



Strategic Employment Review: Macquarie Park

▶ PREPARED FOR NSW DEPARTMENT OF PLANNING AND ENVIRONMENT



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EXECUTIVE SUMMARY

- Macquarie Park (including North Ryde) is Sydney's second largest office market, surpassing North Sydney in 2013. It has witnessed the fastest growth in stand-alone office employment (i.e. office employment in dedicated office buildings) of all major centres over the last two decades, growing by an estimated 6.6% per annum and far outpacing rates of growth across the metropolitan area as a whole of 2.1% p.a., the CBD rate of 1.7% p.a. and growth in the non-CBD stand-alone office workforce of 2.4% p.a. It forms a critical part of the Global Economic Corridor in which Sydney's knowledge jobs are concentrated and has a strong clustering of industries in the medical research and pharmaceutical, high technology and electronics sectors.
- This report assesses the future role that Macquarie Park will play within the Sydney metropolitan area as a major employment hub assuming current planning controls are maintained, as well as considering how the market characteristics might change if higher density office development were permitted across the precinct. Whilst we anticipate continued steady demand for a range of land uses within Macquarie Park, including retail, education, health services, hotels and housing, we envisage future growth will be dominated by businesses requiring office space. As well as continued growth in the current industry clusters, opening up the market to high rise office space should result in stronger growth in industries traditionally located in higher density centres, including finance & insurance and property & business services and, potentially, public administration. The stronger growth will become more evident as competing centres hit capacity constraints.
- In that context, our focus within this report is to understand what share of future metropolitan demand Macquarie Park might be expected to capture. We also consider the impact of current and emerging work practices—activity based working, agile working, remote working hubs etc—on future demand for office space.
- Within Macquarie Park we analyse growth prospects under existing and higher density planning provisions, considering opportunities for development, preferred locations, the appropriate land use mix and existing or potential threats to such development. We seek to answer the following questions:
 - How much demand for commercial office space will there be under the current planning controls (density/height) over the next 50 years and how much incremental demand will there be if higher density precincts were opened up?
 - When would this occur?
 - What are the constraints/risks/threats to future development—from competing land uses and the existing infrastructure's capacity to accommodate anticipated growth?
 - What is the capacity of the Macquarie Park Corridor (including the Macquarie University Station Precinct) to accommodate future demand?
 - Do we need to protect land within Macquarie Park to allow for future office employment growth?

Key conclusions

Employment projections

- The stand-alone office workforce within the Macquarie Park Corridor is estimated to be approximately 42,000 as at December 2015, representing approximately 69% of the total workforce within the precinct. **Based on existing planning controls and land use zonings**, the stand-alone office workforce is forecast to grow at an average annual rate of 2.9%, reaching a level of 55,800 by 2025 and an estimated 173,000 by 2065. Over the same horizon, the total workforce within

Macquarie Park is forecast to grow from 60,800 to around 269,000. Office employment is expected to be the primary driver of economic growth.

- Under this 'low density' scenario, the office stock within Macquarie Park is forecast to rise from close to 887,000 square metres now to around 1.2 million square metres by 2025 and to an estimated 2.9 million square metres by 2065. The Macquarie Park Corridor would reach its theoretical capacity by 2063.
- These forecasts suggest that, even by maintaining existing planning controls across the Macquarie Park area, the Centre has the capacity for substantial growth over the forecast period. It only faces capacity constraints late in the forecast period. Under this growth scenario, Macquarie Park's share of the metropolitan stand-alone office workforce would rise from 7% at present to an estimated 16% by 2065 and it would develop into a large and vibrant commercial centre. Across most parts of Macquarie Park, the current building characteristics—low rise, large floorplate—would likely remain. Sites adjoining Herring Road would become the focus for high rise office space, reflecting recent amendments to Ryde LEP 2014 that allow for commercial development of up to 28 storeys.
- **Allowing high density commercial development to occur across Macquarie Park** would see both the stand-alone office workforce and the total workforce increase at a much faster rate of growth, particularly as competing centres hit capacity constraints over the longer term. The stand-alone office workforce could be expected to increase to 219,000 by 2065, representing some 20% of the metropolitan (stand-alone office) workforce by that time. Accommodating this growth in demand, the office stock across the Macquarie Park Corridor would increase to around 3.6 million square metres—some 760,000 square metres more than under the 'low density' scenario.
- Allowing high rise commercial office space across Macquarie Park could be expected to impact on the character of the precinct. Over the course of future office cycles, we would expect to see Macquarie Park develop characteristics of a traditional higher density office centre, similar to North Sydney or the CBD, with a greater range of ancillary services supporting the commercial core. Sectors that could be expected to experience stronger growth within Macquarie Park include finance & insurance, property & business services and public administration, as well as some that are less intensive office users, such as retail trade and accommodation & food services.
- As a consequence, the total workforce across the Macquarie Park Corridor would be boosted by allowing higher density commercial development, as a wider range of industry sectors and tenancy sizes could be expected to be attracted to the Centre. Under the 'high density' scenario, total employment is forecast to rise from 60,800 to 319,000 by 2065—an increase of almost 51,000 over the 'low density' scenario.

Constraints to future development

- Market research undertaken for this project, including interviews with key stakeholders in Macquarie Park, suggest that the major constraint to future development—either at current densities or at higher densities—is around the issue of transport. Other constraints to future development in Macquarie Park include market demand, adequate provision of amenities, planning restrictions and, crucially, whether a development is financially feasible. However, transport was identified as the major constraint, particularly that transport infrastructure has failed to keep pace with the speed of commercial development that has occurred within Macquarie Park.
- The road network has major bottlenecks, both within Macquarie Park and on the key approaches. Congestion and (long) peak hour delays are critical issues of concern. Lane Cove Road, as the major north-south thoroughfare linking Sydney's northern (and beach) suburbs with the south of the city, generates a large volume of through-traffic and adds to congestion problems within the Centre.

- Compounding this, car usage is a huge legacy issue resulting from the way in which Macquarie Park has developed and historical planning controls. A culture of entitlement around car usage and on-site parking is entrenched.
- Public transport is poorly utilised and, within Macquarie Park, has a number of shortcomings. The existing rail service is inadequate in terms of frequency and capacity to meet demand from many parts of Sydney. Buses generally do not have dedicated/priority lanes for high demand corridors and there is a plethora of different operators servicing the area. Several high demand source areas for employees lack direct services.
- In essence, there needs to be a co-ordinated, holistic transport network plan. We understand Transport for NSW and the Department of Planning & Environment are undertaking a multi-modal transport strategy in conjunction with the Sydney Metro Northwest, but it is not yet clear what the outcome will be. In any case, existing transport problems will be compounded by the plan to close rail stations in the Centre for seven months from 2018 for development works associated with the Sydney Metro Northwest.
- Stakeholders see the completion of the Sydney Metro Northwest in 2019 and expected upgrading of the Macquarie Park Bus Interchange as a potential circuit-breaker in respect of transport concerns. However, until these works are completed, additional development, and especially higher density commercial or mixed use development, will only add to congestion problems.

Future density of commercial office development within Macquarie Park? High rise v low rise

- Macquarie Park has developed over the past 30 years into Australia's premier business park. The appeal of the Centre has been the ability to occupy large floorplate, low rise, modern, campus-style office buildings, incorporating generous car parking provision at lower rentals than in nearby established office centres such as Chatswood, St Leonards and North Sydney.
- Clusters of businesses around key industry sectors have emerged and the Centre has a preponderance of larger sized companies relative to traditional office markets. Amongst existing occupants interviewed there remains a preference to occupy low rise buildings, although there isn't a negative perception of high rise development provided floorplates are large enough to achieve operational efficiencies. Indeed, high rise commercial development is seen as an inevitable and logical outcome for Macquarie Park provided transport concerns can be overcome.
- Higher density development could be expected to result in a faster-growing and more diverse workforce and, in turn, attract more ancillary services and facilities to the Centre. The lack of services (shops, restaurants, hotels) beyond those within Macquarie Shopping Centre was viewed by respondents as a shortcoming of Macquarie Park. Moreover, the location of the Macquarie Shopping Centre at the western end of the precinct means that it doesn't service the whole of the Centre effectively.
- We would expect to see Macquarie Park take on more of the character of a traditional office centre if high density development occurs, with stronger representation by industries such as finance & insurance, business services, government administration and other services sectors. A broader range of businesses, with a cross section of space requirements, would be attracted to Macquarie Park, particularly as other centres hit capacity constraints.
- The precise timing of when Macquarie Park would transition into a higher density office centre is difficult to determine and depends on a number of factors. The transition to high rise will be assisted by a major pre-commitment from a tenant/s willing to pay the higher rent required to underwrite high rise construction or when other preferred locations reach capacity, forcing more 'overflow demand' from companies to move to locations with readily developable sites such as Macquarie Park. On

our forecasts, theoretical capacity for office development will be reached in around 2025 in Chatswood, by the mid 2030's in the CBD, North Sydney and Parramatta and 2050 in St Leonards. We caution that theoretical capacity is not the same as realistic capacity which is likely to be reached much sooner.

Where within Macquarie Park/North Ryde should high rise commercial office space go?

- This is principally a planning question. Already, the state government and Council have determined that high rise office space is permitted along the Herring Road frontage in the Macquarie University Station Precinct. This area is covered by the mixed use zoned Herring Road Priority Precinct. There is a logic for this, given the proximity to the railway station, the bus interchange, Macquarie University and the shopping centre.
- Until such time as a major upgrade to transport infrastructure occurs in and around the North Ryde/Riverside Corporate Park precinct, higher density development would seemingly only add to the traffic difficulties being experienced by occupants of that area.
- Respondents advised that an acceptable walking distance to public transport is around 500 metres. Many businesses currently located within Macquarie Park are located up to 800 metres from the nearest station and consider it too far, although there is much that could be done to improve pedestrian flow, safety and comfort around the Centre.
- Logically, areas surrounding the Macquarie Park station and along the Waterloo Road spine linking that station with the Macquarie University station would be the preferred location for future high rise office space. However, again, traffic is a major constraint, especially along Lane Cove Road. If, and when, these issues can be resolved, such areas would seemingly be preferred locations for higher density development. The Riverside Corporate Park would not work as well as a location for high rise commercial space given the predominant rezoning of sites nearer to the North Ryde Train Station as mixed use zones, favouring residential development. Respondent feedback overwhelmingly suggests the area will develop into a residential precinct.

Co-existence of residential and office space. Do we need to protect office sites in the near term?

- Strong demand for residential sites across Sydney's inner and middle suburbs is boosting the price of underdeveloped commercial property suitable for residential development. Residential developers can afford to pay more for commercial sites and there is a risk that, if sites are not protected, residential development will limit the potential for commercial development when it becomes financially feasible.
- These concerns are particularly relevant in Macquarie Park and Riverside Corporate Park where, already, key sites have been rezoned to allow residential and mixed use development.
- Existing office occupants are not opposed, per se, to high rise residential development occurring within Macquarie Park—with most respondents highlighting the opportunity that it will generate more growth and depth of services to the Centre and create the opportunity to live closer to the workplace. Indeed, residential development was viewed as a key ingredient to making Macquarie Park an effective and attractive precinct. However, there was a widely held perception that apartment development should occur in discrete zones, separate to the commercial office precinct. Certainly, amongst respondents, there was little appetite to occupy space within mixed use buildings. Respondents also felt that further rezoning to permit high rise residential use should not occur until such time as the transport issues are resolved.
- Our forecasts suggest Macquarie Park can accommodate between 2.9 and 3.6 million square metres of office space over the next 50 years i.e. it would grow to three to four times its current

size. Allowing unfettered residential development in the logical areas for commercial office space risks limiting the Centre's employment potential. Sites need to be protected for when the market demand is there for new office space and it is more financially feasible to build.

Conclusion

- With or without changes to planning controls, Macquarie Park is set to expand rapidly as a commercial office centre over the next 50 years. It is already the second largest office market within Sydney and has the capacity to accommodate a significant share of metropolitan growth well into the future. The questions to ask are: should even stronger growth be facilitated/encouraged by allowing higher density commercial development via changes to planning controls? Do sites need to be quarantined to allow this to occur and when will it become feasible to develop high density commercial development?
- Over the past decade transport and services infrastructure has failed to keep up with the pace of commercial development and, as a result, Macquarie Park is currently facing serious traffic problems. Amongst stakeholders in Macquarie Park there is a view that these issues need to be resolved before changes are made to state or local planning controls that would encourage higher density development. The completion of the Sydney Metro Northwest is expected to be a catalyst for a transition from car usage to improved public transport, but that alone will not solve traffic problems.
- Provided these issues can be resolved, there is a compelling logic for high rise development within Macquarie Park. The Centre will play an essential role in Sydney's economic development and has the potential to become a vibrant commercial precinct. There is a place for both residential and commercial office space within the Centre, but respondent feedback overwhelmingly supports the two land uses remaining largely separated. Moreover, we need to reserve key areas around stations for office space. If we allow unfettered residential development, future commercial potential will be compromised.
- The crucial question of when it will be feasible to develop high rise commercial buildings in Macquarie Park requires further investigation and is beyond the scope of this report. High rise commercial development is much more expensive to build and would have higher sites values than the current low rise existing office buildings in the precinct. As a result, substantially higher rents would be required to underwrite financial feasibilities.

1. INTRODUCTION

1.1 Background

BIS Shrapnel was commissioned by the Department of Planning & Environment in October 2015 to undertake a Strategic Employment Review of Macquarie Park. This Review is intended to form an initial input into a broader investigation that the Department is undertaking in conjunction with the City of Ryde into opportunities to enhance Macquarie Park's role as a major commercial centre and to consider the appropriate future land use mix and optimal development density across the precinct.

The precinct, which is located approximately 14km from the Sydney CBD, is within 800 metres of the Macquarie Park, Macquarie University (Herring Road) or North Ryde stations. The boundary of the Investigation Area is located on either side of the North Ryde Station Precinct and adjacent to the eastern boundary of the Macquarie University (Herring Road) Precinct. Within this report, unless otherwise stated, references to Macquarie Park (or the Centre) refer to the Macquarie Park Investigation Area.

Adjacent land to the west of the Macquarie Park Investigation Area, known as the Macquarie University (Herring Road Priority) Precinct, has been rezoned to a B4 Mixed Use zoning that will provide significant uplift in commercial development potential within the precinct, as well as high density housing. Within this report, where we refer to the Macquarie Park Corridor, we include Macquarie Park (as defined above) and the Macquarie University Precinct. A map of the Investigation Area and University Precinct is provided on page A–3.

Likewise, an area adjacent to North Ryde station, defined as the North Ryde Station Priority Precinct, has been rezoned B4.

Within this report, employment for Macquarie Park refers to the ABS SA2 defined area for Macquarie Park-Marsfield and North Ryde-East Ryde—an area which includes the Macquarie Park Corridor as well as some other surrounding areas.

