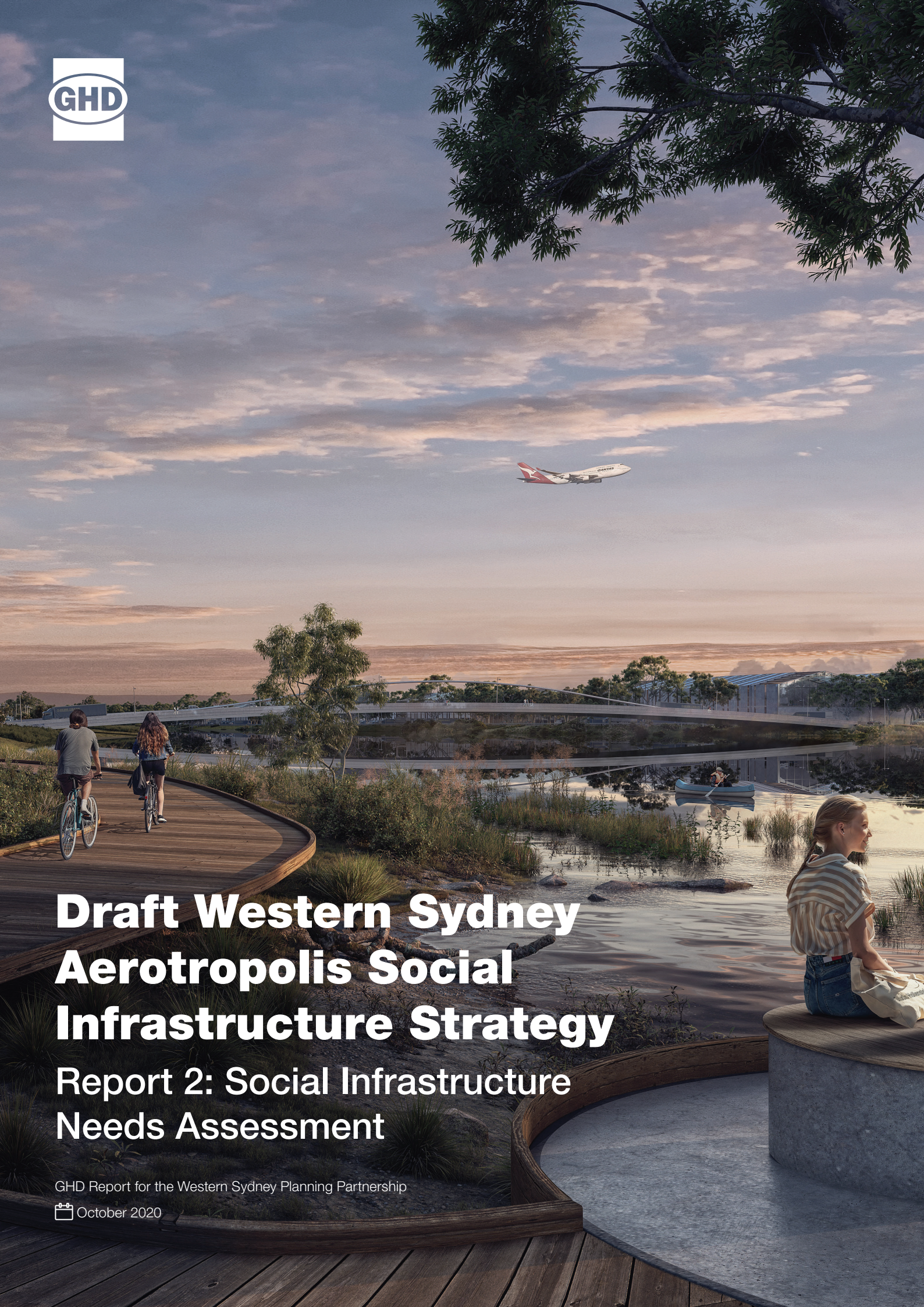
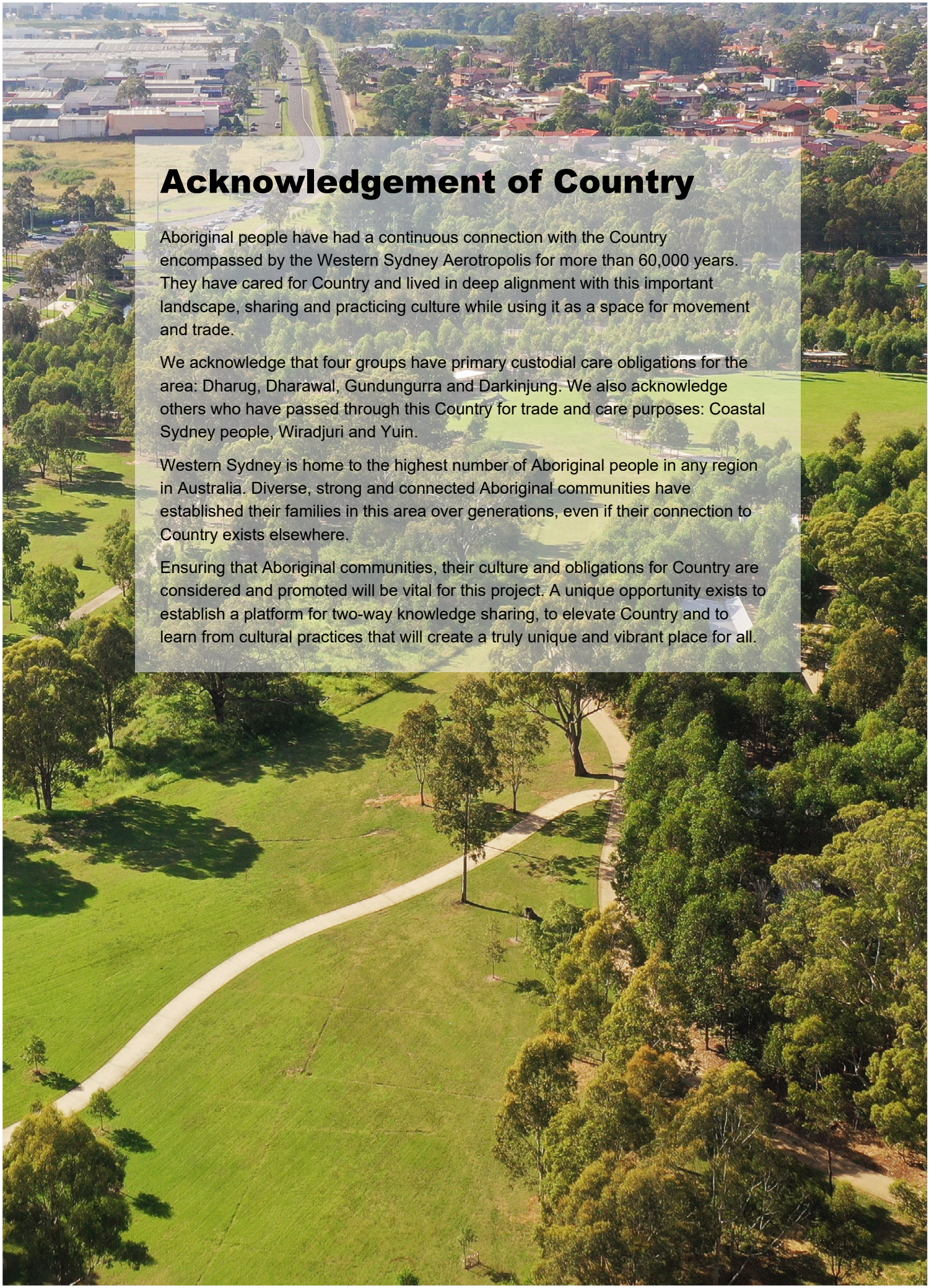


Draft Western Sydney Aerotropolis Social Infrastructure Strategy

Report 2: Social Infrastructure Needs Assessment

GHD Report for the Western Sydney Planning Partnership

October 2020



Acknowledgement of Country

Aboriginal people have had a continuous connection with the Country encompassed by the Western Sydney Aerotropolis for more than 60,000 years. They have cared for Country and lived in deep alignment with this important landscape, sharing and practicing culture while using it as a space for movement and trade.

We acknowledge that four groups have primary custodial care obligations for the area: Dharug, Dharawal, Gundungurra and Darkinjung. We also acknowledge others who have passed through this Country for trade and care purposes: Coastal Sydney people, Wiradjuri and Yuin.

Western Sydney is home to the highest number of Aboriginal people in any region in Australia. Diverse, strong and connected Aboriginal communities have established their families in this area over generations, even if their connection to Country exists elsewhere.

Ensuring that Aboriginal communities, their culture and obligations for Country are considered and promoted will be vital for this project. A unique opportunity exists to establish a platform for two-way knowledge sharing, to elevate Country and to learn from cultural practices that will create a truly unique and vibrant place for all.

Executive summary

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.6 and the assumptions and qualifications contained throughout the Report.

This Social Infrastructure Needs Assessment was prepared to understand the future community and the needs of different users including workers, visitors, tourists and residents within the Western Sydney Aerotropolis Precincts.

The Needs Assessment considers four indicators to determine recommendations for the provision of social infrastructure that will service the future Aerotropolis population. The indicators are as follows:

- Existing need: existing facilities that could service the precinct, outlined in the *Draft Western Sydney Aerotropolis Social Infrastructure Audit* (GHD, 2020a).
- Demographic need: projecting the future resident and worker population through development of a future community profile.
- Comparative need: assessing requirements against a rate of provision or benchmark. This was undertaken through a review of the Greater Sydney Commission's Place Infrastructure Compact (PIC) data and supporting policies.
- Identified need: engagement with key government agencies and social infrastructure providers was undertaken to understand from their perspective the opportunities for social infrastructure.

Future community profile

To achieve the vision to become a metropolitan centre of the Western Parkland City, it is critical that planning for the Aerotropolis considers the projected future community. The community will include people living in, working and visiting the Aerotropolis across its staged planning up until final construction by the year 2056.

Future resident population

The Western City District is projected to have the largest population growth of the five districts that make up Greater Sydney over the coming decades. Development of the Aerotropolis precincts will contribute significantly to this population growth, with an additional 77,000 residents anticipated to move to the area by 2056.

Of the precincts Aerotropolis Core and the Northern Gateway are expected to see the highest population growth, which is largely due to the mixed-use land zoning included in the precincts allowing for residential development. This indicates investment and development of social infrastructure should be concentrated primarily between these two precincts.

Age profile

The age profile of the Aerotropolis is expected to experience substantial change initially between 2016 and 2026 with a young people moving to the area to take advantage of the increasing employment opportunities. An increase in young workforce, career and home builders and babies, and a decrease in senior workforce and people aged over 65 is expected during this period. However, from 2031 the proportion of senior workforce and people aged over 65 is anticipated to steadily increase in line with the aging population trend seen across Greater Sydney.

An increase in younger age groups between 2016 and 2026 indicates a likely initial increase in demand for facilities and services such as childcare and sport and recreation. While a steady

increase in older age groups up to 2056 indicates potential increase in demand for health facilities and aged care between 2026 and 2056.

Household and family type

Family households are expected to remain the largest proportion of households in the Aerotropolis up to 2056. However, the proportion of family households is anticipated to decline steadily with an anticipated increase in lone person households. This is reflective of the trend where a younger workforce is anticipated to move to Aerotropolis to take advantage of the increasing employment opportunities. An increase in lone person households indicates a likely increase in demand for facilities and services which facilitate community connections such as community centres and sport and recreation.

Of the family households, couples with children are expected to remain the largest proportion of family types. Both couples with children and couples without children are however anticipated to experience a steady decline between 2016 and 2056 with an increase in single parent family types. An increase in single parent family types indicates a likely increase in demand for specific facilities and services, such as long day care with extended opening times (i.e. 24/7 childcare), youth specific groups, sport and recreation.

Dwelling growth, density and type

The total population in the Aerotropolis by 2056 is projected to be just over 85,000 persons, with almost 30,000 dwellings required to house the population. In line with the projected population growth the highest number of dwellings would be located in Aerotropolis Core and the Northern Gateway precincts.

The Precinct Plans for the Aerotropolis initial precincts are reflective of urban policies shift to higher density living with zoning allowing for a diversity of dwelling types. Aerotropolis Core and Northern Gateway will support a range of housing densities and types from attached town houses to high rise apartment buildings. This will require the provision of highly accessible and quality public open space and community facilities which facilitate quality community connections. While Agribusiness zoning will limit housing development beyond the existing Luddenham village with the preservation of detached housing.

Aboriginal and Torres Strait Islander population

Western Sydney has the largest Aboriginal and Torres Strait Islander population of any region in Australia at around 32,000 Aboriginal and Torres Strait Islander people (over half of the Aboriginal and Torres Strait Islander people living in Greater Sydney). While the Aerotropolis currently has a relatively small Aboriginal and Torres Strait Islander population there is great potential for the proportion of Aboriginal and Torres Strait Islander people to increase as the Aerotropolis develops. The development of the Aerotropolis into a metropolitan centre of the Western Parkland City presents the opportunity for the Aerotropolis to meet existing demand for facilities and services targeted at accommodating the needs of Aboriginal and Torres Strait Islander people in Western Sydney.

Cultural diversity

Western Sydney is highly diverse with 37 per cent of the population speaking one or more than 200 non-English languages in their homes, indicating the potential for this proportion to increase as the Aerotropolis develops, particularly with the increasing employment opportunities and proximity to the international Western Sydney Airport. As the Aerotropolis grows it is anticipated there will be an increase in people from Asian, Middle Eastern and Indian cultural backgrounds while the proportion of people from European cultural backgrounds are expected to decrease. It is recognised social infrastructure such as community centres and halls which accommodate

support services and social groups for CALD communities can play a key role in creating a sense of community.

Future worker profile

The development of the Aerotropolis will result in a higher growth of the workforce than that of resident population, with an additional 135,000 workers projected to be employed in the area by 2056 reaching a total workforce of almost 139,000. The high workforce growth projections for the Aerotropolis are reflective of the significant level of government intervention being undertaken to attract industry and businesses and achieve the long-term vision for the Aerotropolis, particularly in the initial 15 years up to 2036. Potential challenges including access to suitable skilled labour, attracting business and talent, and an initial lack of residential population to support retail and urban service industry sectors indicate the need for substantial investment in social infrastructure facilities and services which will improve the overall liveability of the Aerotropolis and assist in attracting and retaining residents and workers.

Workforce growth

Workforce growth trends reflect the resident population growth trends with the Northern Gateway expected to have the highest workforce growth over the next 15 years up to 2036 and by 2041 the Aerotropolis Core workforce will start to increase and overtake the Northern Gateway as the precinct with the highest growth rate. By 2056 the Aerotropolis Core is expected to have grown into a metropolitan centre of the Western Parkland City and account for 36 per cent of the total Aerotropolis workforce.

Industries and worker types

Giving consideration to the employment trends indicated in case studies of Melbourne and Brisbane airport employment catchments, the challenges facing the Aerotropolis and the development yields outlined in the precinct plans the initial precincts workforce is anticipated to be characterised by:

- A higher proportion of knowledge-intensive employment sectors and white collar worker types within the Aerotropolis Core and Northern Gateway initially than typically seen in airport employment catchments. This workforce will require social infrastructure provision which focuses on highly accessible facilities and services such as open space, health and sport and recreation facilities during and either side of the 9:00 am to 5:00 pm work day.
- A prominence of traditional industry sectors and blue collar worker types in Badgerys Creek and Agribusiness precincts due to the majority large scale logistics and general industrial land uses. This workforce will require social infrastructure provision which focuses on facilities and services such as health and community services with extended opening times.
- An increase in white collar worker types between 2036 and 2056 with the growth in knowledge-based sectors in Aerotropolis Core, Northern Gateway and Badgerys Creek.

Potential future visitors

State and regional visitor trends

In the year ending March 2019, NSW received 39.9 million international and domestic visitors who spent $32.9 billion. Of this, Western Sydney attracted 11.8 million visitors who spent $5.2 billion. With aviation playing a key role in underpinning the tourism industry the strategic alignment of the Aerotropolis with the Western Sydney (Nancy-Bird) International Airport provides the opportunity for the Aerotropolis to benefit from international and domestic tourism spending in the local economy.

Potential visitors to Aerotropolis

The Western Sydney (Nancy-Bird) International Airport is anticipated to accommodate 10 million passengers annually five years after opening. By 2050, the airport is anticipated to have an annual capacity of 37 million passengers and accommodate over half of Sydney's international air travel demand. This significant proportion of visitors travelling through the Aerotropolis as either arrivals or departures presents an exciting opportunity for the Aerotropolis to develop into a destination in itself. It will be critical for the Aerotropolis to provide key attractors including regional level cultural facilities and event spaces to attract visitors.

Future social infrastructure

Education

The Western Sydney Aerotropolis Plan (DPIE, 2020c) outlines the aspiration for the Aerotropolis to become an internationally significant and competitive area for research/ innovation, science, training and education (including tertiary and vocation education training institutions and secondary school level), particularly in the Aerotropolis Core. Commitments to education made in the Western Sydney City Deal include a new specialist public high school. the establishment of a VET facility and the multiversity that is being developed by the NUW Alliance.

Health

The Aerotropolis is located in the South Western Sydney Local Health District (SWSLHD). A review of NSW Health's PIC workbook and consultation with the SWSLHD confirmed that existing health hospitals with planned upgrades in the suburbs surrounding the Aerotropolis had sufficient capacity to support the future population up to 2036 and did not warrant a separate public hospital facility in the Aerotropolis. Beyond 2036 consideration should be given to the development of an Integrated Health Hub (IHhub) within Aerotropolis Core. This facility would delivery a comprehensive range of clinical services that can support 'stepped' up care for local primary care providers as well as outreach models of care for clinical services traditionally delivered from hospital sites. Recommendations were also made for 12 bay ambulance statione and new community health facilities in suburbs just outside Aerotropolis.

Emergency facilities

Consultation with Fire Rescue NSW (FRNSW) confirmed that the NSW Rural Fire Service as of August 2020 are responsible for all fire services in the Aerotropolis. Rural Fire Service NSW are expected to transfer the area to the responsibility of FRNSW as the area becomes developed and increasingly urbanised. Boundary determination regarding service provision is discussed between FRNSW and RFS, both agencies should therefore be regularly consulted as the area becomes more developed. Within the PIC Data the recommendation was made for a multipurpose police hub that would be located within Badgerys Creek. This facility could accommodate facilities for both NSW Police and FRNSW. It would also be considered for use as a state emergency management centre for government and local authorities.

Community facilities

The provision of appropriate community facilities can assist communities, and particularly vulnerable groups, to address social isolation and exclusion and improve overall social cohesion, health and wellbeing. Depending on the size of the population that is being served, and the amount of space/land available, multipurpose facilities can be provided as either a community space or a standalone centre. A multipurpose space could be integrated into another council facility such as a library, tourism centre or cultural facility. Facilities should accommodate for particular services and activities for specific target groups such as young peoples, older peoples, and people from culturally and linguistically diverse backgrounds.

Childcare

Urban Economics (2018) prepared the Occupancy and Performance Appraisal: Early Childhood Education and Care Sector to analyse the factors influencing demand for, and supply of, Early Childhood Education and Care across Australia. The report found that childcare facilities close to a parent's place of work, along with other 'lifestyle' facilities including end-of-trip facilities and co-working spaces, are increasingly in demand by workers and business across CBDs and employment hubs.

The provision of childcare should be planned at the local level in close proximity to the population that it services. In areas of high employment, such as Aerotropolis Core or employment hubs, additional childcare places will be required to cater for workers.

Aged Care and disability

While demand for residential aged care will largely be met by the private market, it is important for the precinct plans to consider this potential demand and allow for appropriate planning controls to enable the development of aged and disability care facilities within the Aerotropolis.

Cultural and art facilities

Create NSW's Cultural Infrastructure Plan 2025+ defines cultural infrastructure as buildings or spaces that accommodate or support culture, including art galleries, performance spaces, museums, digital and technological infrastructure, amphitheatres and public art and more. It is a facility or area where the community and cultural sector can create, share, and learn with each other.

Within the PIC workbook a number of infrastructure projects were considered as high priority for Aerotropolis. They included:

- Holistic collection storage facility/facilities – Best practice storage solutions to meet the needs of 8 cultural institutions and state significant organisation
- Aboriginal cultural infrastructure – infrastructure that focuses on genuine cultural exploration and engagement rather than providing tourism experiences
- Making space/accommodation for the cultural sector – the provision of affordable and accessible, fit for purpose infrastructure for artists and small to medium creative organisation and creative industry practitioners.
- Screen production offices– fit for purpose infrastructure to house screen producers.
- Warehouse space for screen production – a minimum of 10,000 m2 for warehouse space
- School or education facilities for arts and creative industries – Opportunity to explore a school or education facility dedicated to the creative industries
- Libraries including cultural and maker spaces
- Sound mixing studios – potential to be delivered by a commercial partnership
- Water tank for filming - potential to be delivered by a commercial partnership

In addition to the above, one regional level cultural infrastructure facility is recommended within the Cultural Infrastructure Plan 2025+ (Create NSW, 2017) to meet the vision outlined for Aerotropolis. During consultation with Create NSW it was suggested that this could include an Aboriginal Cultural Centre that could attract both domestic and international visitors which was supported during Aboriginal consultation for Aerotropolis as discussed below

Sports and recreation

All sport facilities should be multipurpose to cater for a range of sporting uses particularly as participation levels will change over time. Facilities should be adaptable and accommodate summer and winter sports and allow multiple uses within relatively short periods of time. When planning for new areas the Office of Sport assess the need for sport and active recreation infrastructure using participation rate, forecast population, number of participants that can be assigned to a field per week and the number of existing facilities.

The Office of Sport NSW recommends that where land availability is constrained, existing local open space should be considered for active use on the proviso that it is large enough to accommodate both active and passive uses.

Parks and open space

Parks and Open Space should be provided in a way that allows the space to be versatile, flexible, adaptable, and resilient. Community needs can change rapidly and the most effective parks can be reconfigured in design and function to accommodate changing participation, activities, trends, needs, and preferences.

Social infrastructure to attract visitors

The following identifies potential social infrastructure that should be considered for Aerotropolis, that would cater for the visitor population. It is recommended that a broader tourism study be undertaken to assess further demand for these facilities.

Indigenous Cultural and art facilities - this could be one facility or a range of facilities across Aerotropolis that showcase indigenous culture continuing to be practiced in the Sydney area and on-Country experiences for visitors

Innovation Education Centre – similar to the NSW Department of Education Environmental Education Centres. The Innovation Education would be a facility that provides programs to visiting school groups focussing on STEM and Aerospace Technology.

Aquatic centre - An aquatic centre that is of regional significance catering to a number of water activities.

Adventure based tourism facility– providing a facility that caters to adventure based sports and recreation facilities. Penrith is known for its adventure sport opportunities. This facility can leverage off existing facilities in Penrith while also accommodate to interstate tourists.

Convention centre focussing on agribusiness – a conference centre or facility that can cater for conferences within the agribusiness sector.

Infrastructure by precinct

Each of the initial precincts has its own character and identity that will contribute to achieving the vision of the Aerotropolis. Although Precinct Planning will investigate opportunities and appropriate planning controls for each individual precinct, planning for each precinct must take into consideration the broader goals and objectives of the Aerotropolis. Social infrastructure will play a critical role in creating the communities that will live, work and visit the Aerotropolis.

The following table summarises the social infrastructure requirements for each Aerotropolis precinct, to be delivered by 2056 which aligns with the Transport for NSW *Future Transport Strategy 2056,* and the Greater Sydney Commission *A Metropolis of Three Cities – Greater Sydney Region Plan.*

Table E-1 Future social infrastructure requirements per Precinct

Precinct	Characteristics	Population	Recommend Social Infrastructure to 2056 (facility type)
Aerotropolis Core	Mix of employment uses 24-hour hub and thriving night time economy Entertainment and retail Arts and cultural experiences Health and education hub	Workers (estimated 50,000-60,000) Residents (estimated 20,000-24,000)	Education Health Emergency services Community facilities Childcare Aged care Cultural facilities Library Sports fields Local outdoor multipurpose sports courts District indoor sports facility Swimming facility Youth focused outdoor recreation Open space
Northern Gateway Precinct	Innovation hub on tourism, health, education and research Technology associated with food production & processing	Workers (estimated 19,000-21,000) Residents (estimated 8,000-10,000)	Education Health Emergency services Community facilities Childcare Aged care Cultural facilities Library Sports fields Local outdoor multipurpose sports courts District indoor sports facility Youth focused outdoor recreation Open space Fire station
Wianamatta South Creek	Central green spine and area of high biodiversity Connected open space network Outdoor recreation and outdoor amenity	Workers (minimal)	Open space Sport and recreation

Precinct	Characteristics	Population	Recommend Social Infrastructure to 2056 (facility type)
Badgerys Creek	Airport/aviation related employment Industrial character	Workers (estimated 9,000-11,000)	Childcare Sports fields Open space Emergency services (Multipurpose police hub)
Agribusiness	Catalyst for agricultural operations Natural landscape character	Workers (estimated 8,000-21,000) Residents (minimal)	Education (Expand Bringelly Public School or Luddenham Public School) Childcare Aged care Library Sports fields Local outdoor multipurpose sports courts Open space

Table of contents

1. Introduction 1
   - 1.1 Western Sydney Aerotropolis 2
   - 1.2 The Aerotropolis precincts 2
   - 1.3 Development of the precinct plans 5
   - 1.4 Purpose of this report 5
   - 1.5 Structure of this report 7
   - 1.6 Scope and limitations 8
2. Approach to social infrastructure planning for the Aerotropolis 9
   - 2.1 Definition of social infrastructure 10
   - 2.2 Hierarchy of social infrastructure 11
   - 2.3 Principles for planning social infrastructure 14
   - 2.4 Challenges for social infrastructure planning in Aerotropolis 16
3. Methodology 18
   - 3.1 Existing need – audit of existing facilities and community 19
   - 3.2 Demographic need – future population profile 19
   - 3.3 Comparative need – determining a rate of provision 21
   - 3.4 Identified need – consultation with government agencies 21
   - 3.5 Needs assessment 22
4. Aerotropolis future community 23
   - 4.1 Future resident population 24
   - 4.2 Future worker population 33
   - 4.3 Future visitor population 37
   - 4.4 Implications for social infrastructure 38
5. Social Infrastructure Needs Assessment 41
   - 5.1 Education 43
   - 5.2 Health 51
   - 5.3 Emergency services 56
   - 5.4 Community facilities 61
   - 5.5 Childcare 64
   - 5.6 Aged and disability care 67
   - 5.7 Cultural and art facilities 70
   - 5.8 Libraries 75
   - 5.9 Parks and open space 79
   - 5.10 Sport and recreation 84
   - 5.11 Social infrastructure to attract visitors 90
6. Recommendations by precinct 91
   - 6.1 Indicative social infrastructure locations 92
   - 6.2 Aerotropolis Core Precinct 95

6.3 Northern Gateway Precinct 97
6.4 Wianamatta-South Creek Precinct 99
6.5 Badgerys Creek Precinct 100
6.6 Agribusiness 101
7. Conclusion 103
7.1 Key findings 104
7.2 Summary of recommendations 105
7.3 Areas for further investigation 106
8. References 109

Table index

Table 1-1 Overview of the five initial Aerotropolis precincts 3
Table 2-1 Providers of social infrastructure 10
Table 2-2 Social infrastructure type relating to hierarchy 13
Table 2-3 Social infrastructure planning principles 14
Table 3-1 Stakeholder meeting 22
Table 4-1 Common Planning Assumptions – residential population projections 25
Table 4-2 Common Planning Assumptions - dwelling projections 30
Table 4-3 Dwelling density by land use type 31
Table 4-4 Common Planning Assumptions - job projections 33
Table 4-5 Potential number and proportions workers by land use type 36
Table 5-1 Needs assessment section structure by facility type 42
Table 5-2 Education facility types and spatial requirements 44
Table 5-3 Commitments and recommendations for education 45
Table 5-4 Education needs assessment 49
Table 5-5 Commitments and recommendations for health 52
Table 5-6 Health needs assessment 55
Table 5-7 Facility types and spatial requirements 56
Table 5-8 Facility type and spatial requirements 57
Table 5-9 Facility type and spatial requirements 57
Table 5-10 Commitments and recommendations for emergency services 58
Table 5-11 Emergency services needs assessment 60
Table 5-12 Community facility requirements 61
Table 5-13 Community facilities needs assessment 63
Table 5-14 Childcare types 64
Table 5-15 Childcare provision rates and site requirements 64

Table 5-16 Commitments and recommendations for childcare 65
Table 5-17 Child care needs assessment 66
Table 5-18 Aged care provision rates and requirements 67
Table 5-19 Aged and disability care needs assessment 69
Table 5-20 Cultural infrastructure provision rates 70
Table 5-21 Commitments and recommendations for cultural and art facilities 72
Table 5-22 Culture and arts facilities needs assessment 74
Table 5-23 Library size population based benchmark 75
Table 5-24 Library size serviced base benchmark 76
Table 5-25 Commitments and recommendations for libraries 76
Table 5-26 Library needs assessment 78
Table 5-27 Types of open space 79
Table 5-28 Open space performance criteria 80
Table 5-29 Commitments and recommendation for parks and open space 81
Table 5-30 Parks and open space needs assessment 83
Table 5-31 Sporting facility spatial requirements 85
Table 5-32 Commitments and recommendations for sports fields 87
Table 5-33 Sport and recreation needs assessment 89
Table 6-1 Aerotropolis Core Precinct place context 95
Table 6-2 Aerotropolis Core social infrastructure recommandations 96
Table 6-3 Northern Gateway place context 98
Table 6-4 Northern Gateway social infrastructure recommendations 98
Table 6-5 Wianamatta South Creek place context 99
Table 6-6 Wianamatta South Creek social infrastructure recommendations 100
Table 6-7 Badgerys Creek place context 100
Table 6-8 Badgerys Creek social infrastructure recommendations 101
Table 6-9 Agribusiness place context 101
Table 6-10 Agribusiness social infrastructure recommendations 102
Table 7-1 Future social infrastructure requirements per Precinct 105
Table 7-2 Recommended further studies 107

Figure index

Figure 1-1 Location of the ten Aerotropolis precincts 4
Figure 1-2 Overview of the Aerotropolis Social Infrastructure Needs Assessment 6
Figure 2-1 Aerotropolis community and their needs 11
Figure 2-2 Social infrastructure hierarchy 12
Figure 3-1 Indicators applied to the social infrastructure needs assessment 19
Figure 4-1 Western Sydney Aerotropolis 'end state' (2056) 24
Figure 4-2 Aerotropolis precinct population growth comparison 26
Figure 4-3 Aerotropolis, Western City District and Greater Sydney average annual growth rate 26
Figure 4-4 Aerotropolis service age group projection trends 28
Figure 4-5 Household type projections 29
Figure 4-6 Family type projections 29
Figure 4-7 Aerotropolis precincts workforce growth comparison 34
Figure 6-1 Indicative social infrastructure locations 93
Figure 6-2 Indicative parks and open space locations 94

Appendices

Appendix A – Future resident profiles by precinct
Appendix B – Literature Review of Social Infrastructure Rates of Provision
Appendix C – Sports field hierarchy

Glossary

Term	Definition
Aerotropolis	A metropolitan area where infrastructure, land uses and economy are centred on an airport and includes the outlying corridors, and aviation orientated business and residential development that benefit from each other and their accessibility to the airport.
Common Planning Assumptions	Precinct-specific population and worker projections for the ten precincts within the Western Sydney Aerotropolis, which have been prepared by the Department of Planning, Industry and Environment (2019).
Culturally and linguistically diverse communities	The cultural and linguistic diversity of a community or a population refers to people who were born overseas, have a parent born overseas or speak a variety of languages.
District social infrastructure	Social infrastructure that services the Aerotropolis with the catchment area extending across all of the precincts. Infrastructure would be accessible within 30 minutes, either by foot, bike, public transport or vehicle or within a 2 kilometre radius. District social infrastructure is typically provided by local government or the private sector, there may also be State Government Agency involvement
Initial precincts	The Aerotropolis Core, Northern Gateway, Wianamatta-South Creek, Badgerys Creek, Agribusiness and Mamre Road precincts are the focus of initial precinct planning for the Western Sydney Aerotropolis. The Western Sydney Planning Partnership are responsible for the planning for all initial precincts except Mamre Road which is the responsibility of the Department of Planning, Industry and Environment, for this reason Mamre Road is not included within this report.
Local social infrastructure	Social infrastructure that services the local neighbourhood within a precinct and should be accessible from most houses/workplaces by foot or bike in approximately 10 minutes or within a 400 metre radius. Within each of the priority precincts, it is anticipated that there will be multiple local catchments. Local social infrastructure is predominantly provided by local government or the private sector.
Place Infrastructure Compact (PIC)	The Place Infrastructure Compact is a strategic planning model that looks holistically at a place to better align growth with the provision of infrastructure and services. NSW government agencies, utility providers and local councils are brought together to identify future infrastructure planning needs for a selected area.
Regional social infrastructure	Social infrastructure that services the whole of the Western Parkland City, including multiple Local Government Areas, metropolitan and regional areas. Infrastructure would be accessible for users willing to use public transport or drive within a 5 to 10 kilometre radius. Regional social infrastructure is typically provided by State or Federal Government Agencies.

Term	Definition
Social infrastructure	Social infrastructure incorporates the facilities and services that are used for the physical, social, cultural or intellectual development or welfare of the community. These include health-related services, education and training, social housing programs, police, courts and other justice and public safety provisions, as well as arts, culture and recreational facilities
Western Sydney Growth Area	Western Sydney is a key growth area, with new houses, jobs and major projects planned for the future. The Western Sydney Growth Area covers the three growth centres of North West, South West and Aerotropolis which are identified in the NSW Government's Western Sydney Special Infrastructure Contribution (SIC) program.
Western Parkland City	Broadly, Penrith, Liverpool, Campbelltown, Hawkesbury, Wollondilly, Camden, Fairfield and Blue Mountains LGAs, anchored around Liverpool, Greater Penrith and Campbelltown–Macarthur, with the new Airport and Aerotropolis geographically at its centre.
Western Sydney Planning Partnership	A local government-led initiative comprising of representatives of all eight Western Parkland City councils as well as Blacktown Council, and representatives from the NSW Department of Planning, Industry and Environment, Transport for NSW, Sydney Water and the Greater Sydney Commission.
24/7 Precinct	The 24/7 concept is the offering of services, amenities and job opportunities 24 hours a day, 7 days a week, making it a desirable place for people to live, work and visit.

Abbreviations

Abbreviation	Detail
AMS	Aboriginal Medical Service
BCA	Building Code of Australia
CALD	Culturally and Linguistically Diverse
CBD	Central Business District
DPIE	NSW Department of Planning, Industry and Environment
FRNSW	Fire and Rescue New South Wales
GSC	Greater Sydney Commission
LGA	Local Government Area
NSWPF	New South Wales Police Force
NUW Alliance	University of Newcastle, University of Wollongong and Western Sydney University alliance group.
OOSH	Out of School Hours
PIC	Place Infrastructure Compact
SAMIS	Sydney Ambulance Infrastructure Strategy
SCG	School Community Groups
SWSLHD	South Western Sydney Local Health District
VET	Vocational Education Training
WSPP	Western Sydney Planning Partnership

01 Introduction

1.1 Western Sydney Aerotropolis

The development of the Western Sydney International (Nancy-Bird Walton) Airport is a 'game-changer' for Sydney. The investment in the $5.3 billion airport as well as other major transport links will create Sydney's newest city and will be one of the fastest growing regions in Australia, creating 200,000 jobs by 2028.

The *Western Sydney Aerotropolis Plan* (DPIE, 2020c) sets out the planning framework for the Western Sydney Aerotropolis (Aerotropolis) and identifies ten precincts that will undergo a precinct planning process. Each of the ten precincts will have its own character and identity that will contribute to achieving the vision of the Aerotropolis.

Although companies have committed to establishing significant offices within Aerotropolis, attracting a workforce is the biggest challenge to the Western Parkland City achieving its vision as a 'next generation city.' Social and cultural infrastructure are what bring life to a 24/7 precinct, which is a precinct that offers services, amenities and job opportunities 24 hours a day, 7 days a week, making it a desirable place for people to live, work and visit.

Social infrastructure will play a fundamental role in creating the communities that will live, work and visit the Aerotropolis. The character, as outlined in the vision for each of the individual precincts, will be critical in identifying and planning the social infrastructure that will need to be provided. Although each precinct will have its own requirements for local social infrastructure, regional infrastructure will need to consider the requirements of the Aerotropolis and the broader Western Parkland City and Greater Sydney community.

Equally, having internationally competitive health and education facilities will provide significant opportunities and will also benefit the local community. Cultural infrastructure will service the large worker population but also to support a tourism and leisure economy and a nighttime economy that attracts locals and visitors.

Green infrastructure will also be critical to creating a sustainable and liveable Aerotropolis that attracts people to parks, recreation and open spaces. Integrating social infrastructure with green infrastructure will facilitate the vision of the Western Parkland City to create better health and wellbeing outcomes for the whole community of Western Sydney.

1.2 The Aerotropolis precincts

The *Western Sydney Aerotropolis Plan* (DPIE, 2020c) outlines the ten precincts that make up the 11,200 hectare Aerotropolis site surrounding the Western Sydney (Nancy-Bird) Airport. The Aerotropolis will grow into being a significant metropolitan cluster for the Western Parkland City and become an economic hub for greater Sydney and the international and domestic gateway through the 24/7 Western Sydney International (Nancy-Bird Walton) Airport.

The Western Sydney Planning Partnership (WSPP) are responsible for the planning of five of the six initial precincts which are the focus of this Social Infrastructure Assessment. They are:

- Aerotropolis Core
- Northern Gateway Precinct
- Wianamatta-South Creek
- Badgerys Creek Precinct
- Agribusiness Precinct.

Of the remaining five precincts, Mamre Road initial precinct is being planned by the Department of Planning, Industry and Environment (DPIE). The remaining four precincts to be planned at a later phase include North Luddenham, Kemps Creek, Rossmore, and Dwyer Road precincts.

