APP | Property and Infrastructure Specialists

LIVERPOOL INDUSTRIAL DEVELOPMENT LANDS STUDY

APP Corporation Pty Limited

3 July 2019

This report has been prepared and reviewed in accordance with our quality control system. The report is a preliminary draft unless it is signed below.

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June 2019

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Executive Summary

This report has been prepared by APP Corporation Pty Ltd (APP) to provide Liverpool City Council with an understanding of:

- The changing demands and drivers affecting traditional industrial and employment lands and innovation, research and advanced manufacturing and business park uses; and
- The potential land use implications and planning initiatives required to support long term economic prosperity and job growth in the Liverpool LGA.

It includes a review and analysis of:

- The key domestic and global demands and drivers for change influencing Liverpool's existing industrial precincts;
- Domestic and international case studies which identify and confirm best practice for land use planning; and
- Market and Government initiatives that have incentivised growth and development of industrial development lands.

The report has focused on the following industrial precincts within Liverpool, comprising Chipping Norton, Moorebank, Orange Grove, Priddle/Scrivener Street (Warwick Farm), Sappho Road (Warwick Farm North), Warwick Farm Racecourse (Coopers Paddock), Yarrunga/Prestons, Crossroads (Casula), Hoxton Park Airport (Len Waters Estate) and Austral.

The way in which land and buildings are used and developed in industrial precincts is steadily changing in response to a number of key drivers, both domestically and internationally and include globalisation and impacts of global competition, population growth and increased construction activity. These drivers have led to investment in major infrastructure projects and land releases in Greater Sydney, including Western Sydney Airport. The changing nature of industries, the workplace and working efficiencies have created shifts in global and domestic economic conditions and a changing consumer market, spurring creative thinking and investment in technical and professional service industries.

Liverpool's industrial lands will transform steadily over the coming decades. A growing need for industry to specialise and target niche sectors to retain a competitive edge along with a demand for continued urban services, larger-scale distribution and freight and specialised innovation/creative and advanced technology industries will require the development of a variety of industrial spaces to accommodate the range of demands. Good access to movement corridors, with access to transport, essential services and amenity will be paramount to further development in this sector.

To understand the challenges and opportunities that will influence the changing Liverpool industrial sector, APP has examined the critical success factors of comparable industrial precincts throughout

Australia and overseas and how these learnings could be applied to Liverpool's industrial precincts. This review has focused primarily on their land use planning and development regulation.

A variety of market and government led initiatives can support the retention and growth of local jobs and industries. Value capture is an effective tool to reinvest funds raised from new development projects back into infrastructure upgrades. It is also a means of leveraging growth against significant infrastructure investment, such as the Western Sydney Airport and North-South Rail to drive investment from the private sector and establish important connected corridors of economic strength. Planning and land use incentives can also be used to drive growth, encourage desirable built form outcomes and place making, and protect established industries.

Development standards including building height, floor space ratios (FSRs) and lot size under Liverpool Local Environmental Plan 2008 (LLEP 2008) have been reviewed with a series of recommended improvements included based on the best practice experiences investigated. This report recommends alterations to Liverpool's planning framework to better respond to the changing nature of the industrial precincts. These changes include better definition of the type, scale and nature of industrial and other activities considered suitable in each of the zones as well as clarification of the desired intent of each zone. It is essential that the zones avoid generality by including more specific objectives and remove unnecessary duplication of permissible land uses.

There is a need to reconcile the current zoning of Liverpool's precincts. Specialised urban services are best suited to the IN2 Light Industrial Zone. The IN1 General Industrial Zone should be applied to industrial parks or estates that accommodate mid-sized operators and large, low-impact operations including warehousing, distribution, logistics, processing and manufacturing. The IN3 Heavy Industrial Zone should only be retained in areas where heavy impact industries are considered desirable to be maintained with protected separation distances to surrounding uses.

Finally, this report explores the introduction of a modified B7 Business Park Zone in suitable precincts to allow for a variety of light and innovative industrial, commercial and retail uses. It is recommended that the tailored B7 zoning be applied to the Priddle/Scrivener Street precinct as part of an extension to the Liverpool Health and Education Precinct. This rezoning needs to be supported by initiatives, revised development standards and infrastructure improvements which focus on revitalizing places within the precinct.

1. Introduction

1.1 Purpose of the Study

Liverpool City Council (Council) have commissioned APP Corporation Pty Limited (APP) to undertake a detailed investigation of existing industrial and employment land within the Liverpool Local Government Area (LGA). This report will provide Council with a better understanding of the changing demands and drivers of traditional industrial and employment land and innovation, research and advanced manufacturing and business park uses, the potential land use implications and planning initiatives required to support long term economic growth, prosperity and job creation in Liverpool LGA. This report:

- Investigates the changing demands and drivers of industrial and employment land uses and built form relevant to the Liverpool LGA in the short to medium term.
- Investigates current best practice of land use planning for industrial and employment lands.
- Provides an overview of the objectives, land uses and development standards within existing industrial zones under Liverpool Local Environmental Plan 2008 (Liverpool LEP 2008) and makes recommendations to the planning framework.
- Investigates changing demand and drivers of Innovation/Research/Health/Advanced manufacturing precincts and business parks including B7 Business Park zoned land.
- Investigates current best practice of land use planning for Innovation/Research/Health/ Advanced manufacturing precincts and business parks including B7 Business Park zoned land within Australia and in other countries.
- Provides recommendations regarding implementation of Innovation/Research/Health/Advanced manufacturing precincts and business parks within the Liverpool LGA, including zone objectives and permissible uses.
- Provide advice on land use planning initiatives to foster the establishment of Innovation/Research/Health/Advanced manufacturing precincts and business parks in existing precincts.

This study builds on the previous research undertaken by Council and other organisations to understand the constraints, opportunities and changing nature of industries. The study identifies and acknowledges how global competition, advances in technology and collaboration are driving specialisation, clustering and innovation, and how these fundamental shifts need to be understood in the content of Liverpool's employment lands.

1.2 Report Structure

This Study is structured in the following Chapters:

Chapter 1: Introduction – Includes an overview of the purpose of the Study and its structure. This section considers the types of employment precincts examined in the Study, their economic role, typical characteristics and how these relate to Liverpool's industrial context.

Chapter 2: Industrial Employment Lands in Liverpool – This Chapter includes summaries of planning and research documents to provide the strategic context behind the purpose for this Study. It also includes summaries and a Strengths, Weakness, Opportunities and Threats (SWOT) analysis of each of the industrial precincts.

Chapter 3: Key Demands and Drivers – Includes an investigation into the key demands and drivers of employments lands in the context of Liverpool. It also examines how changes globally are re-defining industries as well as the physical form and characteristics of employment lands.

Chapter 4: Best Practice Planning for Industry and Innovation – Investigates international and domestic case studies which have in some capacity demonstrated best practice approaches to planning for industrial and innovation precincts. This chapter considers how approaches to land use planning and development regulation has stimulated economic growth, retained jobs or delivered on a precinct Vision for built form or operational outcomes.

Chapter 5: Market and Government Initiatives – This Chapter investigates a number of international and domestic examples of how the private sector, governments or partnership structures have influenced employment outcomes through initiatives. Some of the initiatives discussed include the utilisation of value capture, investments in infrastructure, governance structures, planning and development incentives and financial abatements.

Chapter 6: Planning Review - Utilising best-practice approaches to land use planning, development regulation and initiatives, a review of Liverpool's planning framework is undertaken to align zones with the economic roles, SWOTs and characteristics of each precinct. Development standards including building height, floor space ratios (FSRs) and lot size under *Liverpool Local Environmental Plan 2008* (LLEP 2008) have been reviewed with a series of recommended improvements included based on best practice experiences investigated. The purpose of this exercise is to best prepare Liverpool's employment precincts for the future of evolving industries and to facilitate continued job growth.

Chapter 7: Conclusion – Summarises the key findings from the investigations and planning review to form a series of recommendations and actions for Council's consideration.

1.3 Defining Industrial and Innovation Precincts

This Study investigates existing employment precincts in Liverpool that are currently zoned IN1 General Industrial, IN2 Light Industrial or IN3 Heavy Industrial. These are currently best defined as industrial precincts. They accommodate a range of built forms, activities and operations that by their nature require some level of physical separation from more sensitive land uses, including residential, due to their environmental impacts and spatial operating requirements.

There has been a myriad of terms used domestically and internationally to define industrial precincts. The Greater Sydney Commission in their Western City District Plan groups Liverpool's industrial precincts into 'urban services' lands and 'sub-regional employment' lands.

Urban services are a collection of industries that support the development, operation and liveability of a city, providing for the needs of local populations. They comprise the likes of local trade and construction services, building support, transport, automotive repairs, manufacturing, storage, postal and hire premises[1]. Good examples of urban services precincts in Liverpool include Coopers Paddock at Warwick Farm Racecourse, Chipping Norton (predominantly) and Priddle/Scrivener Street.

Sub-regional precincts by their definition are larger industrial estates typically positioned on, or with good access to arterial motorways and freight rail lines. They typically comprise 'big-box' warehousing, freight and logistics, distribution, postal and processing centres which require larger land parcels to accommodate truck movements and turning, loading and work spaces. They also comprise a series of complementary ancillary uses including commercial offices, neighbourhood retail and recreation which does not compromise the predominant industrial activities[2]. These precincts often require greater physical separation or treatments to surrounding areas and more sensitive land uses because of the nature of the environmental impact arising from their operations. This includes nuisance pollution, noise, odour and unsightliness and risk to human health and safety. They are centres of significant employment numbers but typically lower employment densities owing to their expansive scale. Examples of sub-regional precincts in Liverpool include Moorebank, Yarrunga/Prestons and Hoxton Park Airport (Len Waters Estate).

Whilst the identification of urban services and sub-regional precincts goes some way to delineating and defining industrial precincts, it is worth acknowledging that the nature and characteristics of such precincts, particularly in Liverpool, are much more complex than this. In Moorebank and Chipping Norton, a genuine mix of larger scale transport, warehousing and distribution is inter-mixed with small unit storage and local construction-based activities. Similarly, the Priddle/Scrivener Street precinct, although quite small at 23.2 hectares, includes medium to large floorplate light industrial or freight and logistics uses with a small number of industrial strata units.

There is then the added complexity of innovation and how this ultimately affects the land use definitions and zoning of traditional industrial lands. Innovation precincts are globally recognised as centres of collaboration between firms, researches, investors and entrepreneurs. They can take a variety of forms, from an agglomeration of innovation activity around a research-intensive hospital or university to a single incubator hosting start-ups and innovators. The Brookings Institution defines these precincts as "areas where leading-edge anchor institutions and companies cluster and connect

[1] The future of Greater Sydney's Urban Services, SGS Economics and Planning https://www.sgsep.com.au/news/latest-news/future-greater-sydneys-urban-services
[2] Liverpool Industrial Lands Study, SGS Economics and Planning July 2018

with start-ups, business incubators and accelerators – they are physically compact, transit-accessible and technically wired and offer mixed use housing, office and retail"[3].

Globally, traditional industrial areas are undergoing transition due to improving technology, better understanding of good place-making and the impetus to collaborate and specialise. Older inner-city industrial areas, close to transport and innovation anchors, such as research institutions, hospitals and universities are being re-adapted into innovation clusters with a mixture of land uses and built form types[4]. In Liverpool, ageing industrial precincts to the immediate north and east of the CBD have come into the focus of Council and the Greater Sydney Commission in recent years as potential innovation precincts given their scale, declining physical environments and proximity to the Liverpool Collaboration Area, comprising the Health and Education precinct.

Innovation precincts are broad in their employment and land use characteristics. They can be areas of advanced manufacturing, bio-medical and chemical production and warehousing positioned around a scientific research base, through to incubators comprising micro creative spaces, organic markets and live/work settings[5]. The land use zones under LLEP 2008 have not fully comprehended the intricate mixed-use nature of innovation precincts; hence the need for the review and recommendations outlined in this Study.

1.4 Liverpool: Employment Profile

The nature of industrial land is undergoing significant transition, predominantly due to the impacts of innovation in industry and business. These impacts are being felt globally but particularly in Liverpool due to the commitment and delivery of the Western Sydney Airport (WSA) and Aerotropolis under the Western Sydney City Deal. A snapshot of the current and future employment profile of its workers is required to appreciate the changing demands and drivers behind employment lands in Liverpool.

Currently there are 25,600 jobs in employment lands which represents 17% of industrial jobs in the Western City District and 33% of all jobs in Liverpool[6]. Job growth in employment lands has been modest in the LGA over the past decade to 2018, owing mostly to the developed nature of existing operational precincts and the delays in land release for new precincts around the WSA.

A large proportion of employment jobs in Liverpool are in manufacturing (28%) and transport, postal and warehousing (14%). Urban services including construction (12%) and wholesale trade (11%) also account for a large proportion of jobs. Employment in the professional, scientific, research and

[3] NSW Innovation Precincts, NSW Innovation and Productivity Council September 2018
[4] Unlocking enterprise in a changing economy, Victoria State Government September 2018
[5] ibid
[6] Greater Sydney Region Plan, Greater Sydney Commission 2018

technical services sectors is currently very under-represented in the Liverpool employment precincts[7]. The recent and current employment trends are reflective of:

- the successes of transport, warehousing and distribution centre activities in the sub-regional precincts of Moorebank and Yarrunga/Prestons given their proximity and superior access to the M5 and M7 Motorways and future proposed access to the WSA via the M12 link and Outer Orbital; and
- the decade of growth in the residential development and infrastructure sectors in Western Sydney which has translated to a growing need for local trade and construction business. These in turn have supported the urban renewal and redevelopments in the Liverpool City Centre and new housing estates in the South-West Growth Centres.

According to the SGS *Liverpool Industrial Lands Study - July 2018*, the number of jobs in employment lands in Liverpool are expected to more than double to 59,300 by 2046[8]. Whilst specialised manufacturing jobs will still form part of the industrial sector across the Western City over the next 30 years there is consensus that a steady decline will be experienced as a result of improving technologies in processing and the continued rise of off-shore competition. Freight and logistics, construction and wholesale industries currently have a degree of specialisation which will continue to be in demand, particularly as a result of ongoing land release in the south-west and the construction of the WSA and Aerotropolis.

The highest rates of growth are anticipated in the professional services and transport and logistics sectors. Whilst higher-value knowledge jobs ('smart jobs') will be in demand across the LGA's employment lands, most are anticipated to be based around the WSA and in the Aerotropolis.

1.5 Understanding the Changing Demands and Drivers

Land use and built form in employment lands across the world began to undergo change in the 1990s with increased access to the internet and technological advancements in mechanisation which fundamentally shifted sectors away from the traditional Fordist industries[9]. Further advances in technologies coupled with lifestyle improvements and the rise of global competition and globalization has demanded innovation and specialization to create competitive niche industries[10]. These global shifts have impacted on the types of jobs that people have, the way they work and the way they collaborate with others day to day. This has impacted drastically on land use and the physical environments emerging within traditional employment precincts.

For industrial employment lands, this has predominantly resulted in one of the following scenarios:

[7] Liverpool Industrial Employment Land Study, Knight Frank August 2016
[8] Liverpool Industrial Lands Study, SGS Economics and Planning July 2018
[9] Working futures: the changing nature of work and employment relations in Australia, Callus, Ron 2002
[10] Liverpool Industrial Employment Land Study, Knight Frank August 2016

1.5.1 Industrial Parks

The need for space in general industry still remains, notwithstanding the rise of mechanisation and advances and specialization in sectors such as manufacturing. In fact, the success of large-scale industrial cities which are home to a variety of warehousing, distribution, aerospace, port facilities, mining and extractive industries has continued in China, Europe, the Middle East and North America over the past few decades[11]. Successful Industrial Parks are those that are diverse by the nature of their activities and physical forms but are also well connected and serviced by major transport and digital infrastructure and are well planned in advance of development. Eastern Creek in the Western Sydney Employment Area is a good example of a modern industrial park which has been strategically planned to support general industries.

1.5.2 Specialised Urban Services Precincts

Industrial lands positioned around the edges of cities or in outer-suburban locations have the opportunity to become specialist urban services precincts where the demand for local services and

[11] Suzhou Industrial Park celebrates 25 years http://www.chinadaily.com.cn/cndy/201904/12/content_37457505.htm

materials is still high. In Australia, these precincts are either existing or newly planned and developed small-scale industrial estates comprising strata title multi-unit complexes. These precincts accommodate a range of light industrial operations including construction and trade services, storage, advanced manufacturing, plant equipment repair and hire, auto repairs and fabricators[12]. Newly developed versions of these precincts are incorporating sustainable methods of construction and operations and their workspaces are decreasing in size and becoming more efficient[13].

1.5.3 Innovation Precincts

Innovation Precincts are genuine mixed-use precincts that often form around the edge of a catalytic anchor such as a hospital, research centre or university. They typically occur as a result of urban renewal in an inner-city setting which has good access to public transport, walkability, a strong sense

[12] The future of Greater Sydney's Urban Services, SGS Economics and Planning https://www.sgsep.com.au/news/latest-news/future-greater-sydneys-urban-services
[13] Liverpool Industrial Employment Land Study, Knight Frank August 2016

of history and place and excellent amenity for workers[14]. Innovation in these precincts is not only drawn from the creative industries that tend to occupy them, but also from the inspiration incited by the urban setting. Land use is both complementary and conflicting in these precincts, owing to the planned and unlikely collaboration and co-existence that can occur to create a truly dynamic place. Residential and retail elements often form core components of these precincts to drive vibrancy and a 24-hour collaboration economy. The Victorian Government's recent establishment of a new Commercial 3 zone typifies the growth and attraction of Innovation Precincts in areas like West Melbourne.

The demands for building and planned space, transport and access, environmental settings and interface treatments are broad and area-specific. Planning for land use, development outcomes and initiatives to encourage job retention and growth therefore need to be consciously grounded in an understanding of economic, environmental, social and technological drivers. These are examined in greater detail in Chapter 2 of this Study.

[14] Reimagining the Liverpool Health, Education, Research and Innovation Precinct, PWC August 2017

1.6 What Is Best Practice?

Council in collaboration with the Greater Sydney Commission (GSC), the Department of Planning and Environment and others have long recognised the need to review and revisit land zoning provisions, objectives and development controls to reflect and accommodate the changing needs of industry. This Study has investigated international and domestic approaches in land use planning and development across Industrial Parks, Specialist Urban Services Precincts and Innovation Precincts to provide insights and ideas for possible changes to Liverpool's local planning framework. Approaches deemed 'best practice' from the case studies have been qualified in the literature on the basis that they have generated significant economic returns, ensured job growth and retention or have delivered on the original precinct vision or objective.

Planning as a broad discipline first needs to consider the question: ***who are we planning for and why?*** In the context of employment lands in Liverpool the changing demographics of the workforce and the continued goal of delivering safe, flexible and attractive places for people to work is understood. Certain precincts have been identified as potentially more suited to a changing economic role given their scale, environmental parameters and proximity to growth in the Liverpool City Centre and Collaboration Area. Other precincts will continue to serve an important economic role as producers and distributors reliant on access to motorways, freight rail and the WSA, however, the changing nature of jobs and spaces in these precincts requires ongoing consideration.

Getting the land use zoning and planning framework right is therefore fundamental to successful growth and transition. In this Study we consider how zoning in places like North America and Europe has been reformed to attract new industries, protect important traditional and heavy industries and encourage change through diversity. Floor area bonuses and height incentives are just some examples of planning approaches applied universally as a means of generating desired land use in new and existing employment precincts. Domestically, the identification of precincts by both State and local governments in land use planning for particular outcomes have laid clear platforms for the successful development of precincts such as the Bentley Technology Park in South Perth.

Land use zoning and planning for built form and environmental outcomes are one part of the equation in delivering successful employment precincts. Economic, social, environmental and political drivers and demands all need to be considered in formulating mechanisms to encourage growth and change. A series of successful initiatives which have been implemented abroad and in Australia have been examined in this Study. These include planning incentives within legislation and local plans, the formation of joint partnerships and transparent governance structures, funding mechanisms, the relocation of catalytic anchors and other financial incentives which have provided cities and regions with continued job growth and excellence in industry.

1.7 Review and Recommendations for Liverpool

The Planning Review undertaken in Chapter 6 includes a series of recommended strategies for Council to consider based on the best-practice case studies examined in Chapters 4 and 5. These consider wholesale changes to the three industrial zones to better align established precincts for the future based on current and future employment trends. Changes to minimum lot size, maximum building height and FSR standards under LLEP 2008 are also discussed.

The review has highlighted that the current zoning framework objectives and land use provisions are too broad, contradictory and unnecessarily duplicative. Differences between the IN1, IN2 and IN3 zones are slight and do not clearly define intended outcomes for different precincts. The result has been a dilution of the character and specific economic roles of Liverpool's employment precincts. In some cases, this will lead to a decline of investment from larger operators who are at risk of relocating around the Aerotropolis[15].

The consistency of numerical standards across the industrial precincts has also fueled homogenous outcomes which erodes specialised built form and land characters. This Study recommends the incorporation of subtle changes to standards and restructuring of industrial zones to better refine the specific character of each precinct.

Council's brief to investigate the function of a B7 Business Park zone has also been pursued. Currently, the B7 zone does not apply in the LGA. Other examples of modified B7 zones across Greater Sydney have been examined in the context of transitioning the Scrivener/Priddle Street precinct into some form of Innovation Precinct. Previously identified by the GSC in their Liverpool Collaboration Area – Place Strategy, the precinct is well positioned to leverage on the growth of the health and education cluster in the eastern edge of the city centre. This Study affirms that opportunities to transition this precinct in connection with the adjoining low-density residential area to the north should be pursued through rezoning, development of a visionary master plan and careful consideration of new controls and incentives.

[15] Liverpool Industrial Employment Land Study, Knight Frank August 2016

2. Industrial, Employment and Innovation in Liverpool

In order to establish the context for this Study the suite of State and Local planning, infrastructure and investment strategies and policy reports are reviewed and summarised. Each of the industrial precincts in the LGA are then reviewed. A SWOT analysis for each precinct has been undertaken to confirm the future threats and opportunities to economic growth, job retention and investment from developers and industrial operators.

2.1 Strategic Planning Context

2.1.1 Greater Sydney Region Plan

The Greater Sydney Region Plan produced by the GSC includes a plan for the Sydney Metropolitan Area. It establishes the core principle of creating and harnessing the value in three 30-minute cities: The Eastern Harbour City, Central River City; and Western Parkland City. Liverpool is identified as a Metropolitan City Cluster in the Western Parkland City whose economy is projected to grow with the development of the WSA. Investigations and commitments for State significant transport infrastructure is also identified including a future mass-transit connection between Bankstown and Liverpool, the M9 Outer Orbital and M12 Motorway, Bringelly Road and The Northern Road upgrades and rapid bus transport services connecting Liverpool to the Aerotropolis and WSA.

The Plan identifies Liverpool as a Collaboration Area. This is a direction by government which identifies the need for collaboration between all agencies and community stakeholders to contribute to better forward place-making for Liverpool. The Collaboration Area is to be well-connected and vibrant with a core focus on leveraging on the growth and development of its health and education precinct and pharmaceutical cluster.

Figure 1 Extract from Western City District Plan – Industrial Lands

Existing industrial zoned lands to the east of the Liverpool City Centre are designated as 'Review and Manage'. This means that these lands require review to confirm whether they should be retained or transition to higher order activities, considering the changing nature of industry and demand. Industrial zoned lands to the west of the city are designated as 'Plan and Manage'. This necessitates that strategic plans are prepared to determine the need for industrial land in release areas in connection with the delivery and timing of infrastructure.

2.1.2 Western City District Plan

The Western City District Plan establishes a series of overarching planning priorities and directions for infrastructure investment, governance, liveability, productivity, sustainability and implementation. It acknowledges the opportunities, strengths, weaknesses and challenges facing Western Sydney from a housing, jobs, place-making and environmental perspective.

Liverpool is the largest Metropolitan City Cluster in the Western Parkland City and is also geographically the closest to the WSA and Aerotropolis. The Plan acknowledges the significance of Liverpool's role as a specialist industry leader in manufacturing, construction, transport and logistics. It also notes the need for the city's employment lands to be adaptive, flexible to change and resilient in the face of globalization and competition.

Importantly, it establishes the following key planning priorities for jobs and skills in the Western City:

W8: Leveraging industry opportunities from the WSA and Aerotropolis

W9: Growing and strengthening the Metropolitan Cluster

W10: Maximising freight and logistics opportunities and planning and managing industrial and urban services land

W11: Growing investment, business opportunities and jobs in strategic centre.

Key actions and issues identified in the District Plan for the Liverpool City Centre and Collaboration Area include improving and coordinating transport and other infrastructure to support job growth and developing 'smart jobs' around the health and education precinct, especially in advanced manufacturing, logistics and automation.

2.1.3 Liverpool Collaboration Area – Place Strategy

The Liverpool Collaboration Area identified in both the Greater Sydney Region Plan and the Western City District Plan incorporates the Liverpool City Centre and surrounding precincts including specialist health, education, residential, urban services and industrial areas. The aim of the Collaboration Area is to provide governance to the delivery and improvement of coordinated infrastructure, land use planning initiatives, sustainability outcomes and place making principles.

The Place Strategy identifies the significance of Liverpool as a health and education cluster with opportunities to leverage research, scientific and technical industries around the CBD as part of a pharmecuiticals cluster[16].

Figure 2 Artistic Impression of the Liverpool Collaboration Health and Education Precinct

The analysis of opportunities and impediments to productivity in the Collaboration Area identifies the following:

- The City Deal ensures that Liverpool will be home to the Western Sydney Investment Attraction Office; will benefit from connections to aerospace, defence and advanced manufacturing industries related to the WSA; and be connected to the airport via rapid bus transport services.
- The health and education precinct offers opportunities for expansion and greater diversity of jobs on the back of $740 million allocated to the expansion of the Liverpool Public Hospital, ongoing presence of Western Sydney University and emergence of the University of Wollongong and growth in medical technologies.
- Education stakeholders have joined with Council, Ingham Institute for Applied Medical Research and Health Infrastructure to form the Liverpool Innovation Precinct Steering Committee to guide and promote growth of the precinct.
- Warwick Farm's specialised equine activities will continue to attract domestic and international visitation centred around the racecourse.
- Moorebank North industrial precinct is continuing to strengthen, having generated 7,500 jobs in specialised manufacturing, postal, transport and logistics.

[16] Liverpool Collaboration Area Place Study, Greater Sydney Commission September 2018

- The Liverpool Employment Land Study has identified opportunities to re-purpose some sites located close to the City Centre to respond to growth opportunities, particularly those generated by the health care sector.

The Collaboration Area is an important governance tool in the context of this Study. It has already largely identified the productivity, land use and development opportunities and market conditions of Liverpool's industrial zoned lands. The next steps for Council and the State Government through the mechanism of the Collaboration Area is to implement more focused rezoning, infrastructure and development priorities for the employment precincts which are detailed in Section 2.2 of this Study.

2.2 Local Employment Land and Market Studies

Council has previously commissioned Knight Frank and SGS to undertake Industrial Employment Land Studies for the industrial zoned lands and precincts identified in Section 2.2.

2.2.1 Knight Frank Liverpool Industrial Employment Lands Study

The Knight Frank study investigated current market conditions, factors affecting supply and considered the future demand for industrial activities. It establishes that global competition is placing increased pressure on larger industrial operations to specialise and innovate. It also highlights the importance of continuing to protect and encourage growth in smaller-scale urban services industries which support construction, trade, maintenance and repair jobs which are considered the backbone of Liverpool's specialist industrial economy. Manufacturing based employment was found to constitute 46% of blue-collar jobs in Liverpool and the report identifies the future challenge in diversifying this existing skills base, particularly with indicators suggesting a continued decline in this sector[17].

The Knight Frank study also identified the need to release larger tracts of appropriately zoned and serviced employment lands across the western portion of the LGA to leverage on the investment of the WSA and to meet future employment demands. The investments by government outlined in the City Deal in the M9 Outer Orbital, M12 Motorway, future Freight Line and other recent and ongoing upgrades to the arterial motorway network were identified as significant opportunities to grow sub-regional industrial precincts for warehousing, freight and distribution activities.

With respect to the existing eastern industrial precincts the report acknowledged the physical limits and future constraints to their growth but also highlighted the significance from an economic perspective to preserve and diversify urban services jobs. These smaller precincts are predominantly made up of sole-trader and small-business operators who on average employ less than 4 people and typically occupy sites and spaces of 1,500m² or less[18]. These precincts however do still contain larger

[17] Liverpool Industrial Employment Land Study, Knight Frank August 2016
[18] ibid

freight, logistics, postal, transport and manufacturing operations who have existed for decades and whose businesses are firmly grounded within a local consumer market.

2.2.2 SGS Economics and Planning - Liverpool Industrial Lands Study

The SGS report provided a focused understanding of the role and function of industrial precincts and the future demand that growth will create. It comprehensively detailed the impacts of a growing population on Liverpool's economy and provided a snapshot of market trends and drivers likely to impact the precincts. It also broadly considered opportunities to rezone certain industrial lands and provided recommendations to Council to investigate best-practice land use, planning controls and initiatives to drive growth, ensure job retention and encourage ongoing diversity and resilience in the sectors.

It confirmed that whilst industrial land supply currently exceeds future demand due to the forthcoming industrial corridor stretching along the edge of the WSA and Aerotropolis, not all of the land was zoned appropriately for sub-regional uses. In contrast, there was an identifiable supply issue for urban services industries that rely on close proximity to established centres of population and business, hence the recommendation to protect and manage the eastern industrial precincts[19].

The study called into question the suitability and application of the current zoning framework under LLEP 2008. It acknowledged the broad objectives of each of the three industrial zones and identified unnecessary overlap and inconsistencies between land uses. It also acknowledged a need to revise the current zoning of precincts to better represent the character and importance that each precinct plays in the local economy. A review of development controls and planning initiatives was also highlighted as part of a next steps approach which is discussed in Chapter 6 of this Study.

[19] Liverpool Industrial Lands Study, SGS Economics and Planning July 2018

2.3 The Precincts

This section includes a brief description and Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis of each of the industrial zoned precincts in the Liverpool LGA which are shown in Figure 3 below. The information supplied is a collation of information obtained from previously commissioned reports, investigations into land use planning and environmental constraints and discussions with locally based developers and agencies.