The focus of this study is to provide guidance on the following issues:

- What role does Macquarie Park play within the Sydney metropolitan area in meeting demand for, and supply of, commercial office space?
- What centres does Macquarie Park compete with for commercial office space?
- How might that change in the short, medium and long term? What factors will influence this? What is the capacity of Macquarie Park and competing centres for future office development under current zonings?
- Does Macquarie Park need to be preserved as a commercial office market in both the short and longer term?
- How will the office and residential cycles interact within Sydney? What pressures/threats will that place on office sites in the near term?
- What development density should be permitted for future office development? Low rise versus high rise? And where? How will that impact on the type of tenant located in the centre? Will high rise be a positive or negative for existing businesses by sector? Will it open up Macquarie Park to new types of businesses or different industry sectors? From where?

- Should high rise residential development be permitted alongside commercial office space—either in mixed use developments, adjacent to office buildings or in residential precincts close to but separated from commercial zones?
- What can be done to provide a greater amenity to the area and additional services?
- What other threats does Macquarie Park face if it wishes to remain and grow as a competitive commercial office centre?

1.2 Contextual issues

The Macquarie Park Corridor faces a number of critical issues in its future development.

- Macquarie Park competes as an office location against other centres across metropolitan Sydney. Macquarie Park is an overflow market which competes for tenants with other major centres located in the North Shore, including North Sydney, St Leonards, Chatswood, but also to a lesser extent, with the CBD and Parramatta. How well it can compete, and what share of metropolitan employment it will capture, depends on planning regulations and the limits they place on the type and size of businesses that can go there.
- At present, the Macquarie Park corridor covers a large area with isolated precincts that are not well integrated or connected. The low density development that has occurred over the last 30 years in Macquarie Park has lent itself to attracting stand-alone enterprises and, in particular, businesses that want large floorplate, campus-style office space.
- Macquarie Park, unlike most of the centres that it competes with, has experienced a rapid phase of development since the early 1990s, with development being underpinned by businesses with a high reliance on car usage due to generous car parking provisions and, until recently, limited public transport provision to the Centre. Whilst public transport options have improved, particularly with the introduction of the Chatswood to Epping rail link and stations in 2009, and expansion of the bus network servicing the area, there remains a significant reliance upon private transport amongst users within Macquarie Park and major traffic issues that will impact future development.
- The challenge for Macquarie Park is how to make it into an effective and attractive working precinct around transport nodes with linkages between clusters that will help it grow.
- Acting as a constraint on the development of effective commercial precincts in Macquarie Park are encroachment pressures from alternative uses, most notably residential.

1.3 BIS Shrapnel approach to study

Our approach to undertaking the study has been to focus firstly on the capacity of Macquarie Park over the short, medium and longer term under **existing** planning provisions. We use a mix of desk research—including existing BIS Shrapnel analysis and forecasts of demand for and supply of the Sydney office market—and qualitative market research with stakeholders in the Macquarie Park area to address the following issues:

- the evolution of Macquarie Park;
- its current role in the Sydney metropolitan commercial office market;
- the existing structure of its office and non-office workforce, including dominant industry clusters;
- key drivers of employment such as the University and Hospital etc;

- capacity for office development under existing planning controls over the short, medium and long term across the Macquarie Park Corridor; and
- opportunities and constraints to development.

We consider long term demand for office space across the Sydney metropolitan area and the share of this that could potentially be captured within the Macquarie Park Corridor under existing planning provisions.

We also consider the capacity of competing centres to accommodate future demand—when will the CBD and major suburban centres such as North Sydney, Parramatta, St Leonards and Chatswood reach capacity (under current zonings).

Specifically, we seek to understand whether there is a need for higher density commercial development within Macquarie Park to accommodate future demand, particularly given the theoretical capacity of the adjoining Macquarie University Station Precinct.

In any case, we also consider how the characteristics of Macquarie Park will change if planning controls are amended to allow **higher density land uses** (by FSR and height) across the precinct. Specifically, whether these changes will open up the area to a broader range of tenants and industries that might not consider the location with its current characteristics. We assess the impact of high density development on the capacity of the Centre and what that might mean for future employment potential.

Comments as to the appropriate density and land use mix that could be achieved within Macquarie Park reflect the feedback from our discussions with stakeholders in the area including businesses occupying office space, real estate agencies, Macquarie University and Connect Macquarie Park+North Ryde (hereafter referred to as Connect) as to how they might respond to such changes.

2. CURRENT STATE OF PLAY WITHIN MACQUARIE PARK

2.1 Evolution of Macquarie Park as an office centre

Originally established in the 1960s, Macquarie Park/North Ryde witnessed a gradual transition from an industrial employment precinct to a business/office park through the 1980s and '90s.

In the 1970s, development was led by biotechnology, pharmaceutical and science-related businesses, who chose the area because of its proximity to the newly established Macquarie University. Johnson & Johnson, one of the first major companies to build their national headquarters in the mid '70s, was attracted to the area because of the availability of land, proximity to the University and reasonable accessibility to the CBD. Many of the early buildings that were developed within the precinct held a combination of office and warehouse space. Demand from high tech companies such as Microsoft led to the appearance of the first high office content buildings during the mid to late 1980s. At the time, planning controls required that new commercial developments incorporate a research & development component.

Subsequently, Macquarie Park became popular as a location for companies that wanted to consolidate office, warehouse/distribution and research functions under one roof. However, for the first time, Macquarie Park also drew attention from more traditional office users, such as American Express, which saw the area as a cheaper alternative at the time to the major office markets such as the CBD and North Sydney.

A major phase of development occurred during the late 1990s/early 2000s, with much of the demand being for pure office space, and from key industry sectors including IT&T, computing, (bio)-medical/pharmaceutical and electronics. As well as growth within Macquarie Park, the precinct known as Riverside Corporate Park (bounded by Delhi Road and Epping Road), saw considerable commercial development around this time.

A large part of the appeal of Macquarie Park at this time was:

- Price differential/lower rentals relative to other major North Shore centres and the CBD.
- The growing clusters of businesses in key industry sectors and relative ease of accessibility to clients, suppliers, competitors and peers in those industries.
- Proximity to the north shore executive belt and often to a previous business location, which minimised staff disruption on relocation.
- Generous car parking provisions. Many companies that occupied space at Macquarie Park had either a significant distribution or sales function, requiring ease of access to markets or clients. With limited public transport options available, car usage was high and generous car parking ratios under local planning controls within the area encouraged tenants to drive. Many companies came from quasi industrial locations that likewise had generous car parking ratios and were serviced by relatively poor public transport, such as Frenchs Forest, Mona Vale, Pymble/Gordon, Lane Cove, and elsewhere.

The leasing/development market in Macquarie Park was badly affected by the 2001 'tech wreck'. Most IT&T related businesses shed staff, causing net absorption in the Centre to turn negative in 2002. With a number of speculative buildings coming on stream at the time, the vacancy rate blew out to 23%. The subsequent few years were relatively quiet but, as demand recovered across the Sydney market, Macquarie Park captured a significant share of the growth.

The completion of the Epping to Chatswood rail link in 2009 provided a much needed boost to public transport provision to the centre, with three new stations opening access to the University, Macquarie Park Shopping Centre and businesses in the Macquarie Park precinct. State and local government planning controls reinforced the role of the Centre as a major commercial business hub, with significant potential for growth.

Over the three years to 2009 the office stock in Macquarie Park almost doubled off the back of major pre-commitments for space by Optus (84,000 square metres), Aristocrat, Hyundai, CA, Sonic Health Care and Medtronic, amongst others.

The key factors driving companies to occupy space at Macquarie Park over the past eight to ten years have broadened. Many of the historic reasons remain relevant: rental relativity and attractive incentives, consolidation of premises after outgrowing old buildings, proximity to peers in industry, availability of car parking. Proximity to the University is a driver for some companies and several respondent companies discussed collaborative initiatives with the University. Also important has been the fact that the type of large floorplate, campus-style building typically found at Macquarie Park allows companies to build in new work practices (encouraging better collaboration between staff) and new technologies. Feedback from respondents suggests an optimal floorplate to facilitate Activity Based Working is of the order of 1,800 to 2,000 square metres.

At least two companies (Citrix and Fujitsu) have relocated from the Riverside Corporate Park to the main area of Macquarie Park over recent years. Amongst other reasons, Macquarie Park was perceived to offer better public transport facilities, a greater range of amenities and easier private transport access than Riverside Corporate Park. There was also a concern that plans to allow additional high rise housing close to North Ryde railway station would exacerbate an already heavily congested road network.

By 2013 Macquarie Park/North Ryde had overtaken North Sydney as the second largest office market in the Sydney metropolitan area, with a dedicated stock of office space of the order of 854,000 square metres. Its share of metropolitan stock had grown from an estimated 3% in 1995 to just over 7% by December 2013, with its share of non-CBD stock rising from 6% to 13% over the same period.

Macquarie Park remains one of the strongest growing office markets within Sydney. Since 1995 (to 2015), its growth rate has outpaced that of all other office precincts, with the stand-alone office workforce growing by an estimated 6.6% per annum, compared to a rate of 1.7% per annum for the CBD and 2.4% per annum across the non-CBD market.

2.2 Current role of Macquarie Park within the Sydney office market

Following two years of weak employment growth across the Sydney metropolitan area, that impacted demand across all office precincts, we believe that this year we have turned the corner. Off the back of a solidly growing NSW economy and strengthening employment growth, demand for office space across the metropolitan market is estimated to have reached a five year high throughout 2015. Across the non-CBD, net absorption is expected to outpace net additions this year, resulting in a fall in the non-CBD vacancy rate from 9.5 to 7.8%. We estimate that net absorption within Macquarie Park will be the strongest of all of the major suburban centres, at around 37,000 square metres, with most other centres only recording net absorption of between 2,000 and 15,000 square metres for the year.

During the first half of 2015, Macquarie Park recorded net absorption of approximately 15,000 square metres. A string of tenants relocating from outside the market (including Datacom, Ricoh,

IGT and Rural Co), as well as expansion by a handful of resident tenants, boosted the result. We expect even stronger net absorption during the second half of the year, bringing the annual total to about 37,000 square metres. The pick-up will be underpinned by the leasing-up of the refurbished 1 Thomas Holt Drive (11,400 square metres) which has been mostly taken by Metcash—moving from non-stand-alone office space in Macquarie Park and Silverwater. Novartis is planning to lease an additional 5,000 square metres when it moves into its new building at 52–58 Waterloo Road. A handful of other companies are due to relocate to Macquarie Park by December.

Apart from 1 Thomas Holt Drive and 52–58 Waterloo Road, the only other supply changes in Macquarie Park involve the refurbishment of 33–39 Talavera Road, along with the permanent withdrawal of nearly 6,000 square metres at 71 Epping Road and 117 Wicks Road, with the former to be redeveloped into serviced apartments. The combination of completions (27,000 square metres) and withdrawals (of 10,000 square metres) will see about 17,000 square metres added to stock in 2015.

The strength of net absorption in Macquarie Park this year has underpinned a reduction in the vacancy rate to 8.4% at June and a further expected fall to 7.9% by December.

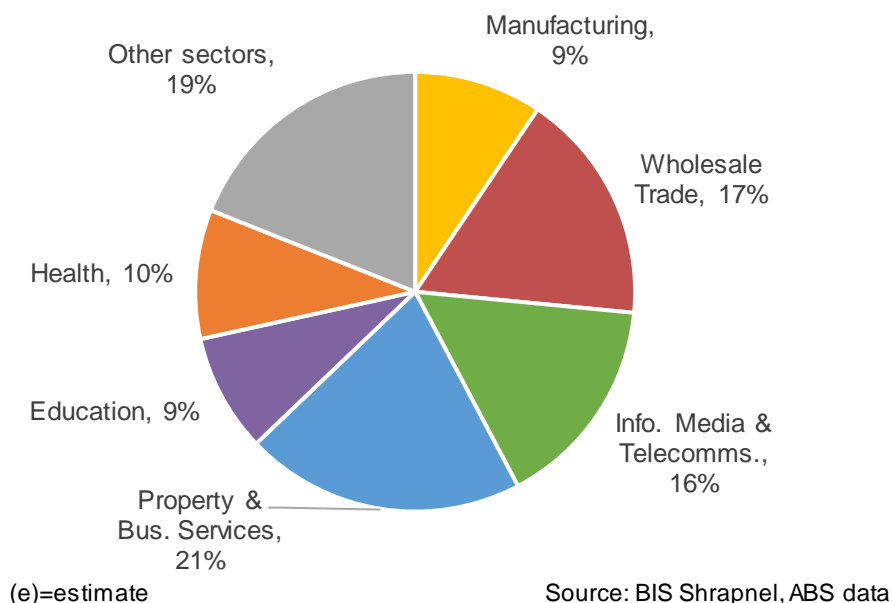
By December 2015, we estimate Macquarie Park’s office stock has reached 887,000 square metres, extending its lead over North Sydney as Australia’s largest non-CBD office market.

The Sydney office market is in the midst of a long cyclical upswing, which we think has at least five to six years to run. With its vast availability of readily developable sites, we think Macquarie Park is well positioned to capture an increasing share of metropolitan office demand and supply. Over the next 20 plus years, Macquarie Park’s appeal as an office location will only increase as competing centres hit capacity constraints and their rents get more expensive.

2.3 Current structure and key industry clusters within the Macquarie Park workforce

The current structure of the Macquarie Park workforce is dominated by six industry sectors which represents more than 80% of the total workforce, estimated at about 61,000 people. The largest industry sectors/clusters and their share of the total workforce are shown in Chart 2.1:

Chart 2.1: Macquarie Park and North Ryde total employment, Major industry sectors, December 2015(e)



There are alternative approaches to classifying businesses, with significant clusters identified within Macquarie Park in telecommunications, medical research and pharmaceuticals, computing and electronics, as highlighted in Table 2.1. These industries can be allocated across the traditional ABS sectors (noted above) according to whether their primary business function is manufacturing, sales, distribution or service provision.

Table 2.1: Businesses by industry sector, Macquarie Park

Telecommunications: Optus, Foxtel, Ericsson, TPG
Medical & Pharmaceutical: Sonic Health, Laverty Pathology, Johnson & Johnson, Cochlear, Astra Zenica, Novartis, Sanofi, MSD, Medtronic, Boehringer Ingelheim, Smith & Nephew, Abbott Australasia
High Tech: Oracle, BOC Gases, Siemens, 3M, CSIRO, Raytheon, Komatsu Australia, Dupont, Schek, BAE Systems, Citrix
Computing: Microsoft, CSC, Honeywell, CA Technologies, Compuware
Electronics: Schneider Electric, Fujitsu, Toshiba, Canon, Fuji Xerox, Konica Minolta, Philips, Panasonic, Epson, Kyocera, Brother, Ricoh
Education: Macquarie University, MGSM, Morling College, Excelsia College, Macquarie University Hospital

Source: Macquarie Park Investment Prospectus 2015, BIS Shrapnel

Our estimates of total workforce are derived from ABS Census and Labour Force industry sectors and are presented in Table 3.5. The closest matching ABS employment data for Macquarie Park, by place of work, is at the SA2 level, which encompasses surrounding areas such as Marsfield and East Ryde. However, the bulk of employment is within Macquarie Park.