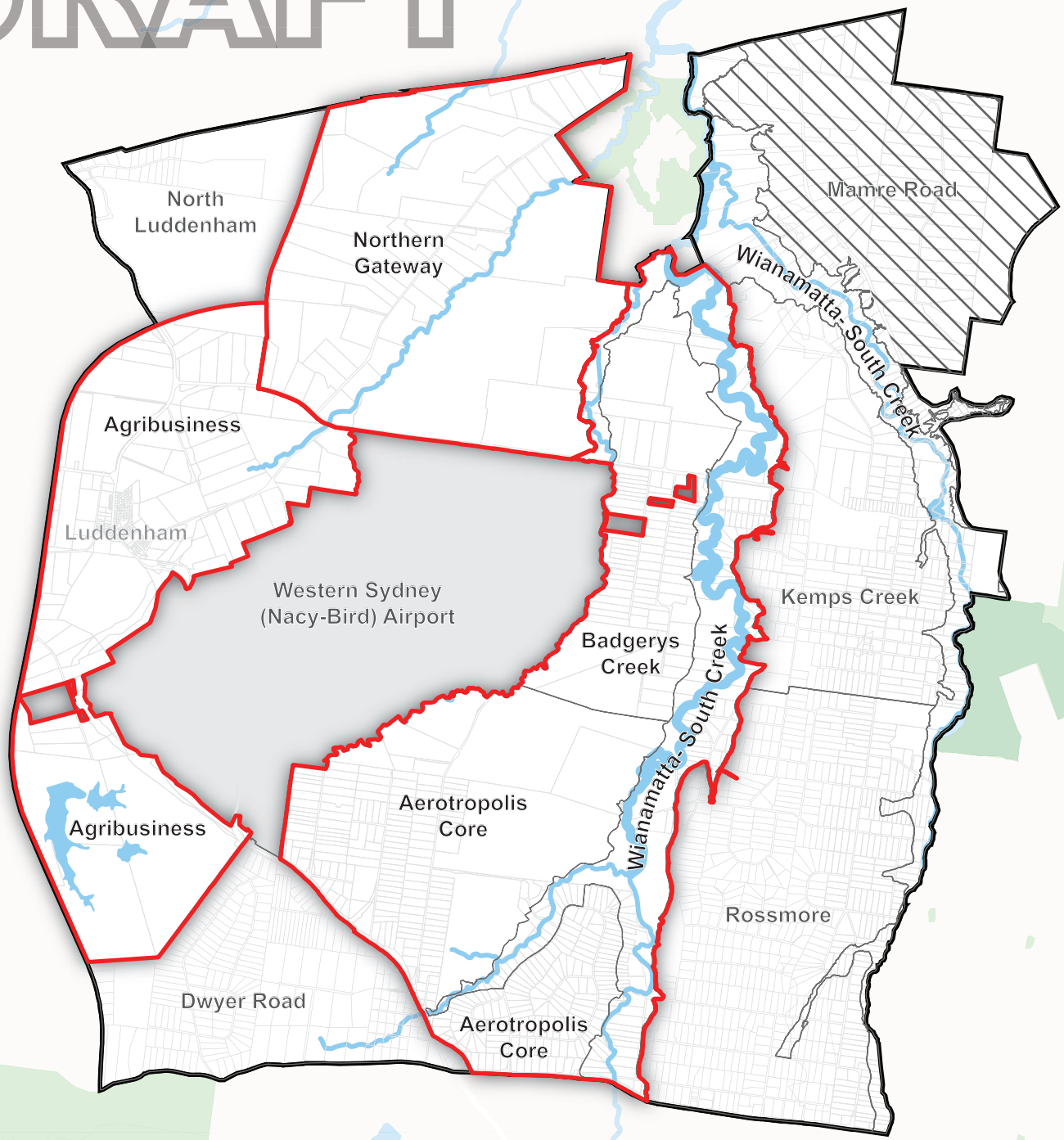
Only the five initial precincts are the subject of this study, with the remaining precincts to be addressed as part of future studies.

The five initial precincts outlined in the *Western Sydney Aerotropolis Plan* (DPIE, 2020c) are detailed in Table 1-1, with Figure 1-1 showing the location of all ten precincts.

Table 1-1 Overview of the five initial Aerotropolis precincts

Precinct	Features	Characteristics	Population
Aerotropolis Core	1,382 Ha Enterprise zone Potential for major public hospital and/or a private hospital University campus High school	Mix of employment uses to promote economic growth 24-hour hub and thriving night time economy Entertainment and retail Arts and cultural experiences World-class health and education hub	Workers – estimated 50,000-60,000 Residents – estimated 20,000-24,000
Northern Gateway	1,616 Ha Sydney Metro Greater West (first stage) Industry, commercial zoning	High technology associated with food production and processing Innovation hub on tourism, health, education, research	Workers – estimated 19,000-21,000 Residents – estimated 8,000-10,000
Wianamatta-South Creek	1,330 Ha Environment and Recreation zoning	Central green spine and area of biodiversity Connected open space network Wellbeing values and outdoor amenity Outdoor recreation	Workers – minimal No additional dwellings
Badgerys Creek Precinct	634 Ha Enterprise zoning	Airport and aviation related employment Industrial character	Workers – estimated 9,000–11,000 No additional dwellings
Agribusiness Precinct	1,560 Ha Industrial and agricultural land	Catalyst for agricultural operations Natural landscape character Agricultural international export Retain peri-urban agricultural lands High quality agricultural produce and production	Workers – estimated 8000-10,000 Residents – minimal

DRAFT



LEGEND

- Western Sydney Aerotropolis
- Aerotropolis Precincts
- Initial Precinct Groups
- Mamre Road Precinct (DPIE)
- Lot boundary

Note: for the purpose of this Social Infrastructure Needs Assessment the western side of the Wianamatta-South Creek precinct has been considered. The eastern side will be considered in later development stages in conjunction with the adjoining precincts of Mamre Road, Kemps Creek and Rossmore.

Paper Size ISO A4

0 1 2

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Western Sydney Planning Partnership
Western Sydney Aerotropolis
Social Infrastructure Strategy

SOCIAL INFRASRUCTURE NEEDS ASSESMENT
INITIAL PRECINCTS

Project No. **12527145**
Revision No. **C**
Date **15 Oct 2020**

FIGURE 1-1

\\ghdnet\ghd\AU\Sydney\Projects\21\12527145\GIS\Maps\12527145_Aerotropolis_InitialPrecincts.ai

© 2020. Whilst every care has been taken to prepare this map, GHD make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.

Data source: General Topographic - CIP&SHIP 2020; General Cadastral - CIP&SHIP 2020 - DPIE WSA Data Sets and Boundaries
Created by: jglasby

1.3 Development of the precinct plans

Precinct plans are currently being prepared by the WSPP for the five initial precincts (discussed in section 1.2). The precinct planning will be sequenced to align population and economic growth with the planning and construction of new transport, services and community facilities for residents and workers, and with opening of the Western Sydney International (Nancy-Bird Walton) Airport (DPIE, 2019a).

- The precinct plans will consider the rezoning of land and set development controls. The plans will:
- Provide detailed information on vision, objectives and land uses of the precincts.
- Integrate technical studies, including land use, transport and urban design to realise changed travel behaviours across the Western Parkland City.
- Include indicative layout plans and implementation provisions.
- Be consistent with and give effect to the *Western Sydney Aerotropolis Plan* (DPIE, 2020c), region and district plans, and relevant local strategic planning documents.
- Be coordinated with infrastructure requirements.
- Outline a statutory mechanism for development to occur.
- This report has been prepared to inform the precinct planning process, particularly to ensure that sufficient and appropriately located land is identified and zoned within each precinct plan.

1.4 Purpose of this report

This report presents a social infrastructure needs assessment for the Aerotropolis initial precincts. It also considers how the recommended social infrastructure for the initial precincts can contribute to the broader Aerotropolis community.

This Social Infrastructure Needs Report is the second report in a series of three which comprise the social infrastructure needs analysis for the five initial Aerotropolis precincts, as depicted in Figure 1-2. The three reports are:

- Report 1 – *Draft Western Sydney Aerotropolis Social Infrastructure Audit* (GHD, 2020b)
- Report 2 – *Draft Western Sydney Aerotropolis Social Infrastructure Needs Assessment* (this report)
- Report 3 – *Draft Western Sydney Aerotropolis Social Return on Investment Framework*

This report builds on the work undertaken in Report 1. Report 1 provides a baseline review of the Aerotropolis outlining an analysis of community and place, review of government policies and commitments made in relation to social infrastructure for the Aerotropolis as well as an audit of existing infrastructure both within and servicing the Aerotropolis.

Report 3 focuses on the services and networks that could be provided in the study area to complement the built infrastructure, including the facilities and spaces outlined in Report 1 and this report. It illustrates opportunities and constraints that may affect the future community and provide a framework for evaluation of social infrastructure over time to ensure social infrastructure facilities and activation programs are achieving the Aerotropolis vision.

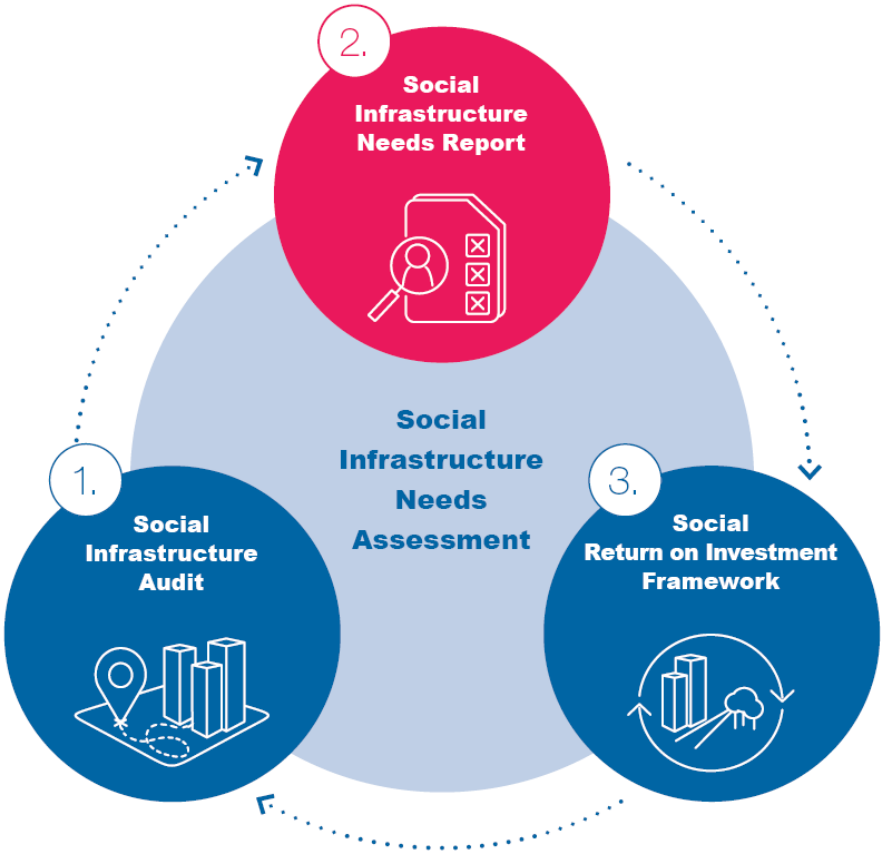


Figure 1-2 Overview of the Aerotropolis Social Infrastructure Needs Assessment

The purpose of this Social Infrastructure Needs Report is to understand the future community and needs of different users of the workers, visitors, tourists and residents of the initial precincts. This report sets out:

- A hierarchy of social infrastructure that will be applied to the initial precincts
- Rates of provision to assist with staging and planning of new social infrastructure
- Planning requirements that will influence the location of facilities within the precinct plans
- Social infrastructure needs assessment for each facility type
- Social infrastructure requirements within each of the initial precincts.

This report informs the precinct plans, which consider development up to the year 2056, which aligns with the *Future Transport Strategy 2056* (Transport for NSW, 2018) and *A Metropolis of Three Cities* (Greater Sydney Commission, 2018a). This report therefore assesses potential social infrastructure needs and makes recommendations up to 2056.

1.5 Structure of this report

This report presents a social infrastructure needs assessment for the Aerotropolis' initial precincts. It has taken a 'beyond business-as-usual' approach to incorporate the needs of workers and residents. It also considers how the recommended social infrastructure for the initial precincts can contribute to the broader Aerotropolis community, as well as attract and support a visitor population.

Although this report provides recommendations for social infrastructure provision until 2056, it has been developed as a framework so that the recommendations can be flexible and adaptable in response to external social, environmental and economic changes that may occur over the forty year development timeframe of the Aerotropolis. The report can be read in its entirety; it has also been structured so that sections can be read on their own to provide guidance for social infrastructure planning for the Aerotropolis.

This report is comprised of the following sections:

- **Section 1 – Introduction:** sets the context for the study and outlines the purpose and structure of the report.
- **Section 2 – Approach to social infrastructure planning for the Aerotropolis:** defines a hierarchy of social infrastructure and relevant planning principles to guide future social infrastructure provision in the Aerotropolis. It also outlines the challenges for social infrastructure planning in the Aerotropolis.
- **Section 3 – Methodology:** provides a summary of the social infrastructure needs assessment methodology.
- **Section 4 – Aerotropolis future community:** analyses the potential future residential, worker and visitor populations in the Aerotropolis and discusses likely implications for social infrastructure planning.
- **Section 5 – Social Infrastructure Needs Assessment :** includes a review of government policies including the Greater Sydney Commission's (GSC) Place Infrastructure Compact (PIC) for the Western Sydney Growth Area, and provides a rate of provision and planning considerations for each facility type. Using the four indicators of need presented in the methodology (section 3). This section also identifies future social infrastructure requirements per facility type for the years 2036 and 2056.
- **Section 6 - Social infrastructure requirements by precinct:** summarises the social infrastructure recommendations in section 5 by precinct.
- **Section 7 – Conclusion and next Steps** – provides an overall summary of the objectives of this social infrastructure needs assessment and outlines further areas of research to be undertaken to confirm the recommendations for social infrastructure that have been identified.

1.6 Scope and limitations

This report: has been prepared by GHD for Western Sydney Planning Partnership and may only be used and relied on by the Western Sydney Planning Partnership for the purpose agreed between GHD and the Western Sydney Planning Partnership as set out in section 1.4 of this report.

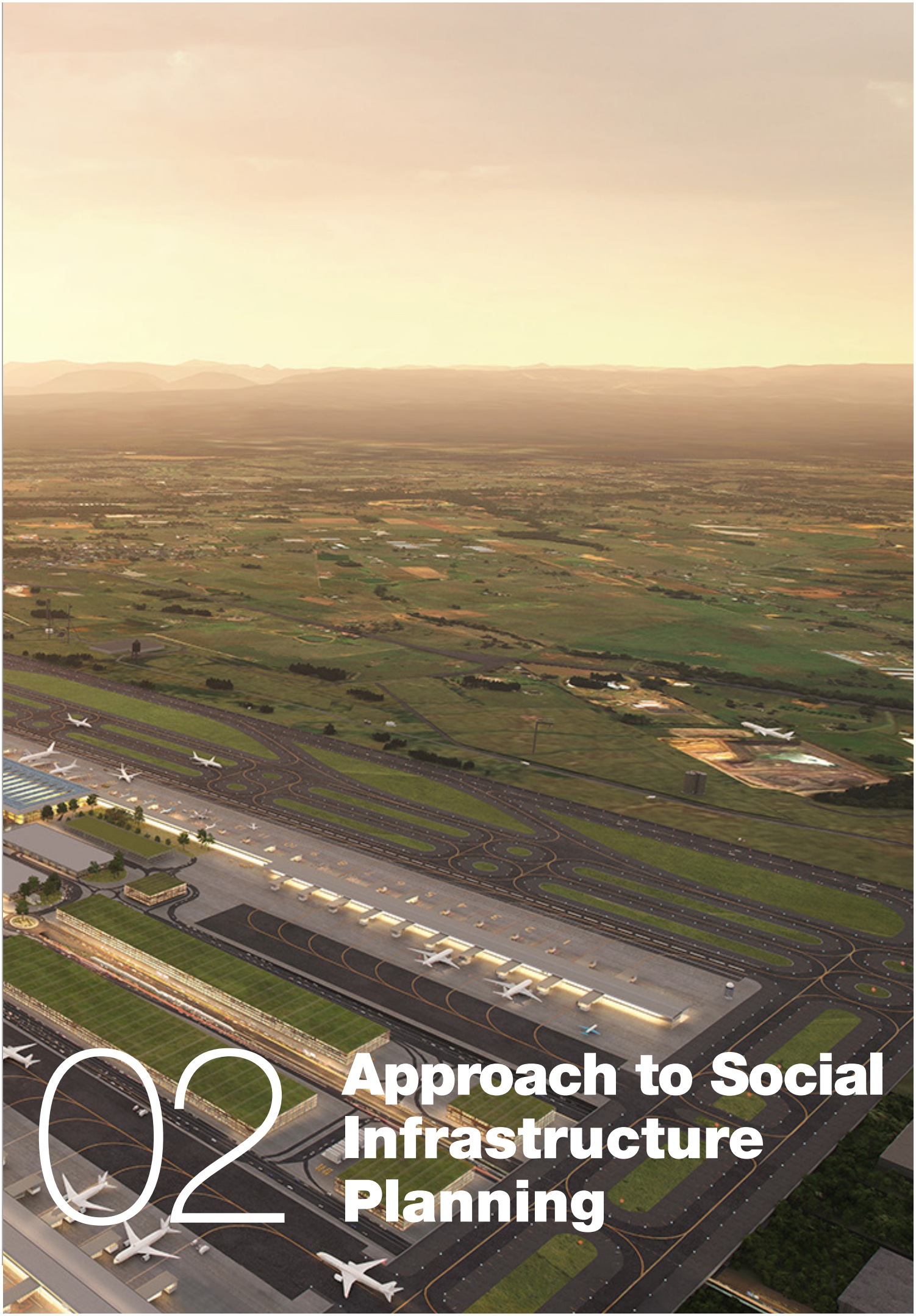
GHD otherwise disclaims responsibility to any person other than the Western Sydney Planning Partnership arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Western Sydney Planning Partnership and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.



02 Approach to Social Infrastructure Planning

This section outlines the overarching approach to planning social infrastructure for the Aerotropolis. It defines social infrastructure and establishes a hierarchy to determine the facility type needed to service the community's needs at the local, district and regional level. This sections also identifies principles to help guide social infrastructure planning, delivery and operation, along with some of the challenges

2.1 Definition of social infrastructure

Social infrastructure incorporates the facilities, services and spaces that are used for the physical, social, cultural or intellectual development or welfare of the community. It includes physical infrastructure such as libraries, community centres and cultural facilities that facilitate the delivery of social services and activities. It also includes components of green infrastructure, including open spaces, parks, recreation areas and sport fields that support sport, recreational and leisure uses. Importantly, social infrastructure also incorporates the services, activities and programs that operate within these built facilities and spaces.

Social infrastructure is not limited to that provided by federal, state and local governments. It also includes those services and facilities that are operated by non-profit community organisations as well as the private sector. Table 2-1 provides examples of the types of facilities that are provided by these different sectors. For some facilities, such as childcare, several sectors may be providers while there are many examples of facilities where funding has been "pooled" or shared by different sectors.

Table 2-1 Providers of social infrastructure

Local Government	Federal or State Government	Private/Non-Government
Childcare	Out of School Hours Care	Childcare
Out of School Hours Care	Public schools	Out of School Hours Care
Libraries	Preschools	Entertainment facilities (cinemas, hotels etc.)
Public space including green infrastructure such as open space and parks	Public hospitals	Private hospital
Playgrounds	Green infrastructure (e.g. open space and parks)	Private schools
Sports stadiums	Sport stadiums	Commercial gyms and recreation centres
Playing fields, pitches and courts	Emergency services	Museums
Walkways/cycle ways	Playing fields, pitches and courts	Galleries/exhibition spaces
Skate and BMX facilities	Museums	Places of worship
Multipurpose halls and community centres	Gallery/exhibition spaces	Shopping centres and associated amenities
Cultural centres	Cultural centres	Leisure and aquatic facilities
Leisure and aquatic facilities	Public transport	

2.2 Hierarchy of social infrastructure

The size and features of a social infrastructure facility will determine the number of people that the facility can accommodate as well as the geographical distribution of the population that it is serving. Different types of facilities should be planned to cater for different population catchments. For example, a community centre or meeting space will be planned to cater to the needs of the community that are within walking distance of the facility. In comparison, a multipurpose community centre will cater for a larger population (up to 50,000 people), many of whom may access the infrastructure by car, bicycle or public transport.

For the purpose of this study, 'community' refers to residents, workers and visitors (Figure 2-1). Social infrastructure planning typically considers residents and their requirements in close proximity to their dwellings, however in order to achieve the GSC's vision for a 30 minute city (GSC, 2018a), the social infrastructure requirements of workers and visitors are considered to be just as important.

Figure 2-1 Aerotropolis community and their needs

This social infrastructure needs analysis has developed a hierarchy of social infrastructure that considers distance and time to access facilities and services and spaces from dwellings as well as places of employment.

The hierarchy of social infrastructure facilities is considered at three levels; local, district and regional. In assessing the social infrastructure requirements for Aerotropolis the following parameters for each level have been applied (refer to Figure 2-2):

- **Local** – social infrastructure that services the local area **within a precinct** and should be accessible from most houses and workplaces by foot or bike in approximately 10 minutes or within a 400 metre radius. It is anticipated there will be multiple local catchments within each precinct. Local social infrastructure is predominantly provided by local government or the private sector.

- **District** – social infrastructure **services the Aerotropolis** with the catchment area extending across all ten precincts. Social infrastructure would be accessible from most houses and workplaces by foot, bike, public transport or vehicle within a two kilometre radius. District social infrastructure is typically provided by local government or the private sector, and sometimes with involvement of state government agencies.
- **Regional** – social infrastructure services the **whole of Western Parkland City**, including multiple Local Government Areas, metropolitan and regional areas. Social infrastructure would be accessible from most houses and workplaces for users willing to use public transport or drive within a five to 50 kilometre radius. Regional social infrastructure is typically provided by state or federal government agencies.

For this report **National** level social infrastructure has also been considered. National level facilities service **all of Australia** and attracts international visitors. Social infrastructure would be accessible for those willing to fly, drive or catch a train from anywhere in Australia including those willing to fly from overseas. National level social infrastructure is typically provided by state or federal government agencies.

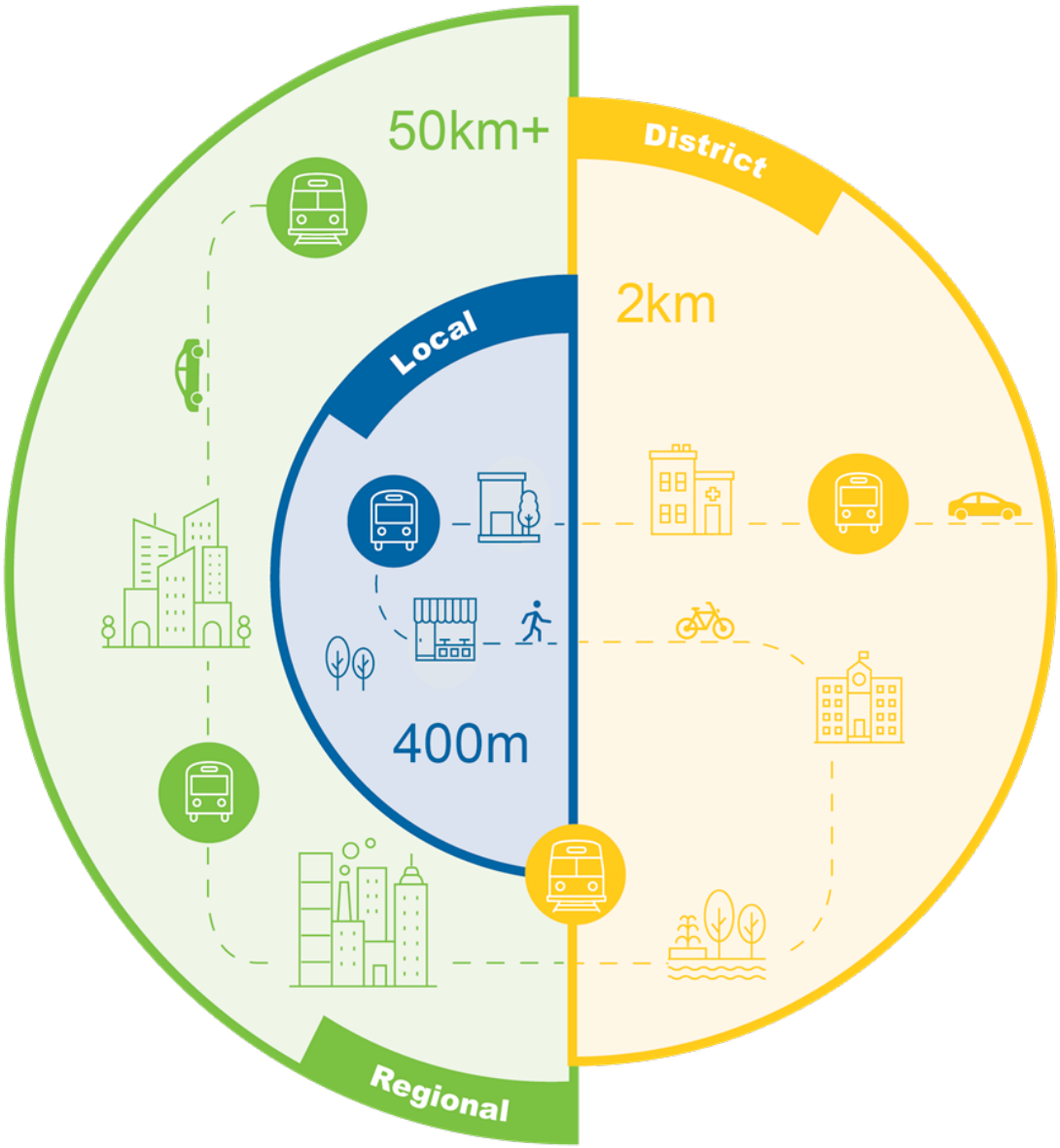


Figure 2-2 Social infrastructure hierarchy

This social infrastructure needs assessment investigates requirements across the hierarchy that will service future residents, workers and visitors of the Aerotropolis. Different types of social infrastructure facilities can be provided across the spectrum of the hierarchy, depending on the size and types of services offered by those facilities. The types of social infrastructure facilities considered in this report along with where they fit in the hierarchy are shown in Table 2-2.

Table 2-2 Social infrastructure type relating to hierarchy

Social infrastructure type	Hierarchy		
	Local	District	Regional
Community facilities	Community hall	Multipurpose community centre	Specialised centre
Cultural and tourism	Public art	Art space within a multipurpose community centre	Performing arts centre or major cultural institution
Childcare and out of school hours care	Long day care Preschool Out of school hours care	N/A	N/A
Libraries (based on the State Library People Places)	Branch library / District library	Central library	N/A
Open space	Local park	District Park	Regional Park
Sport and recreation facilities	1 sportsground 1 multipurpose court or 2 tennis courts	1 double sportsgrounds 4 multipurpose courts or 8 tennis courts Indoor aquatic centre/swimming centre Youth recreation facility	Multiple sportsground and training facilities Leisure centre
Aquatic facility		Water park or facility that enables access to natural water	Aquatic centre
Education	Primary school	High school	Tertiary institution
Health	Medical centre	Integrated health clinic Community health facility Ambulance standby point Fire station	Hospital Ambulance station
Civic		Police shopfront	Police station Court

2.3 Principles for planning social infrastructure

Effective social infrastructure planning takes into consideration a range of factors related to location, design, operation and maintenance of facilities. The principles in Table 2-3 have been developed from a review of relevant literature and the feedback received during the consultation process, outlined in Report 1: *Social Infrastructure Audit*. The principles should be considered in the planning, delivery and operation of any social infrastructure facility.

Table 2-3 Social infrastructure planning principles

Principle	Description
Contributes to local identity and sense of place	Social infrastructure should contribute a sense of place in the community by becoming an important focal point and gathering space. The design and uses of the facility/space can also be used to reflect and reinforce local culture, strengthening the sense of community and connecting with Country.
Affordable and accessible	Physical and financial access to facilities/spaces is important both to meet the needs of a diverse population and to ensure it is well used day and night. Affordability and accessibility should be considered to support the diversity of users reflecting requirements for shift workers, Indigenous Community, culturally and linguistically diverse (CALD) community, older residents, and young people and children.
Equitable distribution of facilities	Social infrastructure should support the objective of an accessible and well-connected Aerotropolis where facilities and services are accessible within 30-minutes of a home or workplace. The appropriate staging of the development will need to be undertaken to ensure that the provision of facilities is commensurate with the development of Aerotropolis.
Centrally and co-located to enable efficiencies	Social infrastructure should be located within the precinct centres thereby taking advantage of existing infrastructure such as public transport and other related uses such as retail and other services. Multiple services or facilities should be provided in the same or adjacent location. In addition to enabling efficiencies through the sharing of resources, these locations can encourage greater public use through a range of services being placed in one location creating a vibrant hub.
Quality infrastructure	Facilities should be 'fit for purpose' in terms of size, funtionality and context. They should be appropriately located giving consideration to environmental constraints and well maintained to attract high levels of use and ensure long term viability.
Integrated as a network of services	Social infrastructure should be planned as a network of facilities and services delivered by the private and public sector. Governance and operational models should be complimentary in order to ensure longevity and adaptability. This level of integration will enable efficiencies in the delivery of services whilst preventing a sense of isolation. This will ensure the cost and delivery is shared as a public and private network of social infrastructure.

Principle	Description
Sustainable	Social infrastructure should be designed to ensure it meets the objective of a sustainable low carbon Aerotropolis that embeds the circular economy. All facilities will need to be financially sustainable taking into consideration lifecycle costs, suitable arrangements for management, fees, and charges, and appropriate access and connectivity in order to reduce dependency on cars.
Multipurpose and adaptable to changing needs	All facilities should allow for a variety of different uses and where possible, cater for a range of intergenerational population groups. This will enable facilities to be utilised as much as possible accommodating the 24/7 demands of the Aerotropolis. Designing multipurpose facilities will also enable the facility to adapt to changes over time, as the interests and needs of the community change. The design of facilities should be sufficient to enable expansion to other uses.
Catering to different users and user needs	All members of the community are considered in the delivery of social infrastructure and services, acknowledging the differing needs for workers, residents, and visitors. The dual role of some users should be considered where an Aerotropolis resident is also a worker. This can be achieved by ensuring operating hours reflect the 24/7 nature of the precinct and the types of facilities and services enhance the participation of workers in the Aerotropolis
Strengthening communities	Social infrastructure should deliver public benefit. This can be achieved by meeting the social needs of the community, by facilitating social interaction between different groups within in the community and nurturing the development of networks, linkages and partnerships.
Create healthy and resilient communities	Social infrastructure facilitates healthy communities and lifestyles by enabling access to blue and green spaces and creating walkable catchment areas that improve individual wellbeing. Appropriate shading in parks and communal rest areas create a comfortable, amenable environment. This also includes equitable access to health and wellbeing services.
Safe, inviting and active	All members of the community should feel welcome and safe utilising the facilities and services. All infrastructure should be designed in accordance with the principles of Crime Prevention Through Environmental Design as well as the principles of Universal Design. The diversity of social infrastructure creates active places and passive surveillance day and night.

2.4 Challenges for social infrastructure planning in Aerotropolis

There is no formulaic approach to planning social infrastructure, and as outlined in the methodology (section 3), a number of factors need to be taken into consideration. These include existing and projected future demographic characteristics, provision of existing facilities, outcomes of consultation and applying a rate of provision.

This social infrastructure needs assessment recognises social infrastructure will play an important role towards achieving the vision for Aerotropolis as Greater Sydney's next global gateway. However, there are a number of challenges for social infrastructure planning in the Aerotropolis which have been discussed further below. It is because of these challenges that this needs assessment challenges the traditional approach to social infrastructure planning. The Aerotropolis presents a unique opportunity for planning as the future community does not yet exist. Social infrastructure will play a fundamental role in attracting the communities that will live, work and visit the Aerotropolis.

The following section describes the challenges for future social infrastructure planning in the Aerotropolis. Some of these challenges have already been identified in Report 1: *Draft Western Sydney Social Infrastructure Audit* (GHD, 2020b), and further challenges have been identified through a review of the Greater Sydney Commission (2020) *Place Infrastructure Compact* recommendations.

Planning for the future worker community

The Aerotropolis community as defined in section 4, comprises residents, workers and visitors. The initial precincts have a strong focus on creating employment opportunities, which means there will be a significantly higher proportion of workers compared to the residential population. Rates of provision and benchmarks within the literature are often based on a per capita rate for residents and often do not consider demand generated by workers and visitors.

Given the Aerotropolis will be Sydney's new CBD and an employment hub, considering the needs of workers will be vital. Worker needs are vastly different to resident needs, with workers often using social infrastructure facilities before or after work or in the middle of the day during a lunch break. Unlike a traditional CBD which primarily caters to office-based workers with relatively consistent working hours of 9 to 5, the Aerotropolis will have a more diverse workforce due to shift workers being required to support the airport and other ancillary industries to the airport (section 4.2). Shift workers will likely have a different recreation pattern compared to a typical 9 to 5 worker.

In determining an appropriate rate of provision for each infrastructure facility type, this study has investigated how worker needs are factored into existing rates of provision (section 3.5). Government organisations such as the City of Sydney and Office of Sport were also interviewed (section 3.4) to understand how planning within the Sydney CBD has taken into consideration worker requirements, and to identify recreational trend data for workers to inform the planning of open space and recreation facilities.

Planning for visitors

Social infrastructure plays a vital role in increasing the vibrancy of a place by providing attractors that encourage workers, residents and visitors to spend time in the area. Planning for social infrastructure needs to extend beyond a 'business as usual approach' to consider facilities that will attract a broader range of users and contribute to a sense of place.

This Social Infrastructure Needs Assessment has therefore taken into consideration the vision for the Aerotropolis to become a destination in and of itself. It has considered the opportunity for social infrastructure to play a role in attracting and accommodating potential visitors. Visitor segments are likely to include the Western Parkland City community, the broader Greater

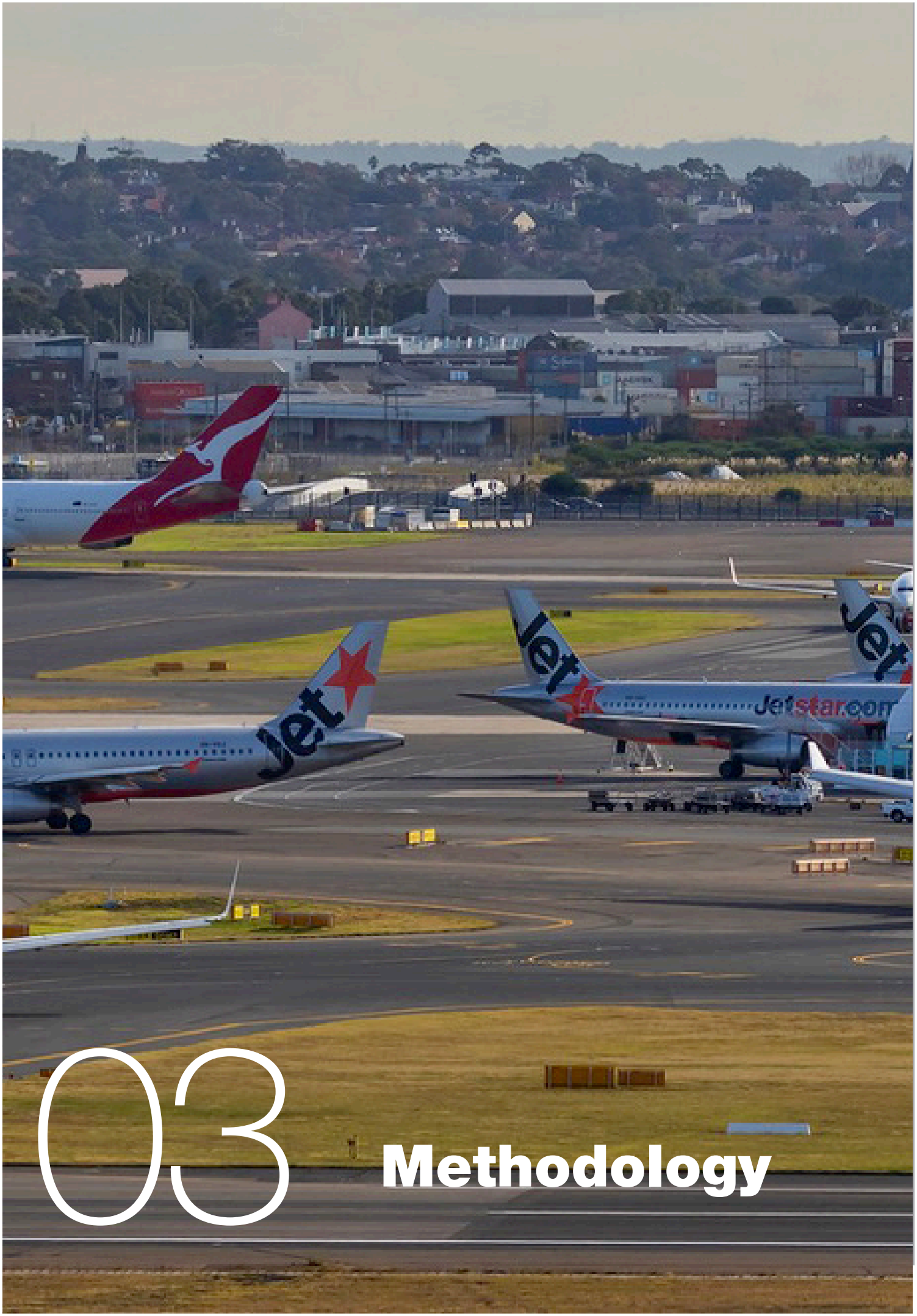
Sydney community, regional visitors from New South Wales, and domestic and international travellers who access the Aerotropolis via the airport. Social infrastructure planning will need to consider access and wayfinding to account for the key points of entry and departure to the Aerotropolis, including the airport, transit nodes (Metro station and bus stops), and major arterial roads. Visitor infrastructure and amenities will need to focus on these locations.

To encourage visitors to stay within the Aerotropolis, social infrastructure should be an attractor with an authenticity that reflects the character of the Aerotropolis and Western Parkland City. This could include regional attractors that promote and celebrate the vision of Aerotropolis, for example Aboriginal culture and innovation which was finding in the *Draft Western Sydney Aerotropolis Aboriginal Engagement Summary Report* (GHD, 2020a). This social infrastructure assessment has made recommendations for infrastructure that could be attractors to the region. Report 3 extends on this to explore activation programs that would support the built infrastructure in achieving the overall objectives for Aerotropolis.

Infrastructure planning until 2056

This Social Infrastructure Needs Assessment considers social infrastructure needs to the year 2056. This extended timeframe is to inform the precinct plans and ensure sufficient land area is allocated for social infrastructure. Identifying land area is particularly important for open space and recreation facilities that have specific site requirements. However planning to meet social infrastructure needs until 2056 is a challenge due to a number of variables that have the potential to influence infrastructure provision over a forty year period. These variables include changing community profile and needs, rate of development, changes in land use and changes in recreation trends.

To mitigate these challenges, this Social Infrastructure Needs Assessment provides a framework for planning social infrastructure across the life span of Aerotropolis to provide an adaptive approach to infrastructure planning. Section 5 outlines traditional population based rates of provision, contemporary needs based provision models, and planning spatial requirements which have informed the precinct specific recommendations outlined in section 6. It is anticipated that as the precinct plans are confirmed and master plans are developed, section 5 will assist with confirming the social infrastructure required. Additionally, section 5, can be used to inform future social infrastructure needs assessments for the remaining precincts (Rossmore, Kemps Creek, Dwyer Road and North Luddenham) to ensure consistency across all of Aerotropolis.



03 Methodology

The objective of this report is to understand the future community and make recommendations to meet the social infrastructure needs of different users, including workers, residents and visitors. The social infrastructure needs assessment identifies what will be required to make the Aerotropolis a great place to live, work and play.

A social infrastructure needs assessment considers four indicators of need, as summarised in Figure 3-1.

