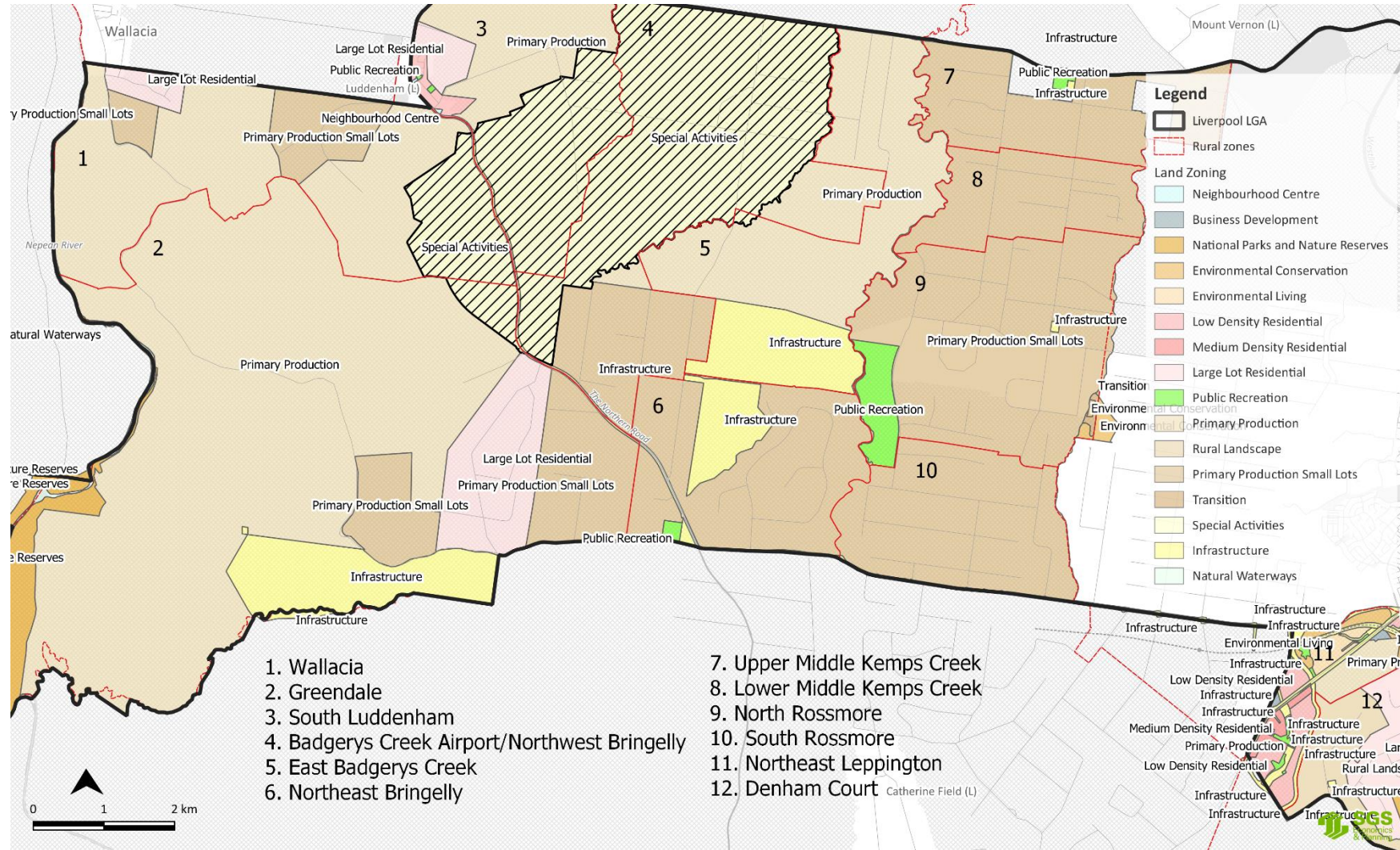
The **E3 Environmental Management** zone expresses the importance of managing, restoring and protecting ecological, scientific, cultural or aesthetic values. Decision guidelines include that development should not interfere with these values.

The **W1 Natural Waterways** protects scenic and ecologic values and works towards preventing development that does not have a significantly impact on the waterway. Recreational enjoyment that does not significantly impact the natural waterways is permissible in this zone. Scientific study, fishing industries and recreational fishing are also encouraged in the zone.

The table overleaf outlines uses that are permitted with or without consent in each rural zone within Liverpool. Uses permitted without consent suggests activities that are compatible with the overall intent (for example, agricultural productivity) of the zone. In some instances, they may be activities that the population living in a rural area would require, for example, dwelling houses, health consulting rooms, home businesses and recreation areas.

Figure 70 shows the current application and extent of rural zones in the Liverpool LGA.

FIGURE 70: LAND ZONES IN LIVERPOOL



Source: SGS Economics and Planning, 2019

TABLE 18: LIVERPOOL RURAL LAND USE TABLE

Land Use Zone	Uses permitted without consent	Uses permitted with consent*	Prohibited Uses
<b>RU1 Primary Production</b>	Environmental protection works; Extensive agriculture; Home based child care; <b>Home occupations</b>	Agriculture; Airstrips; <b>Animal boarding or training establishments</b> ; Aquaculture; Bed and breakfast accommodation; Building identification signs; Business identification signs; Cemeteries; <b>Community facilities</b> ; <b>Dual occupancies (attached)</b> ; Dwelling houses; Environmental facilities; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Hazardous storage establishment; Health Consulting Rooms; Helipads; Heliports; Home businesses; Home industries; Intensive livestock agriculture; Intensive plant agriculture; Landscaping material supplies; Offensive storage establishments; Open cut mining; Plant nurseries; Recreation areas; Recreation facilities (outdoor); Roads; Roadside stalls; Rural industries; Rural supplies; Rural workers' dwellings; <b>Secondary dwellings</b> ; Veterinary hospitals; Water recreation structures	Any development not specified in item 2 or 3
<b>RU2 Rural Landscape</b>	Extensive agriculture; <b>Home-based child care</b> ; <b>Home occupations</b>	Aquaculture; Bed and breakfast accommodation; Building identification signs; Business identification signs; <b>Community facilities</b> ; <b>Dual occupancies (attached)</b> ; Dwelling houses; Environmental facilities; Environmental protection works; Farm buildings; Farm stay accommodation; Flood mitigation works; Helipads; Home businesses; Home industries; Horticulture; Places of public worship; Recreation areas; Recreation facilities (outdoor); Roads; Roadside stalls	Any development not specified in item 2 or 3
<b>RU4 Primary production Small lots</b>	Extensive agriculture; <b>Home-based child care</b> ; <b>Home occupations</b>	Agriculture; <b>Animal boarding or training establishments</b> ; Aquaculture Bed and breakfast accommodation; Building identification signs; Business identification signs; Cemeteries; <b>Community facilities</b> ; Crematoria; <b>Dual occupancies</b> ; Dwelling houses; <b>Entertainment facilities</b> ; Environmental facilities; Environmental protection works; Farm buildings; Farm stay accommodation; Flood mitigation works; Helipads; Home businesses; Home industries; Landscaping material supplies; <b>Places of public worship</b> ; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Roads; Roadside stalls; Rural industries; Rural supplies; Rural workers' dwellings; Secondary dwellings; Veterinary hospitals; Water recreation structures	Backpackers' accommodation; Hotel or motel accommodation; Livestock processing industries; Sawmill or log processing works; Serviced apartments; Stock and sale yards; Any other development not specified in item 2 or 3
<b>E2 Environmental Conservation</b>	Environmental protection works	Building identification signs; Environmental facilities; Flood mitigation works; <b>Information and education facilities</b> ; Oyster aquaculture Roads	Business premises; Hotel or motel accommodation; Industries; Multi dwelling housing; Pond-based aquaculture; Recreation facilities (major); Residential flat buildings; Restricted premises; Retail premises; Seniors housing; Service stations; Tank-based aquaculture; Warehouse or distribution centres; Any other development not specified in item 2 or 3
<b>E3 Environmental Management</b>	Environmental protection works; <b>Home-based childcare</b> ; Home occupations	Building identification signs; <b>Cellar door premises</b> ; Dwelling houses; Environmental facilities; Flood mitigation works; Home businesses; Home industries; <b>Information and education facilities</b> ; Kiosks; Neighbourhood shops; Oyster aquaculture; Pond-based aquaculture; Roads; <b>Recreation areas</b> ; <b>Recreation facilities(outdoor)</b> ; Roadside stalls; Tank-based aquaculture	Industries; Multi dwelling housing; Residential flat buildings; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; Any other development not specified in item 2 or 3

Land Use Zone	Uses permitted without consent	Uses permitted with consent*	Prohibited Uses
<b>Natural Waterways</b>	Environmental protection works	Aquaculture Boat sheds; Building identification signs; Business identification signs; Environmental facilities; Flood mitigation works; Information and education facilities; Marinas; Mooring pens; Moorings; Recreation areas; Roads; Water recreation structures	Business premises; Hotel or motel accommodation; Industries; Multi dwelling housing; Recreation facilities (major); Residential flat buildings; Restricted premises; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; Any other development not specified in item 2 or 3

Note: Land uses **highlighted in bold** are selected as 'non-rural' uses permitted within a rural zone; in some instances, these are considered acceptable because they may support nearby urban populations, or to serve those living within the rural area.

## Zone implementation in Liverpool

All rural areas in Liverpool have **closed zones**, which means that land uses permitted are only those that are specifically listed in the zone (shown in Table 18 on page 134). In other words, closed zones mean that any development that is not specified in the land use table is prohibited.

In the LEP, Clause 7.24 permits the use of dual occupancies that are detached in the RU2 zone and the RU4 zone. Dual occupancies are permissible in the RU2 zone provided the gross floor area of the dwelling is not over 200 square metres. Dual occupancies are permitted in the RU4 Primary Production zone but only if the dwellings are not over 350 square metres. This means that the planning framework gives people the opportunity to develop their land for the purpose of residential intensification.

FIGURE 71: DUAL OCCUPANCY CONSTRUCTION IN ROSSMORE



Source: Google Maps, 2019

## Liverpool Development Control Plan (2008)

The Liverpool Development Control Plan (DCP) contains a range of planning controls for rural areas. The policies apply to an application to use or develop land under the LEP provisions, and address planning considerations such as encouraging development that will be environmentally sustainable and protecting water quality and native flora and fauna. The built form aspects of buildings are also considered; for instance, buildings are to be 'compatible with the environment' and their design should 'protect and enhance the visual qualities and characteristics of rural areas'.

The Liverpool DCP identifies the need to 'protect and manage rural areas,' and sets out a range of design requirements that seek to preserve and retain the character of the rural area:

- Buildings heights are limited to 8.5 metres
- Impermeable surfaces (other than building footprints) are only permissible on driveways.
- There is a focus on maintaining natural features.
- Run-off is to be treated on site to ensure that waterways are protected.