Changes to geographic boundaries by the ABS between the 2006 and 2011 Census periods makes it difficult to compare growth by industry sector over that period. However, an approximate matching to the former SLAs showed employment growth in Ryde outpaced the metropolitan average between 2006 and 2011 in property & business services, manufacturing and information media & telecommunications (which was dramatically boosted in 2007 by Optus moving into the area). Since 2011, we estimate the strongest growing sectors have been property & business services, health, education, construction and other services.

Comparing Macquarie Park to the metropolitan area as a whole, the Centre clearly has stronger industry clusters in information media & telecommunications, wholesale trade and property & business services, with representation in the other key sectors closer to the metropolitan average.

The 2011 Census data also suggests that a higher proportion of the total workforce in Macquarie Park comprises white collar workers that work in offices when compared to the broader metropolitan area. By our estimates about 70% (or 42,000 people) of the total workforce in Macquarie Park is accommodated in stand-alone office space (i.e. in dedicated office buildings) in 2015, a much higher proportion than the metropolitan equivalent of closer to 27%. This indicates that the Macquarie Park workforce is weighted towards office employment, with an estimated 19,000 people in the non-stand-alone office workforce.

Role of Macquarie University/Macquarie Hospital as a driver of employment

Established in 1964, Macquarie University was one of the first developments in the Macquarie Park area and, from inception, has played a role as a business attractor to the area, particularly amongst businesses in the medical/pharmaceutical area. Amongst many other businesses, the University has historically been less important as a driver in their decision to locate in Macquarie Park compared to other factors such as the centrality of the Centre to other parts of Sydney, proximity to like industries within the precinct and rental differential. Research undertaken by BIS Shrapnel in 2001 suggested that only around 5% of companies chose to locate in Macquarie Park predominantly because of the proximity to the University.

Notwithstanding this, the University has the potential to dramatically influence the future character of future demand and supply of commercial space within Macquarie Park. On the supply side, the University has substantial land holdings with significant uplift potential for commercial/campus development. The University already has an estimated 230,000 square metres of commercial space across its Research Park and buildings for Cochlear and the Hearing Hub, amongst others, with potential (reportedly) for an additional 975,000 square metres of gross floor area (approximately 875,000 square metres net lettable area) across office and university services.

On the demand side, the University is increasingly focused on building collaborative partnerships with businesses in Macquarie Park. It has set up a corporate engagement group that will seek out industries that can benefit from co-locating within close proximity to the University and developing long term relationships involving research and development. Whilst Cochlear is a prime example of a company that has recently been drawn to Macquarie Park because of their vision to develop and gain from a strong collaboration with the University (and in turn has driven the development of the nearby Hearing Hub on University land), many other companies in the surrounding area are increasingly finding value in building partnerships with the University. Citrix, Johnson & Johnson, Optus, 3M and Fujitsu are amongst those companies, with initiatives planned around the joint development of research, education programmes and employment opportunities.

The opening of the Macquarie University Private Hospital in 2010, and the addition of a new faculty within the University focused on Medicine, Health & Innovation, had added further depth to the role of the University as a key business attractor in the area in the area of (bio)-medical research. The strategic direction of the University appears to be on focusing study paths in a way that can result in better collaboration with business across a wider range of industries.

3. FORECASTS OF STAND-ALONE OFFICE AND TOTAL EMPLOYMENT IN MACQUARIE PARK

3.1 Capacity for growth in the Macquarie Park stand-alone office workforce under existing planning controls

Our focus in this section is on how much forecast demand for office space Macquarie Park is expected to capture in the short, medium and long term and whether the centre has sufficient capacity to cater for this demand under current planning controls. Critically, planning controls at both a state and local government level influence how much space can be built and where, and can limit or facilitate a centre's ability to accommodate future office employment growth. The outlook for office employment within Macquarie Park will be determined by a mix of organic growth by resident businesses as well as overflow demand from companies moving in from other centres.

The Sydney metropolitan office market works as an overflow market, with tenants moving into and out of centres based on the availability of space within preferred locations and how affordable the rental is (and this varies over the cycle). Some businesses are prepared to pay whatever it costs to remain in the CBD, but others are forced to move as and when rents get too expensive. Macquarie Park's appeal as an office centre hinges on the availability of readily developable sites for new office buildings and the rental cost differential to other competing markets. It is well positioned to capture overflow demand from parts of the CBD, North Sydney, Chatswood and St Leonards given its comparatively low rents when compared to these centres.

There is little by way of new office construction underway in Macquarie Park besides the 5,000 square metres being constructed for Astra Zeneca at 80 Talavera Road, but falling vacancies and rising rents are expected to underwrite two phases of construction over the next 10 years. Over the longer term, Macquarie Park will play an important role in accommodating Sydney's future office employment. Macquarie Park has the potential to grow to more than double its current size, to reach at least 2 million square metres of net lettable area. Including Macquarie University land, the area has the potential to increase to around 2.9 million square metres, which would easily surpass the size of Brisbane's CBD as it stands today.

Based on our forecasts of demand (outlined below) Macquarie Park will not reach its capacity for office stock until at least 2060. This is based on the assumption that sites zoned for commercial office use are not lost to alternative uses (such as residential). Furthermore, theoretical capacity is higher than realistic capacity as there are bound to be sites which will not be built to their maximum potential. That means the centre is likely to hit capacity earlier than 2060. Nevertheless, Macquarie Park has the capacity to capture substantial office employment growth over the long term and will remain Sydney's major commercial market outside of the CBD.

3.1.1 The outlook for stand-alone office employment growth across metropolitan Sydney

The outlook for office employment growth across the metropolitan area (and within Macquarie Park) is heavily dependent on the NSW economy and its prospects. The NSW economy is outperforming the national average and is expected to continue to do so over much of the next six to seven years, driven by phases of strong investment. The current phase is being driven by infrastructure investment (in road and rail) and residential construction. A sustained lower \$A will facilitate the structural change from mining to non-mining investment and boost NSW's trade-exposed services sectors. Late decade, stronger non-dwelling construction and further infrastructure and equipment spending will provide an extra boost to the economy.

Over the remainder of the current upswing in the Sydney office market (forecast to peak in 2021), total metropolitan employment growth is expected to increase by about 1.9% p.a., with a cyclical downturn between 2021 and 2025 lowering the 10-year growth rate to 1.5%. The strongest employment growth across the Sydney metropolitan area is expected to come from the service sectors, particularly health, arts & recreation, education, accommodation & food services, property & business services and finance & insurance, with all these sectors expected to outpace total average annual employment growth. Finance & insurance and property & business services employment growth will be boosted by the lower \$A reducing the attractiveness of offshoring of services to other countries.

Three out of six of these growth sectors are key users of office space. As a result, we expect the metropolitan SAOWF to outpace total employment growth, with a six-year average annual growth rate of 2.2%, and 1.8% p.a. for 10 years.

Beyond 2025, our forecasts of employment growth across the Sydney metropolitan area are derived by applying the NSW employment growth rates by industry sector. The major structural changes we have factored into our forecasts of total employment and office employment are the impacts of an ageing population and the continuation of the longer term shift towards greater office services employment. Over the long term, Australia's population growth is expected to slow as the natural rate of population increase eases back and is not offset by net migration levels. The ageing of the Australian population is expected to lead to lower population growth, falling participation rates and weaker employment growth. There is a risk that employment growth could be lower than we have forecast due to the ongoing automation of certain types of jobs.

Between 2025 and 2065, we forecast total metropolitan employment to grow at an annual average rate of 1.0%, with the stand-alone office workforce increasing at 1.1% p.a.

3.1.2 The outlook for the stand-alone office workforce in Macquarie Park

Over the next six years, the Macquarie Park stand-alone office workforce is forecast to increase at a much faster rate than the metropolitan average—at an average annual rate of 3.7% p.a. In the near term, Macquarie Park will benefit from a strengthening metropolitan market but may be constrained by a growing shortage of vacant A grade buildings. It is only when rents rise well above replacement levels and the next round of office completions come on stream (between 2018 and 2020) that office employment growth will accelerate more strongly. Toward the end of the decade, rising rents—driven by low vacancies in the CBD and major North Shore markets—should see significant overflow demand into Macquarie Park, in turn providing a major boost to employment growth.

Early next decade, we anticipate a significant economic downturn across the Sydney metropolitan market. This is expected to coincide with a major phase of office construction that we expect will oversupply all major centres, including Macquarie Park, triggered by strongly rising rentals forecast for later this decade. Slower office employment growth between 2021 and 2025 will pull the Macquarie Park 10-year average annual SAOWF growth rate down to 2.9%.

Beyond 2025, we have assumed that Macquarie Park's stand-alone office employment will increase at a 'high' average annual growth rate of 3.0% (see Appendix A1) until the Centre reaches capacity in the last few years of the forecast period. This strong rate of growth will be sustained by overflow demand from major competing centres which are expected to reach capacity by around 2025 in Chatswood, the mid 2030s in the CBD, North Sydney and Parramatta, and around 2050 in St Leonards. In determining when each centre reaches

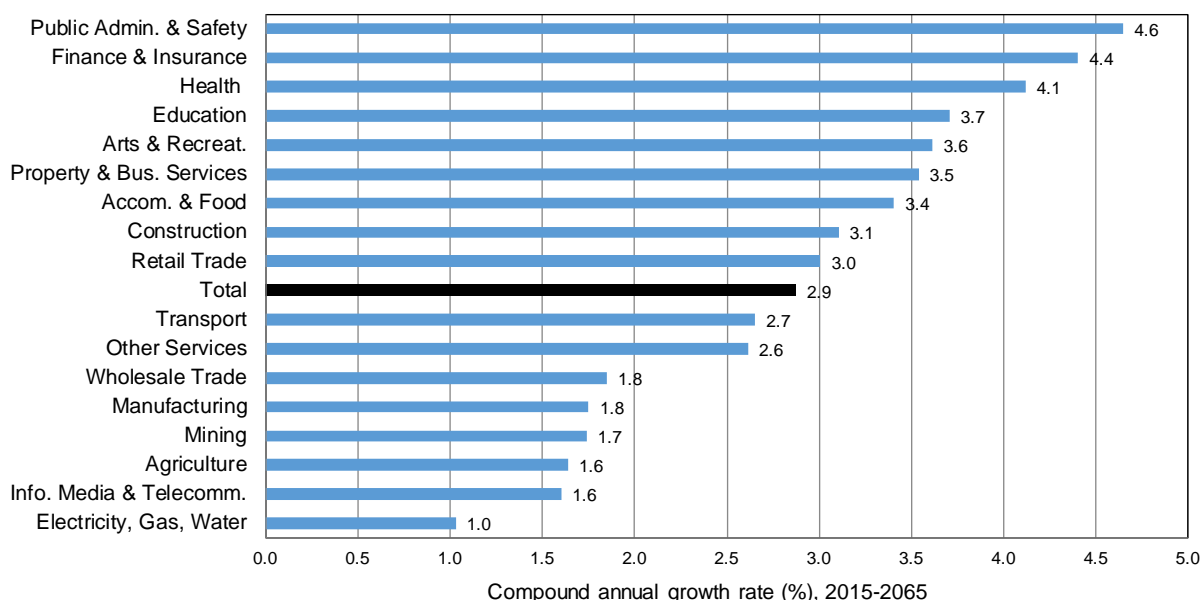
capacity, a long run SAOWF growth rate, vacancy rate and decline in average workspace ratios have been applied. Once a centre reaches theoretical capacity, we have assumed its SAOWF growth rate will fall to a 'low growth' rate of 0.5% per annum (allowing for a modest uplift in planning controls), with the incremental demand overflowing to competing centres with capacity still available.

By 2065, our forecasts suggest Macquarie Park's SAOWF will reach 173,000 people, up from an estimated 42,000 at December 2015. Our forecasts are based on growth projections over the short, medium and longer term incorporating organic growth by resident companies and overflow demand from other office markets. At present, we are not aware of any planned large scale tenant moves either into or out of Macquarie Park in the future and as such have not made allowances for this in our forecasts. There is the potential for any such move to significantly change employment levels in any given year. Discussions with stakeholders in Macquarie Park suggest that most find the Centre meets their needs and would be reluctant to relocate away from it at lease expiry.

Growth projections by industry sector

Looking across the industry sectors, patterns of growth between now and 2065 in the Macquarie Park SAOWF are expected to mirror trends in the broader metropolitan market, with the strongest growth sectors being health, finance & insurance, education, property & business services and arts and recreation (see Table 3.1 and Chart 3.1). The one major exception is likely to be public administration, where office employment growth is expected to outpace the metropolitan average. Already, between 2011 and 2015, public administration employment within Macquarie Park has witnessed strong growth—albeit off a very low base—courtesy of moves by the National Measurement Institute and Transport for NSW in 2012 and 2015 respectively.

Chart 3.1: Macquarie Park and North Ryde stand-alone office workforce, compound annual growth rates, 2015-2065



Source: BIS Shrapnel, ABS data

We have allowed for another major move by the State government, likely in 2019, as the government pursues its policy to decentralise staff from the CBD. Moreover, we understand that Ryde Council has plans to relocate to Macquarie Park in the future.

Applying metropolitan growth rates by industry results in a noticeable change in industry structure within Macquarie Park by 2065. At present, the stand-alone office workforce within the Centre is dominated by property & business services (24%), information media & telecommunications and wholesale trade (at 20% each), and manufacturing (10%), together accounting for around 75% of the total stand-alone office workforce. By 2065, the share of property & business services is expected to increase to 34% with health rising to 9%. Whilst still significant, the share of stand-alone office workforce employment in wholesale trade falls to 12%, with information media & telecommunications and manufacturing slipping back to 11% and 6% of the total respectively. The other notable increases are in the education and public administration sectors, which rises from 6% and 3% respectively of the stand-alone office workforce to about 9% and 7%.

