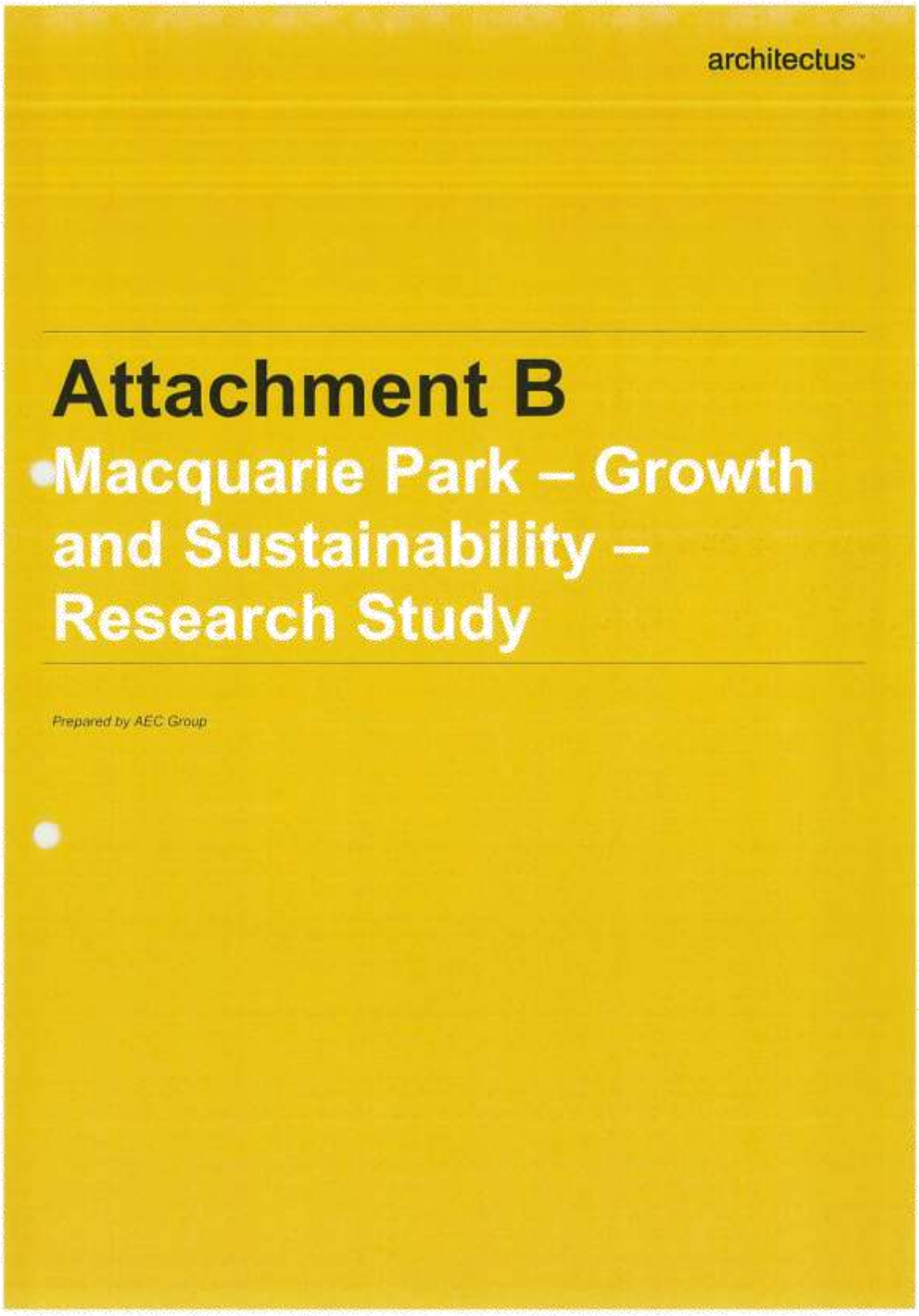
ITEM 5 (continued) **ATTACHMENT 3**



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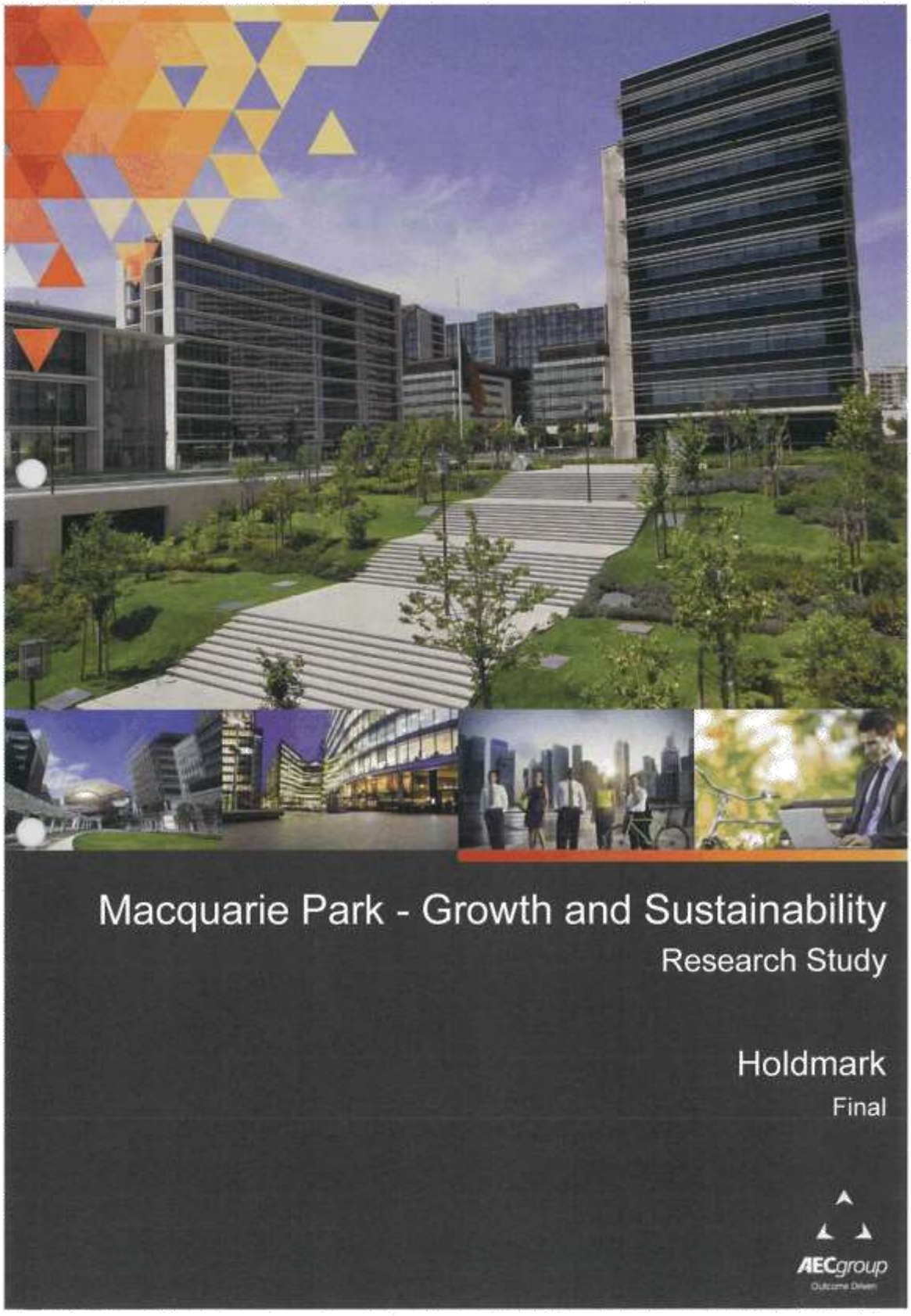

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Executive Summary

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.

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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

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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:

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- 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.

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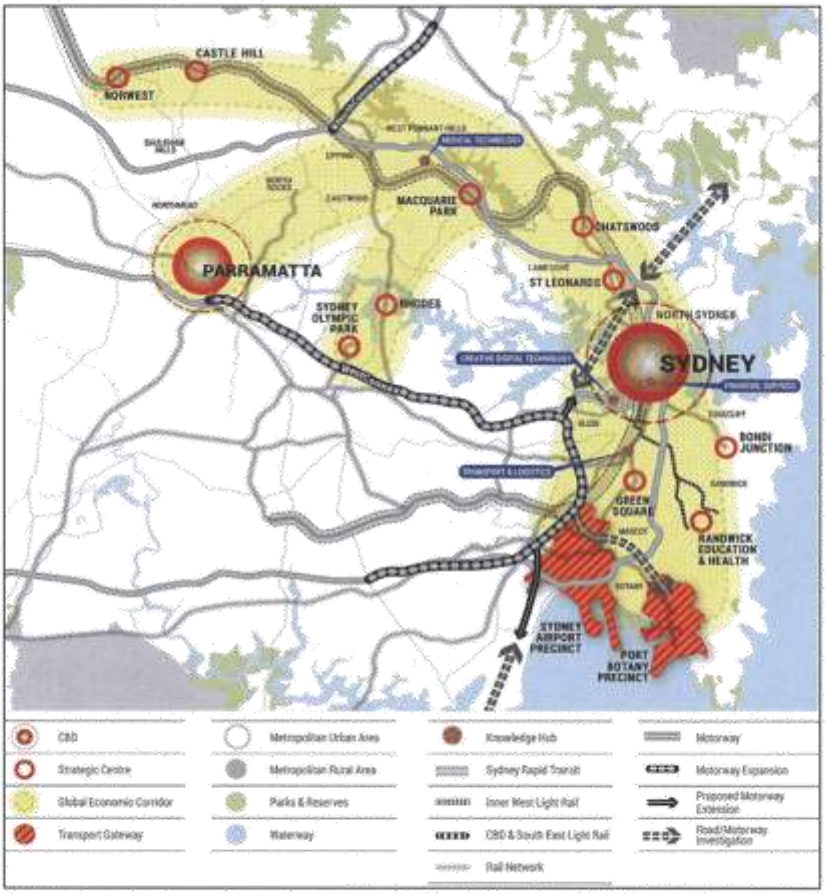
2. Overview of Macquarie Park

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



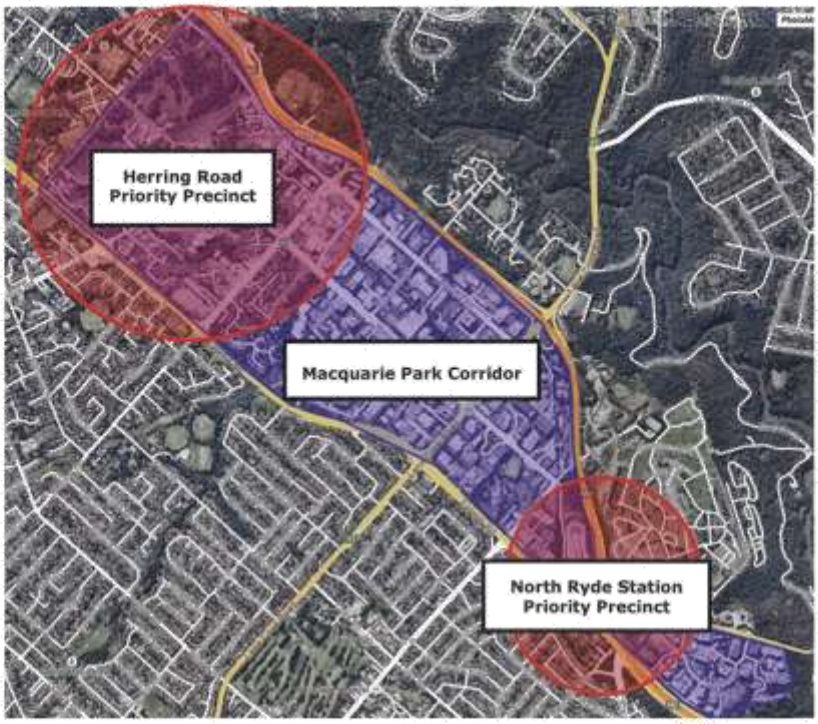
Source: NSW DPE (2014a)

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.

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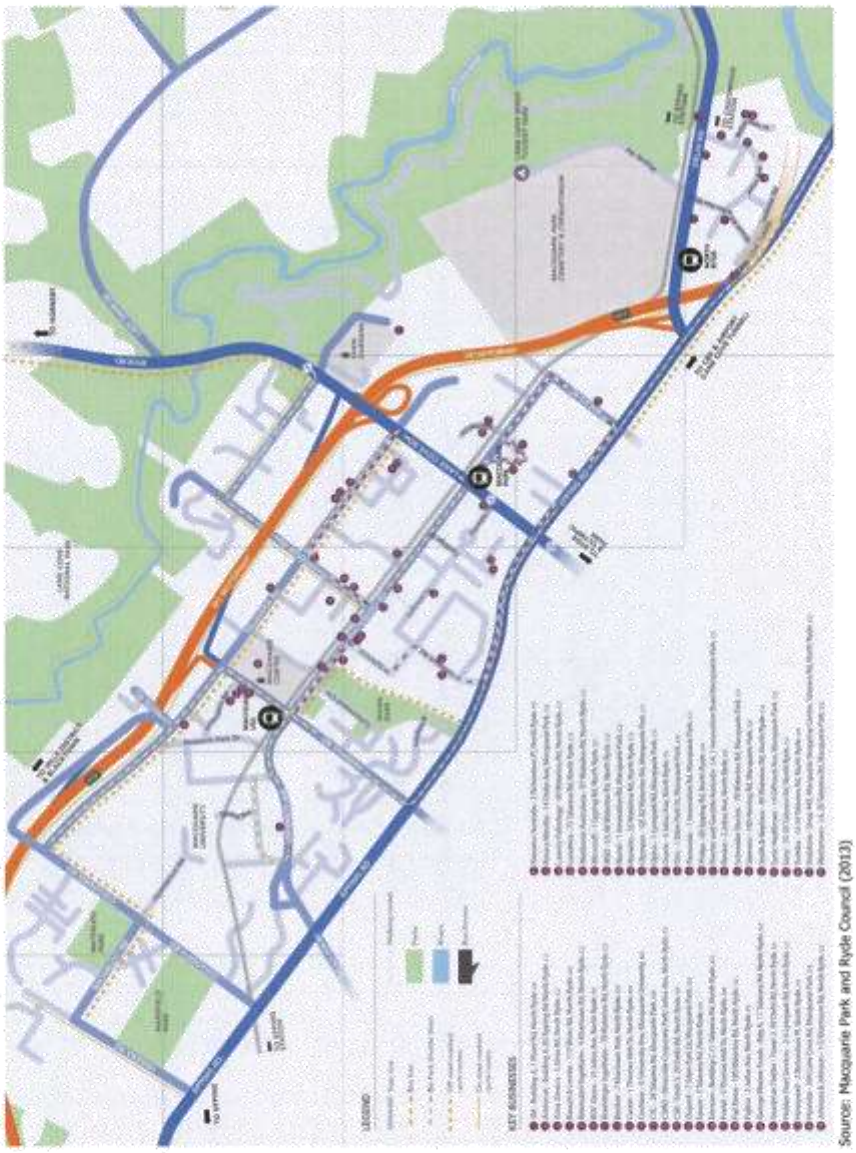

Figure 2.3: Macquarie Park Key Businesses

Source: Macquarie Park and Ryde Council (2013)

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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.