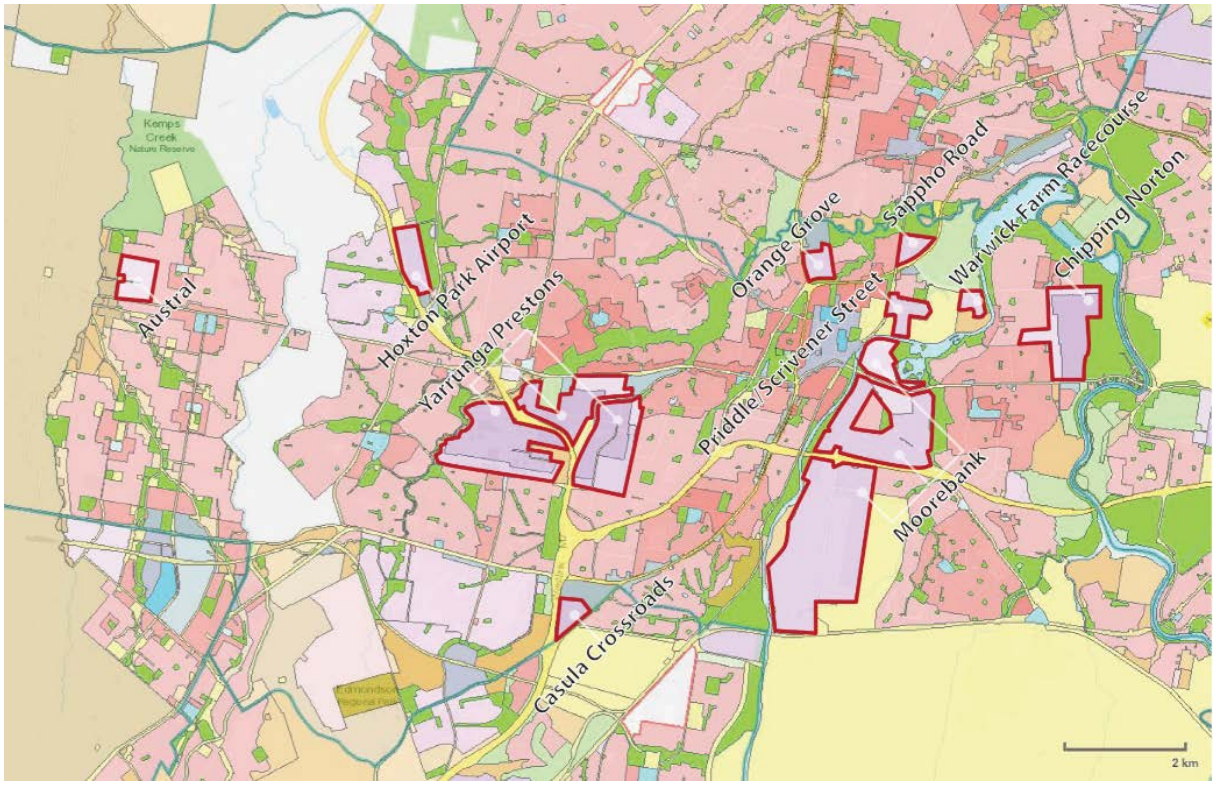


Figure 3 Zoning Map highlighting the location of the Liverpool Industrial Precincts

2.3.1 Chipping Norton

CHIPPING NORTON

Top: Figure 4 Extract of zoning map showing the Chipping Norton Industrial precinct
Right: Figure 5 Modern unit complex in Chipping Norton
Left Figure 6 Older storage / industrial units in Chipping Norton
https://www.realcommercial.com.au/property-industrial+warehouse-nsw-chipping+norton-502867642

Established in the 1970s, the Chipping Norton Industrial Area is one of the largest established industrial areas in South-West Sydney. It benefits from direct access to Governor Macquarie Drive to the north connecting to the Hume Highway and Liverpool CBD as well as the Bankstown Airport via Newbridge Road to the south.

Zoning: IN3 Heavy Industrial and IN2 Light Industrial
Height Limit: 15m – 30m
Lot Size: 2,000m²

FSR: 0.75:1

Built Form and Land Character: Mixture of both older and modern strata title multi-unit complexes with some larger warehousing stock. Lot sizes in the precinct vary from 470m² through to 4.1ha. Building heights are predominantly 1-2 storeys and floor-plates generally occupy between 60-80% of the allotment area.

Industrial Use Character: The precinct accommodates a broad mix of urban service uses including repairs, maintenance, construction, storage, plant hire and equipment, wholesaling, trade suppliers, scrap and metal recycling. Some larger warehousing, transport and logistics operations are also within the precinct.

Strengths	Weaknesses
▪ Connections to major arterial roads (Newbridge Road and Governor Macquarie Drive), providing direct access to the M5 and Hume Highway ▪ Within 1 kilometer of Bankstown Airport ▪ Established precinct with a strong local economy and defined land use character ▪ Centrally positioned with access to Liverpool CBD and Collaboration Area as well as nearby strategic centres of Bankstown and Campbelltown ▪ Within 5km of the future Moorebank Intermodal Terminal ▪ Genuine Urban Services Precinct with a diversity of businesses serving established residential communities ▪ A mixture of complementary existing business, interacting to create hubs for urban services uses	▪ Land use conflicts and lack of a defined edge between light industrial and residential precincts to the west and north ▪ Lack of public transport linkages, currently restricted to bus routes along Newbridge Road and Governor Macquarie Drive which connect the industrial areas to Liverpool, Bankstown and smaller suburban centres. ▪ Traffic issues around capacity and safety with conflicts between trucks and residential traffic ▪ Road network is constricted and too narrow to cater for existing truck traffic ▪ Older building stock is in decline, with a mismatch of allotment sizes, building types and access arrangements ▪ The area generally features aging infrastructure and amenity
Opportunities	**Threats**
▪ Growth and synergies associated with the Moorebank Intermodal ▪ Opportunities for urban renewal and increased industrial densities ▪ Improved building stock and renewal opportunities good resolved planning controls	▪ New industrial precincts with modern, purpose-built stock in new industrial parks to the west of Chipping Norton may draw businesses away, leading to vacancies in older stock ▪ Existing infrastructure is not conducive to fast and efficient operational flow when compared to emerging industrial precincts positioned with direct motorway access

▪ Still some opportunities for smaller-lot subdivision to occur to provide for additional multi-unit complexes ▪ Better activate and provide for urban services jobs through a heightened focus on precinct amenity and walkable connections ▪ Opportunity exists to investigate linkages, active transportation and connections existing open space ▪ To improve physical interface to residential areas ▪ Sustained growth in local construction and infrastructure sectors likely to drive demand for urban services	▪ Traffic and congestion issues continue to lead to a loss of larger, established industrial anchors, creating a flow-on effect of vacancy as the supporting peripheral and complementary industrial businesses follow and vacate ▪ Land use conflicts between a range of uses and heavy industrial operators that require greater levels of separation

2.3.2 Moorebank

MOOREBANK

Top: Figure 7 Extract of zoning map showing the Moorebank Industrial precinct
Right: Figure 8 View of logistics development in Moorebank
Source: https://www.commercialrealestate.com.au/property/moorebank-logistics-park-moorebank-nsw-2170-12709546
Left: Figure 9 Artistic impression of Moorebank Logistics Park
Source: http://qubemlp.com.au/2017/08/23/target-australia-commits-qube-moorebank-logistics-park/

The Moorebank Industrial Area is positioned to the south of Liverpool CBD and its northern portion sits within the Collaboration Area. It benefits from direct access to the M5 Motorway and is 800m from the Liverpool train station at its north western corner. The southern portion of the precinct will comprise the Moorebank Intermodal Terminal a new transport connection facility for freight containers transported from Port Botany via rail.

Zoning: IN1 General Industrial and IN2 Light Industrial

Height Limit: 15m – 21m
Lot Size: 2,000m²
FSR: 0.75:1 – 1:1

Built Form and Land Character: Diverse – comprising large floor-plate warehousing and distribution centres alongside strata title multi-unit complexes and older factory style buildings. Lot sizes vary from 325m² through to 83 hectares.

Industrial Use Character: Main land use activities include freight, transport, warehousing and wholesale supplies owing to the access to the M5 and M7 Motorways and now the Intermodal. Clusters of urban services including construction services and trades.

Strengths

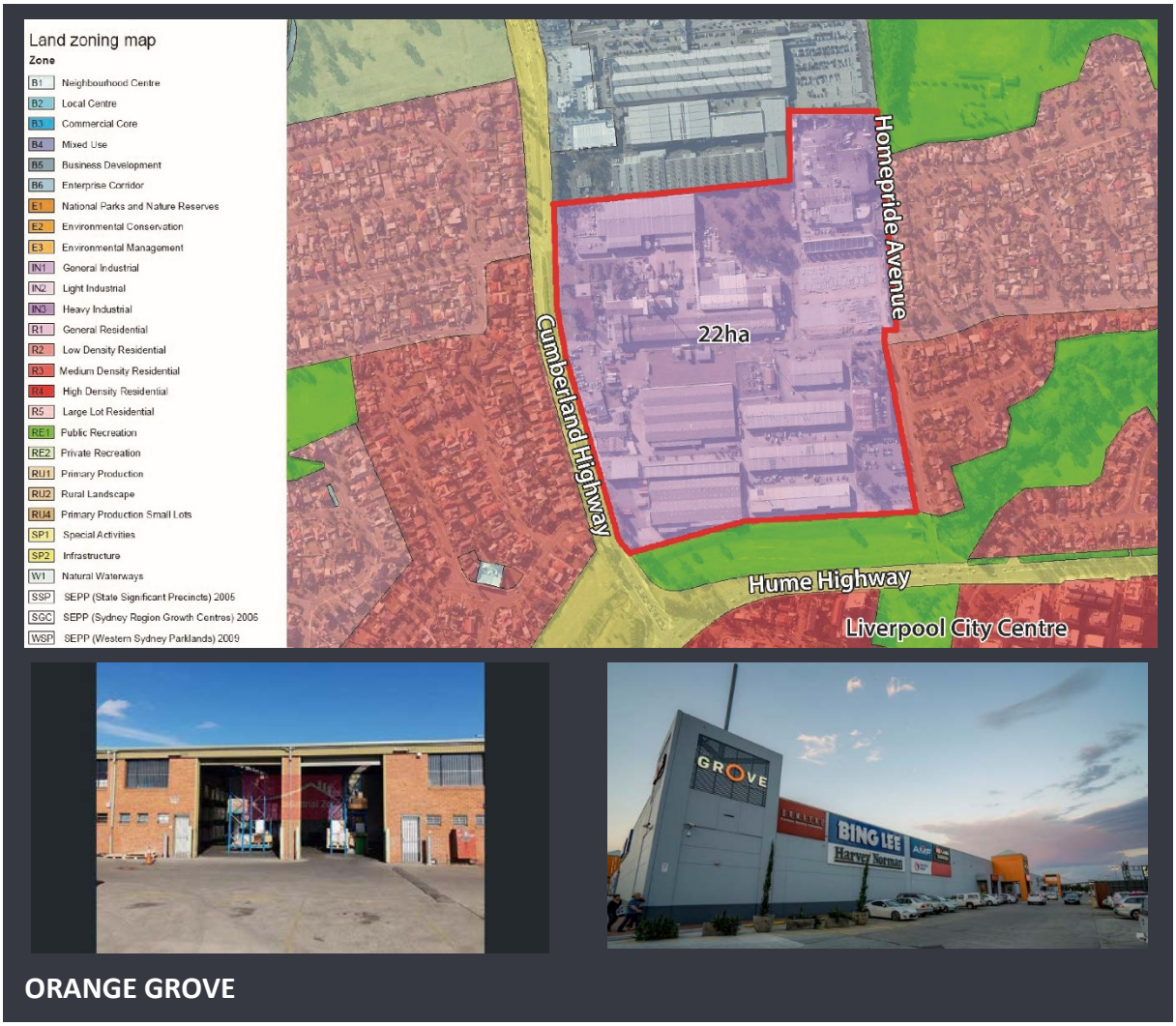
- Direct access to the adjoining arterial road network, with both the Moorebank Avenue M5 interchange and Heathcote Road Interchange located within the precinct.
- Future road infrastructure will further strengthen this precinct's accessibility, with the establishment of the M12 providing connections to Western Sydney Airport and surrounding areas.
- The future Intermodal Terminal will provide direct access to Port Botany, strengthening the areas connection with other industrial and commercial areas of Greater Sydney
- Established precinct with a strong local economy and defined land use character
- Centrally positioned with access to Liverpool CBD and Collaboration Area as well as other Metropolitan City Clusters including Penrith, Campbelltown and larger industrial precincts to the north at Eastern Creek, Wetherill Park and Ingelburn to the south-west.
- Within 1km of Liverpool Trains Station, with interconnecting bus services throughout the precinct

Weaknesses

- Established low density residential area positioned in the centre of the precinct, limiting expansion and suite of heavier, more intensive industrial uses
- Traffic issues around capacity and safety with conflicts between trucks and residential traffic
- Shared vehicular access to the southern residential portion of this precinct creates additional conflict between residential and industrial land uses
- Competing interests from light industrial, retail and other operators seeking to establish within the precinct

Opportunities	Threats
▪ Growth and synergies associated with the Moorebank Intermodal ▪ Available land in the southern portion of the precinct still to be developed ▪ Further opportunities to leverage industrial growth centred around the development and future operations of the Intermodal Terminal ▪ Future opportunities for further strata-title subdivision of larger building stock as it vacates and relocates to new industrial areas in Greater Western Sydney ▪ Continued growth in freight, logistics and distribution activities will see demand well-located facilities to serve both e-commerce and traditional goods dispersal throughout Sydney	▪ Increasing threat of impacts from creative spaces, incubators, retail and other specialist uses entering the precinct with likely disruption to larger, heavier operators ▪ Traffic and congestion issues continue to lead to a loss in productivity, prompting businesses requiring larger floorspace and associated transport types to relocate to areas with easier access and room to expand. ▪ Direct competition from future and emerging logistics and transportation precincts earmarked for the Aerotropolis and Western Sydney Airport

2.3.3 Orange Grove



Top: Figure 10 Extract of zoning map showing the Orange Grove Industrial precinct
Right: Figure 11 View of the Grove Retail Development to the north
Source: https://www.gazcorp.com/the-grove-homemaker-centre
Left: Figure 12 Older factory unit stock on Homepride Parade
Source: https://www.realcommercial.com.au/property-industrial+warehouse-nsw-warwick+farm-502874890

A small (22ha) pocket of industrial land positioned to the immediate north of the Liverpool City Centre bounded by Orange Grove Road to the west and Hume Highway to the south. The precinct is one of the oldest within Liverpool's Local Government Area, with the northern portion having transitioned to a business and retail focused zone over the past 15 years. Older factory stock is currently unoccupied and ageing, however new strata title unit development is occurring on the eastern edge of the precinct.

Zoning: IN1 General Industrial
Height Limit: 15m
Lot Size: 2,000m²

FSR: 0.75:1

Built Form and Land Character: Typically comprises older-style factories and warehouse buildings that are in a state of decline, situated on large lots (between 1-8ha). Some recent multi-unit stock is currently under construction whilst a larger unit complex constructed in the 1960s occupies the southern part of the precinct.

Industrial Use Character: Characterised as ageing and vacant sites intermixed with new redevelopments in multi-unit stock which is driving urban renewal and re-investment. Predominantly 1-2 storey buildings with large floor-plates. Comprises a range of local urban and trade services with some specialised manufacturing.

Strengths	Weaknesses
▪ Directly adjacent to Liverpool CBD, within the established Collaboration Area ▪ Well placed to take advantage of urban renewal given the declining state of building stock and emergence of new and redevelopment of sites for specialised urban services and booming new retail precinct to the north at The Grove and Fashion Spree ▪ The precinct is directly connected to both the Cumberland Highway and Hume Highway ▪ Existing public transport linkages connect this precinct with Liverpool CBD and Station, as well as surrounding residential areas and suburban centres	▪ Much of the existing building stock is currently vacant or in decline, with many of the sites no longer fit for purpose ▪ Traffic issues around capacity with improvements required to the Hume Highway and Orange Grove Road to support new development ▪ Poor pedestrian access to Liverpool Train Station and CBD, with the precinct separated by the Hume Highway ▪ Poor pedestrian and cycle connections throughout the precinct ▪ Bounded by existing residential precincts to the east which limit potential growth ▪ Known contamination issues in this precinct may deter development in this area
Opportunities	**Threats**
▪ Urban renewal and adaptive re-use of older building stock could bring about successful incubator and innovative industrial space, creating a strong character and distinctive built for typology which may attract emerging industries and uses ▪ Strong demand for urban services given proximity to surrounding residential areas	▪ Lack of investment and clarity of a clear direction for this area could see the precinct continue as an industrial wasteland ▪ Traffic and congestion issues continue to lead poor accessibility, prompting businesses and industry requiring ease of vehicular flow to relocate elsewhere

- Large sites which could be subject to further Torrens and strata title subdivision and increased densities
- With the exception of the eastern boundary, this precinct features low-impact interfaces to residential and other surrounding sensitive land uses
- Opportunities to integrate with the successful retail precinct in the north sector of this precinct, which serves a key driver to stimulate activity within the area

- Missed opportunities for government to create real change and drive urban renewal through complicated planning processes
- Without sufficient upgrades to vehicular access, public transport, pedestrian movement, coupled with declining existing public amenity, this precinct may struggle to secure an anchor business or usage cluster to underpin urban renewal across the area
- Poor built form quality of new unit stock being delivered under complying development processes, bypassing Council

2.3.4 Priddle/Scrivener Street (Warwick Farm)

PRIDDLE/SCRIVENER STREET (WARWICK FARM)

Top: Figure 13 Extract of zoning map showing the Priddle/Scrivener Street Industrial precinct
Right: Figure 14 View of the Direct Freight site and development
Source: https://www.directfreight.com.au
Left: Figure 15 Older large-format factory / warehousing on Priddle Street
Source: https://www.griffinproperty.com.au/8-priddle-street-warwick-farm-194

A 25ha pocket of industrial zoned land positioned to the immediate east of the Liverpool City Centre. Within the suburb of Warwick Farm and identified in the Liverpool Collaboration Area the precinct is home to a mix of large-scale freight, manufacturing and smaller scale urban services industries. It is bounded by the Sydney Water Recycling Plant to the east, the Liverpool Hospital to the west, the Georges River to the south and an older low-density residential area to the north.

Zoning: IN1 General Industrial

Height Limit: 15m
Lot Size: 2,000m²
FSR: N/A

Built Form and Land Character: Predominantly dated built form stock in the form of a few large warehouses and strata title units, as well as other historic industrial buildings. Typically, the built form occupies the majority of the lot area with lot sizes between 500m² and 4ha.

Industrial Use Character: Paper, pulp and recycling, specialised manufacturing, technology and medical industry with supportive trade, repairs and maintenance operators.

Strengths

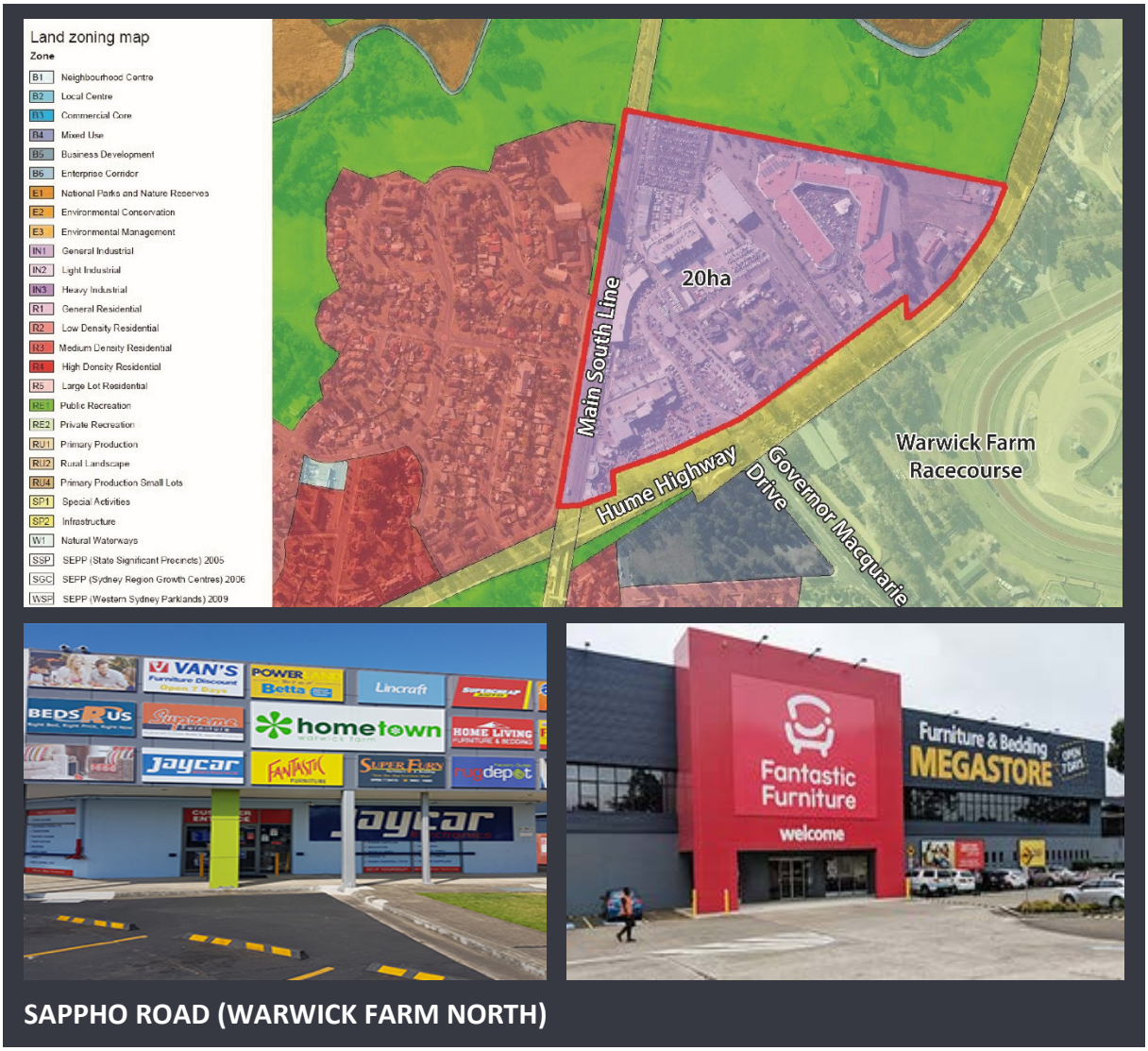
- Directly adjacent to Liverpool CBD, within the established Collaboration Area
- Direct access to Liverpool Hospital and broader established health and education precinct
- Strong existing access to public transport, Warwick Farm train station within 500 metres of this precinct
- Close proximity to specialised equine entertainment precinct at Warwick Farm Racecourse
- Nearby links to natural amenity, open space and dedicated recreational precincts along Georges River
- Although this precinct is small, the area and existing commercial and industrial uses provides strong economic output due to location and established uses and businesses

Weaknesses

- Interfaces with non-compatible uses including low density residential to the north, Sydney Water Recycling Plant to the east and equine horse stabling facilities
- Constricted and aging road network provides access to this precinct which is not conducive to large truck movements
- Shared roads and access points to the precinct provide conflicts between industrial and residential traffic, which require rectification in order to deliver a safe and usable vehicular network
- The existing rail infrastructure severs this precinct from Liverpool CBD, with little direct pedestrian and cycle access to the established commercial and health hubs of Liverpool
- Ageing industrial stock is no longer fit for purpose – particularly larger warehouses which are becoming vacant. Precinct cannot compete with sub-regional precincts positioned on arterial motorway network
- Odour impacts and buffer required to the adjoining treatment plant, creating restrictions and complications for further development within this precinct

Opportunities	Threats
▪ Opportunities to leverage on proximity to the health and education precinct to create an innovation precinct servicing health, research and science industries ▪ Improve local amenity to the precinct population through upgraded local road, cycle, pedestrian and open space networks ▪ The existence of the established entertainment precinct at Warwick Farm Racecourse provides a unique opportunity to leverage this industry and integrate supporting industries and businesses throughout a redeveloped precinct ▪ The presence of Warwick Farm Racecourse also provides additional entertainment amenity to the precinct, a feature which may encourage redevelopment within the area ▪ Continued demand and growth in specialised urban services and manufacturing operations close to Liverpool CBD ▪ Opportunities for redevelopment, strata subdivision and re-purposing of older built stock to attract more creative and professional industries	▪ Continued presence of ageing and isolated low-density residential area in the Northern portion of the precinct, which is incongruent to the overall current use and tenancy mix of the precinct ▪ Advancements in technology may be unable to adequately mitigate the impact of odour present in the precinct, which will stagnate growth and investment potential ▪ The need to provide good connectivity to the hospital and CBD over or under the railway. If connectivity is not achieved as a priority, development and investment within this precinct will suffer significantly ▪ Ongoing vacancy of existing operators – transition to new innovative uses needs to be economically viable ▪ Alterations to current land use and planning may displace successful industries currently operating within the precinct.

2.3.5 Sappho Road (Warwick Farm North)



SAPPHO ROAD (WARWICK FARM NORTH)

Top: Figure 16 Extract of zoning map showing the Sapho Road Street Industrial precinct
Right: Figure 17 Fantastic Furniture Megastore
Source: https://www.jaycar.com.au/store/WarwickFarm_JaycarAU?lat=-33.908626&long=150.939695
Left: Figure 18 Retail outlets in Sapho Road
Source: https://www.fantasticfurniture.com.au/store-finder/store/Warwick%20Farm

This precinct is a triangular shaped 20ha precinct positioned in the northern part of Warwick Farm to the north of the Hume Highway and east of the train line. It adjoins a open space to the north and a medium density residential area to the west.

Zoning: IN1 General Industrial
Height Limit: 15m
Lot Size: 2,000m²

FSR: N/A

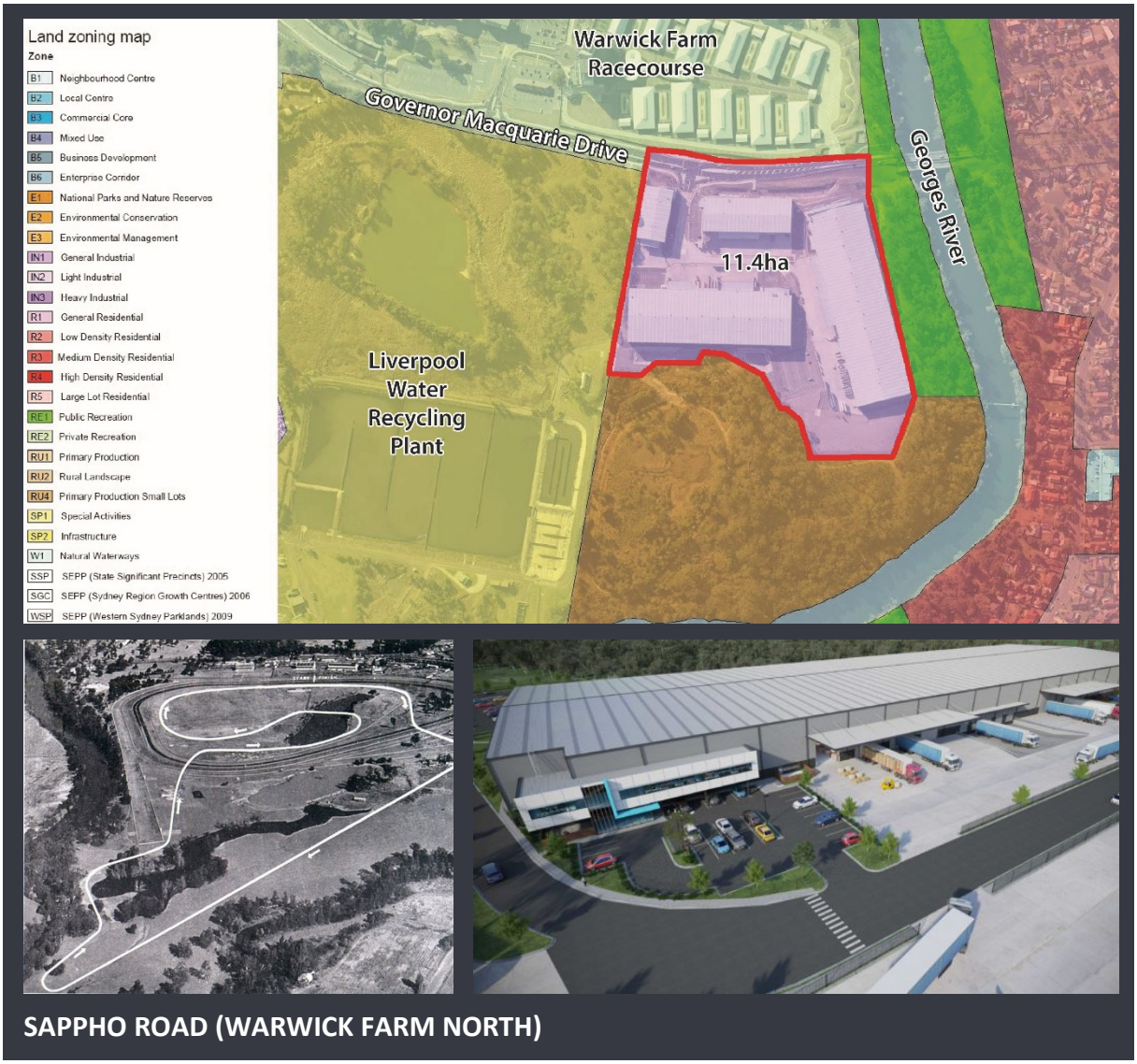
Built Form and Land Character: Highly varied built form character owing to the mixed nature of retail and service uses. Open hard-stand display yards and residential display homes.

Industrial Use Character: Predominantly retail and bulky goods including an existing Motel, car dealership and sales yard and Masterton Homes Display village. This precinct does not currently reflect its industrial zoning.

Strengths	Weaknesses
▪ This precinct is features direct frontage to the Hume Highway, providing access to Liverpool CBD, Bankstown and greater Sydney ▪ An expansive open space area to the north forms part of this precinct ▪ Warwick Farm Racecourse is easily accessible to the south and east of this precinct, providing am ▪ Strong existing linkages to public transport through access to bus established bus routes and within 500 metres of Warwick Train Station ▪ Existing retail and commercial tenants provide strong economic output. The main commercial anchors are well established and landmark destinations for their serviced sectors, providing an onflow of strong commercial activity in the surround retail and bulky goods businesses.	▪ Interface to medium density residential along the western boundary will limit intensification ▪ Long established successful retail uses in the precinct conflict with industrial zoning ▪ Despite being closely located to both Warwick Farm station and Liverpool CBD, the Hume Highway disconnects the precinct from the CBD area to the South. Connectivity would need to be improved to full develop this precinct into an extension of Liverpool's city centre.
Opportunities	**Threats**
▪ Rezoning to affirm the existing retail nature of the site to accommodate growth in bulky-goods, display centre and take away food outlets	▪ Incorporation of new development and interest from new operators could displace existing successful businesses

▪ Improve connections to Liverpool CBD and Warwick Farm train station through new pedestrian and cycle connections which take advantage of the precinct's location within the greater Liverpool commercial core ▪ Due to the precinct's proximity to public transport, road infrastructure, Liverpool City Centre and the established health precinct centering on Liverpool Hospital, the precinct is well positioned to adapt over time to support the growing and changing nature of industrial precincts within Liverpool	▪ Continued disconnection of this precinct will result in ageing stock and possible vacancies into the future ▪ Competition from competing comparable precincts with improved amenity and access may drive existing tenants and businesses to vacate

2.3.6 Warwick Farm Racecourse (Coopers Paddock)



SAPPHO ROAD (WARWICK FARM NORTH)

Top: Figure 19 Extract of zoning map showing the Coopers Paddock Industrial precinct
Right: Figure 20 Artistic impression of the new Stockland Industrial Unit development
Source: https://www.nettletontribe.com.au/projects/stockland-warwick-farm/
Left: Figure 21 Aerial view of the adjoining racecourse
Source: http://www.speedwayandroadracehistory.com/sydney-warwick-farm-raceway.html

Positioned to the immediate south of the Warwick Farm Racecourse and specialised equine precinct Coopers Paddock is a small (11.4ha) pocket of industrial zoned land which benefits from direct access to Governor Macquarie Drive.