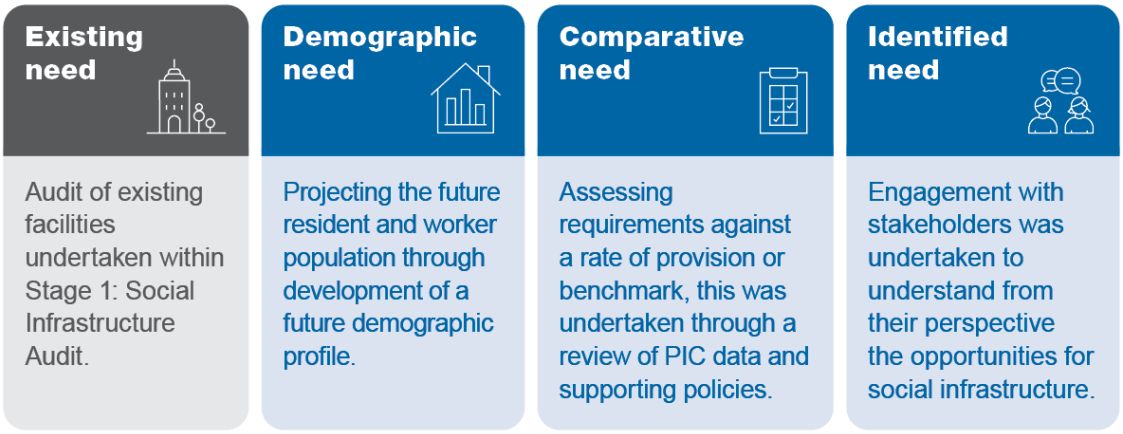


Figure 3-1 Indicators applied to the social infrastructure needs assessment

The 'existing need' indicator has been investigated and documented in Report 1: *Social Infrastructure Audit* (GHD, 2020a). The remaining three indicators have been analysed in this Social Infrastructure Needs Report. The following sections describe how each indicator has been considered in this study.

3.1 Existing need – audit of existing facilities and community

The *Draft Western Sydney Aerotropolis Social Infrastructure Audit* (GHD, 2020a) documents an analysis of existing need for social infrastructure in the study area. This included profiling the existing communities and providing a detailed audit of existing social infrastructure. This considered areas both within and servicing the Aerotropolis. The report also identified existing gaps and opportunities for social infrastructure provision within the initial precincts.

3.2 Demographic need – future population profile

This section describes the process undertaken to understand the growth and characteristics of the future community in order to inform social infrastructure needs for the Aerotropolis. The Common Planning Assumptions (GSC, 2019) have informed the development of the resident and workers profiles discussed in sections 4.1 and 4.2. The GSC (2019) Common Planning Assumptions have been prepared to provide resident, dwelling and employment projections for the Aerotropolis. The projections have been developed for all ten precincts, at five year increments between 2016 and 2056. These projections have used the DPIE (2019b) population projections and Transport, Performance and Analytics (2019) Travel Zone projections as a 'base' before a series of redistributions to align with the vision for the Aerotropolis.

The following sections detail how the profile of future residents, workers and visitors has been prepared using the Common Planning Assumptions as well as a range of other data and studies.

3.2.1 Future resident profile

The purpose of determining the potential future resident profile is to understand implications for social infrastructure regarding the needs of different community groups. As the Common

Planning Assumptions only provide overall resident population projections, a potential resident community profile has been developed including age, household type and family type. Other social indicators including Aboriginal and Torres Strait Islander population, cultural diversity and dwelling density and type have also been analysed to inform social infrastructure needs and provision.

The following steps were undertaken to determine the potential residential profile including age, household type and family type of the projected resident population:

1. The DPIE (2019b) population projections by age, household type and family type were adopted for each precinct based on their LGA as follows:

- Aerotropolis Core precinct – Liverpool LGA
- Northern Gateway – Penrith LGA
- The Aerotropolis and two of its initial precincts (Badgerys Creek and Agribusiness) straddle both Liverpool and Penrith LGAs. Therefore, the projected population was divided between Liverpool and Penrith LGAs based on the percentage of the land that is located within each of the LGAs. Wianamatta-South Creek also straddles the two LGAs however, has not been included in this demographic profile as it is not projected to have any residents, workers or dwellings.

2. The DPIE (2019b) population projections only extend to the year 2041. To calculate residential population projections between 2041 and 2056, the ABS (2019) 2017-2066 population projections by age for Greater Sydney were applied to the Common Planning Assumptions for the years 2046 to 2056. The household type and family type projections for 2046 to 2056 were determined by extrapolating the annual growth rate trend between 2036 and 2041. The purpose of these projections is not a demographic estimate but to understand the likely implications for social infrastructure provision.
3. Other characteristics of the future resident population that have been considered include:

- Dwelling density and types have been analysed based on the Common Planning Assumptions dwelling projections as well as information supplied by the WSPP regarding initial precinct zoning, land uses and potential development yields (population per hectare).
- The potential Aboriginal and Torres Strait Islander population based on existing population trends and findings from the *Draft Western Sydney Aerotropolis Aboriginal Engagement Summary Report* (GHD, 2020a) ..
- Culturally and linguistically diverse communities based on analysis of historic ABS census data trends between 2006 and 2016; and anecdotal information and insights into current trends gained through consultations with Liverpool and Penrith Councils.

3.2.2 Future worker profile

The purpose of understanding the future worker profile is to understand their needs and implications for social infrastructure provision. GHD analysed the following data sources to inform the worker profile:

- Common Planning Assumptions job projections to understand the anticipated employment for each initial precinct in the Aerotopolis
- *Western Sydney Aerotropolis Market and Opportunity Analysis Discussion Paper* (Atlas Urban Economics, 2020) to understand market trends seen in the employment catchment areas of Brisbane and Melbourne airports, as well as challenges for employment within the Aerotropolis.

- Precinct plan land use types and development yields (jobs per hectare) provided by WSPP which were used to inform discussion on potential industry and worker types.

3.2.3 Understanding potential visitors

GHD analysed available data to provide an indication of the types of visitors to the Aerotropolis and therefore the implications for social infrastructure provision. This included a review of:

- Destination NSW international and domestic travel data for the year ending March 2019
- Tourism Research Australia (2020a, 2020b) data
- GHD also reviewed the *Western Sydney Airport Environmental Impact Statement* (Department of Infrastructure and Regional Development, 2016) which provides annual passengers projections through the Western Sydney (Nancy-Bird) Airport.

3.3 Comparative need – determining a rate of provision

The GSC's PIC investigates infrastructure requirements for the Western Parkland City and brings together NSW Government agencies, utility providers and local councils to better align projected population growth with the provision of infrastructure and services.

In February 2020, the GSC provided all relevant NSW Government agencies with three growth scenarios based on 2016 DPIE population projections for residents. Using these projections, each government agency developed a workbook which described the assumptions and methodology used to develop their recommendations for future social infrastructure provision across the three growth scenarios. GSC then used these workbooks to create the PIC for the Western Sydney Growth Area until 2036.

To determine a rate of provision that could be used to assess comparative need, a literature review was undertaken for each social infrastructure type. The literature review included; PIC data, supporting workbooks and relevant government agency policies. Rates of provision were also determined based on consultation with government agencies, described in section 3.4 below. A summary of the literature review including rates of provision, spatial requirements and planning considerations, is outlined in Appendix B.

3.4 Identified need – consultation with government agencies

GHD held a series of meetings during June and August 2020 with NSW Government agencies, councils and education providers to determine the relevant criteria for the planning and provision of social infrastructure in the Aerotropolis. Overall, consultation focused on:

- Confirming the findings of the PIC data
- Confirming social infrastructure benchmarks applied by government agencies
- Identifying principles regarding locational requirements and facility planning (described in section 2.3)
- Identifying the types of social infrastructure required to achieve the overall vision for Aerotropolis.

Table 3-1 lists the stakeholders consulted by GHD to inform this study. The majority of stakeholders consulted have a connection to the Aerotropolis study area and provided relevant benchmarks at a local, district or regional level to inform this social infrastructure needs assessment. GHD also consulted the City of Sydney to understand approaches to meeting the needs of worker populations in the CBD.

Table 3-1 Stakeholder meeting

Category	Stakeholder
NSW Government agencies	Greater Sydney Commission
	Department of Planning, Industry and Environment
	Government Architect NSW
	Western Parkland City Authority
	Fire and Rescue NSW
	Office of Sport NSW
	Sydney Western Local Health District
	NSW State Library
	Destination NSW
	Western Sydney Health Alliance
	Land and Housing Corporation
	Create NSW
	Schools Infrastructure NSW
Councils	Liverpool City Council
	Penrith City Council
	City of Sydney (to understand social infrastructure planning approach for workers)
Education providers	The NUW Alliance (University of Newcastle, University of Wollongong and now joined by Western Sydney University)
	Association of Independent Schools of NSW
	Catholic Education

3.5 Needs assessment

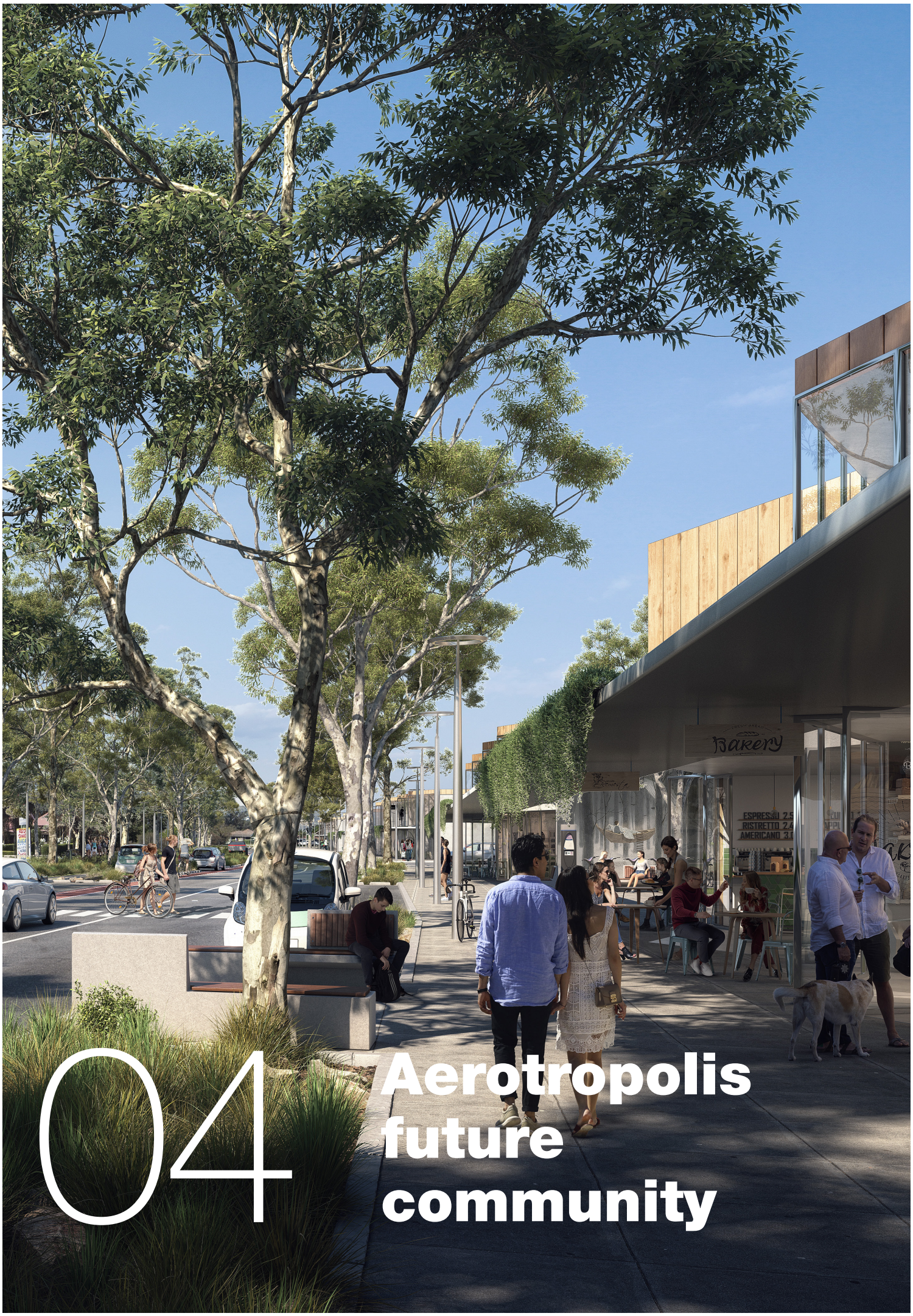
Every community has its own unique demographic profile, rate of growth and population density. These factors all influence community needs for and the provision of social infrastructure. For this reason, recommendations for social infrastructure are based on demonstrable need rather than a numeric standards-based approach. This needs assessment has therefore taken into consideration each of the four indicators (see section 3) to determine recommendations for provision of social infrastructure that will service the future Aerotropolis resident, worker and visitor population.

The needs assessment outlines recommendations for 2036 to align with the PIC timeframes, and 2056 to align with the precinct plan timeframes.

Each of the initial precincts will have its own unique character and attributes which have been established in the *Aerotropolis Land Use and Infrastructure Implementation Plan* (DPIE, 2020b). This has been considered in the recommended location for each facility across the initial precincts. The recommendations also consider the hierarchy of centres and zoning proposed in the precinct plans.

The social infrastructure recommendations in this report predominantly outline physical infrastructure, which will support the 'soft' social infrastructure i.e. the programs, services and activations that will bring the built form and public realm to life.

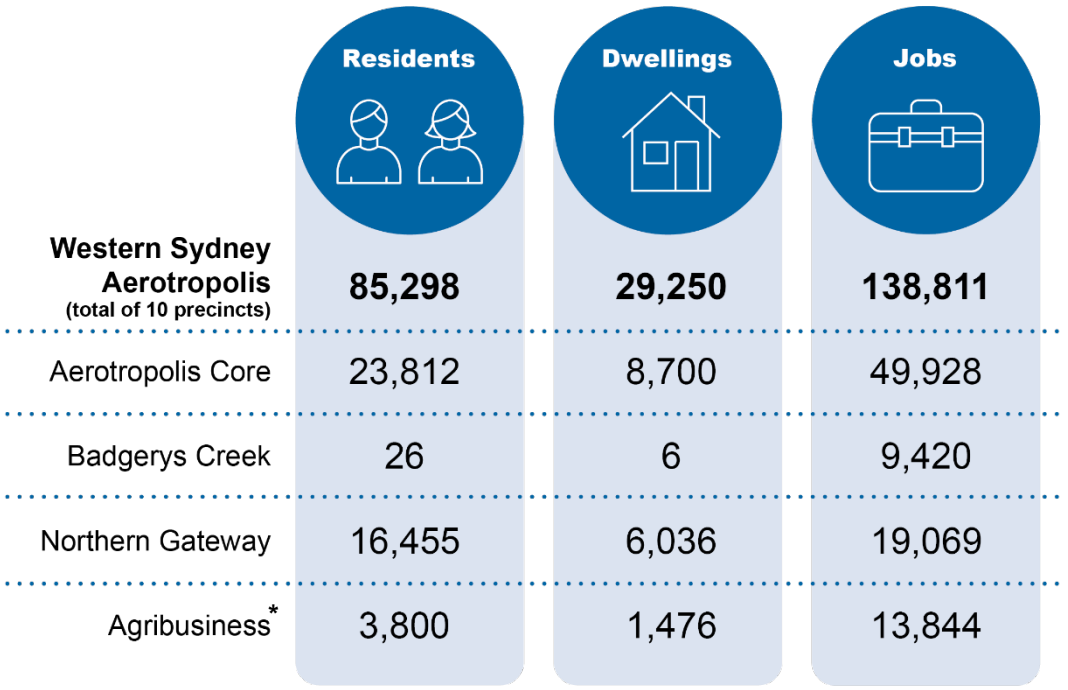
Report 3: *Draft Western Sydney Aerotropolis Social Return on Investment Framework* outlines the soft infrastructure that may be delivered from the facilities recommended in this report.



04 Aerotropolis future community

To achieve the vision of the Aerotropolis becoming the metropolitan centre for the Western Parkland City, it is critical that planning considers the projected future community. The community will include people living in, working and visiting the up until final construction by the year 2056.

Figure 4-1 outlines the anticipated 'end state' for the Aerotropolis in 2056, noting the significantly higher number of jobs across all initial precincts, which reflects the emphasis of the Aerotropolis becoming an employment hub.



Data source: GSC Western Sydney Aerotropolis Common Planning Assumptions (GSC, 2019)

** The Common Planning Assumptions were prepared prior to the separation of the Agribusiness and Dwyer Road precincts therefore, any projections, assessment and discussion of the Agribusiness precinct CPAs includes Dwyer Road precinct.*

Figure 4-1 Western Sydney Aerotropolis 'end state' (2056)

The following section details the growth trends and characteristics for residents, workers and visitors for the whole Aerotropolis (all 10 precincts) and each of the initial precincts where applicable. The Wianamatta-South Creek precinct has not been included in this discussion as it is excluded from development that would generate a residential or worker population. The future community profile informs the social infrastructure needs assessment and recommendations for future provision and staging.

4.1 Future resident population

4.1.1 Population growth

The population projections for the Aerotropolis have been provided by the GSC in the Common Planning Assumptions (GSC, 2019) (Figure 4-1) as discussed in section 3.2. It is important to understand the different growth trends between each of the initial precincts to identify which precincts will experience significant growth and at when. This will inform recommendations for the location and staging of social infrastructure provision (section 6).

Table 4-1 Common Planning Assumptions – residential population projections

Area	2021	2026	2031	2036	2041	2046	2051	2056	Ave. annual growth rate (2021-2036)	Ave. annual growth rate (2036-2056)
Total Aerotropolis	**8,195**	**11,314**	**16,389**	**37,847**	**6,138**	**67,374**	**73,481**	**85,298**	**18.1%**	**5.0%**
Initial Precincts										
Aerotropolis Core	1,504	2,431	4,116	10,130	17,406	19,230	20,441	23,812	28.7%	5.4%
Badgerys Creek	183	170	78	53	38	31	27	26	-3.5%	-2.1%
Northern Gateway	250	2,107	5,027	10,263	11572	13,228	14,883	16,544	200.6%	2.4%
Agribusiness*	1,817	2,065	2,466	3,319	3,343	3,461	3,649	3,800	4.1%	0.6%

Data source: GSC Western Sydney Aerotropolis Common Planning Assumptions (GSC, 2019)

** The Common Planning Assumptions were prepared prior to the separation of the Agribusiness and Dwyer Road precincts therefore, any projections, assessment and discussion of the Agribusiness precinct CPAs includes Dwyer Road precinct.*

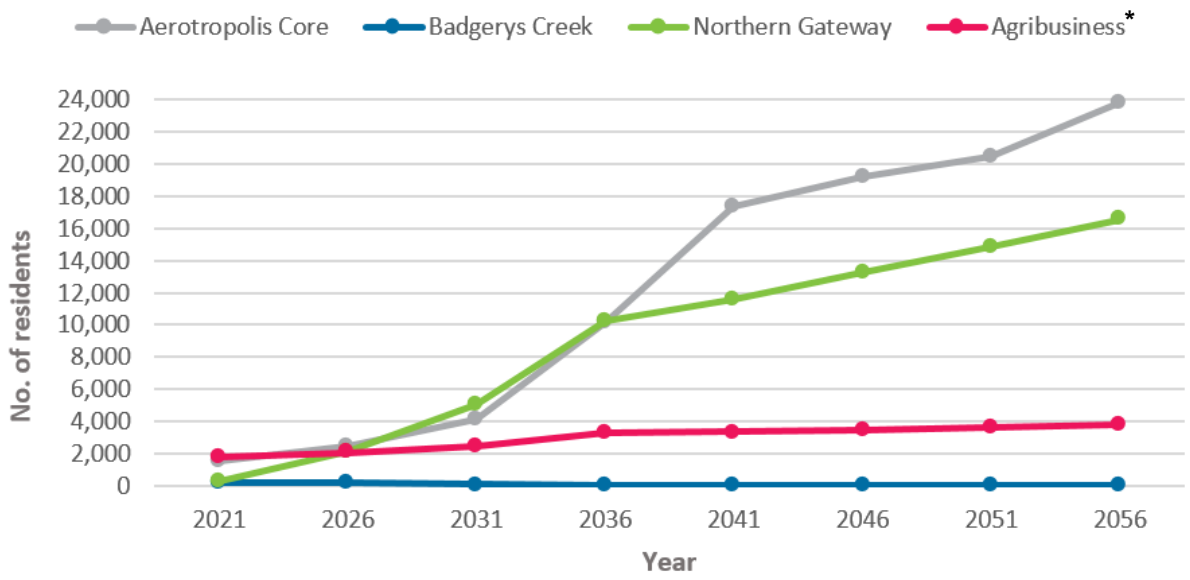
Of the initial precincts, Aerotropolis Core and the Northern Gateway are expected to see the highest population growth over the next 50 years, which is largely due to the mixed use land zoning included in the precincts allowing for residential development (Table 4-1). In comparison, Agribusiness will have a moderate increase because of the amount of enterprise zoning within the precinct, which also explains why Badgerys Creek is expected to experience a decline in residential population.

Data source*: GSC Western Sydney Aerotropolis Common Planning Assumptions (GSC, 2019)*

** The Common Planning Assumptions were prepared prior to the separation of the Agribusiness and Dwyer Road precincts therefore, any projections, assessment and discussion of the Agribusiness precinct CPAs includes Dwyer Road precinct.*

Figure 4-2 illustrates that the Northern Gateway is expected to have the highest population growth over the next 10 years up to 2031, when it is anticipated to account for 30.7 per cent of the total Aerotropolis population or 5,027 residents. This trend is expected to change between 2036 and 2041 with the Aerotropolis Core population growth rate anticipated to overtake the Northern Gateway around 2036. By 2056 the Aerotropolis Core is expected to have grown into a metropolitan centre of the Western Parkland City and account for 27.9 per cent of the total Aerotropolis population or 23,812 residents.

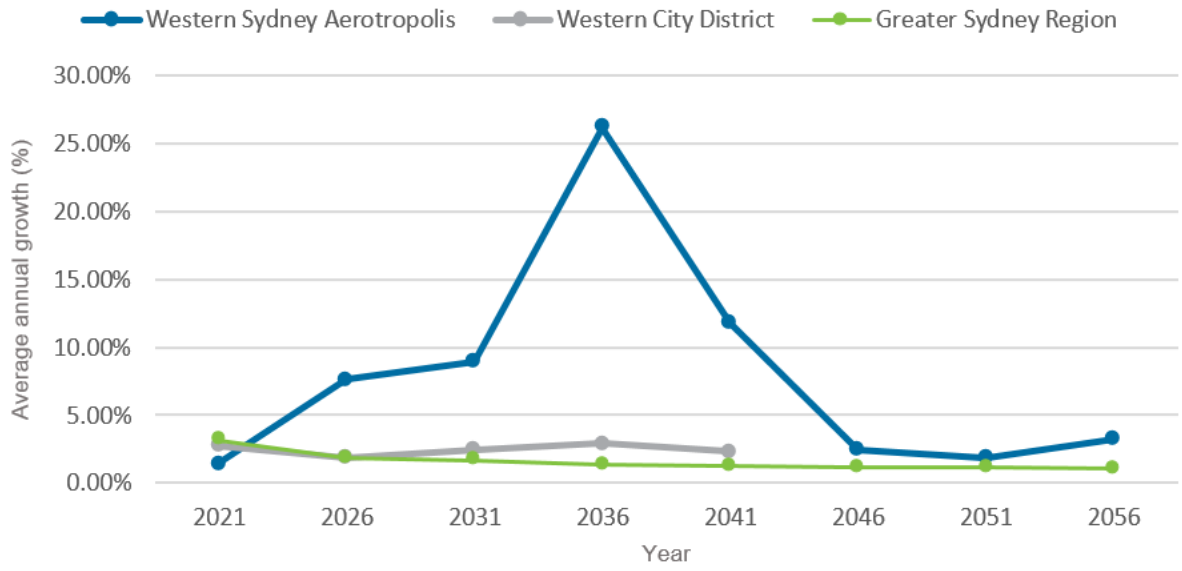
Consequently, the largest proportion of residents in the initial precincts will primarily be living to the east (Aerotropolis Core) and north (Northern Gateway) of the Western Sydney International (Nancy-Bird Walton) Airport, with similar growth up to 2036, and growth in the east (Aerotropolis Core) significantly increasing between 2036 and 2056.



Data source: GSC Western Sydney Aerotropolis Common Planning Assumptions (GSC, 2019)
** The Common Planning Assumptions were prepared prior to the separation of the Agribusiness and Dwyer Road precincts therefore, any projections, assessment and discussion of the Agribusiness precinct CPAs includes Dwyer Road precinct.*

Figure 4-2 Aerotropolis precinct population growth comparison

Overall, the Aerotropolis is expected to grow to 85,298 residents by 2056 with the highest average annual growth rates to occur between 2026 and 2041, and then dropping to a stable growth rate, consistent with the growth rates for the Western City District and Greater Sydney between 2046 and 2056 (Figure 4-3). It is important to note the Western City District is projected to have the largest population growth of the five districts in Greater Sydney over the coming decades, particularly between 2031 and 2041.



Data source: GSC Western Sydney Aerotropolis Common Planning Assumptions and Department of Planning, Industry and Environment population projections (2016-2041)
Note: Population projections for Western City District are only available up to 2041

Figure 4-3 Aerotropolis, Western City District and Greater Sydney average annual growth rate

Liverpool, Camden and Penrith LGAs are anticipated to experience the greatest rate of growth within Western City District, collectively accounting for 76% of the additional residents expected across the district (Atlas Urban Economics, 2020). The growth in Liverpool, Camden and Penrith will be primarily driven by the development of the Aerotropolis precincts and contribute significantly to overall growth of the Western City District.

4.1.2 Age profile

The age profile for the Aerotropolis and the initial precincts was developed based on DPIE LGA population projections (2019) for Liverpool and Penrith LGA's, and Greater Sydney population projects (2019), as discussed in section 4.1.1. It is important to understand the age profile of the Aerotropolis and its initial precincts in order to predict demand trends for different types of social infrastructure which cater to particular sections of the population (i.e. childcare facilities vs. senior citizens centres). This will inform recommendations for specific facility and service types (section 5), as well as location and staging of social infrastructure provision (section 6).

This section discusses the age profile projections of the Aerotropolis as a whole to understand general trends. For the age profile breakdown of each initial precinct, refer to Appendix A. The breakdowns for each initial precent have been applied in the needs assessment to inform specific recommendations discussed in section 6.

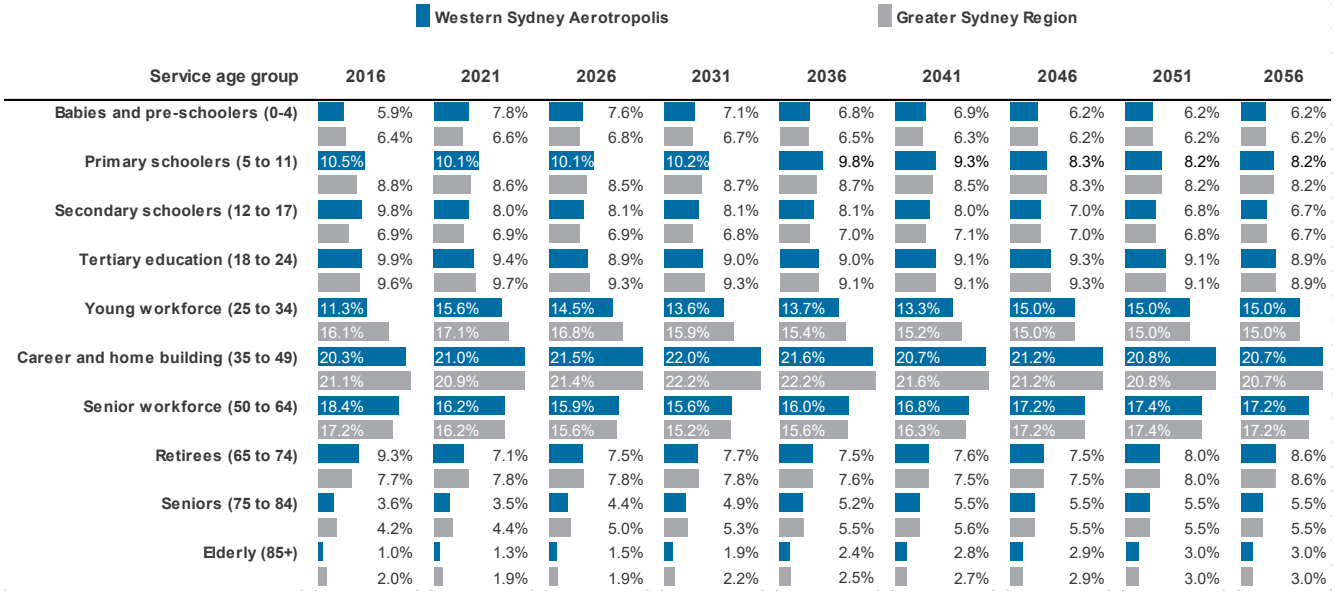
As discussed in the *Draft Western Sydney Aerotropolis Social Infrastructure Audit* (GHD, 2020b), the age profile of the resident population in the Aerotropolis study area in 2016 consisted of a higher proportion of senior workforce and retirees (50 to 74 years) which accounted for over a quarter (27.7 per cent) of the population, compared to Greater Sydney (24.9 per cent). The study area also had a higher proportion of children under the age of 18 (26.2 per cent) compared to Greater Sydney (22.2 per cent), with a significantly higher proportion of children in primary school (5 to 11 years) (10.5 per cent) and high school (12 to 17 years) (9.8 per cent) compared to Greater Sydney (8.8 per cent and 6.9 per cent respectively). However, the Aerotropolis had a significantly lower proportion of young workforce (25 to 34) (11.3 per cent) compared to Greater Sydney (16.1 per cent). The 2016 age profile for Aerotropolis outlines a high proportion of older families and retirees, with a high overall dependency ratio (52) indicating an insufficient working population to support the dependent population.

The age profile of the Aerotropolis is expected to experience substantial change initially between 2016 and 2026, as illustrated in Figure 4-4, with an increase in young workforce and career and home builders (25 to 49 years) and infants (0 to 4 years), and a decrease in senior workforce (50 to 64 years) and people aged over 65.

Between 2016 and 2026 an increase in young workforce and career and home builders (25 to 49 years) is anticipated as a result of workers moving to the area to take advantage of the increasing employment opportunities, particularly in transport, postal and warehousing, construction and manufacturing (section 4.2.2). It is anticipated that this will increase the proportion of infants (0 to 4 years). In contrast, the proportion of senior workforce (50 to 64 years) and people aged over 65 is anticipated to decline. According to Liverpool City Council, this is an existing trend seen in other nearby growth areas such as Edmondson Park and Austral where the younger worker population (24 to 34 years) and young children (0 to 5 years) made up a large proportion of the initial population.

Although the proportion of senior workforce (50 to 64 years) and people aged over 65 is expected to decline initially between 2016 and 2026, these age groups are anticipated to begin to steadily increase from 15.6 per cent and 14.5 per cent respectively in 2031 to 17.2 per cent and 17.1 per cent respectively in 2056 (Figure 4-4). This increasing older population is reflective of the broader trend of an ageing population across Greater Sydney and NSW in general.

The proportion of children aged under 18 and young adults in tertiary education age cohort (18 to 24 years) is anticipated to remain relatively consistent between 2016 and 2056 (Figure 4-4).



Data source: GSC Western Sydney Aerotropolis Common Planning Assumptions, Department of Planning, Industry and Environment LGA population projections (2016-2041) and ABS Greater Sydney population projections (2016-2056)

Figure 4-4 Aerotropolis service age group projection trends

4.1.3 Household and family type

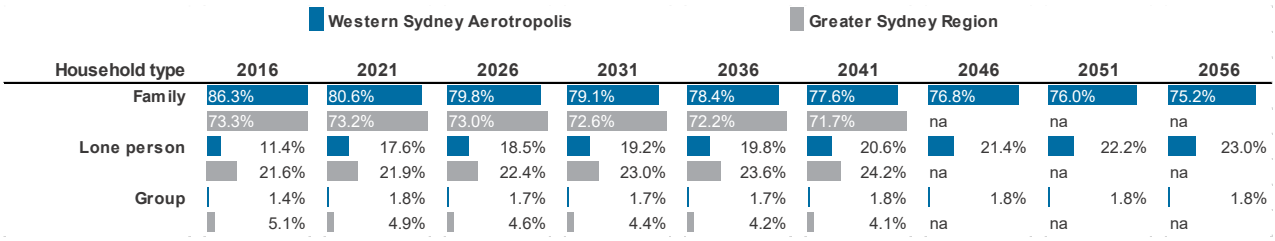
The household and family characteristics for the Aerotropolis and the initial precincts were developed based on DPIE LGA population projections (2019) for Liverpool and Penrith LGA's, and Greater Sydney population projections (2019), as discussed in section 3.2.1. It is important to understand household and family types of the Aerotropolis and its initial precincts in order to predict demand trends for different types of social infrastructure which cater to different types of households and families (e.g. community centres and libraries). This will inform recommendations for specific facility and service types (section 5), as well as location and staging of social infrastructure provision (section 6).

This section discusses household and family type projections of the Aerotropolis as a whole to understand general trends. For the household and family type breakdown for each initial precinct refer to Appendix A. The breakdown for each initial precent have been used to inform specific recommendations discussed in section

The *Draft Western Sydney Aerotropolis Social Infrastructure Audit* (GHD, 2020b) identified that the most prominent household type in the Aerotropolis in 2016 was family households (82.8 per cent), which is significantly higher than Greater Sydney (73.6 percent). This is reflective of the high proportion of children aged under 18 years and career and home builders (35 to 49 years) residing in the Aerotropolis study area. The study area also had a significantly lower proportion of lone person households (15.3 per cent) compared to Greater Sydney (21.6 per cent), with a higher proportion of group households (5.1 per cent) compared to Greater Sydney (1.4 per cent).

Figure 4-5 demonstrates family households are expected to remain the largest proportion of households in the Aerotropolis up to 2056. However, the proportion of family households is anticipated to decline steadily with the most notable decrease occurring between 2016 and 2021 where family households are anticipated to decrease by 6.3 per cent. In contrast, lone person households are anticipated to increase steadily up to 2056 with the most notable increase between 2016 and 2021 at 6.2 per cent. This is reflective of the trend discussed in

section 4.1.2 where a significant increase in young workforce (25 to 34 years) is anticipated to move to Aerotropolis to take advantage of the increasing employment opportunities.

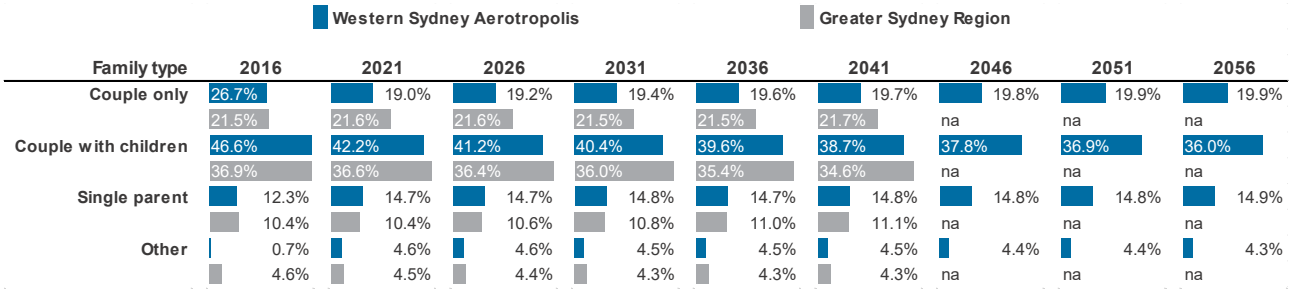


Household type	2016	2021	2026	2031	2036	2041	2046	2051	2056
Family	86.3%	80.6%	79.8%	79.1%	78.4%	77.6%	76.8%	76.0%	75.2%
	73.3%	73.2%	73.0%	72.6%	72.2%	71.7%	na	na	na
Lone person	11.4%	17.6%	18.5%	19.2%	19.8%	20.6%	21.4%	22.2%	23.0%
	21.6%	21.9%	22.4%	23.0%	23.6%	24.2%	na	na	na
Group	1.4%	1.8%	1.7%	1.7%	1.7%	1.8%	1.8%	1.8%	1.8%
	5.1%	4.9%	4.6%	4.4%	4.2%	4.1%	na	na	na

Data source: GSC Western Sydney Aerotropolis Common Planning Assumptions and Department of Planning, Industry and Environment Greater Sydney and LGA household type projections (2016-2041)
Note: Household type projections for Greater Sydney are only available up to 2041

Figure 4-5 Household type projections

Of the family households, Figure 4-6 shows couples with children are expected to remain the largest proportion of family types but experience a steady decline between 2016 and 2056. Couple only family types are also expected to experience a steady decline with the most notable decrease between 2016 and 2021 where it is anticipated couple only family types will decrease by 7.7 per cent, going from a 5.2 percent higher proportion than Greater Sydney to 2.6 per cent lower. Furthermore, single parent family types are expected to steadily increase from 2016 to 2056.



Family type	2016	2021	2026	2031	2036	2041	2046	2051	2056
Couple only	26.7%	19.0%	19.2%	19.4%	19.6%	19.7%	19.8%	19.9%	19.9%
	21.5%	21.6%	21.6%	21.5%	21.5%	21.7%	na	na	na
Couple with children	46.6%	42.2%	41.2%	40.4%	39.6%	38.7%	37.8%	36.9%	36.0%
	36.9%	36.6%	36.4%	36.0%	35.4%	34.6%	na	na	na
Single parent	12.3%	14.7%	14.7%	14.8%	14.7%	14.8%	14.8%	14.8%	14.9%
	10.4%	10.4%	10.6%	10.8%	11.0%	11.1%	na	na	na
Other	0.7%	4.6%	4.6%	4.5%	4.5%	4.5%	4.4%	4.4%	4.3%
	4.6%	4.5%	4.4%	4.3%	4.3%	4.3%	na	na	na

Data source: GSC Western Sydney Aerotropolis Common Planning Assumptions (2019) and Department of Planning, Industry and Environment Greater Sydney and LGA family type projections (2016-2041)
Note: Family type projections for Greater Sydney are only available up to 2041

Figure 4-6 Family type projections

4.1.4 Dwelling growth, density and type

The dwelling projections have been provided by the GSC in the Common Planning Assumptions (2019) with potential dwelling types being informed based on precinct zoning development types and yields, as discussed in section 3.2. It is important to understand dwelling types of the Aerotropolis and its initial precincts in order to predict usage trends for different types and hierarchy levels of social infrastructure which accommodate to particular uses and activities (i.e. open space, sport and recreation). This will inform recommendations for specific facility and service types (section 5), as well as location and staging of social infrastructure provision (section 6).

As discussed in section 4.1.1, the total population in the Aerotropolis by 2056 is projected to be just over 85,000 persons, with almost 30,000 dwellings required to house the population (Table 4-2). In line with the projected population growth discussed in section 4.1.1, the highest number of dwellings would be located in Aerotropolis Core and the Northern Gateway precincts. The Northern Gateway is anticipated to require the most investment between 2021 and 2036 with an additional 3,759 dwellings, while Aerotropolis Core will require the most investment between 2036 and 2056 with an additional 4,953 dwellings. There will be minimal dwellings located in the

Agribusiness precinct due to zoning constraints restricting development to the existing Luddenham village area, and the Badgerys Creek precinct will see the removal of existing dwellings to make way for industry and business uses.

