Macquarie Park - Growth and Sustainability

Research Study

Holdmark

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AECgroup
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Executive Summary

Background and Overview

Macquarie Park sits in the Global Economic Corridor as identified in *A Plan for Growing Sydney*. The Global Economic Corridor is an area of concentrated employment, economic activity and other uses in centres, transport gateways and industrial zoned land extending from Port Botany and Sydney Airport, through Sydney CBD, north-west through Macquarie Park, and towards Norwest, Parramatta and Sydney Olympic Park.

The Macquarie Park Corridor is positioned on a new growth trajectory, with significant growth in residents and employment expected to further strengthen its importance and significance as one of Sydney's economic engine rooms and Sydney's second largest commercial office precinct after the Sydney CBD.

Despite there being a range of economic benefits associated with population and employment growth, there are challenges associated with urban renewal and growth. In urban planning terms, it is well accepted that growth puts pressure on infrastructure needs. These needs include access to amenities such as quality housing, transport systems, roads, schools, hospitals and police and fire services.

AEC Group have been commissioned to provide a clear understanding of key and critical factors that underpin the success and competitiveness of business parks. This understanding of key site selection factors will assist in understanding the sustainability of Macquarie Park's competitive position.

The Evolution of Business Parks

Over the past number of decades, business parks have transitioned from accommodating warehousing and light manufacturing uses to include office uses in greater proportions.

As the proportion of office space provided in business parks increases and further to their location outside or on the fringe of the city, there is a growing need to provide a greater range of amenities for workers. This includes, *inter alia*, shops, restaurants, childcare centres, medical services, retail facilities and recreational space as well as housing in close proximity.

Business parks are beginning to resemble a CBD in many ways, combining a retail offer of shops, restaurants, banks and travel agencies as well as a recreational offer of gyms, swimming pool and playing fields. The availability of housing options in close proximity to accommodate the worker population is also an important factor.

Occupier/Tenant Requirements

As businesses continue to evolve to remain competitive in the face of global and national pressures, the primary focus for accommodation selection is to reduce cost and increase efficiencies.

Businesses recognise that in order to keep their cost base lean, they need to ensure their largest cost element (i.e. employees) is effectively managed. Ensuring that employees are satisfied and happy in their working environment will not only assist staff retention rates but improve staff productivity levels. On this basis, worker amenity and employee wellbeing are critical factors that have come to the fore in recent years.

Worker Amenity

"Worker amenity" demanded by industry is over and above statutory requirements, more akin to those which are deemed social infrastructure items, i.e. childcare, gyms, public recreation space, etc.

Annual office tenant surveys are instrumental in identifying trends in tenants' leasing decision making with recent surveys indicating that overwhelmingly, occupier needs are focused on cost-cutting and achieving workspace efficiencies (Colliers International, 2012). That said, there is increasing importance placed on location selection for attracting and retaining staff and with a focus on staff health and employee wellbeing.

Employee Wellbeing

In addition to worker amenity, social research shows that greenspace in business parks is no less important for amenity and wellbeing (Gilchrist, Brown and Montarzino, 2014). The use of greenspace and visual access to them supports employee wellbeing, thus positively related to job performance and productivity.

Corporations are increasingly placing more importance on employee wellbeing. Employee satisfaction and wellbeing are seen as key factors in workplace productivity and retention of staff. This in turn has shaped how businesses select locations and configure their work space (Colliers International, 2012).

Proximity of Housing

A number of key factors influence residential location choice, one of these is proximity to work. Research suggests that the time it takes to get to work is just as important as the job itself (Oxford Properties and Environics Research Group, 2013):

- 76% of respondents wanted a reasonable commute to the office. The majority of those surveyed said a commute time of less than 30 minutes was the appropriate travel time.
- 50% of respondents considered commute time to be the No. 1 factor in choosing one employer over another.
- The survey also found that once at the office, workers sought space that allowed them to work collaboratively with other employees, is close to shops and other amenities and is energy-efficient.

Macquarie Business Park: Present and Future

A Plan for Growing Sydney identifies that Macquarie Park sits in the Global Economic Corridor. The Plan identifies, *inter alia*, the following priorities:

- Work with council to retain a commercial core in Macquarie Park for long-term employment growth.
- Work with council to concentrate capacity for **additional mixed-use development around train stations, including retail, services and housing**.
- Investigate potential **future opportunities for housing in areas within walking distance of train stations**.

Since the completion of the Epping to Chatswood Rail Link in 2009 which resulted in the opening of three new stations (North Ryde, Macquarie Park and Macquarie University), the profile of Macquarie Park and its surrounds has lifted significantly.

Some 215,000sqm of new office space has been completed since January 2009 with strong residential growth driven on several fronts: increased appeal of the area, desire for workers to live close to their place of work and growth in Macquarie University's enrolment activity.

Future employment and residential growth expectations are equally strong with coordinated planning by state and local governments leading to significant development projects in the pipeline.

The NSW Bureau of Transport Statistics (BTS) forecasts that the population in Macquarie Park will increase by 15,358 persons and increase by 12,872 employees by 2031, representing an increase of 770% and 28% respectively from 2011.

Broadly, Macquarie Park's continued growth will be driven on three key fronts:

- **Macquarie Business Park**
  There is some 450,000sqm of commercial/retail floorspace in the pipeline in the business park and commercial core.
- **Herring Road and North Ryde Station priority precincts**
  The priority precincts have the potential to deliver up to 5,400 new dwellings.
- **Macquarie University's growth plans**
  The university's growth over the last decade has been impressive, with growth in the 2003-2010 period amongst the highest of Australian universities.

Macquarie University has significant expansion plans. A concept plan was approved for 400,000sqm of floorspace outside the Academic Core, 61,200sqm of floorspace within the Academic Core and 3,450 additional beds within the University Housing precinct.

Planning for and Delivering Social Infrastructure

The nature and composition of business parks has changed over the last two decades. A range of uses are now incorporated into business parks as worker convenience and amenity are of increasing importance to businesses and occupiers. Business parks increasingly aspire to provide the offer of a CBD location, Macquarie Business Park is no exception.

In addition to residential-driven demand, increasingly, employment hubs such as business parks are responding to demand from employers and employees for amenities such as recreational and childcare facilities. Flexible and inviting workplaces that are not only engaging within but engaging with the surrounding public domain are highly valued by business and occupiers.

According to the Ryde Integrated Open Space Plan (Ryde Council, 2012), there is presently an open space deficiency in the Macquarie Park Corridor that will be exacerbated by planned growth. The Plan further indicates that **two new major reserves** suitable for active and passive recreation and several smaller open space areas are needed to support planned growth in Macquarie Park. These have significant funding and delivery challenges.

The funding of public infrastructure has changed significantly over the past few decades, the burden shifting from government budgets to an array of public-private arrangements and user pays charges.

Statutory Funding Mechanisms

Current statutory funding mechanisms are fairly rigid in their scope of application, in that only '*additional*' demand resulting from new development can be funded via these mechanisms. Furthermore, development contributions in established areas were capped to $20,000 per dwelling in 2008.

More specifically, Ryde City Council's Section 94 Development Contributions Plan (2007) **does not** provide for public open space by non-residential development, implicit in this is the presumption that only residential users demand public open space. As indicated by contemporary tenant/occupier requirements, this presumption is incorrect.

Incentive-based Infrastructure Funding Mechanisms

Incentive-based infrastructure funding mechanisms can be effective if conceived and implemented well, as demonstrated by the Green Square Community Infrastructure Contributions (formerly known as the Green Square Bonus FSR System).

Green Square

Since its implementation over a decade ago, significant public domain and community infrastructure works have been delivered in Green Square. Today, the Sydney DCP 2012 outlines a list of "community infrastructure" that can be delivered in exchange for, subject to a merits assessment, "additional floorspace" in Green Square. Community infrastructure items include public streets, pedestrian and bike networks and public open spaces.

The large scale renewal of Green Square (led by and cross-subsidised by the residential market) has been instrumental in delivering substantial amounts of community infrastructure. *But for* the permissibility of residential uses in Green Square, the rate of infrastructure delivery would conceivably have been much slower.

Macquarie Park Corridor

The City of Ryde Section 94 Development Contribution Plan 2007 does not provide for open space by non-residential development, implicit in the now-outmoded presumption that only residential uses demand public open space.

Ryde Council has recognised the need to fund the delivery of new roads and public open space in Macquarie Park and has sought to do this via the Macquarie Park Corridor Planning

Proposal (proposed Amendment 1 to the Ryde LEP 2013) wherein bonus floorspace can be granted to proponents who deliver an acceptable package of infrastructure works.

When Amendment 1 to the Ryde LEP 2013 is effected, proponents of bonus floorspace in Macquarie Park will be required to deliver items of infrastructure including new roads and open space. At proposed contribution rates ($250/sqm of bonus FSR), the contributions received and subsequent delivery of infrastructure could conceivably occur at a slow pace, given that these are dependent on industry take-up of bonus *commercial* floorspace.

Despite an identified deficiency of open space in Macquarie Park, there is presently no mechanism to fund the provision of public open space in Macquarie Business Park.

In order to address the difficulties associated with delivering infrastructure in a timely manner, an alternate mechanism to deliver required and social infrastructure in Macquarie Park is needed.

A Strategy to Deliver Social Infrastructure in Macquarie Park

Architectus has developed a strategic planning framework by which Council could consider a rezoning application for sites that have the ability to deliver public benefit and meet all of the following specified criteria.

- **Public open space**
  Provide either new open space shown in the Draft Macquarie Park DCP 2014 or a new 1ha minimum public open space, designed to Council's reasonable requirements.

  Where a site proposes to deliver the 1ha minimum open space, the site must be larger than 3ha, thereby allowing for a 2ha development site for mixed uses.

  The open space must have a frontage to a major road (Waterloo Road, Talavera Road, Wicks Road or Herring Road) and one secondary street.

  The proposed open space should satisfy specified design criteria and be dedicated to Council on completion.
- **Non-residential floorspace**
  Provide a minimum of 20,000sqm GFA of non-residential floorspace.
- **Key worker housing**
  Deliver key worker housing (or Affordable Housing) at the rate of 3% of total dwellings provided.

  Up to 15% of the open space (1,500sqm) can be used to deliver the required key worker housing.
- **Childcare facilities**
  Provide privately run childcare facilities suitable for 60 children.
- **Public domain**
  Delivery of all other required public domain on the site including roads and through site links as nominated in the Draft Macquarie Park DCP 2014.

Conclusion

While the appropriation of land to public open space and affordable housing would mean less available land to accommodate new employment floorspace, the provision of these items of key social infrastructure would undoubtedly result in increased appeal of Macquarie Park as a business destination, leading to increased demand for floorspace.

The ultimate delivery of additional jobs (through increased overall employment densities) would support NSW Government and Council objectives of strengthening Macquarie Park's position in the Global Economic Corridor.

This Research Study concludes that permitting residential and mixed-use development on selected, appropriate sites in Macquarie Park which comply with the criteria listed in the Architectus strategic planning framework would have a **significant positive impact on the growth and sustainability of Macquarie Park** as a major employment zone in metropolitan Sydney and a key economic engine room for NSW.

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1. Introduction

1.1 Background and Overview

Macquarie Park sits in the Global Economic Corridor as identified in *A Plan for Growing Sydney*. The Global Economic Corridor is an area of concentrated employment, economic activity and other uses in centres, transport gateways and industrial zoned land extending from Port Botany and Sydney Airport, through Sydney CBD, north-west through Macquarie Park, and towards Norwest, Parramatta and Sydney Olympic Park.

Macquarie Park is located in the local government area of City of Ryde, about 12km north-west of the Sydney central business district and is one of Sydney's major business hubs. Macquarie Park contains three major employment anchors: Macquarie Business Park, Macquarie University and Macquarie University Hospital. Macquarie Park is serviced by three train stations, these include: Macquarie University Station, Macquarie Park Station and North Ryde Station.

Macquarie Park is set to experience significant population and employment growth. The NSW Bureau of Transport Statistics forecasts that the population in Macquarie Park will increase by 15,358 persons and increase by 12,872 employees by 2031 (representing an increase of 770% and 28% respectively). Testament to this growth outlook is the quantum of development already in the pipeline, at various stages of planning and development.

- Commercial proposals totalling some 450,000sqm of commercial floorspace.
- Residential proposals totalling more than 3,000 residential units.

Despite there being a range of economic benefits associated with population and employment growth, there are also challenges associated with urban renewal and growth. In urban planning terms, it is well accepted that growth puts pressure on infrastructure needs. These needs include access to amenities such as quality housing, transport systems, roads, schools, hospitals and police and fire services. A reduction in access and service levels would result in a commensurate reduction in quality of life. Urbanisation demands equal emphasis be placed on social infrastructure, such as community centres, youth centres, parks and sporting fields, so as to enable social cohesion in urban areas.

Many business parks have transitioned from providing warehousing and light manufacturing space to include increasing amounts of office uses. As a result of the increasing amount of office space (and office workers) located in business parks, the overall composition of business parks has evolved to contain a range of facilities, including restaurants, banks, medical centres and even travel agencies. These facilities are similar to those that might be found in a CBD. As such, business parks are beginning to take the shape of a CBD in some ways, they are becoming denser and more walkable centres. As a result, there is increasing demand and expectation for social infrastructure and facilities that contribute to worker and resident amenity in business parks.

As business parks evolve, workers will be attracted to housing options in close proximity to their place of work (i.e. people will want to live and work locally). This has broader economic benefits as it promotes self-containment which improves the health of the local economy.

1.2 Scope and Purpose

The overarching objective of the Study is to provide a clear understanding of key and critical factors that underpin the success and competitiveness of business parks, including the complementary residential development that they generate. This understanding of key site selection factors will assist in understanding the sustainability of Macquarie Park's competitive position.

The importance of key infrastructure items is investigated against current and future provision. Case studies, tenant/occupier surveys and a literature review collectively identify key tenant requirements (e.g. open space, affordable housing for workers, childcare facilities, etc.). The position and ability of Macquarie Park to respond to infrastructure need is then analysed, specifically with respect to funding mechanisms available to Council.

The Study has sought to answer the following questions:

- In the context of expected growth (employment and residential), do current and future provision of social infrastructure (specifically open space, childcare facilities, key working housing) affect Macquarie Park's ability to be sustainable and competitive?
- Are there any impediments to achieving growth in Macquarie Park as envisioned by the incentive scheme introduced by Ryde LEP 2013 (Amendment 1) Macquarie Park Corridor?
- Incentive zoning - is it a viable method to procure critical items of community infrastructure and what is an appropriate strategic criteria framework to guide the use of incentive zoning in Macquarie Park? Is residential permissibility the only viable incentive, what about increased commercial density?
- What are the trade-offs (costs v benefits) should community infrastructure be obtained via incentive zoning that permits residential uses within the Macquarie Business Park?

This Study together with a proposed Planning Strategy (Architectus, 2015) aims to define and evaluate a strategic framework as to how key items of community infrastructure can be secured.

1.3 Structure of the Study

Capital in search of investment is mobile and will gravitate to the most attractive investment opportunity. In order to attract more private capital investment and grow, Macquarie Park needs to not only remain sustainable but competitive as a premier business park destination.

This study aims to, *inter alia*, investigate the factors required for sustainable growth in Macquarie Park.

In order to understand how Macquarie Park can accommodate sustainable growth, it is necessary to understand:

- Factors of success for similar business parks.
- Macquarie Park's competitive and future offer.
- Practical delivery of required and social infrastructure.
- Cost-benefit trade off of accommodating social infrastructure on land designated for employment.

Chapter 2 provides an overview of Macquarie Park, the history of its growth and its future growth outlook.

Chapter 3 examines the evolution of business parks nationally and internationally to understand the drivers of location selection and tenant requirements.

Chapter 4 examines the current employment composition of Macquarie Park, where workers live and the industries that are highly represented. The chapter also examines current and future provision for social infrastructure in Macquarie Park.

Chapter 5 investigates the current and future competitive position of Macquarie Park, recognising the impact of changing tenant requirements and surrounding residential growth. This chapter also analyses the various infrastructure funding mechanisms available to Council to fund the required items of social infrastructure.

Chapter 6 evaluates the necessity for a planning framework and strategy to ensure required infrastructure is able to be delivered in a timely manner. The cost-benefit trade-off is also examined, particularly if lands designated for employment are appropriated for community infrastructure and residential uses.

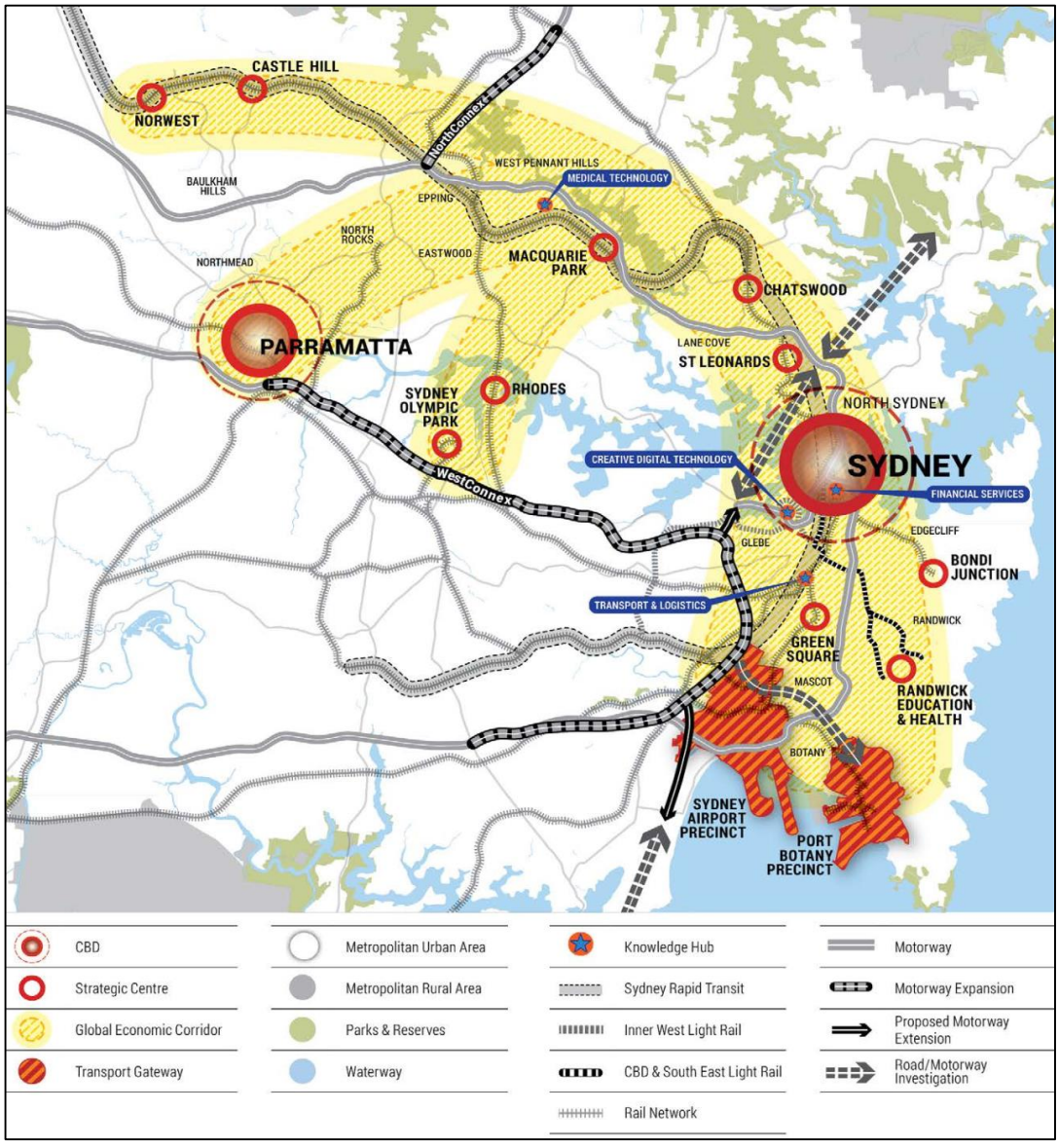
2. Overview of Macquarie Park

2.1 Location

Macquarie Park is located in the local government area of City of Ryde. It is located 12km northwest of the Sydney central business district and it is one of Sydney's major business hubs. Macquarie Park contains three major employers: Macquarie Business Park, Macquarie University and Macquarie University Hospital. Macquarie Park is serviced by three train stations, these include: Macquarie University Station, Macquarie Park Station and North Ryde Station.