Zoning: IN1 General Industrial
Height Limit: 18m
Lot Size: 2,000m²

FSR: N/A

Built Form and Land Character: Recently constructed warehouse facilities by Stocklands with internal access roads and at-grade car parking.

Industrial Use Character: Small-scale warehousing, logistics and distribution facilities comprising ancillary office areas. Modern industrial complex with contemporary facilities and good on-site amenity for workers.

Strengths	Weaknesses
▪ Well positioned with direct access to Governor Macquarie Drive ▪ The recent development of this area into an industrial precinct included a new intersection to control truck and vehicle congestion. ▪ Recently completed contemporary industrial warehousing stock which is likely to accommodate local workforce over several decades to come	▪ Size and proximity to the Sydney Water treatment plant which limits an expansion or intensification of use due to issues ▪ Increase in industrial density is constrained due to the proximity to residential area, environmentally sensitive lands and the adjacent Liverpool Water Recycling Plant
Opportunities	**Threats**
▪ Proximity to Liverpool CBD and health district may accommodate more research and health-focused industries into the future.	▪ Locational isolation from other precincts will erode opportunities for innovation and collaboration with other industries ▪ As the racecourse precinct expand in the long term, this precinct may be threatened by burgeoning development to the southern side of Governor Macquarie Drive

2.3.7 Yarrunga / Prestons

Top: Figure 22 Extract of zoning map showing the Yarrunga/Prestons Industrial precinct
Left: Figure 23 Large-scale unit and factory development in Prestons
Source: https://www.colliers.com.au/13340/
Right: Figure 24 Logistics development in Prestons
Source: https://www.watchthisspacedesign.com/project-6

The Yarrunga / Prestons Industrial Precinct is one of the largest and most successful employment districts in Liverpool's Local Government Area. It is well connected to the arterial motorway network with direct access to the M5 and M7 motorways and the future M9 Outer Orbital. The area will also benefit from committed and ongoing upgrades to Bringelly Road, The Northern Road and M12 Motorway linking the precinct to the WSA.

Zoning: IN1 General Industrial, IN2 Light Industrial and IN3 Heavy Industrial
Height Limit: 15m – 30m
Lot Size: 2,000m²
FSR: 0.75:1

Built Form and Land Character: Land allotments within the area are fragmented in parts, with sizes varying between 1,500m² and 28 ha. Built form comprises a genuine mix of open-style heavier industrial sites with expansive hardstand and storage areas, some factories, large and smaller warehouses and multi-unit complexes. Building heights are predominantly under 16m and stock is varied in age.

Industrial Use Character: The precincts position on the edge of the M5 and M7 motorways has been suited to freight, logistics, warehousing and distribution land uses, and this is likely to continue to be in strong demand into the future. The Aldi Distribution Centre, Inghams, Mainfreight, Biz Holdings and Sydney Water are some of the anchor tenants in the precinct.

Strengths	Weaknesses
▪ Strong existing transport links to M7 and M5 motorways and future road and rail investments, with future road upgrades such as M12 will strengthen these links ▪ Existing and planned transport infrastructure will provide access to Western Sydney Airport and the Aerotropolis ▪ Direct access to the future Moorebank Intermodal Terminal and Industrial Precinct ▪ Established industrial economy as a sub-regional precinct with limited constraints for a mix of heavy and specialised warehouse industrial ▪ Well positioned to take advantage of growth in logistics, distribution and freight ▪ Internal road network is well equipped to accommodate heavy industrial vehicles	▪ Geographically constrained by hard edges to low density residential areas to the east, west and south ▪ Current configuration of road network creates traffic conflict between trucks and residential traffic ▪ A lack of public amenity servicing the current population, in part owing to the age of the precinct and a lack of adequate public transport and both pedestrian and active transport infrastructure ▪ There is a likely presence of land contamination throughout the precinct, which could inhibit future development with additional capital investment ▪ Much of the existing building stock may no longer be fit for purpose and is a legacy of past uses within the precinct, relying on significant restricting and redevelopment in order to adequately redevelop the area ▪ Opportunities for future subdivision are limited with largely developed nature of the precinct

Opportunities ▪ Well positioned for future growth in innovative industries, freight, logistics and distribution including postal and transport due to both current and planning transport networks and infrastructure ▪ Can also continue to provide sufficient space for supportive urban services and light industries, levering the surrounding established and emerging residential communities ▪ Opportunities to leverage growth on the Western Sydney Airport and Aerotropolis due to both current and planning transport networks and infrastructure	**Threats** ▪ Increased competition from development of release area industrial lands in the Aerotropolis and eastern corridor of Western Sydney Airport, as new and larger industrial areas are developed with ease of access and modern amenity ▪ Existing stock will require ongoing maintenance, retro-fit and space management to stay competitive with Moorebank and the Aerotropolis ▪ As Western Sydney Airport and the Aerotropolis mature, land and rents may already be unaffordable for particular existing businesses as it is anticipated this new infrastructure will have a positive overall effect on rents and land value in areas within close proximity

2.3.8 Crossroads, Casula

Top: Figure 25 Extract of zoning map showing the Crossroads Industrial precinct
Right: Figure 26 Views of the new Logistics Centre at Casula
Left: Figure 27 Views of the new Logistics Centre at Casula
Source: https://www.ampcapitalindustrial.com.au/new-south-wales/nsw-developments/crossroads-logistics-centre-precinct-c

The Crossroads Industrial Precinct at Casula is a small industrial precinct (21 ha) positioned to the south of the Casula Business and Retail Centre. It adjoins the Hume Highway and Campbelltown Road and benefits from internal road access from Beech Road.

Zoning: IN3 Heavy Industrial
Height Limit: 18m – 30m
Lot Size: 2,000m²
FSR: 0.75:1

Built Form and Land Character: The precinct is part of a new subdivision and will be home to the AMP Crossroads Logistic Centre.

Industrial Use Character: 79,000m² net leasable purpose-built and modern warehouse building housing a range of specialised manufacturing uses and logistics including Cosentino, Electrolux and Westrac.

Strengths	Weaknesses
▪ Direct access to both the M7 and M5 Motorways interchanges, which provides transportation links to key commercial precincts around Sydney, making this precinct suitable for both logistics and freight ▪ Position and planned infrastructure and will provide direct access to Western Sydney Airport and the Aerotropolis, further enhancing this area as a strategically placed centre for distribution ▪ Recently constructed multi-purpose facilities which will continue to provide niche competitive space for wholesale suppliers and distribution	▪ Precinct is small in size and constrained to future growth by hard road boundaries and residential lands further to the north ▪ This precinct sits in isolation and lacks proximate connections with comparable industrial areas, removing the opportunity for the creation of co-existent and supporting industrial hubs to emerge.
Opportunities	**Threats**
▪ Opportunity exists for future development of new distribution and logistics spaces within this precinct ▪ Well positioned to operate in connection with larger industrial areas which will emerge through the development of both Western Sydney Airport and the Aerotropolis	▪ Whilst this area will benefit from the establishment of Western Sydney Airport and the Aerotropolis, it is like that competition from larger precincts closer to these key development areas will attract businesses that would otherwise consider this precinct as a viable option for long term occupation

2.3.9 Hoxton Park Airport (Len Waters Estate)

HOXTON PARK AIRPORT (LEN WATERS ESTATE)

Top: Figure 28 Extract of zoning map showing the Len Waters Estate Industrial precinct
Right: Figure 29 Woolworths Distribution Centre, Hoxton Park
Source: https://www.tandlnews.com.au/2012/08/14/article/woolworths-opens-hoxton-park-mega-dc/
Left: Figure 30 Modern unit complex in the Len Waters Estate
Source: https://www.commercialview.com.au/commercial-real-estate/nsw/for-lease/len-waters-estate-2171

The Len Waters Estate is another small (21 ha) specialised industrial precinct positioned on the edge of the land occupied by the former Hoxton Park Airport, with direct access to the M7 Motorway.

Zoning: IN1 General Industrial
Height Limit: 15m – 30m
Lot Size: 2,000m²
FSR: N/A

Built Form and Land Character: The area is part of a recent subdivision and subsequent development for industrial warehouses and a distribution centres. The building stock is therefore modern and purpose-built for a number of well-known retail operators.

Industrial Use Character: The precinct is home to the newly developed distribution centres of Big W and Woolworths. Some allotments remain undeveloped or are the subject of recent construction activities for new warehouses.

Strengths	Weaknesses
▪ Direct access to the M7 Motorway Cowpasture Road Interchange which provides access to several commercial hubs across greater Sydney ▪ The precinct is well connected to planned road and rail infrastructure developments ▪ On completion, the precinct will have strong transportation links to Western Sydney Airport and the Aerotropolis ▪ The precinct features recently constructed multi-purpose facilities which will continue to provide niche competitive space for logistics, wholesale suppliers and specialised manufacturing	• Existing IN3 zoning of the precinct may not be genuinely representive of current uses and operators • The area is not well serviced by existing public transportation services
Opportunities	**Threats**
▪ Future improved integration and connections with the Casula Business and Retail Centre ▪ To rezone the precinct to a more commensurate industrial zone to allow for supportive urban services, retail or other specialty use	▪ Increased competition from development of release area industrial lands in the Aerotropolis and eastern corridor of Western Sydney Airport, as new and larger industrial areas are developed with ease of access and modern amenity

2.2.10 Austral

Top: Figure 31 Extract of zoning map showing the Austral Industrial precinct

This small industrial pocket is positioned on the northern side of Fifteenth Avenue in Austral. It is currently vacant and subject to the provision of future utility infrastructure connections and road improvements.

Zoning: IN2 Light Industrial under Sydney Region Growth Centres SEPP
Height Limit: 13m
Lot Size: N/A
FSR: 1:1

Strengths	Weaknesses
▪ Given limited supply of light industrial land, this area is well positioned to provide smaller sites for multi-unit complexes housing urban services to accommodate local growth and housing ▪ The precinct is well positioned on a main road in newly established release area,	▪ Small and isolated area which cannot leverage growth and activity in larger sub-regional precincts ▪ Adjoins residential areas to the immediate north, south and east and rural / environmental protection lands to the west which limit the extent of industrial land which is available to develop

providing the foundations of a successful industrial zone ▪ The land unaffected by biodiversity or other significant environmental impediments to development, encouraging future unimpeded growth within this area	
Opportunities ▪ Well positioned to provide urban services to support established and emerging local residential communities ▪ Land could accommodate suitable small incubator / creative and specialised industry space for local workforce. ▪ Uniquely positioned to facilitate developments which encourage live/work opportunities	**Threats** ▪ Increased competition from development of release area industrial lands in the Aerotropolis and eastern corridor of Western Sydney Airport, as new and larger industrial areas are developed with ease of access and modern amenity ▪ Competition from established and emerging industrial precincts which will benefit from both existing and planning road and rail infrastructure, lessening the appeal of this precinct

2.2.11 Planned Industrial Precincts

Tracts of land around the rural areas of Kemps Creek, Rossmore and Bringelly / Badgerys Creek have been identified as future industrial lands under the Stage 1 Land Use and Infrastructure Implementation Plan (LUIIP) for the Aerotropolis. These precincts are an integral part of the broader Aerotropolis precinct and will leverage their future growth on the development of the WSA and other key transport infrastructure committed and under construction.

These precincts are in planning and are likely to undergo more specific land use and master planning to develop the core appreciation of environmental constraints and desirable economic outcomes. The Bringelly / Badgerys Creek Industrial Precinct being the largest planned for Liverpool and closest to the WSA will deliver a global economic corridor of national significance. It is likely to accommodate a range of large-scale distribution, freight and warehouse activity as well as having a focus on innovation which is likely to translate to aerospace industries and scientific research. The opportunities and strengths of these precincts far outweigh the threats and weaknesses; however, all levels of government are appreciating the significance of these precincts and are focusing attentions on excellence in land use and infrastructure planning and implementation as part of the LUIIP.

3. Key Demands and Drivers

The ways in which land and buildings are used and developed in industrial precincts is steadily changing in response to a number of key drivers, both domestically and internationally. Knight Frank (2016) identified the pressures on industries in Australia to innovate and specialise as a result of rising global competition and improvements in digital infrastructure[20].

Continued population growth and improved regional planning for land use and infrastructure are influencing change in Liverpool's industrial precincts. Western Sydney Airport and commitments to key road and rail infrastructure around the Aerotropolis will impact growth and transition of sub-regional industrial precincts providing freight, logistics, distribution and transport services to Greater Sydney. These sectors will be further supported in this area through the development of the Moorebank Intermodal Terminal, which will drive increased growth and demand in freight and logistics in the sub-regional precincts around Liverpool. Existing and new building stock will need to adapt to the changing demands of these sectors as industries change the ways in which they conduct their business operations, how they occupy and adapt their space and where they invest.

3.1 Globalisation and the Liverpool Industrial Sectors

Whilst larger-scale industrial operations such as wholesale trade, distribution, logistics and transport are in greater demand in Liverpool's sub-regional industrial precincts, the LGA has an over-representation and reliance on the success of smaller urban services businesses operating in construction and trades, auto repairs and maintenance and other specialised manufacturing. The buoyancy of Liverpool's urban service industries was deemed to be relatively competitive compared with the rest of the Greater Sydney market[21]. However, the identified shortage of vacant and serviceable space to support the growth of this sector is a significant impediment.

Across Australia, the urban service sectors and light industries are transitioning into smaller, more cost-effective spaces as a result of increased global competition. Urban services, tech and creative industries therefore require smaller, flexible spaces which are well serviced by infrastructure. Typically, strata title units and small warehouses on lots of less than 1,500m² are ideal for smaller operations, however these spaces need to be open-plan, adaptable to changing operational needs and contemporary in their design. There is a growing demand for these types of spaces in Liverpool[22] which may necessitate further adaptation or redevelopment of larger warehouse spaces in precincts such as Moorebank and Chipping Norton which have good access to the CBD and other strategic centres.

[20] Liverpool Industrial Employment Land Study, Knight Frank August 2016
[21] Liverpool Industrial Lands Study, SGS Economics and Planning July 2018
[22] Liverpool Industrial Employment Land Study, Knight Frank August 2016

Urban renewal of industrial parks and replacement of older 'big-box' warehousing and factories with smaller multi-unit complexes is occurring across Australia. In Liverpool, recent examples include new unit development within the eastern edge of the Orange Grove Precinct and the recently constructed Stocklands small-warehouses at Coopers Paddock which replaced outdated industrial factory buildings.

Conversely, the growth of the online retail sector has created substantial demand for improved large-scale distribution, storage and postal operations. Consequently, growth has occurred in the logistics, distribution and postal sectors in Australia. There is currently strong demand for services and this is predicted to continue in Liverpool. By 2046, the transport, postal and warehousing sector is anticipated to accommodate an additional 12,556 jobs within the LGA, equivalent to a 348% increase on current employment figures[23].

3.2 Decline of Manufacturing and the Rise of the Service Sector

In Australia, the industrial sector has expanded and contracted since the end of the Second World War in response to technological advancements, global competition, domestic tariff and tax changes and the introduction of free trade in the 1980s. As of 2017, manufacturing accounts for 33% of Australia's employment sector. Liverpool's population have a proportionately high level of residents employed in the manufacturing sector, with over 40% of the population employed in industrial workforce. Liverpool's population is therefore highly exposed to the declining sector. Manufacturing activity in Australia continues to decline, notwithstanding specific sub-sectors attempting to transition and modernise to specialised forms of manufacturing, supported in part by the growth of the services and knowledge sectors, referred to as "smart jobs".

Smart jobs are technical in nature, generating faster revenues with increased margins and are in higher demand globally. In 2017, the professional and technical services sector represented 8.3% of Australia's total workforce as of 2017, yet only 2% of Liverpool's workforce[24]. This sector is well placed to grow with improvements in skills and investment by government in education and training in connection with significant investments in urban planning, place making and infrastructure including the WSA. The investment by Western Sydney University and the University of Wollongong in Liverpool's Collaboration Area will be crucial to unlocking growth in this sector.

In Liverpool, demand for specialised manufacturing is forecasted to steadily increase through to 2046, however, will decline overall when compared with the growth of professional and technical, logistics and transport services[25]. Manufacturing in Liverpool has traditionally required moderate building scales of between 4,000m² and 10,000m² gross floor area as evidenced in the warehouse stock across most of Liverpool's employment precincts. As the sector has specialised with advancing technologies

[23] Liverpool Industrial Lands Study, SGS Economics and Planning July 2018
[24] Liverpool Industrial Lands Study, SGS Economics and Planning July 2018
[25] Liverpool Industrial Lands Study, SGS Economics and Planning July 2018

some of these space requirements have reduced and traditional open-working floor areas have been adapted into office areas and mezzanine storage floors. On-site storage areas remain important components of such operations, however the storage space requirements are also declining with the reduction in plant and equipment sizes.

In recent years, the revival of 'maker-space', workshops and fabrication labs has prompted the adaptation of historical warehouse, dock and factories into cost-effective and unique working spaces. This has been evidenced internationally in Rotterdam, where former industrial port facilities have been re-adapted into workspaces for specialist engineering, designers, light industries and other creative industries. Similarly, in parts of inner-city Melbourne, the Victorian Government has developed a new Commercial 3 – Innovation Precinct zoning to drive urban renewal and adaptive re-use of now vacant and ageing industrial factories. These initiatives enable collaboration between a series of smaller niche creative industries, encouraging the emergence of innovation precincts. This movement enables urban renewal in a cost-effective way whilst improving productivity output.

3.3 Positive Impacts of Growth

The Greater Sydney Commission was established by the NSW Government in response to the need to sustainability manage growth, with a focus on maintaining and balancing job growth and investment. Their 20-year Greater Sydney Region Plan identifies a population growth projection of 464,450 people in the Western Parkland City, equating to 27% of Greater Sydney's overall growth[26]. This population growth will equate to 370,200 new jobs being created in the Western City[27].

Liverpool's competitive urban services industries have been the beneficiaries of population growth within the region. Residential expansion in South-West Sydney and a subsequent housing boom has generated significant growth in the need for locally based construction, materials supplies, building and trade services, which represented 12% of Liverpool's industrial workforce in 2017[28]. With continued population growth and ongoing land release across the South West and Greater Macarthur release areas to 2036 and beyond, the construction sector is anticipated to strengthen.

3.4 Investments in Infrastructure

Infrastructure NSW, in collaboration with the Department of Planning and Environment, has developed the State Infrastructure Strategy 2018-2038. In line with Western Sydney's projected population growth, Liverpool and South-West Sydney stands to benefit from substantial investments in new road, rail and utilities infrastructure. Some of the key policy decisions and priorities relevant to Liverpool include:

- Prioritising intercity road connections to support access from all directions
- Providing a north-south mass transit connection from the T1 Western Rail Line to the WSA

[26] Greater Sydney Region Plan – A Metropolis of Three Cities (Greater Sydney Commission, March 2018)
[27] Greater Sydney Region Plan – A Metropolis of Three Cities (Greater Sydney Commission, March 2018)
[28] Liverpool Industrial Lands Study, SGS Economics and Planning July 2018

- Prioritising sustainable transport connections, particularly walking and cycling infrastructure within the city
- Facilitating high quality digital connectivity infrastructure as part of all development
- Providing social infrastructure, such as schools, social housing and hospitals to support population growth
- Providing additional cultural and recreational infrastructure
- Encouraging Council and private investment in recreational infrastructure
- Facilitating South Creek Catchment to become an enabler of world class water management, urban greening and climate control
- Delivering a freight network to support a growing city, and the next tranche of container imports to Sydney.

Committed infrastructure and projects under construction and investigation likely to influence industrial sectors in Liverpool include:

- Liverpool Rapid Bus Connection to WSA
- Leppington to WSA train link
- North-South Rail Link
- M12 Motorway
- M9 Outer Orbital
- The Southern and Western Sydney Fright Line Corridors

Development of the WSA and supporting infrastructure including the upgrading of Bringelly Road and The Northern Road are projects committed as part of the Western Sydney City Deal. Additionally, the construction of the new Moorebank Intermodal junction to the south of the M5 Motorway is a significant investment by government and the private sector.

The effects of this new transport infrastructure will translate to growth and demand in the logistics, distribution and transport sectors. Precincts such as Moorebank and Yarrunga/Prestons are already well positioned with access to the arterial motorway network, continuing to accommodate the growth in these industries. Savills (2019) have identified the opportunities for job growth in logistics and transport, citing a 50% uptake in large floor-plate space across Western Sydney since 2012[29]. Western Sydney Airport and its associated future transport infrastructure will continue to boost the logistics, freight and distribution sectors. The nature of these industries is heavily reliant upon movement of goods and materials, hence access to transport and freight corridors is critical.

3.5 Efficient Ways of Working

In emerging specialised industrial sectors, the requirement for abundant floorspace is declining, with a focus on flexibility and efficiency of use. This trend is both cost-driven and a consequence of

[29] Quarter Time National Industrial (Q1/2019, Savills)

technological advancements and improvements in mechanisation and processing. As industry becomes increasingly automated, flexibility in operational processes and changes in types of plant and equipment has impacted on the layout and requirements of manufacturing and processing spaces, allowing industrial businesses to operate in locations previously deemed unsuitable for such uses.

Advancements in offline-technologies for specialised manufacturing, technical research and construction services in recent years has enabled more work from home situations. The research identified over 65% of workers in the Warwick Farm industrial precincts lived within a 30-minute commute of their workplace, changing the ways in which workers in a variety of sector are engaging with the workplace[30]. As a result, the spatial requirements and location of industrial facilities will continue to chance, adapting to the requirements of a changing workforce.

3.6 Access to Public Transport and Essential Services

Place-based approaches to planning and urban design demonstrates the significance of attractive places for housing, employment and industry. This has led to growing prevalence of Innovation Precincts where workers have ease of access to public transport, essential daily services and digital infrastructure and improved physical and social amenities.

The current economic output of Liverpool's industrial precincts is strong, despite poor access, undeveloped transport connections and low levels of amenity and access to services across these key employment areas. A strong reliance of private vehicles is evident in these precincts when compared to usage of existing rail and bus connections[31]. In many of these locations, existing public transport services are poorly connected and does not support the day to day needs of workers.

Pedestrian and cycle connections to Liverpool's industrial precincts are also inadequate, largely due to the age of the precincts and the philosophies around urban planning and design at the time they were developed. The best-case examples of Innovation Precincts and Industrial Parks feature internal connections for pedestrians and cyclists between their work space, essential supportive retail and social utilities and other forms of transit. The Priddle/Scrivener Street Precinct is an example of a unique opportunity to provide improved pedestrian and cycle connections between work places and essential services in the adjacent Liverpool City Centre and improved access to regular public transport at Warwick Farm and Liverpool train stations.

Essential services in the form of retail, health care, community facilities and financial institutions have traditionally been positioned away from industrial precincts in local or larger strategic centres. Today, industrial parks and innovation precincts comprise strong essential services offerings built into the fabric of larger warehouses and interspersed within incubators. Access to these services contributes

[30] Liverpool Industrial Lands Study, SGS Economics and Planning July 2018
[31] Liverpool Industrial Lands Study, SGS Economics and Planning July 2018

to enhancing productivity and preserving the health and happiness of workers. Liverpool's industrial areas require improved and integrated essential services to be developed within existing and emerging precincts. Incentives should be considered to aid investment of essential services.

3.7 Future Industrial Land to be Unlocked

Over the coming decades, the development and unlocking of serviceable lands around Western Sydney Airport and within the Aerotropolis will generate tens of thousands of new jobs. Lands are proposed to be rezoned in Rossmore, Kemps Creek and across the Aerotropolis Core which extends from Bringelly in the south to Badgerys Creek in the north. The NSW Department of Planning and Environment has identified that the 114ha Aerotropolis Core will be a 24-hour, global centre comprising 80% employment land uses, including aerospace and defence industries and other associated uses including logistics and advanced manufacturing[32]. World-class health and education facilities and additional employment lands to the south east of the WSA are earmarked to provide for campus-style settings which encourage growth of jobs in aerospace, defence and high-technology industries.

These areas earmarked for future rezoning and development will be underpinned by attractive amenity and accessibility features which will attract a mixture of "large-scale and innovative industries" to the Aerotropolis. These new industrial precincts will have excellent access to the arterial motorway network, mass transit rail to be delivered within the next decade and importantly the airport. They are anticipated to be strong drivers for the establishment of new industries as well as existing operators who will look to relocate. The latter is of critical consideration to Liverpool.

With the new lands to be rezoned around the Aerotropolis there is likely to be a midterm surplus in larger sites to support logistics, distribution and transport industries[33]. In the short term however, precincts such as Prestons and the Len Waters Estate may lose out with the relocation of large-scale operators to the Aerotropolis who will benefit from access to the WSA, new transport and more efficient, purpose-built modern facilities.

Table 1 Summary of Key Drivers and Demands for Industrial and Innovation Precincts

Key Drivers	Key Demands
Effects of Globalisation and impacts of global competition	Need for industry to specialise and target niche competitive edge
Population Growth and Construction Boom	Demand on continued urban services, larger-scale distribution and freight and specialised

[32] NSW State Infrastructure Strategy 2018-2038 (NSW Dept of Planning, 2018)
[33] Liverpool Industrial Lands Study, SGS Economics and Planning July 2018

Key Drivers	Key Demands
	innovation / creative and advanced technology industries
Investment in Major Infrastructure Projects	Variety of industrial spaces to accommodate the range of demands
Changing nature of industries	More efficient work spaces – typically smaller and well-planned with modern facilities
Changing nature of the workplace	Workplaces to be better connected to transport, essential services and provided with improved amenity
Changing attitudes to working efficiencies	Requirements for good access to movement corridors
Access to transport, essential services and amenity	Requirements on access to digital infrastructure
Future land release	Collaboration between specialised industries – rise of the incubator
Western Sydney Airport	Ongoing demand for new large-lot land to be released across Western Sydney
Innovation in Industry	High demand for existing quality small-unit space with good proximity to local consumer / customer market
Rise of the Professional and Technical Services Industry	Improved technologies and storage spaces
Economic conditions and a changing consumer market	Creative thinking and investment in technical and professional service industries – education and training required

4. Best Practice Planning for Industry and Innovation

4.1 What is Best Practice Planning?

This Chapter examines how differing approaches to land use planning and development regulation are utilised internationally and domestically. The investigation into a number of greenfield industrial parks and cities, transformed historic industrial areas and innovation precincts has confirmed that different settings require very different approaches to planning.

All of the case study examples investigated in this Chapter started with a clearly defined Vision. For many, this was rooted in an economic objective and an understanding of the land use activities and industries for which the precincts were targeting to establish, attract and grow. This is fundamentally answering the question of *'who are planning for and why?'*.

Planning approaches should consider whether zoning is segmented or mixed. This is influenced by a number of factors including:

- The specific regulated approach to land use zoning, urban design and development control in a given context and how this is entrenched in legislation;
- Prior examples of successes and failings based on the type of industrial activities, the changing nature of industrial operations and a comprehension of what are good planning outcomes;
- The size of the industrial area and scale of investment and governance;
- The predominant industrial activities that are considered desirable in a particular precinct;
- The environmental setting and crucial aspects of the physical and natural environments which need to be protected and preserved from impact;
- Need for physical separation and isolation due to environmental impact and scale of operations;
- Need for innovation and connection of knowledge-based industries; and
- Investment in infrastructure and the quality of access and utilization of that infrastructure.

Best-practice approaches to land use planning are those that:

- Achieve the objectives and deliver on the Visions originally planned for;
- Stimulate economic activity and draw investment; and
- Protect or help transition workforces to maintain jobs.

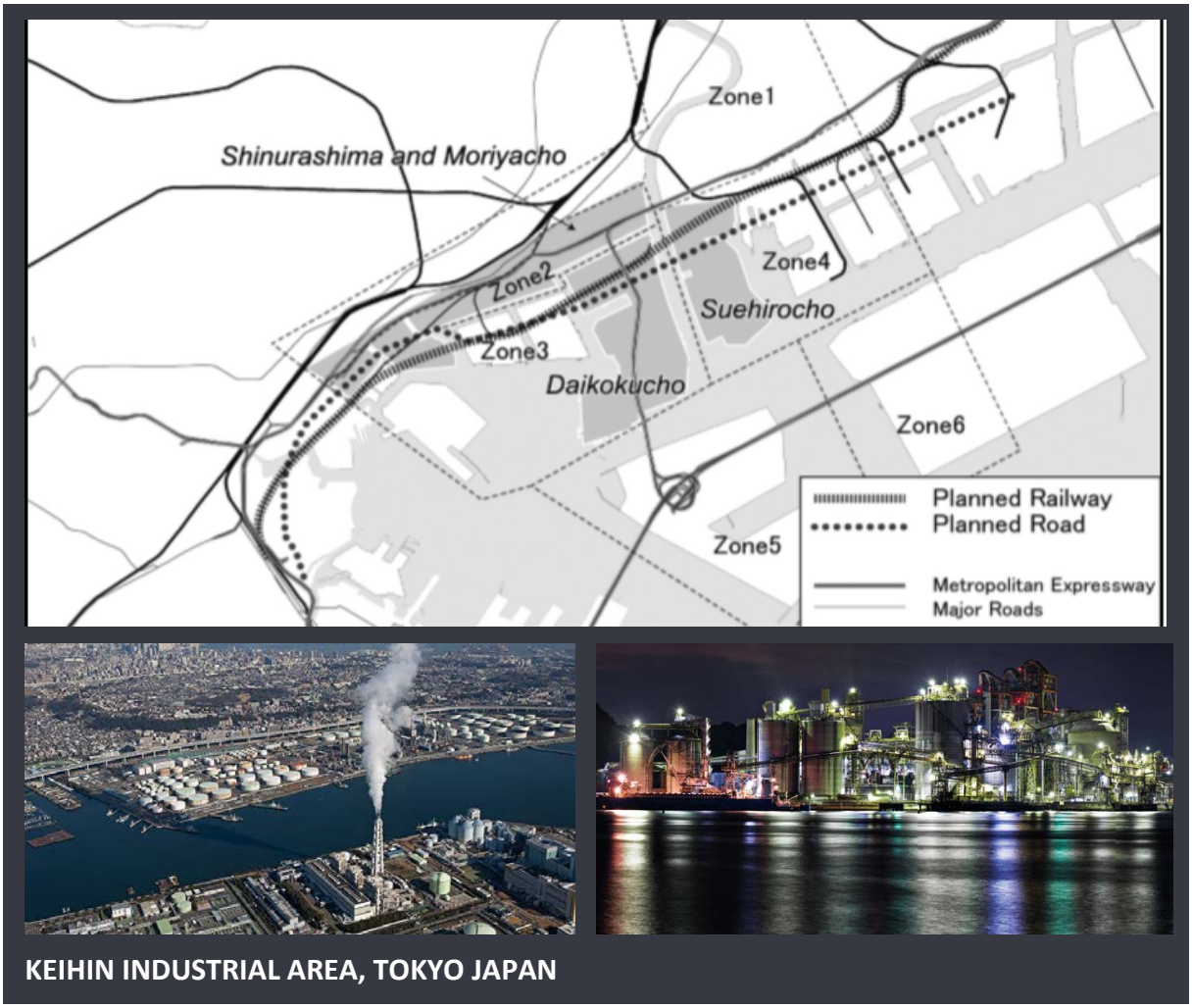
This Chapter also considers approaches to development controls, often linked to zoning or land use planning. In any given framework guidelines or controls incorporated in legislation mandate economic, environmental, social and governance outcomes.