## Previous rural lands studies

### Liverpool Rural Lands Study (2007)

The 2007 *Liverpool Rural Lands Study* was prepared by Don Cox Planning, as an update to a 1994 study. It sought to understand the changing nature of agricultural economics. The study split the rural lands into two different areas:

- A primary study area, consisting 1,422 hectares of land around the (now) Badgerys Creek Airport and Commonwealth Land, and excluded the south west Sydney Growth Area.
- A secondary study area included 1,498 hectares of land which included part of the South West Growth Corridor.

The agricultural sector in Liverpool was worth \$26.1 million in 2001; this represented of 6 per cent of the total value of agriculture in the Sydney Basin. Poultry farming had the highest value out of agricultural industries in the Liverpool region, contributing \$26.1 million GDP. At the same time, the study suggested that the primary area would be converted to residential land within the next 25 years (by 2032).

Due to peri-urban pressures and land use conflicts, alongside residential growth pressures from the east, Badgerys Creek was forecast to transition within 25 years of the study. This had been forecast in rural planning since 1994, when a noticeable trend in agricultural decline began. Indeed, similar trends were occurring across the peri-urban areas of Sydney by 2007. The study suggested that urban encroachment had reduced agricultural activities to a point where they are no longer “economically sustainable” in peri-urban areas of Sydney. The study also found:

- In 2007, 11 per cent of the primary study area was being used for commercial farming, predominantly with semi-commercial extensive livestock grazing (which made up most of the agricultural sector).
- Other prominent agricultural activities were cattle grazing, equestrian, poultry, and protective cropping (controlled environment horticulture). The study projected these activities would decline based on residential encroachment.
- At the time of writing, agriculture in peri-urban areas around Sydney Basin was (and continues to be) impacted by pressure for residential expansion. In 2007, agricultural activity in the Badgerys Creek area was already declining.
- In and around Badgerys Creek, several farms reported that they were no longer competitive due to competition from larger landholders who were able to produce a larger yield. Many reported being in a ‘run off’ phase (not reinvesting capital into their farming business).
- The market gardening sector was also affected by this; for example, areas that had had strong representation of this sector such as Martin Road and Lawson Road (Badgerys Creek) along the Nepean River flats had significantly (or completely) reduced. The feasibility of market gardens on lots less than 10 hectares was becoming less viable than in the past due to land value changes and (on smaller lots) limited ability to expand.
- Vegetable growing and horticultural activities in polyhouses were declining; only 22 polyhousing horticultural farms were identified in the Commonwealth study area
- The proportion of agricultural activities were higher in the Badgerys Creek area than in the secondary study area.
- A large proportion of the land in the secondary study area was used for poultry. This agricultural industry was found to be in decline due to urban encroachment pressures (the odour and noise emissions from poultry farming make it particularly incompatible with residential development). Similar challenges faced other noise, dust and odour-emitting agriculture sectors including protected agriculture, aquaponics and intensive farms.
- The average annual rainfall for the Liverpool rural lands was 800 mm. In Liverpool, access to reliable water was identified as an issue, where the average temperature for the January maximum was 29 degrees; 3 degrees warmer than the coast.

- Water scarcity could limit the viability of future agricultural production; however, water licences that were obtained to harvest water from the Nepean River enabled farms to retain better viability.
- Badgerys Creek, Cosgrove Creek and the arm of South Creek were subject to high salinity and low soil fertility.
- The Leppington Pastoral Company is the largest agricultural business in the Liverpool LGA.

Given the broader trends and local conditions, the 2007 Rural Lands Study recommended:

- Lots with ANEF (emissions) contours in place should not be reduced in size, to enable their ongoing viability and protect them from encroachment.
- Current agricultural land that runs along the Nepean River should be maintained and protected based on its productive capacity, and should not be fragmented.
- Higher tourist visitation should be encouraged, by permitting land uses that provide tourists with accommodation, such as B&Bs (in appropriate locations and of an appropriate scale).

### Rural Lands Study (2012)

Council prepared its most recent Rural Lands Study in 2012. The study aimed to understand the current planning framework context and any changes in the physical environment since 2007. The study's recommendations sought to balance the challenges between residential development and the importance of agricultural production. Overall, the recommendations aligned with a desire to maintain and enhance agricultural productivity. Based on the plan's recommendations, the following local policy changes were made:

- Allow dual occupancy development in certain RU1 zones.
- Identify certain areas as primary production areas to secure food production through RU1 primary production lots.
- Implement DCP design controls to ensure that rural character is maintained throughout the area.
- There is some tension between Council's aim to maintain agricultural lands and the planning recommendations in 2012, which expanded the list of permissible non-agricultural uses such as dual occupancy development. At the same time, this policy change may have enabled some light industrial and urban population serving uses to enable a wider range of businesses to occupy the rural areas, where agriculture has been steadily declining since 1994.

# APPENDIX 2

## Proposed Western Sydney Aerotropolis SEPP land use table

LAND USES PROPOSED UNDER THE DRAFT SEPP (WESTERN SYDNEY AEROTROPOLIS)

Objectives	Permitted without consent	Permitted with consent	Prohibited
<b>Enterprise Zone</b>			
<ul style="list-style-type: none"> <li>To ensure a range of uses that enable successful aerospace and defence industries.</li> <li>To manage the transition of land from non-urban uses to employment uses</li> <li>To support the development of well-planned and serviced new urban communities in accordance with the Precinct Indicative Layout Plan.</li> <li>To safeguard land used for non-urban purposes from development that could prejudice the use of the land for future commercial land use purposes.</li> <li>To encourage a precinct built around professional services, high technology, food production and processing, health and education and creative industries</li> <li>To ensure that land which has the potential to impact environmental conservation areas is developed appropriately and enhance biodiversity outcomes for the Precinct. • To protect the operations of the Airport, including 24-hour operations, and provide appropriate protections for the community.</li> <li>Ensure there are no sensitive land uses (such as residential, aged care, early education and childcare, educational establishments and hospital amongst other uses) located within the ANEC 20 and above contours.</li> <li>Ensure that land uses up to the ANEC 20 contour are subject to appropriate design and construction standards to reduce any potential for airport noise impacts.</li> <li>Prevent potential conflicts between airport operations and land use/development outcomes.</li> </ul>	Nil	Animal boarding or training establishment, Building identification sign, Car park, Centre-based child care facility, Commercial premises, Community facility, Depot, Educational Establishment, Electricity generating works, Emergency Services Facility, Entertainment facility, Environmental protection works, Flood mitigation works, Freight transport facility, Function centre, Funeral home, Garden centre, General industry, Hardware and building supplies, Hazardous industries Health services facility, Hotel or motel accommodation, Industrial retail outlet, Industrial training facility, Information and education facility, Landscape material supplies, Light industry, Liquid fuel depot, Neighbourhood shop, Passenger transport facility, Places of public worship, Public administration building, Pubs, Recreation area, Recreation facility (indoor), Recreation facility (major), Registered club, Research station, Restricted premises, Road, Service station, Serviced apartment, Sex services premises, Signage, Storage premises, Telecommunications facility, Transport depot, Truck depot, Vehicle body repair station, Vehicle body repair workshop, Vehicle sales or hire premises, Veterinary hospital, Warehouse or distribution centre, Waste or resource management facility, Water supply system, Water treatment facility, Wholesale supplies	Any development not specified in item 2 or 3
<b>Mixed Use Zone</b>			
<ul style="list-style-type: none"> <li>To manage the transition of land from non-urban uses to a range of urban uses.</li> <li>To encourage the development of well-planned and well-serviced new urban communities in accordance with the Precinct Indicative Layout Plan.</li> <li>To ensure a range of uses are located in a way that are consistent with the strategic planning for the Western Sydney Aerotropolis.</li> <li>To safeguard land used for non-urban purposes from development that could prejudice the use of the land for future urban purposes.</li> <li>To ensure that land adjacent to environmental conservation areas is developed in a way that enhances biodiversity outcomes for the Precinct.</li> </ul>	Home business • Home occupation • Home-based child care	Attached dwelling, Backpackers' accommodation, Boarding house, Business identification sign, Car park, Commercial premises, Community facility, Early education and care facility, Educational Establishment, Electricity generating works, Emergency Services Facility, Entertainment facility, Environmental facility, Environmental protection works, Flood mitigation work, Function centre, General industry, Group home, Health services facilities, Home industry, Hostel, Hotel or motel accommodation, Industrial training facility NSW Department of Planning, Industry and Environment   18, Information and education	Any development not specified in item 2 or 3



Objectives	Permitted without consent	Permitted with consent	Prohibited
<ul style="list-style-type: none"> <li>▪ To protect the operations of the Airport, including 24-hour operations, and provide appropriate protections for the community.</li> <li>▪ To ensure there are no sensitive land uses (such as residential, aged care, early education and childcare, educational establishments and hospitals amongst other uses) located within the ANEC 20 and above contours</li> <li>▪ To ensure that land uses up to the ANEC 20 contour are subject to appropriate design and construction standards to reduce any potential for airport noise impacts.</li> </ul>		facility, Light industry, Multi dwelling housing, Passenger transport facility, Places of public worship, Public administration building, Pubs, Recreation areas, Recreation facility (indoor), Recreation facility (major), Registered club, Residential care facility, Residential flat building, Respite day care centre, Road, Semi-detached dwelling, Service station, Serviced apartment, Sex services premises, Shop top housing, Storage premises, Telecommunications facility, Vehicle repair station, Veterinary hospital.	
<b>Environment and Recreation Zone</b>			
<ul style="list-style-type: none"> <li>▪ To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.</li> <li>▪ To prevent development that could destroy, damage or otherwise have an adverse effect on ecological or recreational values.</li> <li>▪ To enable land to be used for public open space or recreational purposes.</li> <li>▪ To provide a range of recreational settings and activities and compatible land uses.</li> <li>▪ To ensure that development is secondary and complementary to the use of land as public open space, and enhances public use, and access to, the open space.</li> <li>▪ To encourage, where appropriate key regional pedestrian and cycle connections.</li> </ul>	Environmental protection works, Flood mitigation work.	Environmental facility, Information and education facility, Kiosk, Recreation area, Recreation facilities (outdoor), Water recreation structure, Road.	Any other development not specified in item 2 or 3  * land that is of high biodiversity value and intended to be preserved for environmental conservation will benefit from additional planning controls in the proposed SEPP which are intended to prevent the clearing of vegetation or broader uses and activities that are not consistent with this object. These areas will be mapped.
<b>Infrastructure Zone (SP1)</b>			
<ul style="list-style-type: none"> <li>▪ To provide for special land uses that are not provided for in other zones.</li> <li>▪ To facilitate development that is in keeping with the special characteristics of the site or its existing or intended special use, and that minimises any adverse impacts on surrounding land.</li> </ul>	Nil (noting that developments on the Airport Site are subject to the Airports Act regime).	The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose (noting that developments on the Airport Site are subject to the Airports Act regime).	Any development not specified in item 2 or 3 (noting that developments on the Airport Site are subject to the Airports Act regime).