Chart 3.2: Macquarie Park and North Ryde stand-alone office workforce, major industry sectors, December 2015(e)

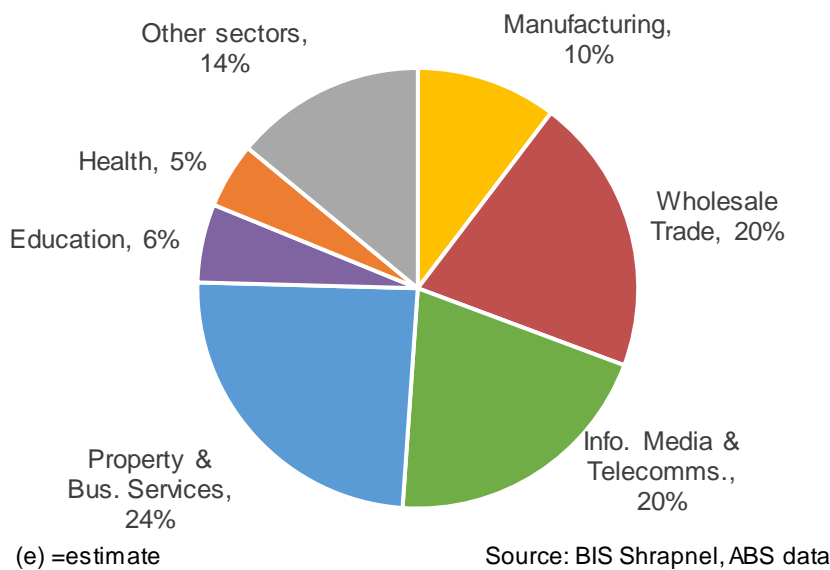
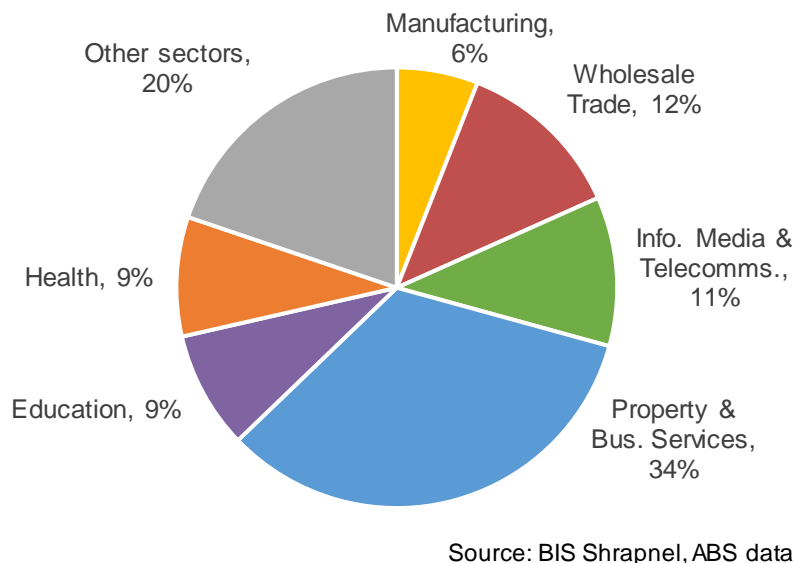


Chart 3.3: Macquarie Park and North Ryde stand-alone office workforce, major industry sectors, 2065



Future workplace design and workspace ratios

How stand-alone employment translates into demand for office space amongst competing centres within the metropolitan area depends on how space is used—manifest in space per employee, or average workspace ratio.

Much has been written about future workplace practices and functions, with some more extreme views depicting a future with no requirement for office space, as technological improvements allow people to work anywhere, any time. Certainly, over the longer term it is reasonable to assume that as younger 'more tech savvy' generations make their way through the workforce into decision making positions, the way people work will change. However, we do not think office spaces will become redundant, with an underlying theme of collaboration driving the need for people to come together in one place.

Technological innovation is, however, driving a greater mix of workplace models used by office-based companies across Sydney, with most incorporating some form of open plan design. This phenomenon is unlikely to change. The exact way in which office space is used is likely to evolve in line with changing workplace trends and fashions, with recent trends in office space design including Activity Based Working (ABW), Agile Working, the focus on employee wellness and the rise of remote working hubs. Agents estimate around a quarter to a third of all offices across Australia have adopted some form of ABW, with the key principal being use of mobile technology to allow people to choose from a variety of work space environments that best suit them to do their work.

The phenomenon of flexible workplace practices is not new, and is likely to continue to impact on the demand for office space across Sydney. No doubt other workplace practices will emerge in the future. The long term adoption of these practices has seen businesses require fewer desks/workspaces than employees, theoretically reducing their office space requirement. It is not clear how much space per employee these workplace practices save and the space savings are often over-stated once additional meeting rooms, quiet spaces, break-out spaces etc. are included. Moreover, the ability to adopt workplace functions such as ABW does not suit some (very small) businesses and is not favoured by all industries, such as legal services, although even here there is some evidence of a shift in attitudes. Nevertheless, with these exceptions, most office-based businesses select their workspace lay-out based on whatever the latest trend is and we can expect to see office requirements in terms of square metres per person continue to decline steadily.

The transmission mechanism within our forecasts to allow for changing workspace design and more efficient use of space is a reduction in the average workspace occupied per person. We have factored in a gradual reduction in the average workspace ratio over the forecast horizon across Sydney's major centres. By 2065, we have allowed for average workspace ratios to fall by between two and four square metres per person, converging to about 15 square metres. This pace of growth assumes the 10 year forecasts of average workspace ratios contained within our *Sydney Commercial Property Prospects* and *Suburban Centres & Office Parks 2015 to 2025* reports continues at the same pace until 2065.

In Macquarie Park, our forecasts assume the average workspace ratio falls from 19.4 square metres at present to 15.5 square metres by the end of the forecasting period—an average annual decline of 0.5%. We acknowledge that our forecast falls in average workspace ratios may be viewed as fairly conservative, given that new build office space typically targets work space ratios of 10 to 12 square metres per person. In practice, this level is rarely achieved.

Table 3.1: Macquarie Park and North Ryde SA2 stand-alone office workforce, low density base case, 2011 to 2065

Year ended	Agriculture	Mining	Manufactur.	Electricity, Gas, Water	Construction	Wholesale Trade	Retail Trade	Accom. & Food	Transport	Infor Media & Telecomm.	Finance & Insur	Property & Public Admin.	Education	Health	Arts & Recreat.	Other Services	Total
Dec	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s
2011	0.02	0.04	4.57	0.04	1.41	8.71	1.08	0.18	0.09	7.72	0.57	8.95	0.20	2.16	1.77	0.09	38.36
2012	0.01	0.04	4.50	0.03	1.39	7.94	0.99	0.18	0.08	9.18	0.56	9.08	0.73	2.05	1.72	0.10	39.32
2013	0.01	0.07	4.53	0.04	1.36	9.04	1.08	0.18	0.08	7.66	0.54	9.10	0.82	2.28	1.92	0.12	39.64
2014	0.02	0.02	4.57	0.04	1.57	8.27	1.07	0.17	0.09	8.01	0.56	9.41	0.77	2.42	1.93	0.11	39.94
2015e	0.01	0.03	4.34	0.04	1.61	8.56	1.13	0.19	0.09	8.58	0.57	10.22	1.19	2.42	2.02	0.10	42.03
Forecasts																	
2020	0.02	0.03	4.85	0.04	1.97	9.63	1.35	0.24	0.10	9.27	0.73	12.11	3.06	2.93	2.39	0.12	49.90
2025	0.02	0.03	5.13	0.04	2.16	10.42	1.54	0.28	0.11	9.97	0.88	14.04	3.47	3.49	2.91	0.14	55.81
2030	0.02	0.03	5.64	0.05	2.60	11.69	1.80	0.34	0.13	10.91	1.11	16.92	4.11	4.28	3.55	0.18	64.69
2035	0.02	0.03	6.13	0.05	3.07	12.98	2.12	0.41	0.15	12.04	1.38	20.40	4.66	5.21	4.40	0.22	75.00
2065	0.03	0.07	10.35	0.07	7.42	21.39	4.99	1.04	0.33	19.00	4.91	58.13	11.52	14.94	15.19	0.58	173.31
Compound annual growth rates (%)																	
2011-15	-3.1	-5.4	-1.2	-0.2	3.4	-0.4	1.2	1.8	-0.4	2.7	-0.1	3.4	55.6	2.9	3.3	1.4	2.3
Forecasts																	
2015-20	2.3	0.9	2.2	-0.5	4.1	2.4	3.5	4.1	2.9	1.6	5.2	3.4	20.9	3.9	3.4	3.6	3.5
2020-25	1.5	-0.8	1.1	1.9	1.8	1.6	2.8	3.3	2.2	1.5	3.9	3.0	2.5	3.5	4.0	3.6	2.3
2025-30	1.5	2.1	1.9	1.4	3.8	2.3	3.2	4.0	3.1	1.8	4.6	3.8	3.4	4.2	4.0	4.7	3.0
2030-35	1.4	2.2	1.7	1.5	3.3	2.1	3.3	3.9	3.2	2.0	4.5	3.8	3.4	4.0	4.4	4.2	3.0
2035-65	1.6	2.2	1.8	1.0	3.0	1.7	2.9	3.1	2.5	1.5	4.3	3.6	2.9	3.6	4.2	3.3	2.8
2015-65	1.6	1.7	1.8	1.0	3.1	1.8	3.0	3.4	2.7	1.6	4.4	3.5	4.6	3.7	4.1	3.6	2.9

Source: BIS Shrapnel, ABS data

e: estimate
Property & Business Services combines: Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services & Administrative and Support Services

3.1.3 Office floorspace requirements for Macquarie Park under current planning controls

The amount of office space that will be needed over the short, medium and longer term is determined by the balancing of the stand-alone office workforce and average workspace ratio per person (which combine to give occupied space).

Table 3.2: Supply and demand for Macquarie Park office space, low density base case, 2011 to 2065

Year ended Dec	Office stock '000 sqm	Share of metro stock %	Total vacancy rate %	Occupied space '000 sqm	Stand-alone office workforce '000	Workspace ratio Sqm per person
2011	810	6.9	8.2	744	38	19.4
2012	840	7.1	7.3	778	39	19.8
2013	854	7.2	9.5	773	40	19.5
2014	866	7.2	10.0	780	40	19.5
2015e forecast	887	7.4	7.9	817	42	19.4
2020	1,006	7.8	5.0	956	50	19.2
2025	1,164	8.2	9.5	1,054	56	18.9
2030	1,281	8.9	7.0	1,191	65	18.4
2035	1,448	9.6	7.0	1,347	75	18.0
2065	2,879	15.7	7.0	2,678	173	15.5
Compound annual growth rates (%)						
2011-15 forecast	2.3				2.3	0.1
2015-20	2.6				3.5	-0.3
2020-25	3.0				2.3	-0.3
2025-30	1.9				3.0	-0.5
2030-35	2.5				3.0	-0.5
2035-65	2.3				2.8	-0.5
2015-65	2.4				2.9	-0.5

Source: BIS Shrapnel, PCA

Table 3.2 shows our office stock forecasts for Macquarie Park assuming no changes to current planning policies. Over the next five years, we expect the Macquarie Park office market to tighten significantly (along with the broader metropolitan office market) as demand outpaces supply. In the process, rising rents will surge past replacement cost levels, allowing financial feasibilities on new projects to stack up. A substantial phase of construction is forecast during the first half of next decade that is expected to take the office stock to about 1.16 million square metres by 2025.

Over the longer term, we have applied a vacancy rate of 7.0% for Macquarie Park which reflects a fairly balanced market with neither landlords or tenants in the ascendancy (in lease negotiations). Applying our long term forecasts for the SAOWF, a steady decline in average workspace ratios and long run vacancy rates, the Macquarie Park precinct will not hit capacity until around 2050. If the land at the Macquarie University is included, the Corridor will not reach capacity until 2063.

We have been advised that theoretical capacity for Macquarie Park is around 2 million square metres of net lettable area, with reportedly about 875,000 square metres NLA potential office stock at Macquarie University, which combines to a total of 2.875 million square metres. Our assumption is that once Macquarie Park reaches theoretical capacity, it will continue to grow, but at a much lower rate (as Council may increase permissible density). By 2065, we project the office stock to reach about 2.88 million square metres.

For this exercise, we have used theoretical capacity figures provided by Ryde Council and Macquarie University. However, theoretical capacity assumes that all buildings are built up to their maximum height and floor space ratio permitted under planning controls. In reality, for site specific reasons, not all buildings will realise their maximum potential and therefore the realistic capacity is likely to be reached much sooner. Theoretical capacity is also sensitive to how much space is lost to other competing uses, most notably residential. The more potential commercial office floor space that is allowed to be developed for other uses, the lower the capacity that remains for office space.

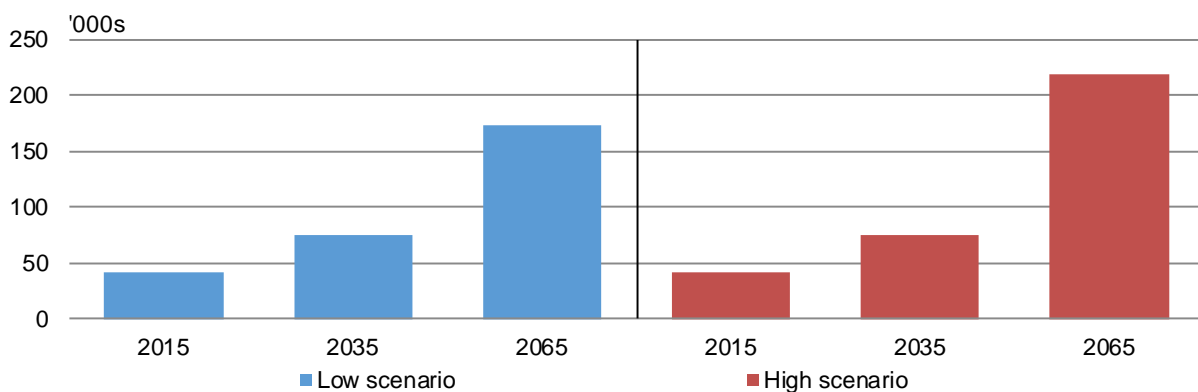
3.2 Capacity for stand-alone office employment in Macquarie Park if higher density office development is permitted

Under this scenario, we forecast employment growth within Macquarie Park assuming planning controls are amended to allow for much higher density office development across the Centre. Our focus for this exercise is on stand-alone office employment, which we consider to be the primary growth driver for the area.

Opening up the precinct to permit high density office development will not result in the immediate development of high rise towers. Firstly, it must be feasible to build the taller towers and developers are likely to need a much larger pre-commitment from a tenant/s than has typically been seen in Macquarie Park. Moreover, significantly higher rentals will be required to underwrite the higher construction costs associated with high rise office development.

Macquarie Park sits within an office hierarchy in Sydney. Whilst it captures a proportion of metropolitan organic demand in its own right, it will also capture additional *overflow demand* (or incremental demand) once capacity constraints emerge in the preferred (and more central) office locations of the CBD and North Sydney and, to a lesser extent, St Leonards and Chatswood—in the process pushing rents sufficiently high to underwrite high rise office buildings.

Chart 3.4: Macquarie Park and North Ryde stand-alone office workforce, low vs high scenario



Year ended December

Source: BIS Shrapnel, ABS data

To estimate the incremental stand-alone office workforce demand that might be captured by a (higher density) Macquarie Park, we estimated how much employment the other major centres would have absorbed had they not reached capacity. This incremental demand was then allocated between Macquarie Park and the residual markets. The residual markets are defined as the metropolitan area minus the CBD and major suburban markets.

The opening up of Macquarie Park to high density office development would likely increase the appeal of the centre to a broader range of tenants who might not have considered moving there

in its current format—particularly the vast array of smaller companies that are not big enough to occupy large campus style floor plates. By the time most of the major centres (CBD, North Sydney, Parramatta) are expected to reach capacity (around the mid 2030's), Macquarie Park's stand-alone office workforce is forecast to account for almost 10% of metro-wide stand-alone office workforce. Reflecting the broader appeal of the Centre, we have assumed it will capture 15% of incremental demand flowing from the other capacity-constrained major centres after 2035. Keeping all other things equal, Macquarie Park's stand-alone office workforce would increase to an estimated 219,000 people compared to the base case of 173,000 people, or an extra 46,000 people as illustrated in Chart 3.4.

