Sydney Science Park, Luddenham

Social Planning Report

Client:
APP

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Final Report

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Executive Summary

This report presents an assessment of the social infrastructure required, and that which will be provided, to support proposed development of the Sydney Science Park at Luddenham, within the City of Penrith. The report has been prepared for APP, who is working on behalf of the project's developers to seek a rezoning approval for the site.

In addition to an Introduction, the report contains seven chapters.

Chapter 2 presents an overview of the social context for the development. The site is located in an agricultural and rural residential area which has been identified for inclusion within the Broader Western Sydney Employment Area, intended to create employment opportunities for residents of Western Sydney. The existing population of this area is small and dispersed, and is characterised by a predominance of mature families with older children and adolescents, above average household incomes and low levels of cultural diversity. Consistent with is nature as a predominantly rural area served by the small villages of Luddenham and Mulgoa, there is little in the way of existing local social infrastructure.

The established suburbs closest to the site, Glenmore Park and St Clair, contain a greater variety of facilities and services, but these have been built to serve the needs of their immediate communities, and would not have the capacity to also meet demand generated by the Sydney Science Park. In the wider area, a variety of district and regional facilities and services are focused in and around the Penrith City Centre and the St Marys town centre.

Chapter 3 examines the planning context for the development and presents a summary of issues from the planning policies of Penrith City Council that are of social planning relevance for Sydney Science Park.

Chapter 4 considers the need for residential uses to be included as part of the mix of uses proposed for the Sydney Science Park. It draws from research undertaken for this project by Hill PDA which shows that providing housing and lifestyle opportunities that will help to attract an international or executive workforce is a critical element in the establishment of a successful science park. Social integration between the incoming population and the existing Luddenham community will be enhanced through public access to the new retail, community and recreation facilities and local employment opportunities that the Science Par will generate, creating considerable benefit to the wider community, and by Science Park residents using facilities and networks in the surrounding area.

Chapter 5 presents housing and population projections for the Sydney Science Park. At full development around 2041, the Science Park is forecast to contain around 3,000 dwellings, together with around 400 units of student housing. This will generate a residential population of around 6,900 people. In addition, the Science Park will contain a workforce of around 9,800 people and a university enrolment of up to 10,000 students. Consistent with the mix of dwelling types proposed, the population will contain a wide spectrum of households, at different life stages and with varying socio-economic circumstances and lifestyle preferences.

Chapter 6 considers the needs of the future residential, workforce and student populations for community facilities and human services, and the ways in which those needs should be met.

The Sydney Science Park will generate a population of sufficient size to form a fairly self-contained catchment for local level facilities and services.

In terms of facilities to be owned and managed by Penrith City Council, it is recommended that a multi-purpose community centre of around 550 sqm be provided on a site of around 2,500 sqm within or adjacent to the town centre. This will meet needs for indoor spaces for structured community activities and programs for all age groups, and for private and community functions and events.

The population forecasts suggest that a new primary school will be required within the Science Park, but this will depend upon the extent to which existing small rural schools in the surrounding area might instead be redeveloped as urban schools. As the need for a primary school cannot be confirmed by the Department of Education and Communities at this early stage of planning, the draft Master Plan should indicate a site for a "potential" primary school, with underlying residential / mixed use zoning to maintain future flexibility.

The population will also generate demand for a variety of local facilities and services to be provided by the private or non-government sectors. These include childcare centres and pre-schools, medical centres, family support services, places of worship and leisure and entertainment facilities. Sites for such facilities do not need to be identified at the rezoning stage, and will be acquired through market forces as demand is identified.

The Science Park population will not be large enough to support higher order district and regional facilities and services, but will rely on those in the surrounding area. The relatively small size of the Science Park population will make only modest demands on these facilities and impacts are expected to be marginal.

Chapter 7 identifies the likely needs of the residential, workforce and student populations for open space and sporting and recreation facilities, and the ways in which those needs will be addressed.

The open space plan for Sydney Science Park provides a total of 61.92 ha of land with a proposed RE1 Public Recreation zoning, to be handed over to Council to own and manage. This quantum of open space will be more than sufficient to meet future needs. It will provide a diversity of recreation opportunities, including spaces for informal recreation and enjoyment of natural settings, spaces for the workforce to enjoy a break from the workplace, playgrounds for children and young people, community gardens, walking and cycling trails and outdoor spaces for community cultural activities. It will also provide spaces for active recreation, including three playing fields (or one oval and one playing field), a number of kick about areas for informal games and multi-use recreation zones containing embellishments for individual fitness activities.