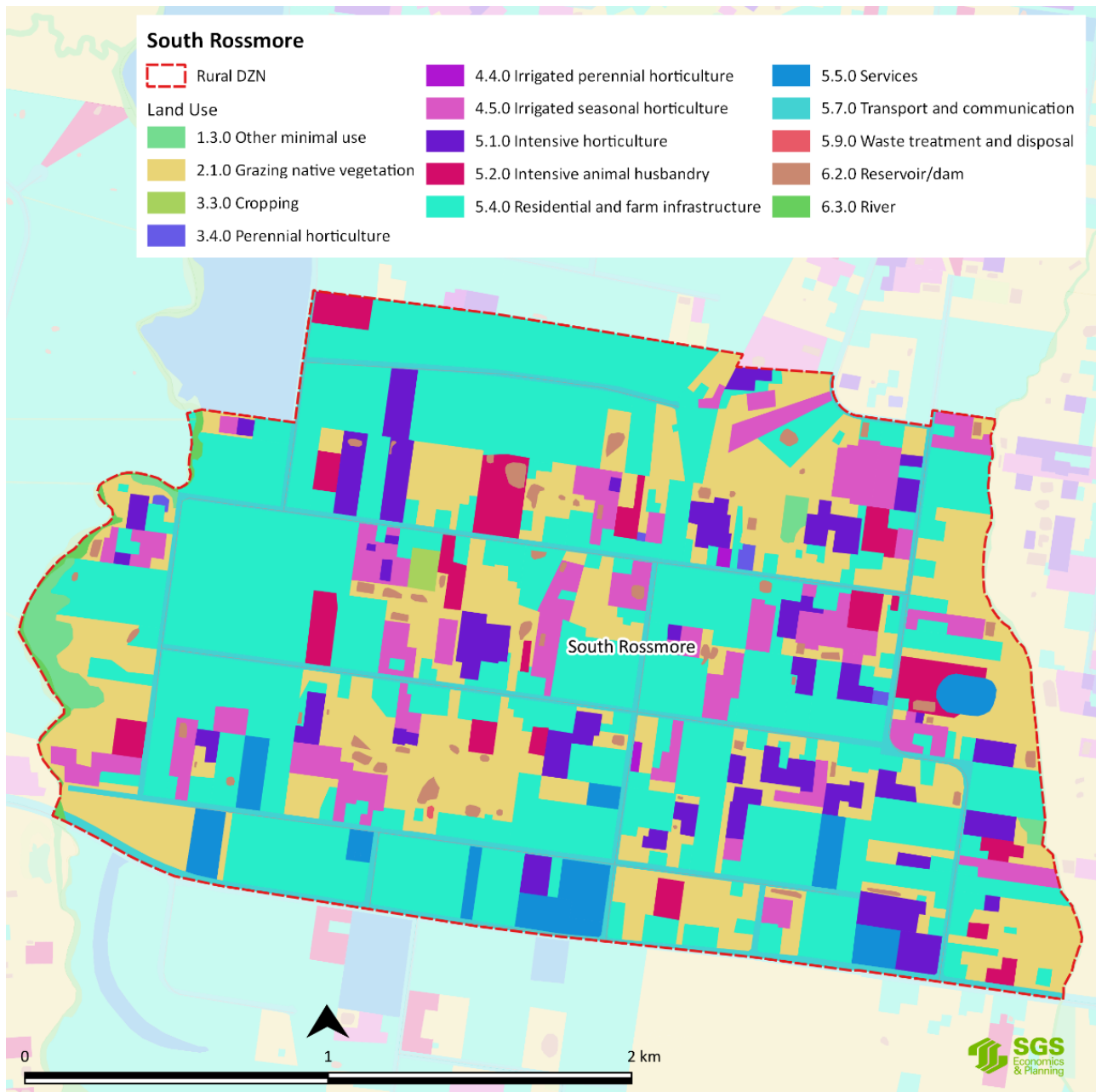
Objectives	Permitted without consent	Permitted with consent	Prohibited
<b>Infrastructure Zone (SP2)</b>			
<ul style="list-style-type: none"> <li>To provide for infrastructure and related uses.</li> <li>To prevent development that is not compatible with or that may detract from the provision of infrastructure.</li> </ul>		The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose.	Any development not specified in item 2 or 3
<b>Agribusiness Zone</b>			
<ul style="list-style-type: none"> <li>To encourage sustainable and high technology Agribusiness and Agricultural production with links to food production and processing.</li> <li>To encourage diversity in Agricultural and Agribusiness enterprises and systems appropriate for the area.</li> <li>To encourage the development of integrated food and supply chain related industries.</li> <li>To minimise conflict between land uses within this zone and land uses within adjoining zones.</li> <li>To maintain and enhance natural rural character, biodiversity and sustainability of the area</li> <li>To allow for non-agricultural land uses that will not restrict the use of other land in the locality for agricultural purposes.</li> <li>To allow for the sustainable and holistic development of agritourism product and experiences.</li> <li>To protect the operations of the Airport, including 24-hour operations, and provide appropriate protections for the community.</li> <li>Ensure there are no sensitive land uses (such as residential, aged care, early education and childcare, educational establishments and hospitals amongst other uses) located within the ANEC 20 and above contours.</li> <li>Ensure that land uses up to the ANEC 20 contour are subject to appropriate design and construction standards to reduce any potential for airport noise impacts</li> </ul>	Home occupation	Animal boarding or training establishment, Business premises, Car park, Community facility, Earthworks, Educational establishment, Eco-tourist facility, Electricity generating works, Environmental protection works, Environmental facility, Farm building, Farm stay accommodation, Flood mitigation work, Food and drink premises, Freight transport facility, Function centre, Garden centre, Health services facility, Industrial training facility, Information and education facility, Intensive plant agriculture, Landscaping material supplies, Light industry, Market, Places of public worship, Plant nursery, Recreation area, Research station, Roadside stall, Rural industry, Rural supplies, Rural workers' dwelling, Service station, Telecommunications facility, Warehouse or distribution centre, Water recycling facility, Water supply system	Any development not specified in item 2 or 3

Source: Western Sydney Aerotropolis Draft SEPP, 2019.

# APPENDIX 3

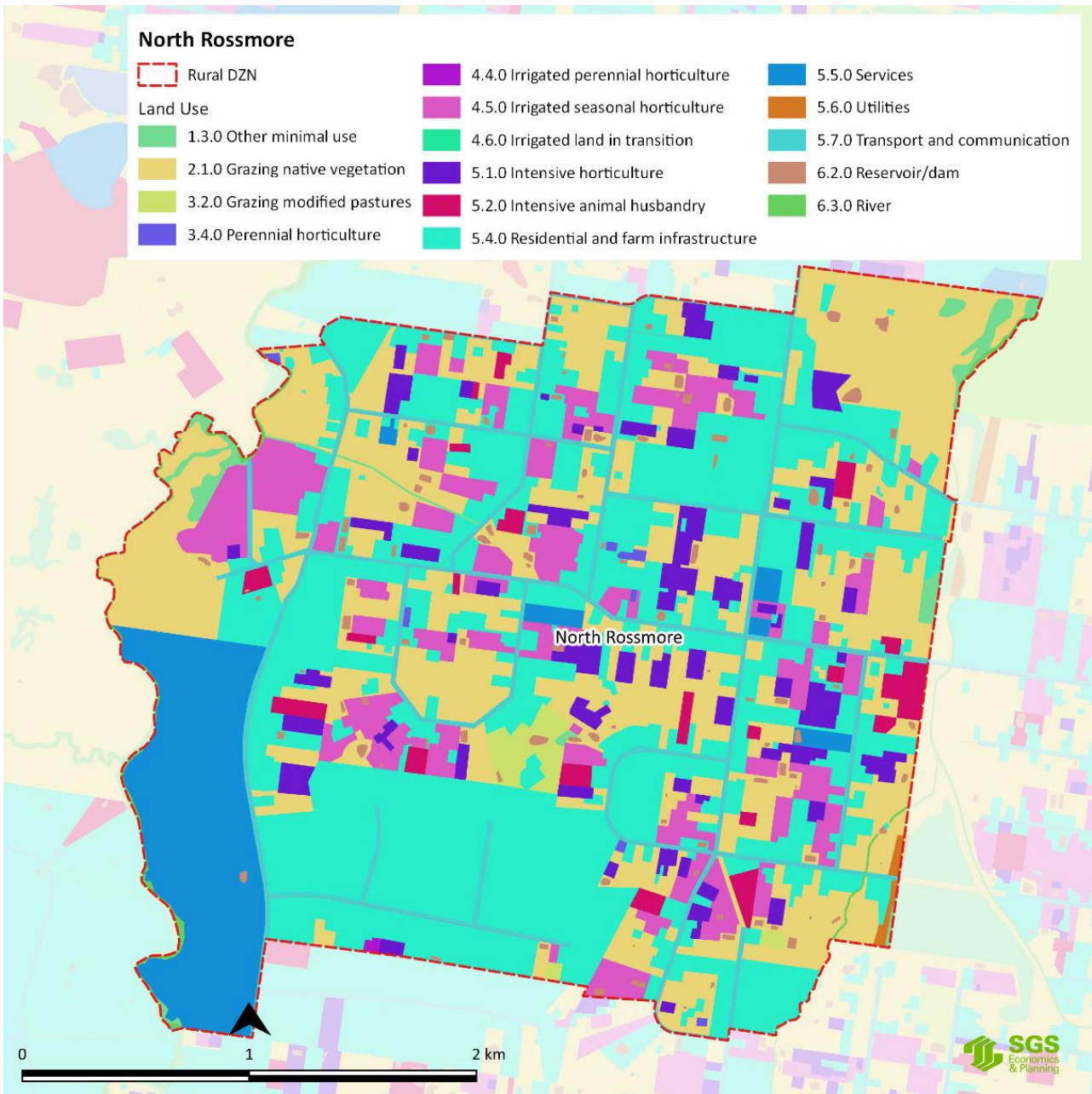
## Agricultural land uses across rural Liverpool