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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.

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- 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.

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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

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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.

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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).

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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).

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- 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.

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- 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

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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 neighbourhood 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 fasonating 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.

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Figure 3.1: Intech Park Land Use Plan

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

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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.

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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.

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- 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%

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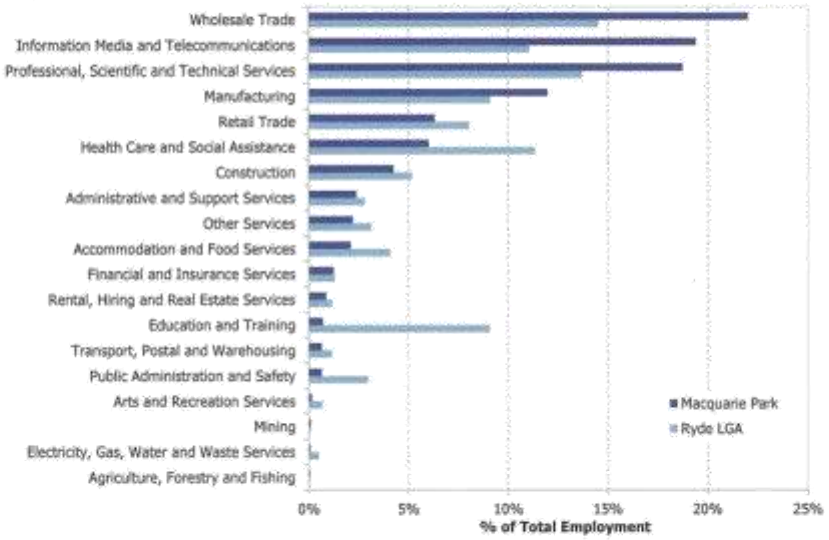
Industry	Macquarie Park		Ryde LGA	
	Employment	% of Total	Employment	% of Total
Arts and Recreation Services	61	0.2%	492	0.7%
Other Services	890	2.2%	2,344	3.1%
Total	**40,475**	**100.0%**	**74,527**	**100.0%**

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)

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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.

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- 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.

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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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 IP01) 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.

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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.

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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.

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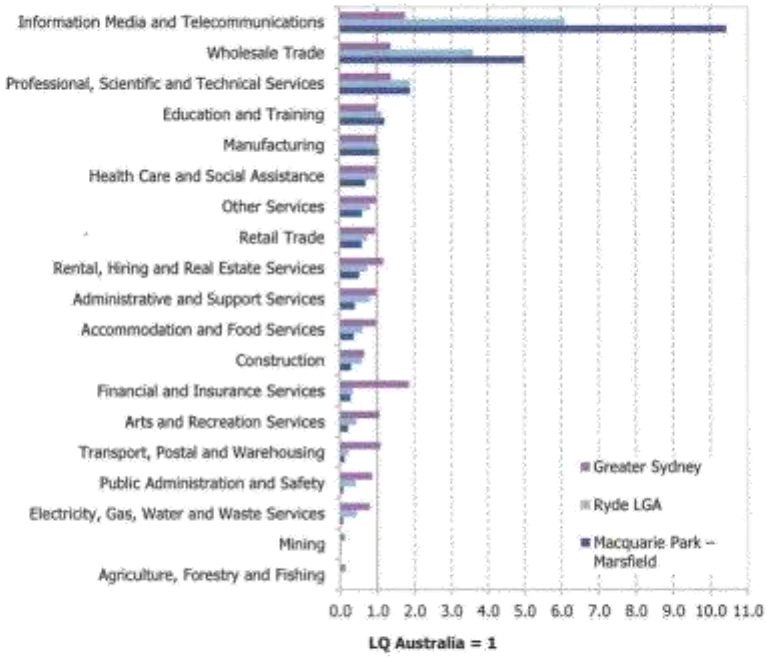
Figure 5.1: Location Quotient Analysis (PoW, 2011)



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.

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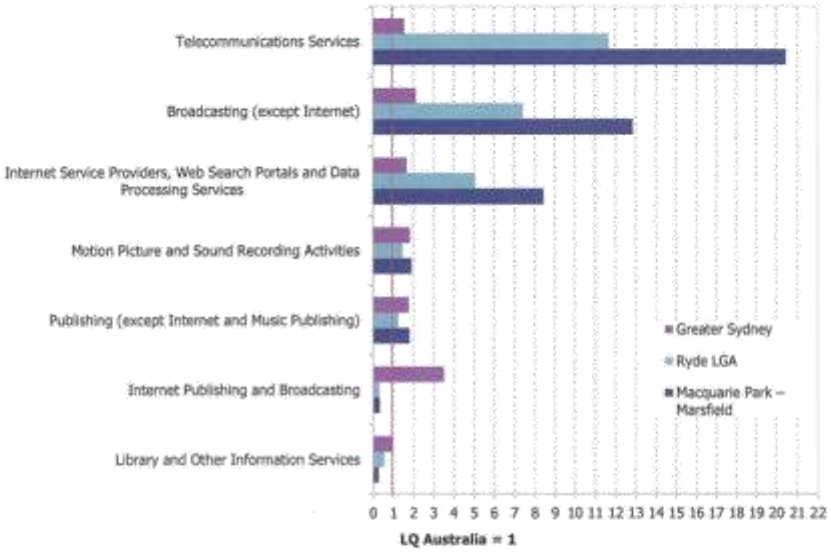
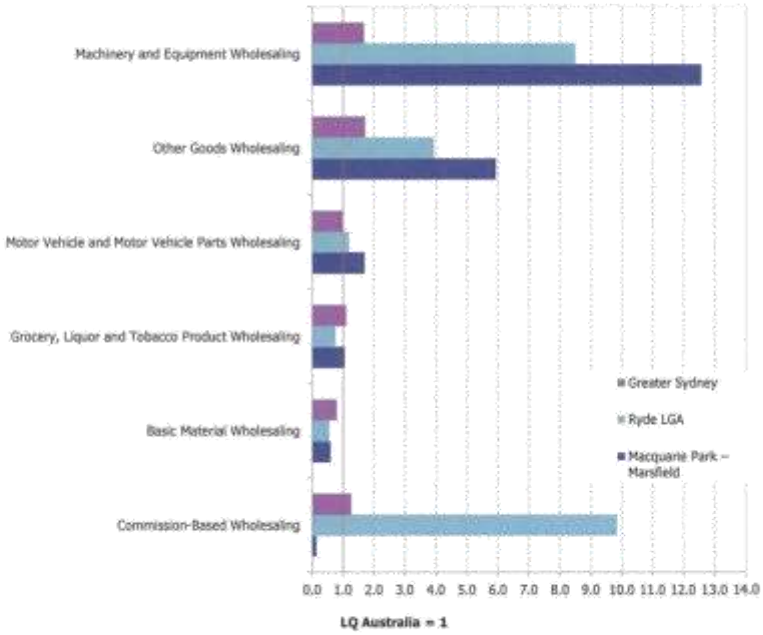
Figure 5.2: Location Quotient Analysis Information Media & Telecommunications (2 Digit PoW, 2011)



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)

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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.

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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.

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- 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.

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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.

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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

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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:

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- 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.

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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.

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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.

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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.

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- **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.

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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.

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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.

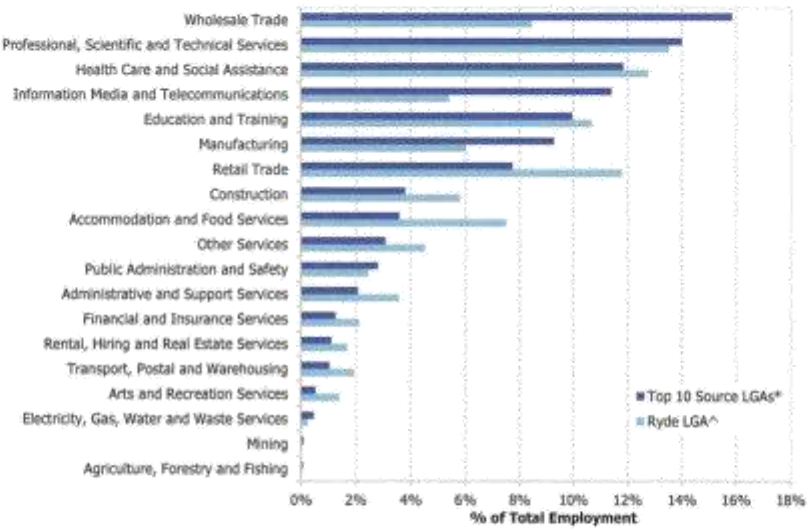
The largest source of workers for Ryde LGA include, alongside Ryde LGA residents itself, residents of Hornsby, Parramatta, The Hills Shire, Blacktown, Ku-Ring-Gai, Sydney, Warringah, Canada Bay, Willoughby LGAs. Approximately 30,970 workers commute to Ryde LGA from these LGAs (hereinafter referred to 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.

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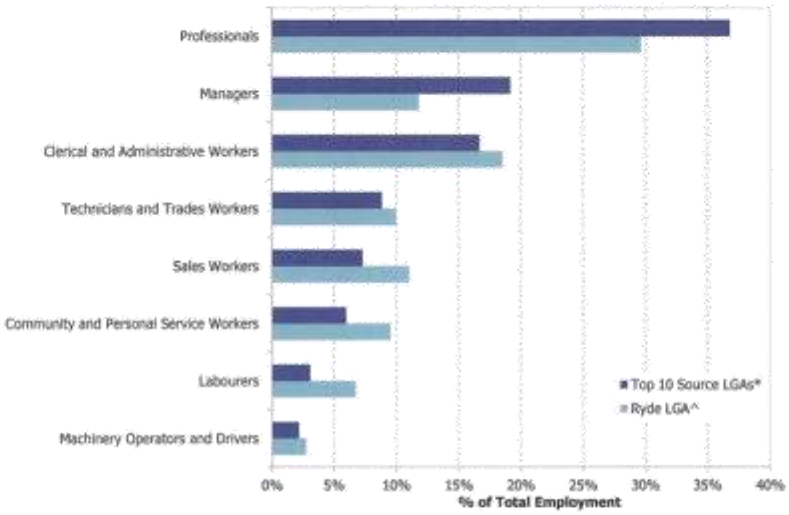
Figure A.2: Ryde LGA Employment by Occupation from Top 10 Source LGAs, 2011

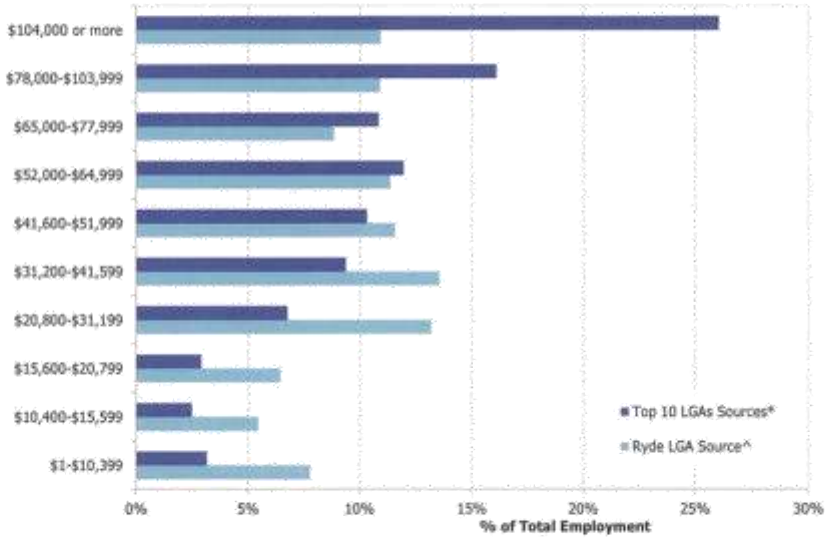


*Top 10 LGAs for number of workers travelling to Ryde LGA ^Workers in Ryde LGA also residing in Ryde LGA
Source: ABS (2012)

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)

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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).

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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 (DPS82794)	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 (DPS67569)	Construction of a 9 storey building for use as a 192 room hotel.	6,264sqm	5/02/2016	Construction

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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)

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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

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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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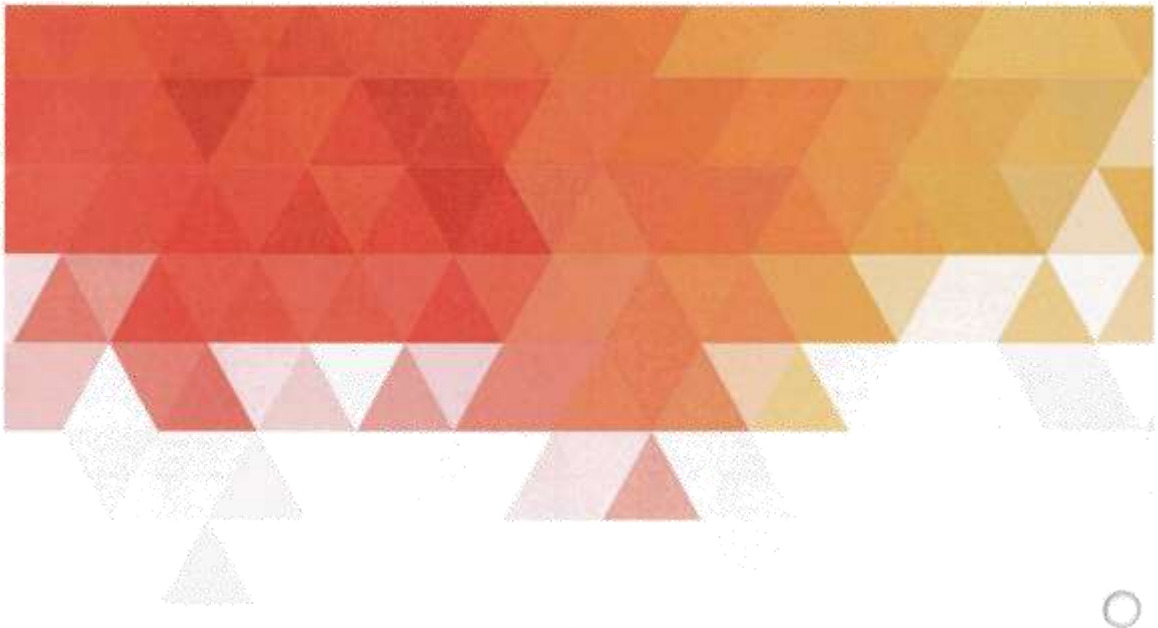