Development controls are also used to guide outcomes for the built environment. These can span across the physical design and layout of buildings, operational activities, design of the streetscapes and the public domain, transport, infrastructure, land form and landscape amongst other elements. The combination of such controls contributes to place-making. True reflections of best-practice planning

are evident in the following examples when the components of a place contribute to creating a defined and distinguished character. This in turn generates economic activity, draws investment and contributes to job retention and growth.

4.2 International Case Studies

4.2.1 Keihin Industrial Area, Tokyo Japan



KEIHIN INDUSTRIAL AREA, TOKYO JAPAN

Top: Figure 32 Urban Plan for the Keihin Industrial Area
Source: ("Toward the Integration of Brownfield rehabilitation and planning methodologies: case study of Keihin Industrial Area, Tokyo, Japan", A Murayama, The University of Tokyo, 2006.) https://www.witpress.com/Secure/elibrary/papers/BF06/BF06014FU1.pdf
Left: Figure 33 Aerial View of the Keihin Industrial Area
Source: A smart place to work (JTB Photo/UIG via Getty) https://www.nature.com/articles/d41586-017-08660-0
Right: Figure 34 View to the industrial foreshore
Source: http://www.unmissablejapan.com/industry/kojo-yakei

Markers of Success

Keihin Industrial Area is classified as a "Free Trade Zone" because of its geographical location near a major seaport. Free Trades Zones are an advantage to facilitate foreign trade by removing restrictions to imports and exports.
Keihin Industrial Area, in Kanagawa Prefecture, has over 400 foreign affiliated companies operating within its 4,400ha
High focus on industry-related redevelopment and infrastructure projects to accommodate the established industrial uses within the Keihin Industrial Area, rather than urban redevelopment. Maintaining of existing industrial zoning within the Keihin Industrial Area, and commitment to industrial redevelopment and enhancement and modernisation of infrastructure

At 4,400 hectares, the Keihin Industrial Area is one of the largest industrial areas in Japan. It is located within the Kanagawa prefecture, forming part of the Tokyo Bay Waterfront Area which is the largest concentration of industrial uses in Japan. It has been retained as a predominately industrial and commercial area over its lifetime.

Urban planning in the Keihin Industrial Area has sought to transition the area since 2006 from heavy industries to research and development institutions, light industries, business and commercial facilities.[34] This early 2000's planning response acknowledged that the traditional heavier industries around the ports were down-sizing operations with improved efficiencies in their ways of working, leading to the consolidation of industries, reducing their reliance on and need for expansive lands. Additionally, governments understood the opportunities associated with the rise of new-age industries in the technology and research and development sectors around nanotechnology, biotechnology and information technology.

The following key objectives underpinned the development of the Keihin Waterfront Area Regeneration Master Plan in 2006:

- Maintain and protect the area for industrial land use in zones closest to the waterfront which have excellent port access for shipping and distribution of goods;
- Encourage urban renewal processes including the down-sizing and switching to more efficient ways of working for traditional industries;
- Invest in the creation of an amenable place with new pedestrian and cycle links, greening, better road connections and other local facilities;
- Encourage investment and establishment of new-age industries in technology and research and development within a new Free Trade Zone (FTZ); and

[34] Toward the integration of brownfield rehabilitation and planning methodologies: case study of Keihin Industrial Area, Tokyo, Japan (A. Murayama, K. Banno, S. Ishii, T. Kurose & T. Sato, 2006)

- Provide improved transport linkages for workers in the form of metro and bus services throughout the area.

The Master Plan outlines six zones within the Industrial Area which aim to maintain the existing industrial uses while also allowing for new uses to transition into the area. The six zones outlined by the Master Plan have specific policies which aim to achieve the explicit objectives such as employment and population targets, environmental standards and transportation infrastructure[35].

The six zones are outlined below:
Zone 1: Inland urban regeneration in cooperation with waterfront regeneration
Zone 2: Promotion of land use transition to create a mixed-use urban area
Zone 3: Advanced manufacturing centre with global competitiveness
Zone 4: Advanced research and development centre related to manufacturing
Zone 5: General distribution centre
Zone 6: Advanced and efficient manufacturing centre

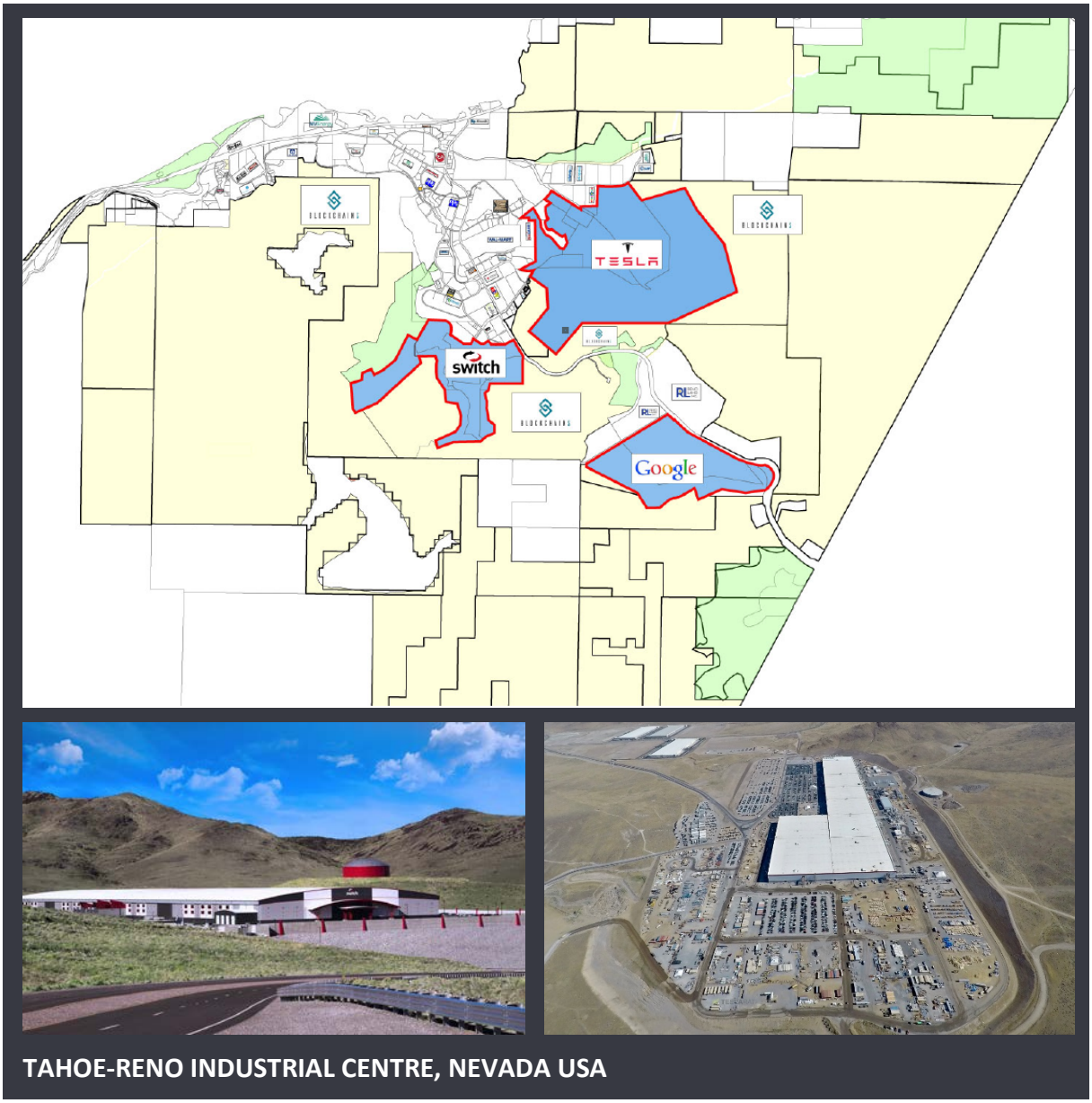
The six zones provide a clear pathway in guiding the planning of the three districts which are interlinked by the existing passenger and freight infrastructure. The Shinurashima and Moriyacho districts act as urban barriers separating the industrial land uses from residential lands further to the north and west. Numerous other examples of how transitional zoning is utilised to buffer impacts of industrial operations to more sensitive uses are identified throughout the remainder of this chapter.

The Daikokucho district was identified as part of the FTZ. Today it remains one of Japan's manufacturing strongholds home to transport machinery, petroleum and coal and chemical companies which heavily rely on the port and surrounding road infrastructure. Changes to urban zoning and the implementation of business-deregulation in the establishment of the FTZ has encouraged significant investment from global operators and driven healthy competition in the area. Some of the operators and industries in the district include the Nissan's Yokohama Plant No. 3, Kagomebutsurya Service Shotoken Logistics, Liebherr, Tepco, Nichirikuyokohama Logistics and USS Yokohama.

The Suehirocho district was created to attract advanced small-medium size businesses and research institutions. The Prefecture is one of Japan's leading areas for science and technology centred around the Yokohama City University – Tsurumu Campus. The effective use of the existing port infrastructure, improvements in transport and place making and the ability to leverage the adjoining and existing manufacturing sector and university campus has led to the expansion of scientific and research industries in the district over the past decade. Industries include chemical, recycling and a sewerage treatment plant intermingled with Toshiba's manufacturing plant, Yokohama Bio Research and Supply, JFE Steel Works and Gas Production.

[35] Toward the integration of brownfield rehabilitation and planning methodologies: case study of Keihin Industrial Area, Tokyo, Japan (A. Murayama, K. Banno, S. Ishii, T. Kurose & T. Sato, 2006)

4.2.2 Tahoe-Reno Industrial Centre, Nevada USA



Top: Figure 35 Tahoe-Reno Industrial Centre Map
Source: ("Tahoe Reno Industrial Center", Tahoe Reno Website, 2019) http://tahoereno.com/maps/
Left: Figure 36 Switch Data Centre
Source: ("Switch Tahoe Reno Now Open: Largest, Most Advanced Data Center Campus in the World", 2017) https://www.switch.com/switch-tahoe-reno-data-center-now-open/
Right: Figure 37 Tesla Data Centre
Source: Tesla spurs land grab at Tahoe-Reno Industrial Centre (Alverez, S. 2018) https://www.teslarati.com/tesla-gigafactory-land-tahoe-reno-industrial-center-sold-out/

Markers of Success
Strong demand with 30,000 hectares of land sold for $175 million with only 250 hectares left remaining in the centre[36].
Attraction of strong investment decisions by the likes of Tesla who have established their $5 billion battery factory in the centre, generating over 6,500 jobs and Switch who have established their $3 billion headquarters.[37]
Development in the centre has generated 6,000 jobs in construction.[38]
The centre draws workers from out of state to Reno with out of state workers representing 20% of the total workforce.
Inclusion of Google's new $600 million investment over 20 years in its new data centre which will create 50 permanent jobs a year over the next 5 years.[39]

The Tahoe-Reno Industrial Centre is a privately owned 43,300-hectare industrial park in Storey County, Nevada approximately 16km east of Reno City. The centre is the largest in the United States and accommodates over 130 companies including the Switch Data Centre Campus, Google's Data North American Data Centre and the Tesla Gigafactory. Other industrial activities in the centre include a power plant, logistics and distribution, warehousing, wholesale suppliers, fulfillment centres (packaging plants), technical and extraction-based mining and building product production[40] [41]

The opportunity to establish a mega-industrial centre was born out of the site's location close to a main freight rail line, highways and isolation from nearby communities. Land parcels from 20,000m² - 2,000 hectares affirmed the desired character of the precinct to accommodate only the largest industrial and technological operators[42]. This is evidenced by the acquisition of 1,000-2,000-hectare sites by the likes of Tesla and Google, both of which have established massive data centres that cannot be easily accommodated elsewhere. The parcel sizes are such that each becomes a centre in itself, providing for all of the ancillary supportive services on-site.

The North American approach to development control is similar to Australia's in that it is highly regulated and numerically based in regard to setbacks, on-site car parking, street profiles, building coverage, building areas, heights and loading/service area controls. In Tahoe-Reno, built form design outcomes and layout standards are set out in the Storey County Ordinance. Under the Ordinance, the

[36] The Tesla Effect, Hagar R Jan 2018 https://lasvegassun.com/news/2018/jan/27/the-tesla-effect-tahoe-reno-industrial-center
[37] ibid
[38] Nevada: Betting big on high technology and winning, Rogers, J June 20 2018 https://businessfacilities.com/2018/06/nevada-governors-report
[39] Google planning to building $600m data centre, Rindels, Michelle Nov 15 2018 https://thenevadaindependent.com/article/google-planning-to-build-300-million-data-ce
[40] ibid
[41] Deep in the Desert, an Experiment of Economic Development, Macaig M Nov 2017 https://www.governing.com/topics/finance/gov-industrial-parks-reno-tahoe.html
[42] Resolution determining similar uses in the I-2 Heavy Industrial Zone, Stoney Country 2007

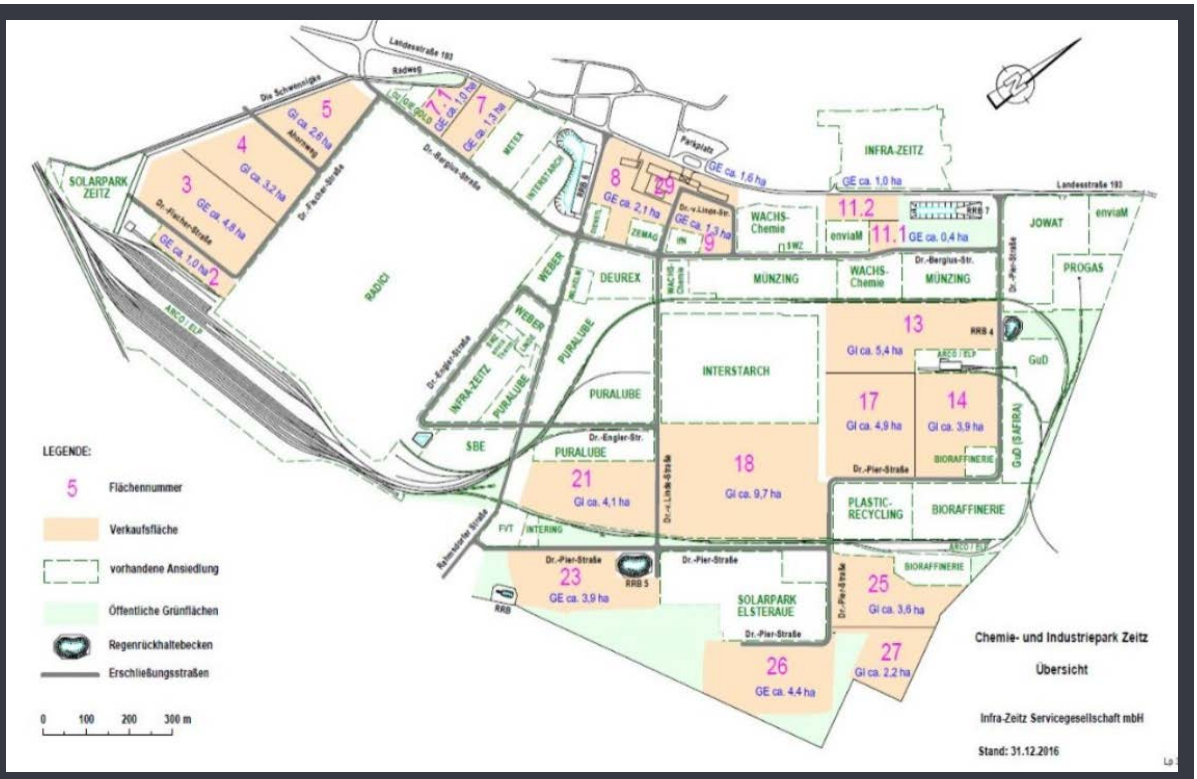
Tahoe-Reno Industrial Centre is zoned I2 Heavy Industrial[43]. Like the NSW IN1 General Industrial zone, the I2 Heavy Industrial Zone permits a broad range of land use activities including mixed use, industrial, office and commercial businesses. Light industrial and commercial zoning is restricted to 10% of the total centre on smaller parcels to ensure larger, more intrusive operators are protected and promoted[44].

The numerical development controls are applied on a site-by-site basis with uniformity in approaches to overall building construction standards and signage all heavily regulated. The development controls have driven functional layouts of buildings, streets, parking and loading areas across the precinct. Design quality is ensured through architectural review as part of the building permits process in accordance with the Development Handbook and Site Design Guidelines.

The economic success of the centre is a direct result of tax-incentives and limitations on development levies imposed by the State of Nevada as detailed in the next chapter. The approaches to land use planning and development controls set the desired scale and built form outcomes. This was particularly important in providing large and serviced parcels for tech giants and world-leaders in distribution and processing.

[43] https://www.storeycounty.org/309/Zoning-Ordinances
[44] Ibid

4.2.3 Zeitz Chemical and Industrial Park, Saxony-Anhalt Germany



ZEITZ CHEMICAL AND INDUSTRIAL PARK, SAXONY-ANHALT GERMANY

Top: Figure 38 Map of Zeitz Industrial Park
Source: (Industrie Park Zeitz Website, 2019) https://www.industriepark-zeitz.de/en/chemical-park/profile/
Left: Figure 39 Chemical production operations, Zeitz
Source: ("Five of Eastern Germany's chemical site operators – have jointed to create CeChemNet", 2016) https://www.chemietechnik.de/cechemnet-central-european-chemical-network/
Right: Figure 40 View of Zeitz Industrial Plants
Source: https://www.invest-in-saxony-anhalt.com/chemical-industry-4-dot-0

Markers of Success
The former site of Zeitz Hydrogeneration Plant was transformed in the early 2010's to accommodate around 50 different companies, providing for 1,000 jobs within the park[45].
One of the largest anchor industries in the park Interstarch GmbH are expanding their operations investing $25 million euros to 2020 in extending production facilities and establishing a new dedicated research department in collaboration with local universities.
Globally recognised as a center of scientific excellence in green energy production and development drawing investment from international organisations from China, Italy, Ukraine and the USA[46].
$400 million euros invested by private companies in developments and operations in the park to date. $600 million euros annual turn-over.[47]

Zeitz is a medium-sized town located 40km south-west of the city of Leipzig. It has an industrial legacy spanning back to the 19th Century linked to lignite mining activities. Following the re-unification of Germany and the de-industrialization which followed, the town fell into economic despair with a number of major industrial enterprises relocating to Eastern Europe. In the 1990's, industries in mechanical engineering, piano manufacturing and sugar cane production, amongst other traditional manufacturing operations, were in a state of steady decline[48]. Heavier chemical production industries continued to operate which began to draw the attention of environmental groups with concerns around pollution outputs[49].

Multiple shifts in governance and declining demands for production and manufacturing over the years to follow resulted in industrial enterprises in the town decreasing by more than 50% between 1995 and 2001[50]. The impetus for change and a focus on developing a future Vision for the local economy was urban restructuring (Stadtumbauprozess), akin to strategic planning in Australia. It introduced a Special Use zone with an Industrial overlay. The zoning change in itself was not significant, rather it was the two objectives which underpinned a new strategic Vision for Zeitz being:

1. *An importance on re-establishing and building the economy – particularly in industry*
2. *Promoting the historical and cultural assets of the town*[51].

As part of the Vision for Zeitz, the local government collaborated with other district authorities to invest significant capital into renewing the town's civil and cultural attractions whilst upgrading physical and digital infrastructure and streamlining its local land use planning statutes. This included defining the desired types of industrial operations[52]. As a consequence, the interest of Germany's

[45] https://www.industriepark-zeitz.de/en/
[46] https://www.invest-in-saxony-anhalt.com/center-of-excellence-chemical-park-zeit
[47] https://www.industriepark-zeitz.de/wp-content/uploads/2014/11/Infra_Zeitz_Brosch%C3%BCre_EN.pdf
[48] https://acore-project.eu/case-studies/germany-case-study-1-zeitz/
[49] https://acore-project.eu/case-studies/germany-case-study-1-zeitz/
[50] https://acore-project.eu/case-studies/germany-case-study-1-zeitz/
[51] ibid
[52] https://acore-project.eu/case-studies/germany-case-study-1-zeitz/

growing professional, creative and green industries has been drawn to Zeitz. This reflects a movement in recent decades across Europe to develop 'Eco-Industrial Parks' which are focused around creating, harnessing and developing green energy and conducting industrial activities in a more environmentally sustainable manner[53].

Development of the park is in accordance with the local urban development plan and environmental regulation which mandates efficient grid-like site layouts with physical separation distances to other more sensitive uses. Clear delineation of setbacks is evident along the edges of the precinct. Other key planning control approaches to development in Zeitz has been the establishment of pedestrian / cycle links throughout the precinct and the preservation of heritage industrial buildings. The latter has created a unique post-war edge which has a back-drop of wind-turbines and vast solar farms, delivering a dynamic and attractive place to work and visit.

[53] An International framework for Eco-Industrial Parks, United Nations Dec 2017

4.2.4 Suzhou Industrial Park, Jiangsu Province China

Top: Figure 41 Master plan – Suzhou Industrial Park
Source: ("The Building of a Chinese Model New Town: Case Study of the Suzhou Industrial Park", Zhongjie Lin, 2013)
Left: Figure 42 Views of Suzhou
Source: ("The Building of a Chinese Model New Town: Case Study of the Suzhou Industrial Park", Zhongjie Lin, 2013)
Right: Figure 43 Views of Suzhou Lake
Source: https://en.wikipedia.org/wiki/Suzhou_Industrial_Park

Markers of Success
Ranked 1st among China's 219 state-level economic development zones and is a top performer in key benchmarks including technological innovation and foreign trade.
Over the past 25 years the park has contributed 800 billion yuan ($119.11 billion US) in tax revenue, achieved more than $1 trillion in foreign trade volume and completed more than 900 billion yuan in investment in fixed assets.
Home to more than 156 projects initiated by Fortune 500 companies.

The Suzhou Industrial Park (SIP) is a modern industrial city covering an area of 288km², located in the Jiangsu Province, approximately 30km to the west of Shanghai. The park is a joint nation venture between Singapore and China which commenced in the early 1990's following the ongoing success of Singapore's industrial global exposure which peaked Chinese interests[54].

The SIP is a strong example of well-planned land use structured strategically around infrastructure investments by both governments and built form outcomes under a comprehensive master plan developed by the SIP Administrative Committee and China-Singapore SIP Development Corporation[55]. The Vision plan for Suzhou (meaning 'One Body and Two Wings) envisaged two new towns flanking the historic central city, one to its west and the other to the east. It featured a traditional urban fabric known as the "double-cheeseboard" structure defined by two overlapping grids, one consisting of streets and the other canals, hence the city coming to be known as 'the Venice of the East'[56]. Later revisions to the masterplan saw the creation of the freshwater Jinji Lake which formed the centerpiece of a major boulevard and rail connections. Building heights were deliberately transitioned to preserve heritage outlooks to the UNESCO-listed old city whilst also defining the main connectivity routes with strategically positioned skyscrapers[57].

The plan established a hierarchal organisation of the city. Similar to zoning, the Singaporean approach to land use configuration establishes four levels of public facilities across regions, districts, neighbourhoods and clusters[58]. The SIP districts were designed to accommodate walkable high-density residential neighbourhoods around the lake. These areas were interspersed with retail, commercial and office spaces. The expansive industrial lands comprising manufacturing plants, distribution, freight and production facilities formed the outer periphery of the SIP, making up roughly 50% of the total area (shown in purple in Figure 41).

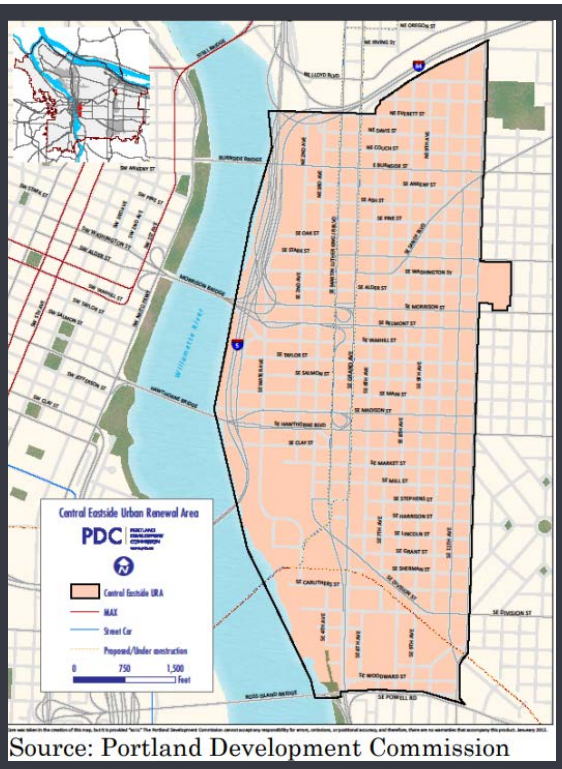
Transitional approaches to zoning across the SIP ensured appropriate interfaces between land uses and effective separation of activities. For example, heavier industrial operations were positioned on the outer peripheries of the SIP on dedicated larger holdings bounded by the man-made canals and railways. More sensitive residential uses interfaced with commercial zones and heightened access to green parks, recreational areas and the lake. Transitional commercial zones were utilised to buffer industrial operations from the centre of the SIP and were delineated through a set grid road pattern forming regular and expanding block sizes.

Land use planning in the SIP demonstrates the importance of a strong masterplan. In this instance, the masterplan understood the need to physically separate the most sensitive land uses from the heaviest, whilst also promoting transitions where certain forms of mixed use were deemed suitable. It also

[54] The building of a Chinese model new town: Case study of the Suzhou Industrial Park, Zhongjie, Lin 2016
[55] The New Economic Partnership between China and Singapore, Bolt, P 1993
[56] Building orderly urban spaces: Singapore Suzhou Industrial Park in Jian Zhu Xue Bao 1997
[57] The building of a Chinese model new town: Case study of the Suzhou Industrial Park, Zhongjie, Lin 2016
[58] ibid

understood the value of planning for aesthetic outcomes, amenity for residents and workers and delivering infrastructure ahead of development. These factors combined have contributed to the successful development and job growth in the SIP, now into its 25th year of operations.

4.2.5 Central Eastside Portland, Oregon USA



Source: Portland Development Commission

CENTRAL EASTSIDE PORTLAND, OREGON USA

Top: Figure 44 Map of Central Eastside, Portland
Source: ("Central Eastside Urban Renewal Area", Portland Development Commission, 2019) https://prosperportland.us/portfolio-items/central-eastside/
Left: Figure 45 Mixed Use corner block and incubator, Eastside
Source: ("Towne Storage in Portland", Journal Staff, 2018) https://www.djc.com/news/co/12116101.html
Right: Figure 46 Views of Eastside Industrial Quarter, Portland
Source: https://www.portlandoregon.gov/bps/article/482062

Markers of Success
Today, a vibrant and diverse mix of business sectors that employ more than 17,000 people across over 1,100 companies.
Multiple examples of re-investment by businesses into refurbishing historic building stock and contributing to gentrification processes.
19% district business growth since 2008 and 35% of total workforce retained in manufacturing[59].

The Central Eastside Precinct in Portland was historically an inner-city industrial district which served as a manufacturing and warehousing hub. It is situated on the east bank of the Williamette River, bounded by major highways and collector roads to the west, north and south. Today, it is an excellent example of urban renewal and gentrification which has led to the creation of a leading Innovation Precinct accommodating 17,000 employees within a various range of work-spaces[60].

The built form within the precinct remains in use by a mix of businesses of varying scales, however, as market demands for non-traditional and knowledge-driven industries increases, so to are the ways in which buildings are being used and adapted. This has given rise to the incubator, a collaborative complex which accommodates smaller-scale specialised manufacturing, design, engineering and other creative industries, all under the one roof[61].

A proactive district authority instituted an 'Employment Opportunity Subarea (EOS)', which is an overlay on the Industrial IG-1 zone[62]. This regulatory approach to zoning provides a more refined level of detail around the desirable types of land use activities in the area to promote continued job growth in incubators and knowledge-sharing neighbourhoods. The approach ensured that existing manufacturing and distribution operations in the zone would not be forced out and protection measures were introduced into the local Ordinance to mandate preservation of industrial operations. These included considerations for the 'predominant' industrial land use and limitations on the EOS which is periodically reviewed in response to changing economic drivers[63].