FIGURE 72: SOUTH ROSSMORE LAND USE



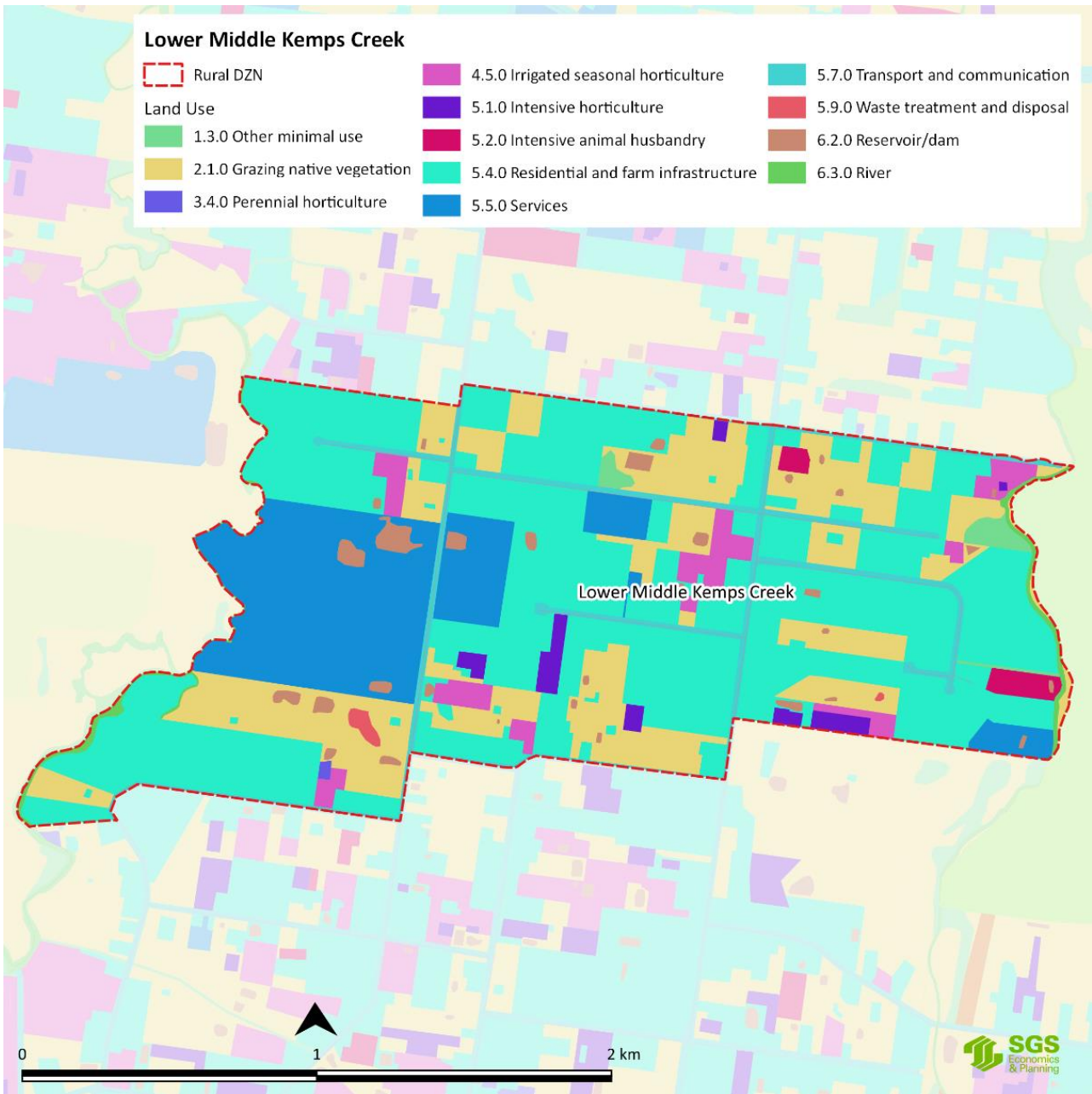
Source: Department of Planning, Industry and Environment 2013

FIGURE 73: NORTH ROSSMORE LAND USE



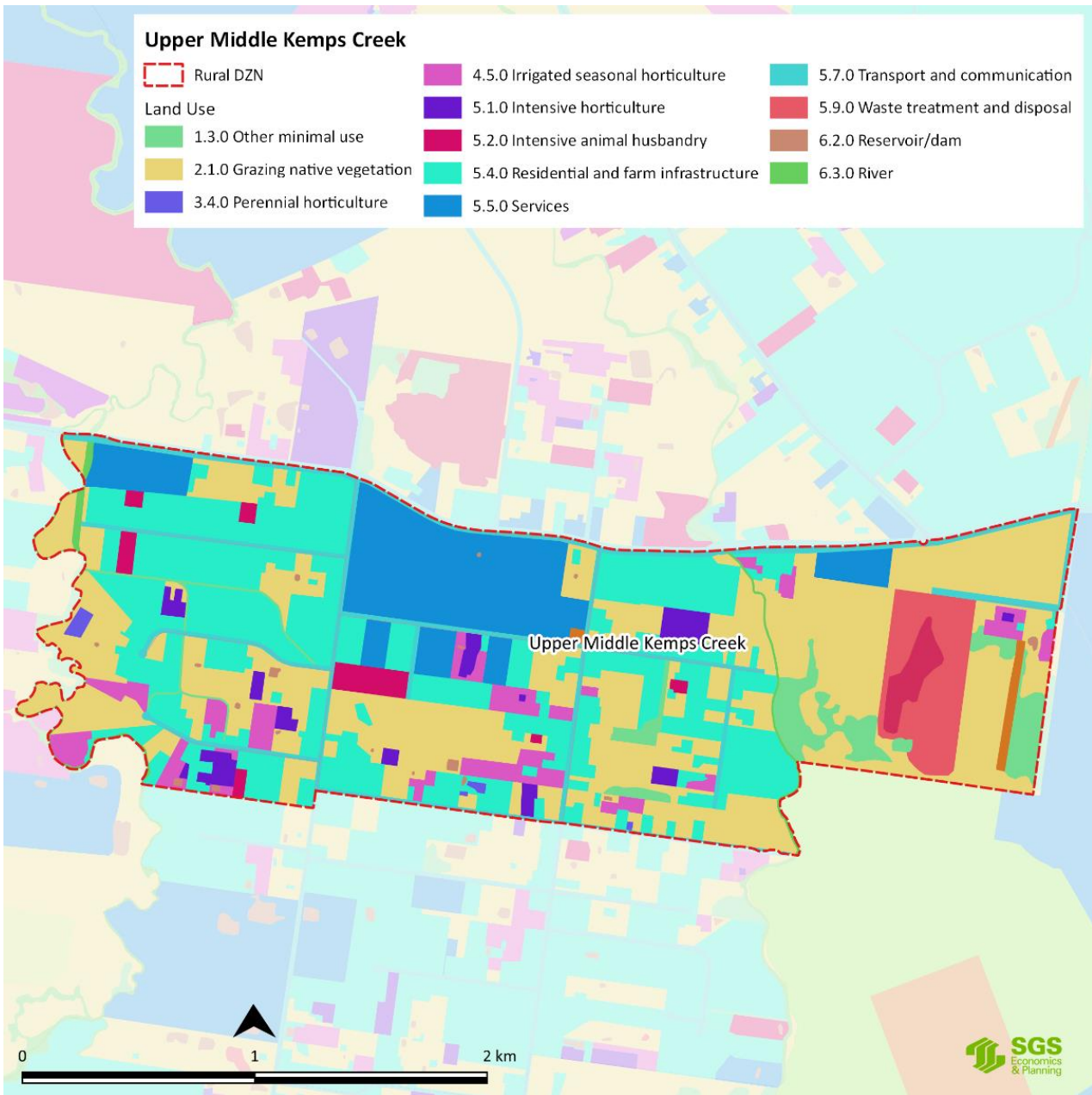
Source: Department of Planning, Industry and Environment 2013

FIGURE 74: LOWER MIDDLE KEMPS CREEK LAND USE



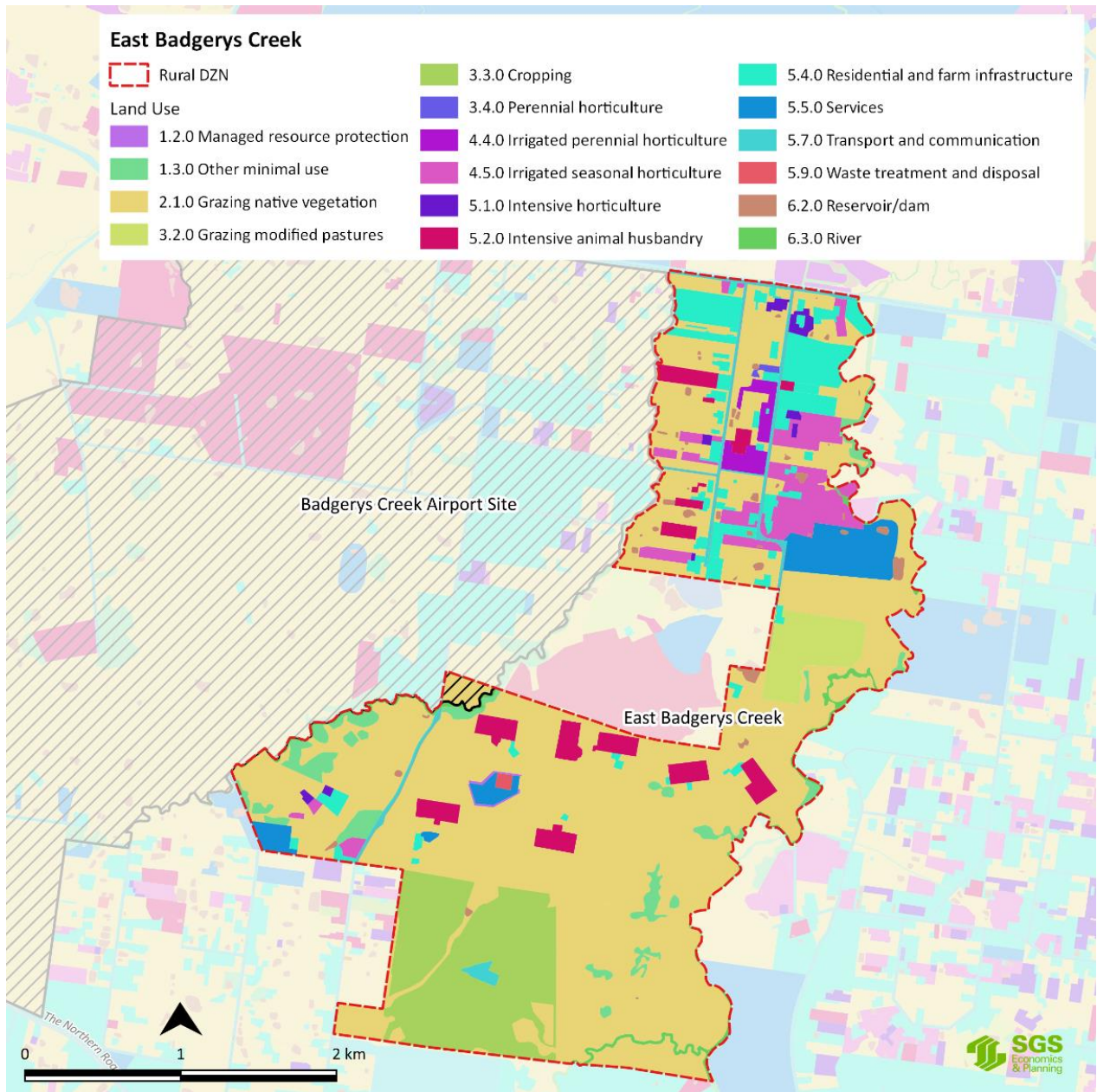
Source: Department of Planning, Industry and Environment 2013