Table 4-2 Common Planning Assumptions - dwelling projections

Area	2021	2026	2031	2036	2041	2046	2051	2056	Ave. annual growth rate (2021-2036)	Ave. annual growth rate (2036-2056)
Total Aerotropolis	**2,638**	**3,592**	**5,524**	**13,348**	**20,741**	**23,202**	**25,279**	**29,250**	**20.3%**	**4.8%**
Initial Precincts										
Aerotropolis Core	451	755	1,417	3,747	6,348	7,008	7,453	8,700	36.6%	5.3%
Badgerys Creek	66	63	28	18	11	8	6	6	-3.6%	-2.7%
Northern Gateway	81	602	1,708	3,840	4,298	4,877	5,456	6,036	233.2%	2.3%
Agribusiness*	645	752	898	1,288	1,299	1,351	1,417	1,476	5.0%	0.6%

Data source: GSC Western Sydney Aerotropolis Common Planning Assumptions (GSC, 2019)

** The Common Planning Assumptions were prepared prior to the separation of the Agribusiness and Dwyer Road precincts therefore, any projections, assessment and discussion of the Agribusiness precinct CPAs includes Dwyer Road precinct.*

Urban policies related to Australia's major cities acknowledge that land development for detached housing on greenfield sites is not environmentally sustainable and recognise the need to supply a diversity of dwelling types in cities, to offer choice and to support shifting household needs and compositions (AHURI, 2020). The precinct plans for the Aerotropolis initial precincts are reflective of the shift to higher density living, with the Aerotropolis Core and Northern Gateway enabling development of medium to high density residential(outlined in Table 4-3). This land use zoning would enable a range of dwelling types, including attached town houses, dual occupancy, manor houses (type of residential flat building, no more than two storeys) and apartment buildings from two to five storeys or five to eight storeys and more. The low rise dwelling types are likely to be developed within the medium density zones of Aerotropolis Core and Northern Gateway, while apartment buildings of five to eight storeys or more would likely occur in the high density zones, particularly in areas closer to major town centres and transport infrastructure such as Metro stations.

Dwellings in the Agribusiness precinct will be minimal and located in appropriate locations outside of the Australian Noise Exposure Concept (ANEC) and Australian Noise Exposure Forecast (ANEF) 20 contours (the ANEC and ANEF are both noise modelling tools designed to predict aircraft noise). The location of any additional dwellings in the Luddenham will be subject to detailed precinct planning. This reflects the intention of retaining the rural character of Luddenham village.

Table 4-3 Dwelling density by land use type

Land use type	2036		2056	
	No. dwellings	Dwellings per Ha*	No. dwellings	Dwellings per Ha*
Aerotropolis Core				
Medium density residential	na	na	587	31
High density residential	3,859	74	8,463	63
Northern Gateway				
Medium density residential	1,298	28	2,834	31
High density residential	2,564	56	3,164	55
Agribusiness				
Luddenham Village (Low density residential)**	163	na	minimal growth	na

Source: WSPP (2020) - based on precinct plan development yields undertaken by Hassell, hill thalis and Studio Hollenstein.

** Net residential density includes the residential site component plus local roads to provide an indication of the intensity of residential built form.*

*** Please note the number of dwellings indicated for Luddenham village are the existing dwellings, there will be minimal additional dwellings, subject to detailed precinct planning in the Luddenham village in accordance with the recommendations in the Western Sydney Aerotropolis Plan (DPIE, 2020c).*

4.1.5 Aboriginal and Torres Strait Islander population

This section discusses the potential Aboriginal and Torres Strait Islander population of Aerotropolis based on engagement outcomes detailed in the *Draft Western Sydney Aerotropolis Aboriginal Engagement Summary Report* (GHD, 2020a) (and discussed further in section 5.7.3). It is critical to understand the potential needs and aspirations of the existing and future Aboriginal and Torres Strait Islander community that will access the Aerotropolis in order to anticipate demand trends for specific types of social infrastructure, as well as opportunities to fill any existing gaps in Western Sydney (i.e. Aboriginal cultural centres, yarning circles and services). This will inform recommendations for specific facility and service types (section 6), as well as location of social infrastructure provision (section 6).

The *Draft Western Sydney Social Infrastructure Audit* (GHD, 2020b) identified that in 2016, the Aerotropolis had a lower proportion of Aboriginal and Torres Strait Islander people (1.6 per cent) compared to Western Parkland City (2.7 percent) and Greater Sydney (2.2 percent). However, Western Sydney has the largest Aboriginal and Torres Strait Islander population of any region in Australia at around 32,000 Aboriginal and Torres Strait Islander people (56.1 per cent of the 57,000 living in Greater Sydney) (GSC, 2018a; GSC, 2018b). This indicates the potential for the proportion of Aboriginal and Torres Strait Islander people to increase as the Aerotropolis develops. The development of the Aerotropolis into a metropolitan centre of the Western Parkland City presents the opportunity for the Aerotropolis meet existing demand for facilities and services targeted at accommodating the needs of Aboriginal and Torres Strait Islander people in Western Sydney.

The *Draft Western Sydney Aerotropolis Aboriginal Engagement Summary Report* (GHD, 2020a) identifies that the need for increased opportunities for cultural celebration was the most frequently raised topic throughout the engagement program, with place naming, artwork and installations, cultural design and dedicated gathering spaces for the Aboriginal community as key recommendations.

Another key theme relevant to this study was ‘infrastructure and facilities’ which was the third most frequently raised topic throughout the engagement program, with linked service delivery, cultural infrastructure, employment services and public transport networks as the key recommendations.

4.1.6 Cultural Diversity

This section discusses the potential cultural characteristics of the future residential population of Aerotropolis. The discussion is based on analysis of historic census data trends and qualitative assessment of anecdotal information and insights into current trends gained through consultations with Liverpool and Penrith Councils, as discussed in section 3.4. It is important to understand the potential cultural characteristics of the future population of Aerotropolis in order to anticipate demand trends for different types of social infrastructure which cater to particular cultural groups (i.e. cultural centres and community halls). This will inform recommendations for specific facility and service types (section 5).

The *Draft Western Sydney Social Infrastructure Audit* (GHD, 2020b) identified the Aerotropolis had a lower proportion of people who speak non-English languages in their home (30 per cent) compared to Greater Sydney (35.8 per cent) in 2016. However, a third of the population can still be considered significant. Western Sydney is highly diverse with 37 per cent of the population speaking one or more than 200 non-English languages in their homes, indicating the potential for this proportion to increase as the Aerotropolis develops, particularly with the increasing employment opportunities and proximity to the international Western Sydney International (Nancy-Bird Walton) Airport.

In 2016 the top three languages spoken at home other than English in the Aerotropolis were Italian (6.6 per cent), Eastern Asian languages (4.2 per cent) and South Slavic (3.1 per cent) (GHD, 2020). Consultation with Penrith City Council indicated that the historical trend of high proportions of people from non-English speaking European countries such as Italy and Greece is declining, with a noticeable increase of people from countries such as India and China. This is reflected in the trends observed in Penrith LGA over the last decade (between 2006 and 2016) with the proportion of the LGA population who spoke a non-English language at home increasing from 13.4 per cent to 16.8 per cent. The highest increases were in people who spoke Punjabi, Filipino/Tagalog, Mandarin, Hindi and Arabic, while Italian, Greek and Croatian decreased (.id community, 2020b). Similar trends have occurred in Liverpool LGA over the last decade, with the proportion of the population who spoke a non-English language at home increasing from 45.8 per cent to 51.9 per cent between 2006 and 2016. The highest increases were in people who spoke Arabic, Vietnamese, Assyrian, Hindi and Urdu, while Italian, Polish and Maltese decreased (.id community, 2020a).

In addition, consultation with Liverpool City Council identified that anecdotally, families from particular cultural backgrounds tend to relocate in extended family and community groups. For example, observations of families moving into other growth areas such as Edmondson Park identified a high proportion of Indian families relocating to the area.

While it is acknowledged that migration trends fluctuate and the Aerotropolis may attract different cultural groups, the trends observed from Liverpool and Penrith LGAs over the last decade indicate it is likely there will be a significant proportion of the Aerotropolis population from Asian and Middle Eastern cultural backgrounds. As discussed in the *Draft Western Sydney Social Infrastructure Audit* (GHD, 2020b) the rate at which people from CALD backgrounds adapt to living in Australia is directly related to the rate at which they achieve proficiency in English, and this impacts on how they participate in many aspects of their community. Social infrastructure such as community centres and halls which accommodate support services and social groups for CALD communities can play a key role in the persons ability to adapt to living in Australia.

4.2 Future worker population

It is important to understand the growth trends in employment as well as different proportions of industry and worker types between each of the initial precincts to predict increases in demand for different types of social infrastructure which cater to the workforce and different worker types (i.e. child care and open space, sport and recreation). This will inform recommendations for specific facility and service types (section 5), as well as location and staging of social infrastructure provision (section 6).

4.2.1 Workforce growth

The job projections for the Aerotropolis have been provided by the GSC in the Common Planning Assumptions (2019) (Table 4-4). This section presents an analysis of these projections to inform anticipated employment growth for each initial precinct.

Table 4-4 Common Planning Assumptions - job projections

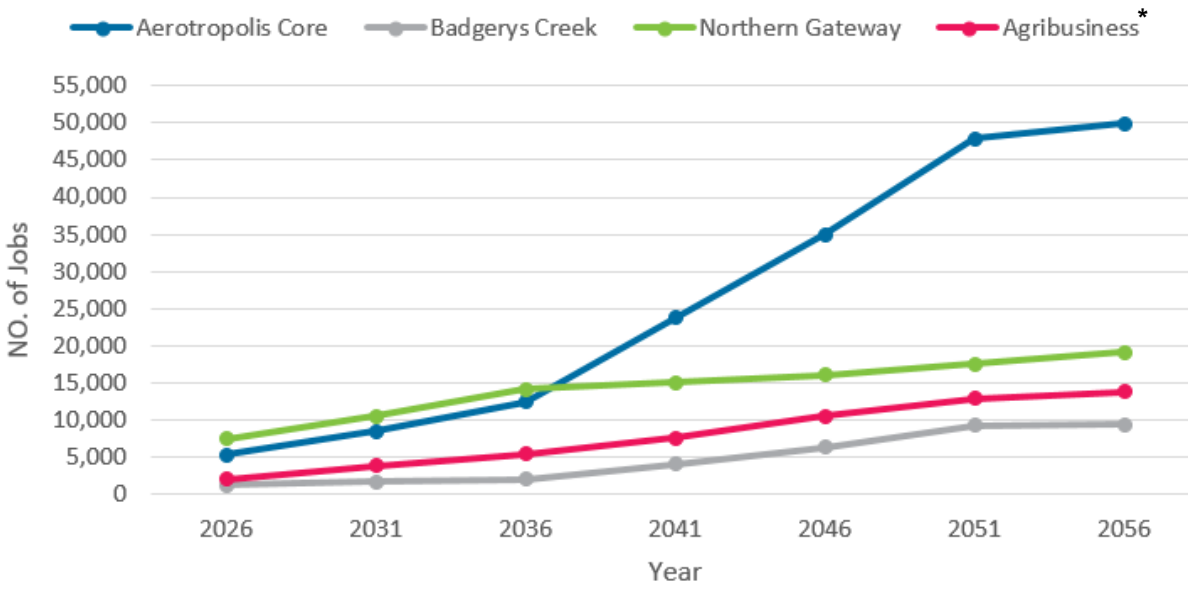
Area	2021	2026	2031	2036	2041	2046	2051	2056	Ave. annual growth rate (2021-2036)	Ave. annual growth rate (2036-2056)
Total Aerotropolis Total	**4894**	**22415**	**35158**	**48819**	**74388**	**101163**	**130319**	**138811**	**44.9%**	**7.4%**
Initial Precincts										
Aerotropolis Core	699	5322	8458	12431	23786	34942	47894	49928	83.9%	12.1%
Badgerys Creek	241	1243	1635	1998	4088	6295	9245	9420	36.5%	14.9%
Northern Gateway	320	7399	10458	14129	15038	16054	17540	19069	215.8%	1.4%
Agribusiness*	1232	2056	3840	5405	7566	10557	12864	13844	16.9%	6.2%

Data source: GSC Western Sydney Aerotropolis Common Planning Assumptions (GSC, 2019)

** The Common Planning Assumptions were prepared prior to the separation of the Agribusiness and Dwyer Road precincts therefore, any projections, assessment and discussion of the Agribusiness precinct CPAs includes Dwyer Road precinct.*

By 2056, there would be an additional 135,000 workers projected to be employed in the area by 2056 reaching a total workforce of almost 139,000, as outlined in Table 4-4. The high workforce growth anticipated for the Aerotropolis reflects the significant level of government intervention to attract industry and businesses (DPIE, 2020), particularly in the initial 15 years up to 2036 through programs such as the Western Sydney City Deal. This significant rate of growth would result in the Aerotropolis being one of the largest employment precincts in Greater Sydney (Atlas Urban Economics, 2020).

Workforce growth trends for the initial precincts are similar to the trends seen in resident population growth (section 4.1.1), with the Northern Gateway expected to have the highest workforce growth over the next 15 years up to 2036 when it is anticipated to accommodate 28.9 per cent of the total Aerotropolis workforce (4). However, by 2041 the Aerotropolis Core workforce will start to increase and overtake the Northern Gateway as the precinct with the highest growth rate. By 2056 the Aerotropolis Core is expected to have grown into a metropolitan centre of the Western Parkland City (DPIE, 2020) and account for 36 per cent of the total Aerotropolis workforce.



Data source: GSC Western Sydney Aerotropolis Common Planning Assumptions (GSC, 2019)

** The Common Planning Assumptions were prepared prior to the separation of the Agribusiness and Dwyer Road precincts therefore, any projections, assessment and discussion of the Agribusiness precinct CPAs includes Dwyer Road precinct.*

Figure 4-7 Aerotropolis precincts workforce growth comparison

4.2.2 Industries and worker types

Information from the *Western Sydney Aerotropolis Market and Opportunity Analysis Discussion Paper* (Atlas Urban Economics, 2020) as well as precinct plan land use types and development yields (jobs per hectare) provided by WSPP has informed discussion of potential industry and worker types in the Aerotropolis, as discussed in section 3.2.2.

Industry case studies

The *Western Sydney Aerotropolis Market and Opportunity Analysis Discussion Paper* (Atlas Urban Economics, 2020) analyses case studies to understand potential industries and workers of the Aerotropolis. This includes the employment catchment areas of Melbourne and Brisbane, with an analysis of trends between 2011 and 2016. Key findings relevant to this study are summarised below:

- Airport employment growth outpaced the average employment growth of both Greater Melbourne and Greater Brisbane regions.
- Employment in manufacturing and wholesale trade declined significantly.
- Traditional industrial sectors associated with airport employment catchments (transport, postal and warehousing) remained the largest employers' accounting for over 50 per cent of employment.
- Accommodation and food services, retail trade and arts and recreation were among the top three employment growth sectors following traditional industrial sectors associated with airport employment catchments (transport, postal and warehousing).
- A notable increase in the professional, scientific and technical services sector, however this sector still only accounts for around 2 per cent of the workforce.

- A significant increase in the proportion of 'white collar' occupations in the transport, postal and warehousing sectors with just over 50 per cent of new jobs in Melbourne and 43 per cent of new jobs in Brisbane created being in 'white collar' occupations (i.e. managers, professionals, sales workers and clerical and administrative workers), which demonstrates the increasing role of automation and technology in the sector.

Challenges for the Aerotropolis

While it is important to understand the types of industries and workers that have gravitated towards employment catchments of other airports such as Melbourne and Brisbane, the Aerotropolis faces a number of challenges which will influence employment trends. The *Western Sydney Aerotropolis Market and Opportunity Analysis Discussion Paper* (Atlas Urban Economics, 2020) identifies four key challenges summarised below:

- Access to all skill levels (skilled, unskilled and executive). While the Western City District is experiencing growth in residents who are skilled workers there is still a market perception that the Western City District is lacking in suitable skilled labour.
- Ability to attract talent and executive level workers which traditionally reside in the Eastern City (Atlas Urban Economics, 2020). This may be a hindrance to attracting non-traditional sectors such as professional, scientific and technical services and creative industries.
- A lack of existing residential population to generate demand and growth in industry sectors, such as retail, non-retail and urban services, in return hindering the attraction of new residents.
- An initial lack of industry diversification with the potential for traditional industries to occupy the majority of available enterprise zoned land, which may hinder the attraction of different sectors to the Aerotropolis.

Potential industry and occupation trends

Table 4-5 Potential number and proportions workers by land use type

Land use type	Workers 2036		Workers 2056		Workers 2056+	
	No.	% of total	No.	% of total	No.	% of total
Aerotropolis Core						
City centres	5,136	40.7%	13,107	20.4%	22,902	31.4%
Urban services	62	0.5%	413	0.6%	413	0.6%
Office park	0	0.0%	16,168	25.1%	24,527	33.7%
Campus-style business park	6,832	54.1%	27,981	43.5%	17,673	24.3%
General industrial	249	2.0%	6,255	9.7%	6,896	9.5%
Total	*12,632*	*100.0%*	*64,353*	*100.0%*	*72,840*	*100.0%*
Badgerys Creek						
Urban services	256	11.8%	3125	31.0%	4342	25.1%
Campus-style business park	0	0.0%	0	0.0%	7202	41.7%
General industrial	0	0.0%	5738	56.9%	4005	23.2%
Large scale logistics	1918	88.2%	1230	12.2%	1720	10.0%
Total	*12,632*	*100.0%*	*64,353*	*100.0%*	*72,840*	*100.0%*
Northern Gateway						
Large scale logistics	3,348	22.5%	3,348	17.4%	4,650	18.3%
Urban services/ general industrial	3,825	25.7%	9,391	48.7%	10,955	43.0%
Mixed use	6,937	46.7%	5,781	30.0%	8,671	34.0%
Residential mixed use	754	5.1%	754	3.9%	1,197	4.7%
Total	*14,864*	*100.0%*	*19,274*	*100.0%*	*25,473*	*100.0%*
Agribusiness						
Large scale logistics	1,070	35.2%	6,176	42.4%	8,013	37.6%
Warehousing/ general industrial	347	11.4%	4,696	32.3%	7,303	34.3%
Food and Pharma markets	1,492	49.1%	1,990	13.7%	2,487	11.7%
Enterprise/ general industrial	0	0.0%	1,326	9.1%	1,426	6.7%
Glasshouse	132	4.3%	361	2.5%	2,087	9.8%
Total	*3,041*	*100.0%*	*14,549*	*100.0%*	*21,316*	*100.0%*

Source: WSPP (2020) - based on precinct plan development yields undertaken by Hassell, hill thalis and Studio Hollenstein.

** The Common Planning Assumptions were prepared prior to the separation of the Agribusiness and Dwyer Road precincts therefore, any projections, assessment and discussion of the Agribusiness precinct CPAs includes Dwyer Road precinct.*

Giving consideration to the employment trends indicated in the case studies of Melbourne and Brisbane airport employment catchments, the challenges facing the Aerotropolis (2.4.) and the development yields outlined in Table 4-2, the future worker population of the Aerotropolis has the potential to grow in accordance with the trends and characteristics outlined below:

- A greater proportion of knowledge-intensive employment sectors and white collar worker types is likely to be established initially within the Aerotropolis Core and Northern Gateway precincts than that of Melbourne and Brisbane due to the higher proportion of city centre (40.7 per cent) and campus style business park and (54.1 per cent) land uses. This will be supported by the planning and investment in infrastructure (e.g. through the Western Sydney City Deal), amenity and supporting industries and facilities such as retail and leisure services, cafés and restaurants which generally attract knowledge-based businesses and workers. There needs to be adequate housing, public transport and economic viability as well to attract knowlege-based businesses and workers (Atlas Urban Economics, 2020).

- A prominence of traditional industry sectors such as transport, postal and warehousing and blue collar worker types in Badgerys Creek and Agribusiness precincts due to the majority large scale logistics and general industrial land uses. This will be supported through strategic alignment with the Western Sydney (Nancy-Bird) Airport operations (Atlas Urban Economics, 2020).
- An increase in white collar worker types between 2036 and 2056 with the growth in knowledge-based sectors such as professional, scientific and technology services with a growth in office park, campus style business park and mixed use land uses in Aerotropolis Core, Northern Gateway and Badgerys Creek. This growth in white collar worker types is reflective of the significant growth in jobs between 2036 and 2056 (section 4.2.1) particularly in Aerotropolis Core as it establishes the main metropolitan centre of the Western Parkland City (DPIE, 2019).
- With this in mind, social infrastructure needs to be based on the needs of different worker cohorts, given white and blue collar jobs create different needs for the workforce. White collar workers will typically work between 9:00 am and 5:00 pm from Monday through Friday. These facilities and services can be mutually beneficial for workers, residents and visitors. Blue collar workers are more likely to work in shifts across a 24 hour, 7 day per week cycle. The needs of blue collar workers should account for different facility types that operate late in the evening to accommodate these different working patterns. Equally, social infrastructure will be the catalyst for growth and the attraction of white and blue collar industries that support the development of the Aerotropolis.

4.3 Future visitor population

This section presents a high level discussion of the potential future visitors to the Aerotropolis based on information gathered from Destination NSW, Tourism Research Australia and the *Wester Sydney Airport Environmental Impact Statement* (2016). It is important to understand the potential demand for tourism-related social infrastructure (e.g. cultural infrastructure and event space) and identify opportunities to invest in regional level infrastructure as key attractors. This will inform recommendations for the location and staging of social infrastructure provision, as well as Report 3: Social Return on Investment Framework.

4.3.1 State and regional visitor trends

Aviation plays a key role in underpinning the tourism industry and associated contribution to the NSW economy (Department of Infrastructure and Regional Development, 2016). According to Destination NSW (2019a), in the year ending March 2019, NSW received 39.9 million international and domestic visitors who spent $32.9 billion. Of this, Western Sydney attracted 11.8 million visitors who spent $5.2 billion (Atlas Urban Economics, 2020; Destination NSW, 2019b).

While international visitors for the year ending March 2020 were down 5.9 per cent as a result of the Australian 2019-2020 bushfires and the ongoing COVID-19 pandemic (Tourism Research Australia, 2020a), domestic overnight tourism showed considerable growth for the year ending March 2020. With outbound travel by Australian residents currently limited due to international border closures, there is potential for Australians to redirect some of the $65.5 billion they spent overseas in 2019 on travel within Australia. In May and June 2020, more than half (53 per cent) of Australian residents interviewed to inform the research planned to take a domestic trip within the next 3 months and 80 per cent within the next 12 months (Tourism Research Australia, 2020b).

4.3.2 Potential visitors to Aerotropolis

The *Western Sydney Airport Environmental Impact Statement Volume 1 Chapter 2 (2016)* identifies the Western Sydney (Nancy-Bird) Airport is anticipated to accommodate 10 million passengers (arrivals and departures) annually five years after opening. By 2050, the airport is anticipated to have an annual capacity of 37 million passengers (arrivals and departures) and accommodate over half of Sydney's international air travel demand.

This significant proportion of visitors travelling through the Aerotropolis as either arrivals or departures presents an exciting opportunity for the Aerotropolis to develop into a destination in itself. In order to capitalise on this opportunity, it will be critical for the Aerotropolis to provide key attractors including cultural facilities which entice visitors to Sydney to stay, explore and contribute to the local economy in the Aerotropolis.

Infrastructure NSW's *Cultural Infrastructure Strategy 2025+* identifies investment in cultural infrastructure as critical to the future success of NSW. Social infrastructure facilities which support the tourism industry such as cultural facilities, generally require investment and development prior to the generation of demand in order to attract visitors. This is similar to the requirement of early investment for facilities such as community centres prior to residential development in order to enable and support important social connections.

4.4 Implications for social infrastructure

Key findings and the implications relevant for social infrastructure provision are outlined below:

Future resident population

- Significant growth in the Western City District, in particular Liverpool, Camden and Penrith (section 4.1.1), will generate an overall increase in demand for social infrastructure, which indicates there is significant opportunity for social infrastructure investment and development in the Aerotropolis to support the wider growth occurring in the district. Supporting a wider catchment with quality social infrastructure that attract people to the Aerotropolis will be important to achieve the vision of becoming a metropolitan centre of the Western Parkland City and achieving a 30-minute city (DPIE, 2020).
- Growth trends for Aerotropolis Core and Northern Gateway (section 4.1.1) indicate investment and development of social infrastructure should be concentrated relatively evenly between the east and north of the Aerotropolis area up to 2036, and then in the primarily in the east between 2036 and 2056.
- An increase in younger age groups between 2016 and 2026 (section 4.1.2) indicates a likely initial increase in demand for facilities and services such as childcare and sport and recreation. While a steady increase in older age groups (following an initial decline between 2016 and 2026) up to 2056 (section 4.1.2) indicates potential increase in demand for health facilities and aged care between 2026 and 2056.
- A consistent proportion of school aged children between 2016 and 2056 (section 4.1.2) indicates a steady increase in demand for education facilities as the general population increases over time (see section 4.1.1).
- An increase in lone person households (section 4.1.3) indicates a likely increase in demand for facilities and services which facilitate community connections such as community centres and sport and recreation. Further, a steady increase in single parent family types from 2016 to 2056 indicates a likely increase in demand for specific facilities and services, such as long day care with extended opening times (i.e. 24/7 childcare), youth specific groups, sport and recreation.

- The majority of medium to high density residential land uses (section 4.1.4), particularly in the Aerotropolis Core and Northern Gateway, will require the provision of highly accessible and quality public open space and community facilities which facilitate quality community connections such as community centres and sport and recreational facilities.
- Higher density development provides a viable mechanism to meet the needs of rapidly growing urban populations. However, communities living in apartment buildings or high density housing often have limited access to their own private open space, and therefore rely heavily on the provision of accessible, public facilities such as open space and informal sport and recreational facilities (Infrastructure Australia, 2019). Densification must be implemented in conjunction with high quality precinct design that includes connections to jobs and education and easy access to high-quality public spaces, including parks, community facilities and cultural precincts (Infrastructure Australia, 2016).
- Recommendations for Aboriginal and Torres Strait Islander cultural celebration (section 4.1.5) are applicable across all types of social infrastructure and should be incorporated into the detailed precinct master planning and individual facility design and development in order to promote social inclusion, sense of place and cultural identity. In addition, recommendations for infrastructure and services (section 4.1.5) build on the current facilities and services available in Western Sydney in order to improve service delivery, accessibility and fill existing gaps to ensure the cultural needs of Western Sydney's Aboriginal community are accommodated within the Aerotropolis.
- Social infrastructure play a key role in assisting CALD community members to adapt to living in Australia (section 4.1.6). It will be important for Aerotropolis to consider cultural needs in detailed precinct master planning and individual facility design and development in order to address social isolation and exclusion, and improve overall social cohesion, health and wellbeing for CALD communities.

Future worker population

- The number of jobs from 2026 to 2036 are anticipated to increase by significant proportions earlier than anticipated for the residential population (which is expected to experience significant growth between 2031-2041) (sections 4.2.1 and 4.1.1). This indicates the need for social infrastructure provision to focus on catering to and attracting workers to the Aerotropolis, which would include facilities and services such as child care, health, open space and sport and recreation.
- Potential challenges including access to suitable skilled labour, attracting business and talent, and an initial lack of residential population to support retail and urban service industry sectors (section 4.2) indicate the need for substantial investment in social infrastructure facilities and services which will improve the overall liveability of the Aerotropolis and assist in attracting and retaining residents and workers.
- A high proportion of knowledge-intensive employment sectors and white collar worker types in the Aerotropolis Core and Northern Gateway (section 4.2.2) indicates a higher proportion of the workforce participating in office based jobs with typical working hours of 9:00 am to 5:00 pm from Monday through Friday. This workforce will require social infrastructure provision which focuses on highly accessible facilities and services such as open space, health and sport and recreation facilities during and either side of the 9:00 am to 5:00 pm work day.

- A high proportion of traditional industry sectors and blue collar worker types in Badgerys Creek and Agribusiness (section 4.2.2) indicates a higher proportion of the workforce participating in labour intensive based jobs with varying shift work across a 24 hour, 7 day per week cycle. This workforce will require social infrastructure provision which focuses on facilities and services such as health and community services with extended opening times. There may be lower demand for open space and sport and recreation facilities in these precincts due to the typically labour intensive roles associated with traditional industry sectors.
- An increase in knowledge-based sectors and white collar worker types between 2036 and 2056 in Badgerys Creek (section 4.2.2) indicates an increase in demand for highly accessible facilities and services such as open space, health and sport and recreation facilities during and either side of the 9:00 am to 5:00 pm work day.

Future visitor population

- A decline in international tourism due to the Australian 2019-2020 bushfires and the ongoing COVID-19 pandemic (section 4.3.1) may have impacts on tourism trends into the future. A tourism study/strategy should be undertaken in the initial years of the Aerotropolis development in order to more accurately understand tourism trends and opportunities (discussed further in section 7).
- Significant numbers of passengers utilising the Western Sydney (Nancy-Bird) International Airport presents the opportunity for Aerotropolis to develop into a destination in itself (Section 4.3.2). In order to capitalise on this opportunity it will be critical for the Aerotropolis to provide key attractors including regional level cultural facilities and event spaces. These facilities should be viewed as ‘enablers’ and invested in early in order to support the attraction visitors.

05 Social Infrastructure Needs Assessment

The indicator of comparative need uses a rate of provision or a benchmark to compare infrastructure provision across communities and geographical areas. Planning for each infrastructure facility depends on the service model of delivery. For some social infrastructure types it is determined based on a per capita rate, for example community facilities, while other facility types are planned based on a catchment, for example ambulance facilities require a 10 minute call out time.

To undertake the social infrastructure needs assessment, it was important to understand the facility planning process, determine a rate of provision that could be applied to facilities across NSW and identify planning and design considerations for each facility type. A literature review was undertaken of PIC data, supporting workbooks and relevant government agency policies to inform this social infrastructure needs assessment (see Appendix B). It was also supported by consultation with government agencies, as outlined in section 3.4.

PIC recommendations developed by the Greater Sydney Commission are also described in detail below. It is important to note that these recommendations were not developed by GHD but have been used to identify future social infrastructure requirements for the Aerotropolis up to 2056.

This section of the report sets out the needs assessment for each social infrastructure type. Table 5-1 outlines the sections and information is presented for each type of social infrastructure.

Table 5-1 Needs assessment section structure by facility type

Section	Description
Facility types and spatial requirements	Considerations for determining facility requirements regarding type and spatial needs informed by a literature review of relevant policies, strategies or studies and consultation with relevant government agencies.
Commitments and recommendations	Government Commitments that have been made regarding infrastructure that will service the Aerotropolis, including the Western Sydney City Deal (to support the vision established for the Western Parkland City) and government agency recommendations detailed in the PIC and in workbooks supporting the PIC.
Planning and design considerations	Considerations for determining appropriate site locations within the precinct plans informed by literature review of relevant policies, strategies or studies including workbooks supporting the PIC, and consultation with relevant government agencies. These should be considered along with the principles identified in section 2.3.
Needs assessment	Presents the four indicators of need (section 3.5) to determine recommendations for the provision of social infrastructure, including: - **Existing need:** informed by the *Draft Western Sydney Aerotropolis Social Infrastructure Audit* (GHD, 2020b) on existing facilities that could service the initial precincts. - **Identified Need:** Recommendation or outcomes from the consultation undertaken with the relevant Government Agencies. - **Demographic Need:** Based on the residential population projections and profile outlined in section 3.2. - **Comparative Need:** The rate of provision that has been identified to assess infrastructure provision. This rate has been determined based on a review of the literature relevant to each facility type as outlined in section 3.3.

Section	Description
Recommendations	Details recommendations for social infrastructure provision in the Aerotropolis initial precincts that will service the future resident, worker and visitor population in 2036, 2056 and the total recommendations (2036 + 2056).

5.1 Education

Both the government and private sectors provide education including TAFE, universities and employment and training facilities. NSW public schools provided by the NSW Department of Education have defined local enrolment areas. The private sector plays a critical role in the provision of education services with Catholic and independent schools supporting the public sector. Across Australia enrolments in Catholic and independent schools has grown over the last decade with the private school sector delivering education to around 35 per cent of school aged children in NSW.

5.1.1 Facility types and spatial requirements

When planning for new schools in greenfield areas, the NSW Department of Education uses future population projections and a rate of children per teaching space to assess the number of additional teaching spaces and/ or new schools required to support the future population (see Table 5-2). The Department of Education also assume that they account for 70 per cent of the primary market and 60 percent of the secondary market to help in their assessment of future school demand.

Consultation with Catholic Education indicated they account for roughly 20 percent of the primary market and 30 percent of the secondary market in the Parramatta Diocese, with independent schools making up the rest. This aligns with the assumptions made by the NSW Department of Education in their PIC workbook. Catholic primary schools usually cater to a catchment of five kilometres for primary schools and secondary schools for a wider catchment of eight to 10 kilometres.

When planning for new schools, Catholic Education are actively working towards the co-location of their facilities to other services, such as lifelong learning, health and community services that have Catholic values. To do this Catholic Education have requested land use zoning in the SEPP be more flexible, to allow for a range of permissible uses to support the co-location of their schools with a range of facilities and services including libraries and cultural, health and community facilities. During consultation, Catholic Education noted that some parents were choosing to send their kids to school near their place of employment and not their place of residence. This was more applicable for primary schools, where children require parents to accompany them to school.

The Department of Education recognised an increase in demand for schools located with employment hubs, however their service delivery model continues to be based on a residential catchment due to the stipulation of the Education Act 1990 (NSW Department of Education, 1990) which states that every child is entitled to enrol in a particular school based on his or her residential address. Flexible zoning to support private and catholic schools within these locations is recommended to accommodate this trend.

Tertiary education

The NUW Alliance are proposing to build a new university in the Aerotropolis called the Multiversity that will deliver a range of STEM related courses including engineering, aerospace, advanced manufacturing and defence (UNSW, 2020). Consultation with the NUW Alliance confirmed that by 2026 the multiversity will expand from the Western Sydney University Werrington and Kingswood Campuses to a new campus in the Aerotropolis. However, the Multiversity will move away from a centralised campus where all courses are offered in one location similar to existing universities throughout Australia. The Multiversity will instead be dispersed throughout the Aerotropolis and be physically located alongside its industry partners.

The Western Sydney City Deal has committed to the establishment of a permanent VET facility with a focus on construction, aviation and aeronautical-related engineering to support residents of the Western Parkland City to access jobs of the future (see Table 5-3). TAFE NSW's PIC workbook confirmed that they will not be the lead agency for this facility and there will be no requirement for a TAFE facility in the Aerotropolis by 2036. However, TAFE NSW did identify an opportunity for a Centre of Excellence which is a specialist hub within the TAFE NSW interconnected training network. This would be co-located with multiple industry partners similar to the multiversity.

Table 5-2 Education facility types and spatial requirements

Facility type	Distribution	Provision rate	Spatial requirements
Government			
Primary School (K-6)	70% of children aged 5-11 years	23 students per teaching space	Minimum 2 ha (includes 1 ha open space) in greenfield area and 1.5 ha in highly urbanised areas.
High School (7-12)	60% of children aged 12-17 years	20 students per teaching space	Minimum 4 ha (includes 2 ha open space) in greenfield area and 2.5 ha in highly urbanised areas
Special School (K-12)	0.8% of children aged 5-17 years (based on the average for Blacktown, Campbelltown, Liverpool and Penrith LGAs)	9 students per teaching space	Minimum of 1 ha
Non-Government			
Catholic Education	25% of children aged 5-11 years 30% of children aged 12-17 years	Case-by-case (for the purpose of this assessment it is assumed 23 students per teaching space)	2-3 hectares with a preference for a connection to community ovals within walking distance, as well as connections to community services.
Independent Schools	5% of children aged 5-11 years 10% of children aged 12-17 years	Case-by-case basis (for the purpose of this assessment it is assumed 20 students per teaching space)	Case-by-case basis (for the purpose of this assessment it is assumed 2-3 hectares)

Facility type	Distribution	Provision rate	Spatial requirements
Tertiary education			
TAFE	Over 15 years	Case-by-case basis	5-6 ha minimum
University	Over 17 years	Case-by-case basis	Dependant on curriculum needs

5.1.2 Commitments and recommendations

The following government commitments have been made regarding education facilities that will fulfil the aspiration for the Aerotropolis to become an internationally significant and competitive area for research, innovation, science, training and education, particularly in the Aerotropolis Core. Table 5-3 describes recommendations and alliances detailed within the Western Sydney City Deal, PIC and PIC workbook.

Recommendations within Table 5-3 include a new specialist public high school, the establishment of a VET facility, the Multiversity that is being developed by the NUW Alliance, and consideration for the establishment of an Aerotropolis outreach innovation / centre of excellence that would cater for all students across NSW (modelled on the Department of Environment Outreach Centres). These facilities are in addition to primary and secondary education facilities that have been recommended by the Department of Education.

The specialist public high school would have the potential to provide around three specialist STEM streams including aerospace and aviation, technology and science, and agriculture which align with the business and industry focus of the Aerotropolis. Consultation with the NSW Department of Education determined in the majority of specialist schools local students have access to the same electives as students in the specialist streams which means that the students enrolled in those specialist streams are likely to be out of area. Therefore, a reasonable assumption for a typical specialist high school (2000 students and three STEM streams in each year) is 25% of students could be 'out of area enrolments'. This indicates the recommended specialist high school would accommodate to the wider Western Parkland City and even Greater Sydney area for students interested in the offered STEM streams.

Table 5-3 Commitments and recommendations for education

Type	Western Sydney City Deal	PIC recommendations	PIC workbook recommendations
Primary education	None	One new school in the Northern Gateway One new school in the Aerotropolis Core Expand Austral Public School Expand Bringelly Public School or Luddenham Public School One Aerotropolis Education Centre	The equivalent of one new school within the Glenfield Primary School Community Group (SCG) with a total of 32 teaching spaces. The equivalent of three new schools within the Rossmore Primary SCG with a total of 81 teaching spaces. The equivalent of 50 additional teaching spaces within the Rossmore Primary Aerotropolis Education Centre

Type	Western Sydney City Deal	PIC recommendations	PIC workbook recommendations
Secondary education	New public high school in the Aerotropolis with vocational links to Western Sydney International (Nancy-Bird Walton) Airport and the aerospace and aviation industries, preparing students for future job opportunities	One new secondary school in the Aerotropolis Core One new Specialist secondary school with a focus on aerospace and aviation. One Aerotropolis Education Centre with vocational links to Western Sydney International (Nancy-Bird Walton) Airport and the aerospace and aviation industries.	The equivalent of a new school will be required within the South Western Sydney Growth Area (North) Secondary SCG with a total of 90 teaching spaces. The equivalent of 55 additional teaching spaces will be required within the South Western Sydney Growth Area (North) Secondary SCG
School for specific purpose	None	The equivalent of a new school will be required within the Western Sydney Growth Area with a total of eight teaching spaces.	None
Tertiary education	Establishment of a permanent VET facility in the Aerotropolis with a focus on construction, aviation and aeronautical-related engineering to support residents of the Western Parkland City to access jobs of the future.	None	None
University	STEM University in the Aerotropolis to be delivered by the NUW Alliance	None	None
Other	None	None	Aerotropolis outreach innovation / centre of excellence facility for students across the Western Parkland City to visit and learn about the Aerotropolis

Additional recommendation – Aboriginal education

GHD consulted with various Aboriginal community members in Western Sydney to help inform the precinct plans for the Aerotropolis initial precincts (GHD, 2020a). Education pathways and opportunities were raised as key issues by participants to help decrease Aboriginal unemployment in Western Sydney. This included:

- Addressing pathways between school and post-school qualifications to create more employment opportunities for Aboriginal communities
- Aligning high school and TAFE curriculums with industries that are expected to have significant job opportunities in the future.
- Providing Aboriginals students with the appropriate certification and training for future job opportunities.
- Educational facilities that are designed and run to improve obstacles to inclusion, identified by Aboriginal education provider.