More recently, the Ordinance has been revised again to provide greater flexibility in the 'industrial' land use term to incorporate emerging new-age industries such as professional and financial services, food services and production, software publishing, apparel manufacturing and micro-distilling. The specification of land use activities and definitions works to promote and target particular operators in areas where incubators are more accessible and provide good separation to larger existing industries. The recognition of incubator districts has emerged out of approaches such as the EOS, which from a

[59] https://ceic.cc/about/
[60] ibid
[61] Industrial decline in an industrial sanctuary Portland's Central Eastside Industrial District, Jones, Allison 2014
[62] Portland's Central Eastside - www.portlandoregon.gov/bps/cc2035/sequadrant
[63] Industrial decline in an industrial sanctuary Portland's Central Eastside Industrial District, Jones, Allison 2014

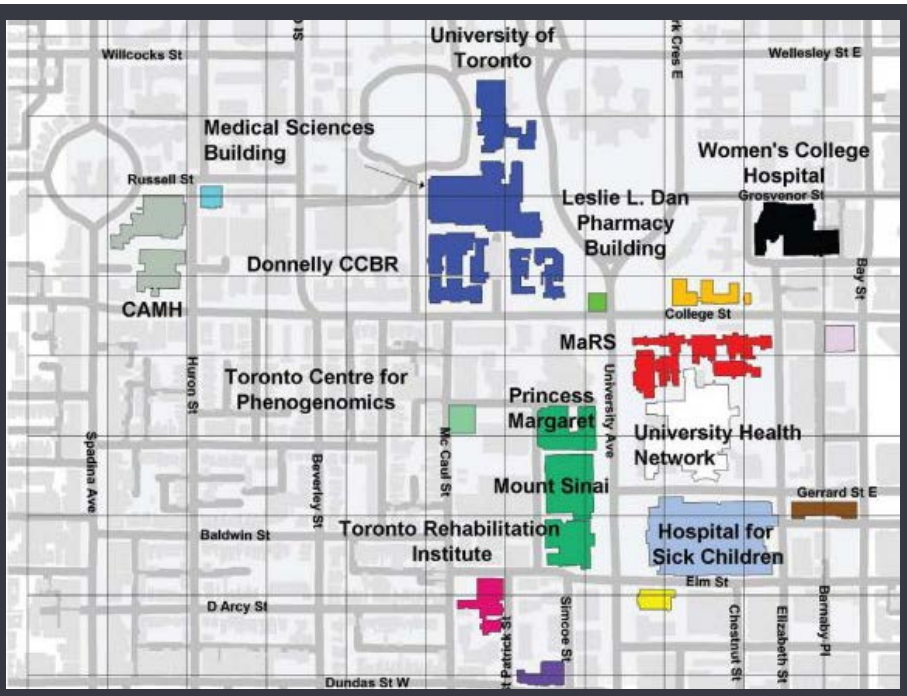
land use perspective in Portland has provided good transitional areas between offices in the Downtown district and the tradition industrial services lands[64].

Planning controls between the EOS and industrial lands are also interesting. The protectionist approach to heavier industries on the edge of the city has seen the complete removal of key development controls including no maximum Floor Area Ratio (FAR), building heights, site coverage or requirements for landscaping[65]. By contrast, the EOS areas are subject to more fine-grain building standards around site coverage, height and FAR, but the build-to boundaries and no landscaping requirements have retained the inner-city industrial character[66]. The local control plan promotes urban renewal in order to preserve historic building stock on the east side and provides more specific standards for the development of incubators, although flexibility in adaptation of industries to space is encouraged.

These approaches to land use planning have been successful in supporting the establishment of new and emerging innovation industries in the area. Controls have preserved the heritage fabric of the area and contributed to vibrancy and a dynamic and attractive urban setting. Recent changes to incentivise protection of traditional industries through uplift standards are now being tested by other economic drivers.

[64] ibid
[65] The Central Eastside Industrial District: Contested visions of revitalization. Minner, Jennifer 2000
[66] Portland's Central Eastside - www.portlandoregon.gov/bps/cc2035/sequadrant

4.2.6 MaRS Discovery District, Toronto Canada



MARS DISCOVERY DISTRICT, TORONTO CANADA

Top: Figure 47 Locational Map – MaRs Discovery District, Toronto
Source: http://torontodiscoverydistrict.ca/district-map/
Left: Figure 48 MaRs Discovery District
Source:("MaRS Discovery District – Phase 2", 2019) https://www.pcl.com/projects-that-inspire/pages/mars-discovery-district-phase-2.aspx
Right: Figure 49 Broader views of Discovery District, Toronto
Source: http://placematters.marsdd.com/

Markers of Success
MaRS play a key role in increasing the commercialization potential of Toronto's science and technology ventures. At 1.5 million square feet, the centre is one of the world's largest urban innovation hubs attracting major global innovation brands.
MaRs supports over 1,000 young companies with expert advice, market intelligence and access to capital and talent[67].
Between 2012-14 startups in the centre generated $640 million in revenues with over 60% coming from exports.
In 2017, MaRS added 28,900 new technology jobs to Toronto across 1,300 ventues. 6,000 people work in the established MaRs centre.
Since 2008 MaRS has generated $3.1b into the regional economy, with $1.4b generated from startups in 2017 alone[68].

The MaRs Discovery District was founded in 2000 as a non-profit corporation to incubate innovative new medical and technological companies by bringing together Toronto's academic, hospital, government and business sectors such that research could be commercialized. The first stage of the project saw small innovative businesses and start-up companies occupy a converted historic building on the edge of the Children's Hospital, Queen's Park and the Metro Station. The District has since expanded to occupy surrounding blocks and other historic industrial buildings. To date it provides working spaces for over 4,000 workers in high technology, research, medical science, pharmaceutical production, information and communications technology, engineering and social innovation[69]. Some of the organisations that occupy the District include the City of Toronto and Government Offices of Ontario and Canada, the University of Toronto, Ryerson University, St Michael's Hospital, the Toronto Rehabilitation Institute, NPS Pharmaceuticals, MDS Inc, CIBC, Cancer Care Ontario and many more[70].

The City of Ontario in the 1990's rezoned vacant industrial zoned lands to 'regeneration areas' to permit a range of mixed-use activities with employment overlays that drove innovation projects such as MaRs. Since, Toronto has been at the forefront of the Jane Jacobs 'flexible zoning and land-use approach' which advocates for greater mixed use in driving vibrancy, creativity and investment (also termed spur economics)[71]. Recently the City's Official Plan and Provincial Policy Statements have been readapted again to ensure local planning for land use and controls responds to local market drivers, creative thinking and resilience over time.

The result has been projects such as MaRs which offer small-scale work spaces positioned close to purpose-built research labs with cafes, shopping centres and residential apartments all assorted across

[67] https://www.toronto.ca/legdocs/mmis/2016/ed/bgrd/backgroundfile-92791.pdf
[68] https://aicd.companydirectors.com.au/membership/company-director-magazine/2019-back-editions/april/mars-innovation
[69] https://www.marsdd.com/about/
[70] https://aicd.companydirectors.com.au/membership/company-director-magazine/2019-back-editions/april/mars-innovation
[71] Some Great Idea, Keenan, Edward 2013

a range of different, yet inter-connected building types. Adding further to this complexity of mixed use are the drivers for operators to re-adapt heritage buildings where possible and preserve key historic land markers and streetscape qualities[72].

The Official Plan outlines a series of objectives and tests for the City's inner and special economic zoned areas, including MaRs. These tests are used to balance and reconcile a range of diverse objectives affecting land use planning including economic outputs, social and environmentally sustainable indicators. These indicators sit over the top of built form, density and often specific land use outcomes regulated under the Official Plan. For example, a proposal which sought to establish 500 new jobs in research and develop collaborative work spaces would represent desired planning outcomes and as such, variations to height controls could be considered more favorably.

There is little question that Toronto's approach to flexible land use zoning in areas like the MaRs Discovery District have drawn significant investment and have resulted in vibrant, active and attractive places to live and work which have molded to the changing nature of workplaces and lifestyles[73]. The City are continuously revising their approaches to land use planning and development controls, particularly in respect of protecting residential amenity and recognizing the importance of maintaining successful creative industry spaces which could be pushed out with increasing rental values.

4.2.7 Key findings from International Examples

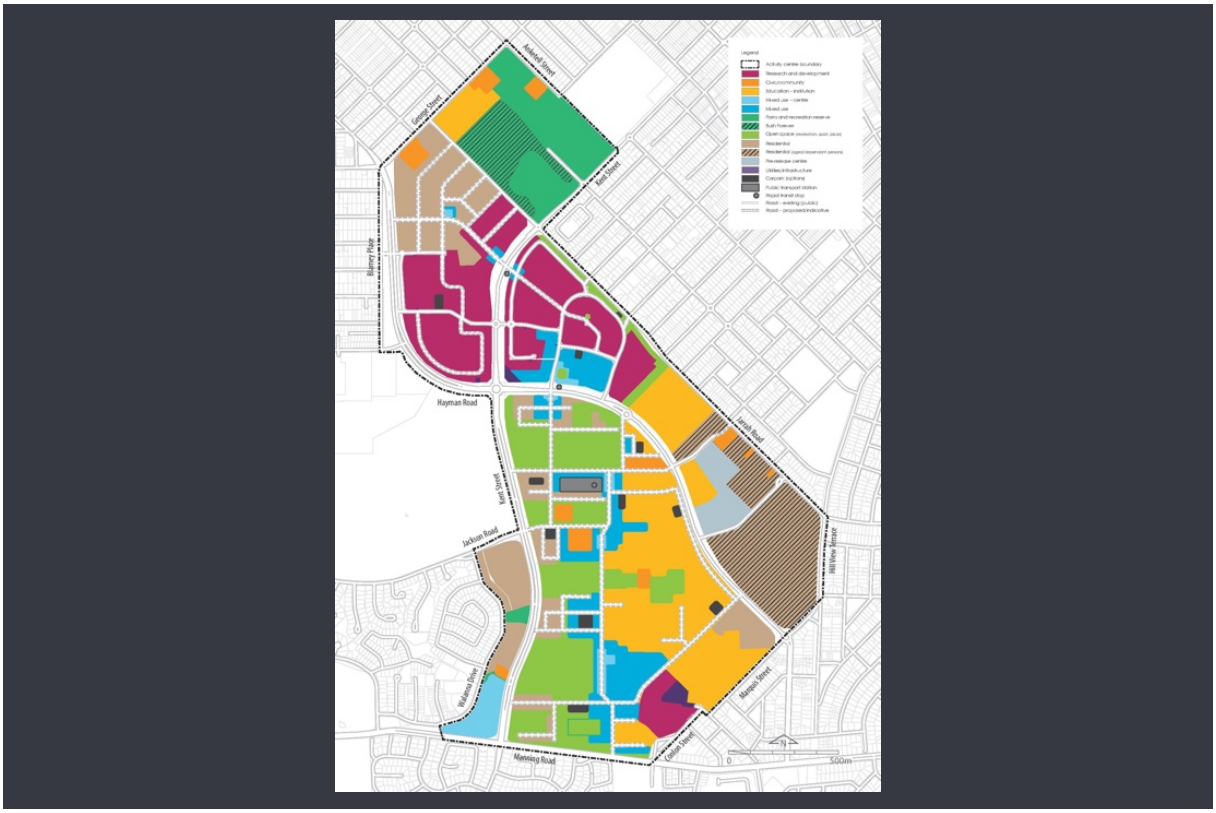
- Land use planning approaches for modern industrial parks are underpinned by protectionist and separation policies to protect the amenity of surrounding sensitive uses, but also to preserve sufficiently sized lands for larger operators.
- In contrast, land use planning for successful Innovation Precincts has been suitably flexible, incorporates a genuine mix of uses including some strategic residential and creative spaces.
- Setting the scale for larger industrial parks from the outset is important for not only preserving expansion of industrial parks but also driving economic growth and attracting global leaders in industry.
- Both Industrial Parks and Innovation Precincts need to be supported by transport, digital and utilities infrastructure.
- Land use planning for Innovation Precincts should focus more on design outcomes and place-based approaches rather than stringent regulation around zoning.
- Generally, competitive industries around the world are becoming more environmentally conscious of sustainable and efficient operations. In Europe, environmental regulation around industrial uses often outranks land use and building design outcomes.

[72] Zoning for a better Toronto, Martin Prosperity Institute 2010
[73] ibid

- For both Industrial Parks and Innovation Precincts, comprehensive master planning has proved critical to successful delivery. The more adaptable the plan, the more resilient the urban fabric of a place is to changing demands and drivers.
- Clearly specifying desired land use outcomes in zoning establishes a clear message for investors and the community as to what a precinct will be like. Zoning needs to clearly define the types of industries and businesses and consider aspects such as scale, level of environmental impact and economic functions.
- A genuine understanding of space requirements for different industrial usage types should inform regulations and development controls. These need to transform as requirements change over time.

4.3 Planning for Domestic Precincts

4.3.1 Bentley Technology Park, Perth



BENTLEY TECHNOLOGY PARK, PERTH

Top: Figure 50 Zoning Plan – Bentley Tech Park
Source: https://techparkwa.com.au
Left: Figure 51 Curtin University, Bentley
Source: ("Bentley – Technology Park", Mingor Website, 2019) http://www.mingor.net/localities/bentley.html
Right: Figure 52 View of Bentley Tech Park Function Centre
Source: https://techparkwa.com.au

Markers of Success
Acknowledged by Western Australia State Government as an important catalyst for science and technology development.
Home to more than 100 organisations including technology-based industry, research and development, academia and support organisations. Anchor tenant is CSIRO.
8,600 jobs currently in the precinct, 5,000 of which are knowledge / professional jobs – anticipated to grow to over 20,000 by 2031[74].

The Bentley Technology Park in Perth was opened in 1985. The Western Australian State Government as an initiative to accommodate a new base for CSIRO and others in proximity to Curtin University introduced the Technology and Industry Development Act, 1983. The purpose of the Act was to establish a corporate body to oversee the development, management and operation of technology parks across the state and to zone land appropriately for such uses. The governments' Vision for the Bentley Technology Park was to create a planned city where scientific and technological industries could thrive, and research resources could be shared and expanded around Curtin University[75].

Zoning frameworks applying to the park fall across two local government areas. A Technology Park zoning applies in the South Perth Council area whilst a Special Use zone applies in Victoria Park. Land use terms that are permitted without any form of consent in the zones include: *Café / restaurant, child*

[74] https://techparkwa.com.au/features/
[75] Growing WA through innovation, Legislative Assembly Report No. 7 June 2016

care centres, civic uses, consulting rooms, industry – service, office, public utility, research and development and take-away food outlet.

The land use activities that currently operate within the park would broadly be captured under the *research and development* land use terms and include pharmaceutical, energy, educational institutions, IT research, government research agencies (CSIRO), geoscience and engineering, software development, vocational training, scientific research and technology development. *Research and development* is defined under the Local Planning Scheme as *"scientific and industrial research and the development, production and assembly of products associated with such research undertaken on any land or within a building designed and equipped for such activities"*. The land use term clearly defines the nature and types of activities considered desirable in the zone and reflects those that have occupied the park.

Land parcels within the precinct remain vacant to this day and this is likely the result of a number of factors:

1. The strict and limited application of land uses permitted in the park. Whilst this has preserved lands for the specific purposes sought by government in the early 1980's other commensurate land uses have been prohibited from entering the park.
2. Development controls for new buildings in the park are highly restrictive and largely outdated (as discussed below).
3. There may be a lack of demand for such knowledge-intensive uses to invest in the park given its poor access to public transport and other essential services.
4. The corporate body managing the park has been overly restrictive in the application of their powers under the Act.

Development controls under both Local Planning Schemes are highly restrictive. Maximum 7 and 7.5m height limits and plot ratios of 0.5:1 severely limit new built forms, particularly on smaller sites, which would produce spaces which are unlikely to attract major R&D. Setback and landscape controls may also be unnecessarily restrictive to new developments which require flexibility in the establishment and use of new spaces.

Whilst the initial stages of development in the park were largely successful in attracting major R&D and delivering suitable built form for such users at the time, it seems that growth of the park has stagnated. This is largely due to the restrictions around complementary land uses and the prohibitive nature of the existing development controls. The State Government in collaboration with the Councils are currently reviewing land use and development controls in the park with the aim of introducing more vibrant activities including small-scale retail and investigating drivers for the establishment of incubator spaces[76].

[76] https://www.jtsi.wa.gov.au/what-we-do/industry-development/industry-participation/technology-parks

4.3.2 Smeaton Grange, Sydney

Top: Figure 53 Map – Smeaton Grange and surrounds
Source: https://www.camden.nsw.gov.au/community/community-information/suburb-maps/
Left: Figure 54 Avid Industrial Development – Ironbark Estate, Smeaton Grange
Source: https://www.avid.com.au/project-landing-pages/iron-bark-industrial-estate-smeaton-grange-nsw
Right: Figure 55 Artistic impression of new industrial development within the Ironbark Estate
https://www.avid.com.au/project-landing-pages/iron-bark-industrial-estate-smeaton-grange-nsw/

Markers of Success
Camden Council's largest employment centre providing for over 4,300 jobs across the precinct which represents 24.1% of all jobs in the LGA.
Well-planned physical interfaces to established and future residential precincts to control environmental nuisance impacts of industry.
Smeaton Grange is one of the most active precincts in South-West Sydney with median property prices on average increasing over 35% in the past 4 years.
Continues to attract investment from international operators including Amazon who have recently purchased 2ha for $7 million to establish their fulfillment centre (warehouses).

Smeaton Grange is an industrial park in South-West Sydney situated within the Camden LGA. The precinct is situated on the junction of Narellan Road and the upgraded Camden Valley Way between the centres of Camden and Narellan. The land is zoned IN1 General Industrial with some pockets of IN2 Light Industrial positioned at the edges of the precinct where it interfaces with more sensitive residential land uses in Currans Hill and Gregory Hills.

The predominant built form observed in the precinct is warehouses and distribution centres of varying sizes. Multi-unit complexes housing construction and trade services are also scattered throughout the precinct. The broad nature of land uses permitted in the IN1 zone has resulted in a genuine mix of operators from industrial-retailers through to childcare, recreation centres, storage and warehousing, vehicle repairs, scrap metal recyclers and some limited manufacturing activities.

Smeaton Grange was developed in accordance with a comprehensive masterplan under Camden's DCP which has helped to deliver a clearly defined street hierarchy and some examples of good landscape outcomes and edge buffer treatments.

Development standards under the Camden LEP 2010 as they apply to Smeaton Grange are as follows:
Minimum Lot Size: 2,000m²
Maximum FSR: 1:1
Maximum Height: 11m

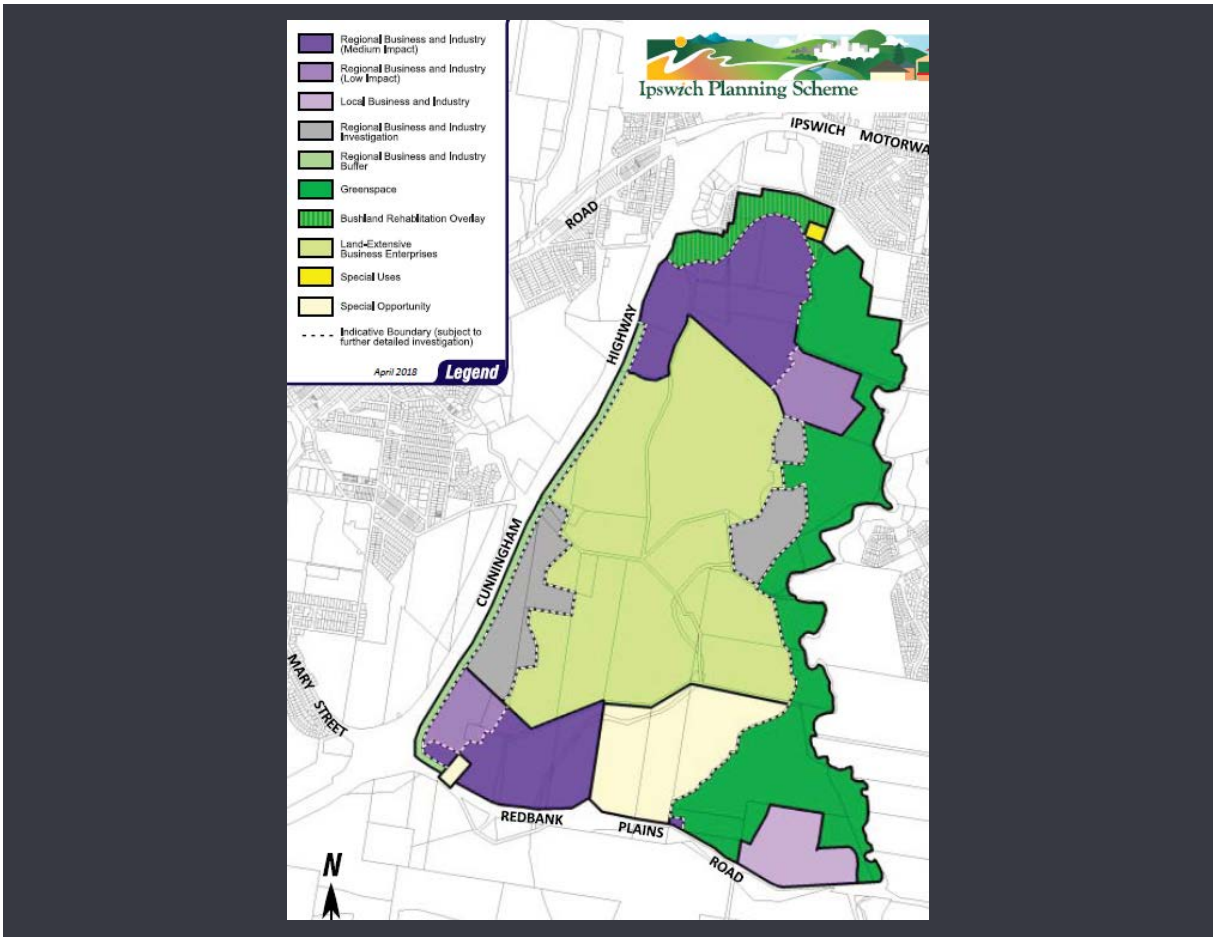
What is interesting to note is the range of lot sizes, building types and scales that have eventuated in the precinct, even with such stringent controls. The masterplan identified specific areas around the edges of the precinct which would be more suited to larger distribution and warehousing operations. Older building stock in the precinct (developed in the 1990's and early 2000's) comprised 2,000m² sites with single buildings or small-scale unit complexes whilst more recent stock has seen a mix of larger floorplates with smaller strata title units as evidenced in the Ironbark Estate developed by AVID[77]. This

[77] https://www.avid.com.au/project-landing-pages/iron-bark-industrial-estate-smeaton-grange-nsw/

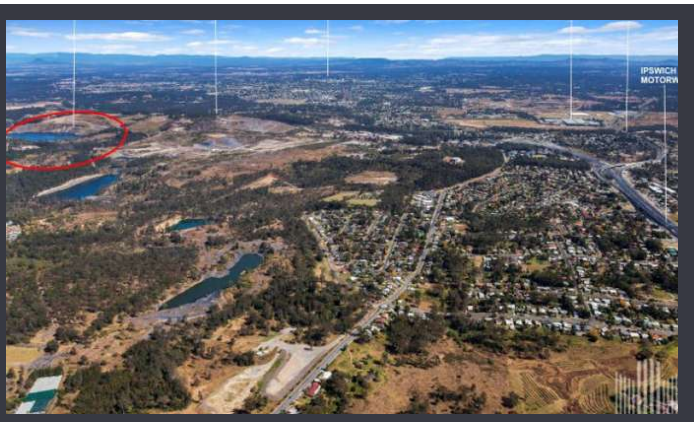
reflects a change in the demands for smaller storage and warehousing space to suit urban services and other light industries.

The masterplan included controls around separation and landscape buffer treatments to the adjoining residential areas to the north and east. Extensive landscape treatments to the Camden Valley Way interface were also originally established to provide visual amenity and screening. To the east landscape corridors were doubled by the preservation of major overhead power line easements which still exist, providing 50m buffer zones between industrial buildings and the closest residential properties. To the north the separation distances have been reduced along Turner Road, however the implementation of an IN2 Light Industrial zone has resulted in more passive uses interfacing to a now major local road[78]. The masterplan approach together with well-considered DCP controls has achieved good amenity and interface outcomes to surrounding residential properties.

4.3.3 New Chum Enterprise Area, Ipswich



[78] https://www.camden.nsw.gov.au/assets/pdfs/Planning/Development-Control-Plan/DCP-Part-D.pdf



NEW CHUM ENTERPRISE AREA, IPSWICH

Top: Figure 56 New Chum Zoning Map
Source: ("Ipswich Planning Scheme 2", City of Ipswich, 2019) https://www.ipswichplanning.com.au/
Left: Figure 57 Views of established industrial area adjoining New Chum Estate
Source: https://www.rhcommercial.com.au/properties/2-chum-street-new-chum-4303-queensland
Right: Figure 58 New Chum and surrounds
Source: https://www.realcommercial.com.au/property-land+development-qld-new+chum-500722659

Markers of Success
Strong example of transitional land use zoning implemented to control impacts to surrounding residential amenity. State Government initiated Temporary Local Planning Instrument in place to mandate separation distances between new industries and residences.
Successful means of utilising rezoning and investment by industry to remediate and repair open-cut mine site and manage existing environmental issues.

The New Chum Enterprise Area is a newly rezoned and proposed industrial precinct in the Ipswich LGA, positioned in the outer south western area of Brisbane. In 2018 Ipswich Council introduced the New Chum Implementation Guide into their Planning Scheme to provide directions around the configuration of proposed land use and separation treatments for new development. The area has long been flagged as having strong enterprise potential by both the State Government and Council being positioned close to the existing heavy industrial areas of Swanbank to the south and having direct motorway access to Brisbane[79].

The area covers some 8km² and includes lands heavily disturbed by previous extractive mining which has left the land unstable, flood prone and impacted by spontaneous combustion of coal and carbonaceous shale. The land was identified as suitable for conversion to a mixture of industrial land uses where built forms could suitably adapt and be responsive to constraints[80]. Adding to the constraints is the existing low-density residential areas positioned to the north and west of the site.

[79] Implementation Guideline No. 25: Ipswich Planning Scheme
[80] Synopsis of findings of the Ipswich-Western Corridor industrial land analysis, December 2008

Council's approach to land use implementation is based on separating heavier industrial operators from nearby residential through land use buffering and transitioning uses based on precinct classifications. The outer peripheries of the area are classified for light industries, business and larger-scale recreational activities whilst heavier industrial operations (known as land-extensive enterprises) are arranged in the centre of the precinct. The strategy is for new development to act as a catalyst for rehabilitating degraded lands in the area whilst also encouraging the implementation of compatible outdoor / adventure sports and off-road vehicle pursuits[81].

Approaches to zoning and master planning of the precinct also nominates edge biodiversity areas which are to be preserved and regenerated as part of larger development sites. These edge treatments together with development controls around high-quality façade treatments to buildings fronting residential edges work to ensure a high standard of visual amenity is achieved along the Cunningham Highway corridor.
Interestingly, land use classifications are based on the level of environmental impact and the land sizes required to support certain industries. Land uses are allocated according to their regional or local significance which are defined by size, character and dependence on access to the outer arterial motorway network. Land extensive industries and enterprises are those operations requiring larger sites such as distribution, freight and chemical production industries. These are positioned in the centre of the site where the need for more expansive buffers to surrounding sensitive uses and environmental areas of significance are recognised.

Whilst not yet developed the approach to land use planning for New Chum is considered reflective of best practice on the basis that:

- Land use configuration has been mindful of land area requirements and the need for separation and isolation of larger, more intensive industrial operators;
- Planning has recognised the significance of incorporating and promoting recreational green edges to provide amenity for workers as well as doubling as extensive vegetated buffers to residential properties;
- It has recognised the importance of high-quality built form in connection with landscape treatments for visual aesthetic; and
- It introduces a comprehensive street network supported by pedestrian and cycle connections for workers to access local business precincts offering essential services, food and drink and retail.

[81] Implementation Guideline No. 25: Ipswich Planning Scheme

4.3.4 Sydney Science Park, Penrith

SYDNEY SCIENCE PARK

Top Figure 59 Locational map – Sydney Science Park
Source: https://www.celestino.net.au/sydneysciencepark/residential
Right: Figure 60 Artistic impression – Sydney Science Park
Source: ("Sydney Science Park – APP", APP Website, 2019) https://www.app.com.au/our-work/sydney-science-park
Left: Figure 61 Artistic impression aerial of Sydney Science Park Masterplan
Source: https://www.celestino.net.au/sydneysciencepark/residential

Markers of Success
Earmarked to cater for some 12,000 new knowledge-based jobs, with opportunities of longer-term injecting tens of millions of dollars in revenues into the broader Western Sydney economy.
The $5 billion project has drawn collective investments from leading industry partners including CSIRO, the Parramatta Catholic Education Diocese, ANSTO and the Westmead Health Precinct's seven health, education and research organisations[82].

Sydney Science Park occupies 280ha of newly zoned business enterprise lands in Luddenhum. It is the creation of Celestino (the developer) in a joint venture with the Commonwealth Government, Catholic Education Diocese and a number of International Scientific Research Institutions including the Birling National Avian Laboratories Centre. It is a project which is aimed at delivering a fully integrated community that will create more than 12,000 knowledge-based jobs in food technology and development, research and scientific industries together with educational facilities for over 10,000 students and homes for 10,000 residents. It is an innovation precinct which has excellent access to Western Sydney's arterial motorway networks and the WSA. Currently under construction, the park will be home to CSIRO's first dedicated Innovation Zone and Urban Living Lab which provides housing and services for scientific research professionals[83].

Planning for the park was undertaken in 2014/15 which saw the land rezoned from rural to a mixture of B7 Business Park, B4 Mixed Use and RE1 Public Recreation to facilitate:

- A new specialised centre accommodating R&D, employment, education and supporting retail and residential use;
- 440,000m² of employment and education floor space;
- 3,000 dwellings integrated within the town centre and within the employment and education land; and
- A diverse worker, resident and student community that is demographically balanced, responds to changing lifestyles and work requirements over time.

The rezoning approach to the park allowed for an immense level of flexibility which was required given the need to incentise investment and attract major scientific, research and educational institutes into a greenfield site. The mixed use centre and modified B7 zone allowed for certain types of worker and student housing to be integrated throughout the park for promotion of better live-work arrangements, higher pedestrian and cycle outcomes and transit-orientated development principles with the future north-west rail link. The percentage of recreational and landscaped open space across the park was also key to unlocking the rezoning in promoting a high level of amenity for workers, students and residents.

[82] https://www.celestino.net.au
[83] https://theurbandeveloper.com/articles/aerotropolis-sydney-science-park-one-step-closer

Development standards under Penrith LEP 2014 stipulate maximum building heights of 18m and 24m across the education, research and town centre areas to accommodate mixed use built form and minimum lot sizes down to 225m² and 125m² for integrated small lot housing, consistent with the growth centre controls.

Development controls are included in a site-specific chapter in Penrith DCP 2014. Extensive place-based controls guide the design of public streets, pedestrian and cycle connections, landscape and biodiversity corridors, public art and creation of a public domain within the town centre. More specific design requirements for the town centre is mandated through precinct plans which must be prepared and approved by Council prior to construction to establish fine-grain urban design outcomes[84].

A variety of building heights, coverage and setback controls are included to produce a variety of built forms for different areas and usage types. Typically, larger building forms with greater heights and floor areas are required to provide increased setbacks and landscaping, whilst smaller forms are encouraged to abut streets at a reduced or nil setback. Active street frontages are promoted along major pedestrianised thoroughfares and internal building amenity controls are extensive to mandate good solar penetration and sustainability outcomes[85].