Opening up Macquarie Park to higher density development would likely see the characteristics of the area change as a wider range of tenants, typically found in higher density office precincts such as the CBD and North Sydney, move into the area. Within these traditional centres, there is currently a higher weighting towards finance & insurance and property & business services sectors.

Table 3.3 provides our forecasts by industry sector assuming high density office development is allowed in Macquarie Park. The results show the existing major industries of information media & telecommunications and wholesale trade remain prominent by 2065, accounting for about 10% of the SAOWF each, but the property & business services sector increases to 35% of the total and the finance & insurance sector increases its share from about 1% now to 5%. It is unlikely that Macquarie Park would lure the headquarters of major finance groups, even with taller office buildings. They have shown a strong preference to remain in the CBD over the cycles and are likely to be able to afford strong rental rises. Nevertheless, high density development at Macquarie Park may be more appealing to back-of-office functions of financial institutions.

Table 3.3: Macquarie Park and North Ryde SA2 stand-alone office workforce, high density scenario, 2011 to 2065

Year ended Dec	Agriculture		Mining		Manufactur.		Electricity, Gas, Water		Construction		Wholesale Trade		Retail Trade		Accom. & Food		Transport & Telecomm.		Infor./Media & Insur.		Finance & Bus. Services		Property & Public Admin.		Education		Health		Arts & Recreat.		Other Services		Total
	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	
2011	0.02	0.04	4.57	0.04	1.41	8.71	1.08	0.18	0.18	0.09	7.72	0.57	8.95	0.20	2.16	1.77	0.09	0.77	36.36														
2012	0.02	0.04	4.50	0.03	1.39	7.94	0.99	0.18	0.08	9.18	0.56	9.08	0.73	2.05	1.72	0.10	0.72	39.32															
2013	0.01	0.07	4.53	0.04	1.36	9.04	1.08	0.18	0.08	7.66	0.54	9.10	0.82	2.28	1.92	0.12	0.80	39.64															
2014	0.02	0.02	4.57	0.04	1.57	8.27	1.07	0.17	0.09	8.01	0.56	9.41	0.77	2.42	1.93	0.11	0.90	39.94															
2015e	0.01	0.03	4.34	0.04	1.61	8.56	1.13	0.19	0.09	8.68	0.57	10.22	1.19	2.42	2.02	0.10	0.93	42.03															
Forecasts																																	
2020	0.02	0.03	4.85	0.04	1.97	9.63	1.35	0.24	0.10	9.27	0.73	12.11	3.06	2.93	2.39	0.12	1.06	49.90															
2025	0.02	0.03	5.13	0.04	2.16	10.42	1.54	0.28	0.11	9.97	0.88	14.04	3.47	3.49	2.91	0.14	1.18	55.81															
2030	0.02	0.03	5.64	0.05	2.60	11.69	1.80	0.34	0.13	10.91	1.11	16.93	4.11	4.28	3.55	0.18	1.34	64.70															
2035	0.02	0.03	6.14	0.05	3.08	12.99	2.13	0.42	0.15	12.06	1.42	20.51	4.87	5.23	4.41	0.22	1.54	75.27															
2065	0.03	0.07	12.27	0.07	9.42	24.06	6.41	2.32	0.34	22.71	11.63	75.86	13.66	17.57	17.19	1.05	4.49	219.14															

Compound annual growth rates (%)	
2011-15	-3.1
Forecast	-5.4
2015-20	2.3
2020-25	1.5
2025-30	1.5
2030-35	1.4
2035-65	1.8
2015-65	1.7
e: estimate	

Compound annual growth rates (%)	
2011-15	-0.2
Forecast	-1.2
2015-20	4.1
2020-25	1.8
2025-30	3.8
2030-35	3.4
2035-65	3.8
2015-65	3.6
e: estimate	

Compound annual growth rates (%)	
2011-15	1.8
Forecast	1.2
2015-20	3.5
2020-25	2.8
2025-30	3.2
2030-35	3.4
2035-65	3.7
2015-65	3.5
e: estimate	

Compound annual growth rates (%)	
2011-15	-0.4
Forecast	-0.4
2015-20	2.4
2020-25	1.6
2025-30	2.3
2030-35	2.1
2035-65	2.1
2015-65	2.1
e: estimate	

Compound annual growth rates (%)	
2011-15	2.7
Forecast	2.7
2015-20	1.6
2020-25	1.5
2025-30	1.8
2030-35	2.0
2035-65	2.1
2015-65	2.0
e: estimate	

Compound annual growth rates (%)	
2011-15	-0.1
Forecast	-0.1
2015-20	5.2
2020-25	3.9
2025-30	4.6
2030-35	5.2
2035-65	7.2
2015-65	6.2
e: estimate	

Compound annual growth rates (%)	
2011-15	3.4
Forecast	3.4
2015-20	2.9
2020-25	3.5
2025-30	4.2
2030-35	4.1
2035-65	4.1
2015-65	4.0
e: estimate	

Compound annual growth rates (%)	
2011-15	3.3
Forecast	3.3
2015-20	3.4
2020-25	4.0
2025-30	4.0
2030-35	4.4
2035-65	4.6
2015-65	4.4
e: estimate	

Compound annual growth rates (%)	
2011-15	1.4
Forecast	1.4
2015-20	3.6
2020-25	3.6
2025-30	4.7
2030-35	4.5
2035-65	5.4
2015-65	4.9
e: estimate	

Compound annual growth rates (%)	
2011-15	4.8
Forecast	4.8
2015-20	2.6
2020-25	2.1
2025-30	2.6
2030-35	2.8
2035-65	3.6
2015-65	3.2
e: estimate	

Source: BIS Shrapnel, ABS data

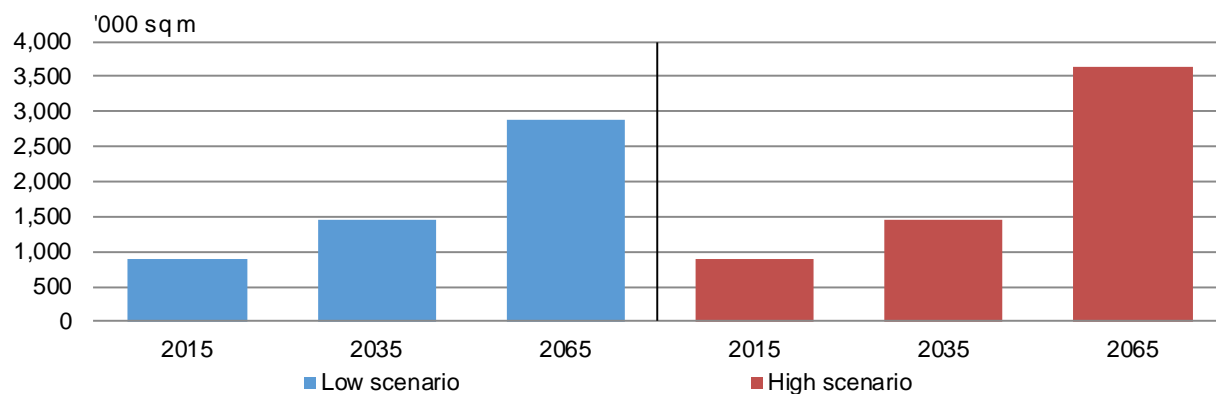
e: estimate

Property & Business Services combines: Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services & Administrative and Support Services

3.2.1 Implications for office stock within Macquarie Park under high density scenario

Keeping all other forecast variables the same, the additional SAOWF growth expected to be generated by allowing high density office development across Macquarie Park translates into the requirement for an extra 760,000 square metres of office space by 2065, taking the forecast stock figure to 3.64 million square metres.

Chart 3.5: Macquarie Park and North Ryde office space, low vs high scenario



Year ended December

Source: BIS Shrapnel, PCA

Table 3.4: Supply and demand for Macquarie Park office space, high density scenario, 2011 to 2065

Year ended Dec	Office stock '000 sqm	Share of metro stock %	Total vacancy rate %	Occupied space '000 sqm	Stand-alone office workforce '000	Workspace ratio Sqm per person
2011	810	6.9	8.2	744	38	19.4
2012	840	7.1	7.3	778	39	19.8
2013	854	7.2	9.5	773	40	19.5
2014	866	7.2	10.0	780	40	19.5
2015e forecast	887	7.4	7.9	817	42	19.4
2020	1,006	7.8	5.0	956	50	19.2
2025	1,164	8.2	9.5	1,054	56	18.9
2030	1,281	8.9	7.0	1,191	65	18.4
2035	1,453	9.7	7.0	1,352	75	18.0
2065	3,641	19.8	7.0	3,386	219	15.5
Compound annual growth rates (%)						
2011-15 forecast	2.3				2.3	0.1
2015-20	2.6				3.5	-0.3
2020-25	3.0				2.3	-0.3
2025-30	1.9				3.0	-0.5
2030-35	2.6				3.1	-0.5
2035-65	3.1				3.6	-0.5
2015-65	2.9				3.4	-0.5

Source: BIS Shrapnel, PCA

3.3 Total employment forecasts for Macquarie Park

Tables 3.5 and 3.6 present our forecasts for total employment across Macquarie Park under our 'low density' scenario (assuming no changes to planning controls) and, alternatively, opening up the centre to 'higher density' office development. Our total employment forecasts should be viewed as indicative only as our main focus was on forecasting stand-alone office employment. The forecasting methodology is spelt out within Appendix A.

At December 2015, total employment within the Macquarie Park Corridor is estimated to be 61,000 people, of which 69% are employed in the SAOWF and 31% in the non-SAOWF. The largest sectors of the total workforce are property & business services, wholesale trade, information media & telecommunications, health and manufacturing.

Looking at the non-SAOWF, the highest proportion of people employed in Macquarie Park are in those services supporting office users and the resident population i.e. retail and business services (such as office suppliers and printers). There is also a large proportion in education housed at the University, as well as in health, predominantly accommodated within the Macquarie University Hospital.

Under either growth scenario, services supporting the projected growth in office employment (cafes, restaurants, accommodation, gymnasiums, printers, hotels) will continue to increase, but the economic stimulus provided by higher density office development should provide for stronger growth. The intensification of office employment around the train stations is likely to be mirrored in supporting services and amenities, which would in all probability broaden in their offering to a format more similar to North Sydney or the CBD. Over the short, medium and longer term it is likely that the Macquarie Shopping Centre will continue to dominate the retail offering in the corridor, but the intensification of office employment in the eastern part of the Corridor could open up the opportunity for more retail offerings to better service that end of the precinct.

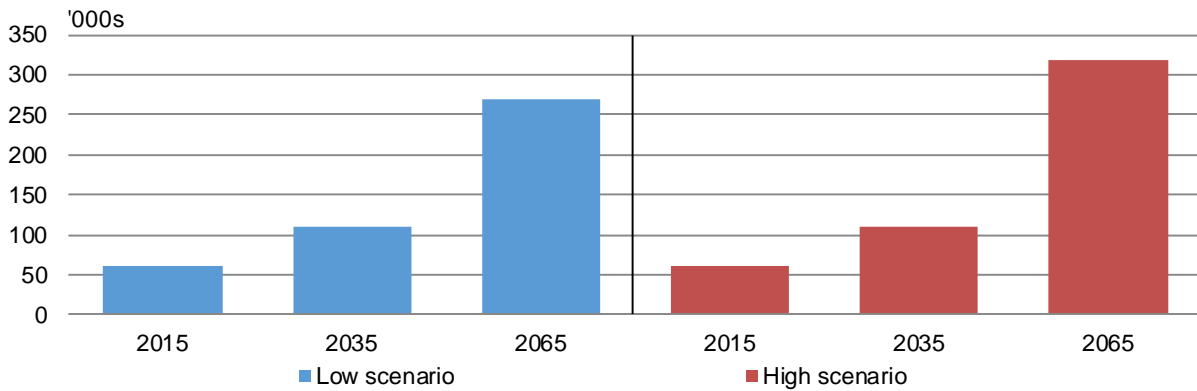
Under the 'low density' scenario, our indicative forecasts show total employment within the Macquarie Park Corridor increasing at an average annual rate of 3.0% between 2015 and 2065. Amongst the sectors, we expect the strongest rates of growth to come from finance & insurance, property & business services, education, health and arts & recreation. As Macquarie Park matures as an office location and increases in size, the availability of land for development will attract overflow demand from preferred office locations such as the CBD and North Shore, particularly as these centres near capacity and become increasingly expensive. In the process, more banks will consider the area for back-of-office functions, with the University and Hospital serving as major drivers of education and health employment. We expect Macquarie Park to increase its share of business service providers, attracted by existing industry clusters in the area and the availability of sites to expand business operations at a discount to competing site-constrained centres. The growth of arts and recreational employment will be driven by servicing the needs of the growing office employment and residential population.

The non-stand-alone office workforce is forecast to increase from 17,300 people in 2011 (18,800 in 2015) to 95,000 by 2065. By the end of the forecast period, we estimate the non-stand-alone office workforce will be dominated by the health, education, property & business services and retail sectors, combining to make up about 70% of the total.

Under the 'high density' scenario, total employment would receive a boost as the market is opened up to a wider range of office based industries as well as those who service them. Again, our forecasts for total employment are derived by applying ratios to the stand alone office workforce by industry, up to the office workforce, white collar workforce and then to

employment by industry. By 2065, we expect total employment to increase from an estimated 61,000 people to 319,000.

Chart 3.6: Macquarie Park and North Ryde total employment, low vs high scenario



Year ended December

Source: BIS Shrapnel, ABS data

The key differences for total employment (compared to the ‘low density’ case) are that the office based industry structure would start to change towards businesses typically found in high density areas, particularly property & business services and finance & insurance, leading to stronger growth in these sectors. Larger and more concentrated office precincts around the train stations would also serve to boost employment in those sectors servicing the office workfare including retail, accommodation & food. In all probability, what would happen is the base of services needed to support a larger stock base and greater density would broaden and evolve to reflect a structure more closely aligned to that of a major CBD. As a result, we would expect much greater employment growth in retail trade, accommodation & food and arts & recreation.