5.1.3 Planning and design considerations

Planning and design considerations for education facilities have been informed by the documents in Appendix B.

Primary and secondary education:

- Co-location and sharing of infrastructure such as childcare and early education, open space, sporting facilities, car parking, community facilities, health services and further education to enhance land use synergies and optimise facility use.
- All schools require frontages to street where buses can physically operate and meet students transport needs.
- Proximity of government and non-government schools to enhance co-location and sharing of infrastructure, particularly open space and sporting fields.
- Consideration should be given to providing healthy and resilient learning spaces such as natural shade to combat urban heat and shaded walking paths throughout the school and to public transport.
- Preferably located in established public transport corridors and in close proximity to locations adjacent / adjoining to local shops and community facilities.
- Adaptability and expansion opportunities to allow for flexibility in changes to demand and education delivery – ensuring school sites are suitable for all three stages of learning (early childhood, primary and secondary).
- Proximity to public transport and active transport networks to encourage walking and cycling which have health, wellbeing and environmental benefits.
- Proximity to universities, business and industry to promote collaboration and opportunities for student learning pathways and industry support for student activities.
- Schools should be located outside of mapped bushfire prone land and outside of mapped the probable maximum flood (PMF) level. Where a significant portion of the town or village lies within a floodplain and there is no reasonable alternative, schools may be located above the 1: 100 year flood level. All school building floor levels should be above the 1:100 year flood level with an additional 500 millimetres. Clear evacuation routes for students and staff should be provided to areas above the 1:100 recurrence interval level.

- Avoid being located within or immediately adjacent to inappropriate developments (brothels, methadone clinics etc.), special use sites (airports, mobile phone towers, wind farms etc.) or development with potential undesirable amenity impacts (heavy industry, mining etc.).
- Avoid sites adjacent to high noise or vibration generating developments such as heavy industry, airport flight paths or motorways.
- Not located on contaminated land audited as unsuitable for school uses.

Tertiary education:

- Integration of higher education facilities with business and industry to promote collaboration and opportunities for real-world experience and industry support for learning and research activities.
- New campuses should consider efficient site design, frontage access and on-site pedestrian permeability to minimise student and staff walking distances to public transport on fronting streets, and integration with surrounding urban areas.
- Consideration should be given to providing healthy and resilient learning spaces such as natural shade to combat urban heat and shaded walking paths throughout the school and to public transport.
- Network of facilities and spaces rather than a 'singular campus'.
- Proximity to child care, schools, open space, sporting facilities, car parking, community facilities and health services to enhance land use synergies and promote precinct activation.
- Proximity to public transport corridors or within major centres to ensure access accessibility for all and in close proximity to active transport networks to encourage walking and cycling which have health, wellbeing and environmental benefits.
- Proximity to affordable, temporary and student accommodation.

5.1.4 Needs assessment

Table 5-4 details recommendations for future education infrastructure provision in the Aerotropolis initial precincts up to 2056. These recommendations have been informed by the four indicators of need (section 3) which have been summarised in the table below.

Table 5-4 Education needs assessment

Facility	Indicator				Recommendations		
	Existing need	Identified need	Demographic need	Comparative need	Recommendations for 2036	Recommendations for 2056	Total provision across the Aerotropolis initial precincts by 2056
Primary Education	Austral Public School - 276 enrolments (6 teaching space (TS) capacity) Bringelly Public School - 115 enrolments (2 TS capacity) Kemps Creek Public School - 154 enrolments (1TS capacity) Luddenham Public School - 80 enrolments (No capacity) Leppington Public School - 276 enrolments (No capacity) Rossmore Public School - 75 enrolments (5 TS capacity) Wallacia Public School - 70 enrolments (3 TS capacity) Bellfield College Junior Campus - 626 enrolment Holy Family Primary School - 246 enrolment Trinity Catholic Primary School - 120 enrolment Combined K-12 - Christadelphian Heritage College - 245 enrolment Combined K-12 - Mamre Anglican School - 639 enrolment	Government: 70% children aged 5 – 11 years Catholic education: 25% of children aged 5 - 11 years Independent schools 5% of children aged 5 - 11 years	Children aged 5 - 11 in the Aerotropolis Core: 1,010 in 2036 1,952 in 2056 Children aged 5 - 11 in the Northern Gateway: 972 in 2036 1,356 in 2056 Children aged 5 - 11 years in Agribusiness: 327 in 2036 311 in 2056 Children aged 5 - 11 years in Badgerys Creek 5 in 2036 2 in 2056	Government School: 70% of children aged 5 -11. Catholic education: 25% of children aged 5-11 years Independent Schools: 5% of children aged 5-11 years A capacity of 1,000 students per school has been assumed. 23 students per teaching space.	Aerotropolis Core: one new primary school with 31 teaching spaces. Northern Gateway: One new primary school with 30 teaching spaces. Expand Austral Public School. Expand Bringelly Public School or Luddenham Public School. *Catholic Education has also committed to a combined K-12 school in the Northern Gateway.*	Aerotropolis Core: one new primary school with 28 teaching spaces. Northern Gateway: upgrade existing primary schools with 11 new teaching spaces. Support needed in Aerotropolis Core to allow the private sector to develop an additional primary school.	Aerotropolis Core: Two primary schools (59 teachings spaces in total) Northern Gateway: One primary school (41 teaching spaces in total) Expand Austral Public School. Expand Bringelly Public School or Luddenham Public School. Support needed in Aerotropolis Core to allow the private sector to develop an additional primary school.
Secondary Education	John Edmondson High School - 1,156 enrolments (7 TS capacity) Hoxton Park High School 714 enrolments (6 TS capacity) Cecil Hills High School - 14,412 enrolments (-2 TS capacity) - has been announced for planning funding to explore upgrades/expansion Glenmore Park High School - 907 enrolments (7 TS capacity) Emmaus Catholic College - 834 enrolment	Government: 60% of children aged 12 – 17 years Catholic education: 30% of children aged 5-11 years Independent Schools: 10% of children aged 5-11 years	Children aged 12 - 17 in the Aerotropolis Core: 832 in 2036 1,606 in 2056 Children aged 12 - 17 in the Northern Gateway: 814 in 2036 1,116 in 2056	Government School: 60% enrolment of children aged 12-17. Catholic education: 30% of children aged 5-11 years Independent Schools: 10% of children aged 5-11 years	Aerotropolis Core: one new secondary school with 25 teaching spaces Aerotropolis Core: one secondary specialist school with a focus on aerospace and aeronautics. Aerotropolis Core: one Aerotropolis outreach innovation / centre of excellence facility	Aerotropolis Core: upgrade existing secondary school with 23 new teaching spaces Northern Gateway: one new secondary school with 33 teaching spaces.	Aerotropolis Core: one secondary school (48 teaching spaces in total) Aerotropolis Core: one secondary specialist school with a focus on aerospace and aeronautics. Aerotropolis Core: one Aerotropolis outreach innovation / centre of excellence facility Northern Gateway: one secondary school (33 teaching spaces in total)

Facility	Indicator				Recommendations		
	Existing need	Identified need	Demographic need	Comparative need	Recommendations for 2036	Recommendations for 2056	Total provision across the Aerotropolis initial precincts by 2056
School for specific purpose	Fernhill School - 95 enrolments Les Powell School - 76 enrolments St Marys Flexible Learning Centre - 81 enrolments	Independent schools support a significant proportion of the population that require additional support for intellectual, physical and behavioural disabilities.	Children aged 5 – 17 years in the initial precincts 4,235 in 2036 6,602 in 2056	9 students per teaching space. Average of 0.8% school students aged 5-17 Assume teaching spaces are integrated into mainstream schools.	Aerotropolis Core: nine teaching spaces integrated with existing schools	Aerotropolis Core: additional eight teaching spaces to be integrated into existing schools.	Aerotropolis Core 17 teaching spaces integrated with existing schools
Tertiary Education	None	None	Tertiary education and young workforce age group 18 – 24 years in the initial precincts	Not based on provision rates.	Aerotropolis Core: Establish permanent VET facility	None	Aerotropolis Core: Establish permanent VET facility
University	None	Aerotropolis Multiversity model is a new approach to education and training which links higher education to vocational education and industry placement.		Not based on provision rates.	Aerotropolis Core: Allow for flexible zoning that enables education uses and associated infrastructure to support the Aerotropolis Multiversity	None	Allow for flexible zoning that enables education uses and associated infrastructure to support the Aerotropolis Multiversity

5.2 Health

The public and private sector provide health facilities in NSW including hospitals, community health facilities and ambulance stations. NSW Health plans and delivers services and infrastructure for population catchments as an integrated network of services across NSW. This includes supporting patient care in the home, community and hospitals. In planning for health services and associated infrastructure required to support those services, NSW Health takes into consideration a range of factors including changing demographic and disease profiles, advances in treatment and research, patient expectations and outcomes and the utilisation of virtual and digitally enabled care.

5.2.1 Facility types and spatial requirements

Hospitals and community health facilities

In response to challenges and changes in the health sector, NSW Health has developed an integrated approach to primary and community health, through the creation of Integrated Health Neighbourhoods (IHN). The IHN approach involves a shift from inpatient models to ambulatory, primary (general practice) and community models, and non-hospital services. The intention is to decrease admission rates and length of stay for some groups of patients as well as reduce reliance on hospitals as the major providers of health care.

A proposed feature of an IHN is the Integrated Health Hub (IHHub) which would deliver a comprehensive range of clinical services that can support 'stepped-up care' for local primary care providers and, where possible, outreach models of care for clinical services traditionally delivered from hospital sites.

Primary health services are mostly provided by private practitioners, while community health services are mostly provided by the public health system. Primary health refers to universally accessible, generalist services (e.g. general practice, community/early childhood nursing services) that address the health needs of individuals, families and communities across the life cycle. Community health refers to a range of community-based prevention, early intervention, assessment, treatment, health maintenance and continuing care services delivered by a variety of providers. Community health services predominantly operate from a social model of health where improvements in health and wellbeing are achieved by directing efforts towards addressing the social and environmental determinants of health.

There is no rate of provision for determining the required number of health facilities, rather NSW Health use their HealthApp tool. This tool determines the high level projected number of beds and treatment requirements for health facilities as part of the PIC for the Western Sydney Growth Area (Aerotropolis). Hospital demand was modelled by NSW Health using the total population for each LGA and service age group data up to 2036.

NSW Health used their HealthApp tool to model the demand for community health facilities using non admitted patient data for all residents of Camden, Campbelltown, Liverpool, Blacktown and Nepean LGAs from 2016/17 to 2018/19. The occasions of service provided within a group setting were also included within the modelling. Services to be provided in community facilities would depend on the needs and size of the population, and could include the integration of specialist ambulatory, primary general practice and community health services.

Ambulance

NSW Ambulance has developed an effective system of forecasting and responding to changes in service provision. Rather than use a rate of provision, NSW Ambulance undertakes modelling incorporating the following:

- A projected 'response area' for each of the stations above was created in the NSW Ambulance activity modelling tool, Placemaker to forecast the overall demand the new stations would serve.
- The response areas were compared to the PIC areas to determine geographic proximity.
- Population projections in Placemaker were scaled to the growth scenarios based on the following age bands: 0-14, 15-44, 45-69, 70-84 and 85 and over.
- The base number of incidents was determined, and the growth scenarios were applied to project future incident growth for the horizons in the scenarios.
- Workload hours for ambulances related to the incidents was calculated.
- Future ambulance infrastructure requirements were calculated using an incident threshold.

An ambulance station is supported by a network of up to 10 standby locations. The infrastructure for a standby hub is minimal and can be collocated with facilities such as police station, fire station etc. The minimal infrastructure required enables standby locations to be easily relocated should there be a change in demand.

5.2.2 Commitments and recommendations for health facilities

The following government commitments have been made regarding health facilities that will fulfil the aspiration for the Aerotropolis to become an internationally significant and competitive area for research, innovation, science, education and health. Table 5-5 describes recommendations and alliances detailed within the Western Sydney City Deal, PIC and PIC workbook.

According to NSW Health existing hospitals with planned upgrades in the suburbs surrounding the Aerotropolis have sufficient capacity to support the future population up to 2036. For this reason a separate public hospital facility in the Aerotropolis is not required during this period. Beyond 2036, facilities that the Aerotropolis could accommodate to ensure demand for health services could be met include an Integrated Health Hub (IHHub) within Aerotropolis Core, allowance for a 12 bay ambulance station, and new community health facilities in Leppington, Glenfield and Oran Park.

Table 5-5 Commitments and recommendations for health

Type	Western Sydney City Deal	PIC recommendations	PIC workbook recommendations
Hospital	None	None	Existing hospitals with planned upgrades have sufficient capacity to support the future population up to 2036 Beyond 2036 the development of an IHHub

Type	Western Sydney City Deal	PIC recommendations	PIC workbook recommendations
Community health	None	One community health	Potential location for a community health facility in Aerotropolis Core after 2031
Ambulance			One ambulance station with 12 bays
Other	Establishment of the Western Sydney Health Alliance to improve coordination and effectiveness of health services in the region, supporting healthier neighbourhoods.	None	None

Additional considerations – Indigenous Health Facilities

The Aerotropolis should give support to addressing current health service gaps for Indigenous communities in Western Sydney in areas of dental care, men's health, youth, and mental health (GHD, 2020a). This would meet a number of limitations preventing some Aboriginal people accessing current medical services in the Western Sydney area, such as a 24 hour medical service that provides bulk-billing and culturally safe and inclusive non-Aboriginal medical services. Incorporating visible Aboriginal artwork or Acknowledgement will support with health and medical service physical infrastructure being a culturally safe and welcoming space.

Distance between health services and residential areas is seen as a barrier, therefore planning for health services will need to factor in accessibility and affordable access (ibid). Mobile health checks should be made available to both Aboriginal employees and residents within the Aerotropolis and surrounding areas. Health services should also be located near public transport services such as shuttle or public buses, and Sydney Metro available nearby (ibid).

5.2.3 Planning and design considerations

Planning and design considerations for health facilities have been informed by the documents in Appendix B.

- Health infrastructure should be located close to public transport and amenities and integrated with green infrastructure to provide healthy and resilient spaces for people within and close to hospitals
- Health infrastructure should include flexible spaces to respond to emergencies such as pop-up testing centres for COVID-19.
- Consider the co-location of health services and facilities with other government and community services which can also respond to emergencies
- Medical centres with approximately 21 general practitioners per 10,000 residents
- Provision of General Practitioners and private medical centres can reduce demand on the public health system (general rate of provision is one medical centre with approximately 21 general practitioners per 10,000 people)

- Private health facilities could reduce the demand on both inpatient and outpatient facilities. In addition, encouraging the development of private health facilities will result in the development of a health cluster that will support the public sector as specialists work across both systems
- The increased focus on moving inpatient services to outpatient reduces the number of hospital beds required to service the population.
- Advances in medical technology and methods of treatment such as remote patient monitoring, virtual and telehealth and smart monitoring will influence the type of services required by the population.
- Ambulance stations require good access to roads and surrounding areas.

5.2.4 Needs assessment

Table 5-6 details recommendations for future health infrastructure provision in the Aerotropolis initial precincts up to 2056. These recommendations have been informed by the four indicators of need (section 3) which have been summarised in the table below.

Table 5-6 Health needs assessment

Facility	Indicator				Recommendations		
	Existing need	Identified need	Demographic need	Comparative need	Recommendations for 2036	Recommendations for 2056	Total provision across the Aerotropolis initial precincts by 2056
Public Hospital	Fairfield Hospital Nepean Hospital Braeside Hospital Minchinbury Community Hospital Nepean Private Hospital	The expected additional volume of public health services to be generated through redevelopments at Liverpool, Campbelltown, Nepean and Westmead Children's Hospitals over the next 20 years does not warrant the development of a separate hospital facility	Initial precincts total resident population: 25,801 in 2036 46,238 in 2056 Initial precincts total worker population: 33,963 in 2036 92,261 in 2056:	Modelling undertaken through NSW Health App	Embellish existing hospitals to accommodate demand.	Aerotropolis Core: development of an IHHub	Aerotropolis Core: one IHHub
Community health	St Clair community health facility Hoxton Park Community Health Centre Miller Early Childhood Health Centre Mount Druitt Headspace Community Centre	New community health facilities in Leppington, Glenfield and Oran Park would service the Western Sydney Aerotropolis. Other potential locations for community health facilities could include the Aerotropolis Core. However, community health services in this location are unlikely to be needed before 2031.		Modelling undertaken through NSW Health App	New community health facilities in Leppington, Glenfield and Oran Park would service the Western Sydney Aerotropolis.	Aerotropolis Core: one community health facility. Specialised Indigenous Health Facility	Aerotropolis Core: one community health facility. Specialised Indigenous Health Facility
Ambulance	Colyton Ambulance Station Green Valley Ambulance Station Warragamba Ambulance Station"	Consultation was not undertaken with NSW Ambulance.		Modelling through NSW Ambulance activity modelling tool, Placemaker	Aerotropolis Ambulance Station with 12 new bays.	None	Aerotropolis Ambulance Station with 12 new bays.

5.3 Emergency services

Emergency services are public organisations that respond to and deal with emergencies when they occur or provide other safety related services. Emergency services include the police, fire and justice services such as courts. While ambulance services are also an emergency service, they are considered under health services in this report (section 5.2).

5.3.1 Facility types and spatial requirements

NSW Police

The provision of police services is dependent on accessibility, response and proximity to critical infrastructure such as access to main roads/highways, enhanced serviceability within existing police commands and proximity to the airport. General population and demographic information also provides a platform for planned infrastructure.

The NSW Police Force (NSWPF) is focused on providing modern multipurpose police centres, which provide functionality for front line police along with specialist and support functions such as taskforces and squads, forensic services and traffic and highway patrols. NSWPF is developing repeatable future-proof infrastructure design, supported by accommodation and equipment standards co-developed and endorsed by users.

Rather than a rate of provision, NSWPF plan facilities based on a number of factors these include:

- Changing crime and offender trends including a rise in complex crimes such as cyber-crime, people trafficking, and drug crime
- Socio-demographic shifts such as population growth and increased density, diversity, and use of social media
- Technology shifts such as artificial intelligence, automation, and the digital economy
- Increasing focus on prevention and disruption
- Changes to the physical environment.

Table 5-7 below details the types of police infrastructure, their rate of provision and land requirements.

Table 5-7 Facility types and spatial requirements

Facility type	Rate of provision	Spatial requirements
Police multipurpose hub	Facilities developed in response to a number of factors including crime and offender trends, demographic shifts, changes to the physical environment.	20,000m^2 includes a police station, specialist resources e.g. traffic and highway, forensics and other agency cohabitation options such as State Archives, Australian Federal Police and Fire and Rescue NSW.
Police station		2,000m^2 or can be incorporated in a multipurpose police hub. Major centres require one police station
Police shop front		150m^2 within a Town Centre

Justice

The Department of Communities and Justice use demographic data and five-year averages for criminal-trial registrations, finalisations, and pending trial caseloads to determine future court infrastructure requirements. There are no benchmarks or thresholds to determine needs for local or district court facilities.

The Department of Communities and Justice is working towards consolidating services and facilities into existing hubs with a focus on developing integrated justice precincts which would bring together interdependent services. This would enable the delivery of complementary services across family support, domestic violence and child protection services, mental health and drug support, police, courts, youth justice and correctional services. Planning for integrated services and co-located facilities will require the careful consideration of the complex needs of different communities and cohorts (e.g. victims and offenders), and collaboration across all levels of government and non-government organisations.

Table 5-8 below describes the spatial requirements for a new court.

Table 5-8 Facility type and spatial requirements

Facility type	Rate of provision	Site requirements
Court	Demographic data and five-year averages for criminal-trial registrations, finalisations, and pending trial caseloads to determine future court infrastructure requirements	10,000 sqm (min 5000 sqm) with three street frontages including two separate secure frontages / entrances for custodial and judicial transfers and secure perimeters.

Fire and Rescue NSW

Fire and Rescue NSW (FRNSW) use the key performance indicator of achieving a 10-minute call out time to establish the number and general location of fire stations required to cover an area. This requirement ensures that stations are distributed across a geographical area creating ‘service catchments’. FRNSW also use a rate of provision of one fire station per 25,000 people to justify a FRNSW fire station.

Table 5-9 below describes the spatial requirements for a new fire station.

Table 5-9 Facility type and spatial requirements

Facility	Rate of provision	Site requirements
Fire station	Incidents need to be attended to in 10 minutes or less One station per 25,000 people	2,500m2 which allows for a two bay, 24 hour staffed station with ancillary facilities. Can be smaller depending on location. Corner sites are preferred s it provides for an easier ‘drive in – drive out’ configuration for the trucks

5.3.2 Commitments and recommendations

The following government commitments have been made regarding emergency services requirement that will fulfil the future needs for the Aerotropolis. Table 5-10 describes recommendations detailed within the Western Sydney City Deal, PIC and PIC workbook.

The Department of Justice and Communities in their PIC workbook anticipated that demand over the next twenty years could be accommodated in existing courthouses through expansion and upgrades, although demand beyond 2040 may require the development of a justice precinct within the Aerotropolis Core. Additionally, NSW Police and FRNSW recommended a multipurpose police hub with the ability to accommodate State archives (relocated from current premises in Orchard Hills), Australian Federal Police, Fire and Rescue NSW (including multiple Fire Stations).

Table 5-10 Commitments and recommendations for emergency services

Facility	Western Sydney City Deal	PIC recommendations	PIC workbook recommendations
Fire and Rescue	None	Three new fire stations: North Rossmore Fire Station Northern Gateway Fire Station Bringelly Fire Station	Three new fire stations: North Rossmore Fire Station Northern Gateway Fire Station Bringelly Fire Station
Police	None	One Police Hub in Badgery's Creek	Multipurpose Police Hub in Badgerys Creek with specialist resources e.g. traffic, highway and forensics. Also to be considered for use as a state emergency management centre for government and local authorities.
Courts	None	None	All courthouses servicing Aerotropolis will need to be expanded and upgraded.

5.3.3 Planning and design considerations

Planning and design considerations for emergency service facilities have been informed by the documents in Appendix B.

Police

- Investigate and develop integrated justice and emergency service planning opportunities

Justice

- Land requirements for court facilities are an average of 10,000 sqm (min 5000 sqm), with three street frontages including two separate secure frontages / entrances for custodial and judicial transfers and secure perimeters.
- Court and tribunal facilities should be located in close proximity to public parking, public transport, town centre and, preferably, be co-located with other services such as Police and legal services.
- The delivery of justice services and supporting infrastructure should be integrated more closely with complementary services across family support, domestic violence and child protection services, mental health and drug support, police, courts, youth justice and correctional services to maintain focus on prevention and early intervention.

Fire and Rescue

- Land requirements for a new fire station is 2,500m2, which allows for a two-bay, 24 hour staffed station with ancillary facilities.
- Corner sites are preferred as it provides for an easier ‘drive in – drive out’ configuration for the trucks, eliminating the need to reverse trucks back into the station or to drive in and manoeuvre on-site.
- Smaller fire stations may be appropriate depending on the location, orientation and whether or not it forms part of a co-located facility.
- Co-location of facilities is supported with other agencies as long as the site meets FRNSW’s operational needs.

5.3.4 Needs assessment

Table 5-11 details recommendations for future emergency services infrastructure provision in the Aerotropolis initial precincts up to 2056. These recommendations have been informed by the four indicators of need (section 3) which have been summarised in the table below.

Table 5-11 Emergency services needs assessment

Facility	Indicator				Recommendations		
	Existing need	Identified need	Demographic need	Comparative need	Recommendations for 2036	Recommendations for 2056	Total provision across the Aerotropolis Initial Precincts by 2056
Fire station	Existing fire services within the Aerotropolis are the responsibility of the NSW Rural Fire Service. Three existing Fire and Rescue Fire Stations within a 15 km radius.	Fire and Rescue confirmed PIC recommendations should be sufficient to service the population to 2056. Service requirements may change what goes into the facilities but additional space shouldn't be required	Initial precincts total resident population: 25,801 in 2036 46,238 in 2056	Incidents need to be attended to in 10 minutes or less One station per 25,000 people	Three new fire stations: North Rossmore Fire Station Badgerys Creek Fire Station Bringelly Fire Station	One new fire station: Aerotropolis Core Fire Station	Four fire stations: North Rossmore Fire Station Northern Gateway Fire Station Bringelly Fire Station Aerotropolis Core Fire Station
Police multipurpose hub	No existing police stations within the Aerotropolis. Liverpool City Police Area Command	Consultation was not undertaken with NSW Police or the Department of Justice.		Facilities developed in response to a number of factors including crime and offender trends, demographic shifts, changes to the physical environment.	Badgerys Creek: Multipurpose Police Hub with specialist resources e.g. traffic, highway and forensics. Also, to be considered for use as a state emergency management centre for government and local authorities.	None	Badgerys Creek: One Police Hub with holding cells
Police station					None	Aerotropolis Core: one police station	Aerotropolis Core: one police station
Police shop front					Northern Gateway: one shop front in a shopping precinct.	Northern Gateway: one police shop front in a shopping precinct.	Northern Gateway: two police shop fronts in different shopping precincts.
Courts	Liverpool Courthouse Campbelltown Courthouse Camden Courthouse			Demographic data and five-year averages for criminal-trial registrations, finalisations, and pending trial caseloads to determine future court infrastructure requirements	Expand existing court facilities	Aerotropolis Core: One new courthouse attached to the Police Station as part of the establishment of a Justice Precinct.	Expand existing court facilities Aerotropolis Core: One courthouse attached to the Police Station

5.4 Community facilities

Liverpool City Council's *Community Facilities Strategy* (2018) defines community facilities as accessible and affordable spaces that support a range of activities and benefit the community. The strategy emphasises the important role community facilities play in supporting vulnerable community groups including: Aboriginal or Torres Strait Islanders; children; young people; women; people who experience a disability; people from CALD backgrounds; and older people. The provision of appropriate community facilities, can assist communities, and particularly vulnerable groups, to address social isolation and exclusion, and improve overall social cohesion, health and wellbeing. The majority of community facilities are provided and managed by local councils, however community facilities can also be provided and managed by church groups, local schools, government agencies and non-government organisations.

5.4.1 Facility types and spatial requirements

Depending on the size of the population that is being served, and the amount of space/land available, multipurpose facilities can be provided as either a community space or a standalone centre. A multipurpose space could be integrated into another council facility such as a library, tourism centre or cultural facility. Such spaces provide a base for the delivery of community services and programs and can be timetabled for use by different community providers. In contrast, a standalone facility typically contains permanent office space for not for profit community organisations and/or government agencies that provide services to the local population.

Table 5-12 below provides an overview of requirements for a community facility that would typically be provided by the public sector which has been drawn from the documents identified in Appendix B. The rate of provision for community facilities is based on a population catchment as outlined Table 5-12.

Table 5-12 Community facility requirements

Catchment	Description	Estimated population	Floor space
Local	Local-based services and spaces	8-10,000 residents	Minimum floor space of 1,000 sqm and have access to outdoor space
District	Multipurpose community centre including a range of facilities	20-50,000 residents	The size of a district facility (with library) is typically 1,500-2,500 sqm (increasing with the size of the catchment's population)
Regional	Facilities which provide for a specific need e.g. environmental education, business hub	N/A	Dependent on facility type

5.4.2 Commitments and recommendations

No commitments or recommendations were made for community facilities within the PIC or Western Sydney City Deal. Section 5.4.4 details all community facility recommendations for the Aerotropolis initial precincts up to 2056.

5.4.3 Planning and design considerations

Planning and design considerations for community facilities have been informed by the documents in Appendix B.

- Community centres should be located central to their catchment area and provide equitable access to all potential users.
- Facilities should be easily accessible by active and public transport (i.e. public transport stops within 400 metres walking distance) and have good pedestrian and cycling connections.
- For optimum visibility and accessibility, facilities should be on a main street with ground floor street frontage for.
- Community centres should be co-located or in close proximity to other facilities, such as shops, schools and public libraries to promote convenient access and help create a focal point for community activity.
- Community facilities should be designed in response to the surrounding landscape features and green infrastructure.
- Facilities should contribute to green infrastructure by incorporating green infrastructure elements into its design and construction to create a health and activity. In addition they should be located near open space, to allow for related outdoor activities and community events, such as festivals and markets,
- In determining the size of a community facility; a minimum of 60m2 should be allowed for a meeting room. For larger facilities a minimum of 180m2 should be allocated for a hall for 100 people.
- Facilities should include space for hire for private functions, particularly for larger Multipurpose Centres.
- Accommodation for particular services, programs and activities for specific target groups such as young people, older people and people from culturally and linguistically diverse backgrounds.
- Facilities should also include natural shade and building materials to combat urban heat
- Providing space for public community gardens within community facilities contributes to addressing the need for access to healthy food for communities

5.4.4 Needs assessment

Table 5-13 details recommendations for future community infrastructure provision in the Aerotropolis initial precincts up to 2056. These recommendations have been informed by the four indicators of need (section 3) which have been summarised in the table below.

Table 5-13 Community facilities needs assessment

Facility	Indicator				Recommendations		
	Existing need	Identified need	Demographic need	Comparative need	Recommendations for 2036	Recommendations for 2056	Total provision across the Aerotropolis initial precincts by 2056
Local community centre or space	Progress Hall (Agribusiness Precinct)	Consultation with Liverpool City Council and Penrith City Council confirmed that community facilities need to meet the needs of the current and future community.	Initial precincts total resident population 25,801 residents in 2036 46,238 residents in 2056 Initial precincts total worker population: 33,963 workers in 2036 92,261 workers in 2056	One facility per 8 – 10,000 residents.	Aerotropolis Core: one local community space. Northern Gateway: one local community space.	Aerotropolis Core: two local community spaces. Northern Gateway: one local community space.	Aerotropolis Core: three local community spaces Northern Gateway: two local community spaces
District community centre	None	Liverpool City Council expect that that there may be a trend towards a younger worker population and young children in the Aerotropolis.		One facility per 20 - 50,000 residents.	None	Aerotropolis Core: one district community centre co-located with the district library. Northern Gateway: one district community centre co-located with the district library.	Aerotropolis Core: one district community centre co-located with the district library. Northern Gateway: one district community centre co-located with the district library.

5.5 Childcare

Childcare is provided by both public and private sectors with local government providing where there are gaps in the private market, either in the number of available places or for the needs of vulnerable community groups. Urban Economics (2018) prepared the *Occupancy and Performance Appraisal: Early Childhood Education and Care Sector* to analyse the factors influencing demand for, and supply of, Early Childhood Education and Care across Australia. The report found that childcare centres are increasingly integrated within mixed use developments not only in CBDs but also in business parks; and as early education "hubs" with other facilities such as swim schools. The report found that childcare facilities close to a parent's place of work, along with other 'lifestyle' facilities including end-of-trip facilities and co-working spaces, are increasingly in demand by workers and business across CBDs and employment hubs.

5.5.1 Facility types and spatial requirements

Childcare is a local facility and typically in close proximity to the population that it services. Table 5-14 describes the different types of childcare facilities.

Table 5-14 Childcare types

Facility type	Details
Long day care	Aimed primarily at zero to five years. Facilities operate eight to 11 hours per day, Monday to Friday
Family day care	Aimed primarily at zero to five years. Services comprise of a network of caregivers who provide care in their own homes for other people
Preschool	Aimed primarily at three to five years. Usually provided at centres staffed by a qualified teacher.
Out of School Hours (OOSH) care	Provides before and after school care for school aged students during the school term, and holiday care for children aged up to 11 years old during school holidays. It is most commonly provided within primary school facilities, although it can also be provided in Council owned or private facilities. During school holidays there is an increased amount of OOSH care required and this is typically provided by private operators

Table 5-15 describes the rates of provision and site requirements for a long day care/ preschool and OOSH facility.

Table 5-15 Childcare provision rates and site requirements

Facility type	Provision rate	Site requirements
Long day care/ Pre school	One place: 2 children aged 0-5 years Workers: 1 child care place per 75 workers.	Minimum of 3.25m^2 of unencumbered indoor space per child Minimum of 7m^2 of unencumbered outdoor space per child (for children over preschool age unencumbered indoor space may be included in calculating the outdoor space – subject to approval)

Facility type	Provision rate	Site requirements
OOSH	One place: 5 children aged 5 – 11 years	minimum of 0.3m^3 per child of external storage space minimum of 0.2m^3 per child of internal storage space. Additional toilet and hygiene, nappy change, laundry and administration and circulation space where appropriate.

5.5.2 Commitments and recommendations for childcare

Table 5-16 describes recommendations and alliances within the Western Sydney City Deal, PIC and PIC workbook.

Table 5-16 Commitments and recommendations for childcare

Facility	Western Sydney City Deal	PIC recommendations	PIC workbook recommendations
Long day care / pre-school	None	One childcare centre in the Aerotropolis Core One childcare centre in the Northern Gateway.	36 new child centres will be required within the Western Sydney Growth Area.

5.5.3 Planning and design considerations

Planning and design considerations for childcare facilities have been informed by the documents in Appendix B.

- Proximity to public transport and active transport networks to encourage walking and cycling which have health, wellbeing and environmental benefits.
- Proximity to employment hubs to improve work-life balance for parents and enhancing the attractiveness of the Aerotropolis as an employment precinct. Consider the compatibility of the child care facility with the operations of surrounding business and industry.
- Co-location with community facilities and services including education, sporting facilities, community centres, libraries and health services.
- Adaptability of the site and facility to include a mix of indoor and outdoor spaces suitable to different activities and needs of children.
- Consider potential noise impacts from the childcare centre / pre-school or OOSH facility on the surrounding community
- Whether the location of the facility will pose a health or safety risk to children, staff or visitors.
- Potential for local traffic conditions to have a detrimental effect on the safety of the children, staff or visitors.
- Potential for the proposed childcare facility to reduce the viability or inhibit/restrict the operation of commercial or industrial areas.

5.5.4 Needs assessment

Table 5-17 details recommendations for future child care infrastructure provision in the Aerotropolis initial precincts up to 2056. These recommendations have been informed by the four indicators of need (section 3) which have been summarised in the table below.

Table 5-17 Child care needs assessment

Facility	Indicator				Recommendations		
	Existing need	Identified need	Demographic needs	Comparative need	Recommendations for 2036	Recommendations for 2056	Total provision across the Aerotropolis initial precincts by 2056
Long day care / pre-school	Bringelly Child Care Centre - 39 capacity Jilly's Early Childhood Developmental and Educational Centre Pty Ltd - 60 capacity Kemps Creek Children's Cottage - 76 capacity Kiddo Care Fdc Pty Ltd - 60 capacity Luddenham Child Care Centre - 39 capacity Mind Champs Early Learning - 76 capacity MNJ Early Learning Pty Ltd - 39 capacity"	None	Children aged zero – four in the initial precincts: 1,605 children in 2036 2,728 children in 2056 Initial precincts total worker population: 33,963 workers in 2036 92,261 workers in 2056:	Residential: one childcare place per 0.45 children aged zero - four years Workers: One childcare place per 100 workers.	Aerotropolis Core: one council owned childcare centre One Aboriginal and Torres Strait Islander childcare centre. Agribusiness: one council owned childcare centre Need to allow for an additional two childcare facilities to be provided by the private sector. Northern Gateway: one council owned childcare centre. Need to allow for an additional seven childcare facilities to be provided by the private sector There may be demand for 24/7 childcare centres to support key shift workers at the Western Sydney Airport and other industries. If this demand is not met by the private sector to a level that is affordable then government may need to provide support through provision of a public 24/7 childcare service.	Aerotropolis Core: need to allow for 14 childcare centres to be provided by the private sector. Northern Gateway: one council owned childcare centre. Need to allow for an additional four childcare facilities to be provided by the private sector. Agribusiness: need to allow for an additional two childcare centres to be provided by the private sector.	Aerotropolis Core: one council owned childcare centre. Aerotropolis Core: need to allow for 14 childcare centres to be provided by the private sector. Aerotropolis Core: one Aboriginal and Torres Strait Islander childcare centre. Badgerys Creek: need to allow for 2 childcare centres to be provided by the private sector. Agribusiness: one council owned childcare centre. Agribusiness: need to allow for four childcare centres to be provided by the private sector. Northern Gateway: two council owned childcare centre. Northern Gateway: need to allow for 11 childcare facilities to be provided by the private sector. There may be demand for 24/7 childcare centres to support key shift workers at the Western Sydney Airport and other industries. If this demand is not met by the private sector to a level that is affordable then government may need to provide support through provision of a public 24/7 childcare service.
OOSH	None	None	Children aged 5 – 11 years in the initial precincts: 2,314 children in 2036 3,621 children in 2056	One place: 5 children aged 5 – 11 years	Aerotropolis Core: need to allow for two OOSH facilities to be provided by the childcare sector. Northern Gateway: need to allow for two OOSH facilities to be provided by the private sector. Agribusiness: need to allow for one OOSH facility to be provided by the private sector.	Aerotropolis Core: need to allow for two OOSH facilities to be provided by the private sector. Nrthern Gateway need to allow for two OOSH facilities to be provided by the private sector.	Aerotropolis Core: need to allow for four OOSH facilities to be provided by the private sector. Northern Gateway need to allow for four OOSH facilities to be provided by the private sector. Agribusiness: need to allow for one OOSH facility to be provided by the private sector.

5.6 Aged and disability care

The aged care sector is comprised of mostly private (for-profit) providers with some community-based and charitable providers, and is supplemented by state and territory and local government providers (AIHW, 2019b). In contrast, the majority of the disability sector that provide services under the National Disability Agreement is comprised of mostly community-based not for profit providers (AIHW, 2019a).

Demand for residential aged care and disability care will largely be met by the private and not for profit sectors respectively. However, it is important that the precinct plans consider the potential demand for residential aged care and disability care and allow for appropriate planning controls to enable their development within the Northern Gateway and Aerotropolis Core.

5.6.1 Facility types and spatial requirements

The aged care and disability system in Australia provides a diverse range of services, ranging from basic support, which can assist people to remain independent and living at home, through to full-time care in a residential aged care facility or disability facility. The four most widely recognised categories for aged care facility/service types and disability support services are outlined below:

- **Residential age care (nursing homes)** - for older people with low, moderate or high care needs who can no longer live at home or require ongoing help with everyday tasks or health care. Some nursing homes provide specialised care for those elderly living with dementia.
- **Respite care** – short-term care to help improve wellbeing and independence for older people and those people living with a disability. It also assists to provide respite for family members and care givers. Short-term services can be provided in the home or at an aged care facility.
- **Community care** – care provided in the home or community to help older people and those living with a disability stay independent for as long as possible. It can include services such as personal care, transport, food, shopping, housework, physio and social activities. Where community care is provided by not-for-profit organisations or government, nurses and volunteers will often operate from the local community health centres or community centres.
- **Independent Living Units (Retirement Village)** - for older people who do not require assistance with everyday tasks or health care. Older people may choose to live in a retirement village for the social benefits of living in a close community. Retirement villages are not subsidised by the Australian Government.

The Growth Centre Commission's Development Code (2006) provides guiding thresholds for the provision of aged care facilities. Table 5-18 sets out the different provision rates and size requirements for each facility type.

Table 5-18 Aged care provision rates and requirements

Aged care type	Provision rate	Size requirements
Residential age care (moderate to high care)	40 residential care places: 1,000 people aged 70+ years	Size requirements are dependent on the facility type, capacity and residents needs.
Residential age care (low care)	48 residential care places: 1,000 people aged 70+ years	

Aged care type	Provision rate	Size requirements
Respite care	2 short term restorative care places: 1,000 people aged 70+ years	All aged care facilities in NSW must comply with the requirements of a class 9a building as defined in the *Building Code of Australia* (BCA), and may be required to comply with the *Private Health Facilities Act 2007.*
Community care	20 community care packages: 1,000 people aged 70+ years	

Source: Growth Centres Commission (2006) Development Code

5.6.2 Commitments and recommendations

No commitments or recommendations were made for aged care facilities within the PIC or Western Sydney City Deal.