[84] https://www.penrithcity.nsw.gov.au/images/documents/building-development/planning-zoning/planning-controls/Penrith_DCP_2014_Part_E16_Sydney_Science_Park.pdf
[85] https://www.penrithcity.nsw.gov.au/images/documents/building-development/planning-zoning/planning-controls/Penrith_DCP_2014_Part_E16_Sydney_Science_Park.pdf

4.3.5 Innovation Precincts in Victoria

Top: Figure 62 West Melbourne Structure Plan boundaries
Source: ("West Melbourne Structural Plan, City of Melbourne", 2018) https://participate.melbourne.vic.gov.au/westmelbourne
Left: Figure 63 Artistic impressions of future mixed innovation precinct – West Melbourne
Source: ("West Melbourne Structural Plan, City of Melbourne", 2018) https://participate.melbourne.vic.gov.au/westmelbourne
Right: Figure 64 Artistic impressions of future mixed innovation precinct – West Melbourne
Source: ("West Melbourne Structural Plan, City of Melbourne", 2018) https://participate.melbourne.vic.gov.au/westmelbourne

Land use zoning in Australia has traditionally been utilised to separate activities, often grounded in the idea that residential, commercial and manufacturing activities are inherently incompatible. On the basis of successful Innovation Precincts overseas the NSW and Victorian Governments are beginning to investigate efforts into the development of these precincts in response to rapidly changing trends in industry jobs, lifestyles and approaches to urban planning.

The Victorian Government, particularly in areas around inner-city Melbourne are leading this charge with the establishment of a new zone – the Commercial 3 zone. This has been established in 2018 as a mixed-use employment zone under the Enterprise Precincts policy. It is intended to facilitate the establishment and growth of creative industries, small manufacturers and startup businesses. The zone prioritises particular uses that form part of the emerging economy, including new models of industrial, commercial, office and other employment generating uses, whilst still permitting some forms of retailing and residential[86].

Uses permitted in the Commercial 3 zone include arts and craft centres, education centres, home-based businesses, certain types of industry, manufacturing sales, markets and research centres. Complementary uses including accommodation, small-scale retailing and warehouses are also permissible with consent, however scale parameters under development controls apply to such uses to best manage their role and scale. For example, shops up to 200m² and warehouses of up to 500m² are permitted with consent. Dwellings are also permitted within a mixed-use development where the residential floor area does not exceed 35% of the combined GFA[87].

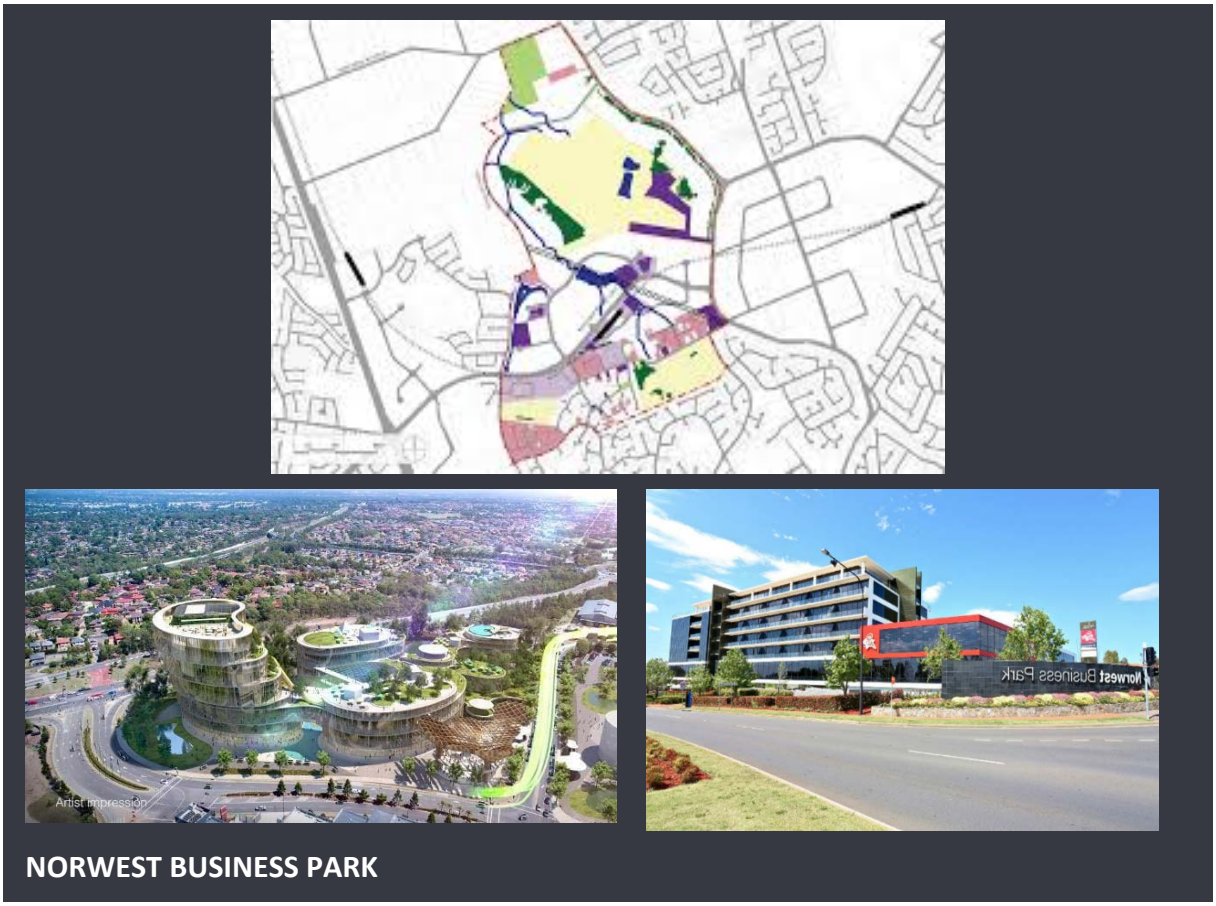
In precincts like West Melbourne, recent attempts at new approaches to land use zoning to encourage urban renewal and retained employment may seek to implement the Commercial 3 zone within a few sub-precincts. Planning in West Melbourne has acknowledged the importance of residential and commercial developments in driving renewal and gentrification processes, however, in recent years the mixed-use zoning of the area has led to an over-abundance of residential units which has forced out traditional industry[88]. The 2018 Structure Plan now seeks to introduce a Special Use zone with incentives provisions to allow for residential apartment buildings only where a certain percentage of the GFA is dedicated to employment generating uses; similar to Central East Side in Portland.

Cremorne, an inner-city area in Melbourne's south east has also been earmarked recently for incorporation of the Commercial 3 zone around the bustling and growing technology precinct, anchored around the cluster of software companies like MYOB[89]. In Cremorne, the City of Melbourne has understood the key draw cards behind the establishment of clusters of creative, technology and innovation startups who are drawn by the presence of like-minded entrepreneurs, heritage buildings,

[86] Unlocking enterprise in a changing economy, Victorian Government, September 2018
[87] Applying the Commercial 3 zone – Planning Practice Note 85, September 2018
[88] West Melbourne Structure Plan 2018, City of Melbourne
[89] https://www.premier.vic.gov.au/boosting-innovative-technology-jobs-in-melbourne/

co-working spaces, a mix of large and small land parcels left by departing industries, and good public transport. Other emerging precincts likely to be investigated for the Commercial 3 zone include parts of Collingwood, South Melbourne and Brunswick that share these key attractor traits[90].

Norwest Business Park



Top: Figure 65 Norwest Station Structure Plan
Source:https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&ved=2ahUKEwj2yueYz5jjAhUWVH0KHU2wDx0Qjhx6BAgBEAI&url=https%3A%2F%2Fwww.planning.nsw.gov.au%2F-%2Fmedia%2FFiles%2FDPE%2FReports%2Fnorth-west-rail-link-norwest-station-structure-plan-a-vision-for-norwest-station-surrounds-2013-09.pdf%3Fla%3Den&psig=AOvVaw0bH_ANCZFpktXJI3AFQ-nA&ust=1562238801956655
Left: Figure 66 Artistic impressions of future Mulpha development, Norwest Smart City
Source:https://www.dailytelegraph.com.au/subscribe/news/1/?sourceCode=DTWEB_WRE170_a_GGL&dest=https%3A%2F%2Fwww.dailytelegraph.com.au%2Fnewslocal%2Fhills-shire-times%2Fnorwest-smart-city-mulphas-futuristic-vision-for-a-nationleading-business-park-has-been-revealed%2Fnews-story%2Faa8e950e01440b6ed8b9d5f0326a8405&memtype=anonymous&mode=premium
Right: Figure 67 View of entrance to Norwest Business Park from Windsor Road
Source: https://jagonal.com.au/office/building/NSW/Sydney/Sydney-North-West/Norwest/Norwest-Business-Park

[90] https://www.premier.vic.gov.au/boosting-innovative-technology-jobs-in-melbourne/

Markers of Success
Planning for the business park has been responsive and adaptive to growth and the changing nature of industries
The partial B7 zoning of the park has produced a larger occupation of commercial uses than industrial or research-intensive industries, however it includes specialist innovative clusters around medical uses

The Norwest Business Park located off Windsor Road in The Hills LGA is a largely developed precinct which is second only to Macquarie Park in terms of overall land size at 377 hectares. It comprises approximately 272,500m² of commercial office floorspace and a further 60,000m² of industrial and retail floorspace which is forecasted to provide for 35,000 jobs once capacity is achieved[91].

The park is home to over 350 companies, comprising a diversity of information technologies, pharmecueticals, manufacturing, construction and financial services[92]. As of 2016 The Hills Shire Council's civic and administrative offices were relocated into the precinct, reflective of its now regional economic significance which continues to grow. The partial B7 zoning of the park has produced a larger occupation of commercial uses than industrial or research-intensive industries, however it includes specialist innovative clusters around the Norwest Private Hospital including advanced health and medical organisations including Sigma Pharmecueticals, ResMed and Rhone Polenc. The B7 zone has proven successful in the rate of land take up and development of accommodative facilities. This successful growth was supported by the executive housing development provided in the adjacent R2 and R3 residential zones incorporating the estates of Bella Vista and Bella Vista Waters[93]. Early investments in regionally significant retail and transport infrastructure also aided in the attraction of large investments by international and domestic organisations[94].

As growth began to constrain the precinct focuses from The Hills Shire Council and the NSW State Government saw further commitments to improving regional transport infrastructure including new stations on the North West Metro, upgrades and widening to Norwest Boulevard and improved connections to the M7 Motorway[95]. In more recent years lands around the major retail centre were rezoned to accommodate mixed use and residential flat building developments built around the principles of transit-orientated development (TODs). These approaches to land use planning and development controls over time have seemingly encouraged renewed economic development and investments in park.

[91] Research park case study analysis, Hill PDA, February 2013
[92] http://norwestbusinesspark.com.au
[93] http://realcommercial.com.au/property-offices-nsw-baulkham+hills-5794934
[94] Research park case study analysis, Hill PDA, February 2013
[95] https://www.pwc.com.au/agendas/cities/citypulse-sydney-building-three-cities-for-the-future-web.pdf

The Norwest Master Scheme has underpinned the ongoing development of the park. From the outset it advocated for the establishment of good pedestrian and cycle links between the retail centre and throughout the park. With the provision of the Metro line, the scheme has again been revised to focus improved pedestrian and cycle connections from places of work, residences and retail to the stations. Road widening, and improved connections are currently being undertaken by the Council in connection with new high-rise developments.

Amenity for workers and residents was always considered a crucial element of the scheme. The Norwest Lake and lake-front dining precinct was developed to encourage high quality break-out and interactive places for people to meet and collaborate[96]. Similar to Suzhou's central lake, the Norwest Lake provides a central recreational anchor and helps orientate land use configuration in the precinct.

Importantly, approaches to planning for the business park has been responsive and adaptive to growth and the changing nature of industries. Zoning has been re-examined over time to ensure land use definitions help aid investment and economic returns. These planning processes have been collaborative in working with major institutions to understand their work-space needs and drivers. Being confronted with expansive residential projects in the Norwest town centre Council are mindful of avoiding a dilution of this precincts' key role as an economic hub, seeking to continuously protect businesses through the continued application of the B7 zone which prohibits residential development.

4.3.6 Key Findings from Australian Examples

- Industrial zoning frameworks across Australia recognise the core differences of industries based on the extent of environmental impact, requirements for land size and separation. Other industries, including urban services, light industries and innovative industries typically fall into broad industrial, commercial, employment or business zonings which more often than not results in fragmented and mixed-use precincts.
- Best-practice approaches to land use planning for industrial parks establish the differing characteristics of uses and include clearly defined land uses. Different types of industrial operations are then segmented into sub-precincts to create clusters of commonality and shared knowledge and resources.
- The economic success of industrial precincts depends on access to other supportive land use activities. Planning needs to consider what supportive uses are appropriate and their quantification needs to be controlled via development regulations incorporated into zoning to avoid diluting the predominant employment uses.
- Innovation precincts in Australia have developed organically in inner-city areas with good access to amenity, transport and built form character, including predominantly vacated industrial factories and buildings of heritage value. Moves to recognise the characteristics of Innovation

[96] http://www.norwestassociation.com.au/master-scheme/

Precincts, such as the Commercial 3 zoning in Victoria will provide some direction to the market around investment decisions and will continue to encourage the growth of creative industries.

- As evidenced overseas, for Innovation Precincts to thrive planning needs to be flexible, adaptive to fast moving drivers of change and incentivizing to draw in startups and users that require cheap rents and cost-effective spaces to operate.
- Collaboration is linked to mixed use areas. Incorporating some limited residential use into precincts to create live-work spaces can support vitality and vibrance, however, careful planning decisions need to be made so as to not compete with employment outcomes.
- Industrial parks should utilise transitional zoning to buffer adjoining sensitive uses. The incorporation of physical separations and vegetated buffers has also proven successful in protecting surrounding amenity. Utilising major roads, rail and infrastructure corridors as well as native forests and other natural features should be investigated in master planning ahead of development commencing.
- Attractive physical features such as man-made lakes, recreational areas or eat streets are pivotal to the successful development of precincts. These help to orientate designers in place-making, configure land use zoning and attract investment from business.
- Planning for industry needs to be both flexible and prescriptive, depending on the needs to control or drive innovation in outcomes. Well-planned precincts such as Bella Vista and Sydney Science Park are also successful because key infrastructure decisions and assets were locked in ahead of development.
- Different industries require very different spaces, levels of access to infrastructure and facilities. Accordingly, some businesses will tend to occupy certain locations over others. Consultation with the private sector ahead, and throughout the course of planning is vital to successful precincts.

5. Market and Government Initiatives

Having considered the key drivers and demands of industry and innovation and the best practice approaches to land use planning, this Chapter considers examples of market and government led initiatives that have supported retention and growth of local jobs and industries. As industries change over time as a result of geo-political factors, technological advancements and global competition there is often a need for governments and the private sector to intervene through planning, financial and governance mechanisms to protect jobs and facilitate transition. The ongoing decline of the traditional manufacturing sector in western nations has seen gradual transitions to service and knowledge industries as well as the promotion of the professional, technical and advanced manufacturing sectors through numerous interventions and incentives. Whilst markets tend to adapt and transition organically over time there is often need for leaders to intervene and be proactive to ensure economic downturns and the effects of urban decay are avoided.

5.1 Utilising Value Capture

Value capture is a mechanism of utilising funds raised from taxes or levies on new private-sector development projects and rate-payer revenues to improve infrastructure. Government authorities around the world enact value capture to drive urban renewal or the development of new precincts and often use incentives to drive initial investment by the market.

Werksviertel is a repurposed former industrial district in Munich which has been transitioned into a thriving Innovation Precinct following ongoing collaboration and intervention by government, the land owners and the community. The city government has deployed instruments to enable land intensification and has reinvested profits from new developments back into social and cultural infrastructure to promote a destination employment centre for business investment[97]. The district's growth and success are the result of multiple government-led initiatives in city planning, including:

- The promotion of residential developments to drive economic returns through a value-capture model;
- Preservation of historic buildings and assets to preserve cultural drawcards and contribute to a sense of tradition and place;
- Incorporation of mixed use and a variety of building forms to add vibrancy and visual intrigue which has drawn investment from both smaller and larger companies;
- The setting of high environmental performance standards; and
- Creating a dynamic combination of recreational, artistic and retail spaces to add vibrancy and life to the precinct.

[97] Building the innovation economy – Case Study: Munich, Clark, G, Moonen, T & Couturier, J, October 2016

The NSW Government has used value capture to reinvest into infrastructure improvements to support its largest business parks at Macquarie Park and Norwest, within Sydney's Global Economic corridor. In Macquarie Park levies on new high-rise residential developments under a State Infrastructure Contributions (SIC) have helped to fund local and regional road improvements and investments in upgrades to recreational infrastructure. In Norwest, development contributions paid in accordance with The Hills Contribution Plan has delivered road widening improvements along Norwest Boulevard and upgrading of the public domain around the entrance to the new Metro stations, new and improved pedestrian and cycle connections and stormwater drainage infrastructure[98].

5.2 Decentralisation and Anchors

Decentralisation, relocation and investments in major research and education institutions have also proven successful in driving economic growth and job protection. These mechanisms have been pursued by both the free market and government in several major cities around the world.

Paris-Saclay is a research-intensive business cluster which is undergoing growth and expansion. It is a strong economic hub which accommodates 40% of the Paris regions public research institutions and 40% of the city's industrial high-tech research and development sector. The city's governments committed over $1.5 billion euros in relocating and re-establishing the Paris University's real estate projects and $1 billion euros towards the establishment of state-owned laboratories and research institutes within a central cluster[99]. This education and research clustering together with significant investment in the expansion of the Paris Metro has attracted global energy, IT, automotive, aerospace and health research companies to the district, contributing to a super-innovation precinct.

The establishment of the CSIRO's first living laboratory in the Sydney Science Park is a domestic example of government investment acting as an impetus for future economic growth in the research and development sector. Other examples such as the Bentley Technology Park in the 1990's saw CSIRO's establishment of a research base draw investment from other major institutions who collaboratively work and leverage on the knowledge and professional services on offer.

In Rochester, Minnesota the establishment of the Mayo Clinic within the heart of the city became a anchor to the growth and development of Discovery Square. The precinct is a highly connected urban life sciences hub which has seen growth of the clinic resulting from ongoing investments from the private sector in new laboratories and private health care facilities[100]. Today it is the largest public-private partnership in the state which has created a destination medical and research centre of international importance that directly employs over 55,000 specialist workers[101].

[98] https://www.lindsaytaylorlawyers.com.au/in_focus/value-capture-through-voluntary-planning-agreements-part-2-key-issues-examples-of-some-local-council-practices/
[99] https://www.epaps.fr/wp-content/uploads/2017/08/170629_BI-anglais_bd.pdf
[100] https://obamawhitehouse.archives.gov/the-press-office/2016/09/26/fact-sheet-announcing-over-80-million-new-federal-investment-and
[101] https://www.nawic.com.au//nawic/documents/20141215_NAWIC_WalkTalkWork.pdf

5.3 Investments in Infrastructure

The best practice approaches to land use planning discussed in Chapter 4 included a common theme of needing to plan for crucial infrastructure to configure land use activities and establish a basis for development regulation. Employment centres rely on infrastructure to transport workers, goods and services. For heavier industries, more intensive utility infrastructure services in the form of power generation, water management and sewerage treatment are vital to operations. For Innovation Precincts to succeed, investments in cultural and social infrastructure in addition to transport is important in creating a sense of identity in place and can attract new investment into renewal areas.

There are multiple examples of where the private sector and/or governments have contributed to well-planned infrastructure ahead of development and gentrification. The Brooklyn Tech Triangle is an excellent example of where infrastructure planning in conjunction with a strategic plan for urban renewal helped establish one of the world's largest technology innovation hubs. The Triangle is home to more than 1,350 companies and employs 17,300 people. It incorporates office headquarters in Downtown Brooklyn, the virtual design and advertising sectors in DUMBO and both factories and distribution yards at the Navy Yard. Urban place-based planning coincided with the development of an infrastructure implementation plan to ensure proper connectivity throughout the triangle[102]. The city invested heavily in an integrated public transport network which was dedicated solely to supporting economic growth and development in the triangle. It included:

- Increasing regular bus services and their connections to ferry stops
- Improvements to the public domain around stops and more regular ferry services
- New and improved bicycle and pedestrian connections as priority-ways throughout the precinct linking to bus and ferry stops[103]

The Government of China are often cited for their infrastructure-led approach to development of their cities. In the Suzhou Industrial Precinct (SIP), billions of dollars were invested by the government in transport and utility services infrastructure to deliver sub-precincts and neighbourhood plots ahead of the development of buildings. This included key investments in passenger and freight rail lines that operated around the perimeter and through the central grids of the city, commencement of transit bus services on completion of all major road construction, utility services including water, power and sewer and local parks, as well as the man-made lake system[104].

Similarly, investment in infrastructure by US state and city authorities in precincts such as Tahoe-Reno, Nevada and the Park 8Ninety Estate in Missouri City, Texas, ahead of individual site development went to establish precinct floor plates to attract investment. In both examples, the establishment of industrial parks through zoning and planning incentives alone was not enough to draw major

[102] http://brooklyntechtriangle.com/about/
[103] brooklyntechtriangle.com/assets/Brooklyn-Tech-Triangle-Strategic-Plan.pdf
[104] http://www.bbc.com/travel/bespoke/specials/suzhou-city-of-classical-charms/modern-city.html

investment from leading industries due to competition with other more established precincts across the country. Governments in both cases encouraged investment by constructing major roads and highways, new rail connections and utility service and digital infrastructure. The land was also subdivided in Tahoe-Reno at the expense of the city into large land holdings to encourage investment from Google and Tesla, which eventuated.

The Western Sydney Aerospace and Defence Industries precincts in the Aerotropolis are following the trends of examples like SIP and Tahoe-Reno. The Western Sydney City Deal is a strong example of commitments by multi-tiered government ventures to deliver key infrastructure to support and incentivise economic investment and growth ahead of development. The obvious examples of this include the commitments to the WSA and all of its facilities, the M12 motorway, the North-South Rail Link and other road and utility upgrades.

5.4 Planning and Development Incentives

Planning and development regulatory systems can be structured to incentivise economic growth, desired land use outcomes and protection industries and jobs.

The Bayswater Industrial precinct in Victoria is one of the state's largest existing mixed industrial business areas. It includes a variety of different types of warehousing, distribution and heavier activities including chemical production, waste recycling and processing plants. Both State and local governments have acknowledged the need for transition of industries in the area for long term employment security with the nature of industries advancing and changing in their needs for space. The over-exposure of the precinct to traditional manufacturing was also seeing large warehousing spaces falling vacant[105]. To drive renewal and encourage investment by emerging industries, the local government have taken a lead on developing a series of planning incentive controls for new development and modifications in the precinct. Selected Industrial 1 zoned areas were first rezoned to a Commercial 2 zone to create a more vibrant activity core comprising a new retail centre and commercial office spaces as one catalyst for transition. Building heights and plot ratios are also proposed to be increased across the traditional industrial lands to provide both existing and new companies with opportunities to redevelop their sites[106].

The LOGIS eco-industrial park in Dandenong is the first of its kind in Victoria. It is a 74-hectare innovation park which is home to Kraft Foods, Cadbury, Ascent Pharmaceuticals, Mercury Marine and Terex Australia. The strategic vision for the park, driven by private sector developers in conjunction with Council, was to create an environmentally sustainable industrial innovation park which built from the learnings of European cities[107]. Development regulations mandate sustainable operational outcomes and the use of green building methods including water reuse, the installation of solar PV

[105] Bayswater Industrial Precinct Review, AEC Group, October 2014
[106] https://www.communitynews.com.au/eastern-reporter/news/city-of-bayswater-to-advertise-draft-local-planning-strategy/
[107] http://www.premiersdesignawards.com.au/entry/dandenong-logis-eco-industrial-business-park/

and battery technologies for energy supply and mandates on lowering emissions. This approach has been well received by industry and has attracted investment into the park[108].

In the Central East Side precinct in Portland, Oregon, the growth of the Innovation Precinct and application of mixed-use zoning tools threatened existing manufacturers with being forced out due to development opportunities and spikes in leasing costs. At the same time, the County wanted to encourage transition of decaying industries on the city's edge to more innovative industries in advanced manufacturing and professional service jobs. A means of incentivised planning was introduced in an attempt to protect existing businesses and influence the retention of manufacturing and light industries in the precinct. Floor Area Ratios (FARs) and Floor Area Uplift (FAU) controls allocated a ground floor industrial bonus to incentivise the retention or provision of manufacturing floor space in new and redevelopment projects[109]. In return, developers were permitted to build increased residential and mixed-use floors above. Additional amenity protection provisions were included into the city's Ordinance to give priority to the operations of existing manufacturing industries over new sensitive land uses. The approach has been successful in retaining industrial operations whilst also encouraging the establishment and growth of emerging creative industries[110].

5.5 Development Authorities

Industrial precincts developed by a government or joint-venture led authority have proven successful in many cities. Development authorities or corporations are typically established to drive growth, change or set standards for innovation. Many governments intervene in the industrial and innovation sectors to drive change but also to build economic structures to suit the state or areas geo-political drivers and to give rise to competitive markets.

Governments in Asia have invested in the model of development corporations to enable new projects in industrial parks. The Singaporean and Chinese Governments in partnership established the SIP Development Corporation to build the infrastructure and provide all regulatory oversight and management of the SIP. Singapore's industrial hubs in the 1980s and 90s experienced significant growth around investments by the Ports Authority Development Corporation who developed dock-side freight and manufacturing spaces, which cemented the city as one of the world's most important trade ports.

In Europe, the experience has been similar. Government-led development authorities have driven visionary change in the development of eco-industrial parks and innovation precincts. Through promotion of innovation within emerging industrial sectors, countries such as Germany, The Netherlands and Denmark have become world leaders in the development of clean and efficient industries.

[108] https://www.savills.com.au/_news/article/109969/158808-0/3/2018/major-corporations-flock-to-dandenong-south
[109] https://www.portlandoregon.gov/bps/article/79307
[110] Industrial decline in an industrial sanctuary Portland's Central Eastside Industrial District, Jones, Allison 2014

In Rotterdam, the concept planning and initial stages of development of the RDM Precinct were led by the City Ports Development Authority. The authority was responsible for all strategic land use planning, infrastructure and investment decisions under legislature that eventuated in the RDM Master Plan. The authority undertook the first stages of the precinct's development in the construction and establishment of incubator space and a communal trade hall which spurred immediate local and international investment from startups and research institutions. The authority was also responsible for the establishment and construction of the public educational institutions which were strategically positioned with good access to the incubator and research facilities[111]. Today the authority still oversees the management and planning development approvals for all land use activity and construction operations in the precinct.

In Western Australia, the Corporate Body established under the Technology and Industry Development Act, 1983 actively continues to manage and oversee development and investment decisions affecting the Bentley Technology Park. Their powers are extensive and function in accordance with detailed statutory provisions which see them having the ultimate oversight over planning approvals in the park. There is an argument to suggest that the overly regulated body has actually stagnated growth of industry in the park, however, it has been successful in maintaining the original land use vision and upholding the highest standards of specialised technical research firms.

The Western City and Aerotropolis Authority established under the City Deals and Western City and Aerotropolis Authority Bill 2018 is a similar example. It is a body instituted to oversee development and regulation in the Aerotropolis. Its powers extend to decision making around key investments, infrastructure, strategic planning and other economic priorities. City-shaping projects such as the Bentley Technology Park and WSA demand strong leadership where important investment, planning and infrastructure decisions can be directed by a corporate body governed under legislative powers.

5.6 Joint Venture Partnerships

Joint venture partnerships between government and the private sector represent the strongest, most comprehensive mechanism to drive economic growth and job retention. Governance structures which reflect the interests of both the public and private sectors in collaboration can deliver real change and stability and multiple successful examples of employment areas have eventuated from such partnerships.

The Randwick Health and Education Precinct has been identified by the Commonwealth and NSW State Governments as a centre of strategic importance in education, research and innovation. It is an active precinct in Sydney's south orientated around 4 major hospitals, 9 medical research institutions, internationally recognised research centres and more than 100 student startups[112]. An intriguing joint-

[111] The impact of urban planning and governance reform on the historic built environment and intangible cultural heritage, Azadeh, AK, Nadin, V, June 2017
[112] https://sciencemeetsbusiness.com.au/tag/china-torch-program/

venture partnership between the Commonwealth and State Governments, Chinese Industry and UNSW was formed to birth the Chinese Torch Innovation Network. This $3 billion project will create the Torch Innovation Precinct at UNSW which will see planned developments in R&D delivered by stakeholders over the next decade[113]. The precinct will comprise advanced R&D and prototype manufacturing as well as a new UNSW Solar Industrial Research Facility. By 2022, the base will be home to between 5-10 major Chinese innovation companies and 100 Chinese and Australian startup technology companies. The project is expected to inject hundreds of millions of dollars into the local economy and provide for thousands of new knowledge-based jobs with additional space for student startups to grow[114].

The Oslo Cancer Cluster was initiated in 2006as a cluster member organisation to accelerate ongoing collaborations and knowledge-sharing of oncology research, treatment and pharmaceutical production. It is an oncology research and industry cluster that is a national non-profit member organisation with 90 members including national and international research institutions, technology companies, financial institutions, university hospitals and other organisations[115]. This makes it one of the largest R&D joint venture clusters in the world which contributes the most highly specialised oncology R&D centre. The Oslo Cancer Cluster Innovation Park and Incubator opened at Montebello in 2015, adjoining the Radium Hospital and the Institute of Cancer Research. It is continually cited by the Norwegian Government as vital to preserving and maintaining jobs in the fields of medical research and specialised health care[116].

The MaRs Innovation Precinct is an example of a successful joint venture funding and governance model between the City of Ontario and private sector industries, however, ongoing funding commitments by government over recent years have drawn controversy and concern from the general public[117]. The initial concept for MaRs was to utilise existing and improved public research, education and health institutions to anchor the development and organic growth of innovation industries. Ongoing financial commitments from the city as well as private sector investors has seen the continued expansion and growth of the precinct which now supplies over 7,000 jobs and has resulted in over $1 billion in capital investments[118]. The lessons from the MaRs governance model is the need for strong transparency and stringent regulation around development control and monitoring.