A Plan for Growing Sydney identifies that Macquarie Park sits in the Global Economic Corridor (refer to Figure 2.1). The Global Economic Corridor is an area of concentrated employment, economic activity and other uses in centres, transport gateways and industrial zoned land extending from Port Botany and Sydney Airport, through Sydney CBD, north-west through Macquarie Park, and towards Norwest, Parramatta and Sydney Olympic Park.

Figure 2.1: Strategic Context and Location of Macquarie Park



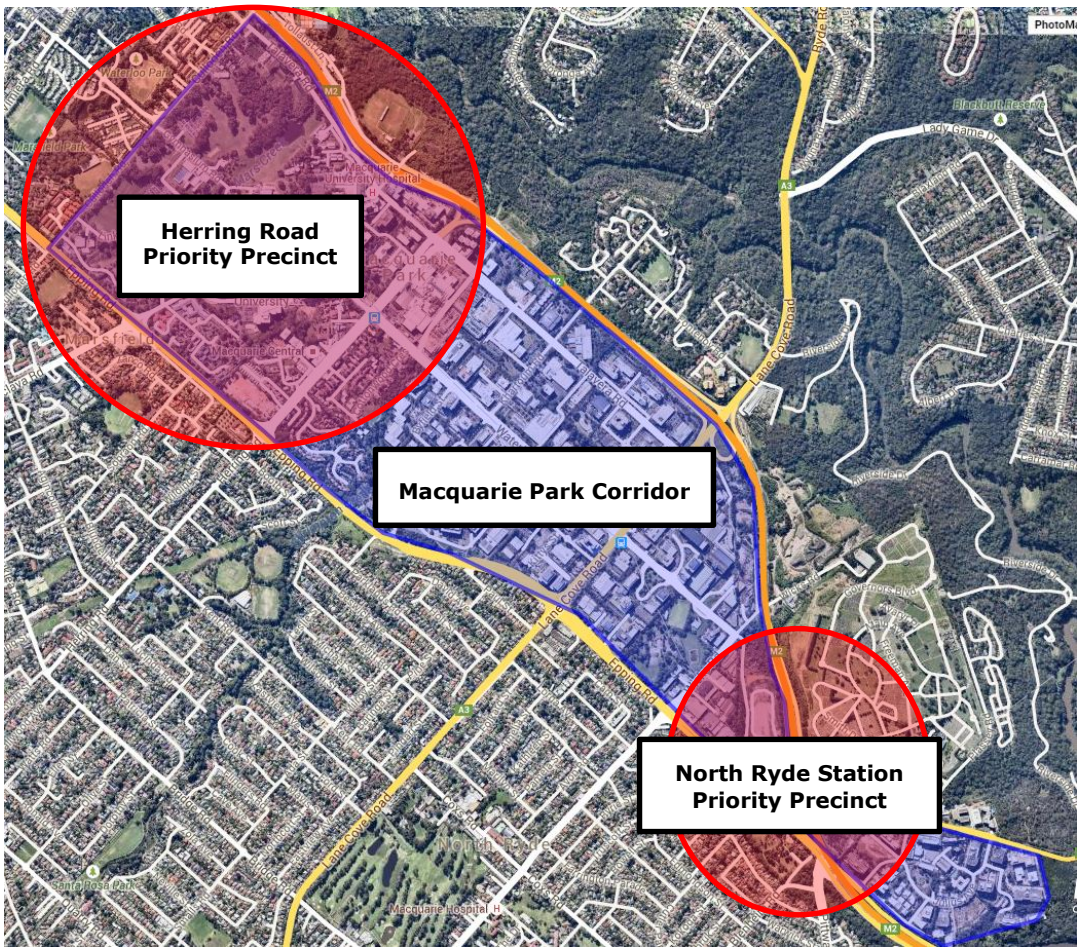
Source: NSW DPE (2014a)

2.2 Macquarie Park Corridor and Surrounds

Macquarie Park contains a range of land uses which are reflective of the different land use zones which subsist in the area. Under the Ryde Local Environmental Plan 2014, the eastern portion is zoned B4 Mixed Use, the core is zoned B3 Commercial Core and the land on either side of the core is zoned B7 Business Park.

Importantly, DPE have identified two Priority Precincts which are located at the northwestern and southeastern ends of the business park, these are Herring Road and North Ryde Station Priority Precincts respectively. Both of these precincts have been designated for substantial dwelling and population growth. The area northwest of Herring Road (Macquarie University) falls under the State Environmental Policy (Major Development) (Macquarie University) 2009 and is zoned SP2 Infrastructure (Educational Establishment) and B4 Mixed Use.

Figure 2.2: Map of Macquarie Park Corridor

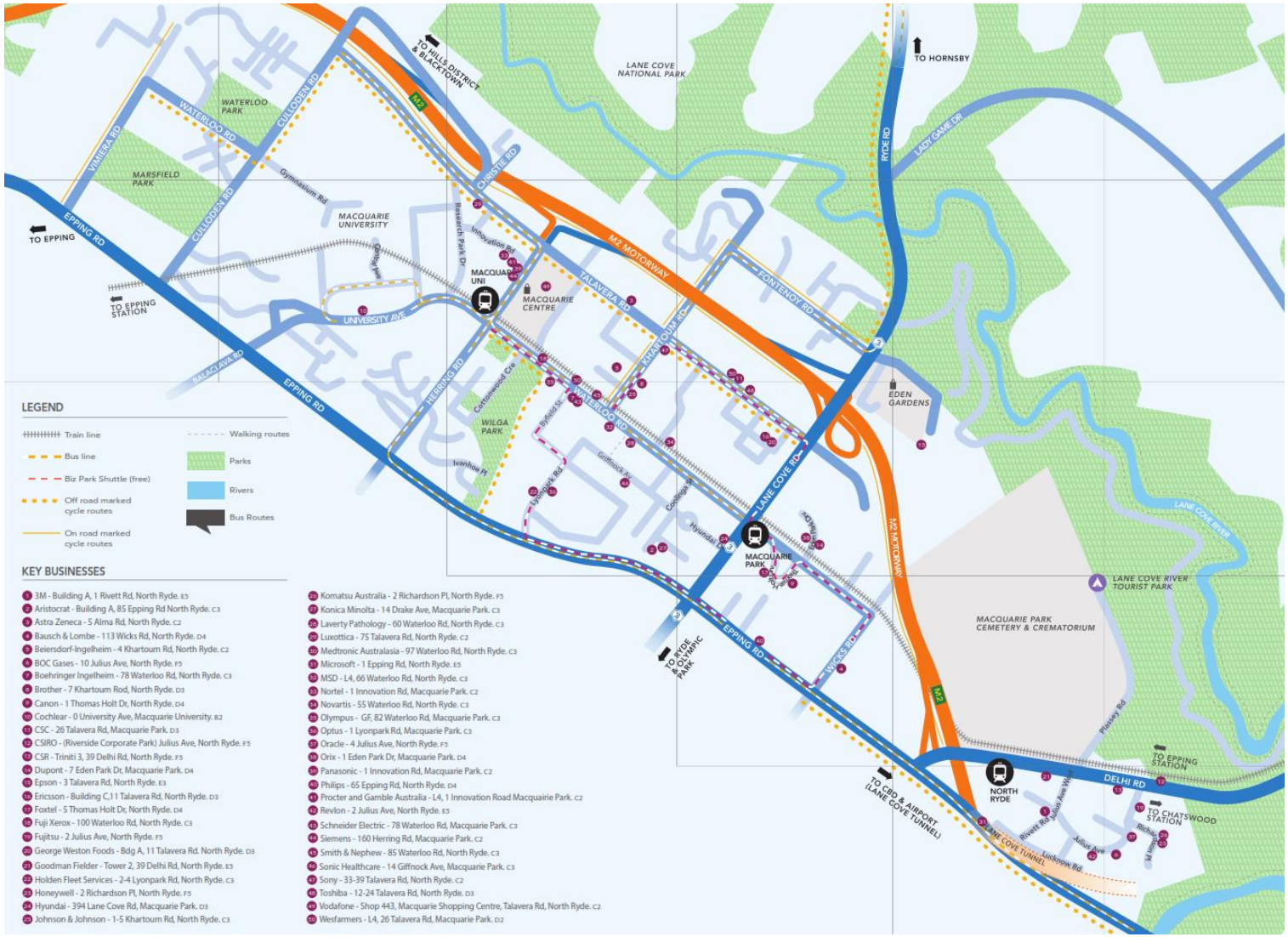


Source: Nearmap (2015)

From its early association with Macquarie University, Macquarie Park has developed into a centre for research and technology activities. The occupiers are diverse within the range of land use zones (refer to Figure 2.3).

- Occupiers in the B4 Mixed Use zone include Macquarie Retail Centre, Panasonic, Macquarie University residential colleges.
- Occupiers in the B3 Commercial Core zone include financial services firms, medical and pharmaceutical research and telecommunications companies. These include Orix, Johnson and Johnson, Novartis Pharmaceuticals and Foxtel.
- Prominent occupiers in the B7 Business Park zone include Toshiba, CSIRO, Komatsu, Astra Zeneca, Seiko and Optus.

Figure 2.3: Macquarie Park Key Businesses



Source: Macquarie Park and Ryde Council (2013)

2.3 Strategic Context and Locational Strengths

2.3.1 History of Macquarie Park – From Market Gardens to Major Employment Hub

In the 1970's Macquarie Park was one of the outlying market garden areas serving Sydney. Under the County of Cumberland Scheme (1951) the area was protected from development by a 'green belt' zone. This zone comprised land surrounding the Sydney metropolitan area which was designated for farming and recreational use.

In 1963 the NSW Government resumed the land to establish Macquarie University (Sydney's third university at the time). In addition to the university, land was rezoned for residential and industrial development. This was done in recognition of the integral role that universities can play in the development of industry clusters. Additionally, this was consistent with a common United States practice where industry sponsors university courses.

Over the past 30 years, Macquarie Park has developed rapidly from market gardens into a major employment hub. One of the key factors which drove development in the initial stages was its close proximity to the professional labour market located in Sydney's northern beaches and inner northern suburbs. A secondary driver was the transport links to service markets in Chatswood, North Sydney and the Sydney CBD.

It was during the 1990s that the area developed as home to various multinational corporations. Over the subsequent decade, the amount of warehouse and distribution occupiers decreased and office occupiers came to prominence.

Over 200 hectares of industrial land has been rezoned in the last two decades to create Macquarie Business Park.

2.3.2 The Evolution of Macquarie Park and Planning Controls

The aim of the planning controls for Macquarie Park is to guide evolution of the area from Business Park to urban centre, making it more attractive to workers and Ryde residents through the provision of an effective access network and parks, plazas and other recreation opportunities whilst also encouraging employment diversity.

In order to support the growth and development of Macquarie Park, Ryde Council has since 2006 implemented various planning controls and initiatives.

In 2008 refinements to strengthen the incentive planning controls were included in a Draft Local Environmental Plan amendment (DLEP Amendment 1). However, due to legal complexities regarding the proposed incentive controls, it took nearly two years of negotiation with the Department of Planning and Infrastructure (DoPI) before they were satisfied that the LEP was compliant with legislative requirements and in particular, the standard template for LEPs. The delay in approving DLEP Amendment 1 for exhibition meant that the financial incentive model prepared by Council in 2007/8 was out-dated and required review.

To address this, Council allocated funds in the 2011/12 budget to review the Macquarie Park Development Control Plan and DLEP Amendment 1. The 2011/12 review recommended new open space and roads networks and changes to the planning controls, in recognition of a public open space deficiency and a need for new roads. The review also proposed a planning incentive scheme to assist with funding needed infrastructure.

It was proposed that the Ryde Local Environmental Plan 2013 Draft (Amendment 1) Macquarie Park Corridor introduce an incentive scheme that defers an availability of additional Floor Space Ratio (FSR) and height until the developer negotiates with Council to deliver roads and/or parks or contribute towards these. Once this agreement is executed the greater height and FSR is made available through a minor site specific LEP amendment. The scheme is voluntary and if a developer chooses not to enter into the agreement the provisions of the existing Ryde LEP 2013 will apply. This changes have not as yet been implemented.

2.3.3 Vision for Macquarie Park

A Plan for Growing Sydney

A Plan for Growing Sydney identifies that Macquarie Park sits in the Global Economic Corridor. The Global Economic Corridor is an area of concentrated employment, economic activity and accommodates a range of other uses. These activities are accommodated in centres, transport gateways and industrial zoned land extending from Port Botany and Sydney Airport, through Sydney CBD, north-west through Macquarie Park, and towards Norwest, Parramatta and Sydney Olympic Park.

Furthermore, The Plan states that by 2030, there will be demand for around 190,000 new stand-alone office jobs: around 75% of these will likely seek to locate in Sydney's 10 major office markets. Many of these jobs will be outside Sydney CBD and North Sydney, in the eight suburban office markets of Chatswood, Macquarie Park, Norwest, Parramatta, Rhodes, St Leonards, Sydney Olympic Park and South Sydney, situated along the Global Economic Corridor.

With specific regard to the Macquarie Park, The Plan identifies the following priorities:

- Work with council to retain a commercial core in Macquarie Park for long-term employment growth.
- Work with council to concentrate capacity for **additional mixed-use development around train stations, including retail, services and housing**.
- Facilitate delivery of Herring Road, Macquarie Park Priority Precinct, and North Ryde Station Priority Precinct.
- Investigate potential **future opportunities for housing in areas within walking distance of train stations**.
- Support education and health-related land uses and infrastructure around Macquarie University and Macquarie University Private Hospital.
- Support the land use requirements of the Medical Technology knowledge hub.
- Investigate a potential light rail corridor from Parramatta to Macquarie Park via Carlingford.
- Investigate opportunities to deliver a finer grain road network in Macquarie Park.
- Investigate opportunities to improve bus interchange arrangements at train stations.
- Work with council to improve walking and cycling connections to North Ryde station.

The importance and significance of Macquarie Park is recognised in state and local planning documents, its future prosperity underpinned by the priorities of governments.

2.4 Future Growth Outlook

The NSW Bureau of Transport Statistics (BTS) forecasts that the population in Macquarie Park will increase by 15,358 residents and by 12,872 employees towards 2031. This represents a phenomenal growth of 770% and 28% respectively (detail in Table 4.8).

There are a number of commercial development applications in the pipeline for Macquarie Park, these cumulatively proposing a total of some 455,286sqm of commercial floorspace while more than 3,000 residential units are at various stages of planning and delivery. A list of commercial/retail proposals are detailed in Appendix B.

Business Park (B3 and B7 Zoned Lands)

With regard to the land zoned B3 Commercial Core and B7 Business Park, there are a number of development applications and projects in early planning in the pipeline.

- The Macquarie Park Commerce Centre (located at 396 Lane Cove Rd, 32-46 Waterloo Rd & 1 Giffnock Avene) is a major project and will involve the construction of a 17 storey retail/commercial building (total floorspace of 83,368sqm). The project is still at the concept plan approval stage and is expected to be completed in 2020.

- The Land and Property Management Authority (LPMA) plans to develop a Defence Technology Hub (located at 45-61 Waterloo Road), expected to be high-tech hub that includes major commercial office space and ancillary facilities. This is still in the very early planning stages (it is expected to be completed by 2020), nonetheless is provides insight into the types of uses Macquarie Park will cater for in the future.

A number of 5-6 storey commercial buildings are under construction along Talavera Road and Waterloo Road.

Macquarie University

It is well documented that Macquarie University has significant expansion plans. Macquarie University has an approved concept plan for:

- 400,000sqm of commercial gross floor area outside of the Academic Core.
- Additional 61,200sqm of academic gross floor area within the Academic Core.
- Additional 3,450 beds within the University Housing Precinct for University purposes.

The concept plan also includes provision of open space as well as cycle paths. A masterplan is now in place to guide the development and staging of the university's planned expansion.

Priority Precincts

NSW Department of Planning and Environment has designated two precincts for urban renewal and future growth, located immediately to the northwest and southeast of Macquarie Park - Herring Road and North Ryde.

These Priority Precincts (formerly known as Urban Activation Precincts) are identified as areas which are suitable for urban renewal including increased housing within the Priority Precincts program to coordinate planning and investment to revitalise local centres, services and infrastructure.

- **Herring Road**
  This Priority Precinct envisages development of medium to high density housing that could achieve up to 5,400 new dwellings by 2031.
- **North Ryde Station**
  This Priority Precinct is envisaged to accommodate 3,000 homes and 1,500 jobs by 2031. There has been a significant amount of work done regarding social infrastructure this precinct is assessed to require approximately 2.4ha open space, public plazas and a multi-purpose community facility.

2.5 Challenges

The Macquarie Park Corridor is positioned on a new growth trajectory, with significant growth in residents and employment expected to further strengthen its importance and significance as one of Sydney's economic engine rooms and Sydney's second largest commercial office precinct after the Sydney CBD.

Despite the range of economic benefits associated with population and employment growth, urban and renewal and regeneration is not without its challenges. All forms of growth exert pressure on existing infrastructure networks, not just from a quantum but also from a suitability-for-needs perspective.

As areas renew and regenerate, the infrastructure needs of its workers and residents change, therefore demand for and access to amenities such as quality housing, transport systems, roads, schools, hospitals and police and fire services should be considered in the appropriate context.

Urbanisation also demands more emphasis be placed on social infrastructure, such as community centres, youth centres, parks and sporting fields, etc. so that urban renewal areas can contribute to reducing social disadvantage and maintaining social cohesion.

3. Business Parks

3.1 What is a Business Park

'Business park' is a term that originated from United States in the 1960's/1970's and was used to describe several buildings in a low-rise development on a greenfield site. This was often located on the city fringe, occupied by large tenants who need significant amounts of office space at a comparatively low price and in a pleasant countryside environment.

The demand for business park space has traditionally been highest from IT firms, FMCG (fast moving consumer goods), telecommunications, pharmaceutical and other companies who, unlike law firms or investment banks, do not place as much emphasis on office location prestige.

In many ways a business park combines the characteristics of an industrial park and an office park, the activities and appearance of the business park conveying a multi-use environment.

"Planned multi-use developments" have been suggested to be the most advanced form of business park (PCA, 2000). Design, land use and transportation patterns, occupancy and operation are carefully planned to accommodate a range of activities from employment-based office and industrial activities to commercial services, recreational facilities and housing. These developments are often designed to be self-sufficient, with basic worker requirements provided within their boundaries. In many respects these developments are designed to replicate the offer of a city CBD environment.

Australian and NSW Context

There are a number of business parks in Sydney and across capital cities across Australia - Macquarie Park is one of Sydney's premier business parks.

In NSW, 'business park' is a separate zone (B7) under the NSW standard LEP template, the zone having the following objectives:

- 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.
- To encourage industries involved in research and development.

Although accommodating a mix of commercial and light industrial activities and functions, the co-location of the B7 Business Park zone with the B3 Commercial Core zone in Macquarie Park presents it with a strong commercial focus.

The success of business parks around the country has been a result of the dynamism of the property industry, constantly reinventing floorspace and accommodation formats to meet the ever-changing needs of industry. The spatial transformation of commercial development favouring highly adaptable out-of-centre locations is the result of a combination of social, economic, technological and policy trends.

The rate at which development occurs is significantly influenced by planning policy which is guided by compact and sustainable city ideologies. This policy philosophy of compact cities is intended to ensure the capital cost of economic infrastructure (usually by government) is leveraged and most efficiently used, this planning approach accordingly affecting the spatial dispersion of development.

Against an international review of literature, the following sections examine how business parks have evolved over time and the key success factors for business parks.

3.2 How have Business Parks Evolved

Business parks continually evolve. It is well documented that the first "planned industrial estate" dates back to 1800, when a company in Manchester, England bought a 1,200 acre estate and called it Tafford Park Estate. In the 1970's large corporate organisations in the

United States like IBM developed low scale corporate campuses on greenfield sites. Being greenfield sites, these campus type developments were heavily reliant on the automobile.