FIGURE 75: UPPER MIDDLE KEMPS CREEK LAND USE



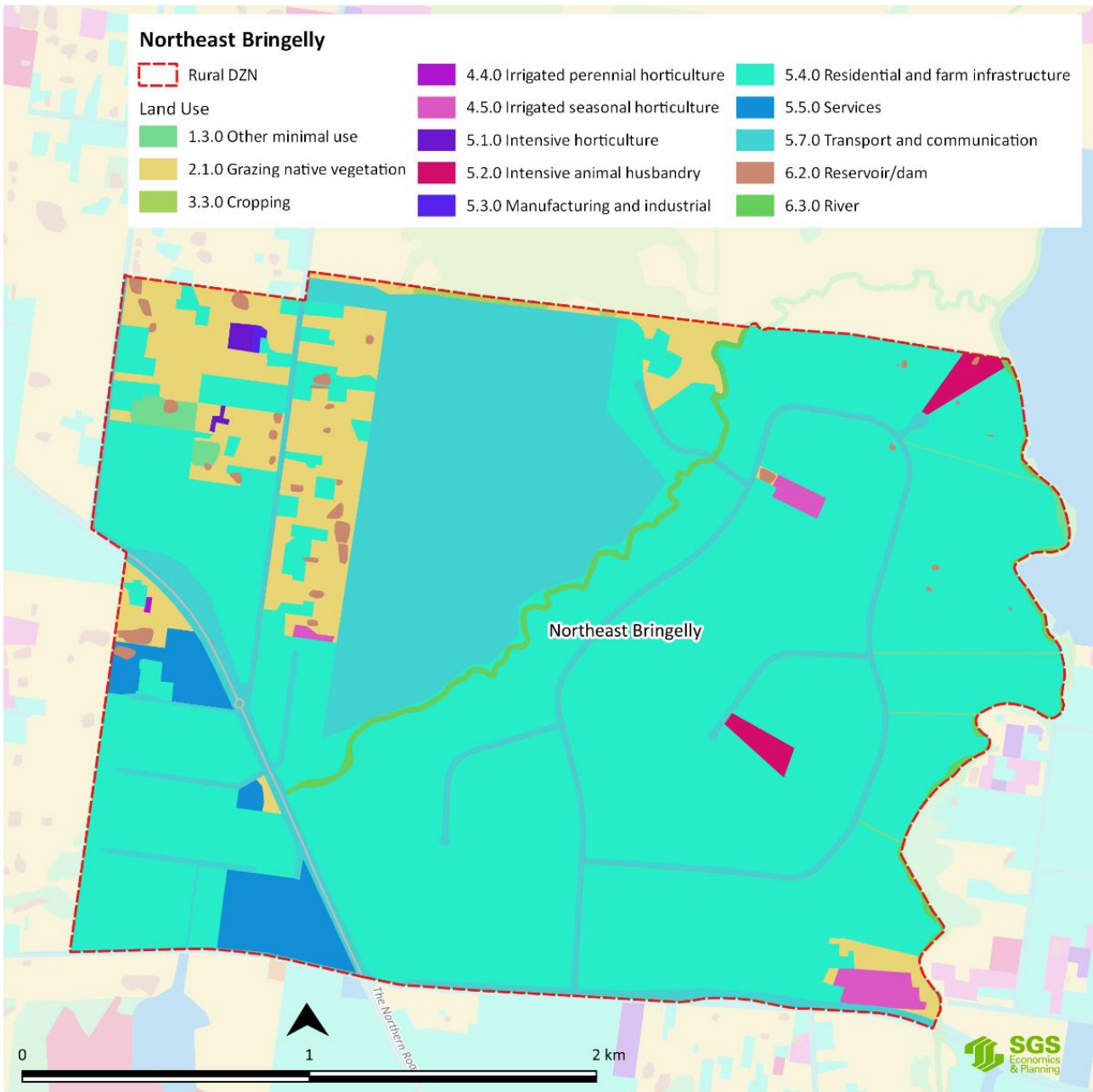
Source: Department of Planning, Industry and Environment 2013