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Sydney	Level 3, 507 Kent Street Sydney NSW 2000	PO Box 942 Spring Hill QLD 4004	T +61 2 9283 8400
Townsville	233 Flinders Street East Townsville QLD 4810	PO Box 5804 Townsville QLD 4810	T +61 7 4771 5550
Bangkok	Level 11 Glas Haus Building 1 Soi Sukhumvit 25, Sukhumvit Road Wattana, Bangkok 10110 Thailand		T +66 2 402 8400
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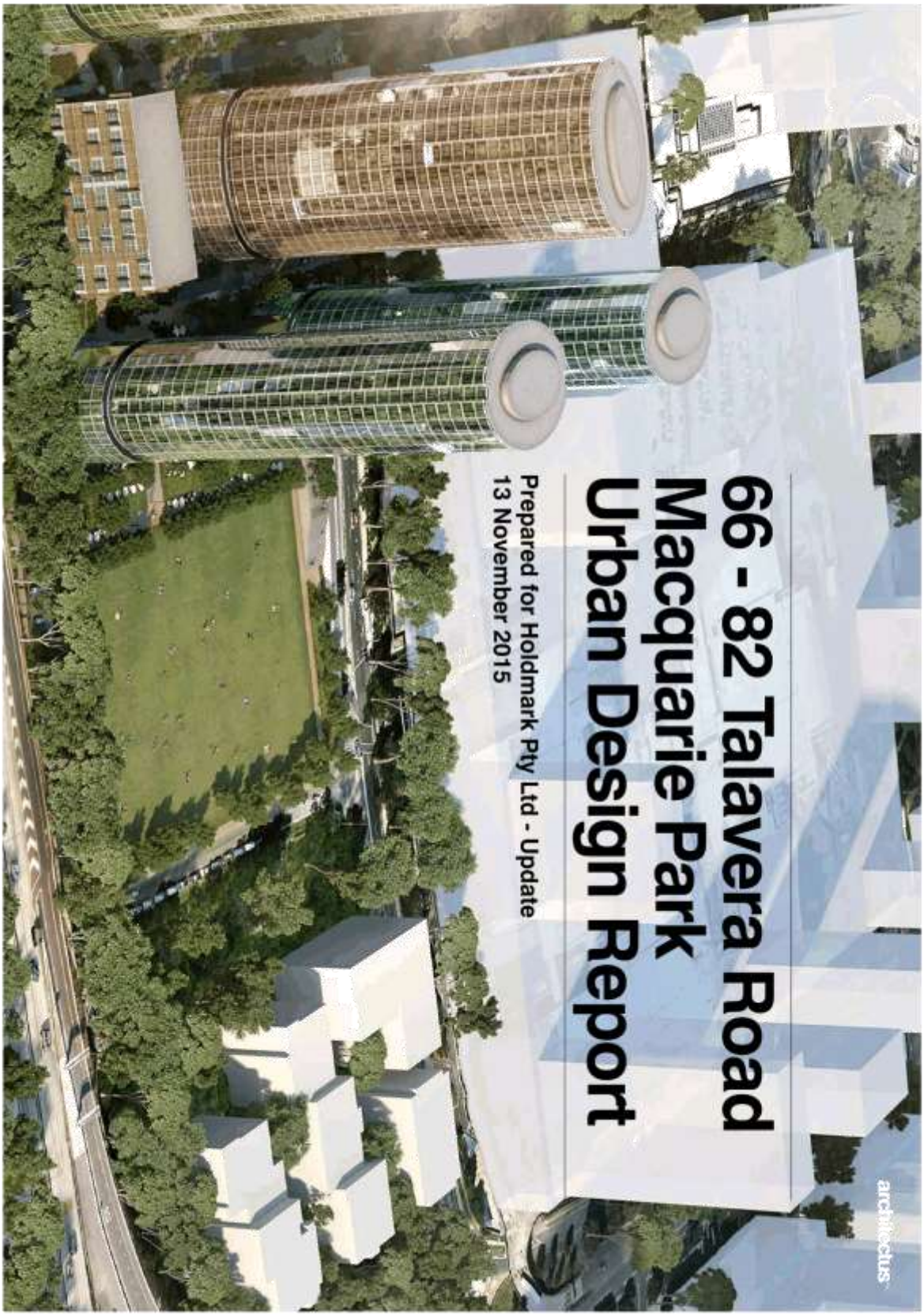

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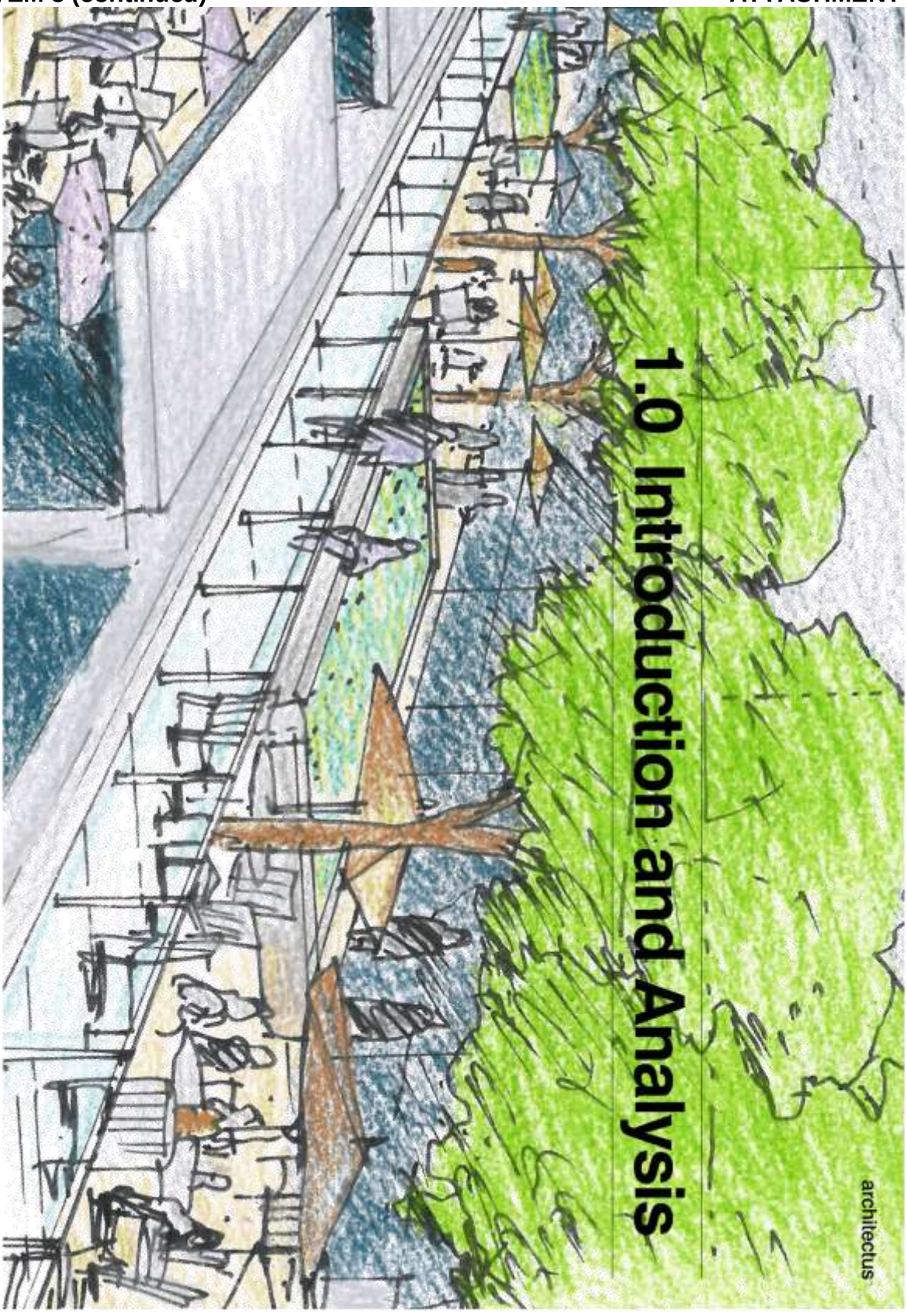


1.1 Purpose of this report

This urban design report has been prepared by Architectus on behalf of Holdmark Property Group, for land at 66-82 Talavera Road, Macquarie Park. The primary purpose of this report is to accompany a Planning Proposal which seeks to:

- Amend the land use controls for the site. Currently the land is zoned B7 Business Park. It is proposed that a B4 Mixed Use Zone be applied to the site, to allow for the site's development for public open space, residential, retail and commercial uses. Through the development process, open space would be dedicated back to Council and rezoned as RE1 Zone at a later stage when the boundaries of the open space are defined as required by Council;
- Amend the current maximum building height controls from 30m to 120m; and
- Amend the current maximum FSR controls from 1.0:1 to 3.5:1.

This urban design report demonstrates the preferred master plan that the Planning Proposal seeks to enable, including the design of the 10,000sqm public open space to be dedicated to Council and delivery of key worker housing.

Aerial view of Macquarie Park showing development proposal in relation to Herring Road Urban Activation Precinct
Source: Herring Road, Macquarie Park Urban Activation Precinct Proposal

1.2 The site

The subject site has an area of almost 3.8 hectares (37,832sqm), with a frontage of 254 metres to Talavera Road and 153 metres to Alma Road.

The site is bound by:

– The M2 Motorway to the north–east;

– The Macquarie Shopping Centre to the south-west, on the other side of Talavera Road;

– A 3-storey office/ warehouse directly adjoining the site to the south-east; and

– An 8-storey residential complex to the north-west, which is still under construction.

Current uses on the site include (with reference to site plan to the right):

– A 4-storey office building fronting Alma Road, which accommodates approximately 8,224sqm of office area (Label A);

– A single storey warehouse on Talavera Road with some mezzanine office space (Label C);

– A conference centre behind the warehouse, that is occasionally utilised by the employees of the Alma Road office only (Label D).

Other existing site features comprise (with reference to site plan to the right):

– Private tennis courts (Label E)

– Internal circulation areas and at-grade parking (Label B)

Refer to the plan to the right, which identifies other key features of the site.

Employment

Part of the site has been leased to AstraZeneca for use of the commercial building which is currently undergoing construction.

Site analysis plan

1.3 Metropolitan Context

1.3.1 A Plan for Growing Sydney

Macquarie Park is an employment centre of increasing metropolitan significance, with the Plan for Growing Sydney identifying Macquarie Park as a specialised centre in the Global Economic Corridor.

The Centre has a strong focus on technology and innovation, driven by Ryde Council and supported by Macquarie University and the Macquarie Hospital. Major private tenants, including international brands in Macquarie Centre, are driving growth in the area.

As at July 2014, the business centre of North Ryde/Macquarie Park offered a total office stock level of 866,961sqm (Preston Rowe Paterson, 2014). The North Ryde/Macquarie Park business centre is currently Sydney's second largest office market, behind only the Sydney CBD (Urbis, North Sydney Commercial Centre Study, 2015).

Whilst it is anticipated that the predominant uses within the Corridor will be Commercial/Business, the Plan for Growing Sydney identifies 'potential for urban renewal in and around centres with improved public transport links in cross-city corridors between:

- Macquarie Park and Parramatta;
- Macquarie Park and Hurstville via Sydney Olympic Park;
- Parramatta and Hurstville via Bankstown; and
- Parramatta to Sydney CBD via Ryde...' (pg. 72, Plan for Growing Sydney)

The Centre is within the North Subregion. Key priorities for the State in this region as identified in the plan for Growing Sydney include:

- Working with Council to retain a commercial core in Macquarie Park for long-term employment growth;
- Working with Council to concentrate capacity for additional mixed-use development around train stations, including retail, services and housing;
- Facilitating delivery of Herring Road Priority Precinct, Macquarie Park Priority Precinct, and North Ryde Station Priority Precinct;
- Investigating potential future opportunities for housing in areas within walking distance of train stations;
- Supporting education and health-related land uses and infrastructure around Macquarie University and Macquarie University Private Hospital
- Supporting the land use requirements of the Medical Technology knowledge hub.
- Investigating opportunities to deliver a finer-grain road network in Macquarie Park.
- Investigating opportunities to improve bus interchange arrangements at train stations.
- Working with council to improve walking and cycling connections to North Ryde train station. (pg. 127, Plan for Growing Sydney)

1.3.2 Dwelling projections

In June 2014, NSW Planning and Environment released new population and dwelling projections for NSW. The data indicates:

- 62,950 dwellings will be required to accommodate the projected population growth in Ryde, compared to 55,516 projected in 2011 - increase of 7,434 dwellings.
- Between 2016 and 2031, the projected demand is 14,950 dwellings for the Ryde Local Government Area.
- Between 2004 and 2011, the City of Ryde averaged 485 dwelling approvals per year. Dwelling approvals in the 12 months to June 2012 was 1,003 dwellings, and in the 12 months to June 2013 was 952 dwellings in the 12 months to June 2013. This indicates an average slightly under 1,000 dwelling approvals per year since 2012.

Based on the projected dwelling demand of 14,950 new dwellings between 2016 and 2031 for the Ryde LGA, and assuming that:

- In the year to June 2014, Council will approve an additional 1,000 dwellings,
- 3,000 new dwellings are to be provided in the North Ryde Urban Activation Precinct,
- 5,400 new dwellings are to be provided in the Herring Road Urban Activation Precinct,

There would be an underlying further demand for an additional 5,550 dwellings in the forecast period for the Ryde Local Government Area.

The subject site has the potential to accommodate approximately 1,200 dwellings.

Finalised Herring Road Priority Precinct master plan: Source: Herring Road, Macquarie Park Urban Activation Precinct Proposal

1.4 Regional context

The subject site is located adjacent to the Herring Road Priority Precinct within Macquarie Park.

The objectives of A Plan for Growing Sydney include the intensification of Macquarie Park for specialised business uses, and the delivery of infrastructure to support that growth. The maintenance of employment lands in Macquarie Park, and its success as an employment centre are priorities for both State government and the City of Ryde Council.

Macquarie Park is extremely well serviced by public transport and freeway connections to the City and a regional shopping centre (the Macquarie Shopping Centre, owned by AMP, adjoins the subject site).

Looking at the nearby centres, Macquarie Park is unique because of its employment function. Strategically, State Government and Council need to ensure that Macquarie Park has the right services and infrastructure, including open space, to ensure that Macquarie Park can continue to compete with Central Sydney and Parramatta as a place to locate business.

Regional land uses plan: Macquarie Park contains a mix of residential, employment, retail and education uses.

Regional context plan: Macquarie Park is well served by rail and the M2 motorway

1.5 Local context

The City of Ryde Council has recently amended the controls for Macquarie Park to allow for additional incentive building height and FSR on all of the employment land in Macquarie Park. Similarly, the recent Macquarie University Master Plan has resulted in increased long term capacity for employment on the university site. These initiatives will go a long way to facilitate significant employment growth in Macquarie Park.

The subject site adjoins the indented north-eastern corner of the Herring Road Priority Precinct, which is identified for future high density mixed use development. The recently approved report recommends FSRs of up to 4.5:1 and maximum building heights of 120m for sites near Herring Road.

The subject site has the following important locational attributes:

- **Proximity to transport:** The site is 550m, measured along the footpath, from Macquarie University Train Station. A distance of 800m is generally accepted a comfortable walking distance from a rail station. The site is also within 400m of the future bus interchange on Herring Road by the Macquarie Shopping Centre (which is owned by AMP).
- **Highly-visible site:** The site is on a street corner and opposite the Macquarie Shopping Centre, which is a major attraction and soon to be the largest shopping centre in NSW. The site is one block away from Waterloo Road, which is the central spine of Macquarie Park. The site is also highly visible from the M2 Motorway.
- **Proximity to residential and employment uses:** The site is located between the high density residential Herring Road Priority Precinct and the employment lands. The site is within 800m of many workers and many existing and planned dwellings.

Local context plan

1.6 Strategic need for open space

Evidence continues to build across the world that the quality of the public domain in our parks and open spaces is central to our individual and collective health and well-being. Accessible, safe and appealing public open space directly affects our sense of the liveability of our working and home environment; it also influences our decisions on where we want to live and work.