Businesses today are increasingly looking for office space in businesses parks which they can lease rather than own (Frej and Mazullo, 2001), enabling firms to expand and contract as they need to. In addition, the types of uses located at business parks have transitioned from warehousing and light manufacturing to include office uses in greater proportions. As a consequence of the increasing amount of office space locating in business parks, the demands of users is changing to demand locations that combine a retail offer of restaurants, banks and travel agencies as well as a recreational offer of gyms, swimming pool and playing fields as well as affordable housing close by for the working population. As such, business parks are beginning to take the shape of a CBD in some ways, they are becoming denser and walkable centres.

Unlike the traditional business parks whereby the only way to access them was by automobile, these new business parks are increasingly centred around train stations. As a result, they increasingly reflect transit-orientated design (TOD) principles.

From Greenfield to Brownfield Sites

Traditionally business parks have been developed on greenfield sites. However, research undertaken by the Urban Land Institute (ULI, 2001) suggests that increasingly business parks are being developed on brownfield sites. Some of the key reasons the ULI suggest that make using brownfield sites a viable proposition is that they are close to transit infrastructure and close to retail provision. An example of where this has occurred is Twin Lakes Business Park in Minnesota which involved the redevelopment of a 275 acres industrial site into a business park. The masterplan for the business park incorporated walking paths, day care facilities and a gym. In addition, it incorporated approximately 600 unit housing (townhouses and apartments). Most of the dwellings were delivered at market rate, however, some units were made to be more affordable to those earning 80% of the area's median income.

Employee Wellbeing

As the proportion of office space provided in business parks increases and further to their location outside or on the fringe of the city, there is a growing need to provide a greater range of amenities for workers. This includes, *inter alia*: shops, restaurants, childcare centres, medical services, retail facilities and recreational space, as well as housing in close proximity.

In addition to worker amenities provided for within business parks, greenspace in business parks is no less important for amenity and wellbeing (Gilchrist, Brown and Montarzino, 2014). Research suggests that both the use of greenspace and visual access to them supports employee wellbeing. Research studies that have gathered employee data and applied them in multiple regression analysis have found that higher subjective wellbeing and job satisfaction at work are positively related to job performance, productivity, and organisational citizenship (e.g. being cooperative, friendly and trustworthy). These have positive implications for economic benefits.

Employee satisfaction and wellbeing are critical factors that underpin location selection and building leasing decisions. These factors are discussed in sections 3.3 and 3.4.

3.3 Drivers of Location Selection and Investment Attraction

There are many factors that influence decisions for business relocation and investment attraction. The Area Development Corporate Survey (2014) is a survey of businesses in the United States of America. The survey focuses on issues such as expansion/ relocation plans, the importance of site selection and quality of life factors in planning decisions, environmental sustainability and the economic climate. Each year the survey ranks the top 25 site selection factors when choosing a facility.

While the survey is based in the United States and the operating environment there is different from Australia, the survey contains many solid indicators as to how businesses make location decisions.

In 2014, the survey found the availability of skilled labour was the top concern for businesses, followed by highway accessibility and labour cost. Occupancy costs are a major factor, this also identified to be important in a tenant survey (section 3.4).

Table 3.1: Corporate Site Selection Factors, 2013

Rank	Site Selection Factor	2013 Score
1	Availability of skilled labour	95%
2	Highway accessibility	94%
3	Competitive labour costs	91%
4	Occupancy or construction costs	87%
5	Availability of advanced ICT services	85%
6	Availability of buildings	83%
7	Corporate tax rate	82%
8	State and local incentives	82%
9	Low union profile	81%
10	Energy availability and costs	81%
11	Tax exemptions	81%
12	Right-to-work state	81%
13	Available land	80%
14	Expedited or 'fast-track' permitting (planning approvals and regulation)	76%
15	Proximity to major markets	75%
16	Availability of long-term financing	75%
17	Environmental regulations	72%
18	Inbound/ Outbound shipping costs	71%
19	Proximity to suppliers	68%
20	Raw materials availability	61%
21	Accessibility to major airport	59%
22	Proximity to technical university	54%
23	Training programs	52%
24	Availability of unskilled labour	49%
25	Railroad service	29%
26	Waterway or oceanport accessibility	20%

Note: Percentages are the total of "very important" and "important" ratings of the Area Development Corporate Survey.
Source: Area Development Corporate Survey (2014).

The same survey asked business decision makers in the United States about quality of life, which is another important locational aspect that supports the quality of an area. While not as conclusive as the site selection factors, these results demonstrate that quality of life in an area is important for site selection and investment decision making.

Table 3.2: Corporate Quality of Life Factors, 2013

Rank	Site Selection Factor	2013 Score
1	Low crime rate	81%
2	Healthcare facilities	80%
3	Housing costs	75%
4	Ratings of public schools	73%
5	Housing availability	72%
6	Recreational opportunities	66%
7	Universities in the area	60%
8	Climate	60%
9	Cultural opportunities	55%

Note: Percentages are the total of "very important" and "important" ratings of the Area Development Corporate Survey.
Source: Area Development Corporate Survey (2014).

Low crime, access to healthcare, housing, schools and recreational opportunities as well as cost of housing featured prominently and provides insights into the type of quality of life factors that can impact business investment decisions.

3.4 Occupier/Tenant Requirements

Cost of Accommodation

Workplaces which are amenity rich are viewed favourably by occupiers when making location and building selection. Notwithstanding this, when occupiers and tenants evaluate their leasing options – what fundamentally underpins the decision is cost (Colliers International, 2012).

There is no doubt occupiers and tenants are attracted to Macquarie Park due to the good value for money proposition that it offers. As a comparison,

- Prime grade rents in Macquarie Park are $320/sqm-$390/sqm (net) and secondary grade rents are $280/sqm-$300/sqm (net).
- Prime grade rents in St Leonards are higher and range between $430/sqm and $450/sqm (net).
- Prime grade rents in Chatswood range from $400/sqm to $450/sqm (net).

A key factor which enables Macquarie Park to compete effectively with Chatswood and St Leonards is the better value for money that it offers, the availability of large floorplates and close proximity to the shopping centre, cafes and train stations. In addition the direct freeway connection to the Sydney CBD enhances its attractiveness.

As businesses continue to evolve to remain competitive in the face of global and national pressures, the primary focus for accommodation selection is to reduce cost and increase efficiencies.

Worker Amenity

As a proportional of total business cost, property occupancy costs (e.g. rents, outgoings, etc.) represent a small proportion, suggested to be in the region of 5%-10%. A key proportion of business cost is employees. As a consequence, despite the importance of cost in the location and building selection process, research suggests that the extent and quality of worker amenity is an increasingly important factor in location selection as employers seek to minimise employee cost by optimising employee productivity and retention.

"Worker amenity" that is sought by businesses is beyond the basic amenities that all workplaces are to provide under the Local Government Act 1995 and the Building Code of Australia (BCA). These legislative documents require the following amenities: air quality, temperature controls, workspace, lighting, seating, washing facilities, toilets, change rooms, dining facilities, drinking water and the provision of suitable access and egress.

"Worker amenity" demanded by industry is over and above statutory requirements, more akin to those which are deemed social infrastructure items, i.e. childcare, gyms, public recreation space, etc.

Colliers International carries out annual office tenant surveys to identify trends in tenants' leasing decision making to assist building owners and investors respond to occupier needs and requirements as they evolve.

The most recent survey was carried out in 2012 where 300 telephone interviews were carried out with key decision makers. Australian tenants surveyed represented 5.5% of all office space in Australia. These tenants were across Sydney, Melbourne, Brisbane, Perth, Adelaide, Canberra, Auckland and Wellington.

The following responses are of direct relevance for this Study:

- Increasing importance of building choice to attract and retain staff (61% of respondents indicated a "high importance rating" compared to 47% respondents in 2010).

- Reasons for the importance of building choice for attracting and retaining staff were suggested as:
  - Central location (51%).
  - Accessibility for staff (47%).
  - Staff happiness (37%).
  - Importance of image (32%).
  - Proximity to amenities (27%).
- An increasing importance placed on certain building attributes, specifically buildings with access to gyms, swimming pools, childcare facilities, bike racks, green space and a CBD location was observed between 2010 and 2012.
- A decline in importance in other building attributes, specifically car parking and ESD (environmentally sustainable design) was observed between 2010 and 2012.

Overwhelmingly, occupier needs are focused on cost-cutting and achieving workspace efficiencies. That said, there is increasing importance placed on location selection for attracting and retaining staff and with a focus on staff health and employee wellbeing.

As a consequence, the provision of significant informal, social and communal space within workplaces has increased.

The next section examines the role and influence of employee wellbeing in site and building selection.

Employee Wellbeing

Corporations are increasingly placing more importance on employee wellbeing. Employee satisfaction and wellbeing are seen as key factors in workplace productivity and retention of staff. This in turn has shaped how businesses select locations and configure their work space (Colliers International, 2012).

In Macquarie Business Park major occupiers like AstraZeneca, a British-Swedish multinational pharmaceutical and biologics company which is one of Australia's largest private sector investors in medical research and development (R&D) places a strong emphasis on the health and wellbeing of its employees. The company has a Health and Wellbeing Strategy, which provides a framework for promoting health and wellbeing and managing and measuring related activities consistently across the company (AstraZeneca, 2015). Broadly the health and wellbeing initiatives aligned with Strategy include:

- Health promotion activities.
- Home-work balance initiatives.
- Ergonomically-designed working environments.
- Fitness opportunities.
- Healthy eating options in restaurants.

Another major occupier in Macquarie Business Park is Optus, and like AstraZeneca, Optus have a clear focus on employee health and wellbeing. In 2012 Optus recruited a Health and Wellbeing Manager and launched a new 'My Wellbeing' program which includes a personalised online health risk assessment, flu vaccinations, mobile dental service and Employee Assistance Program for employees. Furthermore, at the Macquarie Park facility, Optus provides an onsite childcare facility.

Proximity of Housing

A number of key factors influence residential location choice, one of these is proximity to work. Results from a survey undertaken in Canada suggests that the time it takes to get to work is just as important as the job itself. A survey by Oxford Properties and Environics Research Group (Oxford Properties and Environics Research Group, 2013) found:

- 76% of respondents wanted a reasonable commute to the office. The majority of those surveyed said a commute time of less than 30 minutes was the appropriate travel time.

- 50% of respondents considered commute time to be the No. 1 factor in choosing one employer over another.
- The survey also found that once at the office, workers sought space that allowed them to work collaboratively with other employees, is close to shops and other amenities and is energy-efficient.

Whilst proximity to work may be one selection factor in residential location choice, it is important to acknowledge that generally, house price gradient will be negatively related to distance from an employment node (Osland et al, 2011). As such, price of housing is also a factor when workers consider their residential location.

Traditionally houses prices declined with distance from the central business district. However, where there are multiple employment nodes (i.e. Macquarie Business Park) the complexity level of the issue is raised. The median price of houses in proximity to Macquarie Park[1] is currently at $1.275m in the 12 months to December 2014 (Department of Family and Community Services, 2014), comparable to the Ryde LGA median house price of $1.3m. In contrast the median unit price in Macquarie Park[2] is at $613,000, marginally lower than the Ryde LGA median unit price of $623,000.

3.5 Case Study Analysis

In order to understand the key characteristics and environment required for successful business parks a series of case studies (national and international) was examined.

The review identified several core themes which have contributed to the success of each business park.

- Centrally located with good transport infrastructure (road and rail).
- Accessibility to highly skilled knowledge workforce.
- Good communications and ICT infrastructure.
- High quality, modern and flexible building and business park design.
- Good business and personal amenity.

The business parks analysed offer varying degrees of facilities and items of social infrastructure that contribute to worker amenity. Depending on their origins of development, some business parks have transitioned to include these facilities over time while some business parks have been developed with these facilities from the outset.

[1] Postcode 2113 which includes suburbs of Macquarie Park, North Ryde and East Ryde

[2] Ibid

Table 3.3: Multi-use Facilities in Business Parks

Business Park	Description and Occupiers	Social Facilities and Worker Amenity
Norwest (NSW)	Now accommodating more than 400 companies including IBM, Schneider, Woolworths, B Braun, Capital Finance, Optus data centre and more than 20,000 employees. Future expansion is expected to increase capacity to more than 35,000 employees.	The business park has grown to offer a full service and self-sufficient working environment that includes: • Post office, banks (business and retail). • Restaurants, bars and cafés. • Childcare centres. • Gyms, drycleaners, etc. • 2 shopping centres incorporating Woolworths and Coles supermarket. • Recreational lakes. • Walking and bicycle tracks.
Parkview Estate (VIC)	Situated 20km from Melbourne's CBD and provides space for corporate offices, office/ warehouses, bulky goods/trade sales. Tenants include Quest, Bolle, Westpac, AAMI.	Moorabbin Super Centre (located at the front of the estate) contains 30,000sqm of retail space incorporating Bunnings, Fantastic Furniture, Total Tools, Repco, etc. Other facilities include: • Restaurant, café, bar • Quest serviced apartments • Pelican childcare centre. • Star Fitness and Aqua Star swim school. • Crocs Indoor Kids Playcentre and café.
Intech Park (Indianapolis)	Established in 1999 and is Indiana's largest office development. Centrally located and in close proximity to some of the city's most affluent neighbourhoods. Prominent tenants include Eli Lilly, Digital Networks, Statewide Credit Association, US Customs.	Key focus on establishment of this business park was the provision of worker amenity. Key facilities include: • Shops • Basketball courts • Bank • Restaurants • Hotels • Day care facility • 2.5 miles of walking paths
Zuidas (Amsterdam)	A rapidly developing business district known as 'Financial Mile', transitioning over time. In the 1990's a masterplan was developed for Zuidas following the establishment of ABN AMRO's new headquarters. Over 700 companies are now established, including Google, AkzoNoble, Fonterra and Vimpelcom. Zuidas also incorporates a large residential component - with 8,000-9,000 homes by 2040, Zuidas is set to become Amsterdam's most prominent housing location.	The masterplan was developed based on a thorough analysis of lessons from other cities, aiming to achieve a healthy balance between living, working and amenity. With the arrival of more residents Zuidas has transformed into a well-rounded neightbourhood with schools, cafés and restaurants, sports centres and a growing number of retail outlets located therein. The district is the setting for the annual Zuidas Run and for classical music performances as part of Amsterdam's Grachtenfestival. It forms part of the ARTZUID open-air sculpture route and recently hosted the fascinating Body Worlds exhibition.

Source: AEC

Norwest Business Park (NSW) is an example of a business park in the early stages of transition to incorporating a mix of uses.

Intech Business Park (Indianapolis, US) is a business park which has been developed with social infrastructure facilities from the outset while Zuidas (Amterdam, The Netherlands) is a business park which has significantly transitioned over time to include residential uses in addition to social infrastructure facilities.

Even though these business parks are at different stages of development, they all provide insight into the importance of social infrastructure incorporated and co-located with commercial uses within business parks.

Figure 3.1: Intech Park Land Use Plan

Source: http://www.intechpark.com (2015)

Figure 3.2: Zuidas Aerial Image

Source: http://en.cie.nl/projects/54 (2015)

3.6 Implications for Macquarie Park

The configuration and composition of business parks is evolving. Macquarie Park is no exception. This change may be observed to occur on two fronts:

- **Inclusion of multi-use facilities**
  Business parks are evolving to comprise a full offer of services facilities, successful business parks are observed to accommodate a range of uses, including medical, support business services, retail, recreational, residential, leisure and hotel accommodation.
- **Greater tenant emphasis placed on worker amenity and employee wellbeing**
  Tenant requirements are evolving to place more importance on employee satisfaction and wellbeing, less on ESD and building sustainability. Access to gyms, swimming pools, green space, childcare facilities, affordable housing, etc. is becoming increasingly important. Tenant expectations are almost akin to replicating a CBD location.

Population and employment growth will increasingly put pressure on social infrastructure networks and provision, this is a given. The need for increased social infrastructure in Macquarie Park is driven on two fronts:

- New growth in Macquarie Park Corridor.
- Growing demand from occupiers in the business park to service workers and for employee satisfaction and wellbeing.

These two components of growth combined have significant and complex implications for Macquarie Park.

The relevance of the evolution of business parks and implications for Macquarie Park are investigated in Chapter 4.

4. Macquarie Business Park: Evolution and Growth

4.1 Employment and Business Profile

4.1.1 Macquarie Business Park

Macquarie Park is a business precinct located just 12km north-west of the CBD, and is Sydney's second largest commercial office precinct after the Sydney CBD. Some of the growing list of tenants include: Microsoft, Sony, Optus, Johnson & Johnson and Goodman-Fielder.

Macquarie Park is continually evolving, over the past 20 years with the rezoning of 200 hectares of industrial land to create a thriving business centre. Macquarie Park is on the Chatswood to Epping Rail Line and a major stop for bus services from key centres such as Parramatta, North Sydney and Castle Hill.

The proposed Sydney Metro train line will connect to the proposed extension of the North West Rail Link at Chatswood, run under the city and connect to the Bankstown line at Sydenham. It's the first step in introducing next generation rapid, fast-service metro trains to Sydney CBD.

The park is accessible by car via the M2, M4, M7 and Lane Cove Tunnel. The Macquarie Centre also operates the Biz Park shuttle, which offers free transit between the Centre and around the business park.

Macquarie Park contains the following facilities and social infrastructure items that contribute to worker amenity, these include:

- Restaurants and cafés, retail facilities, i.e. Macquarie Centre.
- Fitness centres.
- Childcare centres.
- Public open space, i.e. Christie Park, Fontenoy Park, Tuckwell Park and Wilga Reserve.

This will be discussed in further detail in section 4.3.

4.1.2 Employment Profile

This section summarises key socio economic characteristics of Macquarie Park, combining different data sets, across various levels of geographies as outlined below:

Table 4.1: Data Sources

Data	Geography	Source
Employment by Industry	Macquarie Park Precinct/Ryde LGA	Bureau of Transport Statistics
Employment by Occupation	Macquarie Park Precinct/Ryde LGA	Bureau of Transport Statistics
Method of Transport to Work	Macquarie Park Precinct	Bureau of Transport Statistics
Employment by Income	Macquarie Park- Marsfield SA2/Ryde LGA	Bureau of Transport Statistics
Journey to Work (simple)	Macquarie Park Precinct	Bureau of Transport Statistics
Journey to Work (cross tabulated i.e. by origin by income, by origin by industry)	Ryde LGA	ABS

Source: AEC

Given that various databases have been utilised, totals from different datasets (i.e. employment by occupation, employment by industry) may not add up due to different rounding, statistical analysis and reporting techniques.

Employment Profile

Key employment data for Macquarie Park highlights that:

- Estimated employment of approximately 40,450 people in 2011.

- Wholesale trade (22.0%), information, media telecommunications (19.4%) and professional scientific and technical services (18.8%) are the largest employers.
- Key occupations include professionals (38.2%), managers (21.7%) and clerical and administrative workers (17.3%) reflective of its industry profile.

Table 4.2: Employment Profile Overview, Macquarie Park Precinct

Indicator	Macquarie Park
Total Employment (Number)	
2011	40,475
Key Industries (2011, % of Total Employment)	
Wholesale Trade	22.0%
Information, Media Telecommunications	19.4%
Professional, Scientific and Technical Services	18.8%
Key Occupations (2011, % of total)	
Professionals	38.2%
Managers	21.7%
Clerical and Administrative Workers	17.3%
Average Income* (2011, dollars)	$70,409

*Macquarie Park-Marsfield SA2
Source: BTS (2014)

The following sections investigate at a finer grain the composition of employment.

Employment by Industry

In 2011, Macquarie Park employed 40,475 workers, representing approximately 54% of those employed (74,500) across the Ryde LGA, demonstrating Macquarie Park's significance to the Ryde local economy.

Wholesale trade (22.0%), information, media telecommunications (19.4%) and professional scientific and technical services (18.8%) are the largest employers. Other sectors represented in Macquarie Park include manufacturing (12.0%), retail trade (6.3%) and health care and social assistance (6.0%). This highlights a broad industry mix, comprising white collar, blue collar and service based industries, though with a larger concentration of white collar dominated industries.

The Ryde LGA comprises an even broader industry mix, and in particular a larger proportion of workers in education and training and health care and social assistance.