FIGURE 76: EAST BADGERYS CREEK LAND USE



Source: Department of Planning, Industry and Environment 2013

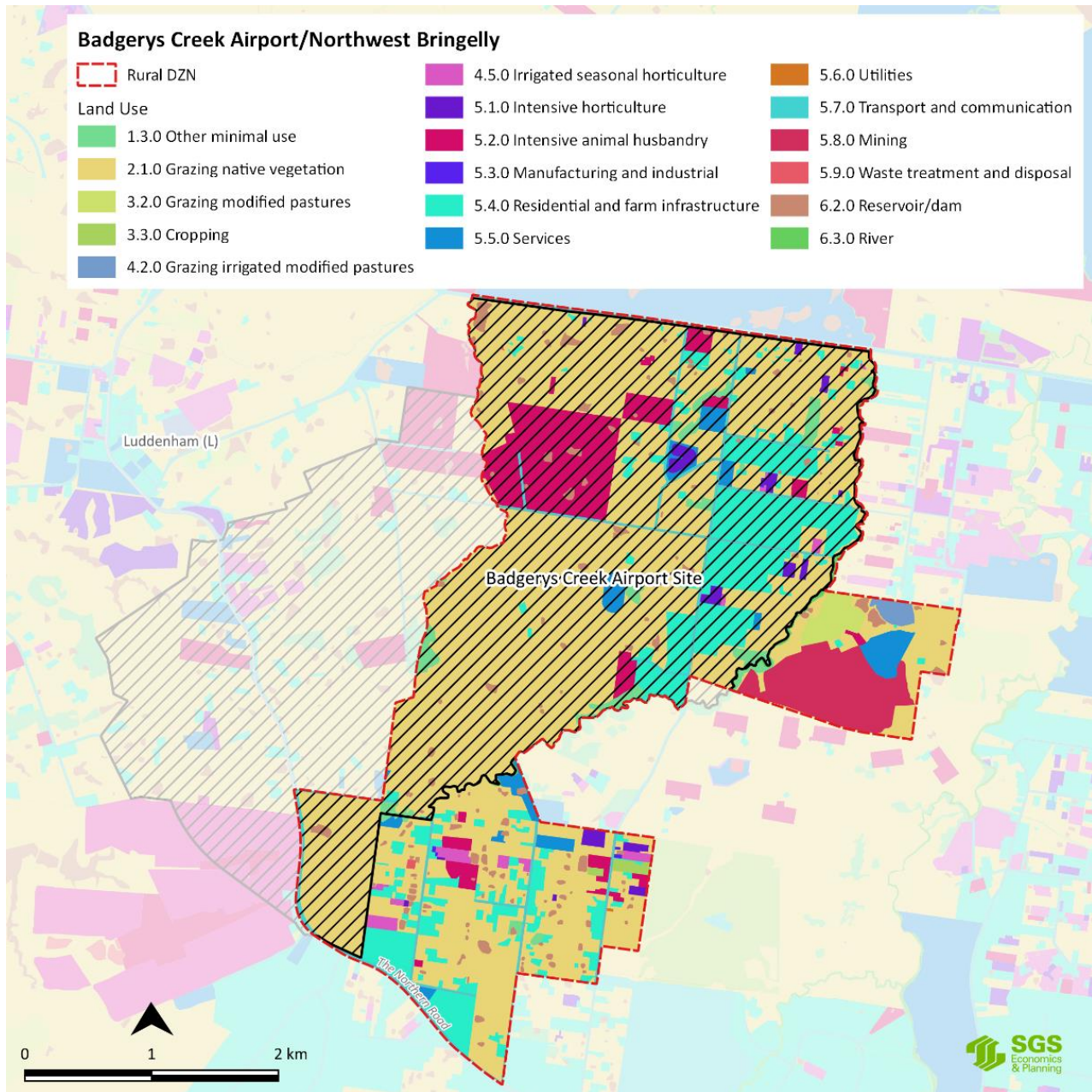
FIGURE 77: NORTHEAST BRINGELLY LAND USE



Source: Department of Planning, Industry and Environment 2013

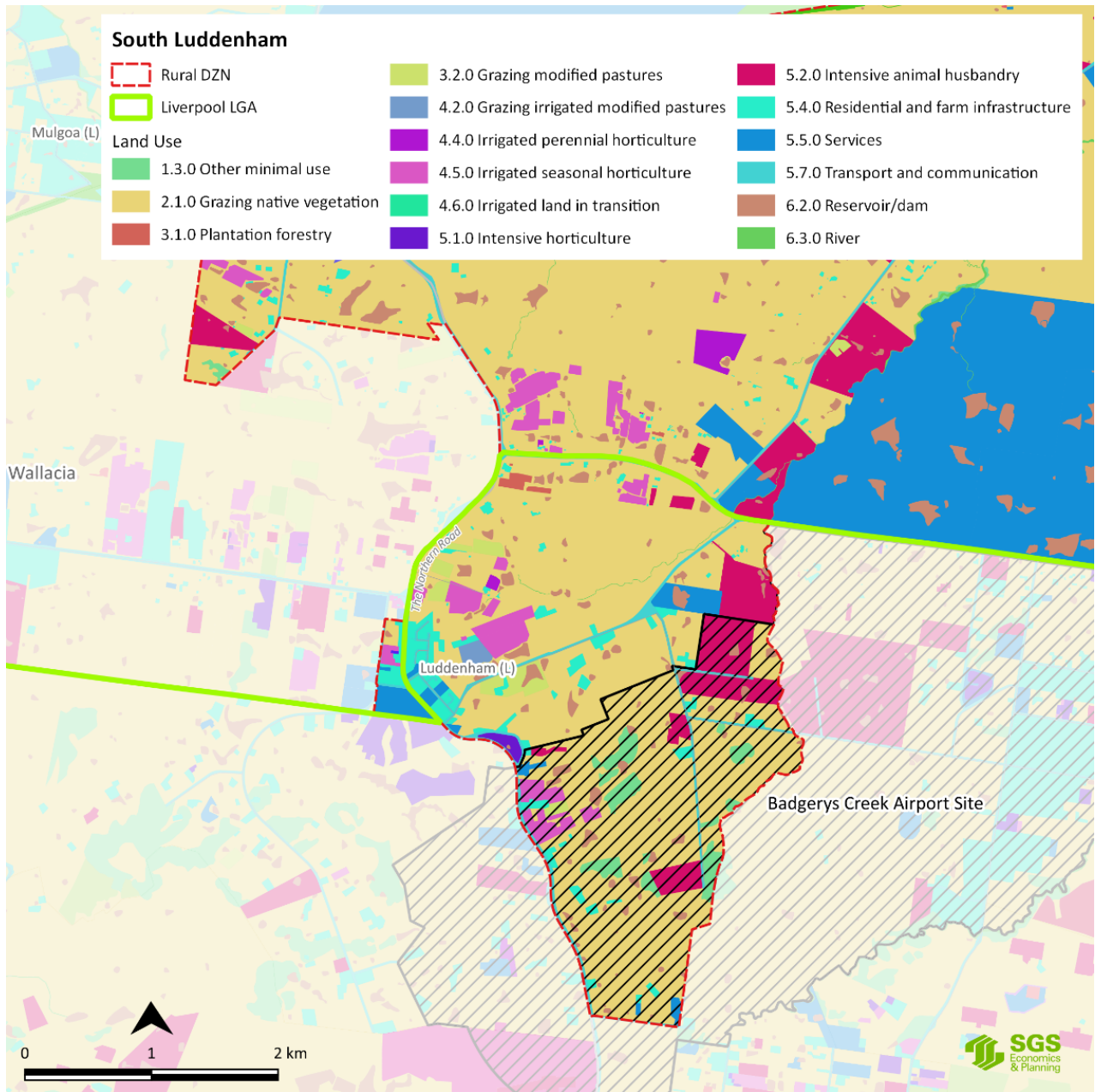


FIGURE 78: BADGERYS CREEK AIRPORT/NORTHWEST BRINGELLY LAND USE



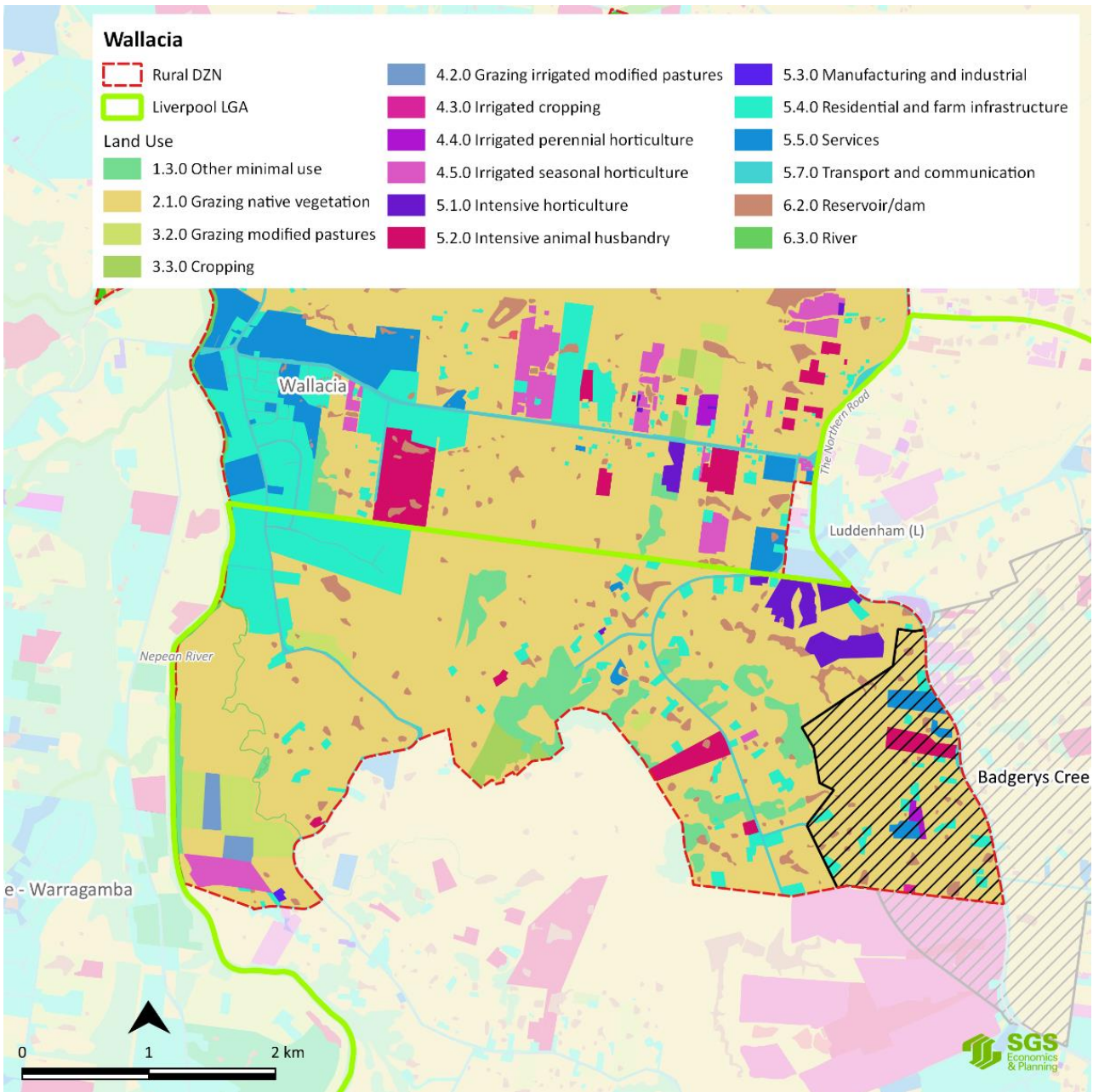
Source: Department of Planning, Industry and Environment 2013

FIGURE 79: SOUTH LUDDENHAM LAND USE



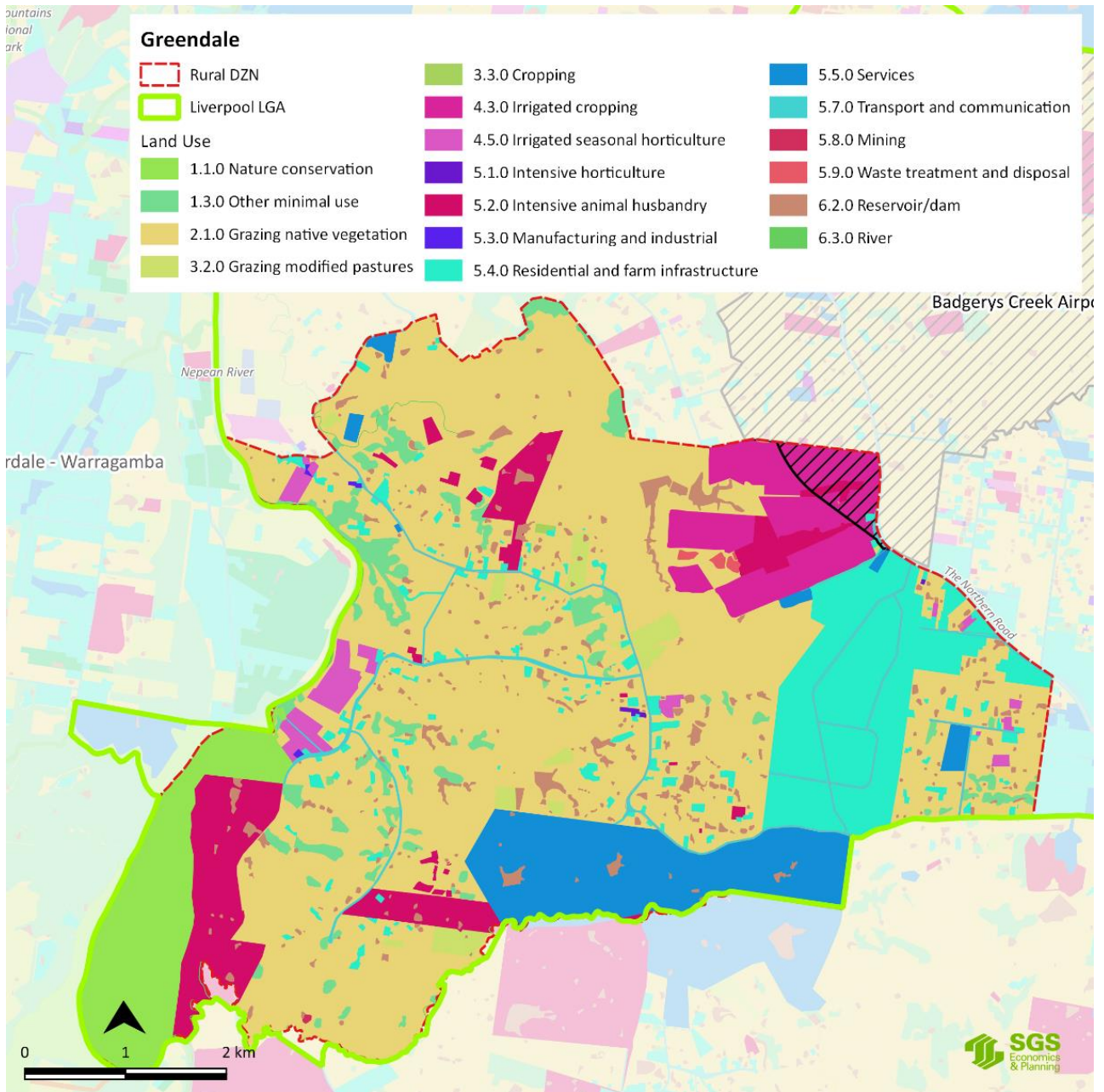
Source: Department of Planning, Industry and Environment 2013