1.6.1 Why open space is important for business

Traditionally, open space planning did not consider that employment land uses would generate any significant demand for recreation during the working day and in that same vein Local Governments would not generally levy Section 94 Contributions for Public Open Space for business precincts.

However, progressive trends in the planning and design of working environments over the last twenty years responding to employee demands, as well as more recent shifts in the times at which many in the working community are choosing to take exercise (increasingly early morning, lunchtimes and early evenings) is requiring a commensurate move in planning to match this demand. In the case of nationally significant specialised centres such as Macquarie Park, this response becomes all the more critical, as explained below.

In preparing the Ryde Integrated Open Space Plan (IOSP) in 2012 CLOUSTON Associates was asked by Ryde City Council to provide an overview of likely requirements for public open space in the Macquarie Park Precinct (see Macquarie Park Green Infrastructure diagram). The following is a direct quote from that report, with respect to open space needs for major high technology employments areas:

Most major international corporations seek development environments in which landscape and open space play a core role in site selection criteria – high-end technology and science parks around the world have hosted major corporations and research organisations since the advent of business parks such as Silicon Valley in the 1980s. For these organisations a high quantum and quality of landscape and open space has a range of benefits that meet their corporate goals:

- *Inspiring work environments attracting top personnel and encouraging high productivity*
- *Raised corporate profile associated with benchmark design and an attractive business environment*
- *Commitment to ESD principles and high Green Star ratings in the built form and landscape*
- *Promotion of healthy lifestyles for staff through provision of recreation facilities and open space*
- *Opportunities to host/sponsor major events within the public domain.*

Typically, high-end business environments in contexts such as Macquarie Park generate needs for public open space during weekdays and working hours that cater for leisure and recreation uses such as:

- *Lunchtime team sports (e.g. touch football, basketball etc., often with inter-business competitions)*
- *Fitness training areas/facilities for personal training and fitness equipment/trails*
- *Shaded circuits and routes suitable for jogging, walking and cycling (not on major roads)*
- *Play spaces (especially associated with or adjoining crèches)*
- *Informal open space with trees, shade and shelter for lunchtime, breaks and working sessions (picnic tables, shelters, BBQ, wireless connectivity etc.)*
- *Natural creeks and formal or natural water bodies*
- *Corporate event and promotion spaces (often catering for significant numbers)*

Macquarie Park Green Infrastructure diagram, Source: Integrated Open Space Plan 2012 (Draft), City of Ryde

The recommendations report went on to observe that where such open space provision was inadequately supplied the impacts on the local Council and the community could be significant and might typically include:

- Major corporations choosing other locations offering a more extensive public domain
- Over-use of existing open space in the adjoining neighbourhoods with resulting cost impacts and negative community perceptions
- Lack of flexibility for open space provided for working communities to absorb additional residential demand by being available for use outside working hours

The net effect of such impacts can be a disjunction in social and economic integration between the working and adjoining residential neighbourhoods.

Current best practice in open space planning acknowledges that there is no single formula for the amount of open space required to meet the needs of a given working population; those needs vary greatly according to the mix of employment type, the local geography and the proximity and capacity of existing open space in the locality. Accordingly, any estimation of the quantum required must be based on site specific analysis of these and other factors.

The brief analysis undertaken for the Ryde IOSP recommended at minimum the following open space quantum for the employment area over and above any existing open space network (e.g. reserves on the Shrimptons Creek and Kikkaya Creek riparian corridors):

- A 2 Ha multi-use reserve close to the core of the employment area (where constraints on acquisition prevailed this could be a minimum of 1.5 Ha)
- A suite of local open spaces of 0.3-0.5 Ha in size evenly distributed across the locality (seven such reserves were illustrated for the whole Macquarie Park area)
- 3 plaza spaces, one near the core of the employment area and one on – or close to -the Herring Road and Waterloo Road junction and one north-west of Blenheim Park
- A number of street corner meeting places (typically 10-20m2 in size). None were illustrated for the whole Macquarie Park area
- Continuous green web connections integrating recreation corridors on all east-west creeks
- District and Local Green Grid streets, as illustrated below.

It should be noted here that this suggested provision was solely oriented to employment needs and did not address the needs of any additional residential population, such as may be generated by the Herring Road Priority Precinct, an initiative that post-dated the IOSP.

Active street and mixed use precinct: West End, Brisbane

Public grow gardens: Melbourne Docklands

Defined, landscaped internal streets: West End, Brisbane

1.6.2 Why open space is important for residential areas

The benefits to residential communities of a well-planned, accessible, safe and engaging public domain include environmental, cultural, social and economic values. In particular, the mental and physical health and well-being outcomes derived from the presence of a high quality public domain is being increasingly demonstrated by national and international research.

The NSW Department of Planning and Environment's guideline document, Open Space Planning Guidelines for Local Government, 2011 (OSPG 2011) provides research-based guidance on planning for open space in residential communities from rural to inner urban contexts with these values in mind. The following analysis draws on those guidelines.

For dense inner urban apartment living, such as will prevail in the Herring Road Priority Precinct the quantum, quality and accessibility of such open space becomes critical to social cohesion in such communities, particularly in the absence of private gardens and ground level living.

The generally accepted norm of 800m maximum distance (10-15 minutes slow walk) between any residential dwelling and some local open space becomes tested for those who may live on upper floors of a high rise apartment blocks, where the first 5 minutes may be taken up in leaving the building, much less crossing major roads.

Consequently, local open space or at minimum off-road corridors (e.g. creek lines) which give access to such open space need to be easily accessed. In such environments the size (preferably 0.5 hectares in size but at minimum 0.3 hectares) and multi-use nature of such spaces is also important, as is the need for larger district level spaces for unstructured recreation within at least 2kms of most residences.

The OSPG 2011 recommends that the default provision for local and regional open space in any new or redeveloping community is 9% of total development area (including district open space this rises to 16%) rather than a per capita quantum. However, the guidelines stress the need to evaluate the site itself in terms of the distribution and accessibility of such space.

The proposals for open space in the Herring Road Priority Precinct make reference to the IOSP 2102 (a document that pre-dated the Priority Precinct) and suggested the need for additional open space, but provides no analysis of the quantum required for the significant additional population (at least 11,000 new residents). The Priority Precinct does not specifically identify the total amount of open space to be provided for the life of the development and thus it is not possible to assess what percentage of the total development area is dedicated to public open space.

Rather, the open space provision appears to be principally based on the embellishment of three small existing reserves (Wilga, Elouera and Quandong) and the enhancing of the Shrimptons and Kikkaya Creek corridors, as well as the notional locations of some additional open spaces of unspecified size and setting type.

The largest of the existing spaces to be embellished is Wilga Reserve at approximately 0.3 hectares (when the creek area is deducted) and this also the only level space that would appear to be suited to easy access and multi-use for local recreation. The total amount of reserve space specifically identified for such embellishment appears to be in the order of 1.41 hectares (excluding the creek corridors) over three separate locations.

There is no provision identified for any larger district level reserves in the Priority Precinct, as such provision is generally deemed to be available within an 800m radius of the Priority Precinct boundaries.

The Priority Precinct report does not however describe, identify or analyse the settings and recreational functions of these nearby spaces nor does it state whether such space is currently below, at or over capacity from existing community use in those neighbourhoods. The Priority Precinct finalised report identifies four new open spaces, however delivery of these spaces is uncertain as they are subject to future development and offseting against Section 94 contributions.

Joynton Park, Victoria Park

1.6.3 Supply analysis

While recognizing that the longstanding benchmark of 2.83 hectares of open space per 1000 persons is generally recognised as being simplistic and unsubstantiated (for the ultimate population of the Priority Precinct this would suggest the need for up to 30 hectares of new open space), the level of provision proposed at 1.41 hectares/1000 future population appears to fall well below the average existing local and district level provision across the whole Ryde LGA at 3.41 hectares/1000 persons and for the Macquarie Park planning precinct at 2.95 hectares/1000 persons.

From this brief overview, it appears therefore that there is definitely a significant under-provision of both local and district level open space for the quantum of population.

The plan to the right shows all of the existing and planned open spaces within 800m of the Macquarie University Train Station, highlighting this under-provision.

1.6.4 Proposed open space

The proposed 1ha public open space at 66-82 Talavera Road would meet the definition of a district level multi-use space and, given that it lies 550 metres away from the Macquarie University Train Station and less than 800 metres from the heart of the Herring Road Priority Precinct, it would materially assist in meeting some of the apparent under-provision of open space in that precinct, as well as serving the adjoining employment precinct.

While the master plan provides convenient on-street parking for public use, the main access to the proposed park will be from the walking catchment.

Planned and existing open space within 800m and 400m of Macquarie University Station

1.7 Current and proposed planning controls

The primary planning instrument for the subject site is Ryde LEP 2014. This section of the report outlines the key land use and built form provisions for the site, from Ryde LEP 2014.

Ryde LEP 2014 - Draft Amendment No. 1 (Macquarie Park) was recently gazetted. This Amendment provides an increase in height and FSR controls for the site and the remainder of Macquarie Park as part of an incentive scheme.

The proposed Herring Road Priority Precinct controls have also been noted to contextualise the site. The Herring Road Priority Precinct Plan has been finalised but not yet translated into legislative controls.

1.7.1 Land use/ zoning

Ryde LEP 2014 currently zones the site, and a large area of Macquarie Park, B7 - Business Park. This zones allows for a range of commercial and industrial uses, as well as some supporting retail and business uses. Residential uses and larger retail uses are prohibited in the zone.

The proposed Herring Road Priority Precinct controls would zone the land adjoining the subject site on two boundaries, B4 - Mixed Uses.

Current land use zoning, Ryde LEP 2014

Composite plan showing Herring Road Priority Precinct and current land use zoning, Ryde LEP 2014

ITEM 5 (continued) **ATTACHMENT 4**

ITEM 5 (continued) **ATTACHMENT 4**

1.7.4 Approved Commercial Office Building

A commercial office building was approved by Council in June 2015. The building is currently under construction and comprises:

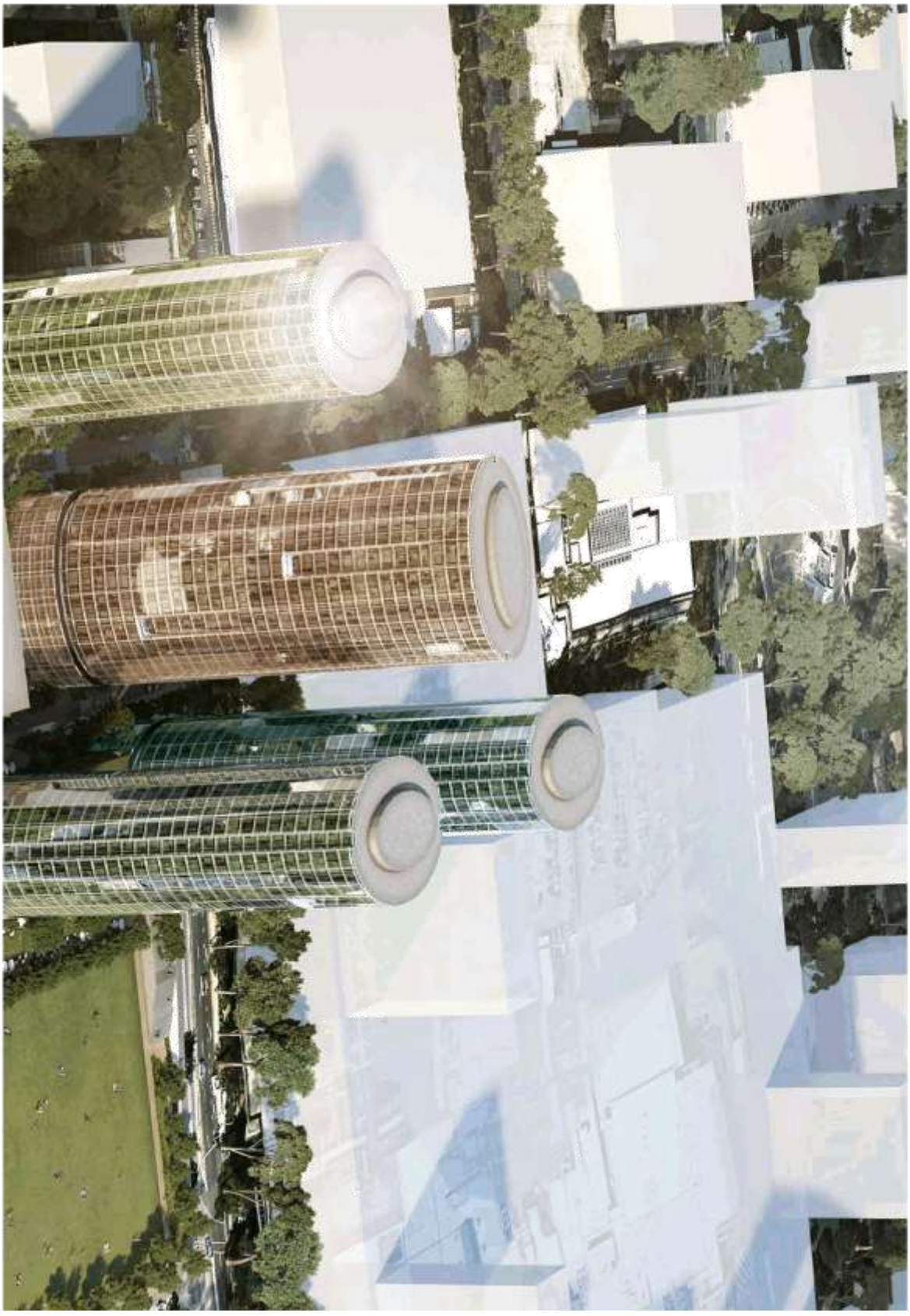
– 8,982sqm commercial office GFA;

– 6 storeys;

– 178 total parking spaces, including vehicle and bicycle spaces.