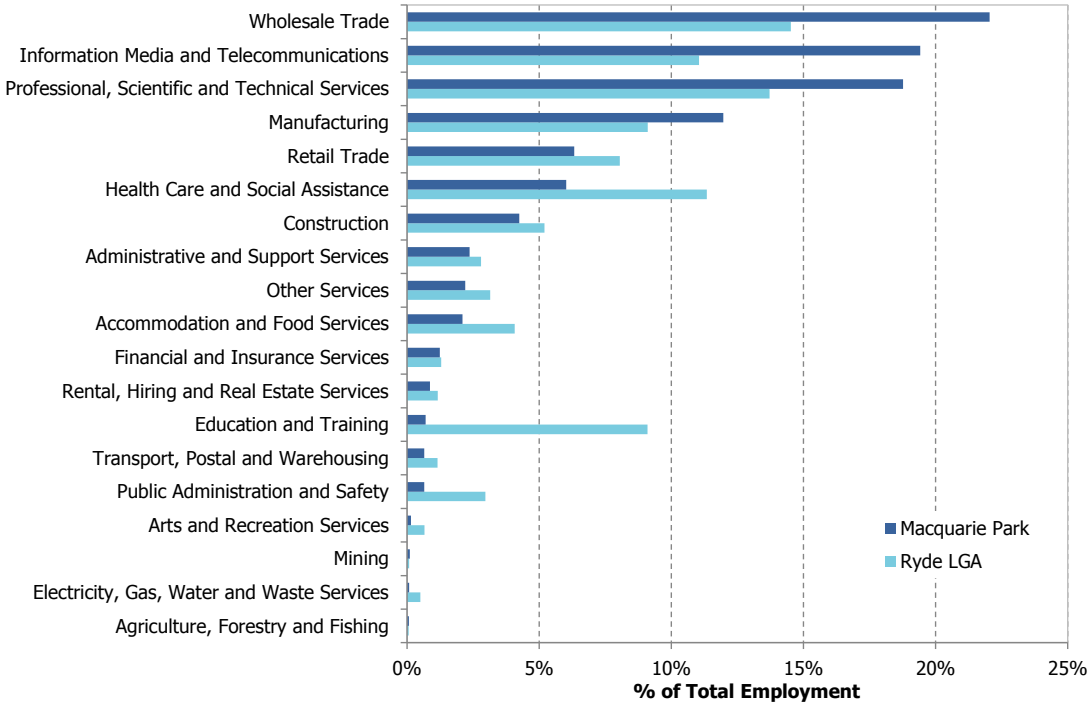
Table 4.3: Employment by Industry, 2011 (19 Sector – 1-Digit ANZSIC)

Industry	Macquarie Park		Ryde LGA	
	Employment	% of Total	Employment	% of Total
Agriculture, Forestry and Fishing	29	0.1%	48	0.1%
Mining	44	0.1%	60	0.1%
Manufacturing	4,844	12.0%	6,787	9.1%
Electricity, Gas, Water and Waste Services	34	0.1%	378	0.5%
Construction	1,720	4.2%	3,879	5.2%
Wholesale Trade	8,923	22.0%	10,825	14.5%
Retail Trade	2,561	6.3%	5,999	8.0%
Accommodation and Food Services	848	2.1%	3,035	4.1%
Transport, Postal and Warehousing	265	0.7%	864	1.2%
Information Media and Telecommunications	7,860	19.4%	8,234	11.0%
Financial and Insurance Services	502	1.2%	964	1.3%
Rental, Hiring and Real Estate Services	352	0.9%	867	1.2%
Professional, Scientific and Technical Services	7,596	18.8%	10,221	13.7%
Administrative and Support Services	959	2.4%	2,087	2.8%
Public Administration and Safety	265	0.7%	2,210	3.0%
Education and Training	283	0.7%	6,782	9.1%
Health Care and Social Assistance	2,438	6.0%	8,453	11.3%

Industry	Macquarie Park		Ryde LGA	
	Employment	% of Total	Employment	% of Total
Arts and Recreation Services	61	0.2%	492	0.7%
Other Services	890	2.2%	2,344	3.1%
Total	**40,475**	**100.0%**	**74,527**	**100.0%**

Note: Totals may not add up to other BTS tables due to different databases utilised and rounding.
Source: BTS (2014)

Figure 4.1: Employment by Industry, Macquarie Park and Ryde LGA, 2011



Note: Place of Work Data.
Source: BTS (2014)

Employment by Occupation

The employment profile of Macquarie Park primarily comprises professionals (38.2%), managers (21.7%) and clerical and administrative workers (17.3%), reflecting a large representation of jobs across white collar dominated industries such a professionals, scientific and technical services. With a broader industry mix the larger Ryde LGA is also represented by a more balanced employment by occupation mix.

Table 4.4: Employment by Occupation, 2011 (1-digit ANZSIC)

Occupation	Macquarie Park		Ryde LGA	
	No.	%	No.	%
Managers	8,776	21.7%	13,101	17.6%
Professionals	15,455	38.2%	25,993	34.9%
Technicians and Trades Workers	4,001	9.9%	7,836	10.5%
Community and Personal Service Workers	759	1.9%	4,773	6.4%
Clerical and Administrative Workers	7,001	17.3%	11,901	16.0%
Sales Workers	2,943	7.3%	5,785	7.8%
Machinery Operators and Drivers	606	1.5%	1,883	2.5%
Labourers	939	2.3%	3,258	4.4%
Total	**40,479**	**100.0%**	**74,530**	**100.0%**

Note: Totals may not add up to other BTS tables due to different databases utilised and rounding.
Source: BTS (2014)

Average Income

The average yearly income in the Macquarie Park-Marsfield SA2 ($70,409) is higher than that across Ryde LGA ($64,445) in 2011, given larger proportion of workers with a yearly income of $104,000+ (highest income range bracket), respectively 27.3% in the former and 22.4% in the latter. This is primarily expected to be influenced by a larger presence of white collar industries across Macquarie Park-Marsfield SA2, such as across professional, scientific and technical services, which often are associated with higher incomes.

Table 4.5: Income, Place of Work, 2011

Income	Macquarie Park - Marsfield SA2	Ryde LGA
	Percentage (%)	Percentage (%)
$0-$7,799	3.2%	4.4%
$7,800-$12,999	2.1%	3.0%
$13,000-$20,799	2.5%	3.5%
$20,800-$31,199	5.7%	8.0%
$31,200-$41,599	8.5%	10.4%
$41,600-$51,999	9.9%	10.7%
$52,000-$67,599	12.1%	12.1%
$67,600-$83,199	11.4%	10.4%
$83,200-$103,999	17.3%	15.1%
$104,000 or more	27.3%	22.4%
Total (%)	**100.0%**	**100.0%**
Average Income	**$70,409**	**$64,445**

Note: average income differs to that identified in 'Journey to Work' given the different level of geographies (Macquarie Park-Marsfield SA2/Ryde LGA) and sources (BTS/ABS respectively) used
Source: BTS (2014)

Macquarie Park comprises a broad industry mix, however with a relatively high concentration of white collar dominated industries, such as professional, scientific and technical services and information, media and telecommunications. Therefore, this leads to a higher proportion of white collar occupations, such as professionals and managers, as well as considerably high incomes.

The industry mix provides good growth prospects for employment, with many white collar sectors forecast to grow significantly in Australia over the medium to long term.

Significantly, the ability to attract and retain a skilled local labour force is crucial in promoting investment and attracting additional such businesses to Macquarie Park.

4.1.3 Where Workers Live

Journey to work analysis answers key questions about commuting workers, such as: how many workers commute to a particular area, where they live, what industries they work in. Such analysis is useful, having significant implications for town planning, dwelling requirements, infrastructure demand, demand for retail and office space, employment land uses and many other aspects of a local/regional economy.

Journey to work data has been applied to Macquarie Park precinct to understand the flow of workers to the precinct and method of transport utilised.

- Macquarie Park comprises a low proportion of workers who live in the catchment LGA (Ryde LGA), with only 10.7% of employees working in the precinct *also* living in Ryde LGA.
- As such, nearly 90 out of every 100 workers employed in Macquarie Park are commuting to work from outside the Ryde LGA. Therefore, the LGA has potential to improve its containment rate and employ a larger proportion of residents living in the local area, to reduce commuting times and pressure on the road system.
- Approximately an additional 35% of workers in Macquarie Park commute from surrounding LGAs, implying relatively short commuting patterns for these workers. However, 55% of workers commute from LGAs further afield implying longer commutes.

- The majority of workers rely on private vehicle transport to get to work, with approximately two thirds of workers travelling by car. Approximately 20% of workers take public transport to work, with opportunities to increase public transportation accessibility for workers travelling to Macquarie Park.

Table 4.6 outlines the origin of Macquarie Park workers, categorising them by the top 10 local government areas and indicating that only 10% of Macquarie Park workers live in the Ryde LGA.

Table 4.6: Movement to Macquarie Park, 2011

Origin LGA	No.	% of Total
Ryde	4,330	10.7%
Hornsby	3,800	9.4%
The Hills Shire	2,998	7.4%
Blacktown	2,686	6.6%
Parramatta	2,441	6.0%
Ku-ring-gai	2,128	5.3%
Warringah	1,514	3.7%
Sydney	1,470	3.6%
Willoughby	1,234	3.0%
North Sydney	1,206	3.0%
Other LGAs	16,679	41.2%
Total	**40,487**	**100.0%**

Note: Totals may not add up to other BTS tables due to different databases utilised and rounding.
Source: BTS (2014)

Table 4.7: Method of Transport to Work, Macquarie Park 2011

Method of Travel	No.	% of Total
Car as driver	26,528	65.5%
Train	5,372	13.3%
Did not go to work	2,412	6.0%
Bus	2,208	5.5%
Car as passenger	1,612	4.0%
Other	2,343	5.8%
Total	**40,475**	**100.0%**

Note: Totals may not add up to other BTS tables due to different databases utilised and rounding.
Source: BTS (2014)

A large proportion of commuters to Ryde LGA are employed in white collar dominated industries such as professional, scientific and technical services and are employed as professionals and managers. The majority of commuters have also high incomes and are well educated.

In particular, journey to work analysis highlights that a higher proportion of those commuting to Ryde LGA are employed as professionals and managers, have higher incomes and are more educated than workers residing in Ryde LGA. Accordingly, even though there is a large proportion of highly paid jobs and a large proportion of white collar positions in Ryde LGA (and Macquarie Park), most of these appear to be better 'suited' to the socio-economic profile of commuters than residents itself.

This is further emphasised by relatively low containment rates, with most LGA residents commuting to work outside. This suggests potential implications for housing affordability for local workers.

4.2 Future Employment and Residential Growth

The completion of the Epping to Chatswood Rail Link in 2009 resulted in the opening of three new stations, i.e. North Ryde, Macquarie Park and Macquarie University. Delivery of the 13km underground line also included a rebuild of the Chatswood interchange, a major upgrade of Epping station, upgrade of the North Sydney station and new substations at Waverton and Beecroft.

Since that time, Macquarie Park and its surrounds have been on a new growth trajectory. Some 215,000sqm of new office space has been completed since January 2009, adding to a total of 866,480sqm of total office space (PCA, 2015). Residential dwelling growth has also been strong, driven by the increased appeal of the area (and the desire for workers to live close to their place of employment) as well as Macquarie University's enrolment activity.

Future employment and residential growth expectations are equally strong with coordinated planning by state and local governments, leading to significant projects in the pipeline.

Growth Projections

The NSW Bureau of Transport Statistics (BTS) provides population and employment projections for both small area geographies and large geographies i.e. an LGA. Table 4.8 identifies population and employment projections for the Macquarie Park Business Park benchmarked against the Ryde LGA. Both the resident population and number of employees are expected to grow significantly toward 2031.

Table 4.8: Growth Projections, Macquarie Park, 2011-2031

	2011	2016	2021	2026	2031	Change, 2011-2031	
						No.	%
Residential Projections*							
Macquarie Park	1,997	2,523	5,373	11,987	17,355	15,358	769.10%
Ryde LGA	108,712	117,392	128,638	140,570	153,018	44,306	40.80%
Employment Projections**							
Macquarie Park	45,837	49,132	51,925	55,218	58,709	12,872	28.10%
Ryde LGA	84,378	90,938	96,801	103,261	109,973	25,595	30.30%

Source: BTS, 2014
* BTS has included North Ryde PP (The PP should provide around 3,000 homes (or approximately 8,000 persons) and Herring Road PP (strong residential development post 2021 is assumed in these three Herring Road travel zones).
**The BTS has factored an additional 500 jobs every 5 years to reflect the expansion of the Macquarie Park Shopping Centre (additional 16,000sqm of floorspace). The Herring Road Priority Precinct has also been factored in and includes an adjustment of 500 additional jobs every year to reflect the growth anticipated for the precinct.

Broadly, Macquarie Park's continued growth will be driven on three key fronts:

- Commercial development and growth in the business park and commercial core.
- Residential development in the priority precincts.
- Macquarie University's expansion plans.

Each of these components of growth are discussed in the following sections.

4.2.1 Macquarie Business Park

There are a range of commercial developments in the pipeline which are at various stages in the approval process.

There is approximately 455,286sqm of commercial/retail floorspace in the pipeline, these proposals range from commercial buildings, mixed use buildings to hotels. Key developments include:

- Macquarie Park Commerce Centre at 396 Land Cove Road
  Proposal for 17 storey retail/commercial building containing 83,368sqm of floorspace.
- 120-128 Herring Road
  Proposal for 45,718sqm of retail/commercial floorspace.
- 110-114 Herring Road
  Stamford Hotel has submitted a Concept Plan Approval for redevelopment into a hotel containing 51,139sqm of floorspace.

A list of the developments in the pipeline is contained in Appendix B.

4.2.2 Herring Road Priority Precinct

The Herring Road Urban Activation Precinct (now termed Priority Precinct) was announced by DPE in January 2013 with significant investigations since then into its potential to increase local housing supply and deliver up to 2,400 new homes by 2021 and up to 5,400 by 2031.

The area of the priority precinct includes the Macquarie Shopping Centre, Macquarie University and Ivanhoe Estate, located to the northwest of the Macquarie Business Park.

Figure 4.2: Herring Road Priority Precinct

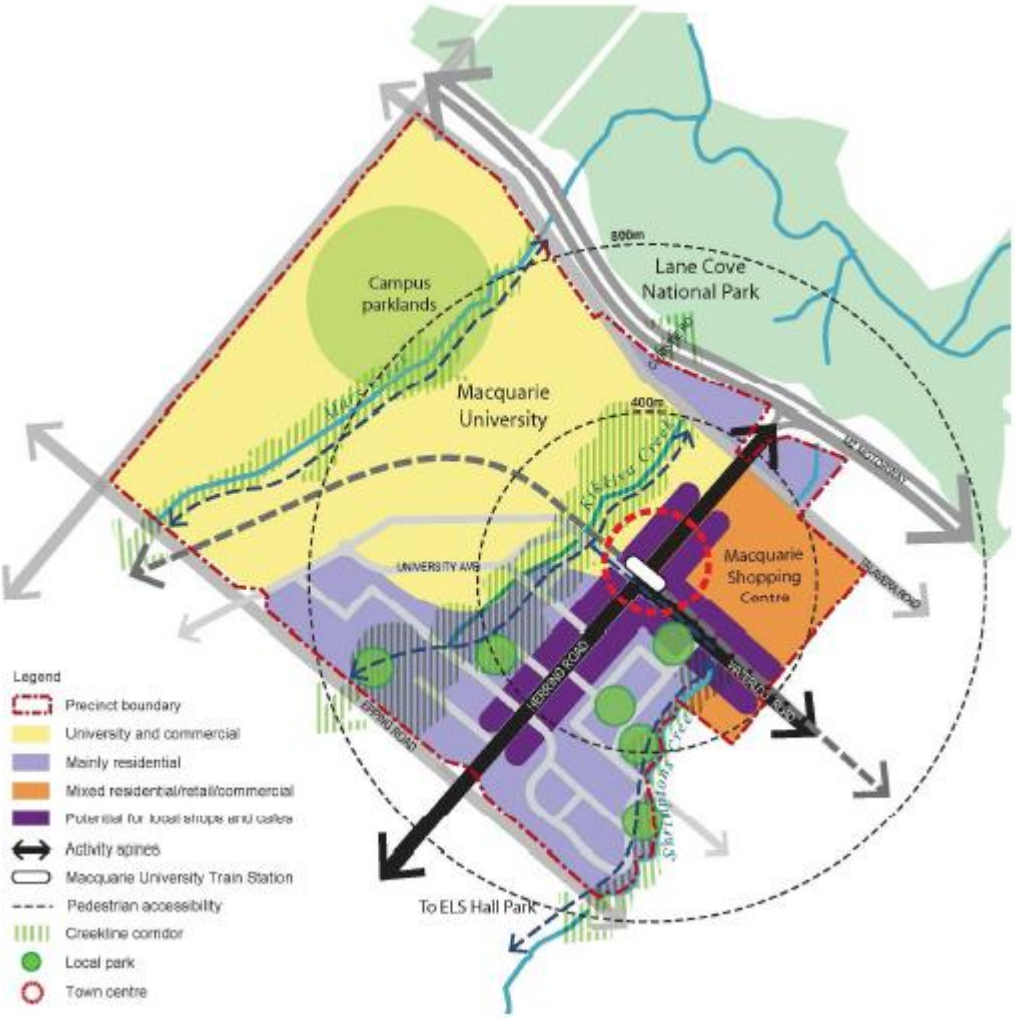
Source: DPE (2014b)

A suite of planning reports was publicly exhibited in June 2014 outlining the proposal for revitalisation. The indicative structure plan illustrates a mix of land uses and activities possible for the Herring Road precinct, which are proposed to be delivered using the 'B4 Mixed Use' zone and floorspace ratios ranging from FSR 2.5:1 to FSR 4.5:1 and with building heights up to 120m.

The proposal envisages redevelopment for medium to high density housing that could achieve up to 5,400 new dwellings by 2031.

Figure 4.3 depicts the future land uses envisaged for the Herring Road Priority Precinct.

Figure 4.3: Herring Road Priority Precinct Future Land Uses



Source: DPE (2014b)

The Herring Road UAP proposal (DPE, 2014b) envisages key opportunities to improve both access to and quality of open space in the Herring Road precinct to include:

- Remove barriers and create connections to ensure existing open space areas are more accessible.
- Enhance the open space and environmental qualities of existing creek corridors.
- Enhance and embellish existing local open spaces with new facilities, such as Wilga Park and Elouera Reserve.
- As precinct redevelopment occurs, provide new public open spaces where gaps in provision exist.

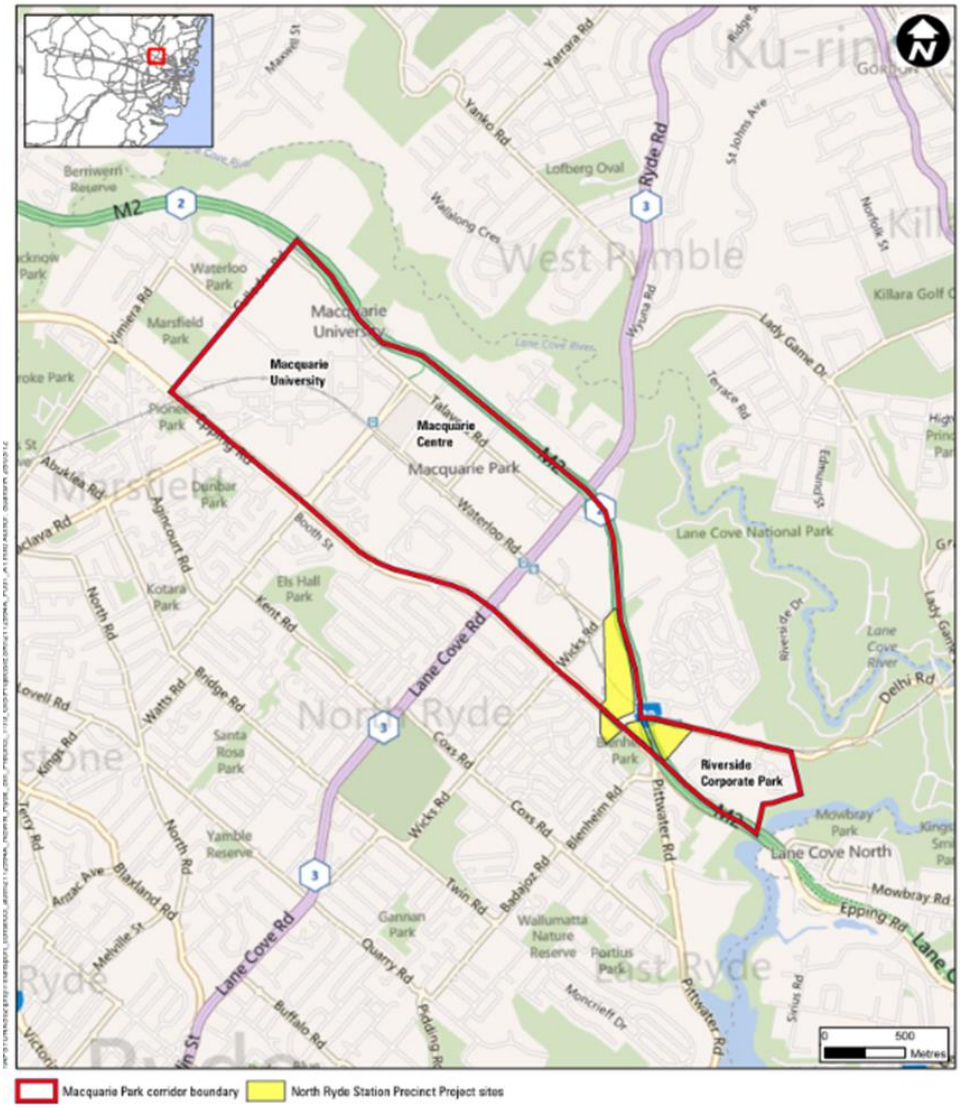
Submissions have closed and DPE is undertaking work to address and respond to submissions received.