FIGURE 80: WALLACIA LAND USE



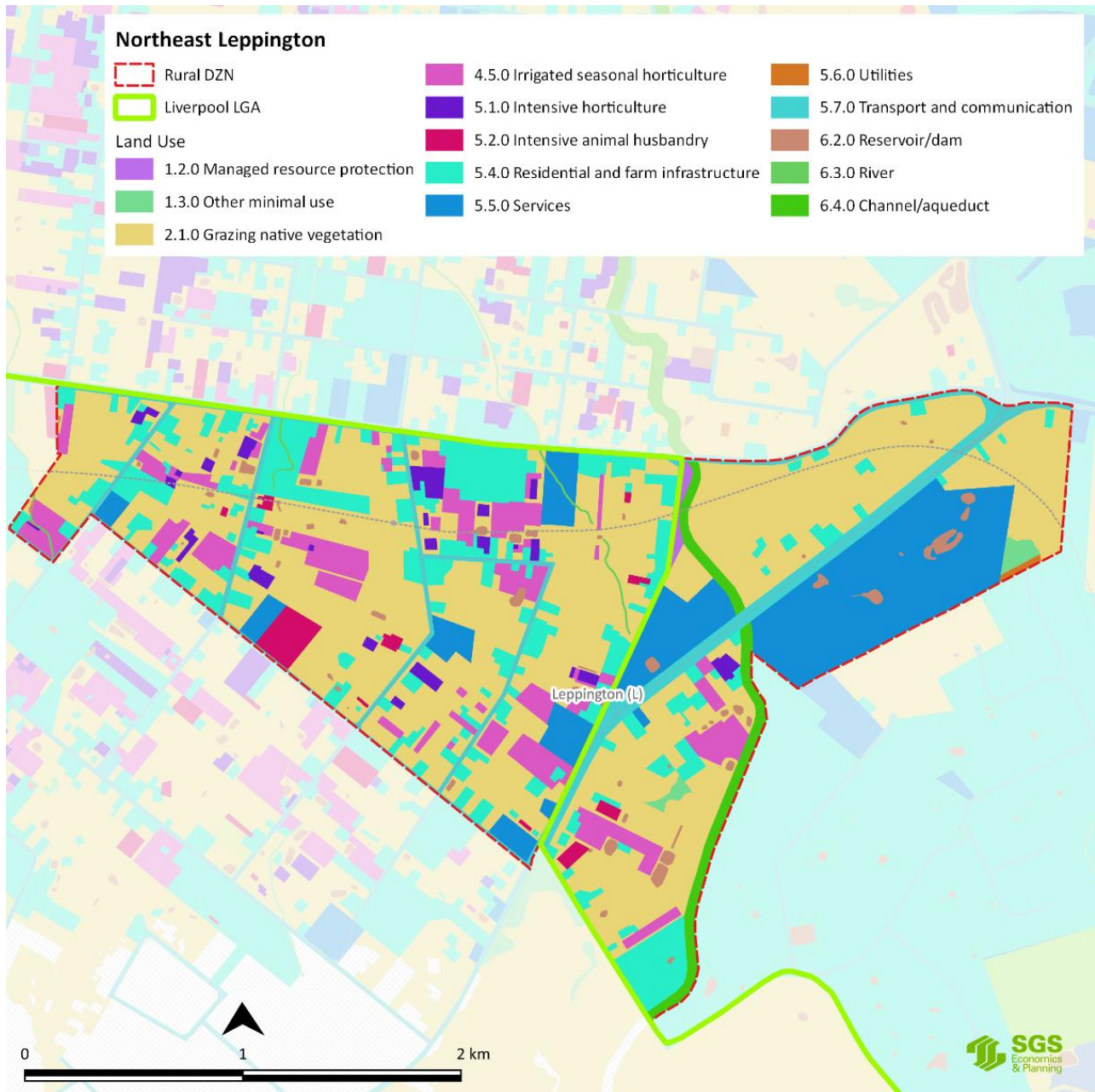
Source: Department of Planning, Industry and Environment 2013

FIGURE 81: GREENDALE LAND USE



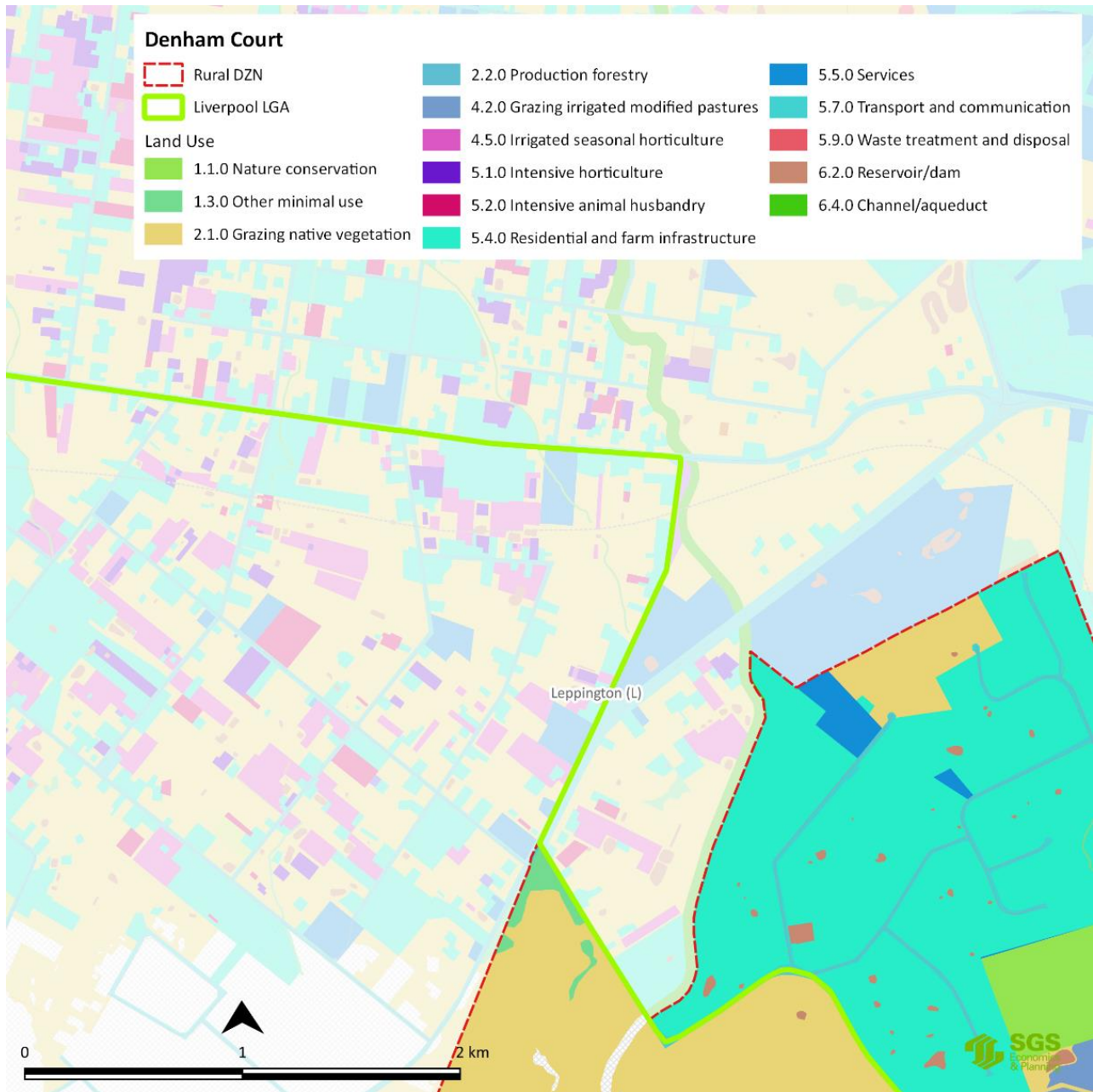
Source: Department of Planning, Industry and Environment 2013

FIGURE 82: NORTHEAST LEPPINGTON LAND USE



Source: Department of Planning, Industry and Environment 2013

FIGURE 83: DENHAM COURT LAND USE



Source: Department of Planning, Industry and Environment 2013

# APPENDIX 4

## Liverpool LGA output by industry

LIVERPOOL LGA OUTPUT BY INDUSTRY (\$M), 2015-16

Source	Supply Chain	Final Consumption Expenditure		Gross Fixed Capital Formation			Total demand	Exports	Total supply
		Households	Gov't	Private	Public Enterprise	General Gov't	= Sum of columns at left		= Total demand + exports
Agriculture, Forestry & Fishing	89	47	2	7	0	1	146	58	204
Mining	20	1	0	0	0	0	21	4	24
Manufacturing	784	294	33	70	3	19	1,203	2,054	3,257
Electricity, Gas, Water & Waste Services	288	117	10	13	4	3	435	30	464
Construction	1,161	9	2	616	52	111	1,950	7	1,957
Wholesale Trade	409	341	7	50	3	12	822	397	1,219
Retail Trade	158	620	26	11	1	3	818	112	930
Accommodation & Food Services	49	294	0	0	0	0	343	79	422
Transport, Postal & Warehousing	456	141	112	11	1	4	725	688	1,413
Information Media & Telecommunications	117	69	8	6	1	2	203	61	264
Financial & Insurance Services	271	75	0	2	0	1	348	172	520
Rental, Hiring & Real Estate Services	436	1,345	3	19	0	0	1,803	2,537	4,340
Professional, Scientific & Technical Services	467	23	22	41	2	7	562	57	619
Administrative & Support Services	413	31	41	1	0	0	486	19	505
Public Administration & Safety	95	8	732	7	0	2	844	886	1,731
Education & Training	8	203	327	1	0	0	540	155	695
Health Care & Social Assistance	19	314	732	1	0	0	1,066	245	1,312
Arts & Recreation Services	29	81	30	1	0	0	140	34	174
Other Services	154	171	4	0	0	0	329	74	403
Compensation of employees	5,443	0	0	0	0	0	5,443	0	5,443
Gross operating surplus & mixed income	4,247	0	0	0	0	0	4,247	0	4,247
Taxes less subsidies (products)	54	169	0	45	0	2	271	0	272
Taxes less subsidies (production)	371	0	0	0	0	0	371	0	371
Imports	4,915	4,420	229	1,051	82	279	10,976	280	11,256
<b>Total Production</b>	<b>20,454</b>	<b>8,772</b>	<b>2,319</b>	<b>1,953</b>	<b>151</b>	<b>445</b>	<b>34,094</b>	<b>7,948</b>	<b>42,043</b>

Source: ABS Census Table Builder (2016) and ABS National Accounts (2015-16).

Note: Industries shown are ANZSIC 1-digit.

# APPENDIX 5

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## Land and soil capability assessment scheme: classes



See table overleaf.