[113] https://www.innovationaus.com/2017/07/UNSW-carries-a-new-China-torch/
[114]https://www.theaustralian.com.au/subscribe/news/1/?sourceCode=TAWEB_WRE170_a_GGL&dest=https%3A%2F%2Fwww.theaustralian.com.au%2Fnation%2Finquirer%2Ftorch-precinct-lights-the-way-for-unsw-innovators%2Fnews-story%2Fdb120b7fe66e23895d0e01598a99fe70&memtype=anonymous&mode=premium
[115] http://osloscancercluster.no
[116] https://nordiclifescience.org/oslo-cancer-cluster-gets-new-innovation-park/
[117] https://betakit.com/mars-may-see-layoffs-as-province-continues-with-tech-funding-cutbacks/
[118] http://www.digitaljournal.com/tech-and-science/technology/mars-discovery-district-proof-toronto-s-tech-sector-is-growing/article/526756

5.7 Tax Breaks and Rebates

Financial incentives for growth and investment can also be regulated successfully by authorities to drive economic outcomes. In North America, the tax and regulatory systems are often adjusted to accommodate free market economics at macro and micro scales. In Europe, a trending focus on environmental outcomes has led to rebate regulations and financial incentives to reduce emissions.

In Australia, new development in employment areas has not been often been financially incentivised. Mechanisms such as S7.11 Contributions and SIC credits are often applied only for precinct-wide developments and are not available to stand alone projects. Furthermore, whilst tax concessions and credits are available to businesses, particularly small-businesses and sole traders, they are not readily promoted to encourage reinvestment into built form assets or new development projects.

The Tahoe-Reno Industrial Park is an excellent example of how financial de-regulation and tax abatement incentives encouraged significant return on investments into the region by some of the world's leading companies. In establishing the regulatory framework around the development of the park the State of Nevada imposed restrictions on development fees and extractions that the County could impose on developers. This saw the removal of a range of standard taxes on companies investing in the park including no corporate income tax, personal income tax, inventory tax, unitary tax, estate and/or gift taxes, franchise tax, inheritance tax and no special intangible tax[119].

New market tax credits in the US have been utilised to incentivise revitalisation of low-income and disadvantaged communities to provide lines of credit against federal income taxes for qualified investments in community infrastructure. These tax incentives were taken up by developers and industries to renovate and repurpose buildings in the Cortex Technology District in St Louis which was founded in 2002 as an innovation hub of bioscience and technology research[120].

In Europe market-based instruments such as environmental taxes, tradable permit systems and targeted subsidies have been implemented to deliver sustainable building and operational outcomes. These have been successfully implemented throughout German and Danish eco-industrial parks where financial incentives are targeted at continual improvements in sustainable operations[121]. This too applies to the heaviest industries in areas like Zeitz that have transitioned to sustainable energy production from intensive-based manufacturing.

[119] Deep in the dessert, an experiment in economic development, Maciag, M, November 2017
[120] https://www.stlouis-mo.gov/government/.../news/2018-nmtc-sldc-awarded-35m.cfm
[121] An international framework for Eco-Industrial Parks, UN Industrial Development Organisation, December 2017

5.8 Summary

- Value capture is a successful tool used to reinvest funds raised from new development projects back into infrastructure upgrades. Leveraging on existing public assets to support the growth of business and to draw investments can be successful in reducing costs, particularly for innovative industries and startups who require greater financial support in the establishment phases.
- The targeted decentralisation, relocation and clustering of public research and knowledge-based institutions can provide strong anchors for investment and growth of innovation precincts. These are centres of activity that generate employment, create vibrancy within an urban setting and release economic value streams which are valuable, particularly for precincts undergoing or in need of renewal.
- Significant infrastructure investment by authorities is critical to driving investment from the private sector. Infrastructure projects, such as the WSA and North-South Rail are vital to good placemaking, establishing important connected corridors of economic strength and drawing in anchor industries.
- Infrastructure projects can be pursued through a multitude of financial streams and governance structures including Development Authorities or Corporations, Government / Public-Sector and Private Sector Partnerships and multi joint ventures. Such arrangements can also reposition or develop impetus projects to incentivise investment and job growth. These have proven to be successful models both internationally and in Australia.
- The planning regulatory systems and land use incentives can be successfully implemented to drive growth, encourage desirable built form outcomes and place making, and also to protect established industries. Examples include bonus building height and floor space provisions in return for commitments to employment floor areas; zoning to encourage particular land use outcomes and leveraging funds raised from new incentive-based developments to provide public domain improvements.
- Financial incentives including tax abatements and development levy credits can also be used to protect and retain jobs.
- Other means of generating continued economic resilience and job retention include:
    - Ongoing investments into best-practice research, opinion polling and surveying of workers and industry leaders;
    - Targeted marketing and promotion by government and the private sector of investment and focus in new or existing precincts;
    - Ongoing investment into understanding key drivers and changing demands of industry; and
    - Focusing on the creation of great places with a developed understanding of the end users firmly in mind.

6. Planning Review

6.1 Intent and Purpose

The previous employment land studies prepared by Knight Frank and SGS identified concerns around the adequacy of the three industrial zones that apply in the Liverpool LGA. These reports and the analysis provided in Chapter 2 of this Study broadly characterised the industrial precincts into two categories: Industrial Parks and Specialised Urban Services Precincts. The investigations have then affirmed that certain precincts are well positioned to be transitioned under another zoning classification. This opinion has been shared in the work of the Greater Sydney Commission in the Liverpool Collaboration Area – *Place Study* which establishes a Vision of three very distinct land use outcomes for the existing industrial zoned precincts:

- The Scrivener/Priddle Street Precinct being transformed for Innovation / Research / Health / Advanced Manufacturing (i.e. a B7 zoning)
- The Orange Grove and Sapho Road precincts transformed to Business Development (i.e. a B5 or B6 zoning)
- The Georges River South (North Moorebank) precinct to be retained as Industrial

In this Chapter a review of the current industrial zoning objectives and provisions has been undertaken to determine:

- What improvements can be made to better align existing zoning with the changing demands and drivers of industry and employment in the context of Liverpool;
- If the objectives listed in each of the three zones are appropriate and whether or not these should be revised; and
- How land use terms can be best positioned within each zone to best reflect the objectives and charactertisation of employment types.

Development standards for minimum lot size, maximum building height and floor space ratios under Clauses 4.1, 4.3 and 4.4 of LLEP 2008 will be reviewed as they currently apply to the precincts. This review will identify whether or not the current standards are appropriate and require change to reflect the changing demands and drivers of industry. The final component of this Chapter will consider the B7 Technology Park zoning in reviewing its current objectives and land use provisions to determine its relevance to the precincts.

6.2 Review of Liverpool Industrial Zones

The three industrial land use zones under LLEP 2008 are the IN1 General Industrial, IN2 Light Industrial and IN3 Heavy Industrial zones. Each of the zones comprise a broad mixture of permitted uses to enable industrial, business and retail activities. Residential accommodation is prohibited in all of the industrial zones.

The three zones are differentiated mainly by the terms 'light', 'general' and 'heavy' which in themselves should deliver very different land use outcomes. However, in Liverpool's industrial precincts this is often not the case. The objectives in connection with the permissible land use activities across the three zones have resulted in broad outcomes with a mixture of industrial and other uses evident across the precincts.

The following sections review the current objectives and permitted land uses in each of the zones.

6.3 Review of Zone Objectives

The objectives of the three zones are reproduced below with a short analysis on each provided:

IN1 General Industrial

- *To provide a wide range of industrial and warehouse land uses.*
- *To encourage employment opportunities.*
- *To minimise any adverse effect of industry on other land uses.*
- *To support and protect industrial land for industrial uses.*
- *To particularly encourage research and development industries by prohibiting land uses that are typically unsightly or unpleasant.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of workers in the area.*

Analysis

The IN1 General Industrial zone objectives are very broad and non-specific, allowing for a range of industrial and warehouse uses to encourage employment opportunities. The generality of the land use objectives provides for a genuine mix of activities which in turn restricts larger and more intrusive operations such as waste management and processing, extractive industries and offensive and hazardous industries.

IN2 Light Industrial

- *To provide a wide range of light industrial, warehouse and related land uses.*
- *To encourage employment opportunities and to support the viability of centres.*
- *To minimise any adverse effect of industry on other land uses.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of workers in the area.*
- *To support and protect industrial land for industrial uses.*
- *To allow other land uses that are compatible with industry and that can buffer heavy industrial zones while not detracting from centres of activity.*

Analysis

The IN2 Light Industrial zone objectives provide for urban service-type industries which are smaller in their land take and operational scale, less intrusive, positioned closer to and on the edge of centres and provide for a mix of land uses. In this sense, the objectives of the IN2 zone are very clear in terms of the locational parameters, however the types of land use operations sought in this zone could be improved. Warehousing for example can require large-tracts of land and be reliant on B-double trucks which may not be suitable for urban services precincts close to centres and more sensitive areas (i.e. residential neighbourhoods). Therefore, the scale and types of warehousing needs to be more clearly typified to provide better guidance to planners.

IN3 Heavy Industrial

- *To provide suitable areas for those industries that need to be separated from other land uses.*
- *To encourage employment opportunities.*
- *To minimise any adverse effect of heavy industry on other land uses.*
- *To support and protect industrial land for industrial uses.*
- *To preserve opportunities for a wide range of industries and similar land uses by prohibiting land uses that detract from or undermine such opportunities.*

Analysis

The objectives of the IN3 Heavy Industrial zone are very similar to the IN1 zone. They encourage a wide range of industries which goes against the success of isolated larger users which require separation from other activities due to the more intrusive nature of their operations and larger land take requirements. The objectives do call on the need to preserve lands which require separation from other land uses, however the types of industrial uses are again not clearly defined. The generality of the objectives translates to flexibility in the application of land use types which can impact on the success of heavy industries.

Summary

The objectives of the three industrial zones are currently too generalised. The general and heavy industrial zone objectives are very similar with the only key difference being that the IN3 objectives note the need for separation to provide isolated larger sites for more intrusive operations.

All zones call for a mix of different industrial land use types and 'other' activities. This can be considered appropriate for urban services / light industrial precincts, but not always conducive for other industrial precincts which require separation from more sensitive uses.

In Liverpool, the range of industrial uses evident in the IN1 and IN3 zones in precincts such as Yarrunga/Prestons, Moorebank, Casula and Chipping Norton reflects the generalised zone objectives. As an example, the IN3 zone in Chipping Norton comprises predominantly urban service type industries which could be considered suitable in an IN1 or IN2 zone based on the scale and less-intrusive nature of these existing operations.

The IN2 Light Industrial zone objectives position such precincts close to centres, such as the Liverpool City Centre, and are often utilised to buffer heavier industrial activities. The nature of urban services industries under the zone is not clear and is confused by the reference to 'warehouse' uses which can vary significantly in scale.

The objectives of each zone should be revisited to:

- Better define the type, scale and nature of industrial and other activities considered suitable in each of the zones;
- Clarify the desired intent of each zone (i.e. the intent of the IN2 Light Industrial zone to provide for small-scale urban service industries that are compatible with surrounding and adjoining land uses);
- Avoid generality by including more specific desired outcomes; and
- Avoid the application of objectives which can be conflicting.

Recommended objectives for each of the three zones is provided later in this Chapter.

6.4 Review of Land Use Provisions

Table 2 identifies the land use terms permitted with development consent in each of the three industrial zones:

Table 2 Permissible Land Uses across the Industrial Zones

	IN1 General Industrial	IN2 Light Industrial	IN3 Heavy Industrial
Animal boarding or training establishments		✓	
Boat building and repair facilities		✓	✓
Boat Sheds	✓	✓	✓
Cemeteries	✓	✓	✓
Centre-based child care facilities	✓	✓	
Community facilities	✓	✓	
Crematoria	✓		✓
Depots	✓	✓	✓
Educational establishments		✓	
Environmental facilities	✓	✓	✓

	IN1 General Industrial	IN2 Light Industrial	IN3 Heavy Industrial
Freight transport facilities	✓		✓
Garden Centres	✓	✓	
General Industries	✓		✓
Hardware and Building Supplies	✓	✓	
Hazardous storage establishments			✓
Heavy industrial storage establishments			✓
Heavy Industries			✓
Heliports	✓	✓	
Horticulture			✓
Hotel or Motel Accommodation	✓	✓	
Industrial training facilities	✓	✓	
Industrial retail outlets	✓		
Information and education facilities	✓	✓	
Kiosks	✓	✓	✓
Light Industries	✓	✓	✓
Liquid fuel depots	✓	✓	
Mortuaries	✓		✓
Neighbourhood shops	✓	✓	
Offensive storage establishments			✓
Oyster aquaculture	✓	✓	✓
Passenger transport facilities	✓	✓	✓
Places of public worship	✓	✓	
Public administration buildings	✓		
Pubs		✓	
Recreation areas	✓	✓	✓
Recreation facilities (major)		✓	

	IN1 General Industrial	IN2 Light Industrial	IN3 Heavy Industrial
Recreation facilities (indoor)	✓	✓	
Recreation facilities (outdoor)	✓	✓	✓
Registered Clubs		✓	
Resource recovery facilities			✓
Respite day care centres	✓	✓	
Restaurants or cafes	✓	✓	
Rural industries			✓
Service stations		✓	
Sex services premises	✓	✓	✓
Storage premises	✓	✓	✓
Take away food and drink premises	✓	✓	
Tank-based aquaculture	✓	✓	✓
Timber yards		✓	
Transport depots	✓	✓	✓
Truck depots		✓	✓
Vehicle body repair workshops	✓	✓	✓
Vehicle repair stations	✓	✓	✓
Vehicle sales or hire premises		✓	
Veterinary Hospitals		✓	
Warehouse or distribution centres	✓	✓	✓
Water recreation structures		✓	

Table 2 above demonstrates that a number of industrial and non-industrial land uses are permitted across multiple industrial zones under LLEP 2008. In fact, 33% (19 out of 57) are permissible with consent in all three of the zones, these include: *boat sheds; cemeteries; depots; environmental facilities; kiosks; light industries; oyster aquaculture; passenger transport facilities; recreation areas; recreation facilities (outdoor); sex services premises; storage premises; tank-based aquaculture; transport depots; vehicle body repair workshops; vehicle repair stations; and warehouse or distribution centres*. 37% (21 out of 57) of other land uses listed in Table 2 are permissible with consent in at least

two of the industrial zones, with at least one of those zones being IN1 General Industrial, owing to the general, mixed use character of this zoning. Only 30% (17 out of 57) are unique to a single zoning.

Given the broad objectives and breadth of similar land uses permitted across all three zones the resultant industrial precincts in Liverpool lack defined character of uses. The research presents that successful approaches to land use zoning for industrial parks, specialised urban services precincts and innovation precincts have been built on defined Visions and a segmentation of land uses of different scales, operations and levels of impact. The industrial zoned precincts in Liverpool comprise a range of different industries which is representative of most historical examples of industrial precincts across Sydney. The reason for this is two-fold:

1. Industrial activities and the needs for space have changed over time, however, the release of new industrial lands has not kept pace with changing demand and so competing industries of varying scale and operations tend to occupy available precincts wherever they can; and
2. The generalised objectives and broad range of permissible industrial land uses across different industrial zones results in a mixed-use outcome.

The organic mixing of certain industrial activities of varying scales can result in positive outcomes according to the research. Particularly in specialised inner-city areas comprising of light industrial / urban services and emerging innovation precincts, smaller-scale operators can leverage on a few larger anchor tenants. As an example, a Bunnings Warehouse or Home Hardware would typically occupy a larger site within an urban services precinct where specialist construction and trade operators seek out sites nearby within the precinct.

The weight of the research however does indicate that larger operations encompassing wholesaling, warehousing, distribution, logistics and aerospace, more intensive forms of manufacturing, processing, recycling and the like require separation from smaller operators and demand larger site areas. The success of such operators is dependent on separation, access to transport corridors and larger sites. In Liverpool, such sites are currently scarce because of the encroaching of smaller occupiers which dilutes the character and disrupts the function of industrial parks. Industrial parks do require some smaller and ancillary land uses including essential services like food and drink premises, retail, community services and office space, but these need to be adequately controlled.

Interestingly too, the IN3 zone appears to be more prevalent in the Liverpool LGA than most other LGAs in Western Sydney. The IN3 zone is typically reserved for the highest-impacting land uses such as offensive and hazardous industries which require expansive separation distances and good amenity controls and buffers to adjoining lands. In Liverpool, the IN3 zone is used widely and permits *light industries* which again go towards generalising the zone, taking away from its intended character to serve heavy industries.

6.5 Industrial Land Use Terms

The research presented in this Study discusses different types of industrial land use activities that are broadly captured under the group terms of *Industry, General Industry, Light Industry, Heavy Industry, Commercial Premises* and *Warehouse or distribution centres*. One of the problems with the current approach to land use terms under the Standard Instrument LEP is that the inclusion of Group Terms for industrial land uses results in the broader application of outcomes in the zones. This approach then relies heavily on non-statutory DCP provisions to help define the character of certain industrial areas, which they often do quite comprehensively. Nonetheless, the approach is evident in Liverpool's precincts where a mismatch of mixed industrial activities fight to occupy the available lands, often resulting in operational conflicts.

Whilst this report has considered the difficulties in amending land use terms under the Standard Instrument LEP, it is considered that more specific land use definitions would provide greater clarity to Council, investors, industries and the general public around the types of operations considered desirable or otherwise in each zone. Examples of industrial land use operations and activities discussed earlier in this Study, but not separately defined under a specific land use definition include:

- Manufacturing
- Mineral Processing
- Logistics and Transport
- Aerospace
- Data Centre
- Professional and Knowledge Industries
- Private Research Institutions
- Medical Research Industries
- Postal processing and distribution
- Scientific Research
- Robotics and Mechanisation Development
- Food Science
- Sustainable Energy Producers and Distributors

The inclusion of additional specific and targeted industrial land use activities as opposed to the widescale application of general Group Terms would help to better define precinct outcomes in order to better plan and manage for areas. This in turn improves opportunities to plan properly for streetscapes that accommodate certain vehicle types, deliver the right capacities for infrastructure and contribute to better place making which connects similar and compatible land use activities.

6.6 Aligning the Zones

Based on the types of industrial precincts identified in this Study, there is a need to reconcile the current zoning of Liverpool's precincts. A number of precincts positioned in close proximity to the Liverpool City Centre have been earmarked as potential innovation precincts or future business

development zones. These precincts may be more suited to a Business zoning which will be discussed later in this Chapter.

The following discussion considers aligning the current industrial zones with the types of industrial precincts identified in the research.

6.7 Specialised or Other Urban Services Precinct = IN2 Light Industrial Zone

The IN2 Light Industrial Zone is representative of an Urban Services Precinct. These provide smaller-scale industrial and essential services close to centres and residential neighbourhoods where services can be quickly distributed and dispatched to suit the needs of the consumer/customer base. They require smaller spaces, largely for storage of equipment and low-impact operations.

Such precincts do allow for a broader mix of land use activities. This is because the services offered do not necessarily conflict with other commensurate land uses such as recreation facilities, dance studios, gymnasiums and shops which also require less land-take and separation from sensitive uses.

Larger industries should be discouraged from occupying in these zones unless there is a strong nexus between the operations. Whilst the existence of some larger operators within these areas is acknowledged, it is expected that over time that larger, more intensive industries will relocate with expansion and new purpose-released lands to the west in the Aerotropolis. In areas like Chipping Norton, Scrivener and Priddle Street, these existing larger operators include paper production and recycling plants, logistics, waste recovery and recycling centres, all of which are becoming less and less compatible with their surrounding contexts.

Desirable activities in the IN2 Light Industrial Zone include:

- Light Industries (including specialised manufacturing and creative industries)
- Small-scale depots
- Storage and small-scale warehousing facilities
- Construction and Trade Services including showrooms, packaging and small-scale distribution operations
- Industrial training facilities
- Industrial retail outlets
- Vehicle body repair and workshops where environmental impacts can be suitably managed
- Sales and hire premises
- Service stations
- Garden Centres
- Hardware and Building Supplies
- Plant Nurseries
- Specialised food manufacture/sales
- Breweries/Cellar doors
- Education and training
- Health Services

6.8 Industrial Park or Estate = IN1 General Industrial Zone

The issue with the current IN1 zone as it applies to Liverpool is it's generalised objectives and broad range of permissible land uses which result in a lack of definition and a confused economic role. This is best reflected in the precincts of Moorebank, Hoxton Park, parts of Yarrunga/Prestons and even in IN3 zoned precincts including Chipping Norton and Casula. These precincts comprise a mix of smaller, mid-tier and larger operations with varying lot sizes and street-types and differing geographic contexts. They are all existing precincts constrained by surrounding sensitive land use zones; predominantly low-scale residential and mixed business zones.

The research indicates that successful industrial precincts can comprise a mix of operators of differing scales and levels of impact. However, these need to be properly separated through the application of development controls around land and building size, separation distances and other amenity treatments. In Moorebank, this physical separation of operators has been market-led with the development of the orbital and staged release of the precinct. In the north, given the interface with low density residential properties, industrial lands have been occupied by less-intrusive smaller urban services whilst in the south large-scale distribution, logistics and transport industries have occupied larger properties in close proximity to the terminals.

The IN1 zone should therefore be applied to preserve mid-sized operators and large, low-impact operations including warehousing, processing and manufacturing. Distribution, logistics, transport and postal operators should also be permitted in the precincts where they have good and direct access onto motorways or freight rail such as in Yarrunga/Prestons, Hoxton Park and Moorebank South.

More intrusive operators such as waste recycling, extractive industries, chemical production and refining and other hazardous and offensive industries should be encouraged to occupy within the IN3 zone. The number of such operators in Liverpool is diminishing, however, where they exist in place they should be permitted to remain either in the IN1 or IN3 zone subject to revised development controls for expanded activities or where redevelopment is proposed.

IN1 zones should in many instances replace the IN3 zoned lands in Liverpool's precincts. In conjunction, the IN3 zone requires further refinement to provide only for more intrusive hazardous and offensive industries as opposed to general and light industries. Consideration should also be given to buffering IN1 zones with IN2 zones as is the case in a number of precincts already. Land use zoning buffers allows for an effective transition of activities to more sensitive land uses surrounding industrial precincts.

Desirable activities in the IN1 General Industrial Zone include:

- Some light industries
- Depots, transport depots and passenger transport facilities
- Manufacturing and processing
- Distribution centres

- Freight and Logistics
- Warehousing
- Wholesale trade supplies
- Storage (both small and heavy industrial / large-scale)
- Service stations and Highway centres
- Limited retail, recreation and commercial office space where it does not detract from the primary industrial activity
- Repairs and maintenance centres
- Vehicle repair and service premises
- Vehicle and scrap storage yards
- Mid-tier and larger construction services
- Technology and Research Centres
- Some waste processing and recycling facilities
- Aerospace Industries
- Pharmaceutical production
- Chemical production and laboratories
- Mortuaries and crematoria

6.9 Industrial Park = IN3 Heavy Industrial Zone

The broad application of the IN3 zone in Liverpool is not reflected in the character of its land use activities. In most other LGAs across NSW the IN3 zone is preserved for areas of large-scale heavy industries which are more intensive polluters and require greater separation and isolation. The IN3 zones in Chipping Norton, Yarrunga/Prestons and Casula are viewed as inapplicable and should be replaced in the main by the IN1 zone.

Heavy industrial operations around the world are transitioning with improvements in technology and with renewed focusses on sustainable and safe operations. This being said, there is, and will likely continue to be demand for more offensive and hazardous industries including smelters, liquid gas and chemical refineries, extractive industries and waste processing plants. These uses emit noise, dust, waste and pollution regardless of the treatments and controls applied in the operational processes. They also have a higher risk profile in the event that the control processes fail and therefore require greater separation from other activities, and even complete isolation depending on the intensity of the use.

Whilst a handful of such heavy industrial are located within the existing IN3 zoned lands it is unlikely that any of the precincts are truly accommodative of such uses and therefore the zone should be considered for removal from the precincts reviewed in this report. IN3 zonings may be suitable to newly released tracts of land around the Aerotropolis where they are properly planned for and well separated from surrounding uses, particularly residential properties. Council may, in the short term

look to preserve pockets of IN3 land in the southern parts of the Yarrunga/Prestons precinct and within the north-eastern corner of the Chipping Norton Precinct.

Additionally, rural industries such as horticulture should be removed from the IN3 zone. Whilst such large-scale operations can be commensurate to heavy industrial activities they are better placed within an RU1 or RU2 zone.

Desirable activities in the IN3 Heavy Industrial Zone include:

- Offensive and hazardous industries
- Offensive storage establishments
- Hazardous storage establishments
- Extractive industries
- Chemical processing
- Liquid Gas and Petroleum Refineries
- Energy production activities
- Waste recycling and processing

6.10 Avoiding Duplication

Table 3 below reconfigures existing permissible land uses to reflect the desirable activities in each of the industrial zones as a means of resolving unnecessary duplication and better aligning land uses to each of the zones as discussed.

Notable recommended changes to permissible land uses include:

- Boat building and repair facilities removed from IN3 zone to avoid duplication.
- Boat sheds removed from IN3 zone to avoid duplication.
- Cemeteries removed from all industrial zoned – recommend SP1 or SP2 zoning for any existing cemeteries. Cemeteries are considered an incompatible use with industrial lands.
- Place a restriction on the size of centre-based child care facilities in the IN1 and IN2 zones.
- Place a restriction on the size of depots based on the type of industrial zone and remove from the IN3 zone.
- Freight transport facilities removed from the IN3 zone to avoid duplication.
- Garden centres removed from the IN1 zone to avoid duplication.
- General industries removed from the IN3 zone to avoid duplication.
- Horticulture removed from the IN3 zone. Recommend this land use type be permissible only in the rural zones.
- Industrial retail outlets made permissible in the IN2 zone in addition to the IN1 zone to encourage on-site sales from creative and light industries to the public.
- Information and education facilities removed from the IN1 zone to promote these specific uses in the IN2 zone only.
- Light industries removed from IN1 and IN3 zones to avoid duplication.

- Liquid fuel depots removed from IN2 zone and made permissible in the IN3 zone in addition to IN1.
- Oyster aquaculture removed from IN2 and IN3 zone to avoid duplication.
- Passenger transport facilities removed from IN3 as inappropriate use in the zone.
- Recreation facilities (major) removed from IN2 zone. Recommend these types of uses be appropriately zoned as RE1, RE2 or SP1 / SP2.
- Recreation facilities (indoor) removed from IN1 zone but retained in IN2 zone.
- Recreation facilities (outdoor) removed from IN3 to avoid duplication.
- Respite day care centres removed from IN1 and IN2 zones. Considered more appropriate in residential zones.
- Rural industries removed from IN3 zone.
- Service stations made permissible in IN1 zone in addition to IN2 zone.
- Sex service premises removed from IN3 zone to avoid duplication.
- Storage premises removed from IN3 zone – offensive storage preserved in IN3 zone.
- Tank-based aquaculture removed from IN2 and IN3 zones, retained in IN1.
- Transport depots removed from IN3 zone.
- Place a restriction on the size of transport deport operations dependent on zone.
- Truck depots removed from IN2 and IN3 zones and made permissible in IN1.
- Vehicle body repair workshops and vehicle repair stations removed from IN3 zone.
- Utilise size restrictions under Cl. 5.4 based on zone for warehouse and distribution centres to control scale of operations.

Table 3 Recommended reconfiguration of land uses under the industrial zones

	IN1 General Industrial	IN2 Light Industrial	IN3 Heavy Industrial
Animal boarding or training establishments		✓	
Boat building and repair facilities		✓	
Boat Sheds	✓	✓	
Cemeteries			
Centre-based child care facilities (recommend size restrictions under Cl. 5.4)	✓	✓	
Community facilities	✓	✓	
Crematoria	✓		✓
Depots (recommend size restrictions under Cl. 5.4 to control size in the IN2 zone)	✓	✓	
Educational establishments		✓	

	IN1 General Industrial	IN2 Light Industrial	IN3 Heavy Industrial
Environmental facilities	✓	✓	✓
Freight transport facilities	✓		
Garden Centres		✓	
General Industries	✓		
Hardware and Building Supplies	✓	✓	
Hazardous storage establishments			✓
Heavy industrial storage establishments			✓
Heavy Industries			✓
Heliports	✓	✓	
Horticulture			
Hotel or Motel Accommodation	✓	✓	
Industrial training facilities	✓	✓	
Industrial retail outlets	✓	✓	
Information and education facilities		✓	
Kiosks	✓	✓	✓
Light Industries		✓	
Liquid fuel depots	✓		✓
Mortuaries	✓		✓
Neighbourhood shops	✓	✓	
Offensive storage establishments			✓
Oyster aquaculture	✓		
Passenger transport facilities	✓	✓	
Places of public worship	✓	✓	
Public administration buildings	✓		
Pubs		✓	
Recreation areas	✓	✓	✓

	IN1 General Industrial	IN2 Light Industrial	IN3 Heavy Industrial
Recreation facilities (major)			
Recreation facilities (indoor)		✓	
Recreation facilities (outdoor)	✓	✓	
Registered Clubs		✓	
Resource recovery facilities			✓
Respite day care centres			
Restaurants or cafes	✓	✓	
Rural industries			
Service stations	✓	✓	
Sex services premises	✓	✓	
Storage premises	✓	✓	
Take away food and drink premises	✓	✓	
Tank-based aquaculture	✓		
Timber yards		✓	
Transport depots (recommend size restrictions under Cl. 5.4 to control size in the IN2 zone)	✓	✓	
Truck depots	✓		
Vehicle body repair workshops	✓	✓	
Vehicle repair stations	✓	✓	
Vehicle sales or hire premises		✓	
Veterinary Hospitals		✓	
Warehouse or distribution centres (recommend size restrictions under Cl. 5.4 to control size in the IN2 zone)	✓	✓	✓
Water recreation structures		✓	

To ensure the scale of certain uses are suitably controlled to reflect the desirable characteristics of each zone, it is recommended that the following size restrictions be incorporated into Clause 5.4 of LLEP 2008:

Centre-based child care centres:	*If development for the purpose of centre-based child care centres is permitted under this Plan, the centre is not to exceed a total gross floor area of 100m² in the IN2 Light Industrial Zone or 200m² in the IN1 General Industrial zone.*
Depots:	*If development for the purpose of depots is permitted under this Plan, they are not to exceed a total site area of 2,000m² in the IN2 Light Industrial Zone*
Transport Depots:	*If development for the purpose of transport depots is permitted under this Plan, they are not to exceed a total site area of 2,000m² in the IN2 Light Industrial Zone*
Warehouse or distribution centres:	*If development for the purpose of warehouse or distribution centres is permitted under this Plan, they are not to exceed a total gross floor area of 2,000m² per development in the IN2 Light Industrial Zone*

6.11 Revised Industrial Zones

The following recommended changes to the industrial land use zones under LLEP 2008 have been formulated based on the discussions in this Chapter and the research findings.