Table 3.5: Macquarie Park and North Ryde SA2 total employment, low density base case, 2011 to 2065

Year ended Dec	Agriculture		Mining		Manufactur.		Electricity, Gas, Water		Construction		Wholesale Trade		Retail Trade		Accommodation & Food Services		Transport & Telecom.		Intor. Media & Infor. Services		Finance & Insur.		Property & Public Admin. Services		Health Recreat.		Arts & Other Services		Total
	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	000s	
2011	0.02	0.04	6.02	0.06	1.98	10.60	3.23	1.54	0.36	8.61	0.85	10.97	0.36	4.70	5.07	0.20	1.28	55.67											
2012	0.02	0.05	5.93	0.05	1.96	9.66	2.97	1.54	0.34	10.23	0.63	11.14	0.84	4.48	4.93	0.20	1.19	56.16											
2013	0.02	0.08	5.97	0.05	1.90	11.00	3.24	1.57	0.34	8.54	0.61	11.16	0.95	4.98	5.49	0.25	1.32	57.48											
2014	0.02	0.02	6.02	0.05	2.21	10.06	3.21	1.44	0.37	8.93	0.63	11.54	0.89	5.28	5.53	0.22	1.49	57.93											
2015e	0.02	0.03	5.72	0.06	2.25	10.41	3.39	1.66	0.35	9.57	0.64	12.53	1.37	5.28	5.78	0.21	1.54	60.82											
Forecasts																													
2020	0.02	0.04	6.39	0.05	2.76	11.72	4.02	2.02	0.41	10.34	0.83	14.85	3.27	6.40	6.84	0.25	1.75	71.96											
2025	0.02	0.03	6.77	0.06	3.03	12.68	4.61	2.38	0.46	11.11	1.00	17.21	3.71	7.61	8.33	0.29	1.95	81.24											
2030	0.03	0.04	7.43	0.06	3.65	14.23	5.39	2.89	0.53	12.16	1.25	20.75	4.39	9.33	10.16	0.37	2.22	94.88											
2035	0.03	0.04	8.08	0.07	4.30	15.79	6.35	3.50	0.62	13.42	1.55	25.02	5.19	11.38	12.58	0.46	2.54	110.91											
2065	0.05	0.08	13.64	0.09	10.40	26.03	14.92	8.84	1.31	21.18	5.54	71.27	12.30	32.59	43.47	1.22	5.59	268.53											
Compound annual growth rates (%)																													
2011-15	-3.1	-5.4	-1.2	-0.2	3.4	-0.4	1.2	1.8	-0.4	2.7	-0.1	3.4	39.4	2.9	3.3	1.4	4.8	2.2											
Forecasts																													
2015-20	2.3	0.9	2.2	-0.5	4.1	2.4	3.5	4.1	2.9	1.6	5.2	3.4	19.0	3.9	3.4	3.6	2.6	3.4											
2020-25	1.5	-0.8	1.1	1.9	1.8	1.6	2.8	3.3	2.2	1.5	3.9	3.0	2.5	3.5	4.0	3.6	2.1	2.5											
2025-30	1.5	2.1	1.9	1.4	3.8	2.3	3.2	4.0	3.1	1.8	4.6	3.8	3.4	4.2	4.0	4.7	2.6	3.2											
2030-35	1.4	2.2	1.7	1.5	3.3	2.1	3.3	3.9	3.2	2.0	4.5	3.8	3.4	4.0	4.4	4.2	2.7	3.2											
2035-65	1.6	2.2	1.8	1.0	3.0	1.7	2.9	3.1	2.5	1.5	4.3	3.6	2.9	3.6	4.2	3.3	2.7	3.0											
2015-65	1.6	1.7	1.8	1.0	3.1	1.8	3.0	3.4	2.7	1.6	4.4	3.5	4.5	3.7	4.1	3.6	2.6	3.0											

Source: BIS Shrapnel, ABS data

e: estimate
Property & Business Services combines: Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services & Administrative and Support Services

Table 3.6: Macquarie Park and North Ryde SA2 total employment, high density scenario, 2011 to 2065

Year ended Dec	Agriculture 000s	Mining 000s	Manufactur. 000s	Electricity, Gas, Water 000s	Construction 000s	Wholesale Trade 000s	Retail Trade 000s	Accom. & Food 000s	Transport & Telecomm. 000s	Infor Media & Insur 000s	Finance & Public Admin. 000s	Property & Safety 000s	Education 000s	Health 000s	Arts & Recreat. 000s	Other Services 000s	Total 000s
2011	0.02	0.04	6.02	0.06	1.98	10.60	3.23	1.54	0.36	8.61	0.65	10.97	4.70	5.07	0.20	1.28	55.67
2012	0.02	0.05	5.93	0.05	1.96	9.66	2.97	1.54	0.34	10.23	0.63	11.14	4.48	4.93	0.20	1.19	56.16
2013	0.02	0.08	5.97	0.05	1.90	11.00	3.24	1.57	0.34	8.54	0.61	11.16	4.98	5.49	0.25	1.32	57.48
2014	0.02	0.02	6.02	0.05	2.21	10.06	3.21	1.44	0.37	8.93	0.63	11.54	5.28	5.53	0.22	1.49	57.93
2015e Forecasts	0.02	0.03	5.72	0.06	2.25	10.41	3.39	1.66	0.35	9.57	0.64	12.53	5.28	5.78	0.21	1.54	60.82
2020	0.02	0.04	6.39	0.05	2.76	11.72	4.02	2.02	0.41	10.34	0.83	14.85	6.40	6.84	0.25	1.75	71.96
2025	0.02	0.03	6.77	0.06	3.03	12.68	4.61	2.38	0.46	11.11	1.00	17.21	7.61	8.33	0.29	1.95	81.25
2030	0.03	0.04	7.43	0.06	3.65	14.23	5.39	2.89	0.53	12.17	1.25	20.76	9.33	10.16	0.37	2.22	94.91
2035	0.03	0.04	8.09	0.07	4.31	15.81	6.36	3.51	0.62	13.45	1.60	25.14	11.39	12.60	0.46	2.55	111.23
2065	0.05	0.09	15.66	0.10	12.40	29.17	16.64	10.44	1.35	25.30	12.47	90.49	35.84	46.26	1.73	6.82	319.36
Compound annual growth rates (%)																	
2011-15 Forecasts	-3.1	-5.4	-1.2	-0.2	3.4	-0.4	1.2	1.8	-0.4	2.7	-0.1	3.4	2.9	3.3	1.4	4.8	2.2
2015-20	2.3	0.9	2.2	-0.5	4.1	2.4	3.5	4.1	2.9	1.6	5.2	3.4	3.9	3.4	3.6	2.6	3.4
2020-25	1.5	-0.8	1.1	1.9	1.8	1.6	2.8	3.3	2.2	1.5	3.9	3.0	2.5	4.0	3.6	2.1	2.5
2025-30	1.5	2.1	1.9	1.4	3.8	2.3	3.2	4.0	3.1	1.8	4.6	3.8	3.4	4.0	4.7	2.6	3.2
2030-35	1.4	2.2	1.7	1.5	3.4	2.1	3.3	4.0	3.2	2.0	5.1	3.9	3.4	4.1	4.4	2.8	3.2
2035-65	1.7	2.3	2.2	1.1	3.6	2.1	3.3	3.7	2.6	2.1	7.1	4.4	3.9	4.4	4.5	3.3	3.6
2015-65	1.7	1.8	2.0	1.1	3.5	2.1	3.2	3.7	2.7	2.0	6.1	4.0	3.9	4.2	4.3	3.0	3.4

e: estimate
Property & Business Services combines: Rental, Hiring and Real Estate Services, Professional, Scientific and Technical Services & Administrative and Support Services
Source: BIS Shrapnel, ABS data

4. ACCOMMODATING FUTURE GROWTH IN MACQUARIE PARK

4.1 Summary of key forecasts

The stand-alone office workforce within Macquarie Park is estimated to be approximately 42,000 as at December 2015, representing approximately 69% of the total workforce within the precinct. Based on the current zonings across the Centre, we forecast that the stand-alone office workforce will grow at an annual average rate of 2.9%, reaching a level of 55,800 by 2025 and an estimated 173,000 by 2065.

BIS Shrapnel has estimated the current office stock across the Macquarie Park corridor—incorporating the University-owned lands—at close to 887,000 square metres. Allowing for forecast employment growth that is expected to occur under existing zonings across Macquarie Park (including capacity under the recent re-zoning within the Macquarie University Station Precinct), the stock base is forecast to increase to around 1.16 million square metres by 2025 and to an estimated 2.9 million square metres by 2065. Under this scenario, the Macquarie Park Corridor reaches theoretical capacity in 2063.

These forecasts suggest that, even by maintaining existing planning controls across much of the Macquarie Park area, the centre will be able to accommodate an increasing share of metropolitan demand until close to the end of the forecast horizon. Indeed, under this scenario, Macquarie Park's share of the metropolitan stand-alone office workforce is expected to rise from 7% now to 16% by 2065. It would develop into a large, vibrant commercial centre, close in size to the Brisbane CBD at present.

If planning controls were to remain unchanged, it is likely that the low-rise, large floorplate characteristic would remain across most of the precinct, whilst sites close to Herring Road would be the focal point for high rise office space, with the new LEP planning controls allowing for commercial development tiering up to 28 storeys.

What would be the incremental demand (or growth in the stand alone office workforce) that could be expected if planning controls across Macquarie Park were relaxed to allow high rise/high density office accommodation?

BIS Shrapnel forecasts suggest that allowing high density commercial development across the precinct would see the stand-alone office workforce grow at a much faster rate—some 3.4% p.a. over the next 50 years compared to 2.9% per annum under the 'low density' scenario. The stand-alone office workforce could be expected to increase to 219,000 by 2065, comprising some 20% of the metropolitan workforce at the time. Accommodating this growth in demand, the office stock across the Macquarie Park Corridor would reach 3.6 million square metres—around 760,000 square metres larger than under the 'low density' scenario.

What would higher density development mean for Macquarie Park? We would expect to see the character of Macquarie Park evolve over the 50 year horizon into a centre with more of the characteristics of a traditional office centre—in terms of industry structure, tenant sizes and the range of supporting facilities and services—and with a lesser reliance on cars.

4.2 Constraints to current and future development

This section of the report considers constraints/threats to current and future development and implications for planning in terms of land use mix, development density, preferred locations for development and timing considerations. The major focus of this section is transport infrastructure. That being said other constraints to future development in Macquarie Park include market demand, adequate provision of amenities, planning restrictions and, crucially,

whether a development is financially feasible. In providing comments on transport, we draw on the results of discussions with occupants within Macquarie Park (including some that have been long term residents and some that have only recently relocated to the area), real estate agencies that are active in leasing office space within the Centre and other key stakeholders.

4.2.1 Private transport infrastructure

- The key message out of discussions with stakeholders at Macquarie Park is that transport infrastructure and business services (restaurants, hotels, serviced apartments etc) have failed to keep pace with the speed of commercial development within the Centre. The road network servicing Macquarie Park has several major bottlenecks, both within the Centre—notably at Lane Cove Road, along Epping Road, at the intersection of Balaclava Road and the University entrance, and in North Ryde, at the entrance and exit points from Julius Avenue to Delhi Road—and at locations and along key transport routes approaching Macquarie Park, such as Epping Station, along Delhi Road and the M2. Traffic congestion is a major problem for commuters entering and exiting Macquarie Park, resulting in extended peak-hour traffic delays.
- Within Macquarie Park, Lane Cove Road is the major north-south thoroughfare that links Sydney's northern (and beach) suburbs with the south of the city, resulting in a large volume of through-traffic, and compounding congestion problems in the Centre.
- There is a huge legacy issue concerning car usage within Macquarie Park. It evolved as a centre catering to businesses that typically had a heavy reliance upon car usage, often with large sales forces or with a warehouse/distribution/manufacturing component that involved the movement of goods and services or required workers to undertake shift work. For many businesses, there remains a reliance upon private transport greater than that in traditional office centres. As at the 2011 Census, it was estimated that close to 68% of people travelled to work in Macquarie Park by car. Compared to other major north shore office centres, this is high. For example, in North Sydney, the comparable figure was 29%.
- Compounding this issue, generous car parking ratios offered in Macquarie Park—relative to traditional office centres that had developed around existing public transport nodes such as North Sydney and Chatswood—saw new developments incorporate very high car parking provisions. A culture of entitlement around car usage and on-site parking is entrenched. Real estate agents market generous car parking provision as a key attractor to tenants seeking space within Macquarie Park. Moreover, amongst many companies, and especially those that have occupied space within the market for many years, car parking is provided 'free of charge' to employees or is included as part of salary packages/novated leases. To withdraw this service will be difficult/'too hard' for many businesses.
- The problem is not only transport congestion in and around Macquarie Park but also where an employee's journey commences. With a significant proportion of the workforce coming from the north-west, upper north shore and northern beaches, typical journey times are long and, if public transport services were available, involve multiple connections. Connect (Connecting Macquarie Park + North Ryde, *What Employees Tell Us*) has estimated that for 58% of people working within Macquarie Park, their journey to work by public transport involves one or more interchanges and, hence, is likely to be an unattractive option. Connect has estimated that the journey from Mona Vale to Macquarie Park by bus would take 80 minutes compared to 32 minutes by car; from Dee Why, 70 minutes by bus compared to 39 minutes by car, reinforcing the disincentive to use public transport.

4.2.2 Public transport infrastructure

- Until 2009, when the Epping to Chatswood rail link opened, the Macquarie Park precinct was reliant upon bus services as the primary form of public transport servicing the area. The introduction of the train service seemingly had the effect of taking some of the pressure off the bus network and modifying travel behaviour amongst a small proportion of drivers. But the take-up of train services amongst workers in Macquarie Park remains low compared to other major north shore centres. According to the 2011 Census journey to work data, just 7.8% of workers in Macquarie Park travelled to work solely by train compared to 28% in North Sydney.
- A number of factors were highlighted by survey respondents as limiting the appeal of the rail service, including:
 - Most importantly, the existing rail service only directly services those commuters coming from Hornsby/Epping/Chatswood and from the city, and does not provide a direct service for those commuters approaching from the north-west, the south, west or northern beaches.
 - The existing rail service is infrequent, with trains passing through the Macquarie Park stations only every 15 minutes at best—even during peak hour periods. For commuters that need connecting services, this can be problematic if timetables do not coincide, if a service is delayed or a train is missed. Moreover, infrequent services outside peak times makes using the train for meetings in other centres unviable.
 - Particularly within North Ryde, the train station is located at one end of the precinct and is quite remote for many employees (with a walking distance of up to 800m). Many respondents noted that lack of synchronization of pedestrian walk signs to cross major roads could add significantly to time taken to reach stations. Moreover, the large, often impermeable block structure of the Centre, with a lack of short-cuts or shared pedestrian paths between buildings, adds to the delays.
 - Lack of integration between different forms of public transport into a co-ordinated, holistic transport network plan. Again, the proportion of commuters travelling to Macquarie Park by multiple transport forms (some 5.8%) is a long way below the proportion seen in North Sydney of 16%, suggesting failures in the system in Macquarie Park.
- Despite the number of bus operators servicing Macquarie Park, use of buses as the principal means of journey to work is low. At the 2011 Census, just 4.6% of workers used bus as the sole means of accessing the workplace, compared to 9.0% in North Sydney.
- Survey respondents highlighted a number of shortcomings in the existing service provision including:
 - Most importantly, the lack of dedicated bus lanes/bus priority lanes for high demand corridors (such as Waterloo Road, Lane Cove Road) from Macquarie Park to Gordon, Top Ryde, Epping and North Ryde.
 - The plethora of different bus operators servicing the area, often with different livery and using different bus stops within the precincts, which creates confusion amongst users.
 - Several high demand source areas for employees lack direct services (Brookvale/Dee Why, Newtown).

- Many of bus services terminate at Macquarie Park and could be extended to Riverside Corporate Park.
- There can be big gaps in timetables servicing Macquarie Park, with many areas of high demand having only an infrequent or slow service.