LAND AND SOIL CAPABILITY CLASSES

Class	Description	Land management considerations
Class 1 (Very slight to negligible limitations)	<ul style="list-style-type: none"> <li>Best cropping country in NSW. Used for a wide variety of agricultural uses that involve regular cultivations, including vegetable and fruit production, grain and oilseed crops, and fodder and forage crops in specific areas.</li> <li>Occasional flooding may restrict its use for some specific rural land uses, such as some cropping and horticulture.</li> <li>Typically uniform with deep, often productive soils.</li> </ul>	<ul style="list-style-type: none"> <li>No special land management practices to control water and wind erosion are required.</li> <li>Good drainage, with sufficient water holding capacity to supply growing crops and pastures.</li> <li>Soils generally have good buffering capacity against soil acidity, no specific management practices to control soil acidity is required.</li> <li>Free of rock outcrop and large stones that would restrict farm machinery operation.</li> <li>Some land management practices that will preserve soil structure and chemical fertility are required.</li> </ul>
Class 2 (Slight but significant limitations)	<ul style="list-style-type: none"> <li>Very good cropping land with often fertile soils and short, gradual, gentle slopes. Capable of a wide variety of agricultural uses that involve cultivations. These include vegetable and horticultural production, and a range of crops including cereals, oilseeds and pulses.</li> <li>Common on plains and on extensive footslopes where run-on from slopes above is not concentrated or can be controlled.</li> </ul>	<ul style="list-style-type: none"> <li>Land can be subject to sheet, rill and gully erosion as well as wind erosion and soil structure decline. Conservation tillage and conservation farming practices can control these limitations.</li> <li>Windbreaks and ground cover should be retained in areas prone to wind erosion.</li> <li>Salinity can be a slight hazard. Land managers need to be aware that deep drainage may cause salinity</li> <li>Acidity can also be a slight hazard. Land managers need to ensure their practices are not slowly acidifying the soils, and pH levels should be monitored regularly.</li> </ul>
Class 3 (Moderate limitations)	<ul style="list-style-type: none"> <li>Especially widespread on NSW slopes and in coastal areas. Typically sloping lands that require earthworks to control runoff and erosion if used for regular cultivation.</li> <li>Class 3 land has limitations that must be managed to prevent soil and land degradation. Includes other soils with acidification and soil structure limitations that are sufficient to require the application of specific management practices.</li> <li>Off-site impacts of land management can be significant if limitations are not managed adequately (for example, water erosion, water erosion, water quality and sedimentation, wind erosion and air quality, or salinity).</li> </ul>	<ul style="list-style-type: none"> <li>Land can be subject to sheet, rill and gully erosion as well as wind erosion and soil structure decline. Limitations can be controlled with land management practices readily available and easily implemented.</li> <li>Included are conservation tillage and farming practices such as retaining stubble, reducing tillage, sowing with minimum ground disturbance and the use of pasture rotations in the cropping system.</li> <li>Practices to manage salinity and ensuring that plant growth is adequate to maintain evapotranspiration rates, and minimising the length of fallows in cropping cycles.</li> <li>Acidity can be a moderate hazard and needs to be managed or the soils will suffer long-term degradation, particularly if acidity extends deep into the soil.</li> </ul>
Class 4 (Moderate to severe limitations)	<ul style="list-style-type: none"> <li>Moderate to severe limitations for some land uses that need to be consciously managed to prevent soil and land degradation.</li> <li>The limitations can be overcome by specialised management practices with high levels of knowledge, expertise, inputs, investment and technology.</li> <li>This class includes sloping lands.</li> </ul>	<ul style="list-style-type: none"> <li>Land is generally used for grazing, and is suitable for pasture improvement. Acidification can be a problem under introduced annual legume pastures.</li> <li>Class 4 land can be cultivated occasionally for sowing of pastures and crops. However, it has cropping limitations because of erosion hazard, weak structure, salinity, acidification, shallowness of soils, climate, wetness, stoniness or a combination of these factors.</li> <li>Essential cropping practices include retaining stubble, reducing tillage and sowing with minimum disturbance.</li> <li>Salinity can be a moderate to severe hazard. Land management practices need to prevent deep drainage that causes salinity.</li> <li>Land management practices need to prevent possible soil acidification and pH should be monitored regularly. Lime should be added or acid-tolerant perennials should be grown when required.</li> </ul>

Class	Description	Land management considerations
Class 5 (Severe limitations)	<ul style="list-style-type: none"> <li>This class includes sloping lands with highly erodible soils and/or significant existing soil erosion, or land that will be subject to wind erosion when cultivated and left bare. Other limitations include shallow soils, stoniness, climatic limitations, acidification, potential for structure decline and salinity hazards.</li> <li>Land has severe limitations for high impact land management uses such as cropping. There are few management practices generally available to overcome these limitations.</li> </ul>	<ul style="list-style-type: none"> <li>This land is not capable of supporting regular cultivation due to the various limitations. Soil erosion can be severe without adequate erosion control measures. Fertility is generally lower than land in Class 4 and there is a lower capacity to regenerate ground cover.</li> <li>Class 5 land can be cultivated occasionally for fodder crops and pasture renewal or establishment. It is important to minimise soil disturbance, maintain cover and maintain good organic matter levels.</li> <li>Eroded land that require earthworks are included in this class.</li> <li>Salinity can be a severe hazard.</li> <li>Acidification can be a severe hazard, particularly under introduced annual legume pastures, and soils can be naturally acidic near the surface and at depth.</li> </ul>
Class 6 (Very severe limitations)	<ul style="list-style-type: none"> <li>Class 6 land has very severe limitations for a wide range of land uses and few management practices are available to overcome these limitations. Land generally is suitable only for grazing with limitations and is not suitable for cultivation.</li> <li>Class 6 land includes steeply sloping lands that can erode severely even without cultivation, or land that will be subject to severe wind erosion when cultivated and left exposed.</li> </ul>	<ul style="list-style-type: none"> <li>Class 6 land has severe to very severe site limitations for grazing and other land uses. It may have very severe limitations due to off-site effects such as salinity and the impact of soil erosion on water and air quality. Soil erosion can be very severe without adequate erosion control measures. Fertility varies with geology, soil depth and type.</li> <li>This land is suited for less productive grazing. Limitations prevent most other land uses.</li> </ul>
Class 7 (Extremely severe limitations)	<ul style="list-style-type: none"> <li>This land has extremely severe limitations for most land uses. It is unsuitable for any type of cropping or grazing because of its limitations.</li> <li>Use of this land for these purposes will result in severe erosion and degradation. It may be too steep, rocky, swampy or fragile for grazing.</li> <li>The land may be suitable for commercial timber plantations or for native timber on undeveloped land.</li> <li>Includes significantly sloping lands.</li> </ul>	<ul style="list-style-type: none"> <li>Class 7 land is not capable of any cultivation or grazing by stock. It also has severe to very severe site limitations for other land uses, but may be suitable for wood production, passive tourism or honey production.</li> <li>Soil erosion control is difficult because of site limitations.</li> <li>Fertility varies with geology, soil depth and type. These limitations prevent most land uses</li> </ul>
Class 8 (Extreme limitations)	<ul style="list-style-type: none"> <li>Class 8 land is not suitable for any agricultural production due to its extremely severe limitations.</li> <li>It includes precipitous slopes and cliffs, areas with a large proportion of rock outcrop, or areas subject to regular inundation and waterlogging (swamps, lakes, lagoons, stream beds and banks).</li> </ul>	<ul style="list-style-type: none"> <li>This land is unusable for any agricultural purposes.</li> <li>Recommended uses are restricted to those compatible with the preservation of natural vegetation including water supply catchments, wildlife refuges, national and State parks, and scenic areas.</li> </ul>

Source: OEH 2012.

# APPENDIX 6

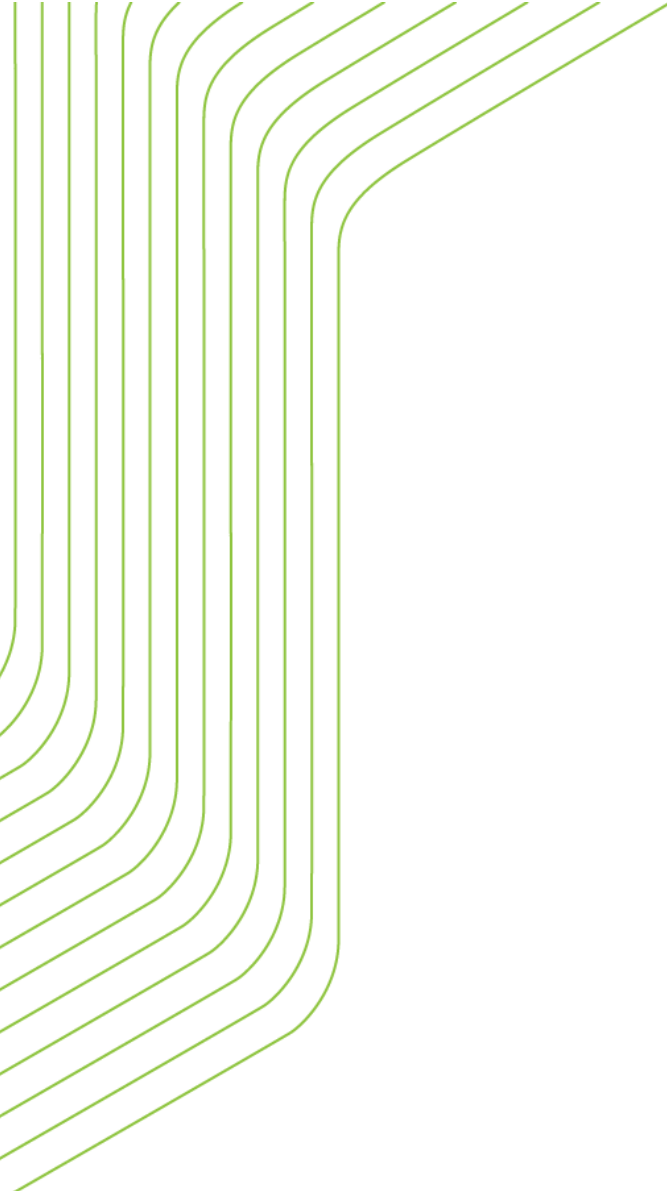
## Fertility classes of great soil groups

### FERTILITY CLASSES OF GREAT SOIL GROUPS

Soil Type (Great Soil Group)	Estimated Fertility	Fertility Value
Acid Peats	Low	1
Alluvial Soils - Light Sandy Textured (Sands to Sandy Loams)	Moderately low	2
Alluvial Soils - Medium Textured (Loams, Clay Loams)	Moderately high	4
Alpine Humus soils	Low	1
Black Earths	High	5
Brown Earths	Moderate	3
Brown Podzolic Soils	Moderate	3
Calcareous Red Earths	Moderately low	2
Calcareous Sands	Low	1
Chernozems	High	5
Chocolate Soils	Moderately high	4
Chocolate Soils - low iron	Moderately high	4
Desert Loams	Moderately low	2
Earthy Sands	Low	1
Euchrozems	Moderately high	4
Gleyed Podzolic Soils	Moderately low	2
Grey Brown and Red Calcareous Soils	Low	1
Grey Brown Podzolic Soils	Moderately low	2
Grey, Brown and Red Clays	Moderate	3
Humic Gleys	Moderately low	2
Humus Podzols	Low	1
Kraznozems	Moderately high	4
Lateritic Podzolic Soils	Moderately low	2
Lithosols	Low	1
Neutral to Alkaline Peats	Low	1
Non Calcic Brown Soils	Moderate	3
Peaty Podzols	Low	1
Podzols	Low	1
Prairie Soils	Moderately high	4
Red and Brown Hardpan Soils	Low	1
Red Brown Earths	Moderate	3
Red Earths - less fertile (granites and metasediment)	Moderately low	2
Red Earths - more fertile (volcanics and granodiorites)	Moderately high	4
Red Podzolic Soils - less fertile (granites and metasediment)	Moderate	3

Soil Type (Great Soil Group)	Estimated Fertility	Fertility Value
Red Podzolic Soils - more fertile (volcanics and granodiorites)	Moderately high	4
Rendzinas	Moderate	3
Siliceous Sands	Low	1
Solodic Soils	Moderately low	2
Solodized Solonetz	Moderately low	2
Solonchaks	Low	1
Solonetz	Moderately low	2
Solonized Brown Soils	Moderately low	2
Soloths	Moderately low	2
Terra Rossa Soils	Moderate	3
Weisenboden	Moderate	3
Xanthozems	Moderate	3
Yellow Earths	Moderately low	2
Yellow Podzolic Soils- less fertile (granites and metasediment)	Moderately low	2
Yellow Podzolic Soils - more fertile (volcanics and granodiorites)	Moderate	3

Source: Modified from Charman, P.E.V. 1978 (ed.), *Soils of New South Wales: Their Characterisation, Classification and Conservation*, Tech. Handbook No. 1, Soil Conservation Service of NSW, Sydney



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