4.2.3 North Ryde Station Priority Precinct

The North Ryde Station Urban Activation Precinct (now termed Priority Precinct) was announced in the 2012-13 NSW Budget and is currently advanced in its planning. A finalisation report has been produced by DPE and the Minister for Planning and Infrastructure has endorsed the rezoning and planning controls for the precinct.

The rezoning of 12.5ha of land around North Ryde Station will enable up to 3,000 new homes and 1,500 new jobs to be created within a 10 minute walk of North Ryde station.

Figure 4.4: North Ryde Priority Precinct



Source: DPE (2013)

The following is envisaged for the precinct:

- More than 2.4ha of parks and open space, i.e. 20% of the precinct.
- More than $17million in transport upgrades
- Precinct Support Scheme funding towards public domain and community infrastructure works.
- Public plazas and a multi-purpose community facility.

As part of the investigations into the precinct's potential for revitalisation, a social infrastructure assessment (DPI, 2013) investigated demand for community infrastructure as a result of anticipated population growth. The following were identified as required:

- New school - the isolated nature of the precinct was recognised as unsuitable for a new school location (as agreed with the Department of Communities). Rather, the additional demand for school places should be addressed through the upgrade of existing schools in the area which have the capacity for additional enrolments.
- The implementation of proposed pedestrian and cycle ways within the precinct is critical to achieve the full connectivity benefits as envisaged.
- Childcare services within the Ryde LGA generally.

4.2.4 Macquarie University

Since its founding in 1964, Macquarie University has grown to accommodate nearly 40,000 students. Its connection with Macquarie Park is still strong as it formed the initial catalyst for development of the business park (refer to section 2.3.1).

The university occupies a 126ha campus and is renowned for accommodating the most high-tech university library in Australia.

Macquarie University's growth over the last decade has been strong, with growth in the 2003-2010 period among the highest of Australian universities (refer to Table 4.9).

Table 4.9: Australian University Growth, 2003-2010 (EFTSL)

University	2003	2004	2005	2006	2007	2008	2009	2010	Growth
RMIT University	27,381	28,061	28,128	30,323	32,001	34,588	36,087	38,624	41.1%
University of Wollongong	15,000	15,290	16,291	15,859	16,351	17,408	19,171	20,737	38.2%
Griffith University	23,364	23,789	24,992	25,729	26,693	27,743	30,006	31,902	36.5%
University of Newcastle	17,401	17,255	17,605	17,804	18,779	20,058	21,930	23,417	34.6%
University of NSW	29,341	27,907	27,051	27,289	30,404	32,329	33,845	36,665	25.0%
Monash University	38,833	40,552	40,429	40,576	41,665	42,826	46,195	48,518	24.9%
La Trobe University	20,664	20,781	20,293	21,439	21,953	22,386	23,548	25,102	21.5%
University of Queensland	29,391	29,329	28,955	29,066	29,339	29,803	32,047	34,932	18.9%
University of Technology Sydney	21,076	21,694	21,997	23,090	22,800	22,887	23,960	24,511	16.3%
Queensland University of Technology	28,187	28,314	27,632	27,546	28,551	28,896	30,144	31,144	10.5%
University of Melbourne	32,869	33,612	33,713	33,949	34,696	35,488	35,887	36,566	11.2%
University of Sydney	36,640	36,589	36,024	35,582	36,132	37,165	38,743	39,711	8.4%
Macquarie University	**18,988**	**19,677**	**19,891**	**20,788**	**21,408**	**22,480**	**24,882**	**26,661**	**40.4%**

Note: Equivalent Full Time Student Load.
Source: MQU (2014)

Macquarie University has significant future expansion plans. A concept plan was approved for 400,000sqm of additional commercial gross floor area outside of the Academic Core. In addition it allows for the provision of an additional 61,200sqm of academic gross floor area within the Academic Core and an additional 3,450 beds within the University Housing Precinct for University purposes.

Following the approval of the concept plan in 2009, a Masterplan is in place to guide future development and expansion of the University campus.

Continued growth of Macquarie University has significant economic benefits for Macquarie Park and the City of Ryde. New enrolments, and increased teaching and research activities will create employment opportunities and contribute to the local economy. Equally important will be the 'lifting' of Macquarie Park's profile.

4.3 Provision of and Planning for Social Infrastructure

It is well accepted that population growth drives the need for social infrastructure provision. As the resident population grows so too does demand for social infrastructure. Industry benchmarks based on residential population thresholds are often used for estimating the need for open space and community facilities.

In addition to residential-driven demand, increasingly, employment hubs such as business parks are responding to demand from employers and employees for amenities such as recreational and childcare facilities.

Whilst there is an abundance of literature on the relationship between residents and social infrastructure need, there appears to be a gap with regard to worker and social infrastructure need.

Planning Benchmarks

A common way of ascertaining social infrastructure requirements is by using planning benchmarks. There are some broadly accepted standards with regard to open space and social infrastructure which are widely used. However, there are two main challenges with using these standards.

- They have been developed to identify demand generated by residents, rather than employees.
- They are generic in nature and accordingly there are limitations with the standards themselves and how they have been derived.

In NSW the 'fixed' standard of 2.83ha of open space per 1,000 people is often applied. However, it should be noted that this standard is derived from the British seven acres per 1,000 residents standard from the early 1900's, which is considered to be outdated for contemporary planning, as it largely ignores that different types of open space is required to accommodate different needs.

The NSW Department of Planning conducted a study which found that the simple fixed, quantitative standard should be treated with caution given observed rates of provision in the different parts of metropolitan Sydney (see Table 4.10).

The table shows that about 5% of inner urban Sydney is classified as open space. If the 2.83 ha per 1,000 people standard was applied about 16% of inner urban Sydney would be devoted to open space. The reality is that the residents of inner urban Sydney have access to a range of recreational and leisure opportunities that the existing open space assets (including high quality urban public spaces and harbour and beach foreshores) manage to deliver (though there may be some pressure on outdoor sports areas).

In contrast, in suburban inner areas average actual provision is equivalent to the standard-derived provision while suburban outer areas demonstrate a reverse situation. Macquarie Park is considered a 'middle ring suburb' and hence a cross between the quoted "suburban inner" and "suburban outer" as depicted below.

Table 4.10: Comparison of Actual Provision v Standard-derived Provision

Geographical Context	Percentage of Urban Residential Areas	
	Average Actual Provision	Provision based on 2.83ha/1,000 persons
Inner urban	5%	16%
Suburban inner	10%	10%
Suburban outer	26%	8%

Source: DoP, 2010

With regard to social infrastructure the NSW Department of Planning & Environment has two sets of standards to estimate demand for social infrastructure. These include:

- Growth Centres Commission Development Code (2006).
- NSW Department of Planning and Infrastructure - Draft Development Contributions Guidelines (2009).

Like the open space standards described above, these standards have been developed to estimate demand for social infrastructure generated by the resident rather than worker population. The social infrastructure standards are outlined in Appendix C.

Chapter 3 outlined the evolution of business parks to incorporate a varied and mix of uses as the proportion of office space in business parks increases and occupier/tenant requirements evolve to demand more worker amenity and access to social infrastructure. Flexible and inviting workplaces that are not only engaging within but engaging with the surrounding public domain are highly valued by businesses and occupiers.

It would appear that open space and social infrastructure standards have failed to keep pace with the evolution of business parks and the increase in amenity and social infrastructure requirements of businesses/employees.

4.3.1 Current Provision

At present, Macquarie Park is provided with a range of social infrastructure items, this includes:

- Public open space:
  - **Christie Park**
    Christie Park features floodlit soccer fields with a grandstand, BBQ areas and canteen.
  - **Fontenoy Park**
    A large soccer field popular for corporate sports events as well as a playground.
  - **Tuckwell Park**
    Used for corporate sport events and features a large soccer field, half a basketball court and a playground for children.
  - **Wilga Reserve**
    Large grassed area surrounded by bushland and located along picturesque Shrimpton's Creek. It offers a picnic shelter, cycle path and walking track.
- Other social infrastructure items:
  - **Childcare facilities**
    There are approximately 10 childcare centres in the business park.
  - **Gyms and Fitness Centres**
    These include the Macquarie University Sports and Aquatic Centre, Upper Limits Health and Fitness, Fitness First and Good Vibes Gym.

Discussions with leasing agents active in Macquarie Park affirm the findings of section 3.4), suggesting that over the last 4-5 years a distinct transition is observed in tenant requirements for worker amenity.

- Businesses seek out the following facilities as part of their leasing requirements, including: showers, bike racks, gym, cafes, etc. Some occupiers such as Goodman have an employee-only gym located within their building.
- Occupiers are increasingly seeking end of trip services, i.e. showers and bike racks.
- Larger occupiers have specific requirements for worker amenity and employee wellbeing (as outlined in section 3.4), e.g. access to green space, childcare facilities, gyms.

Anecdotal feedback suggests that broadly speaking, businesses are presently able to have their worker amenity requirements met in Macquarie Park, however, this need will undoubtedly increase commensurate with employment and population growth.

4.3.2 Planning for the Future

Ryde Council has undertaken analysis of current open space and childcare provision in the LGA. The findings of this research are outlined below.

Public Open Space

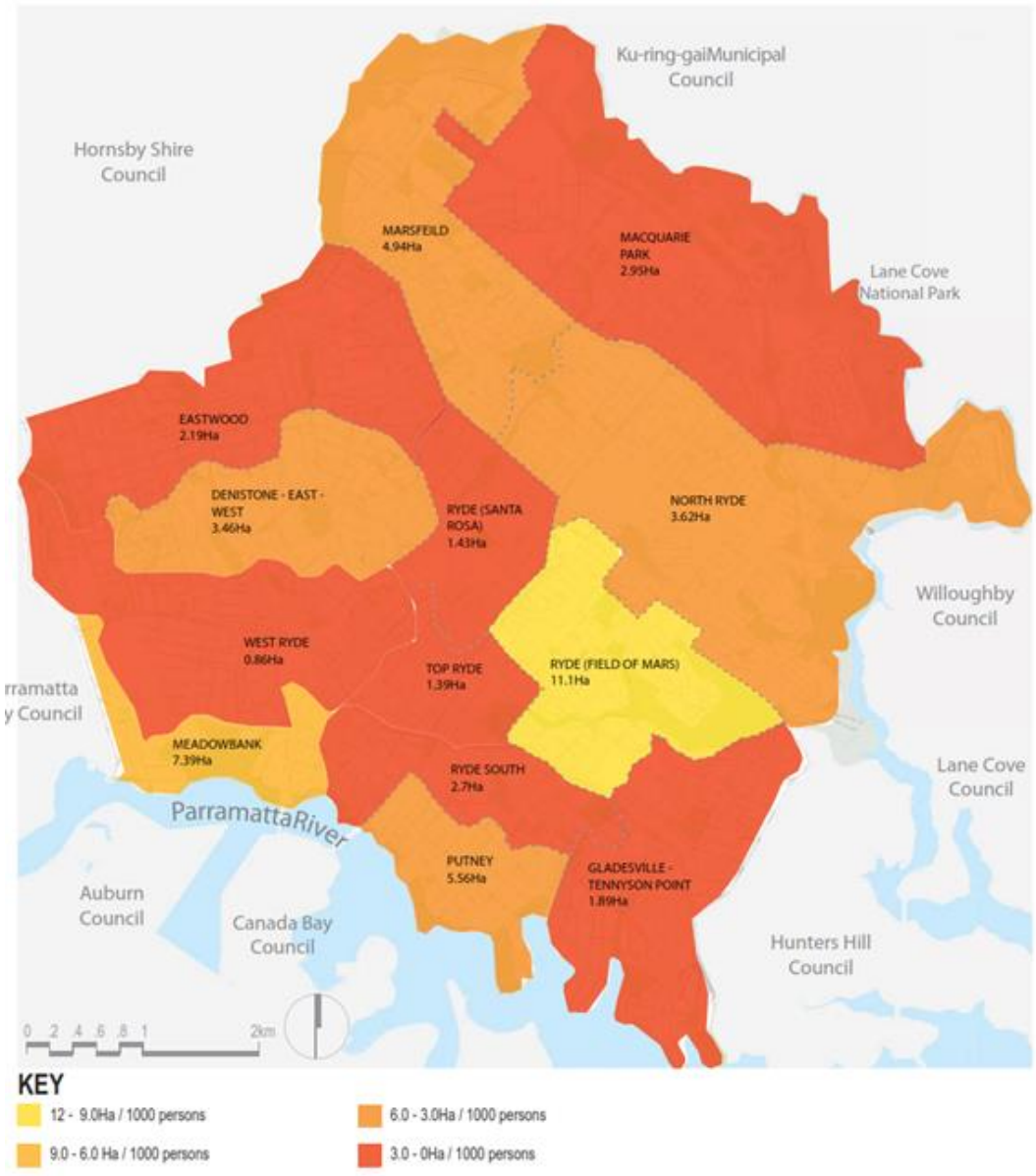
According to the Ryde Integrated Open Space Plan (Ryde Council, 2012), the Ryde LGA contains 355ha of open space while the suburb of Macquarie Park (which very closely aligns with the Macquarie Park Business Park) contains 17.6ha of open space. Figure 4.5 visually shows the quantum of open space in each suburb within the Ryde LGA.

Based on the standard of 2.83 ha per 1,000 people, the amount of open space currently required in the LGA is around **307.67ha** of open space. The LGA currently contains **355ha** of open space, so on the face of it would appear to be meeting resident population demand.

After considering the substantial population growth and employment growth expected to 2031 (additional 44,306 residents and 25,595 workers respectively), there is no doubt the Ryde LGA and indeed Macquarie Park will require more open space.

The Open Space Plan suggests there is presently an open space deficiency in the Macquarie Park Corridor that will be exacerbated by planned growth. The Plan further indicates that **two new major reserves** suitable for active and passive recreation and several smaller open space areas are needed to support planned growth in Macquarie Park.

Figure 4.5: Ryde LGA Open Space Provision



NB. these figures include Level 1 open space and should be considered in conjunction with distribution and access (Refer to Figure IP.01) to gain a full understanding of Level 4 open space sufficiency

Source: Ryde Council (2012)

Childcare Facilities

The City of Ryde is home to approximately 40 preschools (Ryde Council, 2015a) and long day care centres. The type of childcare provided varies and include: long day care centres, preschools, occasional care, playgroups and family day care.

There are currently 7,521 children aged 0-5 in the Ryde LGA. Based on the Draft DPI standards (2009) this means there is need for 23 long day care facilities and 18 pre-schools. The LGA currently contains 40 childcare centres including both long day care centres and pre-schools.

The limitation of this analysis is that it only considers resident need. Considering the high proportion of Macquarie Park workers (90% or circa 32,000 workers) who commute from outside the Ryde LGA, the requirement for childcare facilities within the Macquarie Park business park speaks for itself.

Macquarie Park's ability to provide for social infrastructure and future sustainability are investigated in Chapter 5.

5. The Future of Macquarie Business Park

5.1 Competitive Analysis

Macquarie Park is an important asset to the Ryde local economy, providing for and accommodating more than 50% of the LGA's total employment.

Macquarie Park's offer of large contiguous floorplates at competitive rents has attracted many blue chip tenants over the last decade, employment therein demonstrating high representation by the information, media & telecommunications and professional, scientific & technical services industries.

Key strengths of Macquarie Park include:

- Proximity to employees, suppliers, supplies and key markets.
- Location at the confluence of major roads including M2 Motorway, Epping Road and Lane Cove Road.
- Increasing profile and prestige with occupiers including major institutions, government agencies and corporations.
- Rail transport infrastructure with three train stations therein.

Macquarie Park has a higher employment reliance on a number of industries, including the information, media & telecommunications, wholesale trade and professional, scientific & technical services compared to the Ryde LGA and Australia.

Location Quotient Analysis

Location quotient analysis of employment by industry data for Macquarie Park confirms a high level of specialisation across a number of industries.

In order to demonstrate the specialisation of the economy, location quotients based on employment have been calculated. The location quotients (LQs) demonstrate the degree to which a local or regional economy is specialised by examining the proportion of employment (by industry sub-sector) compared to a large economy (Greater Sydney economy). Location quotients can be used to indicate strengths and weaknesses of a local or regional economy (i.e. its natural competitive advantage).

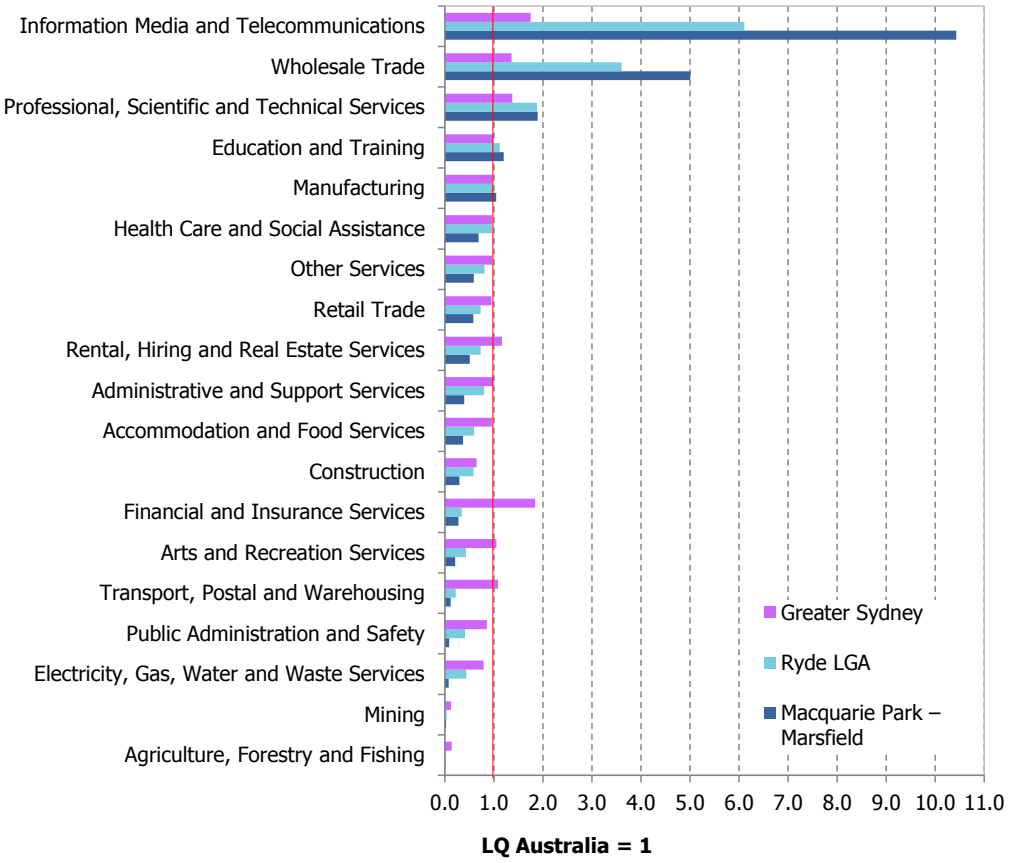
For this Study, the analysis has compared Macquarie Park-Marsfield Statistical Area 2 (SA2), Ryde LGA with the Greater Sydney Capital City economy.