IN2 Light Industrial

The IN2 Light Industrial Zone should be revised as follows:

1. Objectives

- To provide land for urban and essential services, light industries and creative industries as opposed to general industries and heavy industry
- To encourage employment opportunities and to support the viability of centres
- To support collaboration in business and development
- To preserve lands for employment nearby to consumers and customers
- To permit industrial and non-industrial activities that minimise impacts to other lands
- To enable other land uses that provide facilities or services to meet the day to day needs of workers in the area.
- To promote high quality built forms, landscaping and contribute to excellent place-based outcomes.
- To support, protect and buffer industrial land in the IN1 zone

2. Permitted Without Consent

Nil

3. Permitted With Consent

Animal boarding or training establishments; Boat building and repair facilities; Boat sheds; Building identification signs; Business identification signs; Car parks; Centre-based child care facilities; Community facilities; Depots; Educational establishments; Emergency services facilities; Entertainment facilities; Environmental facilities; Environmental protection works; Flood mitigation works; Garden centres; Hardware and building supplies; Helipads; Heliports; Hotel or motel accommodation; Industrial retail outlets; Industrial training facilities; Information and education facilities; Kiosks; Light industries; Neighbourhood shops; Passenger transport facilities; Places of public worship; Pubs; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Registered clubs; Restaurants or cafes; Roads; Service stations; Sex services premises; Storage premises; Take away food and drink premises; Timber yards; Transport depots; Vehicle body repair workshops; Vehicle repair stations; Vehicle sales or hire premises; Veterinary hospitals; Warehouse or distribution centres; Water recreation structures

4. Prohibited

Pond-based aquaculture and any development not specified in item 2 or 3.

IN1 General Industrial

The IN1 General Industrial Zone should be revised as follows:

1. Objectives

- To provide a wide range of industrial land uses.
- To encourage employment opportunities.
- To minimise any adverse effect of industry on other land uses.
- To support and protect industrial land for industrial uses including warehouse, distribution centres, processing and manufacturing and research and development industries.
- To promote high quality built forms, landscaping and contribute to excellent place-based outcomes.
- To enable other land uses that provide facilities or services to meet the day to day needs of workers in the area, but only where they do not detract from predominant industrial uses.

2. Permitted Without Consent

Nil

3. Permitted With Consent

Boat sheds; Building identification signs; Business identification signs; Car parks; Centre-based child care facilities; Community facilities; Crematoria; Depots; Environmental facilities; Environmental protection works; Flood mitigation works; Freight transport facilities; General industries; Hardware

and building supplies; Helipads; Heliports; Hotel or motel accommodation; Industrial training facilities; Industrial retail outlets; Kiosks; Liquid fuel depots; Mortuaries; Neighbourhood shops; Oyster aquaculture; Passenger transport facilities; Places of public worship; Public administration buildings; Recreation areas; Recreation facilities (outdoor); Restaurants or cafes; Roads; Sex services premises; Storage premises; Take away food and drink premises; Tank-based aquaculture; Transport depots; Vehicle body repair workshops; Vehicle repair stations; Warehouse or distribution centres

4. Prohibited

Pond-based aquaculture and any development not specified in item 2 or 3

IN3 Heavy Industrial

The IN3 Heavy Industrial Zone should be revised as follows:

1. Objectives

- To provide suitably planned areas for heavy industries that require separation from other land uses.
- To encourage employment opportunities.
- To minimise adverse effect of industry on other land uses.
- To support and protect heavy industries.
- To promote well connected places with good direct access to motorways and freight rail infrastructure.
- To enable other land uses that provide supportive services to meet the day to day needs of workers in the area, but only where they do not detract or restrict the operations of the predominant heavy industrial land uses.

2. Permitted Without Consent

Nil

3. Permitted With Consent

Building identification signs; Business identification signs; Crematoria; Depots; Environmental facilities; Environmental protection works; Flood mitigation works; Hazardous storage establishments; Heavy industrial storage establishments; Heavy industries; Helipads; Kiosks; Mortuaries; Offensive storage establishments; Recreation areas; Resource recovery facilities; Roads; Warehouse or distribution centres

4. Prohibited

Pond-based aquaculture and any development not specified in item 2 or 3

6.12 Review of Lot Size, Height and FSR Standards

This Study has detailed the changing demands for lands and building forms across different industrial contexts and how these are of relevance to the Liverpool precincts. For urban services, light and creative industries, operators are in demand of flexible spaces in order to adapt to change and varied ways of operating. Spaces are becoming smaller and land parcels of 1,500m² or less are in high demand. By contrast, distribution, warehousing, logistics, transport and postal industries are requiring larger, purpose-built spaces on a range of lot sizes. In Liverpool, there is demand for warehousing lots of between 2,000 -4,000m² but there is likely to be increased demand for sites of more than 10,000m² with the development of new motorways, rail and the WSA. The research undertaken has indicated that heavy industries typically require a vast range of built forms and land areas, so the more flexibility built into development standards for these types of uses, the better.

Industries across all sectors are becoming more attune to their operational needs. No operations are the same; the built form requirements can therefore be very different. In Liverpool, the current models for industry comprise multi-unit strata titled complexes, stand-alone warehouses of varying sizes, larger distribution and logistics centres and a mix of 'other' types.

A review of the current minimum lot size, building height and floor space ratio development standards as they apply to the precincts has indicated the following:

- A minimum 2,000m² lot size applies across all of the precincts, regardless of zoning, operational characteristics or built form.
- Maximum building height limits across the precincts range from 13m up to 30m in Yarrunga/Prestons and Chipping Norton.
- FSRs range from 0.75:1 – 1:1, with some precincts not having allocated FSR maximums.

Table 4 Summary of current development standards

	Lot Size	Height	FSR
Yarrunga/Prestons	2,000m²	15m – 30m	Nil - 0.75:1
Moorebank	2,000m²	15m – 21m	0.75:1 - 1:1
Chipping Norton	2,000m²	15m – 30m	0.75:1 – 1:1
Casula	2,000m²	18m – 30m	Nil – 0.75:1
Hoxton Park Airport	2,000m²	15m – 30m	N/A
Coopers Paddock	2,000m²	18m	N/A
Priddle/Scrivener Street	2,000m²	15m	N/A
Sappho Road	2,000m²	15m	N/A

	Lot Size	Height	FSR
Orange Grove	2,000m²	15m	Nil – 0.75:1
Austral	N/A	13m	N/A

Currently building height standards are considered flexible. These currently permit upwards of 4-5 storey industrial building forms comprising a typical floor-ceiling height of 5-6m per floor. Taller buildings and structural forms appear to be promoted in those heavier industrial precincts whilst 15m represents a standard height standard across most of the precincts. Most of the current built form exhibited in the precincts would measure less than 13m, comprising often of no more than 1-2 storeys. The demand for increased heights is strongest in multi-unit complexes typically occupying light industrial areas. Larger warehousing operations are also often utilising additional height to store vertically with improved robotics and mechanisation of activities.

Floor space ratio standards may currently be too low, evidenced by the fact that the maximum building height standards are often not reached. The FSR standards across the precincts are typically between 0.75:1 and 1:1. Due to DCP controls mandating extensive front setbacks in the order of 15-20m to main collector roads and 5-10m for local streets, site coverage for most existing sites would sit between 50-75%. These types of site coverage outcomes are typical of most industrial sites below 40,000m². The current controls therefore would only permit the establishment of 1-2 storey forms in precincts including Moorebank, Yarrunga/Prestons, Chipping Norton and Casula where very few examples of new or redevelopment projects have been cited. The research indicates that:

- All types of industries require flexibility in the application of space and functional designs;
- Most industries are willing to utilise height in building forms as a result of innovation and improved technologies as opposed to flat-pack big-box designs with mezzanine level offices;
- Globally, increasing density controls have led to a resurgence of investment in redeveloping sites and establishing new businesses within existing precincts, particularly those close to public transport;
- lifting density controls to promote renewal of existing industrial areas has attracted some initial interest and investment in Victoria.

The use of incentive FSR uplifts has also proven successful in a number of settings. In NSW in recent years the application of incentive bonus FSRs have been utilised in the residential development sector in order for governments to deliver place-making improvements to streetscapes, open space and infrastructure and also to mandate design excellence. A similar approach to incentivise investment in Liverpool's industrial precincts would draw redevelopment activity and provide Council with opportunities to improve the public domain, open space provisions and deliver improved infrastructure through increased contributions or site-specific Voluntary Planning Agreements (VPAs). In IN2 zoned areas to avoid dilution of industrial activities, FSR bonusses should be linked to a requirement to preserve a certain ratio of total floor area for exclusive use by specialised

manufacturing, processing or other light industrial uses. These would be considered at the DA stage and imposed as a requirement (positive covenant) on the title of the land and imposed by conditions of development consent.

Minimum lot sizes across the precincts are considered very flexible for the IN1 and IN3 zones, but not flexible enough for IN2 areas. Demand for smaller industrial sites is evident for light and creative industrial activities with the Knight Frank 2016 report citing a demand for sites of 1,500m² and less across Liverpool's urban services sectors. Whilst strata subdivision of multi-unit complexes is currently a mechanism used to deliver these types of products, a reduction in the minimum lot size area to 1,000m² in the IN2 zone is not a radical change. This approach will assist in providing attractive land parcels that are in demand. In the IN1 zone, which is recommended to replace the majority of the existing IN3 zoned areas, a range of lot sizes are required, including larger parcels of 4,000m², 8,000m² and 10,000m²+. In existing precincts, increasing the minimum lot size is recommended to ensure larger land parcels are retained to provide sufficient space for larger operators, however, this decision is unlikely to be supported by land owners. Indeed it may be too late to go about increasing minimum lot size standards for the established precincts, however, newly proposed industrial lands across the western part of the LGA in the Aerotropolis should seek to established well-planned estates for larger operators with minimum 10,000m² lot size standards to support international logistics and distribution operations.

Incentivising land amalgamation through development standards as part of new development in the established precincts could prove to be a successful mechanism to deliver master-planned industrial precincts with improved landscape, built form and streetscape interfaces. Similar to the ideology of consolidating multiple smaller residential properties to accommodate residential flat buildings or mixed-use development in the city centre, Council could encourage consolidation through development standards, site-specific DCPs or through planning proposals supported by VPAs. The intent of such an approach would be to create larger parcels for both larger stand-alone operators and improved multi-unit sites for mid-sized operations in the IN1 zone. This preserves more flexible land areas in the long-term to support the ongoing viability and economic strength of sectors. Opportunities to proceed with such an approach should be investigated in the larger precincts of Moorebank South and Yarrunga/Prestons.

6.13 Recommended Changes to Development Standards

The following recommended approaches are provided for consideration:

- Generally, look to retain existing building height standards as they apply across the precincts. Give consideration to increasing maximum building heights to 30m or higher for earmarked innovation precincts (discussed further in 6.3).
- Increase all base FSR standards to 1:1 across all industrial precincts and seek to update DCP controls to deliver improved landscape, street interface treatments, building design and sustainability outcomes.

- Apply incentive bonus FSR provisions for IN2 zones to permit additional 1:1 FSR in lieu of allocating a minimum 50% of total floor area in a development to light or creative industries including specialised manufacturing, warehousing, construction, trade, etc.
- Apply incentive bonus FSR provisions for IN1 zones to permit additional 1:1 FSR where a new or substantially redeveloped building exhibits architectural design excellence, achieves a high standard of environmental sustainability in its construction and operation, and contributes to improvements within the public domain.
- Reduce minimum lot size standards for Torrens title subdivisions in the IN2 zone from 2,000m² to 1,000m².
- Continue to permit industrial strata-title subdivisions across all zones with no minimum lot size control.
- Consider increasing the minimum lot size standard from 2,000m² to 4,000m² or larger in parts of Yarrunga/Prestons and Moorebank South to effectively preserve big sites for larger distribution and logistics operators.
- Apply an incentive standard to encourage consolidation of existing industrial sites to deliver minimum 8,000m² lots in Yarrunga/Prestons, Moorebank and Chipping Norton to encourage redevelopment and the creation of larger master-planned sites. Incentives for industrial developers could include a minimum 3:1 FSR and 30m height limit which also mandates that new development achieves a high standard of building design and flexibility; contributes to improvements within the public domain and achieves environmental sustainability outcomes in its construction and operations.

6.14 Review of B7 Technology Park Zone

The B7 Business Technology Park zone does not currently apply under LLEP 2008. The application of this zoning in places like Norwest Business Park, Macquarie Park, Marsden Park and now Sydney Science Park have drawn investment and attention from large-scale industrial, commercial, health, educational and scientific research sectors. In the context of Greater Sydney, these precincts, along with the emerging inner-city locations of Waterloo, Alexandria and parts of Botany are the closest examples to the Innovation Precincts examined in this Study.

In Western Sydney, the existing Innovation Precincts like Norwest and Marsden Park are typically home to large-scale operators who occupy sites over 4,000m² in area. These are predominated by light industries and commercial office developments that are expansive, well-constructed and have attracted internationally renowned and owned businesses. They are representative of the traditional US model of suburban business parks with supporting retail centres and executive housing estates. Traditionally, these areas have been heavily dependent on cars, but still provide good access for pedestrians and cyclists. The inclusion of the North West Metro has helped to re-activate areas within Norwest and Bella Vista. These parks are not currently accommodating smaller-scale creative and specialised industries who would tend to occupy inner-city areas around South Sydney's Waterloo or Alexandria. In this sense, there exist two very different types of Innovation Precincts which has been

considered in the literature. The latter version should objectively be the aim for Liverpool's Scrivener/Priddle Street Precinct and potentially also the Orange Grove Precinct given their established character and good proximity to the city centre.

The B7 zone allows for a variety of industrial uses but encourages the development of business parks which incorporate a genuine mix of light industrial and commercial offices. Under the Standard Instrument LEP the objectives of the B7 zone are as follows:

- To provide a range of office and light industrial uses
- To encourage employment opportunities
- To enable other land uses that provide facilities or services to meet the day to day needs of workers in the area

Permissible land use activities under the B7 zoning in the Standard Instrument are limited to the following:

- Centre-based child care facilities
- Garden centres
- Hardware and building supplies
- Light industries
- Neighbourhood shops
- Office premises
- Oyster aquaculture
- Passenger transport facilities
- Respite day care centres
- Tank-based aquaculture
- Warehouse or distribution centres

Modified versions of the B7 zone have been adopted by a number of Greater Sydney Councils including The Hills in Norwest Business Park, Blacktown City Council in Marsden Park and Penrith City Council in Sydney Science Park. All have very different objectives and varying permissible land uses which reflects the characteristics of key anchor tenants in the precincts. For example, in Penrith's Sydney Science Park one of the key objectives is to *"provide a range of higher order job opportunities including health, cultural and high technology industries"*. This objective reflects the Vision of the Sydney Science Park developer Celestino in partnering with the major research institution CSIRO to develop living laboratories, high technology industries and educational establishments. The B7 zone objectives under The Hills LEP 2012 seeks to *"make provision for high technology industries that use and develop advanced technologies, products and processes*". The objectives here focus less on education, health and research, and more on supporting established and advanced internationally recognised industries which has resulted over the past two decades.

Emerging Innovation Precincts around Waterloo, Alexandria and Botany are being spurred on by the City of Sydney's recent efforts to rezone older industrial lands to a mixture of B6 Enterprise Corridor and B7 Business Park. The key difference here is that the B6 zone permits forms of residential accommodation whilst the B7 zone does not. Both zones are 'open zonings' in that a majority of land use activities are permissible with consent, as opposed to Liverpool's industrial zonings which are designed as 'closed zonings' where all land use activities are prohibited unless stipulated otherwise. The B7 zone in Sydney operates in a similar way to the typical IN2 Light Industrial zone in that one of its objectives is to support the viability of nearby centres. A range of light industrial, business and retail activities are permissible with consent in the B7 zone.

6.15 Defining Liverpool's Innovation Precincts

Scrivener/Priddle Street Precinct

The Greater Sydney Commission in their Liverpool Collaboration Area – Place Strategy have identified the Scrivener/Priddle Street Precinct as a future Innovation Precinct given its geographical position on the eastern edge of the city centre and hospitals precinct. This precinct has significant opportunities to leverage on the growth and future investment in the public and private hospitals as well as the growth of involvement and interests from multiple research institutions and educational partners including the Western Sydney and Wollongong Universities. The constraints of this precinct have been well documented, but simple investments in connectivity infrastructure and a focus on planning for good interfaces to adjoining land uses will unlock this precinct's potential. The existing building stock in the precinct is ageing, however the combination of discounted rents, vacant big-box sites and urban-scale streets could attract interest from the right occupiers with well-considered planning approaches and investments.

The precinct is too small to replicate the likes of a Norwest or Marsden Park. It's constraints and ageing built forms could aid its charactertisation as a new inner-city creative precinct which accommodates renewable energy technologies, a range of smart-office jobs and specialised small-scale industries. Medical research and advanced technologies including pharmaceutical production has been identified as a potential target land use outcome for this precinct, however, these industries given their scale would require larger, new, purpose-built facilities which would necessitate redevelopment of the precincts' sites and streets.

The precinct is well suited to transition under a modified B7 zoning with new development standards which incentise either urban renewal through revitalisation of existing building stock or through new master-planned redevelopments. Rezoning should also seek to consider approaches to transition the adjoining low-density residential zone to a mixed use (possibly B6 Enterprise Corridor zone) and overcome constraints tied to odour impacts from the Sydney Water treatment plant.

Orange Grove Precinct

The Orange Grove Precinct has not yet been identified as a possible Innovation Precinct. Instead, the precinct has been earmarked for future transition to a Business Development zoning under the Collaboration Area. Council has long fought to preserve this precinct as an industrial area to protect employment opportunities on the northern edge of the city centre. The adjoining B5 Business Development lands to the north form part of the precinct and have been successfully developed as an integrated retail precinct comprising wholesale trade, bulky goods and warehouse clothing and food outlets. The development, known as The Grove, in its most recent stages has renewed older industrial building stock and reinterpreted the industrial heritage of the site to create an interesting and attractive retail centre.

The IN1 zoned lands to the south are wedged between the new retail precinct, residential areas to the east and west and the city centre further to the south. New industrial storage units are currently under construction in the eastern corner of the site, however the remainder of the building forms in the precinct exist in a state of dilapidation. These sites no longer suit general or heavy industry but may continue to support light and creative industries within newly developed sites under an IN2 zone with incentives provisions to encourage redevelopment. Application of a B7 zone could also deliver significant employment outcomes similar to that of an IN2 zone as proposed to be revised earlier in this Chapter. The key difference between the two zonings would be the incorporation of more mixed-use outcomes under a B7 zone compared to the IN2 zone where retail and other business premises would be limited.

6.16 Recommendations for Adopting a B7 Zone

The formulation and adoption of a B7 Business Park zone for the Scrivener/Priddle Street Precinct needs to be developed on the back of a strong Vision. The objectives for the zone must adopt some of the core provisions under the zoning in the Standard Instrument, but additional objectives can be utilised to define desired land use, built form and economic outcomes. On the basis that the precinct is renewed or redeveloped as an Innovation Precinct (as in the MaRS Precinct in Toronto or Central East Side in Portland, Oregon), zoning for the Scrivener/Priddle Street Precinct needs to consider the success factors:

- **Collaboration** – The future development of the precinct needs to be mindful of encouraging collaboration and incentivising the creation of shared and integrated work spaces.
- **Quality of Place** – Place-making and high quality architectural and urban design principles need to underpin the creation of a great place to attract industries, employers, start-ups and investors.
- **Diversity and Inclusion** – Space needs to be designed for a range of users, with flexibility built into new developments and incentives provided to attract a range of different land use activities and scales of operations.

- **Affordability** – New development in the precinct needs to be attractive and affordable for large- and small-scale operators, including locally-based operations which require discounted rents and flexible operating areas.
- **Critical Mass** – Getting the density right is crucial to the success of the precinct. The area is restricted in size but innovative approaches to space and the configuration of tenancies can attract a number of operations and in turn a large number of new jobs.
- **Vibrant Living** – Is the precinct suitable for some supportive residential components with live-work spaces, or is the adjoining low-density residential area more suited to development of a mixed use B6 zone?
- **Competitive Advantage** – What is the competitive advantage or specialised niche market created in this precinct? There is a focus on attracting advanced and technical industries, pharmaceutical production and scientific research.
- **Anchor Institutions** – The existing private and public hospitals, a range of supporting medical and research institutions and tertiary educational institutions anchor the precinct to the city centres eastern specialised health and education edge.
- **Infrastructure** – Improvements to road, utility infrastructure service capacities, open space and digital infrastructure in this precinct is considered a must.
- **Accessibility** – A vital part to unlocking the success of this precinct is improving accessibility for pedestrians, cyclists, commuters and workers to the Liverpool city centre across the railway line and from Warwick Farm and Liverpool stations.

The following modified B7 zoning provisions for the Scrivener/Priddle Street Precinct are provided for Council's further consideration:

B7 Business Park

1. Objectives of Zone

- To provide a range of office, light and creative industrial uses.
- To encourage specialised and targeted employment opportunities in advanced and specialised manufacturing, technology, research and development and professional industries.
- To enable a wide range of land uses to meet the day to day needs of workers in the area.
- To improve connectivity and ensure uses support the viability of the nearby centres.
- To contribute towards the creation of a resilient, integrated and collaborative health and education precinct.

2. Permitted Without Consent

Nil

3. Permitted With Consent

Business premises; Car parks; Centre-based child care facilities; Community facilities; Educational establishments; Environmental protection works; Flood mitigation works; Food and drink premises; Function centres; Garden centres; Hardware and building supplies; Health services facilities; Hotel or motel accommodation; Industrial retail outlets; Industrial training facilities; Information and education facilities; Kiosks; Light industries; Markets; Neighbourhood shops; Office premises; Passenger transport facilities; Recreation areas; Roads; Signage; Warehouse or distribution centres

4. Permitted Without Consent

Any other use not identified in item 2 or 3.

To strengthen the characterisation of this zone it is strongly recommended that land use definitions be further investigated to specifically include *research and development, advanced and technology, scientific and research* and *specialised industry*.

6.17 Recommendations for Development Standards

Examples of best practice approaches to development regulation for Innovation Precincts has demonstrated the need for flexibility and density incentives to drive urban renewal and investment. In precincts such as Central East Side, Portland incentive zoning provisions were implemented to protect base line manufacturing whilst allowing denser development outcomes with increased building heights and floor area ratios.

In places such as Rotterdam, Discovery Square in Rochester and MaRs in Toronto development standards around building heights and floor areas were completely relaxed in certain parts to encourage investment by the private sector with merit-based development proposals. In these examples, place-based planning and urban design underpinned the desired future character of the area and sites were developed in accordance with aspirational provisions in the respective master plans.

In Victoria, governments have observed the successes of overseas examples and are now building flexibility into new approaches for planning controls to harness the creation of Innovation Precincts in inner-city locations.

For Scrivener/Priddle Street and Orange Grove building height controls currently sit at 15m on average. These should be revised up or completely removed to encourage increased building heights. Increasing or relaxing controls around building heights, as a similar approach to high density residential precincts, can provide improved ground-plain opportunities for landscaping, streetscape and the public domain. Relaxing height controls ensures that maximum FSRs can be commercially achieved which is a key component for unlocking redevelopment in these precincts.

Equally, existing FSR controls of 0.75:1 – 1:1 in these precincts will not encourage redevelopment of sites. Most of the developed building forms in these precincts are built to the maximum site coverages

and density controls which have been in place for well over a decade. The necessary redevelopment of sites will only come about as a result of increasing FSRs which can be incentivised as discussed previously in this chapter. It is recommended that FSRs in the Scrivener/Priddle Street precinct be increased to a base line of 1.5:1 with incentives allowing for up to 2.5:1.

The Vision for a renewed Scrivener/Priddle Street precinct should be formulated in a specific masterplan which could form part of a new DCP chapter. The masterplan should be entrenched in best practice urban design and place-making principles to bring about change in streets and connectivity, open space, built forms, interface treatments and improved amenity for workers.

7. Conclusion

This report provides Council with an understanding of the changing demands and drivers of traditional industrial and employment lands and innovation, research and advanced manufacturing and business park uses. It considers the potential land use implications and planning initiatives required to support long term economic growth, prosperity and job creation in the Liverpool industrial precincts.

The ways in which land and buildings are used and developed in industrial precincts is steadily changing in response to a number of key drivers, both domestically and internationally, including:

- The effects of globalisation and impacts of global competition;
- Population growth and increased construction activity;
- Investment in major infrastructure projects in Greater Sydney, including Western Sydney Airport;
- Changing nature of industries, the workplace and working efficiencies;
- Future land release in Greater Sydney;
- Innovation in industry and the rise of the professional and technical services industry;
- Economic conditions and a changing consumer market; and
- Creative thinking and investment in technical and professional service industries.

As a result of these drivers and influences, the demands on Liverpool's industrial lands will transform steadily over the coming decades. Key sector demands include:

- A growing need for industry to specialise and target niche sectors to retain a competitive edge;
- Demand on continued urban services, larger-scale distribution and freight and specialised innovation/creative and advanced technology industries;
- A requirement for a variety of industrial spaces to accommodate the range of demands;
- Smaller and more efficient workplaces;
- Requirements for good access to movement corridors, with access to transport, essential services and amenity;
- Collaboration between specialised industries;
- Requirements on access to digital infrastructure;
- Ongoing demand for new large-holdings to be released across Western Sydney to accommodate logistics, distribution and more expansive warehousing operations linked to the WSA; and
- High demand for existing quality small-unit space with good proximity to local consumer/ customer markets.

In order to understand the challenges and opportunities that will influence the changing Liverpool industrial sector, it is important to distill the learnings from both domestic and international examples of comparable industrial development lands. These comparable precincts show differing approaches to land use planning and development regulation which have underpinned successful growth in jobs and industries. Some of the key lessons from these best practice examples include:

- Land use planning approaches for modern industrial parks underpinned by protectionist and separation policies which work to preserve the amenity of surrounding sensitive uses, but also provide sufficiently sized lands for larger operators.
- Land use planning for successful Innovation Precincts has been suitably flexible, incorporates a genuine mix of uses including some strategic residential and creative spaces.
- Setting the scale for larger industrial parks from the outset is important for not only preserving expansion of industrial parks but also driving economic growth and attracting global leaders in industry.
- Both Industrial Parks and Innovation Precincts need to be supported by transport, digital and utilities infrastructure.
- Land use planning for Innovation Precincts should focus more on design outcomes and place-based approaches rather than stringent regulation around zoning.
- Comprehensive master planning from the outset has proved critical to the successful delivery of industrial parks and innovation precincts. The more adaptable the plan, the more resilient the urban fabric of a place is to changing demands and drivers.
- Clearly specifying desired land use outcomes in zoning establishes a clear message for investors and the community as to what a precinct will be like. Zoning needs to clearly define the types of industries and businesses and consider aspects such as scale, level of environmental impact and economic functions.
- An understanding of space requirements for different industrial usage types should inform regulations and development controls. These need to revised and re-adapted as requirements change over time.
- Best-practice approaches to land use planning for industrial parks establish the differing characteristics of uses and include clearly defined boundaries. Different types of industrial operations are then segmented into sub-precincts to create clusters of commonality and shared knowledge and resources.
- Planning needs to consider what supportive uses are appropriate and their quantification needs to be controlled through development regulations incorporated into zoning. This avoids a diluting of the predominant employment land uses.
- Innovation precincts thrive where planning is flexible, adaptive to fast moving drivers of change and incentivizing to draw in start-ups and users that require inexpensive rent and cost-effective spaces to operate.
- Incorporating residential use into innovation precincts to create live-work spaces can support vitality and vibrance, however, careful planning decisions need to be made so as to not compete with employment outcomes.
- Industrial parks should utilise transitional zoning to buffer adjoining sensitive uses in order to protect surrounding amenity.

To facilitate the transition and adaptation of Liverpool's industrial development lands, it is essential that incentives are explored. A variety of market and government led initiatives can support the retention and growth of local jobs and industries, including:

- The use of value capture as a tool to reinvest funds raised from new development projects back into infrastructure upgrades.
- The targeted decentralisation, relocation and clustering of public research and knowledge-based institutions to provide strong anchors for investment and growth of innovation precincts.
- Leverage growth against significant infrastructure investment, such as the Western Sydney Airport and North-South Rail, to drive investment from the private sector and establish important connected corridors of economic strength.
- Pursing infrastructure projects through alternative governance structures including Development Authorities or Corporations, Government/Public-Sector and Private Sector Partnerships and multi joint ventures.
- Planning and land use incentives can drive growth, encourage desirable built form outcomes and place making, and also protect established industries. Examples include bonus building height and floor space provisions in return for commitments to employment floor areas; zoning to encourage particular land use outcomes and leveraging funds raised from new incentive-based developments to provide public domain improvements.
- Financial incentives including tax abatements and development levy credits to protect and retain certain industry sectors and jobs.
- Ongoing investments into best-practice research, ongoing investment into understanding key drivers and changing demands of industry.
- Focusing on the creation of great places with a developed understanding of the end users firmly in mind.

A review of Liverpool's planning framework has been undertaken to align zones with the economic roles, SWOTs and characteristics of each industrial precinct. Development standards including building heights, floor space ratios (FSRs) and lot sizes under Liverpool Local Environmental Plan 2008 (LLEP 2008) have been reviewed. A series of recommended improvements (outlined below) have been included based on the best practice examples investigated.

The objectives of each industrial zone should be revisited to:

- Better define the type, scale and nature of industrial uses and other activities considered suitable in each of the precincts;
- Clarify the desired intent of each zone (i.e. the intent of the IN2 Light Industrial zone to provide for small-scale urban service industries that are compatible with surrounding and adjoining land uses);
- Avoid generality by including more specific desired outcomes; and
- Avoid the application of objectives which can be conflicting across zones.

This report has identified a need to reconcile the current zoning of Liverpool's industrial precincts in accordance with the following overarching characteristics and economic roles:

Specialised or Other Urban Services Precinct = IN2 Light Industrial Zone

- Larger industries should be discouraged from occupying in these zones unless there is a strong nexus between operations.

Industrial Park or Estate = IN1 General Industrial Zone

- Current IN1 zone has generalised objectives and a broad range of permissible land uses which result in a lack of definition and a confused economic role.
- The IN1 zone should therefore be applied to preserve mid-sized operators and large, low-impact operations including warehousing, processing and manufacturing.
- More intrusive operators such as waste recycling, extractive industries, chemical production and refining and other hazardous and offensive industries should be encouraged to occupy lands within the IN3 zone.
- IN1 zones should in many instances replace the IN3 zoned lands in Liverpool.

Industrial Park = IN3 Heavy Industrial Zone

- IN3 zonings may be suitable for newly released tracts of land around the Aerotropolis where they are properly planned for and well separated from surrounding land uses, particularly residential properties.

Modified versions of the B7 zone have been adopted by a number of Greater Sydney Councils including The Hills in Norwest Business Park, Blacktown City Council in Marsden Park and Penrith City Council in Sydney Science Park with varying degrees of success. The introduction of a B7 Technology Park Zone in certain precincts, including Priddle/Scrivener Street and Orange Grove are likely to encourage development of business parks which incorporate a genuine mix of light industrial, creative industries and commercial uses which is consistent with the overarching objectives of these precincts within the Liverpool Collaboration Area.

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