Render - Approved AstraZeneca Commercial Office Building

ITEM 5 (continued) **ATTACHMENT 4**



ITEM 5 (continued) **ATTACHMENT 4**

2.1 Design principles

2.1.1 Public domain and streets

- The new internal street should align with the new proposed street south of Talavera Road
- Internal streets should be designed as publicly accessible streets with similar dimensions, and section to public streets, and materials should give the streets more of a shared character
- New vehicle access points should be minimised, particularly near existing intersections and off Talavera Road.
- A suite of integrated and linked open spaces surrounding buildings that provide clear definition between public open space and residential community use
- Create amenity (optimal solar access, shelter from winds) and privacy for residents
- Design ground level to enhance sense of human scale
- Design walkable and cycle-friendly shared zone streets

2.1.2 Built form

- Generally, the built form should comprise street walls with tall, slender, well-spaced towers.
- Architectus' Tower slenderness study (see Appendix A) indicates the following floorplate sizes, inclusive of balconies;
  - Up to 25 storeys – 800sqm GBA maximum
  - 26-35 storeys - 950sqm GBA maximum
  - Above 35 storeys – 1,100sqm GBA maximum
- Maximum building heights similar to the maximum heights in the Priority Precinct should be available
- All envelopes must be capable of achieving SEPP 65 standards, in particular:
  - 70% apartments with minimum 2-3 hrs mid-winter solar access
  - 60% apartments with natural ventilation
  - 24m separation between tall buildings
  - 18m maximum building depth for residential uses (excluding balconies)
  - Minimise the visual bulk of the buildings from the new open space. Buildings should appear slender and maintain low-angle views to the sky between buildings

2.1.3 Land use

- Facilitate retention of the majority of jobs on the site and create opportunities for new jobs where appropriate
- Provide non-residential uses adjoining the park and other important public spaces
- Maximise residential densities in this well-serviced location
- maintain some commercial uses

Human scaled ground level and resident amenity: Power Street development, Erskineville

Slender tower forms, Sydney Olympic Park. Competition entry, Architectus for Ecove

Active frontage, St. Margarets residential development, Bourke Street Darlinghurst

2.1.4 Open space

The design, usability, orientation and location of the new district open space has been given priority for this master plan. The planning and design principles for the proposed open space should include:

- A consolidated form to a total of 1ha (this may include terracing)
- A north/south orientation for optimal solar access (generally two hours between 11am and 3pm on 21June)
- Ready pedestrian access from adjoining streets and buildings in line with AS1428
- High visibility from adjoining streets, minimum two adjoining street frontages to ensure it has a public character
- High levels of passive surveillance from residential dwellings and other public domain
- Active façades fronting the space (e.g. community uses, cafés, amenities)
- Multi use layout and design to allow for general day to day recreation, fitness, special event field sports, community events, celebrations and performances
- Seating, shade (structures and trees) and play areas
- Layout and design for day and evening use, including events stage area
- 'Back-of-house' event support space and services

Given the high levels of potential use and the permeable nature of walking routes to and across the space, the central green space may best be constructed as a synthetic grass surface. There are a number of successful examples which use this surface.

Landscape Principles diagram

2.2 The master plan

Indicative Areas	
Site area	37,832m2
Total proposed GFA	132,500 m2
FSR	3.5:1
Total public open space	10,000 m2
Total residential GFA	112,500 m2
Number of apartments (average of 100 m2 each)	1,125
Total non-residential GFA (incl. new office GFA)	20,000m2
New office (approved) GFA	9,000m2

Illustrative view of proposed master plan looking south-east towards the Herring Road Urban Activation Precinct

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Key worker housing / affordable housing

Consultation with Council identified an opportunity to deliver key worker housing on site. The proposal allows for the use of some of the 1 hectare space for this purpose (less than 15% of the site), whilst retaining a usable open space for a variety of active sports uses. This allows for some flexibility for additional community uses in the 1 hectare zone, at Council's discretion.

Alternatively, key worker housing could be accommodated within the proposed towers in addition to the nominated density.

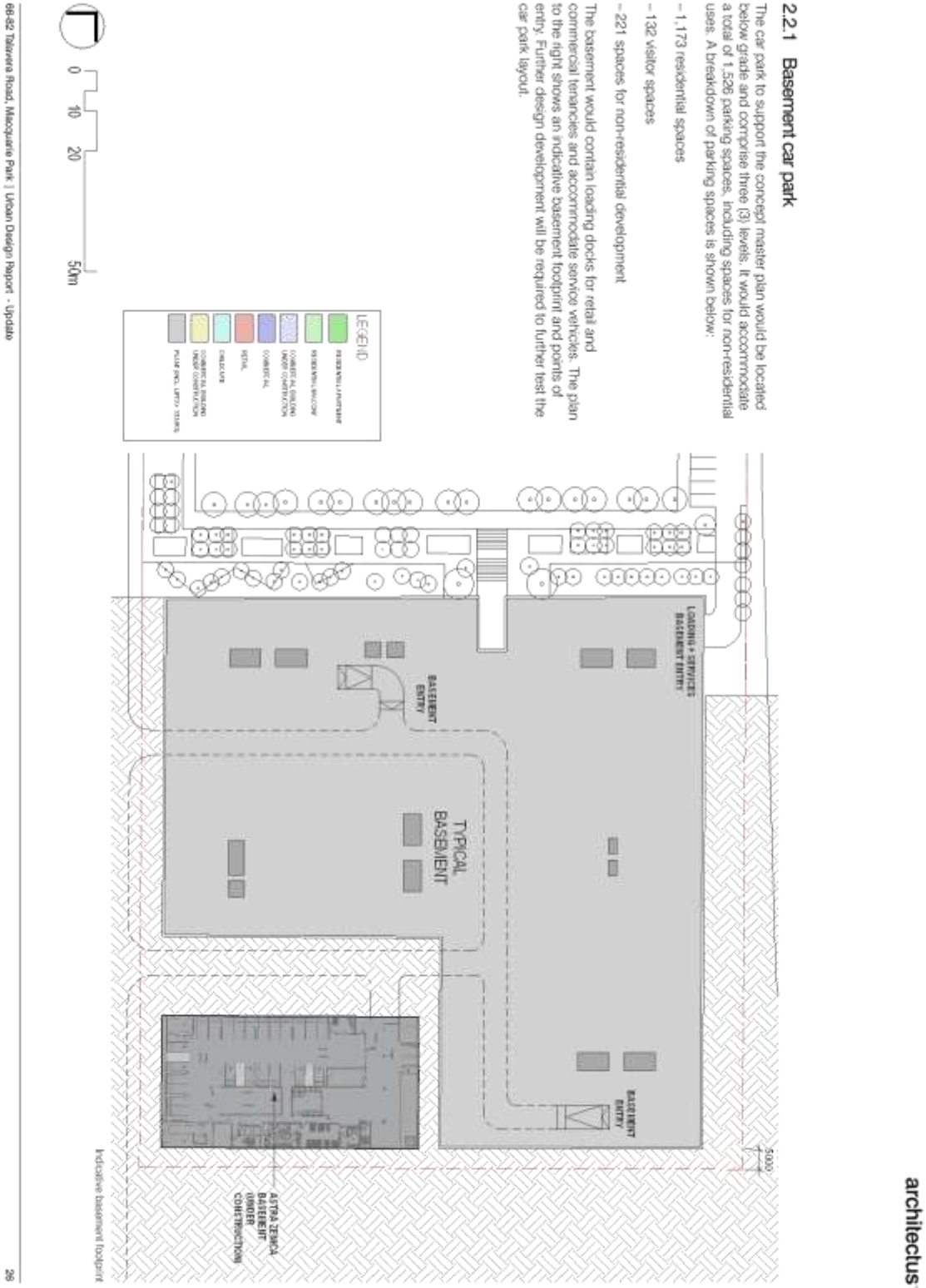
The plan to the right demonstrates how a single-loaded key worker housing development could be accommodated on the north west boundary of the site, and still allow for a competition-sized soccer field (45m x 90m, with 10m run out on all sides) should Council wish to pursue this option.

The key worker housing shown in this option is in two buildings with a footprint of 12m x 35m, separated by a 6m through site link. The total GFA of these buildings at 6 storeys would be 3,780sqm, or approximately 40 apartments at 100sqm/ apartment. This is 3.5% of the 1,125 dwellings proposed, which exceeds the requirements set out in Architectus's Strategic Framework for the Rezoning of Land (Attachment A).

This option results in the loss of the on-street public car parking. This car parking could be relocated to either the basement, or on-street parking on Alma Road and Talavera Road.

Indicative Master Plan (including key worker housing)

ITEM 5 (continued) **ATTACHMENT 4**



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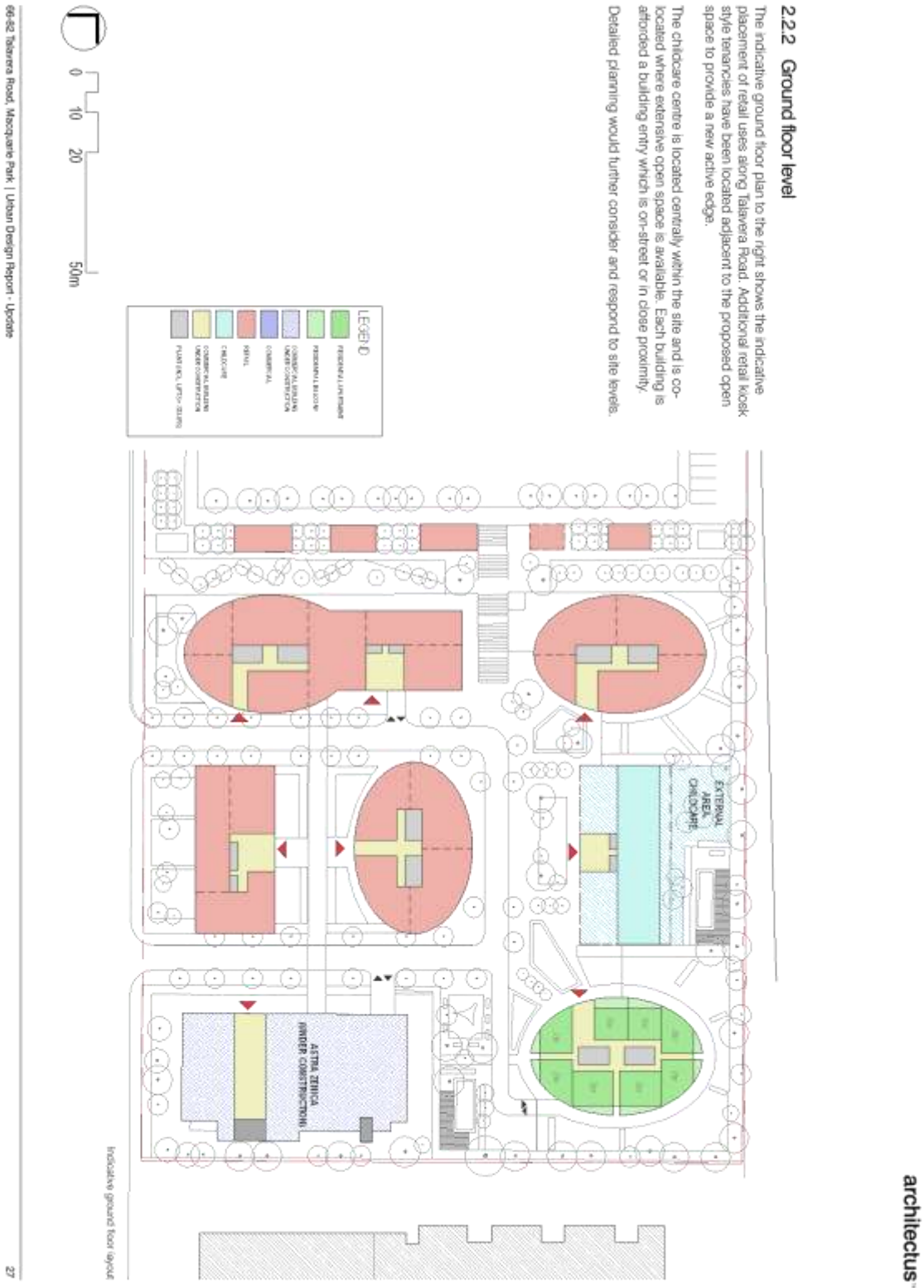

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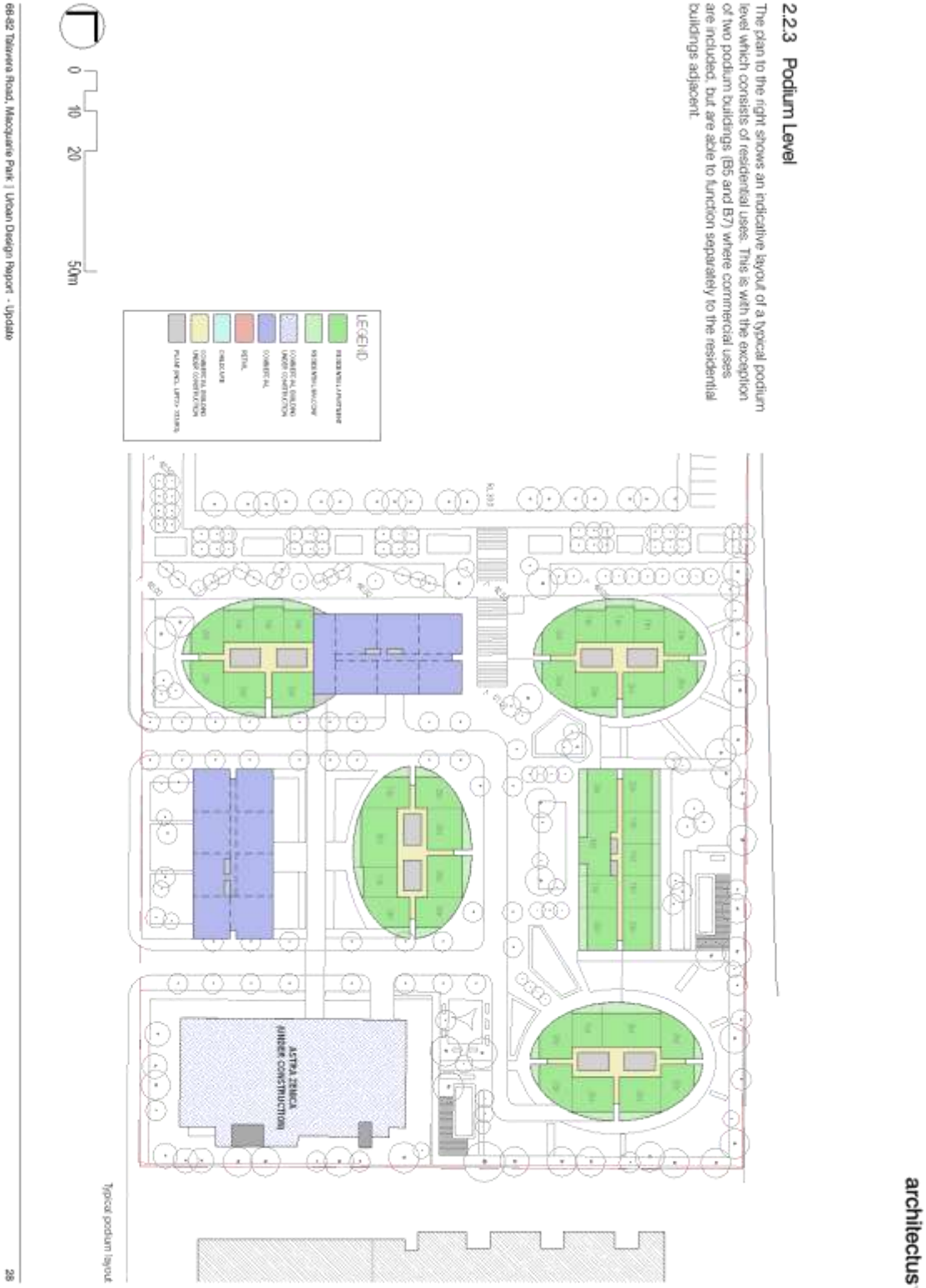