A location quotient of "1" means that the economies being compared have an equal share of employment (compared to Greater Sydney) for a specific industry sector, thus no potential advantage or disadvantage. A location quotient above "1" indicates a specialisation of labour and therefore an area of potential competitive advantage. A location quotient below "1", indicates the area is under-represented compared to the national economic structure in this particular industry sector.

The LQs suggest a local industry concentration (in Macquarie Park) in the following sectors:

- Information, media and telecommunications.
- Wholesale trade.
- Professional, scientific and technical services.
- Education and training.

Figure 5.1: Location Quotient Analysis (PoW, 2011)



Source: ABS (2012)

Macquarie Park has a clear specialisation in a diverse range of information media & telecommunications and wholesale trade activities.

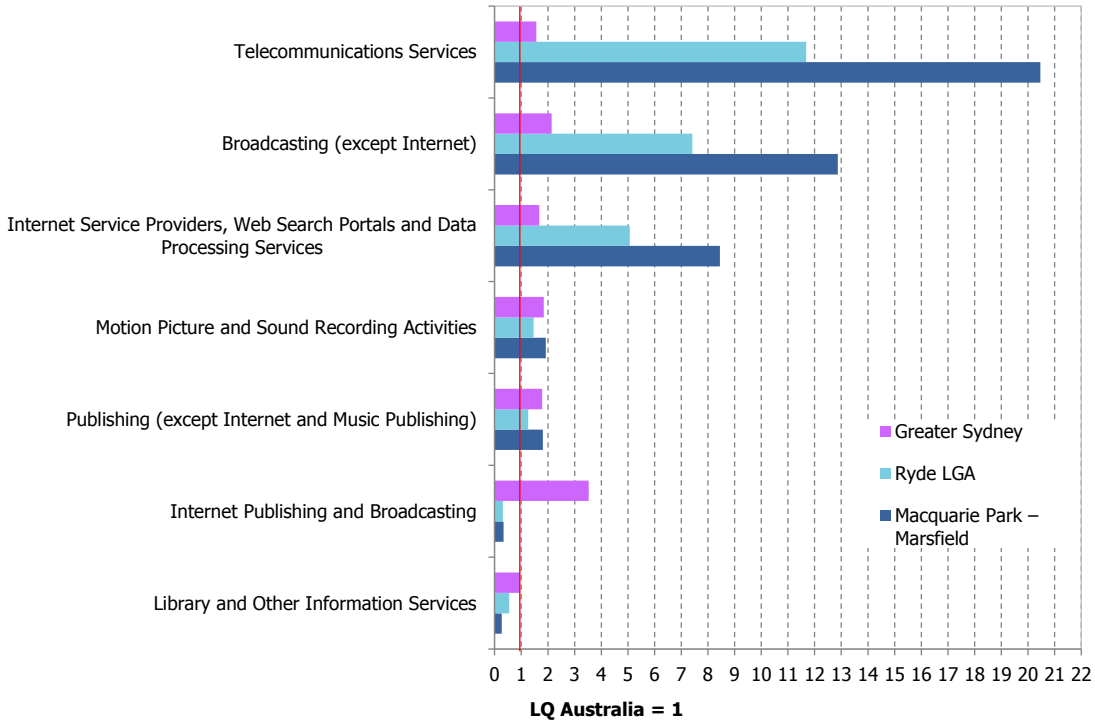
Further disaggregation of information media & telecommunications and wholesale trade depict in greater detail the industry sub-sectors represented in Macquarie Park (refer to Figure 5.2 and Figure 5.3 respectively).

Within the information media & telecommunications sector, significant local specialisation in Macquarie Park exists in:

- Telecommunications Services.
- Broadcasting (except internet).
- Internet Service Providers, Web Search Portals and Data Processing Services.
- Motion picture and sound recording activities.
- Publishing (except internet and music publishing).

Occupiers like Optus, Foxtel, TPG Internet are examples of industry businesses.

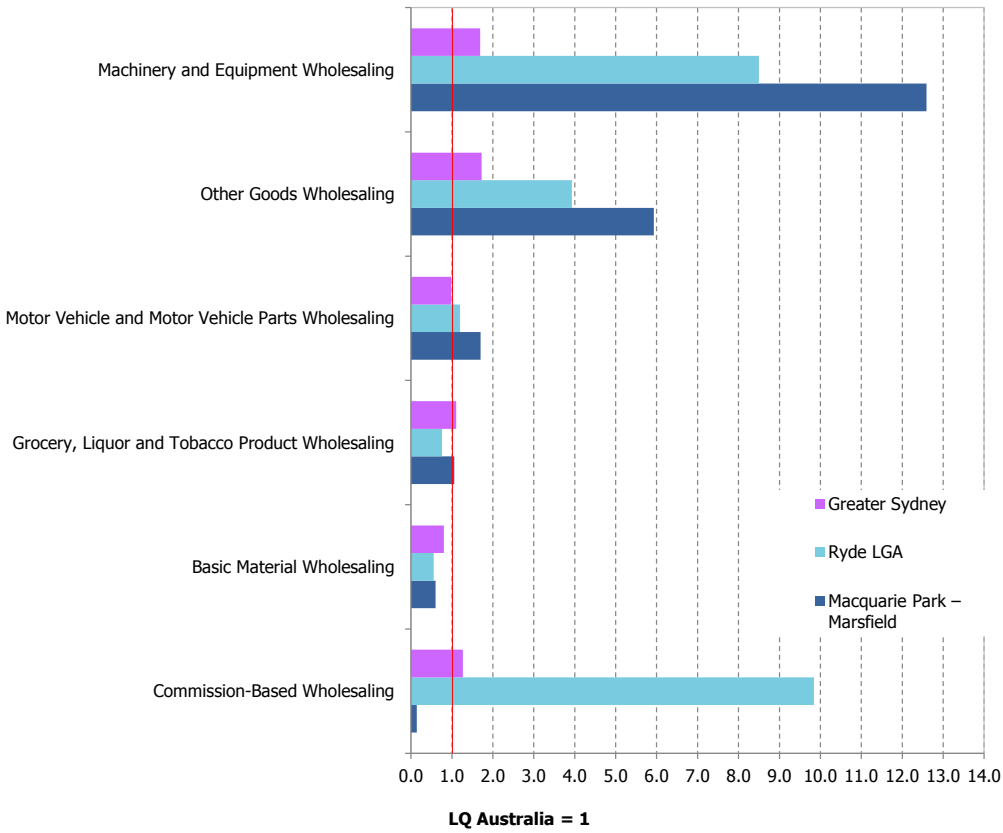
Figure 5.2: Location Quotient Analysis Information Media & Telecommunications (2 Digit PoW, 2011)



SOURCE: ABS (2012)

Figure 5.3 depicts the wholesale trade industry location quotients in major sub-sectors.

Figure 5.3: Location Quotient Analysis Wholesale Trade (2 Digit PoW, 2011)



SOURCE: ABS (2012)

Within the wholesale trade sector, significant local specialisation exists in:

- Machinery and equipment wholesaling.
- Other goods wholesaling.
- Motor vehicle and motor vehicle parts wholesaling.

The focus on wholesale trade recognises the broader trends across the industrial sector in Australia, with a focus moving from often pure production or manufacturing to a larger focus on warehousing and logistics.

Macquarie Park has an opportunity to strengthen its role in accommodating employment for those key industries already highly represented, many of which are in the growth phase of their economic cycle.

As Australia continues its transition into an economy that is a net importer of goods, the wholesale trade industry will increase in importance as will the demand for floorspace.

5.2 Importance of Worker Amenity

The emphasis on worker amenity and employee satisfaction is growing and will, conceivably establish itself as a given just like building 'green sustainability' and ESD standards have. As business parks evolve to accommodate more office-based workers, this emphasis on worker amenity is only expected to increase.

Many office parks and business parks have declined in appeal as occupiers seek to ensure their employees are satisfied in their work environment and are consequently able to achieve high retention rates. There are numerous instances where office buildings have suffered from high vacancies and declining rents as tenants vacate in search of locations that offer better worker amenity and employee satisfaction. Examples include Pymble, Frenchs Forest, etc.

In the first instance, there is current unmet open space demand even before considering future demand generated by an increase in resident and worker population. The Ryde Integrated Open Space Plan (Ryde Council, 2012) suggests there is presently an open space deficiency in Macquarie Park Corridor that will be exacerbated by planned growth. The plan indicates that **two new major reserves** suitable for active and passive recreation and several smaller open space areas are needed to support planned growth in Macquarie Park.

There is clear demand for social infrastructure in Macquarie Park, brought about by changing tenant preferences as well as growth (including surrounding residential growth).

Considering the importance of support and social infrastructure as valued by businesses and occupiers - if allowed to grow, present unmet demand for open space could result in a stagnation of and eventual decline in market appeal.

Substantial private investment has been applied to premises in Macquarie Business Park. An objective of Council is no doubt to attract more private investment as it ensures Macquarie Park competes effectively with other locations.

5.3 Delivering Social and Required Infrastructure

The funding of public infrastructure has changed significantly over the past few decades, the burden shifting from government budgets to an array of public-private arrangements and user pays charges. The various methods of funding infrastructure are collectively known as the development contributions system, broadly including mechanisms such as s94 and s94A development contributions, affordable housing contributions, special infrastructure contributions and planning agreements.

As cities grow, policy makers and statutory planning authorities are faced with the challenge of ensuring infrastructure keeps pace with the needs of new residents and workers and that the right infrastructure is delivered in the right place and at the right time.

5.3.1 Statutory Funding Mechanisms

Current statutory funding mechanisms are fairly rigid in their scope of application, in that only 'additional' demand resulting from new development can be funded via these mechanisms. Furthermore, development contributions in established areas were capped to $20,000 per dwelling in 2008. Councils are able to apply for funding from the Priority Infrastructure Fund following an assessment of the contributions plan by the Independent Pricing and Regulatory Tribunal (IPART).

The main types of developer contributions that are applicable in NSW are:

- **Section 94 contributions**
  Payable to local councils when development results in additional floorspace and presently capped at $20,000 per dwelling in established areas and $30,000 per dwelling in the growth centres.
- **Section 94A levies**
  Levied as a percentage of development cost and payable to local councils.
- **Planning agreements**
  Negotiated between a developer and consent authority, often where there is no contributions plan or if a change to planning controls is sought (e.g. land use zone, density).
- **Affordable housing levy**
  Levy payable to council in designated areas where the availability of affordable housing is reduced or development results in a need for affordable housing.
- **Special infrastructure contribution**
  Applicable in the growth centres.

Section 94 Contributions

Section 94 of the *Environmental Planning and Assessment Act 1979* covers the contribution of development towards local infrastructure provision.

Contributions paid under this regime are based on principles of reasonableness, nexus and fair apportionment of the cost of planned infrastructure to development. This model is generally used where development is occurring at a predictable pace and infrastructure needs can be reasonably foreseen and planned.

Costs of infrastructure are generally apportioned on the basis of estimated demand load on infrastructure or estimated benefit from public amenities and public services. Accordingly this form of contribution is a form of upfront (and estimates based) user pays charge.

The contributions are payable as a condition of development approval as a cash payment or if agreed, dedication of land or works-in-kind in lieu of cash payment. The manner of charging is based on the characteristics of development (such as land development or project / building development) and based on the selected unit of charge.

In order for s94 contributions to be charged, the relevant agency must prepare a Section 94 Contributions Plan which is generally based on the planning framework for an area and its associated population (residents and workers) estimates, development estimates and infrastructure needs. The cost of infrastructure is then apportioned to development sites using a method deemed reasonable for the circumstances, with the objective being to share costs fairly amongst benefiting developments or sites.

In the Ryde LGA, the following s94 development contributions are payable according to the type of development.

Table 5.1: Summary of s94 Contribution Rates, City of Ryde

Local Facilities	Residential			Non-Residential	
	1 bedroom (/dwelling)	2 bedroom (/dwelling)	3 bedroom (/dwelling)	Commercial (/sqm GFA)	Retail (/sqm GFA)
Community and Cultural Facilities	$2,218	$2,662	$3,208	$39	$19
Open Space and Recreation Facilities	$8,899	$10,678	$12,868	-	-
Civic and Urban Improvements	$1,145	$1,374	$1,655	$38	$19
Roads and Traffic Management Facilities	$1,229	$1,474	$1,776	$40	$40
Cycleways	$158	$190	$229	$5	$3
Stormwater Management Facilities	$140	$168	$203	$5	$5
Plan Administration	$43	$51	$62	$1	$1
Transport and Accessibility Facilities	-	-	-	-	-
Total	**$13,831**	**$16,598**	**$20,000**	**$128**	**$87**

Source: Ryde Council, 2015b

Consistent with the comments in section 4.3 wherein community infrastructure planning standards typically only considers resident demand, demand for open space and recreation facilities by workers (i.e. associated with non-residential development) is **not provided for** in the City of Ryde's s94 Development Contributions Plan.

Ryde Council recognised the need to facilitate substantial new infrastructure (including new roads and open space) to address the needs of existing and future residents and workers in the Macquarie Park Corridor Planning Proposal (discussed further in section 5.3.2).

The limitations of current statutory funding mechanisms have been recognised by local governments, with an increasing role played by a range of incentive-based funding mechanisms to fund and deliver public domain and infrastructure works.

5.3.2 Incentive-based Infrastructure Funding Mechanisms

The use and role of incentive-based infrastructure funding mechanisms are important particularly where, owing to statutory limitations not all infrastructure can be funded by Section 94 contributions or Section 94A levies.

There are only a few incentive-based infrastructure funding mechanisms that are codified in NSW. Those few include Green Square Community Infrastructure contributions (formerly known as the Bonus FSR Contributions System) and Macquarie Park Bonus FSR Contributions scheme (still in draft).

Incentive-based infrastructure funding mechanisms are generally centred on incentive zoning provisions, which could include:

- Density bonuses and/or planning concessions in an LEP or SEPP.
- 'Capture' of planning gain/value uplift associated with a rezoning or increased density, typically negotiated as part of a planning agreement.

The City of Sydney adopted new planning controls and the Employment Lands Affordable Housing Program to allow for the transition of employment lands in Green Square to transition from traditional industrial uses to diverse business activity.

The Employment Lands Affordable Housing Program seeks to encourage the provision of affordable rental housing within the Green Square Employment Lands area and provides a framework for the implementation and operation of two approaches.

- Application of a new levy to fund new affordable rental housing.
- Permissibility of residential uses subject to contribution to/delivery of affordable rental housing.

In many cases though, contributions to infrastructure are levied/collected on an ad hoc basis through planning agreements executed in conjunction with planning proposals for change of zone/use and/or change in density.

Green Square Community Infrastructure Floorspace (Sydney LEP 2012)

Part 6 Division 2 of the Sydney LEP 2012 provides for "additional floorspace" (previously known as bonus floorspace) outside Central Sydney in a number of circumstances. These include:

- In Green Square where community infrastructure is also provided, i.e. where development for the purposes of recreation areas, recreation facilities (indoor and outdoor), public roads, drainage or flood mitigation works is carried out.
- Commercial premises where 'end of journey floorspace' is also provided, e.g. showers, change rooms, lockers ad bicycle storage areas.
- A building that demonstrates design excellence.

Additional floorspace provided in Green Square is subject to the City of Sydney's '*Development Guidelines – Providing Community Infrastructure in Green Square*' (City of Sydney, 2012), referred to as "The Guidelines".

A development proposal incorporating floorspace additional to that permitted in the LEP must be acceptable in terms of environmental capacity, compliance with devilment controls and have little or no impact on adjoining properties and the surrounding area.

If acceptable on a merit assessment, a package of community infrastructure work must then be agreed with the City. The Sydney DCP identifies a range of community infrastructure (local infrastructure including public streets, pedestrian and bike networks and public open spaces) to be provided in conjunction with community infrastructure in Green Square.

Community infrastructure proposed must be acceptable to the City, and where there is no community infrastructure identified in the Sydney DCP within a site, the additional floorspace could still be achieved subject to the proponent contributing towards the delivery of other community infrastructure off the site but within Green Square.

The Guidelines provide clear direction on how the value of community infrastructure is to be assessed. A dollar rate is used to establish the value of the additional floorspace and package of community infrastructure to be delivered. This dollar value is then used to guide the community infrastructure package, i.e. the quantum of monetary or in-kind contributions to be made.

The dollar rates per square metre of additional floorspace are as follows:

- Residential - $475/sqm additional floorspace.
- Retail - $275/sqm additional floorspace.
- Other non-residential uses - $200/sqm additional floorspace.

A voluntary planning agreement (VPA) is the legal instrument used for the City and proponent to come to mutual agreement on the additional floorspace and appropriateness of the community infrastructure package, the VPA to be prepared and executed as required by the *Environmental Planning and Assessment Act 1979* and *Environmental Planning and Assessment Regulation 2000*.

History and Premise of Contribution Rates

The predecessor to Community Infrastructure Floorspace in Green Square is the Bonus FSR Contribution system. Following the adoption of South Sydney DCP (1997), an incentive system was put in place with base FSR and maximum FSR identified for the Green Square Urban Renewal Area.

The difference between the base and maximum FSR is known as a 'bonus FSR, where developers were able to potentially achieve a bonus in exchange for delivering an appropriate package of works which would comprise infrastructure and/or public domain works.

Large scale renewal in Green Square commenced in the late 1990's with more than 7,000 dwellings completed in the 10 years from 2002 to 2012. Much development in Green Square over the period has been delivered utilising the bonus FSR provisions with significant public domain works funded and delivered through VPAs.

Macquarie Park Corridor Planning Proposal (Amendment to Ryde LEP 2013)

Ryde Council recognises that in order to facilitate growth and development in Macquarie Park, substantial new infrastructure (including new roads and open space) is required to address the needs of existing and future residents and workers.

As part of a suite of planning controls to guide evolution of the Macquarie Park Corridor, an incentive scheme is being introduced in the Ryde LEP 2013 (Amendment 1) Macquarie Park Corridor.

The proposed incentive scheme defers the availability of additional commercial FSR and height until an acceptable package of infrastructure contribution (monetary and/or in-kind) is negotiated between Council and the developer. Once agreed, the infrastructure contribution is incorporated and executed through the VPA process.

The operation of the incentive scheme is stated to be proposed by the NSW Parliamentary Counsel and is based on the Green Square Town Centre model (City of Ryde, 2013). Furthermore, it is considered to be the "best means of achieving the proposed infrastructure because the scheme is voluntary, feasible, low risk and complies with the Standard Instrument template.

INCENTIVE SCHEME/FUNDING MODEL

The incentive scheme is proposed to operate alongside the LEP controls, a landowner able to develop up to the 'base FSR' under the LEP without making any contributions. A landowner wishing to unlock the site's development potential is alternatively able to make the necessary contributions to access the incentive/bonus FSR.

The planning proposal states the principles that underpin the proposed incentive scheme to include:

- **Transparency**
  A clear understanding of what infrastructure is to be funded and how contribution rates are calculated and applied to individual sites.
- **Equity**
  Landowners must be convinced that the framework treats landowners fairly and that both infrastructure and incentives for development are based on equity and fairness.
- **Practical**
  Implementation of the mechanism must be practical and occur in a timely fashion to avoid delays and provide certainty for commercial dealings.
- **Feasible**
  The contributions must be reasonable and provide infrastructure without undermining development feasibility at each stage.

A multi-disciplinary team of consultants led by Architectus (urban designers, traffic planners, land economists and planners) was engaged by Council to prepare a feasibility assessment in relation to the planning incentives and to make recommendations to ensure Council could leverage proposed new open space and roads through the development process. Other aims of the review were to ensure equity and to provide certainty to the planning process.

Feasibility modelling established that approximately $298/sqm of bonus FSR was required to fund the cost of the required infrastructure. Notwithstanding, the value of the bonus FSR was calculated at around $500/sqm and hence a $298/sqm contribution (60% capture of the bonus) was considered too high to provide adequate incentive for developers to take up the additional floorspace.

Following extensive feasibility testing, Council set the maximum contribution at 50% of the capture of the value uplift, or $250/sqm of additional commercial FSR.