5.6.3 Planning and design considerations

Planning and design considerations for aged care and disability facilities have been informed by the documents in Appendix B.

- Located in an environment suitable for residential use (i.e. inside land zoned for residential use and away from potentially intrusive land uses such as industrial), within close proximity (within 400m) to shops, public transport and community services.
- Located in close proximity to green infrastructure and / or green open space
- The facility should facilitate healthy and resilient communities by providing green infrastructure and increased tree canopy to reduce the impacts of urban heat
- Inclusion of car parking on site and close proximity to transport networks including footpaths and bus stops. Universal Design principles and accessibility requirements in accordance with the Disability Discrimination Act should be incorporated to promote ease of access for all users
- Adequate recreation space and proximity to external open space for the proposed number of residents, suitable for the range of activities to be undertaken onsite by residents, staff and visitors.
- The site is not subject to intrusive noise and light or located in flood or bushfire prone areas.
- The site has minimal changes in terrain to accommodate for residents who may experience mobility issues.

5.6.4 Needs assessment

Table 5-19 details recommendations for future aged and disability care infrastructure provision in the Aerotropolis initial precincts up to 2056. These recommendations have been informed by the four indicators of need (section 3) which have been summarised in the table below.

Table 5-19 Aged and disability care needs assessment

Facility	Indicator				Recommendations		
	Existing need	Identified need	Demographic need	Comparative need	Recommendations for 2036	Recommendations for 2056	Total provision across the Aerotropolis initial precincts by 2056
Residential aged care (moderate to high need care)	Emmaus Retirement Village Heritage Kingswood	None	People aged 70+ years in the Aerotropolis initial precincts: 4,023 residents in 2036 6,200 residents 2056	40 residential care places: 1,000 people aged 70+ years	Aerotropolis Core: 45 places Northern Gateway: 49 places Agribusiness: 15 places	Aerotropolis Core: additional 77 places Northern Gateway: 36 additional places Agribusiness: 5 additional places	Aerotropolis Core: 122 places Northern Gateway: 75 places Agribusiness: 20 places
Residential aged care (low care needs)				48 residential care places: 1,000 people aged 70+ years	Aerotropolis Core: 54 places Northern Gateway: 58 places Agribusiness: 18 places	Aerotropolis Core: additional 93 places Northern Gateway: 44 additional places Agribusiness: 5 additional places	Aerotropolis Core: 147 places Northern Gateway: 102 places Agribusiness: 23 places
Community care	None			2 short term restorative care places: 1,000 people aged 70+ years	Aerotropolis Core: 2 places Northern Gateway: 2 places Agribusiness: 1 place	Aerotropolis Core: additional 4 places Northern Gateway: 2 additional places	Aerotropolis Core: 6 places Northern Gateway: 4 places Agribusiness: 1 place
Short term restorative care	None			20 community care packages: 1,000 people aged 70+ years	Aerotropolis Core: 22 places Northern Gateway: 24 places Agribusiness: 7 places	Aerotropolis Core: additional 39 places Northern Gateway: 18 additional places Agribusiness: 3 additional places	Aerotropolis Core: 61 places Northern Gateway: 42 places Agribusiness: 10 places

5.7 Cultural and art facilities

Create NSW's *Cultural Infrastructure Plan 2025+* defines cultural infrastructure as buildings or spaces that accommodate or support culture, including art galleries, performance spaces, museums, digital and technological infrastructure, amphitheatres and public art and more. It is a facility or area where the community and cultural sector can create, share, and learn with each other.

5.7.1 Facility types and spatial requirements

Cultural facilities encompass a range of activities each with its own unique design requirements. Some facilities require minimal space and can be co-located within other social infrastructure, however other facilities have specific design requirements such as recording studios or maker spaces. Cultural facilities contribute significantly to the character of a place and a standalone facility have the potential to attract visitors from a broader catchment. Although facilities can be provided by government, the not-for-profit and private sectors also play a significant role in the provision of cultural infrastructure and this can be encouraged through grants and other programs. The three levels of cultural facilities are outlined as follows:

- **Local cultural facility/spaces** - are provided at the local level and comprise of a designated space or facility located within a council facility or building such as a library, tourism centre, multipurpose centre or commercial building. Alternatively a cultural space could be a feature within an existing space (for example hanging space in a library for an art exhibition, recording equipment in a multipurpose community centre or space for an art installation in a commercial centre).
- **District cultural facility** - is a stand-alone facility that may be co-located with other social infrastructure buildings such as a district library or community centre or private commercial buildings / precincts such as office buildings, business parks etc.
- **Regional cultural facility** – is an iconic facility that attracts visitors on a metropolitan, state or even international level. Regional facilities should be planned co-operatively across the Western Parkland City LGA's with focus on the priorities outlined in *Cultural Infrastructure Plan 2025+* (Create NSW, 2017).

CreateNSW does not have any rates of provision for cultural infrastructure. However, GHD has adopted provision rates for each type of cultural infrastructure based on outcomes of consultation for this study, and GHD's previous project experience. Table 5-20 provides rates of provision for cultural facilities at a local or district level.

Table 5-20 Cultural infrastructure provision rates

Facility type	Provision rate	Spatial requirements
Local cultural facility	One cultural space for up to 20,000 people	Dependent on facility type Consider increasing capacity of existing cultural spaces by installing additional features within existing facilities or developing partnerships to utilise facilities in other ownership
District cultural facility	One district level facility for 20,001 to 50,000	Dependent on facility type
Regional	No rate of provision	Dependent on facility type

Source: GHD (2014) Draft Social Infrastructure Guidelines (unpublished)

Public art

Public art can also be considered as cultural infrastructure, and is an important part of the cultural and social life of a community. It can be successfully integrated into social infrastructure works; for example, public art can be included in landscape and embellishment works of public open space, or parts of the building structure of a community centre or library.

Public art can be a permanent feature provided by commissioned artists to develop a bespoke artwork, or a temporary feature part of a rotating program of creative arts. Public art and creative expression enhance the sense of place and contributes to creating a place that has a unique identity. Public art also enhances the public realm, for example by improving the sense of safety through lighting and perception, or creating a wayfinding node or marker to guide movement and legibility. The delivery of public art should be through both the public and private sector. By enhancing the public realm and creating a place identity, public art is essential for enhancing enjoyment, comfort and pride, and ultimately drawing future investment.

5.7.2 Commitments and recommendations for cultural and art facilities

The following government commitments have been made regarding cultural and art facilities that will fulfil the aspiration for the Aerotropolis to become an internationally significant destination. Table 5-21 describes recommendations and alliances detailed within the Western Sydney City Deal, PIC and PIC workbook.

CreateNSW within the PIC workbook have identified a number of infrastructure that are considered as high priority for Aerotropolis. The projects include the following:

- **Holistic collection storage facility/facilities –** Best practice storage solutions to meet the needs of 8 cultural institutions and state significant organisations
- **Aboriginal cultural infrastructure –** infrastructure that focuses on genuine cultural exploration and engagement rather than providing tourism experiences
- **Making space/accommodation for the cultural sector –** the provision of affordable and accessible, fit for purpose infrastructure for artists and small to medium creative organisation and creative industry practitioners.
- **Screen production offices**– fit for purpose infrastructure to house screen producers.
- **Warehouse space for screen production** – a minimum of 10,000 m2 for warehouse space
- **School or education facilities for arts and creative industries –** Opportunity to exploe a school or education facility dedicated to the creative industries
- **Libraries including cultural and maker spaces**
- **Sound mixing studios –** potential to be delivered by a commercial partnership
- **Water tank for filming -** potential to be delivered by a commercial partnership

Table 5-21 Commitments and recommendations for cultural and art facilities

Facility	Western Sydney City Deal	PIC recommendations	PIC workbook recommendations
Cultural facility	None	As per PIC workbook recommendations.	Aboriginal cultural infrastructure facilities in multiple precincts. Holistic collection storage facilities in North Luddenham – four facilities in total, two of which would be located within the Western Sydney Growth Area. Artist and creative industries precincts (studio spaces and office accommodation in North Luddenham Western Sydney Screen Industry Production Hub in the Northern Gateway.

Additional Considerations

Regional cultural facilities

Regional level facilities have not been considered as part of this assessment. However, one regional level cultural infrastructure facility is recommended within the *Cultural Infrastructure Plan 2025+* (Create NSW, 2017) to meet the vision outlined for Aerotropolis. During consultation with Create NSW it was suggested that this could include an Aboriginal Cultural Centre that could attract both domestic and international visitors which was supported during Aboriginal consultation for Aerotropolis as discussed below (GHD, 2020a).

Aboriginal cultural facilities

Aboriginal consultation outcomes as detailed in the *Western Sydney Aerotropolis Aboriginal Engagement Outcomes Report* (GHD, 2020a) found that cultural and art facilities in the Aerotropolis will need to consider the needs and aspirations of Aboriginal communities. This includes ambitions to showcase their culture continuing to be practiced in the Sydney area and on-Country experiences for visitors. This may also incorporate spaces for to create, display and sell art, crafts and other goods developed and managed by local Aboriginal communities and artists.

Opportunities to celebrate the Traditional Custodians of the area and create places that foster reconciliation which may include:

- Cultural centre - a place for Aboriginal and non-Aboriginal communities to connect and learn about Aboriginal history and culture.
- Yarning circles embedded throughout Aerotropolis - places for Aboriginal communities and non-Aboriginal communities to gather and connect with one another.
- Employment / training / education hub - Multipurpose facility that can host training, employment services, information for job seekers, work-readiness information, job fairs and education pathways.

- Agribusiness innovation hub - Dedicated space in Agribusiness Precinct for Aboriginal traditional practises, businesses and research
- For further details refer to *Western Sydney Aerotropolis Aboriginal Engagement DRAFT Engagement Outcomes Report* (GHD, 2020a).

5.7.3 Planning and design considerations

Planning and design considerations for cultural and art facilities have been informed by the documents in Appendix B.

- Opportunities to celebrate the Traditional Owners of the area and create places that foster reconciliation as outlined in *Western Sydney Aerotropolis Aboriginal Engagement DRAFT Engagement Outcomes Report* (GHD, 2020a).
- Opportunities for increasing the capacity of existing spaces could include: increasing operating hours, installing exhibition spaces within existing Council facilities including facilities in meeting rooms for art activities, installing sound systems and theatre lighting in community halls.
- Partnerships with local community groups, private operators and schools should be considered for the shared use of facilities.
- Allowance for outdoor space and connections to green infrastructure to provide healthy and resilient places. External spaces should be multifunctional and allowing for activities such as outdoor performances, events and functions.
- For district and regional cultural facilities, create sense of place and identity through the development of an iconic building with aspirational architecture.
- Proximity to transport hubs, public transport and active transport networks to enable accessibility for the whole community and encourage walking and cycling which have health, wellbeing and environmental benefits.
- Access to convenient and safe car parking with priority for people who experience a disability, older residents, parents with prams, staff and night-time users.
- Opportunities for cultural facilities that align to jobs and services that the Aerotropolis will attract, including digital innovations and SMART technology with a STEAM focus (Science Technology, Engineering, Art and Math).

5.7.4 Needs assessment

Table 5-22 details recommendations for future culture and arts infrastructure provision in the Aerotropolis initial precincts up to 2056. These recommendations have been informed by the four indicators of need (section 3) which have been summarised in the table below.

Table 5-22 Culture and arts facilities needs assessment

Facility	Indicator				Recommendations		
	Existing need	Identified need	Demographic need	Comparative need	Recommendations for 2036	Recommendations for 2056	Total provision across the Aerotropolis initial precincts by 2056
Local cultural facility	No local, state or regional-cultural infrastructure.	None	Total resident population in the Aerotropolis initial precincts: 25,801 residents in 2036 46,238 residents in 2056	One local cultural space for up to 20,000 people	Aerotropolis Core: one local cultural facility including maker spaces Northern Gateway: one local cultural facility. Aboriginal cultural infrastructure facilities including yarning circles in multiple precincts Badgery's Creek: Holistic collection storage facility/facilities or Warehouse space for screen production	Aerotropolis Core: one local cultural facility Aboriginal cultural infrastructure facilities including yarning circles in multiple precincts	Aerotropolis Core: two local cultural facilities including maker spaces. Northern Gateway: one local cultural facility. Aboriginal cultural infrastructure facilities including yarning circles in multiple precincts. Badgery's Creek: Holistic collection storage facility/facilities or Warehouse space for screen production
District cultural facility		Aboriginal Cultural Infrastructure is a priority for Create NSW.		One district level facility for 20,001 to 50,000	Northern gateway: one Western Sydney Screen Industry Production Hub. Aerotropolis Core Aboriginal Arts and Cultural Centre.	Aerotropolis Core: Cultural Performance Centre	Northern gateway: one Western Sydney Screen Industry Production Hub. Aerotropolis Core Aboriginal Arts and Cultural Centre and Cultural Performance Centre Aerotropolis Core: Cultural Performance Centre

5.8 Libraries

Public libraries are among the most heavily used social infrastructure in NSW, however the traditional role of the library is evolving to include a broader range of uses to support changing community needs. In addition to their core services (i.e. access to books, information, literacy and education support), libraries are also increasingly becoming places which facilitate collaboration, innovation and engagement through the provision of flexible spaces and digital technology.

5.8.1 Facility types and spatial requirements

Libraries have specific levels of service which are outlined in *People Places – A Guide of Public Library Buildings in New South Wales* (State Library NSW, 2020). The traditional service structure generally used throughout NSW is one central library with several branch libraries, however there are various other models used such as district libraries.

Libraries are evolving and are becoming destinations in themselves. Two of the ways in which a library can become more activated and central to the community it serves is through a co-location or shared use model. A co-located library exists where multiple buildings or services are provided in the same or adjacent locations, or in the same or adjacent buildings. Examples could include co-locating a library with a community facility, museum or art gallery. A Joint use library comprise two or more distinct library service providers, serving their client group within the same building. For example a joint use library could be developed between a local government authority and the Multiversity or local school serving both students and the broader community.

The Library Council of NSW uses a population based benchmark (Table 5-23) in conjunction with a service based benchmark (Table 5-24) as a baseline rate of provision to assess the spatial requirements for libraries. However, it is important to take into consideration the community's unique library service patterns, priorities and needs (State Library NSW, 2020). The library benchmark is also a sliding scale which is built into the 'Library Building Calculator', a free online tool developed by the Library Council of NSW that helps determine a minimum size for a library based on the population[1]

Table 5-23 Library size population based benchmark

Facility type	Provision rate	Size
Local library branch	One library branch to service < 20,000 people where the branch library operates as part of a network with a district or central library.	69 sqm per 1,000 plus 20% circulation space. The minimum recommended size for a public library building is 190 square metres.
District library	One district library per 20,000 – 35,000 people or per 35,000 to 65,000 people	35 - 39 sqm per 1,000 plus 20% circulation space.
Central library	One central library per 100,000+ people	29 sqm per 1,000 people plus 20% circulation space

[1] Library Council of NSW 'Library Building Calculator' - https://www.sl.nsw.gov.au/public-library-services/people-places/library-building-calculator

Table 5-24 Library size serviced base benchmark

Collection type	Population up to 100,000	Population over 100,000	Size requirements
Baseline	2.4 items per person	1.5 items per person	70-100 volumes (books) per 1sqm 10 periodicals (magazines,
Enhanced	2.6 items per person	1.8 items per person	newspapers, journals etc.) per 1 sqm100 non-print materials (CDs, Videos,
Exemplary	3.1 items per person	2 items per person	DVDs etc.) per 1 sqm

Additionally, in response to the increasing demand for more flexible spaces to learn, connect, create, reflect and relax Create NSW's *Cultural Infrastructure Plan 2025+* outlines the goal to support the continued transition of libraries to community and cultural hubs, which encourages co-location and shared use of infrastructure to encompass a range of flexible spaces, uses and services.

5.8.2 Commitments and recommendation for libraries

Table 5-25 describes recommendations detailed within the Western Sydney City Deal, PIC and PIC workbook.

Table 5-25 Commitments and recommendations for libraries

Facility	Western Sydney City Deal	PIC recommendations	PIC workbook recommendations
Library	None	Western Sydney Central Library with event, cultural and maker spaces in the Aerotropolis Core.	Western Sydney Central Library with event, cultural and maker spaces in the Aerotropolis Core.

5.8.3 Planning and design considerations

Planning and design considerations for libraries have been informed by the documents in Appendix B.

- Location in an area with high pedestrian activity such as a main street or shopping centre.
- Location with high visibility from the road and street frontage at ground level.
- Site should be fully accessible for people with limited mobility.
- Proximity and connections to local schools and further educational facilities.
- Connections to active transport networks with safe and attractive pedestrian access, particularly for older residents, children and parents with prams.
- Proximity and connections to public transport networks that are shaded, with the closest public transport connection within 400 to 500 at minimal gradient.
- Access to convenient and safe car parking with priority for people who experience a disability, older residents, parents with prams, staff and night-time users.
- Accessible for community buses, mobile libraries, deliveries and other vehicles.

- Allowance for outdoor space or connections to public open space that are integrated with green infrastructure to ensure spaces are healthy and resilient. External spaces should be multifunctional and allowing for activities such as outdoor performances, markets and functions.
- Temporary or pop-up library kiosks or book-swaps to support walkability in areas with where a branch is less accessible, particularly during construction phase where libraries have not been constructed.
- Co-location and sharing or joint-use of infrastructure such as community centres, community health centres, child care, schools, recreation facilities, museums, art galleries, shopping centres, transport hubs and car parking to provide a more economic use of services and resources.
- Adaptability of the site and ability to accommodate future expansion.
- Sense of place and identity through the development of an iconic building with aspirational architecture.

5.8.4 Needs assessment

Table 5-26 details recommendations for future library infrastructure provision in the Aerotropolis initial precincts up to 2056. These recommendations have been informed by the four indicators of need (section 3) which have been summarised in the table below.

Table 5-26 Library needs assessment

Facility	Indicator				Recommendations		
	Existing need	Identified need	Demographic need	Comparative need	Recommendations for 2036	Recommendations for 2056	Total provision across the Aerotropolis initial precincts by 2056
Local library branch	None	State Library confirmed additional provision rate for branch library: One library branch to service < 20,000 people where the branch library operates as part of a network with a district or central library. 69 sqm per 1,000 plus 20% circulation space. The minimum recommended size for a public library building is 190 square metres. Also confirmed service based benchmarks.	Total resident population in the Aerotropolis initial precincts: 25,801 residents in 2036 46,238 residents in 2056 Initial precincts total worker population: 33,963 workers in 2036	One library branch to service < 20,000 people where the branch library operates as part of a network with a district or central library.	Aerotropolis Core: : one branch library to incorporate cultural and maker spaces. Northern Gateway: one branch library Agribusiness: one branch library	None	Aerotropolis Core: one branch library to incorporate cultural and maker spaces. Northern Gateway: one branch library Agribusiness: one branch library
District library			Initial precincts total worker population: 33,963 workers in 2036 92,261 workers in 2056	One district library per 20,000 – 35,000 people or per 35,000 to 65,000 people	Aerotropolis Core: One district library connected to maker spaces and / or community services. Northern Gateway: One district library connected to maker spaces and / or community services	Aerotropolis Core: One district library that is joint library with the Multiversity	Aerotropolis Core: two district libraries (one co-located to maker spaces and / or community services and the other is a joint library with the Multiversity).
Central library				One central library per 100,000+ people	None	None	None

5.9 Parks and open space

Open space is a form of green infrastructure and is defined in the *Draft Greener Places Design Guide* (GANSW, 2020a) as open or not built upon land that accommodates recreation or provides relief from the built environment. It can take many forms including natural areas, informal parkland, children's playgrounds, historical sites, formal gardens and linear active transport routes. Sports grounds and courts are also forms of open space and have been discussed separately in section 10. Open space can also be used for various purposes including social recreation, sport, physical activity, active transport, biodiversity and fauna conservation, and visual and landscape amenity amongst others (GANSW, 2020b).

5.9.1 Facility types and spatial requirements

When planning for new parks and open space it should be done in a way that is collaborative and integrated with other forms of green infrastructure. This provides health and liveability benefits to the community. For example, connecting parks and open space can allow for increased urban tree canopy which provides natural shade and relief from urban heat, improves air quality and enhances an areas resilience to climate change.

Amongst the literature, public open space is categorised into a hierarchy including local, district and regional open space, and may perform either a passive or active recreation role. Open space that is further up the hierarchy such as regional open space, is typically larger and has a diverse range of opportunities compared to open space lower on the hierarchy. Table 5-27 presents the types of facilities that are typically provided in each level of park.

This list is not exhaustive and has been included to provide an indication of how the facilities are tailored to the function of each type of park which is often based on the average length of stay for each facility. For example in a local park the average length of stay would be around 30 minutes, whilst a regional park the average user would stay for a significant proportion of the day.

Table 5-27 Types of open space

Local park	District park	Regional park
Picnic shelter and seating	Picnic shelter and seating incorporating one BBQ	Contains a mix of uses of specialist users
Some form of shade	Shade	Picnic shelter and seating incorporating at least two BBQs
Play space and/or small kick about area	Public toilets	May have heritage, environmental, amenity or other significance
Concrete pathways	Drinking fountain	Public toilets
Drinking fountain	Large kick about area	Extensive network of pathways
	Lighting	Large area of shade
	Varied range of play equipment and play themes for all ages, and opportunities for kick around, free running activities and ball game	Drinking fountain
		Large open space areas to allow unstructured play / free running / ball games.
		Diversity of play opportunities and play themes, including adventure play intended for multiple hour visits
		Lighting

Open space benchmarks used to inform recommendations for this report are detailed in Table 5-28. They have been sourced from Penrith City Council's Penrith Sport and Recreation Strategy (Penrith City Council, 2020). In their strategy they have adopted an open space performance criteria in addition to open space benchmarks to guide future open space planning. This is consistent with the Government Architect of NSW (GANSW) approach to planning green infrastructure as detailed in the *Draft Green Places Design Guide* (GANSW, 2020a),

Table 5-28 Open space performance criteria

Type	Size	Distribution	Rate of provision
Local park	Minimum size of 0.5 ha	80% of residents are within 400 metres walking distance from home 100% of residents are within 500 metres walking distance from home Medium density (<60 dwellings per ha) 100% within 400 m of local or district open space	One local park per 2,500 people or 0.2 ha per 1,000 residents (includes 20% of the worker population)
	0.3 – 0.5ha	High density (60 -100 dwellings per ha) 100% within 200 m from local or district space	
District park	Average size >5ha Minimum size is 2ha	80% of residents are within 800 m walking distance from home Medium density and high density - 100% of residents within 400 m of local or district open space	One district park per 5,000 people or 1 ha per 1,000 residents (includes 20% of the worker population)
Regional park	Minimum size 20ha	100% can access and must be accessible by public transport	One regional park per: 20,000 people or 1 ha per 1,000 residents (includes 20% of the worker population)

Source: Penrith City Council Sport and Recreation Strategy (2020)

It will be important that the open space provided in the Aerotropolis is not only the appropriate size to support the surrounding population but also has the capacity to accommodate a range of recreation activities and needs. GANSW in their *Draft Greener Places Design Guide* do make recommendations for the capacity of open space, however given the current COVID situation these may not be accurate.

The Aerotropolis will have a unique challenge in that it will have a worker population which will be significantly higher than the residential population. The worker population will likely create a significant demand for morning, lunchtime and after work social sport and recreation. Demand from those who work 9:00 AM to 5:00 PM has significant peaks which do not necessarily coincide with other demand sources (such as school sport, junior sport and club based competition). This is in contrast to shift workers who may finish during times which coincide with other demand sources.

Therefore it is quite practical for spaces to be shared amongst residents and workers including shift workers and for example, a sports field to accommodate both daytime/ social demand and weekend competition demand. Given this we can assume that the above capacity limits should be adequate to support the resident and worker population.

5.9.2 Commitments and recommendations for parks and open space

Table 5-29 describes recommendations detailed within the Western Sydney City Deal, PIC and PIC workbook.

Table 5-29 Commitments and recommendation for parks and open space

Park hierarchy	Western Sydney City Deal	PIC recommendations	PIC workbook recommendations
Local parks	None	As per PIC workbook	Four additional local open spaces in Northern Gateway (2 x 2ha and 2 x 1ha) Nine additional local open spaces in Agriculture and Agribusiness Precinct (0.3ha each) Seven additional local open spaces in Aerotropolis Core (0.3ha each) One additional open space in Mamre Road Precinct (1.0 ha) Two additional local open spaces in North Luddenham (0.3ha each)
District open space	None		Seven multi-functional parks in Rossmore all outside riparian buffer (range in size from 0.15ha to 7.86ha). One multifunctional park in Kemps Creek outside the riparian buffer (2.36ha).
Regional parks	None		Central Wianamatta Park in the Aerotropolis Core (105ha outside riparian area) Gateway Park in Northern Gateway (98.5ha outside of riparian buffer) Sydney Science Park (71ha of passive and active spaces of varying size)

5.9.3 Planning and design considerations

Planning and design considerations for parks and open space have been informed by the documents in Appendix B.

- Public parks are best provided in a way that allows the space to be versatile, flexible, adaptable, and resilient. Community needs can change rapidly and the most effective parks can be reconfigured in design and function to accommodate changing participation, activities, trends, needs, and preferences.
- Parks and open space should be accessible by active transport networks. Larger district / regional recreation facilities should be in proximity to public transport.
- Open space should be integrated with other green infrastructure and increased tree canopy to meet the Greater Sydney Region's Plan's objective of 40% tree canopy cover by 2036 (15% canopy cover in CBD, employment and industrial precincts, 25% canopy cover in mixed use precincts and 40% cover in residential areas) (Greater Sydney Region Plan, 2018). Specifically, local, district and regional open space should have 60%, 40% and 65% canopy cover respectively.
- Railway corridors, train lines or major roads can act as barriers and may reduce access to open space for some communities but may also provide opportunities for linear parks that incorporate active transport routes for joggers and cyclists.
- The shared use of open space within schools should be considered for use by the public during out of school hours
- The open space demands of the worker population should be considered along with existing residential demand and reflect the recreational need of residents
- Consider the different times residents and workers are likely to use parks and open space e.g. workers peak use time of open space would be at lunch time
- Capacity for additional uses may be present in adjacent open space such as that protecting waterways or providing linear or active transport connections.
- Inclusion of parks along ridgelines and high points of Country to ensure preservation and celebration of these important features
- Linear parks that head away from the ridgelines/high points down creek lines to larger water networks to ensure vistas back to Country, creeks and sky are maintained and celebrated
- Limiting development encroachment along creek lines and waterways to ensure these important living places and movement corridors are protected and enhanced
- Sympathetic built form through podium setbacks and lower building heights away from ridgelines designed to promote vistas back to sky and Country
- Preservation of remnant vegetation clusters to ensure caring for Country principles are implemented.

5.9.4 Needs assessment

Table 5-30 details recommendations for future parks and open space infrastructure provision in the Aerotropolis initial precincts up to 2056. These recommendations have been informed by the four indicators of need (section 3) which have been summarised in the table below.

Table 5-30 Parks and open space needs assessment

Facility	Indicator				Recommendations		
	Existing need	Identified need	Demographic needs	Comparative need	Recommendations for 2036	Recommendations for 2056	Total provision across the Aerotropolis initial precincts by 2056
Local park	Bill Anderson Park Bringelly Park Bringelly Recreation Reserve Freeburn Park Overett Park Rossmore Grange Sales Park Wilmington Reserve	None	Total resident population in the Aerotropolis initial precincts: 25,801 residents in 2036 46,238 residents in 2056 Initial precincts total worker population: 33,963 workers in 2036 92,261 workers in 2056:	One local park per 2,500 people or 0.2 ha per 1,000 residents (includes 20% of the worker population) Minimum 0.5 ha in size 80% of residents are within 400 metres walking distance from home 100% of residents are within 500 metres walking distance from home Medium density (<60 dwellings per ha) 100% within 400 m of local or district open space High density (60 -100 dwellings per ha) 100% within 200 m from local or district space"	Aerotropolis Core: Two local parks Northern Gateway: Five local parks Agribusiness: Two local parks"	Aerotropolis Core: 12 local parks Northern Gateway: Three local parks Agribusiness: One local park Badgerys Creek: One local park"	Aerotropolis Core: 14 local parks Northern Gateway: Eight local parks Agribusiness: Three local park Badgerys Creek: One local park
District park	None	None		One district park per 5,000 people or 1 ha per 1,000 residents (includes 20% of the worker population) Minimum 2 ha in size (average size is 5 to 10 ha) 80% of residents are within 800 m walking distance from home Medium density and high density - 100% of residents within 400 m of local or district open space"	Aerotropolis Core: One district park Northern Gateway: Three district parks Agribusiness: One district park	Aerotropolis Core: Six district parks Northern Gateway: One district park	Aerotropolis Core: Seven district parks Northern Gateway: Four district park Agribusiness: One district park
Regional park	Regional open space	None		One district park per 20,000 people or 1 ha per 1,000 residents (includes 20% of the worker population) Minimum 20 ha in size	Aerotropolis Core: Central Wianamatta Park Northern Gateway: Gateway Park Northern Gateway: Sydney Science Park	None	Aerotropolis Core: Central Wianamatta Park Northern Gateway: Gateway Park Northern Gateway: Sydney Science Park

5.10 Sport and recreation

Sports fields and recreation facilities as discussed in section 5.9 are a form of open space and green infrastructure. Sport fields and recreation facilities are important as they help people to stay physically and emotionally healthy and intersect and connect people with their families and community.

They include sporting fields, outdoor sport courts, indoor sport courts and aquatic facilities. All sport facilities should be multipurpose to cater for a range of sporting uses particularly as participation levels will change over time. Facilities should be adaptable and accommodate summer and winter sports and allow multiple uses within relatively short periods of time. Sporting facilities should also be planned in coordination with other layers of green infrastructure such as green spaces and natural waterways to create an environment that is healthy, responsive, integrated, equitable and resilient.

5.10.1 Facility type and spatial requirements

Similar to open space (section 5.9), sport and recreation facilities are categorised into a hierarchy including national / state, high performance / centres of excellence, regional, district, local and neighbourhood (see Appendix B). For the purpose of this assessment the following hierarchy has been applied:

- **Regional:** attract participants across local and regional geographic catchments. They provide a broad range of sport and recreation activities and events, often hosting regional tournaments and carnivals with large numbers of teams across multiple days.
- **District:** provide for association competition as well as servicing a local catchment to provide a mix of recreational, competitive and program formats of participation. District facilities cater for sports that have a centralised competition model such as softball, netball and hockey.
- **Local:** provides a focus for club competition, as well as service a local catchment to provide a mix of recreational, competitive and program formats of participation.

The Office of Sport NSW has developed its own model to determine the required rate of sporting field provision. It was developed by collating sports participation data including participant numbers, home postcode, facility postcode, age, gender, and level of competition over several years with facilities data to develop three benchmarks:

- Sustainable sports field capacity benchmark for each facility type
- Facility to population benchmark
- Percentage of population participating benchmarks.

The Office of Sport NSW then applied these three benchmarks to the forecast resident population and 30 per cent of the worker population to identify demand for each sport by precinct up to 2056. The demand for sports fields by the worker population was developed by the Office of Sport NSW and is based on their own research. Assessing demand for sports fields as 30 per cent of the total worker population is higher than Penrith City Council (10 per cent)[2] and the City of Sydney 20 per cent)[3], however due to the forecast worker population in

[2] Penrith City Council. (2020). Penrith Sport and Recreation Strategy https://www.penrithcity.nsw.gov.au/facilities-recreation/outdoor-recreation/sport-and-recreation-strategy

[3] City of Sydney (2016). Open Space, Sports and Recreation Needs Study Volume 4 https://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0004/278590/Adopted-Open-Space-Sport-Rec-Needs-Study-2016-Vol-4.pdf

the Aerotropolis this number is considered appropriate. Recommendations provided by the Office of Sport have been used in this report and can be viewed in section 5.10.4.

Table 5-31 below describes the required spatial requirements for each sporting facility.

Table 5-31 Sporting facility spatial requirements

Facility type	Features
Local sports field	Football, rugby league, rugby union hockey, cricket, AFL and athletics 1 x single sports field
District sports fields	Football, rugby league, rugby union hockey, cricket, AFL and athletics 2 x rectangular sports fields and 1 x oval Passive green space for tree canopy / informal walking / jogging track Field of play – soil profile, turf, irrigation, drainage, training lights Play space Amenities block / public toilets Technology to manage lighting, irrigation, building access and security Car spaces (100)
Local outdoor sports field	Tennis, basketball, netball and futsal 1 x single outdoor court
District outdoor sports fields	Tennis, basketball, netball and futsal Minimum of4 – 6 x tennis courts or15 x netball courts Passive green space for tree canopy / informal walking / jogging track Court surface, fencing, lighting Amenities block / public toilets etc. Technology to manage lighting, irrigation and building access, security Car park (100 spaces)
Indoor courts	Basketball, netball, futsal, squash / racket ball, volleyball, badminton, table tennis, fencing, gymnastics. Minimum of 4 x netball courts or 2 x squash courts Building – minimum 4 basketball sized courts, storage, toilets and change rooms, administration areas. Multi-use rooms x 3 with operable walls Café & crèche Car park (100 spaces) and landscaping / green grid

Facility type	Features
Aquatic centre	Swimming, diving, water polo, synchronised swimming 2-metre-deep pool x 51-metre-long with an operable boom (split into 2 x 25 metre pools) 25 metre program pool Change facilities / toilets Café & crèche Building - administration area, storage, multi-use rooms x 3 with operable walls Water play area Car park (100 spaces) and landscaping / green grid
Skate park	Field of play – concrete surface and lights Toilets, competition staging area Landscape, seating, drinking fountain, technology to manage site
Mountain bike track	Tracks, wayfinding, staging area, and seating Car park (100 spaces) and landscaping / green grid Kiosk and toilets
BMX track	Tracks, wayfinding, staging area, and seating, lights to 200 lux

High adrenalin active recreation

The Office of Sport NSW noted that the Western City District has a high adrenalin active recreation and sports tourism nice and includes attractions such as iFly, V8 car racing, rock climbing and Ultra Trail Australia. This presents a potential opportunity for the Aerotropolis and future facilities to include certain high adrenalin features such as a high teach interactive climbing walls within the proposed indoor centre or for standalone adventure facilities such as mountain bike trails.

Half courts

In areas where land for sports field is constrained and / or demand for formal sport competition is low such as commercial / employment zones additional opportunities for half sized fields could be explored to meet demand. Such fields could take the form of multi-marked courts with synthetic grass able to cater for court and field sports and potentially sited as part of carparks and other buildings. They could also be provided on built structures within the CBD.

Sport facility requirements for shift workers

The Aerotropolis will be 24/7 and will therefore include shift workers who will work outside regular business hours. It is important that the sporting needs of all workers are supported in the Aerotropolis. To do this it is recommended that sporting facilities incorporate into their design a range of features that allow them to operate outside regular business hours and accommodate shift workers needs. This includes creating facilities that are flexible and have a diverse range of active recreation and sporting opportunities including futsal, tennis, netball, martial arts, yoga and a fitness centre. Facilities should minimise light and noise spill through providing an indoor setting and can be run as a for purpose business to fund the facility at no net loss.

Multi use courts are also preferred as they can carry a much higher participation capacity than grass sports fields (limited by wear and tear) or an outdoor court (limited by development

consent conditions – not disturbing adjacent land uses with noise and light spill). Facilities should also be co-located with cafes and restaurants to cater to shift workers desires to socialise at times that suit them.

5.10.2 Commitments and recommendations

Table 5-32 describes detailed within the Western Sydney City Deal, PIC and PIC workbook.

Table 5-32 Commitments and recommendations for sports fields

Facility	Western Sydney City Deal	PIC recommendations	PIC workbook recommendations
Single sports field	None	None	Aerotropolis Core: one football field
Natural turf sports field	None	One natural turf sports field (2 x rectangles and 1 x oval) in the Aerotropolis Core One natural turf sports field (2 x rectangles and 1 x oval) in the Northern Gateway One natural turf sports field (2 x rectangles and 1 x oval) in the Rossmore precinct along the ridgeline.	Northern gateway: one natural turf sports field (2 x rectangles and 1 x oval) by 2031 Aerotropolis Core: two natural turf sports fields (2 x rectangles and 1 oval each) by 2031 and 2036 Wianamtta South Creek: one natural turf sports field (2 x rectangles and 1 x oval) by 2026
Outdoor multipurpose sports courts	None	Ten netball courts in Wianamatta South Creek Six tennis courts along Ridgeline in Rossmore Precinct Add three netball courts to existing netball courts in Agriculture and Agribusiness Precinct	Agriculture and Agribusiness: Add 3 netball courts to the existing three courts by 2036. Wianamatta South Creek: 10 x new netball courts in by 2026
Indoor sports facility	None	Indoor Facility in Mamre Road Precinct	Aerotropolis Core: Indoor multi use courts between (4) between 2031 and 2046
Indoor aquatic / swimming facility	None	None	None
Youth focussed outdoor recreation	None	None	None

*Office of Sport NSW provided additional information following consultation. It included further sport facility recommendations to service the future resident and worker population in the Aerotropolis until 2056 which have been included in this column.

5.10.3 Planning and design considerations

Planning and design considerations for sport and recreation facilities have been informed by the documents in Appendix B.

- Active open space should be predominantly located within district-level open space that is two to five hectares in size. Where land availability is constrained, existing local open space should be considered for active use on the proviso that it is large enough to accommodate both active and passive uses.
- The shared use of school sports grounds should be considered for organised sport.
- Indoor sports centres should be considered especially in industrial areas as they are unaffected by outside noise and can operate 24/7 to support shift workers. These facilities should be located in close proximity to active and public transport networks and not isolated or remote from communities causing barriers to participation for some groups, especially youth.
- Local and district sportsgrounds should include other amenities such as play spaces, picnic areas and informal sporting facilities to support multipurpose use.
- Facilities should be integrated with green infrastructure to create spaces that are healthy, resilient and accessible.
- Local sports facilities should be accessible by active transport networks and where possible, in proximity of local centres and schools to be easily accessible at the local level - to support participation for everyone.
- Infrastructure should be inclusive and incorporate universal design principles to support participation for everyone.
- Facilities should be shared between multiple users to avoid costly duplication in facility provision.

5.10.4 Needs assessment

Table 5-33 details recommendations for future sport and recreation infrastructure provision in the Aerotropolis initial precincts up to 2056. These recommendations have been informed by the four indicators of need (section 3) which have been summarised in the table below.