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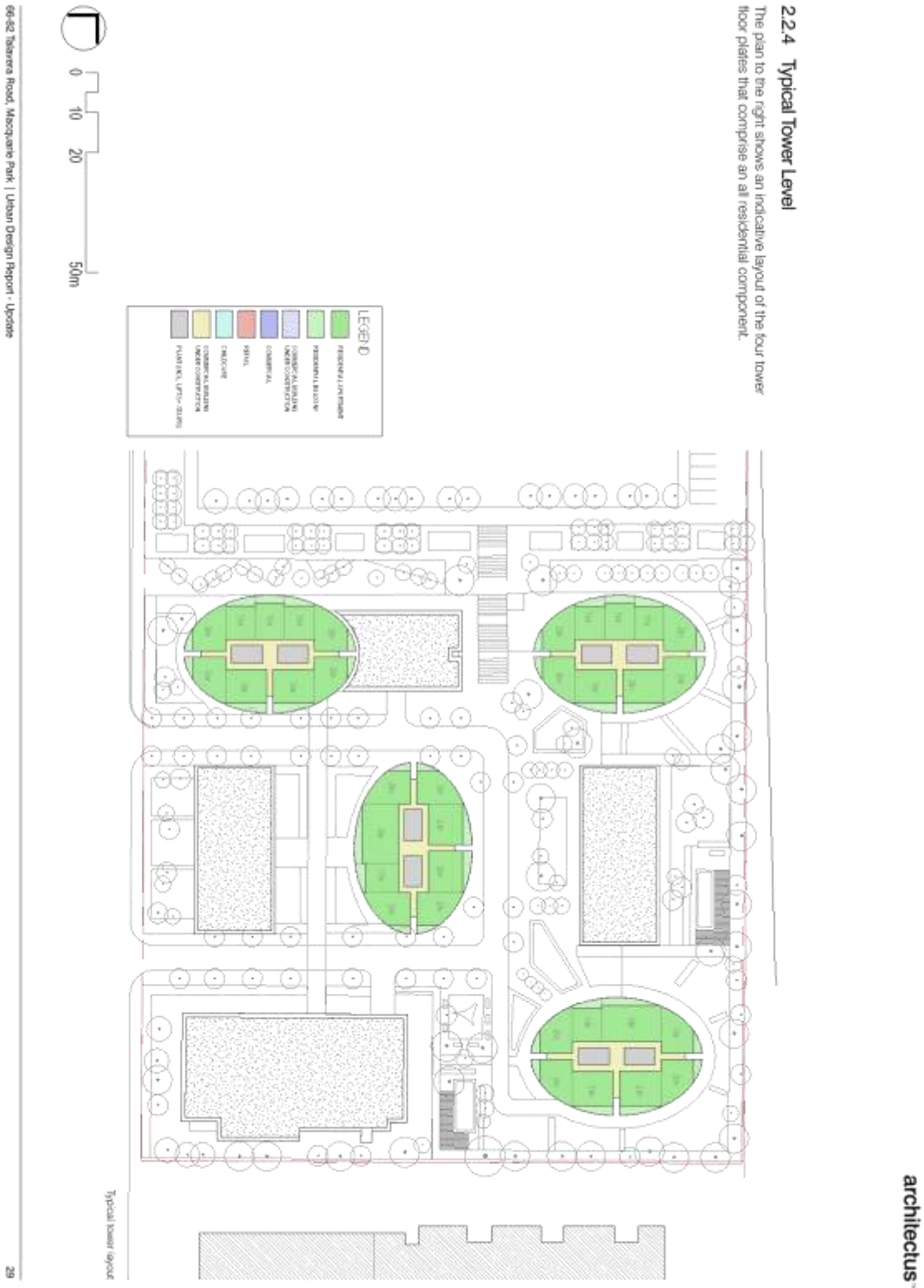
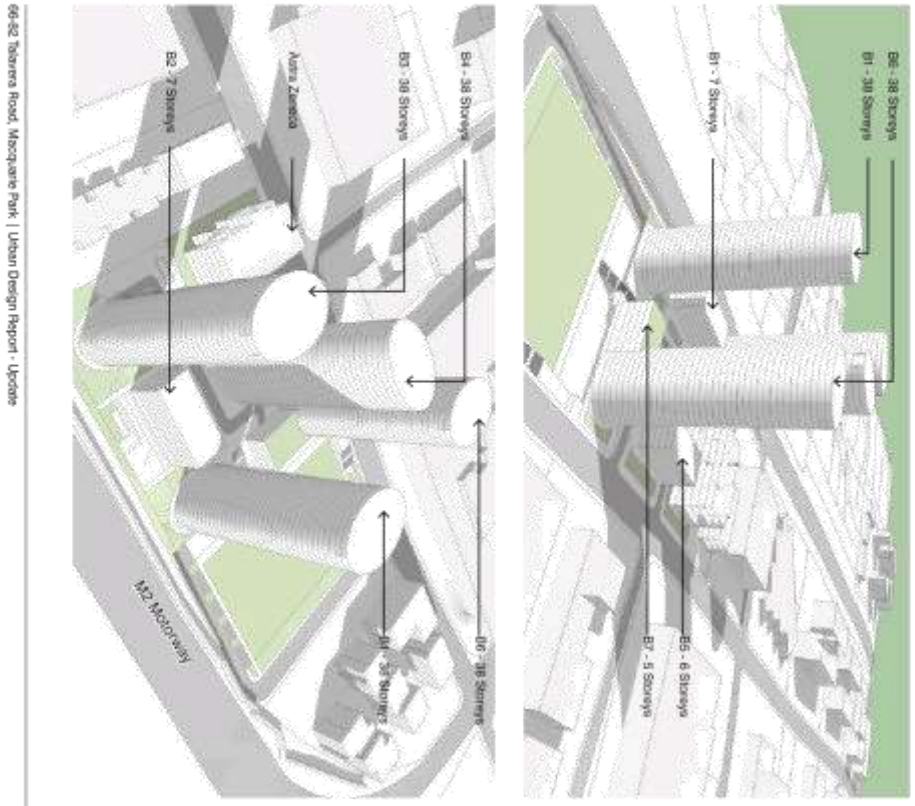


2.2.5 Height of Buildings

The plan to the right shows the building heights represented in storeys. The building envelopes indicate four towers which may support 38 storeys in height inclusive of all mechanical plant and services, with adjacent podium building envelopes ranging from 5 - 7 storeys across the site. Building envelopes that contain retail uses would have a 4.5m floor to floor height at ground level to maximise its flexibility of use.

ITEM 5 (continued) **ATTACHMENT 4**



2.3 The public domain

2.3.1 New public park

The proposed open space, totalling **1ha**, comprises the following elements:

- A single, level, open multi use green space (turf or synthetic surface) of approximately **8,250m2,** including an event stage and support area to be dedicated to Council;
- Four linked terrace spaces of approximately **3,000 m2** in total, overlooking the central green space, with each terrace offering a range of uses such as public seating under trees, play, outdoor café seating, boules courts etc. It is intended that these open spaces be protected for public use through right-of-way easement.
- Off-street pedestrian access from Talavera Road, linked to lift access on the building perimeters to ensure universal access to all areas of the public open space
- Tree and shrub planting on streets and terraces, offering amenity and shade
- Amenity night lighting and special event lighting and service infrastructure (three phase power, water etc.)

Off street parking bays on the northern side of the green space comprise approximately 500m2 and are excluded from the total open space calculations. The built form facing the central green space will have active façades.

Illustrative view of new public park; View looking north towards Alma Road

Illustrative view of proposed new public park

2.3.2 Open space design

Architectus' master planning for the site provided for a minimum 1ha open space. Clouston were involved in the location and dimensions of the open space, with a view to create the best, most flexible space for Macquarie Park. Clouston were then requested by Holdmark Property Group to prepare a preliminary design concept for the 1ha space.

The design principles for the open space are:

– Provide a large, level playing field;

– Ensure that the park has a good relationship with the public domain by minimising level changes and providing level access with the public footpath where possible.

– Provide some at-grade parking to service the park;

– Provide commercial and community space at the edge of the park.

– Focus planting around the edge of the park to allow for active uses in the park.

The level change over the site is a challenge for the design of open space. In early options, the open space extended to the base of buildings B1, B6 and B7, but this was not considered to be an appropriately scaled interface for the open space.

The solution was to introduce terrace buildings, to provide for a transitioned level change with terraced public open space above. The terraces provide for more passive recreation and places to sit and watch the activity in the main area of the park. The lower level of these buildings could be used for community, childcare and retail uses, which would activate the park. The upper level of buildings B8 and B9 is earmarked for residential use, and a small proportion of the terraced area at this level will be designed as private courtyards. The terrace which lies atop the upper, residential level will be entirely for public use.

Whilst the terraces are included within the 1ha open space, they are spatially appropriate because they improve the quality and operation of the open space whilst successfully negotiating the topography.

Clouston have also assisted with a design concept for the common open space areas. The focus for these areas was to create spaces for gathering and interaction. The terraced design ensures that open spaces are private and usable, without the need to provide high fences.

Section west to east through new public park and terraces looking north-east towards the M2

Section north-east to south-west through new dedicated public park looking east towards new development

2.3.3 Communal open spaces and streets

The layout and design of open spaces associated with the buildings and streets on the eastern part of the site recognises the need for a mix of community and more private spaces including:

- Shared use streets designed for low vehicle speeds;
- Defined and easily recognised entry landscapes for each building;
- Community space adjoining each building;
- A ground level local play space;
- Swimming pools for use of residents; and
- Street trees and seating along all access roads.

It is expected that the definition between public open space and the community spaces for residential users will be clearly defined by planting and/or permeable fencing, which establishes the principal uses whilst optimising casual surveillance.

It is proposed to have all-movements vehicle access at the easternmost entry to the built-up area of the site, with a signalised intersection on Talavera Road at this point. The location of this access point will align with the future Council road connecting Talavera Road and Waterloo Road.

The second vehicle entry-point to the site off Talavera Road to the west, and the Alma Road intersection are proposed as left-in/ left-out access.

A one-way link between the two internal circulation roads is proposed to improve opportunities for vehicles to circulate and avoid using the external road network. This link would be a share-zone to safely accommodate pedestrians.

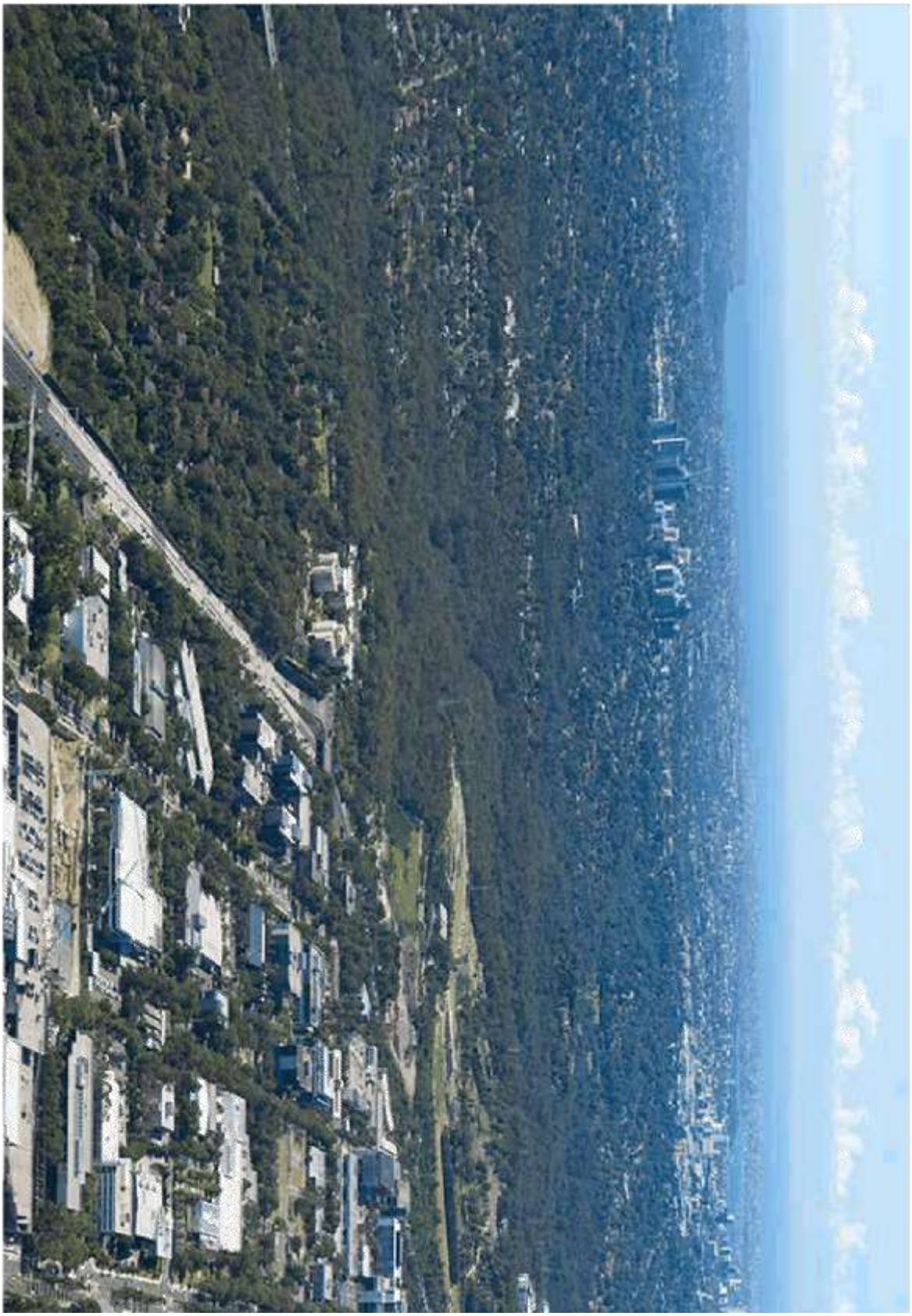
Green internal and external streets: Park Lane, Central Park, Sydney

Communal grow gardens: Elephant Park, Central London

ITEM 5 (continued) **ATTACHMENT 4**

Illustrative view of active frontages and landscaped terraces opening onto new dedicated public park. View looking north-east towards M2