4.2.3 Implications

- Of particular concern, the 2011 Census showed that even from adjoining areas, including Ryde-Hunters Hill, Chatswood-Lane Cove and North Sydney, car travel was the most common form of transport for the journey to work (to Macquarie Park).
- Amongst companies that occupy office space within Macquarie Park, there is a significant resistance to moving from private transport to public transport—at least until there is evidence that the service provision is dramatically improved and broadened. Feedback heard over and over again from respondents was *'why sit on a bus, when you are sitting in the same traffic jam as you would be if you were driving and it will take you longer to get to work'*.
- Compounding the problem is the planned closure of the rail network servicing Macquarie Park/North Ryde associated with the introduction of the new Sydney Metro Northwest rail line that will link Sydney's north-west from Rouse Hill, to the City and beyond. There is a lack of clarity around how long the three stations servicing Macquarie Park will be closed. Transport for NSW says the closure will be for seven months, however mooted times range from a minimum of 6 months up to 2 years, before re-opening in early 2019. Amongst companies based at Macquarie Park there is universal alarm regarding the potential impact of the rail closure on an already over-loaded transport network. Road congestion is currently a major problem and, with the mooted solution being additional buses, there is growing concern regarding the gridlock that will ensue from having more buses on the roads.
- There is a perception that the new Metro service could provide the opportunity to drive a paradigm shift in getting commuters out of cars and onto public transport, by opening up a greater number of source locations to a better commuting service and by providing a more regular service. However, until it is operational, there will be a reluctance to give up the car.
- Many companies located within both Macquarie Park and North Ryde have responded to the traffic concerns in several ways, including a range of initiatives outlined below. Connect is also working closely with local businesses to educate them on available and effective transport/trip options, and with State and Local Government to find solutions to transport problems. Amongst the initiatives adopted by many businesses within Macquarie Park to overcome transport shortcomings are:
 - The adoption of flexible/staggered working hours to avoid peak hour traffic congestion. Whilst changing work practices are also driving the move towards more flexible work patterns—with a greater move towards Agile Working and working from home—within Macquarie Park the need to avoid traffic congestion was repeatedly highlighted as a critical factor underpinning these moves. In most cases, productivity was not negatively impacted by these changes, but in some cases business disruption had resulted.
 - Many businesses advised that they run shuttle bus services for their staff to local/nearby train stations/to the bus interchange and, in some cases, to the CBD. In some cases, this service had been introduced prior to the opening of the rail service and had proven difficult to withdraw. For one company based in North Ryde, a shuttle

service is provided for call centre workers coming from Seven Hills, at a cost of \$100,000 per year, to ensure that they can get to/from work on time.

- Some major companies subsidise or pay fully for use of public transport by staff—bus and train travel may be provided for free, opal cards purchased, ride-sharing facilitated. Amongst the largest companies, respondents advised that they send SMS alerts to staff to let them know if traffic congestion is bad and pay tolls for off-ramps from the M2 to ensure staff can get to work more efficiently.

4.2.4 Conclusions regarding infrastructure constraints

- Traffic congestion on the road network in and around Macquarie Park is currently the major issue of concern amongst existing businesses within the Centre and is also the major impediment to the future growth of Macquarie Park as a commercial office centre—regardless of whether development occurs in a low-rise business park, high rise office tower or mixed use format.
- These issues are unlikely to be resolved (at least) until the Metro is operational and can act as a catalyst to encourage greater use of public transport. Most likely, substantial investment in upgrading the road network around Macquarie Park, and especially dealing with the major bottlenecks focused on Lane Cove Road, as well as finding solutions to prioritising bus services, will also be needed in order to attract continued strong employment growth. Transport for NSW and the Department of Planning & Environment are undertaking a multi modal strategy in conjunction with the Metro, but it is not yet clear what the results of this strategy will be.
- To facilitate higher density development (of either offices or residential land uses) prior to resolution of these issues will likely only add to congestion and reduce the appeal of the Centre to future potential occupiers.
- Future planning around transport infrastructure should also consider linkages to Kingsford Smith Airport. Many of the businesses located at Macquarie Park represent the regional or national headquarters of multinational companies and regularly receive overseas visitors. Respondents noted that it can take up to 1.5 hours to journey from the Airport to Macquarie Park and contrasted this to the relatively simpler task of getting to and from Silicon Valley from San Francisco Airport.

4.3 Low rise v high rise office space?

Macquarie Park has developed over the past 30 years into Australia's premier business park—in the process incorporating best-practice design features into many buildings, including a wide range of amenities and facilities such as gyms and other recreational areas, cafes, childcare and other end of journey facilities, together with the latest technological advances and environmental features.

Typically, buildings can be characterised as self-contained, low rise, large floorplate structures, with generous car parking provision, occupying large, often impermeable blocks. However, linkages between buildings or users within the precinct is limited and pedestrian access/flow is relatively poor. This integration of facilities into individual buildings has, potentially, curtailed the provision of services that one would find in a traditional office centre (although some would argue that the integration of facilities within buildings has occurred because they were not available or accessible for many companies within the precinct, with the exception of those located close to Macquarie Shopping Centre. Respondents located close to Macquarie Shopping Centre viewed it as a major positive for their staff. Within the Riverside Corporate

Park, most respondents felt that the nearby shopping facilities were adequate to meet their needs. Amongst other respondents, there was a sense that better services were required.

For many businesses that have chosen to locate in Macquarie Park the campus-style or large floorplate, low rise building form has a strong appeal, most notably because of the larger sized floorplates. It provides a scale that is often not available elsewhere and generally at a significant rental saving to more traditional, higher density office centres. Most buildings have an average floorplate of 1,700 to 2,500 square metres, with some floorplates reaching 4,000 square metres. Respondents have suggested that an average floorplate of 1,800 to 2,000 square metres is optimal in terms of effective workplace design and functionality of business, facilitating effective collaboration between workers. Smaller floorplates often necessitate the breaking up of teams and the need to traverse different floors. Larger floorplates can be wasteful, creating too big a distance to cover to talk with colleagues.

Even older buildings within Macquarie Park typically have larger average floorplates than in traditional office markets and most buildings are capable of being fitted out to accommodate the latest workplace practices. A recent example at Riverside Corporate Park was the BOC building at 10 Julius Avenue. BOC considers that the upgraded building now matches most CBD buildings in terms of technological, environmental and design standards.

The business park character of Macquarie Park has attracted many larger space occupiers, with a preponderance of headquarters of national and multinational companies in the high tech, medical/pharmaceutical and telecommunications sectors, amongst others. Whilst there is a mix of smaller and larger occupiers when compared with traditional office centres such as North Sydney, the CBD and Chatswood, Macquarie Park has a far greater proportion of larger office space users. A sample of tenancies from the Core Logic leasing database across Sydney's major office markets suggests that around 62% of office tenancies within Macquarie Park occupy more than 2,000 square metres, compared to 38% in Chatswood and just 11% in both the CBD and North Sydney. Conversely, the sample suggests that some 53% of tenancies within the CBD occupy less than 500 square metres, compared to 37% in North Sydney and just 19% in Macquarie Park.

The question is, would the characteristics change if high density office accommodation were allowed across the precinct? In all likelihood, yes. We would expect to see high rise buildings attract a greater mix of tenant sizes and a wider range of office uses or industries, similar to that evident in traditional office centres such as the CBD and North Sydney. Most notably, North Sydney currently has a greater representation of workers in the finance & insurance sector than Macquarie Park (16.6% compared to 1.2%, 2011 Census) and this sector could be expected to grow over time in Macquarie Park. Other sectors that might see a greater representation within Macquarie Park if it were to take on higher density commercial development would be property & business services and admin and support services, as well as sectors that would be less intensive office users, such as retail trade and accommodation and food services. Even so, we think this evolution would take time, occurring over several office cycles.

Another question arises. Do existing tenants prefer the business park nature of Macquarie Park or would they prefer to be in high rise office towers if they were also available? From our relatively limited survey sample, respondents generally confirmed a strong preference for the low rise, large format character of the precinct, but many also advised that they saw a place for higher density office space within the Centre, provided transport infrastructure problems could be overcome. There was a sense that high rise development was inevitable in the future, especially when other centres reach capacity limits. Indeed, most respondents advised that it would not impact their future decisions as to whether to occupy space within Macquarie Park.

Advantages noted in association with high rise office space included the following:

- It would likely result in a finer grain to block density and road/pedestrian networks that would facilitate better movement by workers amongst buildings and to and from public transport nodes.
- With greater density is likely to come a growing workforce, reinforcing the role of Macquarie Park as a major business hub. In turn, this could be expected to reinforce existing industry clusters, as smaller and larger suppliers, vendors and others are attracted to the centre, but also add depth to the range of businesses located within Macquarie Park.
- A greater density of development is also likely to attract more services/facilities. A significant concern amongst a number of respondent companies, particularly those in buildings more than 500 metres from Macquarie shopping centre, was that the range of services accessible to them—shops, restaurants, banks, hotels etc—is limited, with the Macquarie Centre being too far for many to access. Some noted that Macquarie Park also lacks the range of services that are required outside of working hours and on weekends.

Whilst favoured by most, there was some criticism of the campus-style of accommodation amongst respondents. Notably, it could be isolating for a company when they effectively ‘own’ a large ‘campus’—discouraging interaction with neighbouring businesses. For some respondents that owned their own campus-style buildings, there was also a concern that such buildings are not adaptive enough to accommodate rapid changes to businesses due to cyclical or structural factors.

4.4 Co-existence of residential and office land uses

After a long period of stagnation Sydney’s residential market began to recover at the end of 2012. With a significant underlying deficiency of stock in place, successive cuts to interest rates provided the impetus for price growth and a surge in housing construction. Since then, new supply has been dominated by high rise apartment construction, primarily within the inner and middle rings of suburbs.

Building is currently at record levels. Investor demand has driven the market, with owner occupiers relatively slow to follow. Prices have risen strongly, leading to concerns about affordability. But with the apartment sector expected to remain in deficiency for a few more years, construction activity is likely to remain strong.

Meanwhile, strong demand for residential sites is boosting the price of underdeveloped commercial property suitable for residential development. Residential apartment development significantly outperforms commercial offices as the highest and best use for sites and there is considerable pressure on commercial sites for rezoning to allow residential (re)development. The concern is that, by taking sites, residential development will limit the potential for commercial development when it becomes more financially feasible.

These concerns are particularly relevant in and around Macquarie Park. Table 4.1 highlights the exponential rise in medium and high density apartment construction that has occurred over recent years within both the Ryde LGA and across Greater Sydney.

Table 4.2 shows the trend towards high density dwelling approvals is expected to continue over the next five years. But at this stage of the commercial office cycle, new development is difficult to make stack up and certainly not at average market rentals within Macquarie Park. There is a risk that if sites are zoned to allow both residential and commercial towers, residential uses will

occur on sites that would otherwise be prime commercial sites later in the upswing phase of this cycle and in future cycles.

Table 4.1: Number of building approvals for flats/units/apartments in buildings of 4 storeys and above

<i>Year ended June</i>	<i>Ryde</i>	<i>Greater Sydney</i>
2002	60	10,292
2003	277	10,938
2004	271	10,422
2005	284	7,261
2006	221	5,366
2007	0	6,256
2008	143	6,735
2009	0	4,314
2010	107	5,001
2011	650	9,932
2012	791	12,152
2013	746	12,777
2014	1,079	20,457
2015	1,089	21,516
Year to Sep'15	974	24,342

Source: BCI Australia, BIS Shrapnel

Table 4.2: New high density dwelling* approvals, City of Ryde and Greater Sydney, annual average totals

	<i>2002-2006</i>	<i>2007-2011</i>	<i>2011-2015</i>	<i>2016-2021f</i>
Ryde (C)	223	180	926	1,487
Greater Sydney	8,856	6,448	16,726	19,588

* Projects of 20 units or more

Source: BCI Australia, BIS Shrapnel

Already, the *Macquarie University Station Precinct Plan* (approved in 2015) allows for up to 5,800 new residential units within a 10 minute walking radius of the Macquarie University Station by 2031. Urban Growth has commenced work on a masterplan for the area involving 2,570 apartments as part of the Ivanhoe Estate Redevelopment. Elsewhere along Herring Road, major apartment projects are under construction (Macquarie Park Village) or planned.

Similarly, the *North Ryde Station Precinct Development Control Plan 2013* set in place guidelines for a mix of high rise residential redevelopment on a number of sites surrounding North Ryde Station. Currently, at least three major projects involving high rise residential towers are planned within the precinct.

How do commercial occupants of the Macquarie Park corridor view high rise apartment development in and around commercial precincts? Are there preferred locations? What are the constraints on apartment development within the precinct?

With the above planning instruments now gazetted, the areas adjoining the Macquarie University and North Ryde stations will logically become major residential hubs. Respondents occupying commercial office space at Riverside Corporate Park highlighted concerns about the potential impact of high rise residential development on an already congested road system. Whilst plans are reportedly in place to upgrade Delhi Road, there was a strong sense that further apartment development within the North Ryde precinct should be limited until such time as traffic issues have been resolved.

Amongst respondents that were located elsewhere within the Macquarie Park corridor, there was a view that residential development, including high rise apartments, was a positive for the centre, but again that across the precinct—and particularly closer to Lane Cove Road and Macquarie Park station—transport problems firstly needed to be resolved in order for mixed use development to work successfully. Respondents felt that high rise apartment development would add significantly to the volume of traffic in the precinct.

Respondents provided the following feedback in respect of the opportunity for mixed use development across Macquarie Park:

- Most respondents felt that residential apartment (medium and high rise) development would be a positive for Macquarie Park. It would result in population growth (most likely amongst a younger/white collar workforce) and bring with it a greater range of associated services and facilities that are currently lacking across the Centre, such as hotels, shops, restaurants etc.
- Moreover, for those living within the area, the opportunity to work closer to home would be a great benefit. At present a significant proportion of the workforce within Macquarie Park has a long commute to work. By providing additional accommodation closer to the workplace, this also provide greater choice and availability for workers. I.e. the introduction of residential apartments is a key ingredient in making the Macquarie Park Corridor an effective and attractive working precinct.
- However, there was a widely held view amongst respondents that high rise apartments would best be accommodated adjacent to, rather than integrated within, commercial zones. Whilst there are examples of high rise apartments co-habiting successfully with high rise office buildings, both in Sydney (Pyrmont) and overseas, there are also examples where respondents felt that the process had not worked well. In particular, Chatswood was cited by many as an example of where (often) poorly designed residential towers had impacted on the commercial core and in the process changed the perception of the market. Strong design controls within planning approvals may go some way to overcoming these concerns but, even so, there was a sense that within Macquarie Park there was adequate space to allow different land uses to remain separated. Respondents generally felt that the 'professionalism' of the commercial core may be compromised by allowing residential towers to co-exist alongside office towers.
- Respondents were almost unanimous in rejecting mixed use buildings for their workplace. The desire not to work and live in the one building, security issues, regulatory controls and differing building standards that apply to residential and office buildings were all cited as reasons why mixed use projects did not appeal.