Table 5-33 Sport and recreation needs assessment

Facility	Indicator				Recommendations		
	Existing need	Identified need	Demographic need	Comparative need	Recommendations for 2036	Recommendations for 2056	Total provision across the Aerotropolis initial precincts by 2056
Local sports field (single field)	Luddenham Raceway Workers Hubertus Country Club Luddenham Showgrounds	None	Total resident population in the Aerotropolis initial precincts: 25,801 residents in 2036 46,238 residents in 2056 Initial precincts total worker population: 33,963 workers in 2036 92,261 workers in 2056	As per Office of Sport NSW recommendations (see Appendix X)		Aerotropolis Core: one football field	Aerotropolis Core: one football field
District sports field (multiple fields)		None		As per Office of Sport NSW recommendations (see Appendix X)	Aerotropolis Core: two district sports field (2 x rectangles and 1 x oval) Northern Gateway: one district sports field (2 x rectangles and 1 x oval) South Wianamatta Creek: one district sports field (2 x rectangles and 1 x oval)	Aerotropolis Core: one football field	Aerotropolis Core: two district sports field (2 x rectangles and 1 x oval) Northern Gateway: one district sports field (2 x rectangles and 1 x oval) South Wianamatta Creek: one district sports field (2 x rectangles and 1 x oval)
Outdoor multipurpose sports courts		Penrith City Council identified a shortage of indoor sports courts in the LGA.		As per Office of Sport NSW recommendations (see Appendix X)	Agriculture and agribusiness: add three netball courts to the existing three courts South Wianamatta Creek: ten netball courts	None	Agriculture and agribusiness: add three netball courts to the existing three courts South Wianamatta Creek: ten netball courts
Indoor sports facility		Opportunity for indoor sports facilities in the Agribusiness Precinct were identified by the Office of Sport NSW as a good opportunity		As per Office of Sport NSW recommendations (see Appendix X)	Aerotropolis Core: one indoor sports facility	None	Aerotropolis Core: one indoor sports facility
Indoor aquatic / swimming facility		Liverpool City Council identified the need for one new indoor aquatic / swimming facility in the Aerotropolis.		One facility per 20,000 – 50,000 people (includes 30% of the worker population)	Aerotropolis Core: one indoor aquatic/swimming facility Northern Gateway: one indoor aquatic / swimming facility *(This is public provision only. Private facilities should be allowed for particularly learn to swim centres)*	Aerotropolis Core: one indoor aquatic / swimming facility	Aerotropolis Core: two indoor aquatic / swimming facilities Northern Gateway: one indoor aquatic / swimming facility
Youth focussed outdoor recreation	None	None		One facility per 20,000 – 50,000 people (includes 30% of the worker population)	Aerotropolis Core: one youth focussed outdoor recreation facility Northern Gateway: one youth focussed outdoor recreation facility	Aerotropolis Core: one youth focussed outdoor recreation facility	Aerotropolis Core: two youth focussed outdoor recreation facilities Northern Gateway: one youth focussed outdoor recreation facility

5.11 Social infrastructure to attract visitors

The Aerotropolis Community comprises of workers, residents and visitors. Although the social infrastructure identified in this Chapter has focused on the needs of the future residents and workers, the visitors will play a critical role in contributing towards the creation of a vibrant 24/7 activated precinct.

Unlike social infrastructure that accommodates the needs of workers and residents, planning social infrastructure for a visitor population is not meeting a demand but rather creating an attractor. The facility will contribute towards establishing the character of a place and this has the ability to influence the demographics of visitors. Although section 4.3 provided an overview of the potential visitor population, it acknowledged that this population will be determined by the facilities that provided in Aerotropolis.

Social infrastructure recommended for Aerotropolis has been determined by identifying the facilities that will contribute towards achieving the vision for each Precinct that has been outlined within the *Western Sydney Aerotropolis Plan* (DPIE, 2020c). In addition, it has considered the needs of the broader regional community for the Western City Parkland and Greater Sydney. With the development of the Airport, the social infrastructure should support the broader tourism industry catering to interstate and international visitors.

The following identifies potential social infrastructure that should be considered for Aerotropolis, that would cater for the visitor population. It is recommended that a broader tourism study be undertaken to assess further demand for these facilities.

Indigenous Cultural and art facilities - this could be one facility or a range of facilities across Aerotropolis that showcase indigenous culture continuing to be practiced in the Sydney area and on-Country experiences for visitors

Innovation Education Centre – similar to the NSW Department of Education Environmental Education Centres. The Innovation Education would be a facility that provides programs to visiting school groups focussing on STEM and Aerospace Technology.

Aquatic centre - an aquatic centre that is of regional significance catering to a number of water activities.

Adventure based tourism facility– providing a facility that caters to adventure based sports and recreation facilities. Penrith is known for its adventure sport opportunities. This facility can leverage off existing facilities in Penrith while also accommodate to interstate tourists.

Convention centre focussing on agribusiness – a conference centre or facility that can cater for conferences within the agribusiness sector.

06 Recommendations by precinct

The vision for the Aerotropolis is described in the *Land Use and Infrastructure Implementation Plan* (LUIIP) (DPIE, 2020b) and *Western Sydney Aerotropolis Plan* (DPIE, 2020c)*, which* responds to the vision, goals and objectives of *A Metropolis of Three Cities* and *Western City District Plan.* The vision as outlined in the LUIIP is:

"The Western Sydney Aerotropolis at the heart of the Western Parkland City will incorporate Australia's first greenfield Aerotropolis — Greater Sydney's next global gateway built around the exciting new Western Sydney International (Nancy-Bird Walton) Airport. As part of the Western Parkland City, the Aerotropolis will contribute to 200,000 jobs for Western Sydney residents, including specialisations in defence and aerospace, agribusiness, health, education and tourism, powered by modern, sustainable energy infrastructure."

Each of the initial precincts will have its own character and identity that will contribute to achieving this overall vision. Although precinct planning will investigate opportunities and appropriate planning controls for each individual precinct, planning for each precinct must take into consideration the broader goals and objectives of the Aerotropolis vision. Social infrastructure will play a critical role in creating the communities that will live, work and visit the Aerotropolis. The character, as outlined in the vision for each of the individual precincts, will be critical in identifying and planning the social infrastructure that will need to be provided. Although each precinct will have its own requirements for local social infrastructure, regional infrastructure will need to consider the requirements of the Aerotropolis and the broader Western Parkland City and Western Sydney community.

This section outlines the:

- Indicative locations for social infrastructure recommendations
- vision for each precinct as outlined in the DCP
- social infrastructure recommendations for each of the initial precincts based on the outcomes of the needs assessment discussed in section 5.
- recommended social infrastructure for each precinct which will contribute towards achieving the Aerotropolis vision.

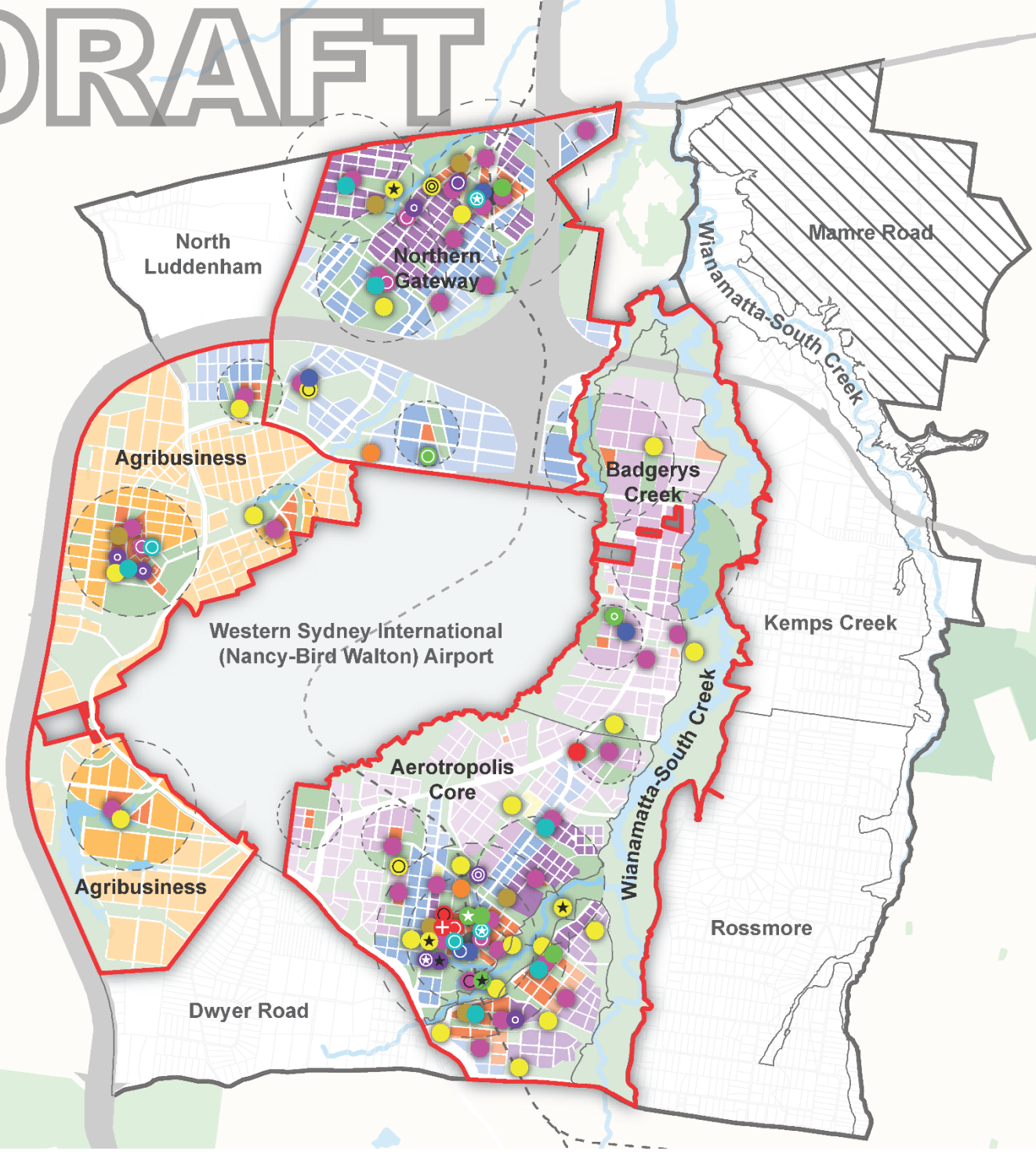
6.1 Indicative social infrastructure locations

Indicative locations for the recommended social infrastructure outlined in section 5 have been identified based on the principles of planning social infrastructure (section 2.3) and each social infrastructure type's planning and design considerations (section 5). Additionally, the hierarchy of centres (as outlined in the precinct plans) and their associated walkability catchment, as defined in *Report 1: Social Infrastructure Audit* (GHD, 2020b), have been considered as follows:

1. Metropolitan centre – 1200m walkability catchment (15 minutes)
2. Specialised centre – 1200m walkability catchment (15 minutes)
3. Local centre – 800m walkability catchment (10 minutes)
4. Neighbourhood centre - 400m walkability catchment (5 minutes)

Indicative locations for the recommended social infrastructure as outlined in sections 5.1 to 5.8 and 5.10 is provided in Figure 6-1, and indicative locations for the recommended hierarchy of parks and open space as outlined in section 5.9 is provided in Figure 6-2. The indicative locations depicted in Figure 6-1 and Figure 6-2 are preliminary and will be refined through community consultation and future development stages (i.e. master planning).

DRAFT



LEGEND

- Western Sydney Aerotropolis
- Aerotropolis Precincts
- Initial Precinct Groups
- Mamre Road Precinct (DPIE)
- Lot boundary
- Proposed transport corridor
- Proposed metro corridor
- Proposed metro station

Land Use

- Centres
- Business & enterprise
- Mixed use residential
- Special purpose
- Enterprise & light industry
- Agribusiness

Recommended Social Infrastructure

- Primary school
- High school
- Combined school
- Specialist high school
- Innovation centre
- IHHub
- Community health
- Aboriginal health
- Ambulance station
- Fire and rescue station
- Police station
- Court house
- Local community space
- District community centre (co-located district library)
- Library branch
- Public childcare centre
- Aboriginal childcare centre
- Private childcare centre
- Aged and disability care
- Local cultural space
- Aboriginal culture centre
- Screen production hub
- Collection storage facility
- Performance centre
- Sport field(s)/ court(s)
- Indoor sport facility
- Leisure/ aquatic facility
- Youth recreation facility

Centres hierarchy & walkability

- Neighbourhood centre 400m (5 mins)
- Local centre 800m (10 mins)
- Metropolitan/specialised centre 1200m (15 mins)

Note: for the purpose of this Social Infrastructure Needs Assessment the western side of the Wianamatta-South Creek precinct has been considered. The eastern side will be considered in later development stages in conjunction with the adjoining precincts of Mamre Road, Kemps Creek and Rossmore.

Paper Size ISO A4

0 1 2

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Western Sydney Planning Partnership
Western Sydney Aerotropolis
Social Infrastructure Strategy

SOCIAL INFRASRUCTURE NEEDS ASSESMENT
INDICATIVE SOCIAL INFRASTRUCTURE

Project No. **12527145**
Revision No. **0**
Date **03 Nov 2020**

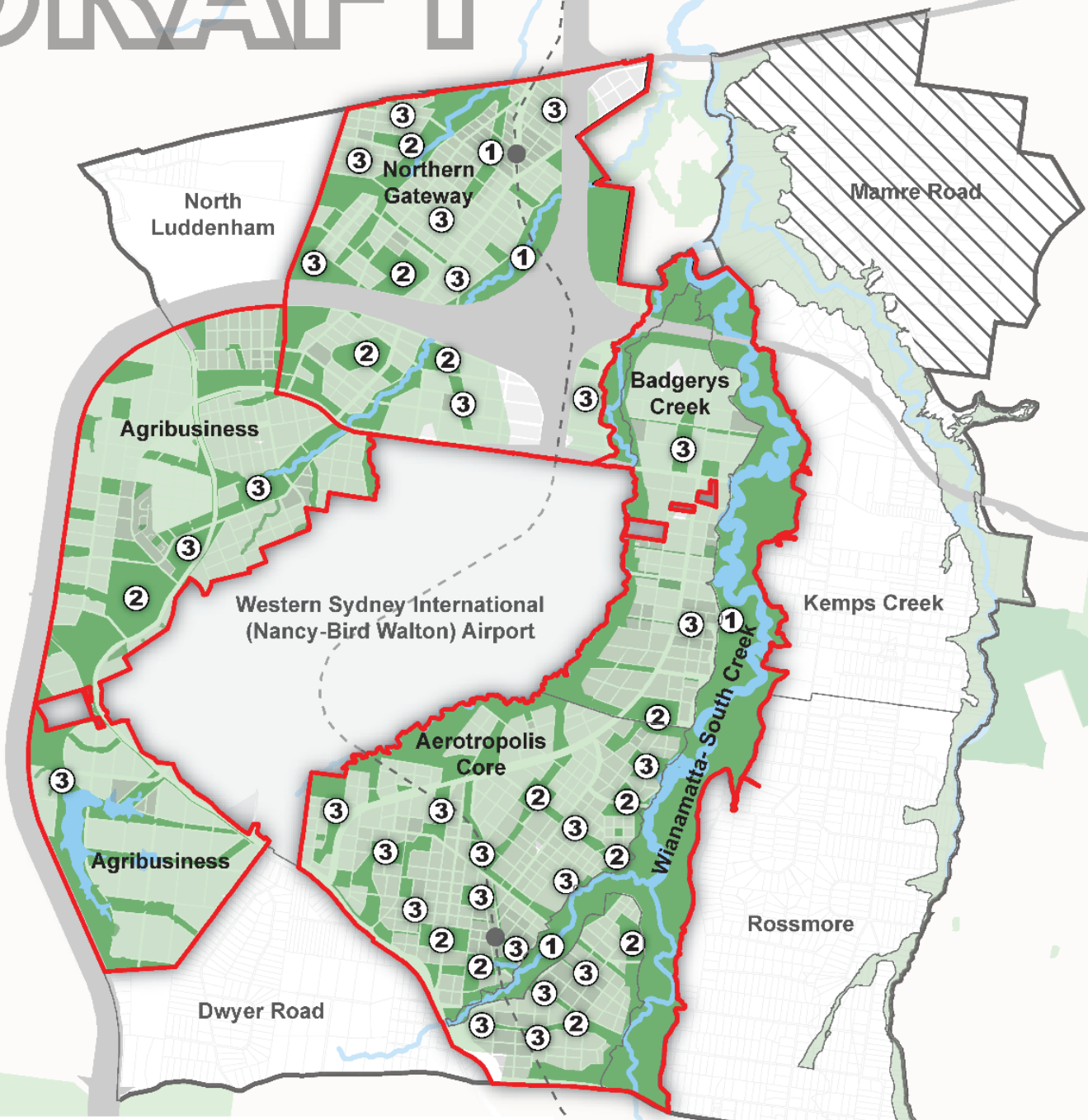
FIGURE 6-1

\\ghdnet\ghd\AU\Sydney\Projects\21\12527145\GIS\Maps\12527145_Aerotropolis_SI Location.ai

© 2020. Whilst every care has been taken to prepare this map, GHD make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.

Data source: General Topographic - CIP&SHIP 2020; General Cadastral - CIP&SHIP 2020 - DPIE WSA Data Sets and Boundaries; Precinct Plan Data Sets from Hassel, hill thalis and Studio Hollenstein.
Created by: jglasby

DRAFT



LEGEND

- Western Sydney Aerotropolis
- Aerotropolis Precincts
- Initial Precinct Groups
- Mamre Road Precinct (DPIE)
- Lot boundary
- Proposed transport corridor
- Proposed metro corridor
- Proposed metro station

Parks and open space

- (1) Regional park
- (2) District park
- (3) Local park
- Open space
- 400m (5 minutes) walkability catchment

Note: for the purpose of this Social Infrastructure Needs Assessment the western side of the Wianamatta-South Creek precinct has been considered. The eastern side will be considered in later development stages in conjunction with the adjoining precincts of Mamre Road, Kemps Creek and Rossmore.

Paper Size ISO A4

0 1 2

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Western Sydney Planning Partnership
Western Sydney Aerotropolis
Social Infrastructure Strategy

SOCIAL INFRASRUCTURE NEEDS ASSESMENT
INDICATIVE PARKS AND OPEN SPACE

Project No. 12527145
Revision No. 0
Date 05 Nov 2020

FIGURE 6-2

\\ghdnet\ghd\AU\Sydney\Projects\21\12527145\GIS\Maps\12527145 Aerotropolis POS.ai

© 2020. Whilst every care has been taken to prepare this map, GHD make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.

Data source: General Topographic - CP&SHIP 2020; General Cadastral - CP&SHIP 2020 - DPIE WSA Data Sets and Boundaries; Precinct Plan Data Sets from Hassel, hill thalis and Studio Hollenstein.
Created by: jglasby

6.2 Aerotropolis Core Precinct

6.2.1 Vision statement

The vision for Aerotropolis Core precinct is to be a diverse, dynamic and sustainable global city precinct supporting a curfew free airport, delivering attractive places for workers, residents and visitors (DPIE, 2020a). It will greatly contribute to the Western Sydney Economic Corridor and forms part of the Metropolitan Cluster as identified in the Western City District Plan. It has the potential to deliver 50,000 – 60,000 jobs, leveraging the positive economic impact of the adjacent airport, creating Greater Sydney's next global gateway (ibid).

The precinct will be a place of choice to do business, a new high order employment-focused metropolitan centre with a focus on advanced manufacturing, research and development, professional services, creative industries and STEM-focused educational facilities (ibid). The Aerotropolis Core will also take advantage of its connection to the airport and facilitate development of cutting edge aerospace and defence industries. The precinct will also attract business incubator hubs and shared office workspaces with the provision of with quality public areas and a mix of social and cultural infrastructure.

Table 6-1 outlines the Aerotropolis Core Precinct's features, characteristics and population targets.

Table 6-1 Aerotropolis Core Precinct place context

Place features and objectives	Place characteristics	Population
- 1,382 Ha - Enterprise zone - Education uses and facilities - Health services and clinics - Multiple recreation facilities and open spaces	- Mix of employment uses to promote economic growth - 24-hour hub and thriving night time economy - Entertainment and retail - Arts and cultural experiences - World-class health and education hub	- Workers (estimated 50,000-60,000) - Residents (estimated 20,000-24,000)

Source: Western Sydney Aerotropolis Plan (DPIE, 2020c)

6.2.2 Social infrastructure recommendations

Aerotropolis Core will be a global city precinct, social infrastructure will therefore need to accommodate the needs of workers, residents and visitors. It will play a significant role in creating the character of Aerotropolis. Cultural facilities such as a local cultural centre, an Aboriginal Arts and Cultural Centre and a district library, all have the opportunity to reflect the vision and character that is established for Aerotropolis.

Central to its success will be the co-location of health and education facilities to create an innovation hub. Multiple education facilities will need to be incorporated into future planning including two new primary schools and one new high school by 2056, and associated uses and infrastructure to support the Aerotropolis Multiversity. In addition, the precinct will accommodate two specialist schools. A STEM high school, as committed to within the Western Sydney City Deal, will accept students from out of area enrolment. The Innovation Centre of Excellence education facility, will be facility utilised by students across Greater Sydney.

Beyond 2036, as the Aerotropolis Core becomes established as a metropolitan centre, public and private health facilities will begin to be developed. This will include the development of an IHHUB this could offer a mix of complex care services able to be delivered safely and effectively in a community environment.

Diverse recreation facilities will provide local and district access to five single and three double sports fields, three local outdoor multipurpose sports courts, a district indoor sports facility and an indoor aquatic / swimming facility.

Table 6-2 outlines the social infrastructure requirements for the Aerotropolis Core for the years 2036 and 2056.

Table 6-2 Aerotropolis Core social infrastructure recommandations

Facility	2036	2056	Total
Education	One new primary school with 31 teaching spaces. One new secondary school with 25 teaching spaces One Aerotropolis outreach innovation / centre of excellence facility Nine teaching spaces for specific purposes to be integrated with existing schools Allow for flexible zoning that enables education uses and associated infrastructure to support the Aerotropolis Multiversity. Aerotropolis Core: Establishment of a permanent VET facility	One new primary school with 28 teaching spaces. Support needed in Aerotropolis Core to allow the private sector to develop an additional primary school. Upgrade existing secondary school with 23 new teaching spaces Additional eight teaching spaces for special purposes SSP to be integrated with existing schools	Two primary schools (59 teachings spaces in total) Northern Gateway: One primary school (41 teaching spaces in total) One secondary school (48 teaching spaces in total) One secondary school with a focus on aerospace and aeronautics. One Aerotropolis outreach innovation / centre of excellence facility 17 teaching spaces for specific purposes Support needed in Aerotropolis Core to allow the private sector to develop an additional primary school. Permanent VET facility
Health	Aerotropolis Ambulance Station with 12 bays	One community health facility / IHHub. Specialised Indigenous Health Facility	One community health facility / IHHub. Specialised Indigenous Health Facility Aerotropolis Ambulance Station with 12 bays.
Emergency services	None	Aerotropolis Core Fire Station One police station One new courthouse attached to the Police Station as part of the establishment of a Justice Precinct	Aerotropolis Core Fire Station One police station One new courthouse attached to the Police Station as part of the establishment of a Justice Precinct
Community facilities	One local community space	Two local community spaces One district community centre co-located with the district library.	Three local community spaces One district community centre co-located with the district library.
Childcare	One council owned childcare centre One Aboriginal and Torres Strait Islander childcare centre Need to allow for two OOSH facilities to be provided by the childcare sector	Need to allow for 14 childcare centres to be provided by the private sector. Need to allow for two OOSH facilities to be provided by the private sector	One council owned childcare centre. One Aboriginal and Torres Strait Islander childcare centre. Need to allow for 14 childcare centres to be provided by the private sector. Need to allow for four OOSH facilities to be provided by the private sector

Facility	2036	2056	Total
Aged care	Residential aged care (moderate to high need care): 45 places Residential aged care (low care needs): 54 places Community care: 22 places Short term restorative care: 2 places	Residential aged care (moderate to high need care): 77 places Residential aged care (low care needs): 93 places Community care: 39 places Short term restorative care: 4 places	Residential aged care (moderate to high need care): 122 places Residential aged care (low care needs): 147 places Community care: 6 places Short term restorative care: 61 places
Cultural facilities	One local cultural facility Aboriginal cultural infrastructure facilities in multiple precincts Aboriginal Arts and Cultural Centre	One local cultural facility Cultural Performance Centre	Two local cultural facilities. Aboriginal cultural infrastructure facility Aboriginal Arts and Cultural Centre Cultural Performance Centre
Library	One district library connected to maker spaces and / or community services. one branch library to incorporate cultural and maker spaces.	One district library that is joined with the Multiversity	Two district libraries (one co-located to maker spaces and / or community services and the other is a joint library with the Multiversity). One branch library
Sport fields	Two district sports field (2 x rectangles and 1 x oval) One indoor sports facility One indoor aquatic/swimming facility One youth focussed outdoor recreation facility	One football field One indoor aquatic / swimming facility One youth focussed outdoor recreation facility	One football field Two district sports field (2 x rectangles and 1 x oval) One indoor sports facility Two indoor aquatic / swimming facilities Two youth focussed outdoor recreation facilities
Open space	Two local parks One district park Central Wianamatta Park (105 ha)	12 local parks Six district parks	14 local parks Four district parks Central Wianamatta Park (105 ha)

6.3 Northern Gateway Precinct

6.3.1 Vision statement

The vision for Northern Gateway precinct is to be a key strategic centre within the Western Economic Corridor – linking the airport with the Western Parkland City Metropolitan Cluster (DPIE, 2020a). It will be a key employment precinct with good accessibility and a supporting residential sub-precinct, providing skilled employment and business opportunities north of the Aerotropolis Core and airport (DPIE, 2020a).

High order employment uses will be predominant within the precinct, with desirable uses including (but not limited to) freight and logistics, warehousing, technology, commercial enterprise, offices, industry, creative industry, fresh food markets, education, civic, health, visitor accommodation, recreation and entertainment (DPIE, 2020a). The precinct will have synergies with the adjacent Airport Business Park and a cluster of leading science-based businesses, tertiary institutions and research facilities at the Sydney Science Park (DPIE, 2020c).

Table 6-3 outlines Northern Gateway precinct's features, characteristics and population targets.

Table 6-3 Northern Gateway place context

Place features and objectives	Place characteristics	Population
- 1,616 Ha - North-South Rail Link (first stage) - Industry, commercial zoning	High technology associated with food production and processing Innovation hub on tourism, health, education, research	Workers (estimated 19,000-21,000) Residents (estimated 8,000-10,000)

Source: Western Sydney Aerotropolis Plan (DPIE, 2020c)

6.3.2 Social infrastructure recommendations

The precinct will have a high technology focus associated with food production and processing, connecting to the Agribusiness Precinct and fertile agricultural land beyond the edge of Greater Sydney boundaries. This centre for high technology will attract tourism, health, education and research. Development of the Western Sydney Screen Industry Production Hub will provide opportunities for the establishment of cultural industry within the precinct.

The Northern Gateway Precinct will include one new high school and one community health facility to support capacity within the wider catchment area. Community and cultural facilities will include a local community space/centre, a co-located community centre with a district library, and a local cultural facility. The precinct will also need to incorporate a Western Sydney Screen Industry Production Hub.

Recreation facilities will include a local outdoor sports court and a district indoor sports facility.

Table 6-4 outlines the social infrastructure requirements for the Northern Gateway precinct for the years 2036 and 2056.

Table 6-4 Northern Gateway social infrastructure recommendations

Facility type	2036	2056	Total
Education	One new primary school with 30 teaching spaces. Catholic Education has also committed to a combined K-12 school in the Northern Gateway.	Upgrade existing primary schools with 11 new teaching spaces. One new secondary school with 33 teaching spaces	One primary school (41 teaching spaces in total) One secondary school (33 teaching spaces in total) *Catholic Education has also committed to a combined K-12 school in the Northern Gateway.*
Emergency services	One new Fire Station One police shop front in a shopping precinct.	One police shop front in a shopping precinct.	One new Fire Station Two police shop fronts in different shopping precincts.
Community facilities	One local community space.	One local community space/centre. One district community centre co-located with the district library.	Two local community spaces One district community centre co-located with the district library.
Childcare	One council owned childcare centre Need to allow for an additional seven childcare facilities to be provided by the private sector Need to allow for two OOSH facilities to be provided by the private sector.	One council owned childcare centre Need to allow for an additional four childcare facilities to be provided by the private sector. Need to allow for two OOSH facilities to be provided by the private sector.	Two council owned childcare centres Need to allow for 11 childcare facilities to be provided by the private sector. Need to allow for four OOSH facilities to be provided by the private sector.

Facility type	2036	2056	Total
Aged care	Residential aged care (moderate to high need care): 49 places Residential aged care (low care needs): 58 places Community care: 24 places Short term restorative care: 2 places	Residential aged care (moderate to high need care): 36 places Residential aged care (low care needs):44 places Community care: 18 places Short term restorative care: 2 places	Residential aged care (moderate to high need care): 75 places Residential aged care (low care needs): 102 places Community care: 42 places Short term restorative care: 4 places
Cultural facilities	One local cultural facility. One Western Sydney Screen Industry Production Hub.	None	One Western Sydney Screen Industry Production Hub. One local cultural facility.
Library	One district library connected to maker spaces and / or community services One branch library		One district library One branch library
Sports fields	One district sports field (2 x rectangles and 1 x oval) One indoor aquatic / swimming facility One youth focussed outdoor recreation facility		One district sports field (2 x rectangles and 1 x oval) One indoor aquatic / swimming facility One youth focussed outdoor recreation facility
Open space	Five local parks Three district parks Gateway Park (98.5 ha) Sydney Science Park (71 ha)	Three local parks One district park	Eight local parks Four district parks Gateway Park (98.5 ha) Sydney Science Park (71 ha)

6.4 Wianamatta-South Creek Precinct

6.4.1 Vision statement

The vision for Wianamatta South Creek precinct is to be rejuvenated into a high-quality central green spine made up of a network of green and blue corridors for amenity and recreation providing the opportunity for development to connect to and care for Country(DPIE, 2020a). The precinct encompasses the full extent of Wianamatta-South Creek within the Aerotropolis boundary.

The creeks and tributaries will be the spine of the open space network within the Aerotropolis providing linkages, conservation and water management areas providing an interface to surrounding development, reducing urban heat. The blue and green corridor will provide a corridor for parks, sport playing fields, waterways and walking and cycling trails and community facilities,

Table 6-5 outlines Wianamatta South Creek precinct's features, characteristics and population targets.

Table 6-5 Wianamatta South Creek place context

Place features and objectives	Place characteristics	Population
- 1,392 Ha - Environment and Recreation zoning	Central green spine and area of biodiversity Connected open space network that is integrated with green infrastructure Wellbeing values and outdoor amenity Outdoor recreation	Workers (minimal)

Source: Western Sydney Aerotropolis Plan (DPIE, 2020c)

6.4.2 Social Infrastructure Recommendations

As an area zoned for environmental and recreational purposes, open space will be incorporated to provide a network of green space that adjoins Aerotropolis Core, Badgerys Creek and Northern Gateway precincts.

Table 6-6 outlines the social infrastructure requirements for the Wianamatta South Creek precinct for the years 2036 and 2056.

Table 6-6 Wianamatta South Creek social infrastructure recommendations

Facility	2036	2056	Total
Parks and open space	Central Wianamatta Park	None	Central Wianamatta Park
Sport and recreation	One district sports field (2 x rectangles and 1 x oval) Ten netball courts	None	One district sports field (2 x rectangles and 1 x oval) Ten netball courts

6.5 Badgerys Creek Precinct

6.5.1 Vision statement

The vision for Badgerys Creek precinct is to support airport operations and the new mixed-use urban centre in the Aerotropolis Core to the south as well as the Northern Gateway to the north (DPIE, 2020a). Land uses, buildings and structures may be temporal in nature in the short to medium term and transition to higher order technology, advanced manufacturing and industry uses in the longer term (ibid).

The precinct will complement the adjacent Airport and interface treatments will be required between existing resource recovery industries and new land uses until they transition to other uses. New enabling industries to facilitate construction of the Aerotropolis may be permitted, subject to interface treatments and an ability for the site to transition to higher order uses.

Affected by aircraft noise, this precinct is not suitable for noise sensitive land uses. It will meet demand for a range of employment generating uses that do not require or benefit from direct access to public transport but would benefit from proximity to airport operations (DPIE, 2020a). Defence industries and aerospace, advanced manufacturing and technology-based industry may be located within the precinct

Table 6-7 outlines the social infrastructure requirements for the Badgerys Creek precinct for the years 2036 and 2056.

Table 6-7 Badgerys Creek place context

Place features and objectives	Place characteristics	Population
- 612 Ha - Enterprise zone	- Airport and aviation related employment - Industrial character	- Workers (estimated 9,000-11,000)

Source: Western Sydney Aerotropolis Plan (DPIE, 2020c)

6.5.2 Social infrastructure recommendations

Badgerys Creek provides an opportunity to develop the multipurpose police hub. This facility will require significant land area, with strong connectivity to other precincts and broader Western Parkland City. The facility, as recommended within the PIC workbook could accommodate Australian Federal Police and Fire and Rescue NSW.

The precinct's working population will utilise the services and amenities available in the Aerotropolis Core to the south and Northern Gateway to the west. The precinct will provide the necessary road infrastructure to support the Western Sydney International (Nancy-Bird Walton) Airport.

Social infrastructure that should be incorporated into the precinct includes two childcare centres and a sports field. The proximity of the precinct to Aerotropolis Core and Wianamatta South Creek precincts will provide access to additional social infrastructure that will support the working population.

Table 6-8 outlines the social infrastructure requirements for the Badgerys Creek Precinct for the years 2036 and 2056.

Table 6-8 Badgerys Creek social infrastructure recommendations

Facility	2036	2056	Total
Childcare	Allow for two childcare centres to be provided by the private sector.	None	Allow for two childcare centres to be provided by the private sector.
Open space	One local park	None	One local park
Emergency services	Badgerys Creek: Multipurpose Police Hub with specialist resources e.g. traffic, highway and forensics. Also to be considered for use as a state emergency management centre for government and local authorities.	None	Badgerys Creek: Multipurpose Police Hub with specialist resources e.g. traffic, highway and forensics. Also to be considered for use as a state emergency management centre for government and local authorities.

6.6 Agribusiness

6.6.1 Vision statement

The vision for Agribusiness precinct is to stimulate investment in new industries that benefit from the proximity to Western Sydney International (Nancy-Bird Walton) Airport and agricultural land. The precinct will build on existing agricultural operations and natural landscape character (DPIE, 2020a). It will be the export hub for high quality regional produce, including fresh food, pre-prepared meals and flowers, to the international market. Business operations will be enabled through the 24/7 open access to Western Sydney International (Nancy-Bird Walton) Airport (ibid).

Table 6-9 outlines the overview of the Agribusiness Precinct's features, characteristics and population targets.

Table 6-9 Agribusiness place context

Place features and objectives	Place characteristics	Population
- 1,572 Ha - Industrial and agricultural land	- Catalyst for agricultural operations - Natural landscape character - Agricultural international export - Retain per-urban agricultural lands - High quality agricultural produce and production	- Workers (estimated 8,000-10,000) - Residents (minimal)

Source: Western Sydney Aerotropolis Plan (DPIE, 2020c)

6.6.2 Social infrastructure recommendations

Social infrastructure in the Agribusiness Precinct will focus around existing facilities within the established community of Luddenham, with some additional facilities to accommodate the anticipated workers. Recommended provision allows for the increased capacity of existing education and childcare facilities and the addition of a branch library. The branch library is recommended to be incorporated into an agile work centre or space to support research and innovation in the precinct. Additional recreation facilities will include two outdoor sports fields, one double and one single. Residents of Luddenham Village will benefit from the provision of social infrastructure to support the growth in the workforce, as well as facilities and services provided in surrounding precincts.

Table 6-10 outlines the social infrastructure requirements for the Agribusiness Precinct for the years 2036 and 2056.

Table 6-10 Agribusiness social infrastructure recommendations

Facility	2036	2056	Total
Education	Expand Bringelly Public School or Luddenham Public School.	None	Expand Bringelly Public School or Luddenham Public School.
Library	One branch library	None	One branch library
Childcare	One council owned childcare centre Need to for an additional two childcare centres to be provided by the private sector. Need to allow for one OOSH facility to be provided by the private sector.	Need to allow for two additional childcare centres to be provided by the private sector.	One council owned childcare centre Need to allow for four childcare centres to be provided by the private sector. Need to allow for one OOSH facility to be provided by the private sector.
Aged care	Residential aged care (moderate to high need care): 15 places Residential aged care (low care needs): 18 places Community care: 7 places Short term restorative care: 1 places	Residential aged care (moderate to high need care): 5 places Residential aged care (low care needs): 5 places Community care: 3 places Short term restorative care: 2 places	Residential aged care (moderate to high need care): 20 places Residential aged care (low care needs): 23 places Community care: 10 places Short term restorative care: 3 place
Sports fields	Add three netball courts to the existing three courts	None	Add three netball courts to the existing three courts
Open space	Two local parks One district park"	One local park	Three local parks One district park

07 Conclusion

This report presents a needs assessment for the social infrastructure that will be generated by development of Aerotropolis initial precincts and its future resident and worker population. It is the second report in a series of three which comprise the social infrastructure needs analysis, with *Report 1 – Draft Western Sydney Aerotropolis Social Infrastructure Audit* (GHD, 2020b) informing this report (*Report 2 – Social Infrastructure Needs Report).* The outcomes of this report will inform the precinct plans for the Aerotropolis Core, Northern Gateway, Badgerys Creek, Agribusiness and Wianamatta South Creek precincts.

7.1 Key findings

The vision for the Aerotropolis

The vision for the Aerotropolis is to become Australia's next global gateway that is accessible, innovative and connected and aligns with NSW Governments plan for Greater Sydney to be 30 minute city. The vision also includes aspirations for the Aerotropolis to become an internationally significant and competitive area for research/ innovation, science, training and education. Social infrastructure will be critical to achieving this vision and creating an Aerotropolis that is a desirable place for people to live, work and visit.

High worker population

The Aerotropolis will become one Sydney's largest metropolitan clusters , which will attract a higher proportion of workers compared to residents. These workers will include knowledge intensive employment sectors and office based 9 to 5 workers, as well as shift workers across the 24 hour period. These diverse workers will require a range of social infrastructure types with flexible operating hours.

Aboriginal and Torres Strait Islander community

Western Sydney has the largest Aboriginal Torres Strait Islander population of any region in Australia. The development of the Aerotropolis into a metropolitan centre of the Western Parkland City presents the opportunity for the Aerotropolis to meet existing and future Aboriginal and Torres Strait Islander community needs in Western Sydney. The *Western Sydney Aerotropolis Aboriginal Engagement DRAFT Engagement Outcomes Report* (GHD, 2020a) identified the need for increased opportunities for cultural celebration through place naming, artwork and installations, cultural design and dedicated gathering spaces. Service delivery, cultural infrastructure, employment services and public transport networks were also raised during consultation.

Meeting the needs of the visitor population

In order to capitalise on the opportunity presented by the new international airport, it will be critical for the Aerotropolis to provide key attractors including regional level cultural facilities and event spaces. These facilities should be viewed as 'enablers' and support the broader tourism industry catering to interstate and international visitors. These include an Indigenous cultural and art facilities (standalone or multiple), innovation education centre, aquatic centre, adventure based tourism facility and a convention centre focusing on agribusiness.

Cultural diversity

The existing Western Sydney community is a very culturally diverse community with over one third of the population speaking a language other than English at home. This has the potential to increase as the Aerotropolis develops, particularly with the increasing employment opportunities and proximity to the international Western Sydney International (Nancy-Bird Walton) Airport. Trends observed from Liverpool and Penrith LGAs over the last decade indicate

it is likely there will be a significant proportion of the Aerotropolis population from Asian and Middle Eastern cultural backgrounds.

7.2 Summary of recommendations

Social infrastructure required to support CALD communities include community centres and halls which can accommodate support services and social groups which can play a key role in a person's ability to adapt to living in Australia.