ITEM 5 (continued) **ATTACHMENT 4**



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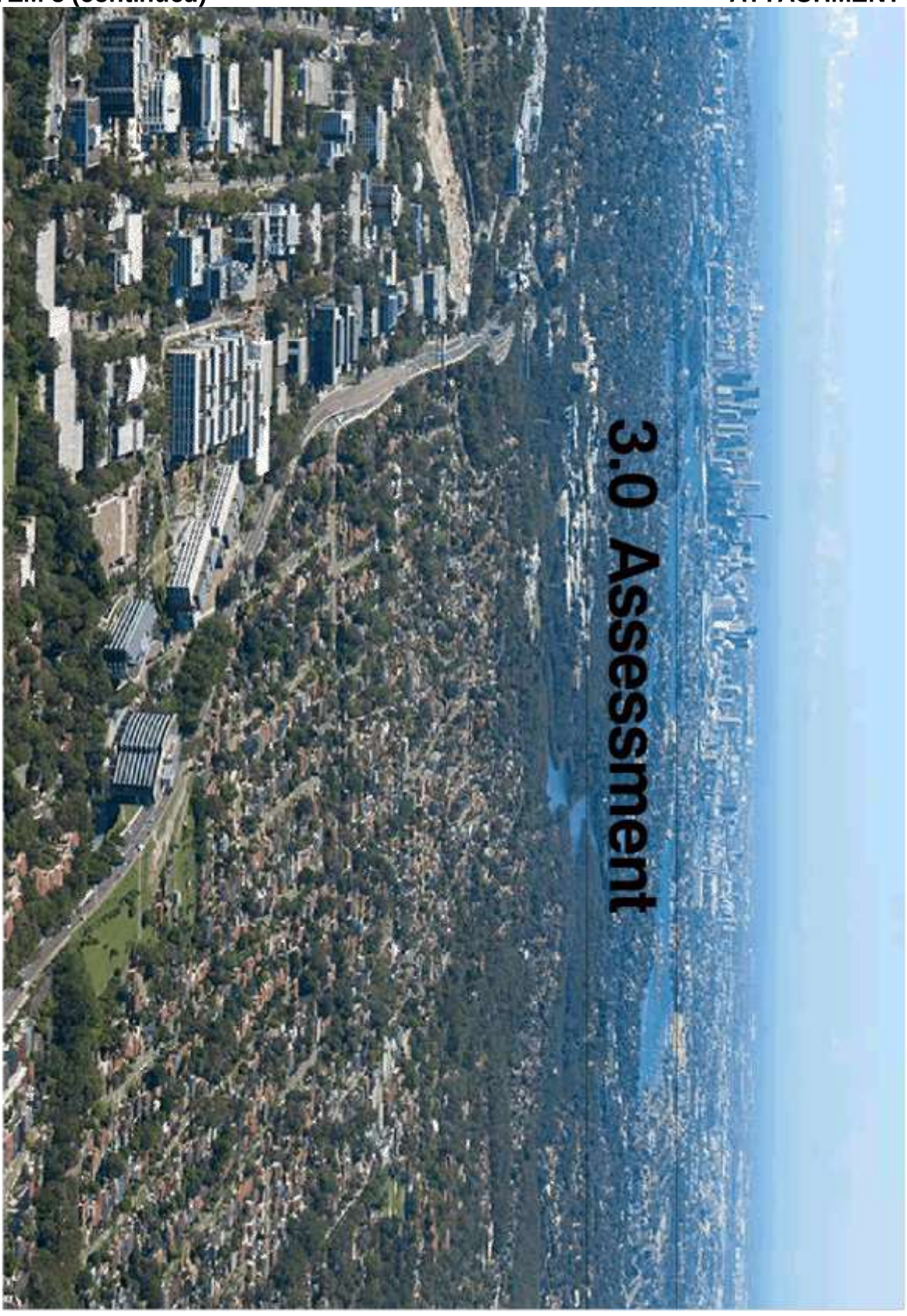


3.1 SEPP65 and Apartment Design Guide compliance

3.1.1 Master Plan Option

Sunlight/ daylight access to buildings

Daylight access to the indicative built form of the master plan proposal has been assessed for mid-winter (21 June) between the hours of between 9 am and 3 pm. With an FSR of 3.5, it is recommended that the proposed development be considered a dense urban area. The proposed master plan achieves SEPP 65 direct sunlight access (2 hrs) to approximately 70% of apartments.

Solar-access promoting features of the proposed development include;

- Elliptical tower form optimises the number of apartments receiving daylight access to habitable rooms and principal windows
- Provision of high ceilings and window-heads to allow deep sunlight penetration
- Provision of external horizontal shading to north-facing windows, and vertical shading to east and west- facing windows

Overshadowing

Potential overshadowing impacts of the indicative built form of the master plan proposal have been assessed for mid-winter (21 June) The 21st June is the shortest day of the year day, and has the longest shadows. For each of these days, an overshadowing study is provided for 9:00am, 12:00pm midday, and 2:00pm.

The proposal concentrates the tallest buildings away from the 1ha park to minimise overshadowing and maximise amenity to this public space. There is no overshadowing impact on adjacent residential areas, with shadows falling on commercial buildings where they have the least impact.

Overshadowing at 10am on 21st June

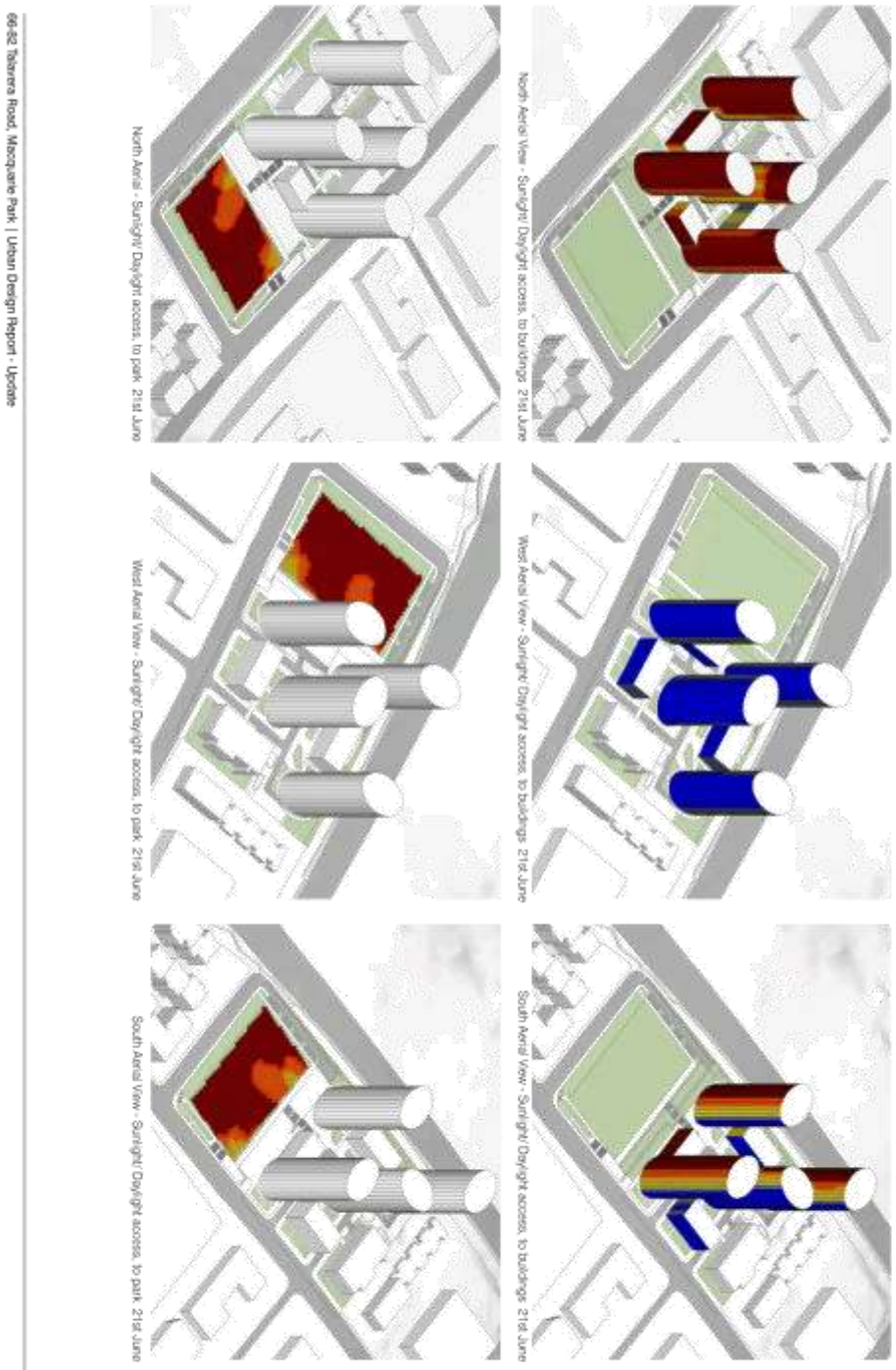
Overshadowing at 12pm on 21st June

Overshadowing at 2pm on 21st June

East Aerial View - Sunlight/ Daylight access, to buildings 21st June

East Aerial View - Sunlight/ Daylight access, to park 21st June

ITEM 5 (continued) **ATTACHMENT 4**



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3.1.2 Cross Ventilation

Cross Ventilation to buildings

Testing of the built form has demonstrated that the envelopes of capable of achieving the 60% natural ventilation requirement of SEPP 65 in line with the Apartment Design Guide. It is considered that with further detailed design development other natural ventilation methods may be introduced to improve performance.

It is intended that apartments above 9 storeys will have balconies that are not fully enclosed. Louvres or other such architectural devices could be used to manage airflow at these heights.

Cross Ventilation of apartments to typical lower levels

3.1.3 Master Plan Option Including Key Worker Housing

Location

The location of the key worker housing is subject to negotiation between Holdmark and Council. Holdmark proposes two options:

a) the key worker housing is located to the north west of the open space;

b) the key worker housing is located within the mixed use towers as increased density.

It is Architectus's recomendation that the approximately 40 apartment dwellings be located within the mixed use towers as additional density to the proposal.

Our recomendation is based on a consideration of the best function of the open space and the relationship between housing and the M2, which may result in the isolation of the key worker housing.

In addition, the integration of key worker housing into the mixed use towers is likely to achieve better social outcomes by ensuring that it is not as easily distinguishable from private housing, reducing the perception and likelyhood of social exclusion.

Solar Access

Solar access testing has been undertaken for the key worker housing located to the north west of the open space, being option a. The testing demonstrates that good solar access is achieveable to the key worker housing and the public open space in this option.

SEPP 65 Compliance

The key worker housing envelopes are considered likely to be able to achieve SEPP 65 compliance through detailed design, based on the envelope width and solar access testing.

Aerial - view looking East Sunlight/ Daylight access to buildings 21st June

Aerial - view looking North Sunlight/ Daylight access to buildings 21st June

Aerial - view looking West Sunlight/ Daylight access to buildings 21st June

Aerial - view looking South Sunlight/ Daylight access to buildings 21st June

Aerial - view looking West Sunlight/ Daylight access to open space 21st June

3.2 Options tested

Prior to arriving at the proposed master plan, Architectus tested a number of alternative master plan options.

3.2.1 Option 01 Variable heights

Strengths	Weaknesses	Conclusions
– Complies with SEPP 65 separation, solar access, cross ventilation, building depths – Park location is excellent – good visibility, public character and can be generally flat. – Varied heights provide interest and break up building bulk. – All buildings have good street address. – Good interface between buildings and the open space. – Maximises views for towers – Oval-shaped towers minimise visual bulk and ensure towers achieve 24m separation.	– Less separation between towers when standing in the park than Option 2 and 4. – Exceeds 120m maximum building height.	– Varied tower heights provide an excellent built form outcome, but requires building height in excess of 120m (the maximum height identified in the Herring Road Priority Precinct)

Option 01 Variable heights: Master plan

Option 01 Variable heights: View from new park (Alma Street)

Option 01 Variable heights: View from Talavera Road west, looking uphill to the east

Option 01 Variable heights: View from M2 Motorway

Option 01 Variable heights: View from Talavera Road east, looking downhill to the west

3.2.2 Option 02 East-west park

Strengths	Weaknesses	Conclusions
– Excellent tower separation – Complies with SEPP 65 separation, solar access, cross ventilation, building depths – Open space effectively relates to drainage channel west of Alma Road	– Open space must be terraced because of level change and does not allow for a large, flexible open space for active play – Towers too close to motorway jeopardising resident amenity	– Does not achieve objectives for district open space

Option 02 East-west park: Master plan

3.2.3 Option 03 Western park

Strengths	Weaknesses	Conclusions
– Complies with SEPP 65 solar access and ventilation. – Park location is excellent – good visibility, public character and can be generally flat. – Open space effectively relates to drainage channel west of Alma Road	– Does not achieve SEPP 65 tower separation distances – Towers are too bulky when viewed from the open space. – Poor street address – Buildings are too long	– Built form needs further consideration in this configuration

Option 03 Western park: Master plan

3.2.4 Option 04 Centralised open space

Strengths	Weaknesses	Conclusions
– Complies with SEPP 65 separation, solar access, cross ventilation, building depths – Internal park provides access from both sides of development	– Open space feels internalised and private. – Poor interface between buildings and the open space – Park centred on steepest slope of site which would cause significant earthworks to be required – Reduced views from towers – Park overshadowed by western towers	– Open space has only one street edge and provides less public amenity than preferred option

Option 04 Centralised open space: Master plan

3.2.5 Option 05 Looped internal road

Strengths	Weaknesses	Conclusions
– Park location is excellent – good visibility, public character and can be generally flat. – New internal road adjoining the M2 provides good access to the park and the common basement – Open space effectively relates to drainage channel west of Alma Road	– Road pattern is inefficient and does not provide good address for individual buildings. – Low-rise slab building adjoining the M2 is too long.	– Need to further resolve road pattern and built form

Option 06 Looped internal road: Master plan

3.2.6 Preferred scheme

Strengths	Weaknesses	Conclusions
– Complies with SEPP 65 separation, solar access, cross ventilation, building depths – Park location is excellent – good visibility, public character and can be generally flat. – All buildings have good street address. – Good interface between buildings and the open space. – Maximises views for towers – Oval-shaped towers minimise visual bulk and ensure towers achieve 24m separation. – Open space effectively relates to drainage channel west of Alma Road	– Less separation between towers when standing in the park than Option 2 and 4.	– Recommend as basis for the master plan as this scheme provides more public and private amenity than any other option

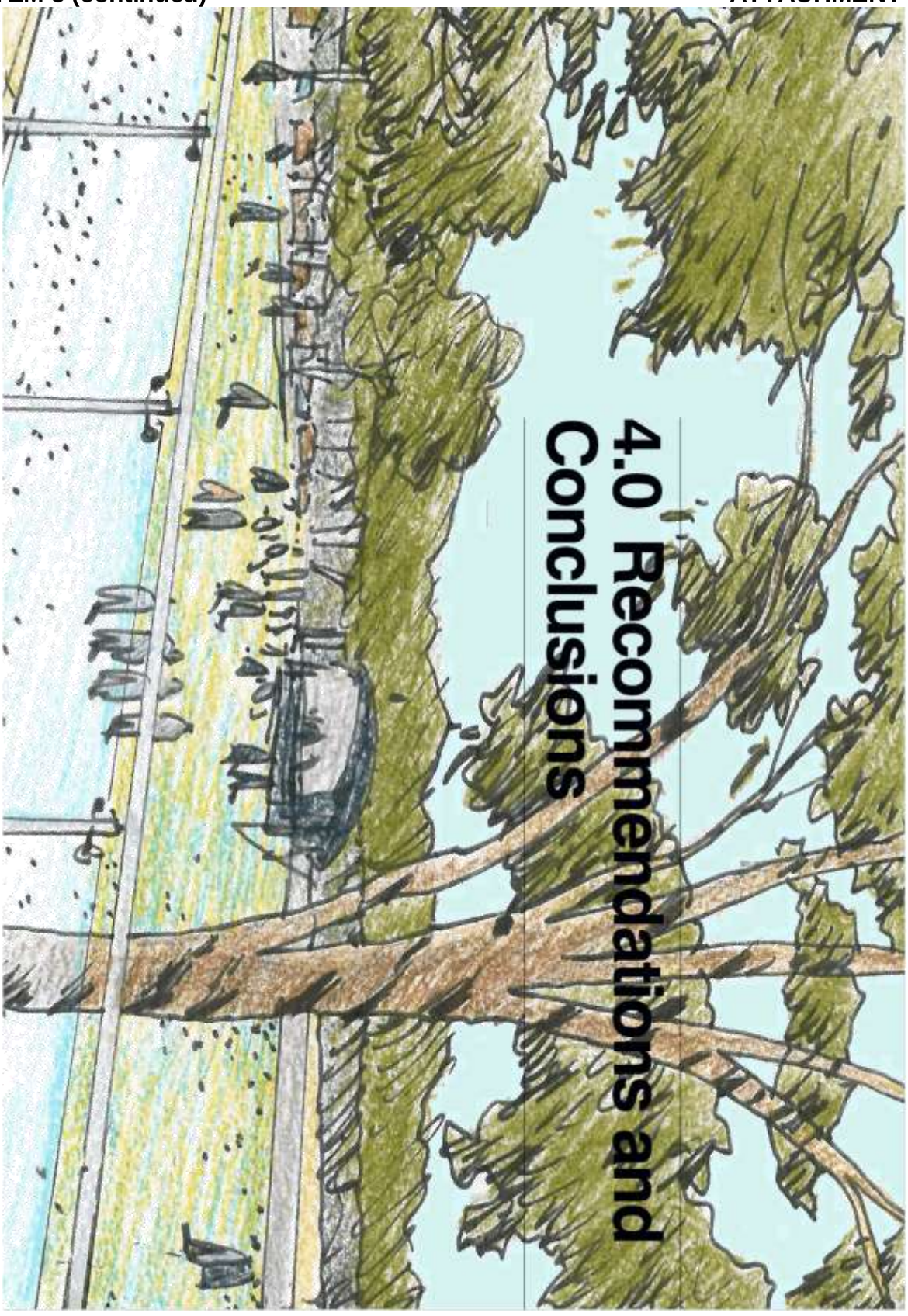
Preferred scheme: Draft master plan

Preferred Scheme: View from new park (Alma Street)

ITEM 5 (continued) **ATTACHMENT 4**

ITEM 5 (continued) **ATTACHMENT 4**

ITEM 5 (continued) **ATTACHMENT 4**



4.1 Proposed Local Environmental Plan controls

4.1.1 Land use zoning

It is recommended that the subject site be zoned **B4 Mixed Uses,** as per all other non-recreational land subject to the Priority Precinct This will allow for the development of the new commercial building on Talavera Road, the new public open space and the residential uses proposed in the preferred master plan. Importantly, this zone will also facilitate actives uses at ground levels, which will be important for the success of the park.