4.5 Timing of future office development. Do we need to protect office sites in the short term?

- The Sydney office market is at the beginning of a long upswing that we expect will run until early next decade. In the very short term, additions to office stock will occur predominantly within the CBD, but centres such as Macquarie Park are expected to capture 'overflow' demand (and new supply) as tenants relocate from site-constrained markets such as Chatswood and, over time, from markets that are experiencing strongly rising rentals, such as the CBD and North Sydney.
- Office vacancies within Macquarie Park are still reasonably high, at around 8%. Leasing incentives, too, remain moderately high at around 2.3 years' equivalent (on a 10 year

lease), although we have seen some growth in effective rents over recent years. This is impacting development feasibility. But, as rents rise above replacement cost levels, we expect to see the first round of new office completions between 2018 and 2020, with a further phase to occur early next decade.

- The key to Macquarie Park's attractiveness as an office precinct is its availability of sites and competitive rentals. Over the next decade Macquarie Park is expected to see its share of metropolitan stock increase from 7.4% to 8.2%, reflecting a rise in stock of 277,000 square metres. Over a longer horizon of 50 years, our forecasts suggest demand for sites within Macquarie Park is likely to be even stronger as many competing centres reach their capacity.
- By 2065, our forecasts suggest office stock in Macquarie Park could grow to between 2.9 and 3.6 million square metres, but this will depend on sufficient sites being readily developable.
- With evidence of developer enthusiasm to pick-off prime sites for residential development, there is a strong logic for protecting commercial sites in the short term, regardless of whether future office development takes the form of low rise, campus-style development or high rise towers.

4.6 Where within Macquarie Park/North Ryde should high rise commercial office space go?

- This is principally a planning question. Already Council has determined that high rise office space will be permitted along the Herring Road frontage in the Macquarie University Station Precinct. There is a logic for this, given the proximity to the railway station, the bus interchange, Macquarie University and the shopping centre.
- Until such time as a major upgrade to transport infrastructure occurs in and around the North Ryde/Riverside Corporate Park precinct, higher density development would seemingly only add to the difficulties regarding access currently being experienced by occupants of the area.
- Survey respondents advised that an acceptable walking distance from office to public transport is around 500 metres. Many businesses currently located within Macquarie Park and North Ryde are located up to 800 metres from the nearest station and consider it too far (especially on hot, cold, wet or windy days) although there is much that could be done to improve pedestrian flow, safety and comfort around the centre. Connect has made recommendations around these issues in reports to both Ryde Council and Transport for NSW.
- Logically, areas within 500 metres walk surrounding Macquarie Park station and along the Waterloo Road spine linking that station with the Macquarie University station would be the sensible location for future high rise office space. However, again, traffic is a major hurdle, especially along Lane Cove Road. If and when these issues can be resolved, such areas would be preferred locations for higher density development.

APPENDICES

A1. METHODOLOGY: MEASURING DEMAND FOR AND SUPPLY OF OFFICE SPACE

BIS Shrapnel has prepared employment forecasts for the Macquarie Park Corridor that cover the period 2015 to 2065. Forecasts for the stand-alone office workforce (SAOWF) and total workforce by industry sector are provided under a 'low density' and 'high density' scenario. For both scenarios, the SAOWF is aligned with BIS Shrapnel forecasts contained within our *Sydney Suburban Centres and Office Parks 2015 to 2025* study.

The 'low density' scenario is based on the assumption that current planning controls set the capacity for Macquarie Park. The 'high density' scenario is based on the assumption that planning controls are amended to allow higher density office development, with no effective cap placed on the Centre's capacity to accommodate employment.

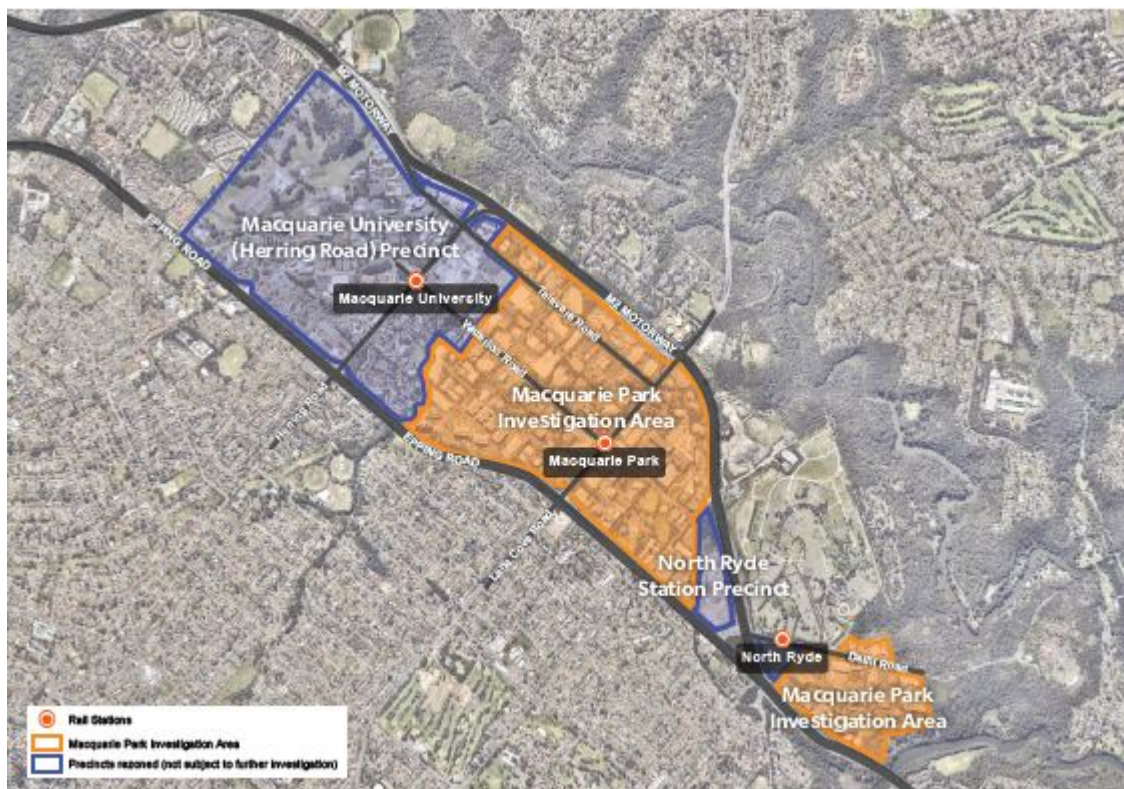
We provide details below of the assumptions that are common to both scenarios. We further detail the methodology used in the higher density scenario.

A1.1 Definition of stand-alone office space

Stand-alone office space is defined as space in buildings where office functions are the principal usage. This is the Australian Bureau of Statistics definition. It excludes ancillary office space in factories, hospitals, warehouses etc. It includes the office component in mixed-use buildings where office space dominates (i.e. over 50% of the building is dedicated to office use). It excludes obsolete office space.

A1.2 Boundaries for Macquarie Park

Chart A1: Macquarie Park office market boundaries



The boundaries for the Macquarie Park office market used within this report are shown as the Macquarie Park Investigation Area (Chart A1). The Investigation Area is broadly consistent with the Property Council of Australia boundary for Macquarie Park.

Where we refer to the Macquarie Park Corridor within the report, we also include land within the area known as the Macquarie University (Herring Road Priority) Precinct.

A1.3 Employment

A1.3.1 Total employment

Total employment for Macquarie Park at 2011 is based on ABS Journey to Work data from the 2011 Census for the SA2 areas, Macquarie Park-Marsfield and North Ryde-East Ryde. As Journey to Work data by industry and occupation is not readily available in the more detailed SA1 areas, the SA2 areas used most closely match the Property Council of Australia boundary for Macquarie Park. We were unable to use the Bureau of Transport Statistics Travel zone data because industry by occupation is not available.

Post-2011, and for our forecasts, we applied BIS Shrapnel metropolitan total employment growth rates by industry to the 2011 base as a first pass. Because growth in Macquarie Park was forecast to be stronger than at the metropolitan level, we then used our Macquarie Park SAOWF series and applied the area's ratios for office workforce and white collar office workforce to scale up the total employment by industry sector.

For the high density scenario, total employment was estimated by adding the additional incremental demand that was expected in the SAOWF and non-SAOWF to the base case forecasts.

A1.3.2 Stand-alone office workforce

Table A1: Measuring stand-alone office employment

Total Macquarie Park workforce → White collar workforce

Census data is used to establish the proportions of white collar workers in each industry sector of the total workforce. White collar professions are distinguished from other occupations in the Census eg, Managers & Administrators and Professionals. These proportions are applied to our estimates of total employment to give the white collar workforce.

White collar workforce → Office workforce

Census data is also used to establish the proportions of white collar workers in each industry sector that work in an office rather than other forms of accommodation. Again, the latest census proportions are applied to the white collar work force to give our estimates of the office workforce by industry sector.

Office workforce → Stand-alone office workforce (SAOWF)

The bulk of office workforce in Macquarie Park are accommodated in dedicated (stand-alone) office buildings, hence we adopted a ratio of the SAOWF to office employment to reflect this.

Office employment growth across Sydney's sub-markets is dependent on total metropolitan office employment growth and competition between the sub-markets. Hence our principal analysis of office employment is for the metropolitan market. We define metropolitan Sydney as the ABS Sydney Statistical Division, which is comparable to the Greater Capital City Statistical Area. Occupations are classified under the ABS ANZSCO structure. We have adjusted total metropolitan 2011 Census data upwards to allow for undercounting using Labour Force data as

a guide. Growth rates were applied from the Labour Force series to the Census between 2011 and 2015.

For Macquarie Park, a similar approach was adopted using the SA2 for Macquarie Park-Marsfield and North Ryde-East Ryde from the 2011 Census as a base. A 'top down' and 'bottom up' approach was used to estimate the SAOWF for the period between 2011 and 2015 and the forecasts. The 'top down' approach involved applying metropolitan growth rates by industry sector from Labour Force data, as well as BIS Shrapnel's metropolitan employment growth forecasts by industry. We then applied ratios for the white collar, office workforce and SAOWF, again by industry (described in Table A1) to estimate Macquarie Park's SAOWF. The 'top down' SAOWF was then scaled up to match the 'bottom up' total SAOWF described in A1.3.2 and A1.3.3.

A1.3.2 Forecast stand-alone office employment and office space capacity constraints

In order to allocate office employment across the Sydney metropolitan area over a long term horizon, it is important to have an understanding of centre capacity constraints. i.e. how much office space can be built in any given centre under current planning regulations? Once a centre nears capacity, the office employment growth it might otherwise have captured will need to be accommodated elsewhere.

Based on internal analysis, BIS Shrapnel has estimates of office stock capacity under existing planning controls for the CBD, North Sydney, Parramatta, Chatswood, St Leonards and Macquarie Park. In order to determine when a centre is likely to hit capacity constraints for office development, we have calculated future office stock by combining projections of office employment with forecasts of average workspace ratios (WSRs) and vacancy rates, as follows:

- For the CBD, North Sydney, Parramatta, Macquarie Park, St Leonards and Chatswood, we separately forecast office stock levels to 2025, as well as average workspace ratios and market vacancy rates in our *Sydney Commercial Property Prospects* and *Sydney Suburban Centres and Office Parks 2015 to 2025* studies. For the period between 2025 and 2065, we assumed the rate of decline in WSRs for each centre forecast over the next 10 years would continue. For the post 2025 period, we adopted a long run vacancy rate of 6.0% for the CBD and 7.0% for each of the remaining major suburban centres.
- The remaining smaller suburban office markets are included in what we define as the residual metropolitan office market (the metropolitan area minus the CBD, North Sydney, Parramatta, Macquarie Park, St Leonards and Chatswood).
- The assumptions for the average WSRs and vacancy rates for each centre are applied to the reference case, with office employment growth the main varying factor.
- When an office centre is known to have reached its capacity under current planning regulations, we have assumed changes will be made by local councils (e.g. increasing floor space ratios, height restrictions etc.) to allow for continued office development, but at a much slower pace.

A1.3.3 Office employment growth assumptions for the 'low density' scenario

We rely on individual market forecasts for growth in the SAOWF for the Sydney CBD, North Sydney, Macquarie Park, Parramatta, St Leonards and Chatswood as published in our *Sydney Commercial and Sydney Suburban Centres and Office Parks 2015 to 2025* reports. For employment projections beyond 2025, we apply the following growth rates:

- 'low growth': 0.5% per annum
- 'moderate growth': 1.0% per annum
- 'moderate to medium growth': 1.5% per annum
- 'medium growth': 2.0% per annum
- 'high growth': 3.0% per annum.

For each of the major office centres, except Macquarie Park, the average annual SAOWF growth was applied by assuming the growth over the last 20 years and that forecast over the next 10 would continue. i.e. for the CBD, North Sydney, St Leonards 1.5% was applied, 0.5% for Chatswood and 3.0% for Parramatta and Macquarie Park. A 3.0% per annum growth rate was applied to Macquarie Park, even though its growth rate between 1995 and 2025 was much higher. It was considered unlikely that the rate of growth in Macquarie Park could be sustained at its historical rate given the slowing in stand-alone office employment growth forecast across the metropolitan area in the longer term.

A1.3.4 Office employment growth assumptions for 'high density' scenario

The amount of additional *office* employment captured by Macquarie Park if the area was opened up to high density office development depends on how much overflow demand is captured when other major centres reach their capacity level. Additional *total* employment within Macquarie Park will be driven by servicing a higher office workforce. Our 'low density' scenario already assumes Macquarie Park will capture an element of overflow demand from other major centres and this is reflected in its SAOWF outpacing the metropolitan area. Under the 'high density' scenario, we assume additional overflow demand (or incremental demand) will be captured, with Macquarie Park opened up to a broader range of businesses.

To estimate incremental demand, we calculated how much extra employment the CBD, North Sydney, Parramatta, St Leonards and Chatswood would have captured at their long term SAOWF growth rates assuming no capacity constraints. This incremental demand would then flow to where it can be accommodated i.e. Macquarie Park and residual markets. After 2025, we assume Macquarie Park will capture 15% of the incremental demand, reflecting its continual expansion as an office precinct. This incremental SAOWF was added to Macquarie Park in the industry proportions reported in the Journey to Work data in the 2011 Census for North Sydney-Lavender Bay. The logic for this is that we expect as Macquarie Park develops into a higher density centre, it would take on an industry structure more typical of such a centre, and reflected in the mix of industry within North Sydney.

Macquarie Park's ratios for the office workforce and white collar workforce were then applied to the SAOWF, by industry, to estimate total employment growth. We expect most of the boost to total employment under the higher density scenario would come from the higher SAOWF employment, with a lower proportionate increase in the non-SAOWF, which we have made allowances for.

A2. LIST OF SURVEYED COMPANIES

Tenants within Macquarie Park/North Ryde

- 3M
- BOC
- Citrix
- Cochlear
- Foxtel
- Fujitsu
- IGT
- Johnson & Johnson
- Jonas Software/Centaman
- Kyocera
- Medtronic
- Metcash
- Optus
- Ricoh
- Rural Co

Ex-tenants

- McMillan Shakespeare
- Sony

Real Estate Agencies

- CBRE
- Cushman & Wakefield
- JLL
- Knight Frank

Other

- Connect Macquarie Park + North Ryde
- Macquarie University – Property
- Sheldon – Interior Fitout specialists
- Transport for NSW