Table 7-1 Future social infrastructure requirements per Precinct

Precinct	Characteristics	Population	Recommend Social Infrastructure to 2056 (facility type)
Aerotropolis Core	Mix of employment uses 24-hour hub and thriving night time economy Entertainment and retail Arts and cultural experiences Health and education hub	Workers (estimated 50,000-60,000) Residents (estimated 20,000-24,000)	Education Health Emergency services Community facilities Childcare Aged care Cultural facilities Library Sports fields Local outdoor multipurpose sports courts District indoor sports facility Swimming facility Youth focused outdoor recreation Open space
Northern Gateway Precinct	Innovation hub on tourism, health, education and research Technology associated with food production & processing	Workers (estimated 19,000-21,000) Residents (estimated 8,000-10,000)	Education Health Emergency services Community facilities Childcare Aged care Cultural facilities Library Sports fields Local outdoor multipurpose sports courts District indoor sports facility Youth focused outdoor recreation Open space Fire station

Precinct	Characteristics	Population	Recommend Social Infrastructure to 2056 (facility type)
Wianamatta South Creek	Central green spine and area of high biodiversity Connected open space network Outdoor recreation and outdoor amenity	Workers (minimal)	Open space Sport and recreation
Badgerys Creek	Airport/aviation related employment Industrial character	Workers (estimated 9,000-11,000)	Childcare Sports fields Open space Emergency services (Multipurpose police hub)
Agribusiness	Catalyst for agricultural operations Natural landscape character	Workers (estimated 8,000-21,000) Residents (minimal)	Education (Expand Bringelly Public School or Luddenham Public School) Childcare Aged care Library Sports fields Local outdoor multipurpose sports courts Open space

7.3 Areas for further investigation

This report is supported by *Report 3 – Draft Western Sydney Aerotropolis Social Return on Investment Framework* which considers how to bring the recommended social infrastructure to life by considering the programs and public activations that will support the use of the infrastructure and facilitate a night time economy. This Social Infrastructure Needs Assessment will inform precinct plans for the Aerotropolis initial precincts which will identify land uses, housing choices, built form, infrastructure, and environmental and open space outcomes. They will be consistent with and give effect to the *Western Sydney Aerotropolis Plan* (DPIE, 2020c), Greater Sydney Region and Western City District Plans and Greener Places (GANSW, 2020b).

The next planning phase for the Aerotropolis initial precincts is the precinct master plans. Each master plan will reassess and confirm the findings within this report, particularly in light of any changes to planning policies (e.g. once the final *Greener Places Design Guide* has been released). The master plans will also provide a conceptual layout to guide future growth and development, taking the recommendations in this report to the next level of detail (e.g. location and size of community facilities and open space).

Table 7-2 outlines recommended additional studies and strategies to build on the findings and recommendations in this report and the *Draft Social Return on Investment Framework* (GHD, 2020). It will also be critical for these studies and the social infrastructure needs of the future communities to be investigated and realigned at regular intervals (e.g. every 5 years initially) to achieve the overall vision for the Aerotropolis.

Table 7-2 Recommended further studies

Study	Description
Visitor demand study and/or tourism strategy	A visitor demand study or tourism strategy should be undertaken shortly after commencement of international flight services at the Western Sydney (Nancy-Bird) Airport and early occupation of the Aerotropolis initial precincts. Key themes of the study should include: - Understanding the current and projected number of visitors - Profiling of visitors and movement patterns - Audit of attractions including facilities, activities and events - Identification of opportunities and constraints - Recommendations for investment and activation This will be important to ensure a strategic approach to attracting people to the Aerotropolis and generate local economic development through tourism.
Recreational needs study	It will be important that active recreation facilities are planned in a way that meets the needs of the future resident, visitor and worker population. A recreation needs study should be undertaken to establish a strategic planning framework for recreation facilities in the Aerotropolis. Key themes of the study could include: - Profile of future visitor population and demand for recreation facilities - Recreation standards and benchmarking - Urban recreation best practice trends and case studies - Recommended opportunities This will be important to identify community expectations and needs for recreation throughout the Aerotropolis.
Open space strategy	The Aerotropolis is forecast to attract over 85,000 residents and 138,000 workers by 2056 (section 4). As the population of the Aerotropolis grows the value and demand for open space is likely to increase over time. An open space strategy should be undertaken to provide a strategic framework and direction for open space in the Aerotropolis to adequately accommodate the needs of the future resident, visitor and worker population. Key themes of the study could include: - Open space needs of workers and visitors - Open space and the night time economy - Open space trends and best practice - Implementation strategy - Facilities within open space to provide a diversity of experiences across Aerotropolis

Study	Description
Arts and culture strategy	Culture and creativity is what will drive social, environment and educational cohesion and innovation in the Aerotropolis (DPIE, 2020c). The Arts and Cultural study would set a vision and guide the development and investment of art and cultural infrastructure in the Aerotropolis. It should be supported by a comprehensive community and stakeholder engagement program to identify the expectations and needs of the community as culture is 'living' and ever changing. Key themes of the study could include: - Vision and principles - Strategic priorities - Best practice approach to cultural infrastructure provision and trends - Night time economy and a 24/7 Aerotropolis The study should also align with the findings of any engagement undertaken with the Aboriginal community in the Aerotropolis.

8. References

AHURI (2020). *Accommodating the diverse housing needs of city-dwellers*. Retrieved from https://www.ahuri.edu.au/research/ahuri-briefs/accommodating-the-diverse-housing-needs-of-city-dwellers

Australian Bureau of Statistics (ABS) (2019). Population Projections by Region, New South Wales, Australia, 2017 (base) - 2066 (cat. no. 3222.0). Retrieved from http://stat.data.abs.gov.au/index.aspx?DatasetCode=POP_PROJ_REGION_2012_2061

Australian Institute of Health and Welfare (AIHW), (2020). *GEN fact sheet 2018–19: People using aged care*. Retrieved from https://www.gen-agedcaredata.gov.au/Resources/Factsheets-and-infographics

Australian Institute of Health and Welfare (AIHW), (2019a). *Disability support services: services provided under the National Disability Agreement 2017 – 2018.* Retrieved from: https://www.aihw.gov.au/getmedia/f750969c-159f-40a3-b576-0aec7c1b327c/aihw-dis-73.pdf.aspx?inline=true

Australian Institute of Health and Welfare (AIHW), (2019b). *GEN fact sheet 2018–19: Services and places in aged care*. Retrieved from https://www.gen-agedcaredata.gov.au/Resources/Factsheets-and-infographics

Atlas Urban Economics (2020). Western Sydney Aerotropolis Market and Opportunity Analysis Discussion Paper.

City of Sydney (2016). *Open Space, Sports and Recreation Needs Study 2016.* Retrieved from: https://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0003/138720/Adopted-Open-Space-Sport-Rec-Needs-Study-2016-Vol-1_Part1.pdf

Create NSW (2019). Cultural Infrastructure Plan 2025+. Retrieved from: https://create.nsw.gov.au/wp-content/uploads/2019/02/20190206_CIP2025.pdf

Create NSW (2015). NSW Arts and Cultural Policy Framework. Retrieved from: https://www.create.nsw.gov.au/wpcontent/uploads/2015/02/CreateInNSW_NSWArtsAndCulturalPolicyFramework.pdf

Deloitte (2015). *Building Western Sydney's Cultural Arts Economy*. Retrieved from: https://www2.deloitte.com/au/en/pages/economics/articles/building-western-sydney-cultural-arts-economy.html

Department of Infrastructure and Regional Development (2016). *Western Sydney Airport Environmental Impact Statement*. ISBN: 978-1-925401-84-4

Destination NSW (2019a). NSW State Tourism Statistics. Retrieved from: https://www.destinationnsw.com.au/tourism/facts-and-figures/state-tourism-statistics

Destination NSW (2019b). Western Sydney Visitor Profile. Retrieved from: https://www.destinationnsw.com.au/wpcontent/uploads/2019/11/western-sydney-visitor-profile.pdf

GHD (2020a). Draft Western Sydney Aerotropolis Aboriginal Engagement DRAFT Engagement Outcomes Report.

GHD (2020b). Draft Western Sydney Social Infrastructure Audit

GHD (2020c). Draft Western Sydney Social Return on Investment FrameworkGreater Sydney Commission (2018a). Greater Sydney Regional Plan – A Metropolis of Three Cities. Retrieved from: https://gsc-public-1.s3-ap-southeast-2.amazonaws.com/greater-sydneyregion-plan-0618.pdf

Greater Sydney Commission (2019). Common Planning Assumptions

Greater Sydney Commissions (2018b). Our Greater Sydney 2056 – Western City District Plan. Retrieved from: https://gsc-public-1.s3-ap-southeast-2.amazonaws.com/western-district-plan0618.pdf

Infrastructure Australia (2016). *Australian Infrastructure Plan: Priorities and reforms for our nation's future*. Retrieved from https://www.infrastructureaustralia.gov.au/sites/default/files/2019-06/Australian_Infrastructure_Plan.pdf

Infrastructure Australia (2019). Australia Infrastructure Audit 2019. Retrieved from: https://www.infrastructureaustralia.gov.au/publications/australian-infrastructure-audit-2019

Liverpool City Council (2018). Community Facilities Strategy - A Blueprint for a Modern Network of Community Facilities. Retrieved from https://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiN-9K4svHrAhWwzDgGHdMGA-UQFjAAegQIBRAB&url=https%3A%2F%2Fwww.liverpool.nsw.gov.au%2Ftrim%2Fdocuments%3FRecordNumber%3D001617.2019&usg=AOvVaw2yoFja_2idmSImDTyurdWD

Liverpool City Council (2019). Liverpool Population and Social Infrastructure Study. Retrieved from: https://projectsportal.ghd.com/sites/pp15_04/wsasocialinfrastruct/Lists/Documents/Attachment%20H%20-%20Liverpool%20Population%20and%20Social%20Infrastructure%20Study%20.PDF

Liverpool City Council (2018). Recreation, Open Space and Sports Strategy. Retrieved from: https://www.liverpool.nsw.gov.au/council/corporate-information

NSW Department of Education (2009). *Community Use of School Facilities Implementation Procedures*. Retrieved from: https://policies.education.nsw.gov.au/policy-library/associated-documents/imp_comm_use.pdf.pdf

NSW Department of Education (1990). Education Act 1990. Retrieved from: https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1990-008

NSW Department of Education (2015). *Planning New Schools: School Safety and Urban Planning Advisory Guidelines*. Retrieved from: http://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiMxojspOrrAhVWbn0KHWaECZ0QFjAAegQIBBAB&url=http%3A%2F%2Fwww.redwatch.org.au%2FRWA%2FWaterloo%2Fssd%2F170728edn%2Fat_download%2Ffile&usg=AOvVaw0ZxdzOaDI-708nxKCJP-I

NSW Department of Planning, Industry and Environment (2020a). Western Sydney Aerotropolis Development Control Plan 2020. Retrieved from: https://www.planningportal.nsw.gov.au/draftplans/made-and-finalised/western-sydney-aerotropolis-planning-package

NSW Department of Planning, Industry and Environment (2020b). *Western Sydney Aerotropolis, Land Use and Infrastructure Implementation Plan, Stage 1*: Initial Precincts. Retrieved from: https://www.planningportal.nsw.gov.au/draftplans/made-and-finalised/western-sydney-aerotropolis-planning-package

NSW Department of Planning, Industry and Environment (2020c). *Western Sydney Aerotropolis Plan*. Retrieved from: https://www.planningportal.nsw.gov.au/draftplans/made-and-finalised/western-sydney-aerotropolis-planning-package

NSW Department of Planning, Industry and Environment (2019). Population projections. Retrieved from: https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections

Government Architect NSW (2020a). Draft Greener Places Design Guide. Retrieved from: https://www.governmentarchitect.nsw.gov.au/resources/ga/media/files/ga/discussion-papers/discussion-guide-greener-places-2020-06-03.pdf

Government Architect NSW (2020b). Greener Places. Retrieved from: https://www.governmentarchitect.nsw.gov.au/resources/ga/media/files/ga/design-guides/framework-document-greener-places-2020-06-02.pdf

NSW Health (2020a). Care in the Community Clinical Services Plan.

NSW Health (2020b). Inquiry into the current and future provision of health services in South West Sydney Growth Region. Retrieved from: https://www.parliament.nsw.gov.au/lcdocs/submissions/67518/0033%20NSW%20Health.pdf

Penrith City Council (2018). Penrith Community Profile. Retrieved from https://www.penrithcity.nsw.gov.au/images/penrithcommprofile_2018_final_web.pdf

Penrith City Council (2008). Penrith Regional City Infrastructure Strategy. Retrieved from: https://www.penrithcity.nsw.gov.au/images/documents/resources-documents/documents/Penrith_Regional_City_Infrastructure_Strategy.pdf

Penrith City Council (2019). Sport and Recreation Strategy. Retrieved from: https://www.penrithcity.nsw.gov.au/facilities-recreation/outdoor-recreation/sport-and-recreationstrategy#:~:text=The%20Sport%20and%20Recreation%20Strategy,in%20the%20first%205%20

Profile id (2020a). Liverpool City: Language spoken at home. Retrieved from https://profile.id.com.au/liverpool/language?EndYear=2006&DataType=UR

Profile id (2020b). Penrith City: Language spoken at home. Retrieved from https://profile.id.com.au/penrith/language?EndYear=2006&DataType=UR

Social Life (2012). Design for Social Sustainability, A Framework for Creating Thriving New Communities. Retrieved from https://www.youngfoundation.org/publications/design-for-social-sustainability/

State Library NSW (2020). People Places – A Guide of Public Library Buildings. Retrieved from: https://www.sl.nsw.gov.au/public-library-services/people-places

Tourism Research Australia (2020a). *Latest international visitor survey (nvs) results year ending march 2020*. Retrieved from https://www.tra.gov.au/International/international-tourism-results

Tourism Research Australia (2020b). *Latest national visitor survey (nvs) results year ending march 2020*. Retrieved from https://www.tra.gov.au/Domestic/domestic-tourism-results

Transport for NSW (2018), Future Transport Strategy 2056. Retrieved from https://future.transport.nsw.gov.au/sites/default/files/media/documents/2018/Future_Transport_2056_Strategy.pdf

University of New South Wales (2020). NUW Alliance to deliver a world class Multiversity in the new Western Sydney Aerotropolis. Retrieved from: https://www.enterprise.unsw.edu.au/news/nuw-alliance-multiversity

Appendices

Appendix A – Future resident profiles by precinct

Table Aerotropolis Core future resident profile

Social indicator	2016	2021	2026	2031	2036	2041	2046	2051	2056
Service age groups									
Babies and pre-schoolers (0 to 4 years)	7.9%	7.7%	7.5%	7.2%	6.8%	6.7%	6.2%	6.2%	6.2%
Primary schoolers (5 to 11 years)	10.6%	10.4%	10.3%	10.2%	10.0%	9.5%	8.3%	8.2%	8.2%
Secondary schoolers (12 to 17 years)	8.7%	8.3%	8.3%	8.2%	8.2%	8.1%	7.0%	6.8%	6.7%
Tertiary education (18 to 24 years)	10.3%	9.6%	9.1%	9.1%	9.1%	9.1%	9.3%	9.1%	8.9%
Young workforce (25 to 34 years)	15.1%	15.3%	14.6%	13.3%	13.2%	13.4%	15.0%	15.0%	15.0%
Career and home building (35 to 49 years)	21.0%	21.2%	21.7%	22.1%	21.6%	20.8%	21.2%	20.8%	20.7%
Senior workforce (50 to 64 years)	16.3%	16.2%	15.9%	15.8%	16.2%	16.8%	17.2%	17.4%	17.2%
Retirees (65 to 74 years)	6.1%	6.6%	7.1%	7.6%	7.6%	7.5%	7.5%	8.0%	8.6%
Seniors (75 to 84 years)	3.1%	3.5%	4.1%	4.6%	5.0%	5.4%	5.5%	5.5%	5.5%
Elderly (85+)	1.0%	1.3%	1.5%	1.8%	2.2%	2.6%	2.9%	3.0%	3.0%
Household type									
Family	83.3%	82.4%	81.7%	81.0%	80.2%	79.4%	78.6%	77.9%	77.1%
Lone person	15.2%	16.1%	16.9%	17.6%	18.3%	19.1%	19.8%	20.5%	21.3%
Group	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.6%	1.6%
Family type									
Couple only	16.8%	17.5%	17.9%	18.1%	18.4%	18.6%	18.8%	19.0%	19.3%
Couple with children	46.9%	45.5%	44.4%	43.5%	42.5%	41.6%	40.6%	39.6%	38.6%
Single parent	14.8%	14.7%	14.7%	14.8%	14.7%	14.7%	14.7%	14.7%	14.7%
Other	4.8%	4.7%	4.6%	4.6%	4.6%	4.5%	4.5%	4.5%	4.5%

Badgerys Creek future resident profile

Social indicator	2016	2021	2026	2031	2036	2041	2046	2051	2056
Service age groups									
Babies and pre-schoolers (0 to 4 years)	7.8%	7.8%	7.6%	7.1%	6.8%	6.9%	6.2%	6.2%	6.2%
Primary schoolers (5 to 11 years)	10.3%	10.2%	10.2%	10.2%	9.8%	9.3%	8.3%	8.2%	8.2%
Secondary schoolers (12 to 17 years)	8.4%	8.1%	8.1%	8.1%	8.1%	8.0%	7.0%	6.8%	6.7%
Tertiary education (18 to 24 years)	10.3%	9.4%	8.9%	9.0%	9.0%	9.1%	9.3%	9.1%	8.9%
Young workforce (25 to 34 years)	15.4%	15.6%	14.5%	13.6%	13.6%	13.3%	15.0%	15.0%	15.0%
Career and home building (35 to 49 years)	20.7%	21.0%	21.5%	22.0%	21.6%	20.8%	21.2%	20.8%	20.7%
Senior workforce (50 to 64 years)	16.6%	16.2%	15.9%	15.6%	16.0%	16.8%	17.2%	17.4%	17.2%
Retirees (65 to 74 years)	6.5%	7.0%	7.5%	7.7%	7.5%	7.6%	7.5%	8.0%	8.6%
Seniors (75 to 84 years)	3.0%	3.5%	4.3%	4.9%	5.2%	5.5%	5.5%	5.5%	5.5%
Elderly (85+)	1.1%	1.3%	1.5%	1.9%	2.4%	2.8%	2.9%	3.0%	3.0%
Household type									
Family	81.7%	80.8%	80.0%	79.3%	78.6%	77.8%	74.2%	73.3%	72.5%
Lone person	16.6%	17.4%	18.3%	19.0%	19.7%	20.4%	23.7%	24.5%	25.4%
Group	1.8%	1.7%	1.7%	1.7%	1.7%	1.7%	2.1%	2.1%	2.1%
Family type									
Couple only	18.3%	18.9%	19.1%	19.2%	19.5%	19.6%	21.1%	21.0%	20.9%
Couple with children	43.9%	42.6%	41.6%	40.8%	39.9%	39.0%	33.9%	33.2%	32.4%
Single parent	14.7%	14.7%	14.7%	14.8%	14.7%	14.8%	14.9%	15.0%	15.0%
Other	4.7%	4.6%	4.6%	4.5%	4.5%	4.5%	4.3%	4.2%	4.1%

Northern Gateway future resident profile

Social indicator	2016	2021	2026	2031	2036	2041	2046	2051	2056
Service age groups									
Babies and pre-schoolers (0 to 4 years)	7.7%	7.9%	7.8%	6.8%	6.7%	7.3%	6.2%	6.2%	6.2%
Primary schoolers (5 to 11 years)	9.9%	9.8%	10.0%	10.1%	9.5%	8.9%	8.3%	8.2%	8.2%
Secondary schoolers (12 to 17 years)	7.9%	7.6%	7.8%	7.8%	7.9%	7.8%	7.0%	6.8%	6.7%
Tertiary education (18 to 24 years)	10.2%	9.1%	8.6%	9.0%	9.0%	9.0%	9.3%	9.1%	8.9%
Young workforce (25 to 34 years)	15.9%	16.0%	14.4%	13.9%	14.4%	13.1%	15.0%	15.0%	15.0%
Career and home building (35 to 49 years)	20.2%	20.6%	21.2%	21.8%	21.6%	20.7%	21.2%	20.8%	20.7%
Senior workforce (50 to 64 years)	17.0%	16.2%	15.8%	15.4%	15.6%	16.8%	17.2%	17.4%	17.2%
Retirees (65 to 74 years)	7.1%	7.8%	8.1%	7.8%	7.4%	7.7%	7.5%	8.0%	8.6%
Seniors (75 to 84 years)	3.0%	3.7%	4.8%	5.3%	5.4%	5.7%	5.5%	5.5%	5.5%
Elderly (85+)	1.1%	1.3%	1.6%	2.0%	2.6%	3.1%	2.9%	3.0%	3.0%
Household type									
Family	78.8%	78.0%	77.1%	76.5%	75.9%	75.1%	74.2%	73.3%	72.5%
Lone person	18.9%	19.8%	20.8%	21.4%	22.0%	22.8%	23.7%	24.5%	25.4%
Group	2.2%	2.2%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%
Family type									
Couple only	21.0%	21.2%	21.1%	21.2%	21.4%	21.2%	21.1%	21.0%	20.9%
Couple with children	38.6%	37.6%	36.8%	36.1%	35.4%	34.7%	33.9%	33.2%	32.4%
Single parent	14.7%	14.7%	14.7%	14.7%	14.7%	14.8%	14.9%	15.0%	15.0%
Other	4.7%	4.6%	4.5%	4.4%	4.4%	4.3%	4.3%	4.2%	4.1%

Agribusiness future resident profile

Social indicator	2016	2021	2026	2031	2036	2041	2046	2051	2056
Service age groups									
Babies and pre-schoolers (0 to 4 years)	7.8%	7.7%	7.6%	7.1%	6.8%	6.8%	6.2%	6.2%	6.2%
Primary schoolers (5 to 11 years)	10.4%	10.2%	10.2%	10.2%	9.9%	9.4%	8.3%	8.2%	8.2%
Secondary schoolers (12 to 17 years)	8.5%	8.2%	8.1%	8.1%	8.2%	8.0%	7.0%	6.8%	6.7%
Tertiary education (18 to 24 years)	10.3%	9.5%	8.9%	9.0%	9.0%	9.1%	9.3%	9.1%	8.9%
Young workforce (25 to 34 years)	15.3%	15.5%	14.6%	13.5%	13.5%	13.4%	15.0%	15.0%	15.0%
Career and home building (35 to 49 years)	20.8%	21.1%	21.6%	22.1%	21.6%	20.8%	21.2%	20.8%	20.7%
Senior workforce (50 to 64 years)	16.5%	16.2%	15.9%	15.7%	16.1%	16.8%	17.2%	17.4%	17.2%
Retirees (65 to 74 years)	6.3%	6.9%	7.3%	7.7%	7.5%	7.6%	7.5%	8.0%	8.6%
Seniors (75 to 84 years)	3.1%	3.5%	4.2%	4.8%	5.1%	5.5%	5.5%	5.5%	5.5%
Elderly (85+)	1.0%	1.3%	1.5%	1.9%	2.3%	2.7%	2.9%	3.0%	3.0%
Household type									
Family	82.3%	81.5%	80.7%	80.0%	79.3%	78.5%	77.7%	76.9%	76.1%
Lone person	16.1%	16.9%	17.7%	18.4%	19.1%	19.9%	20.7%	21.4%	22.2%
Group	1.6%	1.6%	1.6%	1.6%	1.6%	1.6%	1.7%	1.7%	1.7%
Family type									
Couple only	17.7%	18.3%	18.6%	18.8%	19.0%	19.2%	19.3%	19.5%	19.6%
Couple with children	45.1%	43.8%	42.7%	41.9%	41.0%	40.0%	39.1%	38.2%	37.3%
Single parent	14.7%	14.7%	14.7%	14.8%	14.7%	14.8%	14.8%	14.8%	14.8%
Other	4.7%	4.7%	4.6%	4.5%	4.5%	4.5%	4.5%	4.4%	4.4%

Appendix B – Literature Review of Social Infrastructure Rates of Provision

Literature review of education policies

The following policies and documents have informed the recommendations with regard to rates of provision as well as facility and spatial requirements.

Education documents

Document	Overview of key information
NSW Department of Education (2015). Planning New Schools: School Safety and Urban Planning Advisory Guidelines	Provides non-statutory advice on broader planning management of new schools. It aims to demonstrate considerations needed in collaboration with key state government stakeholders in areas of school demands and delivery timeframes, student safety and wellbeing, schools as a community facility, as well as community and stakeholder consultation.
NSW Department of Education (2020). PIC workbook	Identifies the Department of Education's infrastructure requirements for the type and quantity of infrastructure required to meet growth scenarios across the Western Sydney Growth Area. The document outlines additional primary, secondary and SSP teaching spaces that will be required.
TAFE NSW (2020). PIC workbook	Identifies NSW TAFE's infrastructure requirements for the type and quantity of infrastructure required to meet growth scenarios across the Western Sydney Growth Area. The document outlines that no additional campuses will be required, rather it lists opportunities to innovate and better deliver value through existing facilities.
NSW Department of Education (2009). Community Use of School Facilities.	Describes schools as a community resource under guidelines of appropriate use when not occupied by the school. It outlines multi-purpose use for community users, children's services (including out of school hours care), types of agreements, local council partnerships, and finance and rent.
NSW Department of Education (2009). Community Partnerships for the Use of School Playing Fields.	

Literature review of health policies

The following policies and documents have informed the recommendations with regard to rates of provision as well as facility and spatial requirements.

Health documents

Document	Overview of key information
NSW Health (2020). PIC workbook	Identifies NSW Health and Ambulance NSW's infrastructure requirements for the type and quantity of infrastructure required to meet growth scenarios across the Western Sydney Growth Area. The document outlines demand of each growth scenario on hospital beds, emergency treatment spaces, community health facilities and ambulance facilities.
The Western Sydney Aerotropolis Aboriginal Engagement Outcomes report (GHD, 2020)	Summary of engagement outcomes from various Aboriginal stakeholders in the Western Sydney area, including opportunities to address gaps in current health services, greater cultural sensitivity within all medical and health service providers, and improved access to health services. Details SWLHD's strategy for an integrated primary and community care model in the South West Growth Centre Greenfield site in South Western Sydney.
NSW Health (2020a). Care in the Community Clinical Services Plan'	Planning document that considers the community's health care needs and service requirements.
NSW Health (2020b). Inquiry into the current and future provision of health services in the South West Sydney Growth Area	NSW Health's submission for the inquiry into health services in the south west Sydney growth region.

Literature review of emergency services policies

The following policies and documents have informed the recommendations with regard to rates of provision as well as facility and spatial requirements.

Emergency services policy documents

Document	Overview of key information
NSW Police (2020). PIC workbook	Identifies Department of Communities and Justice infrastructure requirements for the type and quantity of infrastructure required to meet growth scenarios across the Western Sydney Growth Area. The document outlines police infrastructure and opportunities for co-location.
NSW Justice (2020). PIC workbook	Identifies Department of Communities and Justice infrastructure requirements for the type and quantity of infrastructure required to meet growth scenarios across the Western Sydney Growth Area. The document outlines courts and youth Justice facilities.

Document	Overview of key information
Fire and Rescue NSW (2020). PIC workbook	Identifies Department of Communities and Justice infrastructure requirements for the type and quantity of infrastructure required to meet growth scenarios across the Western Sydney Growth Area. The document outlines required fire stations and opportunities for co-location.

Literature review of community facilities policies

The following policies and documents have informed the recommendations with regard to rates of provision as well as facility and spatial requirements.

Community facilities policy documents

Document	Overview of key information
Liverpool City Council (2018). Community Facilities Strategy - A Blueprint for a Modern Network of Community Facilities.	The aim of this Strategy is to upgrade Liverpool City Council's aging community infrastructure by transforming into a world-class system of modern facilities addressed to community needs. These strategic outcomes are to be achieved through delivering a world-class network of facilities, customer focused delivery, a new model of governance, and implementing best practice facility asset management.
Liverpool City Council (2019). Liverpool Population and Social Infrastructure Study.	Purpose of this study is to identify how the population increase in the Liverpool LGA will impact current accessibility to social infrastructure with regards to forecasted future growth access which will determine future provision of social infrastructure in the area.
Penrith City Council (2008). Penrith Regional City Infrastructure Strategy	Commissioned by the Penrith City Council (PCC), the strategy focuses on higher order infrastructure such as schools and main roads, not necessarily neighbourhood level infrastructure. The strategy analyses the current provision of higher order infrastructure, existing backlogs and future needs towards developing funding/finance options and advocacy strategies.
Landcom (2007). Community Centre Guidelines.	The guidelines developed by Landcom increase understanding on the successful makeup of a community centre and give insight into various issues to consider planning new community centres. An overview of the guideline details principles for successful community centres and putting those into practice through processes of planning a community centre, design and delivery, and operating a community centre.

Literature review of childcare policies

The following policies and documents have informed the recommendations with regard to rates of provision as well as facility and spatial requirements.

Childcare policy documents

Document	Overview of key information
Department of Planning and Environment (2017). Child Care Planning Guideline: Delivering quality childcare for NSW	The guideline creates an assessment framework for delivery on outcomes for consistent planning and quality of design for NSW child care facilities. Noted guiding areas include design quality principles, matters for consideration, and applying the National Regulations to development proposals.
City of Sydney (2019). City of Sydney Childcare Needs Analysis	An updated version of the Child Care Needs Analysis 2013, this analysis focuses on the City of Sydney LGA's and its research into determining accurate data of current and projected future demand for early education and care across the City's 10 village precincts. Areas Identified were clear influencers and affects for future and current, supply and demand, leading to a gap analysis determined by location.
Urban Economics (2018) Occupancy and Performance Appraisal: Early Childhood Education and Care Sector	This report by Urban Economics has been commissioned by various organisational groups of Early Childhood Education and Care (ECEC) to analyse and profile performance of the ECEC sector in Australia.

Literature review of aged care policies

The following policies and documents have informed the recommendations with regard to rates of provision as well as facility and spatial requirements.

Aged care policy documents

Document	Overview of key information
Standard 5 – Organisation's Service Environment, Aged Care Quality Standards (Australian Aged Care Quality and Safety Commission	These national set of standards for the aged care services sector require organisations working in this line of service to comply with the 8 sets of Age Care Quality Standards from 1 July, 2019, who will be assessed against these measurements.
Global Centre for Modern Aging (2020). Aging in the Right Place, an Australian Perspective	Research into an Australian perspective into Aging in the Right Place (2020). This gives insight into the aging of a global population and the economic and social opportunities it presents for government and industry to address areas of health, wellbeing, lifestyle, engagement and participation of future aging populations.

Australasian Health Facility Guidelines (2016). Multipurpose Service Unit	Multipurpose service units in the health sector provides a number of services in different locations, which gives opportunity for private and NGO providers to share in integrated care. Noted services are primary, community health services, and inpatient care. It is also required that Multipurpose Services include a residential aged care component.
Growth Centre Commission (2006) Development Code	Guiding thresholds including a rate of provision for social infrastructure facilities. The Code has recommendations for Aged Care Facilities which have been considered for Aerotropolis.

Literature review of cultural facility policies

The following policies and documents have informed the recommendations with regard to rates of provision as well as facility and spatial requirements.

Cultural facilities policy documents

Document	Overview of key information
Create NSW (2019). PIC workbook	Identifies Create Infrastructure, a division of Create NSW, infrastructure requirements for the type and quantity of infrastructure required to meet growth scenarios across the Western Sydney Growth Area. The document outlines the range of cultural infrastructure is required to provide access for communities to participate in arts and culture.
Create NSW (2017). Cultural Infrastructure Plan 2025+	Provides a holistic strategy of priorities and actions required to achieve the significant benefits and outcomes identified by Infrastructure NSW. The plan articulates the strategic priorities for NSW to enhance the cultural sector and provide wider access for communities.
Create NSW (2015). Create in NSW: The NSW Arts and Culture Policy Framework 2015 – 2025	A 10-year whole-of-government policy framework to support excellence in arts and culture. The framework that outlines opportunities for Western Sydney including providing support for arts and culture in region as a development priority.
Deloitte (2015). Building Western Sydney's Cultural Arts Economy: a key to Sydney's success	This report is a case of various stakeholders in Sydney Business Chamber and Regional River Cities of Parramatta, Penrith and Liverpool working together to present a greater case of investment in Western Sydney's Cultural Arts economy.
GHD (2020). *Western Sydney Aerotropolis Aboriginal Engagement - DRAFT Engagement Outcomes Report*	Provides a summary of engagement outcomes from various Aboriginal stakeholders in the Western Sydney area. Celebrating culture opportunities from the Aerotropolis development was recognised from the consultation process with Aboriginal communities in Western Sydney. Ways to celebrate Aboriginal culture and art.through mediums were place-naming, artwork and instillations, cultural design, and Aboriginal place.

Literature review of sport and recreation policies

The following policies and documents have informed the recommendations with regard to rates of provision as well as facility and spatial requirements.

Sport and recreation policy documents

Document	Overview of key information
Penrith City Council (2019). Sport and Recreation Study	Road map regarding future provision for sport, open space, play, and sport and recreation in the LGA over the next 15-years.
Liverpool City Council (2018). Recreation, Open Space and Sports Strategy 2018 – 2028	A 10-year strategy around future provisions plan for the Liverpool Council area focusing on three specific areas of open spaces, physical activity, and sport and active recreation towards the advancement of social and economic city life.
Government Architect NSW (2020a). Draft Greener Places Design Guide	This design guide provides a reference on how to design, plan, and implement green infrastructure in NSW urban areas. The draft guidelines provide a supporting framework to State and local government agencies to establish green infrastructure in three areas of open space for recreation, urban tree canopy, as well as bushland and waterways.
City of Sydney (2016). Open Space, Sports and Recreation Needs Study[4]	Guiding documenting outlining recommendations for future planning, provision, development and management of public open space and recreation facilities based in the City of Sydney LGA either through their ownership or managed by other authorities.
Department of Planning, Industry and Environment (2020) PIC workbook	Identifies the Department if Planning, Industry and Environment's Growth Infrastructure Compact (GIC) Program provides an opportunity to identify green infrastructure upfront, alongside forecasted population, dwelling and employment growth, as well as other infrastructure such as roads and rail.

Literature review of open space policies

The following policies and documents have informed the recommendations with regard to rates of provision as well as facility and spatial requirements.

Open space policy documents

Document	Overview of key information
Government Architect of NSW (2020). Draft Greener Places Design Guide	This design guide provides a reference on how to design, plan, and implement green infrastructure in NSW urban areas. The draft guidelines provide a supporting framework to State and local government agencies to establish green infrastructure in three areas of open space for recreation, urban tree canopy, as well as bushland and waterways.

4 This City of Sydney document has been used as it considers rates of provision for worker populations

Document	Overview of key information
Government Architect of NSW (2020). Greener Places	The framework supports the planning, design, and delivery of green infrastructure in NSW urban areas. The purpose of the document is to establish a more healthy, liveable, and sustainable environment through improved community accessibility of recreation and exercise such as supporting walking and cycling connections.
City of Sydney (2016). Open Space, Sports and Recreation Study	Guiding documenting providing recommendations for future planning, provision, development and management of public open space and recreation facilities based in the City of Sydney LGA either through their ownership or managed by other authorities.
Penrith City Council (2019). Sport and Recreation Study	Road map regarding future provision for sport, open space, play, and sport and recreation in the LGA over the next 15-years.
Liverpool City Council (2018). Recreation, Open Space and Sports Strategy 2018 – 2028	A 10-year strategy outlining future provisions plan for the Liverpool Council area focusing on three specific areas of open spaces, physical activity, and sport and active recreation towards the advancement of social and economic city life.
Department of Planning, Industry and Environment (2020) PIC workbook	Identifies the Department if Planning, Industry and Environment's Growth Infrastructure Compact (GIC) Program provides an opportunity to identify green infrastructure upfront, alongside forecasted population, dwelling and employment growth, as well as other infrastructure such as roads and rail.
NSW Office of Sport (2020) PIC workbook	Identifies the Office of Sport's infrastructure requirements for the type and quantity of infrastructure required to meet growth scenarios across the Western Sydney Growth Area.

Appendix C – Sports field hierarchy

Sports field hierarchy

Hierarchy	Characteristics
National / State Primary catchment is NSW attracting users and visitors from interstate and overseas	Provides for the highest level of sporting competition, which may include international events and competitions, national league(s) and associated state and national team and squad training centre(s). Facilities also assist to promote sports and provide community access and pathway opportunities for participants. As these facilities provide for the highest level of competition, they also have a high entertainment value and attract large numbers of spectators. People will often travel over an hour to these facilities (ideally up to 2 hours). May also provide a headquarters for state or national sporting organisation administration. The highest level of play is elite and the ideal travel time is up to 2 hours.
High performance centres and centres of excellence Primary catchment expands across a region and beyond with participants willing to travel to access high standard facilities to master their talent pathway.	Provide world leading training and administration infrastructure that enables clubs to build, attract and retain the best talent among players, coaches, executive and support staff. The Centres are likely to provide programs that identify and develop future elite players and help achieve mastery in their sport. The Centres are an integral component of the talent/youth development pathway and may include an academy program and/or administration. High performance centres and centres of excellence can be a hub for innovation e.g. attract sport research and development partnerships (Universities), include the latest sports technology and equipment, utilises digital technology, provide opportunities for multi purpose and community access to the facility. These facilities often provide for state of the art facilities including sports science, sports medicine along with other complimentary uses that can be used by all members of the community such as health services including physiotherapy, podiatry etc. High performance centres and centres of excellence are often co located with national/state or regional sport facilities. The highest level of play is elite and the ideal travel time is up to 1.5 hours.
Regional Primary catchment of local users with extended catchment across multiple local council areas, primarily for competition and events.	Regional facilities attract participants across local and regional geographic catchments due to their scale or standard of competition. They cater for large scale sites and provide a broad range of sport and recreation activities and events, often hosting regional tournaments and carnivals with large numbers of teams across multiple days. Regional facilities can also be a significant single sport facility of a high quality, catering for high levels of competition, often known as representative level that is a level down from national/inter state competitions. Regional facilities are best provided at high profile sites in accessible locations with links to transport nodes and/or commercial / community centres and services. The highest level of play is grade / representative and the ideal travel time is up to 1 hour.
District Primary catchment area includes large local government areas, but often covers various Councils due to the nature of the competition or sport.	District facilities provide for Association competition as well as service a local catchment to provide a mix of recreational, competitive and program formats of participation. The facilities also provide a function as a local finals venue or a central venue that facilitates regular competition for multiple clubs and/or teams. District facilities cater for sports that have a centralised competition model such as softball, netball and hockey. The highest level of play is grade / association finals and the ideal travel time is 30 minutes.
Local	Provides a focus for club competition, as well as service a local catchment to provide a mix of recreational, competitive and program

Hierarchy	Characteristics
Primary catchment area of single local government areas or multiple suburb areas.	formats of participation. Generally services the needs of local communities and sporting clubs for home and away fixtures, including finals, training activities and for participation programs. Councils may have different classes of this type of facility. The highest level of play is club and the ideal travel time is 15 minutes.
Neighbourhood Primary catchment area usually within walking distance of most users.	Neighbourhood facility locations are not considered suitable for larger facilities as they are generally provided in residential settings and have limited or constrained capacity for formalised sport. These sites provide for active recreation opportunities. The highest level of play is active recreation / informal use and ideally is within walking distance of where people live or work.

Level 15 / 133 Castlereagh Street,
Sydney NSW 2000

61 2 9239 7100

sydmail@ghd.com

© GHD 2020

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.