This allows for the delivery of key worker housing to Council in a location to be agreed.

It is recommended that once the development is occupied and the park dedicated to Council, then the LEP be amended to **RE1 Zone – Public Recreation** - for the park areas.

4.1.2 Building heights

It is recommended that the site have a maximum building height of **120m**. The FSR control and DCP provisions would restrict development on the site to a maximum of four towers.

From an urban design perspective, it is appropriate to have the maximum building height on the periphery of the Herring Road Priority Precinct because the site will be a gateway for the precinct, marking the entrance to Macquarie Park from the M2 motorway, and also visually locating the new park. In practical terms, the additional height on the subject site is required commercially to allow for 1ha of the site to be dedicated to Council for public open space at no cost to Council.

4.1.3 Floor space ratio

The preferred master plan for the site results in an **FSR of 3.5:1**. This is within the range of FSR controls for the Herring Road Priority Precinct.

4.2 Development Control Plan and VPA

4.2.1 DCP controls

Should the Department of Planning and Environment support some residential uses on the site, detailed DCP provisions will need to be amended. Architectus can assist Council and the Department of Planning and Environment in the preparation of these controls in consultation with the land-owner.

The following DCP controls are likely to be required:

– The preferred built form, which shows ground plane RLs, a block plan showing heights in storeys and building footprints.

– The public domain – specific requirements for the design of streets and the new 1ha open space.

– Active frontages and land use plan – identifying where non-residential uses are required.

4.2.2 Voluntary Planning Agreement

It is recommended that there is a binding Heads of Agreement in place (between Holdmark Property Group and Council or the Department of Planning and Environment) for the construction and dedication of the new 1ha open space before the site is formally rezoned.

It is proposed that the key worker housing could be included within the same, or as part of a seperate, VPA through a similar process.

The appropriate mechanism for the dedication of the park to Council is a voluntary planning agreement. Holdmark is willing to enter into a planning agreement for the dedication of this open space. The Agreement should identify development stages, and require that the park be dedicated to Council prior to the release of an Occupation Certificate for the final stage of the development (which should relate to the remaining 35% of units on the site).

The level of embellishment to the new park is to be agreed with Council. Holdmark is also willing to agree that the cost of providing the new open space would not be offset against Section 94 contributions.

4.3 Conclusion and recommendations

The rezoning for B4 Mixed Uses and increased maximum FSR and height would result in the provision of a 1ha open space on the site and, if agreed with Council, approximately 40 key worker dwellings at no cost to the public purse – a significant and important opportunity for Macquarie Park and City of Ryde.

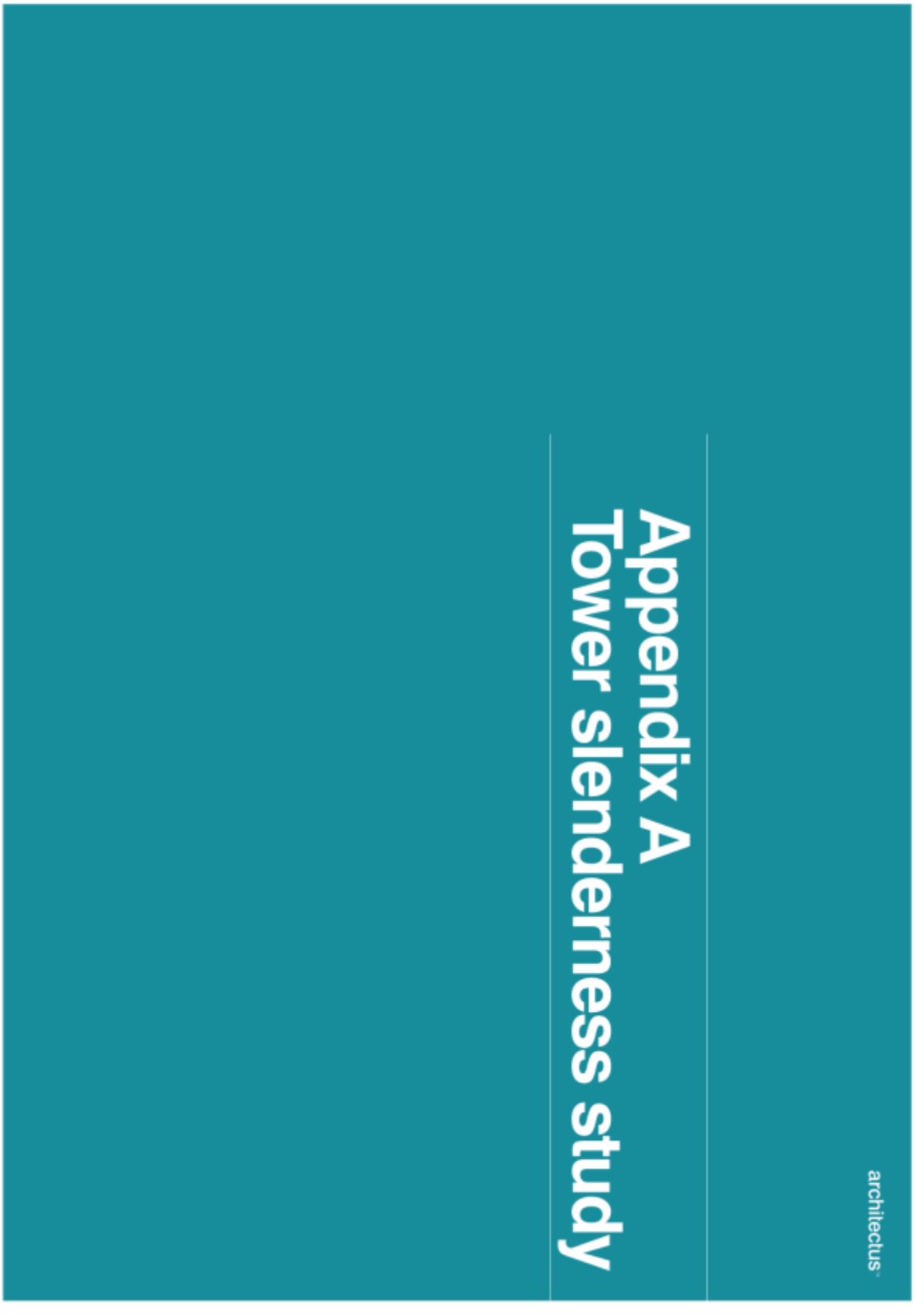
This report provides an indicative building envelope plan for the redevelopment of the remainder of the site for residential uses. In summary, the master plan prioritises the location and design of the open space. In the proposed northern location the park will be visible, have excellent solar access and can be designed to be level (which has been a challenge on this site which has a fall of over 18m from the south to the north of the site). The preliminary design concept for the park, prepared by Clouston, ensures that it will have active edges, passive surveillance opportunities and a significant grassed area for a wide variety of active and passive recreation uses.

Key worker housing would achieve the same level of amenity and complaince with SEPP 65 as the proposed private residential dwellings. The proposed dwellings could also achieve compliance with the definition of affordable housing under the NSW Affordable Housing Guidelines. The location and management of these dwellings would be negotiated between Council and Holdmark to ensure a positive social outcome and a benefit to the Business Park.

The built form provided in this report shows indicative envelopes that would be refined through detailed design, consultation and testing. The plan has demonstrated ability to comply with SEPP65.

On the basis of the public benefit to be delivered, Architectus recomend that the planning proposal is supported.

ITEM 5 (continued) **ATTACHMENT 4**



Tower slenderness study

Architectus has researched methods to achieve tower slenderness to provide good urban design, internal amenity and address impacts of tower bulk on surroundings. The aim of this research is to develop 'rules of thumb' for appropriate tower proportions.

Benefits of slender towers

As urban densities increase the slenderness of tall towers are becoming an important consideration – especially for residential towers and their separation.

Benefits of slender towers include:

- Overcomes the sense of tower bulkiness and overwhelming of the public domain.
- Opportunities for views of sky between buildings and a feeling of openness.
- Minimising overshadowing, particularly extended periods of overshadowing in comparison to long elevations of lower scale development.
- Enables a good sunlight and daylight to the public domain.
- Creating better separation between buildings and better views - improves the amenity, privacy and outlook of apartments
- Increased residential amenity, as the floor-plates are more likely to achieve good solar access and ventilation requirements.
- Limits the number of apartments per level and the length of corridors.
- Ensures that apartments are not too deep and rooms don't rely on 'borrowed' light and air.

Local examples of floorplate controls

New South Wales

SEPP 65 and the Residential Flat Design Code provide design controls for all residential flat buildings in NSW. The Code has controls for building depth and separation and amenity. Together with fire regulations, the proper application of the Code should have the effect of limiting floorplates in residential buildings.

However, in the early master planning stages of a project, it is difficult to test all of these detailed design provisions. As a result, master plans, and planning controls can result in envelopes for large floor-plates that are acceptable from a design and amenity perspective.

There are no state-wide floor-plate controls for tall buildings in NSW.

Green Square, City of Sydney Council

In the South Dowling St Precinct within Victoria Park, Zetland (part of Green Square) detailed consideration has been given to the slenderness of towers. The resulting controls allow for 22-storey towers (approximately 70m in height) to a maximum of 750sqm of floor area including balconies (referred to here as 750sqm Gross Building Area floor-plate).

A significant separation distance between towers (60m) is also provided as this precinct is an inner city area but is not within a designated urban centre.

Central Sydney

In Central Sydney, a 1,000sqm Gross Floor Area maximum is applied to residential tower buildings. This would equate to 1,333sqm GBA. A maximum horizontal dimension of the building facade of 40m is also applied. Towers in Central Sydney have maximum building heights ranging from 60m to 235m.

International examples of floorplate controls

Calgary, Canada

The maximum floorplate size is 650 square metres of net residential floor area (i.e. not including elevator cores, balconies etc.). This would equate to 953sqm GBA.

Chicago, USA

There is no limit to floorplate size, but upper storeys are required to be smaller to give the towers a sculptural appearance.

New York, USA

Floorplate size is regulated using a site coverage control. Towers must cover 40% or less of a site area, with special exceptions up to 50% for smaller sites.

San Francisco, USA

The floorplate of towers in San Francisco must incrementally decrease as height increases. Lower parts of a tower must not exceed 1,600sqm GBA and the upper tower floorplates must not exceed 1,100sqm GBA.

Vancouver, Canada

The maximum floorplate size is 604sqm of net residential floor area (this equates to 886sqm GBA) and the maximum horizontal dimension of a tower is 27.5m.

Open balconies may extend beyond this provided they are less than 1/3 the overall façade length.

Design examples

Victoria Square North: 20 Gadigal Avenue, Zetland, NSW, Australia

– Floorplate: 700sqm including balcony

– Floorplate dimensions: 46m x 15.2m = 700sqm.

– Building Height: 85m and 26 storeys

– Slenderness ratio: 1:6 (using the narrow side of the building)

One Madison Park: East 23rd Street, New York, NY

– Slenderness ratio: 1:12 (Depth:Height)

– 50 Floors plus cellar/ 621 ft (189.28m)

Findings

There are a variety of different floorplate controls in other cities around the world. Ultimately, the controls are a function of different priorities for a city – whether the aspirations are access to sunlight, views, or densification and consolidation. Generally, it seems that larger cities have more relaxed floorplate controls, while smaller cities seek slimmer towers and more separation between towers.

A floorplate control that is simply a percentage of the site area can produce very bulky buildings on large sites or amalgamated sites.

Reducing the size of upper floorplates is a solution to reducing visual bulk for very tall buildings (say, over 50 storeys). In Sydney's climate, it is usually preferable to have a podium/tower form of development where the podium relates to the alignment and scale of the street and the tower relates to a wider context of towers. It is usually preferable to not have "wedding cake"or stepped built forms in favour of simplicity of built form.

It is now commonly acknowledged that the Green Square provisions (700sqm floorplate, 22-25 storeys) produce a tower with slender proportions.

Taller buildings can accommodate larger footprints, and still achieve good internal amenity, as more floor space is dedicated to lift cores/ services.

Architectus' recommendations

In order to achieve slender tower the following rules-of-thumb are recommended:

– Floor-plate sizes should be related to height as follows:

  – Up to 25 storeys – 800sqm GBA maximum

  – 26-35 storeys - 950sqm GBA maximum

  – Above 35 storeys – 1,100sqm GBA maximum

– The length (horizontal dimension) of a residential tower should not exceed 40m.

– A tower slenderness ratio (depth:height) should be at least 1:4.

The above recommendation is subject to detailed testing for each site, and in consideration of the site's context and constraints. Towers might not be able to achieve the above maximum floorplates if they cannot meet SEPP 65 standards for internal amenity.

Sources:

Extract from a study for the City of Toronto: www1.toronto.ca/city_of_toronto/city.../Tall-buildings-Final-pt5.pdf

Program for the 'Slenderness: New York\ Hong Kong' exhibition, Skyscraper Museum, New York: http://www.skyscraper.org/PROGRAMS/slender_program.htm

Important note

The information, drawings and artist's perspectives provided within are indicative only and should not be relied upon. This document does not constitute an offer of any kind and in no way binds Holdmark Property Group or any of their respective officers, employees, agents or related entities.

September 2015