Green Square Employment Lands Affordable Housing Program

The Employment Lands Affordable Housing Program (the Program) provides background, requirements and operational detail for the establishment of affordable rental housing, recognised as key social infrastructure "necessary to support sustainable employment growth and efficient business in the City of Sydney LGA" (City of Sydney, 2015).

The Program contains two approaches to encourage the provision of affordable rental housing and outlines the framework for the implementation and operation of these approaches.

- **Affordable housing levy**
  All development within the Green Square Employment Lands are required to make a contribution towards affordable housing, either in-kind or monetary or both.
- **Permissibility of residential uses**
  Two areas (termed "the investigation areas" within the Green Square Employment Lands have been identified as having the potential to be rezoned to allow residential uses (market housing) where changes to planning controls will result in public benefit, i.e. delivery of affordable rental housing.

  A draft guideline document is prepared to guide the preparation of planning proposals for the rezoning of a site to allow for market housing as well as for increases in density (whether height and/or FSR).

  Any proposed changes must have strategic planning merit, and have regard to a number of considerations, including:

  - Consistency with the strategic objectives of the NSW Government and The City.
  - Appropriateness of proposed uses.
  - Suitability of the proposed built form for the site and surrounds.
  - Resultant public benefit from change in planning controls.

The City recognises the cost associated with the permissibility of employment lands for residential uses and consequent displacement of business. Equally, The City also recognises the critical need for affordable housing resulting from the rezoning and urban renewal of the Green Square Employment Lands.

Without the provision of more affordable forms of housing, the market is expected to continue to produce more expensive housing in the area that will be beyond the financial capacity of lower income households, forcing these households to find accommodation further away.

The City has developed an innovative incentive-based mechanism that seeks to capture a portion of the value uplift created by the rezoning to deliver much needed affordable rental housing.

Central to the implementation of the Affordable Housing Program is acknowledgement that the ability of lower paid works to secure affordable housing close to where they work is critical, and a continued and sustained shortage of affordable housing will undermine the sustainability of the Green Square Employment Lands.

5.3.3 Effectiveness of Different Infrastructure Funding Mechanisms

Statutory Mechanisms

Statutory mechanisms are aimed at facilitating the provision of 'incremental' infrastructure, i.e. as new development occurs.

- **Section 94 development contributions**
  These contributions can only be imposed following the preparation of a contributions plan which details the local infrastructure needed and draws the nexus between

infrastructure need and new development. In recent years these contributions have been capped ($20,000 in established areas and $30,000 in greenfield areas).

- **Section 94A development levy**
  This was introduced to allow development contributions to be levied in areas of sporadic development, e.g. regional areas where development is slow/sporadic and established urban areas where development is mainly 'infill' and sporadic in nature.

  Imposition of a percentage levy on development does not require councils to prepare a contributions plan akin to s94, particularly due to the nexus required to be established under s94 between development and increased demand for public amenities and public services. A s94A development contributions plan is still required, and which outlines the priorities for the expenditure of the contributions with reference to a works schedule.

Statutory mechanisms are generally centred on the principle of inclusionary zoning, where mandatory contributions are 'included' for all development within a defined area.

These statutory mechanisms were designed to facilitate provision of local infrastructure on an incremental basis and are generally effective where new infrastructure need is predictable, easily identified and quantified.

They are less effective in circumstances of urban renewal development where the required infrastructure is less 'local' in nature and/or where existing infrastructure may require augmentation due to age or is inadequate by contemporary planning standards. It is for these reasons that many local councils are increasingly relying on incentive-based infrastructure funding mechanisms.

Incentive-based Mechanisms

Incentive-based infrastructure funding mechanisms can be incredibly effective if conceived and implemented well, as demonstrated by the Green Square Community Infrastructure Floorspace (formerly known as the Green Square Bonus FSR System).

Since its implementation over a decade ago, significant public domain and community infrastructure works have been delivered in Green Square. Today, the Sydney DCP 2012 outlines a list of "community infrastructure" that can be delivered in exchange for, subject to a merits assessment, "additional floorspace" in Green Square. These community infrastructure items include public streets, pedestrian and bike networks and public open spaces.

The large scale renewal of Green Square (led by and cross-subsidised by the residential market) has been effective in delivering substantial amounts of community infrastructure. *But for* the permissibility of residential uses in Green Square, the rate of infrastructure delivery would conceivably have been much slower.

Most recently, the City of Sydney has recognised that the rezoning of the Green Square Employment Lands from industrial to mixed business uses will result in an increased need for affordable housing in the area. To this end, The City has put in place an incentive-based approach to procure affordable rental housing. This includes leveraging the residential market to cross-subsidise the provision of new affordable housing units.

The strength of the residential market in recent years has been unparalleled. This is due to a combination of factors, including a low supply period over the 2004-2008 period which resulted in severe pent-up demand. The strength of this property market has been harnessed effectively in Green Square where The City has obtained a significant level of public benefit in new and renewed infrastructure, and seeks to continue to do so for affordable housing outcomes in the employment lands.

Delivery of public benefit in areas that are non-residential in nature is expected to be more incremental and not to the same rate of delivery as witnessed in Green Square. The Macquarie Park Corridor Planning Proposal, whilst seeking to deliver similar infrastructure items as the Green Square Community Infrastructure Floorspace, will conceivably deliver infrastructure at a more moderate pace than witnessed in Green Square. 'Lumpy' infrastructure items such as large open spaces could take a long time to deliver.

Delivering infrastructure in areas experiencing rapid urban renewal and resultant population growth should have regard to:

- Optimising the value of infrastructure from limited resources by ensuring these assets are flexible to adapt to changing needs over time.
- Keeping up with leading practice and emerging models of service and facility provision.
- Providing infrastructure for the range of needs of new communities, when it's needed.
- Applying standards and benchmarks in ways that produce practical, realistic and equitable outcomes for local, district and regional social infrastructure.

As infrastructure needs change (not just in quantum but also in their nature, e.g. where public open space was not considered to be required in employment areas like business parks but are now increasingly demanded by the market), funding mechanisms need to be able to respond. Current statutory mechanisms are limited in this respect.

In the case of Macquarie Park where employment and residential growth are expected to increase exponentially in the coming years, it is therefore crucial that any infrastructure funding mechanism implemented is effective in delivering needed infrastructure, including, *inter alia*, public open space, childcare facilities, affordable housing, etc. As identified earlier, the effectiveness of incentive-based mechanisms depends on the land use category that is expected to drive contributions as well as the rate of development.

5.4 A Strategy to Deliver Required Infrastructure

The nature and composition of business parks has changed over the last two decades. A range of land uses are now incorporated into business parks as worker convenience and amenity are of increasing importance to businesses and occupiers. Business parks are increasingly aspiring to provide the offer of a CBD location. The Macquarie Park business park is no exception.

The delivery of infrastructure on brownfield and infill sites is challenging due not only to already established lot and development patterns but also as sites are privately held. Unless there are commercial incentives in place, private landowners will not deliver community infrastructure or items of public benefit.

Council's s94 development contributions plan does not provide for public open space by non-residential development, implicit in this is the presumption that only residential users demand public open space. As indicated by contemporary tenant/occupier requirements, this presumption is incorrect. This demonstrates a case for an alternate strategy to deliver required and social infrastructure to ensure the sustainability of Macquarie Park.

Council has recognised the need to fund the delivery of new roads and public open space and has sought to do this via the Macquarie Park Corridor Planning Proposal wherein bonus floorspace can be granted to proponents who deliver an acceptable package of infrastructure works.

The intention of Council's incentive-based infrastructure funding mechanism (still in draft) is commendable - a hybrid of the Green Square Bonus FSR Contributions System and the Green Square Town Centre delivery model of infrastructure.

Given that this mechanism is predicated on ***bonus commercial*** floorspace, the rate of 'bonus' development (beyond the base FSR in the LEP) is expected to be **much more moderate** than (residential) development in Green Square. Accordingly, the receipt of contributions towards infrastructure will be commensurate.

This rate of development is also expected to be **slower** than those in Herring Road and North Ryde Priority Precincts. This has direct implications for the quantum and rate of contribution towards infrastructure, especially if development in the priority precincts outstrips the delivery of infrastructure in Macquarie Park.

In order to address the difficulties associated with delivering infrastructure in a timely manner, a planning strategy to deliver required and social infrastructure in Macquarie Park is needed.

Architectus has developed a strategic framework for the delivery of key items of social infrastructure in Macquarie Park. As is observed in Green Square Urban Renewal Area and Green Square Employment Lands, delivery of key infrastructure seeks to leverage the residential property market.

This framework recommends residential permissibility in the B3 Commercial Core and B7 Business Park zones subject to delivery of acceptable package of infrastructure works. This planning strategy is discussed in the next chapter.

6. Accommodating Future Growth

6.1 Pressures of Growth on Existing Infrastructure

Our research suggests there is growing pressure on existing social infrastructure and open space networks in Macquarie Park. This is brought about on several fronts, new growth as well as current requirements which are evolving:

- **New Residents and Workers**
  The NSW Bureau of Transport Statistics forecasts that the population in Macquarie Park will increase by 15,358 persons and increase by 12,872 employees towards 2031. There are a number of commercial development applications in the pipeline for Macquarie Park, totalling more than 450,000sqm of commercial floorspace.

- **Changing Requirements of Tenants**
  Business parks have transitioned from warehousing and light manufacturing to include office uses. As a result of the increasing amount of office space located in business parks the demands of business park users are changing, increasingly they are seeking business parks which contain restaurants, banks and travel agencies, recreational facilities and open space. In many ways the amenity offer of business parks attempts to replicate that of a CBD.

  Low crime, access to healthcare, housing, schools and recreational opportunities as well as cost of housing featured prominently in survey of businesses and provides insights into the type of quality of life factors that can impact business investment decisions.

  As building sustainability and ESD standards are now well accepted, tenants and occupiers are increasingly focusing on worker satisfaction and employee wellbeing.

  Research suggests that both the use of greenspace and visual access to them supports employee wellbeing. Studies have gathered employee data and applied them in multiple regression analysis, finding that higher subjective wellbeing and job satisfaction at work are positively related to job performance, productivity, and organisational citizenship. These have positive implications for economic benefits.

  Spaces that are engaging, flexible and promote healthy living are keenly sought after. Facilities such as gyms, childcare centres, public open space and end-of-journey amenities are, where possible provided on-site.

  As a net importer of skilled labour (90% of workers in Macquarie Park do not live in the Ryde LGA), there is conceivably a need for childcare facilities to be provided within the business park itself as well as affordable housing close by.

- **Obsolete Planning Standards**
  Open space and social infrastructure standards have failed to keep pace with the evolution of business parks and the social infrastructure requirements of employees. These requirements are notably different from those demanded by residents and as such benchmarks are not aligned to estimating demand generated by workers. This has been carried over to the funding of local infrastructure, Ryde Council's s94 development contributions plan only levying contributions for open space on *new residential* development only.

Ryde Integrated Open Space Plan (Ryde Council, 2012) suggests there is presently an open space deficiency in the Macquarie Park Corridor that will be exacerbated by planned growth. The same plan indicates that two new major reserves suitable for active and passive recreation and several smaller open space areas are needed to support planned growth in Macquarie Park.

6.2 Delivering and Funding Infrastructure on Brownfield Sites

As established areas undergo renewal and growth it is a challenge for policy makers and planning authorities to ensure that required and social infrastructure not only keeps pace but is suitable to accommodate changes in infrastructure need.

The limitations of statutory funding mechanisms (s94 and s94A) are acknowledged, in that they are mostly designed to provide for new local infrastructure directly associated with new development. These mechanisms are less suited to providing for infrastructure needed in urban renewal areas, i.e. where ageing and obsolete infrastructure no longer meets demand and/or provision requires augmentation due to changing planning standards.

Major drivers of the need for augmentation of social infrastructure (i.e. public open space, childcare facilities, affordable housing) in Macquarie Park are:

- Contemporary tenant/occupier requirements.
- Anticipated residential growth in the nearby priority precincts.

There is presently no mechanism to fund the provision of public open space in Macquarie Business Park (no provision in s94 contributions plan and the Macquarie Park Corridor Planning Proposal which is still in draft).

When Amendment 1 to the Ryde LEP 2013 is effected, proponents of bonus floorspace in Macquarie Park will be required to deliver items of infrastructure including new roads and open space. At current contribution rates ($250/sqm of bonus FSR), the contributions received and subsequent delivery of identified infrastructure could conceivably be at a slow pace, given that these are dependent on industry take-up of bonus *commercial* floorspace.

In an environment where tenant/occupier requirements for employee satisfaction and wellbeing are distinct and substantial residential growth is expected to occur, the need for additional public open space and other social infrastructure is clear.

Importantly, delivery of these infrastructure items needs to keep pace with said demand. In line with the analysis in section 5.3.3, cross-subsidisation by residential uses (subject to environmental and planning capacity) is necessary for large scale delivery of infrastructure.

In order to address the difficulties associated with delivering infrastructure in a timely manner, a planning strategy to deliver social infrastructure in Macquarie Park is needed.

Planning Strategy by Architectus

Architectus has developed a strategic planning framework which recommends that Council permit residential uses in the B3 and B7 Zones in Macquarie Park, but only where certain open space can be delivered. This should be done by a rezoning, and subject to an agreement being in place between Council and the owner for the delivery of the new park to Council's reasonable requirements.

Under this framework, Council could consider a rezoning application for sites that can achieve **ALL** of the following criteria.

- **Public open space**
  Provide either new open space shown in the Draft Macquarie Park DCP 2014 or a new 1 hectare minimum public open space, designed to Council's reasonable requirements.

  Where a site proposes to deliver the 1 hectare minimum open space, the site must be larger than 3 hectares, thereby allowing for a 2 hectare development site for mixed uses.

  The open space must have a frontage to a major road (Waterloo Road, Talavera Road, Wicks Road or Herring Road) and one secondary street.

  The proposed open space should satisfy specified design criteria and be dedicated to Council on completion.
- **Non-residential floorspace**
  Provide a minimum of 20,000sqm GFA of non-residential floorspace.
- **Key worker housing**
  Deliver key worker housing (or Affordable Housing) at the rate of 3% of total dwellings provided.

  Up to 15% of the open space (1,500sqm) can be used to deliver the required key worker housing.

- **Childcare facilities**
  Provide privately run childcare facilities suitable for 60 children.
- **Public domain**

Delivery of all other required public domain on the site including roads and through site links as nominated in the Draft Macquarie Park DCP 2014.

6.3 Balancing the Costs and Benefits of Growth

There is currently a recognised deficiency of open space in Macquarie Park (Ryde Council, 2012). In addition, there is increasing demand for social infrastructure as a result of population and employment growth but also from evolving tenant/occupier requirements.

Provision of public open space, childcare facilities and key worker housing (or affordable housing) will conceivably be at the expense of employment lands. The designation of 1ha of land to public open space would mean the land no longer has the ability to accommodate employment.

A large body of literature suggests that in order to attain sustainable economic growth, consistent attention needs to be paid for the development of social infrastructure. Urban open space provides a number of valuable services to urban populations, including recreational opportunities, aesthetic enjoyment and environmental functions.

Over the past 10 years or more, there is a growing body of evidence that the economic benefits of providing social infrastructure far outweigh the costs of provision and result in a net return on investment.

- **Economic and social dividends**
  Research (University of Queensland, 2005) suggest that investment in social infrastructure has an economic dividend as well as a social one. Put simply, it makes good economic sense to invest in the provision of social infrastructure. The need to therefore incorporate social infrastructure requirements in planning and redevelopment proposals has become an increasing requisite for both the private and public sectors.
- **Better social outcomes**
  A UK Study (Marmot and Wilkinson, 2001) suggests that for every $1 invested in community networks and services, $10 were saved in costs on poor health, reduced crime and better employment outcomes, amongst other things.

  The Washington State Institute for Public Policy (Aos et al, 2004) has calculated a benefit-cost ratio of over $2 per dollar of cost for some pre-kindergarten education programs and benefit-cost ratios of up to $11 per dollar of cost for some youth development programs.
- **Economic and social costs of non-provision**
  Research (CABE, University College of London and Department of Environment and Transport and the Regions, 2001) identified both the economic and social costs of inadequate social infrastructure and the opportunities to develop local employment and enterprise and other community-based service provision and also to support communities as they grow.

  Evidence suggests the most successful developments generally involve a partnership between commercial providers and local government with the private sector taking a long-term stake in the development. The most high quality and successful schemes tend to be led by owners/investors who are able to take a longer term view.

While the appropriation of land to public open space and affordable housing would mean less available land to accommodate new development and employment, the provision of these items of key social infrastructure would undoubtedly result in increased appeal of Macquarie Park as a business destination, leading to increased demand for floorspace.

Increased demand for employment floorspace in Macquarie Park would in turn result in take-up of Council's bonus FSR provisions as envisaged under the Macquarie Park Corridor Planning Proposal. Development to greater FSRs than provided for under the LEP would ultimately result in increased overall employment densities in Macquarie Business Park.

The ultimate delivery of additional jobs (in increased overall employment densities) would support NSW Government and Council objectives of strengthening Macquarie Park's position in the Global Economic Corridor.

The strategic provision of required and social infrastructure to support Macquarie Park's growth would also contribute to supporting surrounding residential growth and ultimately contribute to sustainability of the Macquarie Park Corridor.

6.4 Conclusion

The NSW Bureau of Transport Statistics (BTS) forecasts that the population in Macquarie Park will increase by 15,358 residents and by 12,872 employees towards 2031. This represents a phenomenal growth of 770% and 28% respectively. In addition, there are a number of commercial development applications in the pipeline for Macquarie Park, these cumulatively proposing a total of some 455,286sqm of commercial floorspace while more than 3,000 residential units are at various stages of planning and delivery.

The Importance of Social Infrastructure

Research shows that business parks have transitioned from providing warehousing and light manufacturing space to include increasing amounts of office uses. As a result of the increasing amount of office space (and office workers) located in business parks, the overall composition of business parks has evolved to contain a range of facilities, including restaurants, banks, medical centres and even travel agencies. These facilities are similar to those that might be found in a CBD.

As business parks evolve, workers will be attracted to housing options in close proximity to their place of work (i.e. people will want to live and work locally). This has broader economic benefits as it promotes self-containment which improves the health of the local economy.

The emphasis on worker amenity and employee satisfaction is growing and will, conceivably establish itself as a given just like building 'green sustainability' and ESD standards have. This is not surprising as employee costs form a major proportion of an organisation's operational costs.

Many office parks and business parks have declined in appeal as occupiers seek to ensure their employees are satisfied in their work environment and are consequently able to achieve high retention rates. There are numerous instances where office buildings have suffered from high vacancies and declining rents as tenants vacate in search of locations that offer better worker amenity and employee satisfaction. Examples include Pymble and Frenchs Forest.

As social infrastructure (e.g. open space, childcare facilities) is increasingly demanded by occupiers of business parks, it would appear that open space and social infrastructure standards have failed to keep pace with the evolution of business parks and the increase in requirements of businesses/employees. The delivery of social infrastructure in Macquarie Park is no exception.

Delivering Social Infrastrucrure in Macquarie Park

There is current unmet demand for open space in Macquarie Park, as identified by the Ryde Integrated Open Space Plan (Ryde Council, 2012). The Plan indicates that two new major reserves suitable for active and passive recreation and several smaller open space areas are needed to support planned growth in Macquarie Park. This deficiency is even before considering future demand generated by an increase in resident and worker population.

Council's s94 development contributions plan **does not** provide for public open space by non-residential development, implicit in this is the presumption that only residential users demand public open space. As indicated by contemporary tenant/occupier requirements, this presumption is now outmoded.

Council has recognised the need to fund the delivery of new roads and public open space and has sought to do this via the Macquarie Park Corridor Planning Proposal (via Amendment 1 to the Ryde LEP) wherein bonus floorspace can be granted to proponents who deliver an acceptable package of infrastructure works.

Still in draft form, when Amendment 1 to the Ryde LEP 2013 is effected, proponents of bonus floorspace in Macquarie Park will be required to deliver items of infrastructure including new roads and open space. At current contribution rates ($250/sqm of bonus FSR), the contributions received and subsequent delivery of identified infrastructure could conceivably be at a ***modest*** pace, given that these are dependent on industry take-up of bonus ***commercial*** floorspace. Unlike in Green Square, where the rapid rate of delivery of public benefit was driven by development of ***bonus residential*** floorspace.

There is presently no mechanism to fund the provision of public open space in Macquarie Business Park (no provision in s94 contributions plan and the Macquarie Park Corridor Planning Proposal which is still in draft).

This demonstrates a case for an alternate strategy to deliver required and social infrastructure to ensure the sustainability of Macquarie Park.

Architectus has developed a strategic framework for the delivery of key items of social infrastructure in Macquarie Park. As is observed in Green Square Urban Renewal Area and Green Square Employment Lands, delivery of key infrastructure seeks to leverage the residential property market. This framework recommends residential permissibility in the B3 Commercial Core and B7 Business Park zones subject to delivery of acceptable package of infrastructure works.

Balancing the Costs and Benefits of Growth

A Plan for Growing Sydney identifies that Macquarie Park sits in the Global Economic Corridor, an area of concentrated employment, economic activity and accommodates a range of other uses. The Plan also identifies that, in Macquarie Park there should be:

- Additional mixed use development around train stations, including retail, services and housing.
- Future opportunities for housing in areas within walking distance of train stations.

Already Sydney's second largest commercial market, Macquarie Park is not only important to the local Ryde economy (accounting for more than 50% of Ryde LGA employment) but also plays a significant role in Sydney's economic prosperity.

The strategic provision of required social infrastructure to support Macquarie Park's growth would ultimately contribute to the sustainability of the Macquarie Park Corridor.

While the appropriation of land to public open space and key worker housing would mean less land available to accommodate new employment floorspace, the provision of items of key social infrastructure would undoubtedly result in sustaining Macquarie Park's competitive position as well as increasing its appeal as a business destination, leading to increased demand for floorspace.

Increased demand for employment floorspace in Macquarie Park would in turn result in take-up of Council's bonus FSR provisions as envisaged under the Macquarie Park Planning Proposal. Development to greater FSRs than provided for under the Ryde LEP 2013 would ultimately result in increased overall employment densities in Macquarie Business Park.

The ultimate delivery of additional jobs (in increased overall employment densities) would support NSW Government and Council objectives of strengthening Macquarie Park's position in the Global Economic Corridor.

This Research Study concludes that permitting residential and mixed-use development on selected, appropriate sites in Macquarie Park which comply with the nine criteria listed in the Architectus strategic planning framework would have a **significant positive impact on the growth and sustainability of Macquarie Park** as a major employment zone in metropolitan Sydney and a key economic engine room for NSW.

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Appendix A: Journey-to-Work Analysis

This section analyses more detailed data, such as cross tabulations by industry, by occupation, by income and by educational attainment, with all data analysed for the broader Ryde LGA.

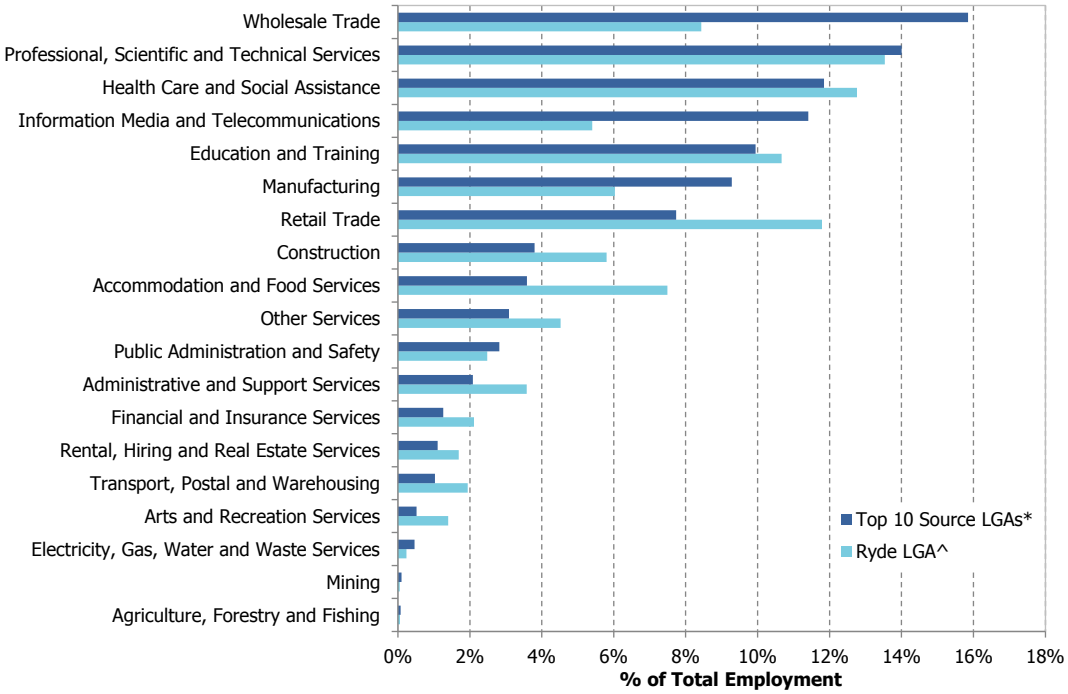
The largest source of workers for Ryde LGA include, alongside Ryde LGA residents itself, residents of Hornsby, Parramatta, The Hills Shire, Blacktown, Ku-Ring-Gai, Sydney, Warringah, Canada Bay, Willoughby LGAs. Approximately 30,970 workers commute to Ryde LGA from these LGAs (hereinafter referred to as "Top 10 Source LGAs") implying that more than 50% of commuters to Ryde LGA (from outside the LGA itself) live in the abovementioned LGAs, based on the number of total workers across the Ryde LGA.

Industry

Analysis of commuting flows by industry indicate a relatively large proportion of workers from the Top 10 Source LGAs are employed in white collar businesses in the Ryde LGA (across industries such as professional, scientific and technical services, health care and social assistance and information media and telecommunications).

There appears to be a significantly larger number of workers in information media and telecommunications that commute from the Top 10 Source LGAs than those living and working in Ryde LGA itself across the same industry. By cross referring to the analysis in section 0, employment in information media and telecommunications are likely to be located in Macquarie Park.

Figure A.1: Ryde LGA Employment by Industry from Top 10 Source LGAs, 2011

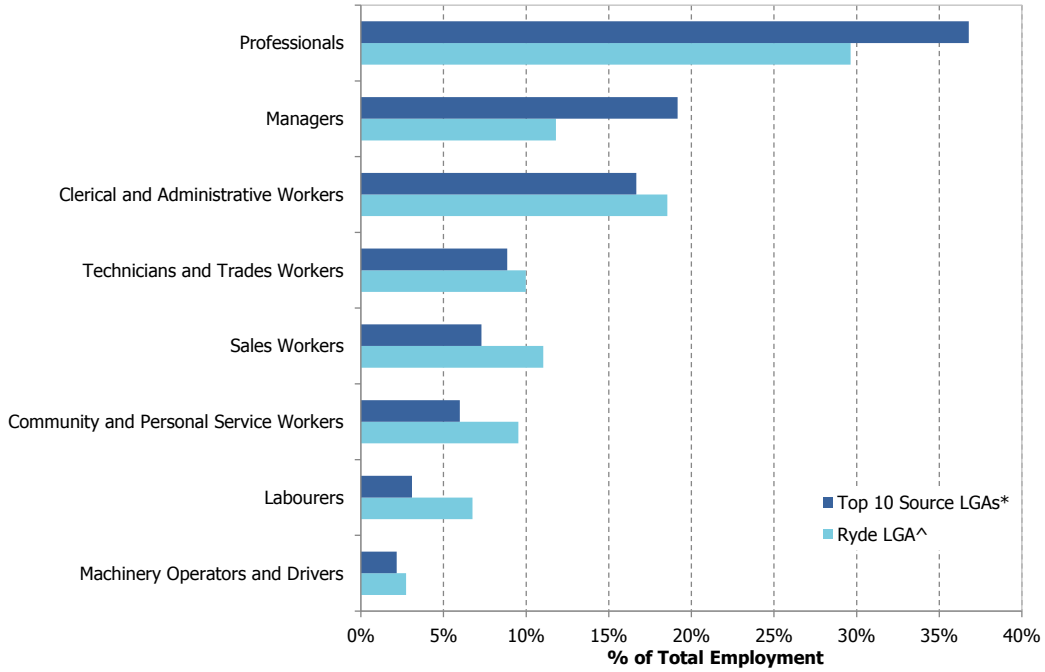


*Top 10 LGAs for number of workers travelling to Ryde LGA ^Workers in Ryde LGA also residing in Ryde LGA
Source: ABS (2012)

Occupation

A large number of commuters work in white collar industries, particularly a large proportion of workers from outside the LGA who are managers and professionals. In particular, more than one third (36.8%) of workers from the Top 10 Source LGAs are professionals, followed by managers (19.2%), accentuating the white collar profile of commuting workers.

Figure A.2: Ryde LGA Employment by Occupation from Top 10 Source LGAs, 2011

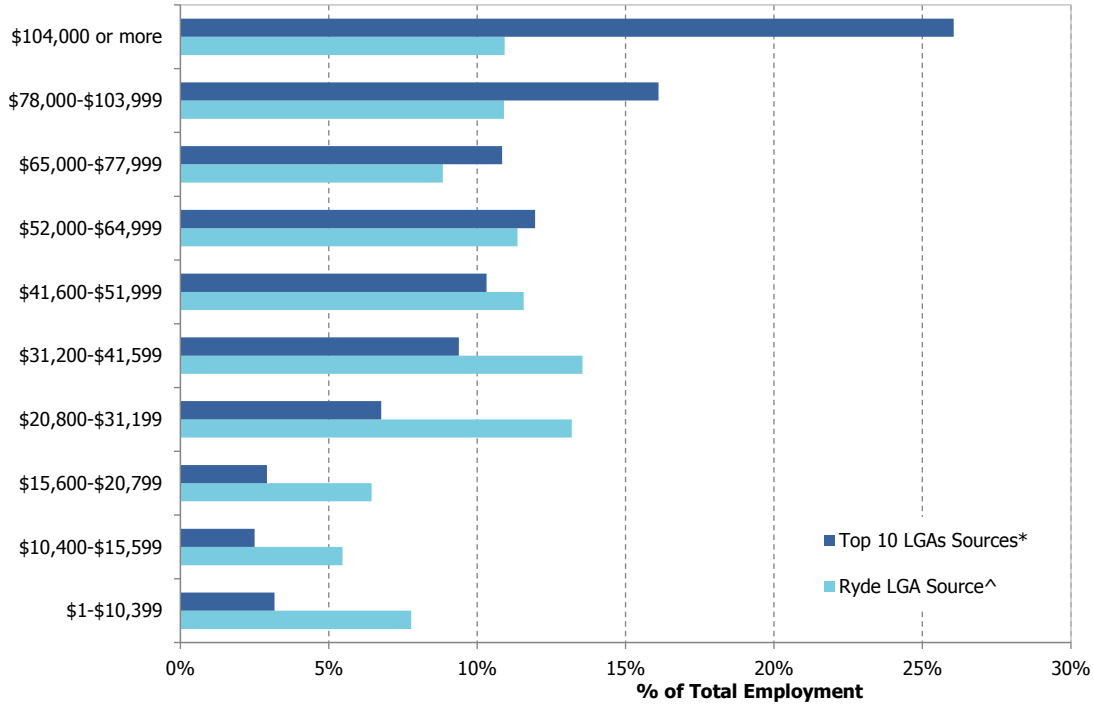


*Top 10 LGAs for number of workers travelling to Ryde LGA ^Workers in Ryde LGA also residing in Ryde LGA
Source: ABS (2012)

Income

Personal income data of commuters from the Top 10 Source LGAs highlights a significant difference between income levels of commuters and those who live and work in Ryde LGA.

Figure A.3: Ryde LGA Employment from Top 10 Source LGAs, Personal Income Distribution, 2011



*Top 10 LGAs for number of workers travelling to Ryde LGA
^Workers in Ryde LGA also residing in Ryde LGA
Source: ABS (2012)

26.1% of workers from the Top 10 Source LGAs have an annual income in the top income bracket, at more than $104,000 per year, while 10.9% of resident workers across Ryde LGA are in the same income category. As such, average household income is higher for those commuting from the Top 10 Source LGAs ($67,516) compared to resident workers in the LGA ($50,306).

Appendix B: Commercial Development Pipeline

Table B.1: Commercial Development Pipeline

Name	Address	Description	Floorspace	Expected Completion	Status
Macquarie Business Park					
Khartoum Road commercial building	8 (Lot 1) Khartoum Rd (DP582794)	Construction of a new part 6/part 7 storey commercial building.	11,731sqm	19/08/2016	Deferred, subject to pre-tenant commitment
Macquarie Square	Herring Road, Macquarie Park	Unsolicited proposal from AMP & Macquarie University for a town centre, called Macquarie Square, in Herring Rd. Under the plan, Macquarie Centre could expand by an extra 60,000sq m, whilst there could also be new housing, commercial, retail, community, education & recreational facilities.	60,000sqm	10/09/2021	Early Planning
Harvey Norman Mixed Use Development	111 Wicks Rd & 29-35 Epping Rd	• Proposed construction of a mixed use development within 3 tower buildings. • A concept masterplan has been prepared which would comprise a new commercial office building comprising an 8 storey element built above the rear of the existing Domayne/Harvey Norman store (no changes are proposed to the existing Domayne/Harvey Norman store. • Hotel to be accommodated within the lower 10 levels of a new building at 111 Wicks Rd. • Approx 160-170 apartments accommodated within the upper 17 levels of new building at 111 Wicks Rd.	N/A	18/04/2022	Early – Rezoning Application refused at Gateway
Ryde Garden	27-37 (Lot 160) Delhi Rd (DP1136651)	Construction of a mixed use development comprising 3 buildings. • The development will contain a total of 830 apartments. • It will also contain retail/commercial uses. The non-residential GFA is expected to be 60,489sqm.	60,489sqm	22/03/2019	Possible
Macquarie Park Commerce Centre	396 Lane Cove Rd, 32-46 Waterloo Rd & 1 Giffnock Av	Construction of 17 storey retail/commercial building.	83,368sqm	30/06/2020	Concept Plan Approval Under Review
Talavera commercial building	66-82 Talavera Rd	Construction of new commercial building.	37,830sqm	3/11/2017	Possible – Development Application Submitted
Defence Industry Technology Hub	45-61 (Lot 101) Waterloo Rd (DP1130630)	The LPMA plans to facilitate this development opportunity either: directly with a private sector lessee or multiple lessees, or with a Master Developer that can demonstrate proven capabilities in the design, construction, leasing, marketing and ongoing operational capabilities needed to manage a Defence Industry Hi-Tech Hub that is expected to include major commercial office space and ancillary facilities within the site in accordance with permitted planning uses for the site.	N/A	30/12/2020	Possible
Holiday Inn Express Hotel	10 (Lot 31) Byfield St (DP567569)	Construction of a 9 storey building for use as a 192 room hotel.	6,264sqm	5/02/2016	Construction

Name	Address	Description	Floorspace	Expected Completion	Status
Stamford Grand Hotel Site	110-114 (Lot 1) Herring Rd (DP780134)	Concept Plan for mixed use redevelopment of Stamford Grand North Ryde site, including 7 new buildings ranging from 4-22 storeys in height, total maximum GFA 51,139sqm, with an indicative total of 593 apartments & minimum non-residential GFA of 1,210sqm.	51,139sqm	27/04/2018	Early Planning – Concept Plan Approval Submitted
Lachlans Line	bounded by 1-17 Delhi Rd & Wicks, Epping & Delhi Rd & M2 Motorway	This prominent site is the first release UrbanGrowth NSW's significant Lachlan's Line Precinct. B4 mixed-use zone with GFA 73,520sqm. Concept scheme for 860 apartments plus 6,000sqm retail.	6,000sqm	30/12/2019	Possible
Herring Road Mixed Use Development Site – Macquarie Central	120-128 Herring Road	Concept Plan application for a mixed use commercial/retail development.	45,718sqm	N/A	Early Planning
Giffnock Avenue Office Development – Links Business Park	22 (Lot 12) Giffnock Av (DP711380)	Construction of a new A grade 7 storey office facility for commercial use.	10,294sqm	28/06/2013	Firm
Novartis Commercial Building	52-58 (Lot 5) Waterloo Rd (DP1043041)	Construction of a 6 storey commercial building for Novartis Pharmacueticals.	9,885sqm	8/09/2015	Commenced
Macquarie Centre	197-223 Talavera Rd	Major expansion of existing shopping centre. The development proposes the demolition of structures at 55-61 Talavera Rd & construction of a new 5 level building containing a full line David Jones department store of 14,664sqm, a new supermarket of 3,861sqm, new fresh food market & approx. 130 specialty shops over 16,396sqm.	31,800sqm	31/12/2014	Commenced
The Park – 5 Talavera Road	5 Talavera Road	Construction of a new 5 storey commercial office building comprising 28,000sq m & ground floor cafe.	28,000sqm	27/05/2014	Construction
118 Talavera Road	118 Talavera Road	Construction of a 6 storey commercial office building with a proposed GFA of 12,768sq m & a NLA of 11,540sq m.	12,768sqm	13/05/2014	Construction
			Total: 455,286sqm		
Macquarie University					
Macquarie University Concept Plan	Bounded by Culloden Rd, Epping Rd, Herring Rd & Talavera Rd	• Concept plan for 400,000sqm of commercial gross floor area outside of the Academic Core • Additional 61,200sqm of academic gross floor area within the Academic Core • Additional 3,450 beds within the University Housing Precinct for University purposes only • Provisions which allow for senior living development within the Precinct • Infrastructure upgrading and improvements to the road network as required • Establishment of landscaped open spaces across the campus, integrated with the pedestrian and cycle network • Establishment of car parking structures at key vehicle access points across the campus.	400,000sqm	N/A	Early Planning

Source: Cordell (2015)

Appendix C: Social Infrastructure Standards

Social Infrastructure Standards in NSW

There are a range of standards which can be used to estimate future demand for community facilities. These are:

- Growth Centre Commission – Development Code (2006).
- NSW Department of Planning and Infrastructure – Draft Development Contributions Guidelines (2009).

It should be noted that the thresholds provided in each of these documents for the provision of community facilities and open space vary considerably and are not intended to be a specific definition of need. They do however provide a useful guide when analysing the generic community facilities that will be required by future population of a proposed development.

Standards for the Provision of Community Facilities

Table C.2 applies the standards provided by the *Growth Centres Commission – Development Code (2006)* to show the indicative demand for community facilities generated by the future residents of the proposed development.

Table C.2: Growth Centres Commission Development Code Benchmarks

Type of Facility	Benchmark (number per population)
Education	
Public Primary Schools	1 : 1,500 new dwellings (approx)
Public High Schools	1 : 4,500 new dwellings (approx)
Health and Social Welfare	
Community Health Centre	1 : 20,000 people
Hospital	2 beds : 1000 people
Aged care Housing	1:10,000 people
Youth Centres	1 : 20,000 people
Community Service Centre	1 : 60,000 people
Childcare facility	1 place : 5 children 0 - 4 yrs
After school care facility	1 place : 25 children 5 - 12 yrs
Culture	
Branch Library	1 : 33,000 people
District Library	1 : 40,000 people
Performing Arts/Cultural Centre	1 : 30,000 people
Community Centre	
Local	1 : 6,000 people
District	1 : 20,000 people

Source: Growth Centre Commission (2006)

The NSW Department of Planning and Infrastructure also provides indicative thresholds for community facility provision in its *Draft Development Contributions Guidelines (2009).* These thresholds are applied in the context of the proposed development in Table C.3.

Table C.3: Draft Development Contributions Guidelines Benchmarks

Type of Facility	Benchmark (number per population)
Performing arts, cultural centre	1 : 50-120,0000 people
Branch library	1: 10,000 people
Central Library	1 : 20-35,000 people
Community/neighbourhood centres	
Small	1 : 3,500-6,000 people

Type of Facility	Benchmark (number per population)
Large	1 : 15-20,000 people
Meeting halls	
Small	1 : 10,000 people
Large	1 : 20-30,000 people
Youth centres	1 : 10-30,000 people
Children's services	
Long day care centres	1 : 320 children aged 0-5 years
Pre-schools	1 : 4-6,000 people
Occasional care centres	1 : 12-15,000 people
Outside of school hours care	1 : 10-30,000 people

Source: NSW Department of Planning and Infrastructure (2009)

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