The future population will rely on existing facilities in the wider Penrith area for district level sporting facilities, aquatic facilities and regional open space.

It is too early in the planning process to anticipate what sport and recreation facilities might be provided by the universities. Opportunities for community and workforce access to any future university facilities and their provision on a shared basis will need to be explored as planning for the Science Park proceeds.

Chapter 8 provides a summary conclusion which outlines the findings above. Elements of social infrastructure to be included in a Voluntary Planning Agreement with Council include the multi-purpose community centre, open space and sporting and recreation facilities. The extent to which Council may require contributions towards the provision of district level facilities in the wider area will be a matter for negotiation with Council, as part of the VPA negotiations.

Should it be determined in later stages of planning that a new primary school will be required, land for the site for the primary school (3 ha) will need to be made available to the Department of Education and Communities. No other state government facilities are proposed for the development area.

1 Introduction

1.1 Background

Elton Consulting has been engaged by APP to prepare a social planning report in support of a Planning Proposal to Penrith City Council for a mixed use development within Luddenham, known as the Sydney Science Park. The proposal is to rezone a 288 hectare parcel of land at 565-609 Luddenham Road, Luddenham to accommodate a new integrated mixed use research and development, employment, education, retail and residential specialised centre.

This Planning Proposal is being submitted to Penrith City Council (Council), on behalf of E.J. Cooper & Son Pty Limited (EJC), in support of an amendment to the Penrith Local Environmental Plan (LEP) 2010.

This report addresses social planning issues relevant to the Planning Proposal, and sets out the proposed social infrastructure offering for the development. The wider development context and the master plan for the site have been reviewed, to identify the demands likely to be placed upon existing and proposed social infrastructure and open space by future residents, and the ways in which those demands will be addressed.

1.2 Project description

The site of the proposed Sydney Science Park lies immediately south of the Warragamba Prospect Water Supply Pipeline, between Old Northern Road and Luddenham Road, in the southern part of Penrith Local Government Area. It is held in private ownership in agricultural and rural residential uses at present. The site lies within the north-western quadrant of the Western Sydney Employment Area (WSEA), which is described in more detail in Section 2.1.

Development of the Science Park represents a new vision for Australia to attract world class international educational and research and development opportunities to Western Sydney. The development will seek to integrate research and development facilities, science based companies, employment, education and residential uses around the important principles of food security, energy and health. A specialised town centre and an extensive network of open space are also key features of the development proposal. The Science Park will also contain the national headquarters of Baiada Poultry Pty Ltd and the Baiada National Food Science Laboratories and Research Facility.

A mix of residential and student accommodation will be integrated with the town centre, employment and education uses to respond to the housing and lifestyle needs of scientific professionals, business executives, employees and students.

The Planning Proposal is supported by a Master Plan, which represents the overall planning framework and preferred outcome for Sydney Science Park. The Master Plan includes:

» Approximately 340,000m2 of research and development floor space;

» Approximately 100,000m2 of education floor space;

» a Town Centre including a 30,000 m2 mix of retail floor space and residential apartments;

» 3,400 dwellings including student housing;

» A primary school;

» new roads and infrastructure; and

» sporting fields and parks.

The Planning Proposal addresses site servicing and environmental conditions. It is also accompanied by an offer to enter into Voluntary Planning Agreements with State Government and Penrith City Council for the delivery of infrastructure and community facilities that are required to meet the future demands of Sydney Science Park. This includes road network improvements, district and local open space, sporting facilities and a community centre.

1.3 Scope of report

This study outlines the rationale for including residential development as a component of a major Science Park project set to occur within the Western Sydney Employment Area. It also identifies the demand for social infrastructure and open space likely to be generated by the forecast residential, workforce and student populations, and the ways in which that demand will be addressed.

Preparation of this report has involved:

» Discussions and meetings with our client and other consultants and consideration of the draft Master Plan for Sydney Science Park;

» A review of existing plans, policies and background studies from Penrith City Council and the NSW Department of Planning & Infrastructure (DP&I), with a particular focus on the role of the Western Sydney Employment Area and Council's planning policies;

» Analysis of the social context of the proposed development, including demographic characteristics and development forecasts;

» An assessment of the existing community facilities and open space in the areas around Luddenham and within Penrith, and an understanding of the facilities proposed within the Sydney Science Park;

» A project meeting with staff of Penrith City Council about existing services, social planning approaches and the future requirements of the forecast population;

» Discussions with representatives from the Department of Education and Communities regarding school planning for the area;

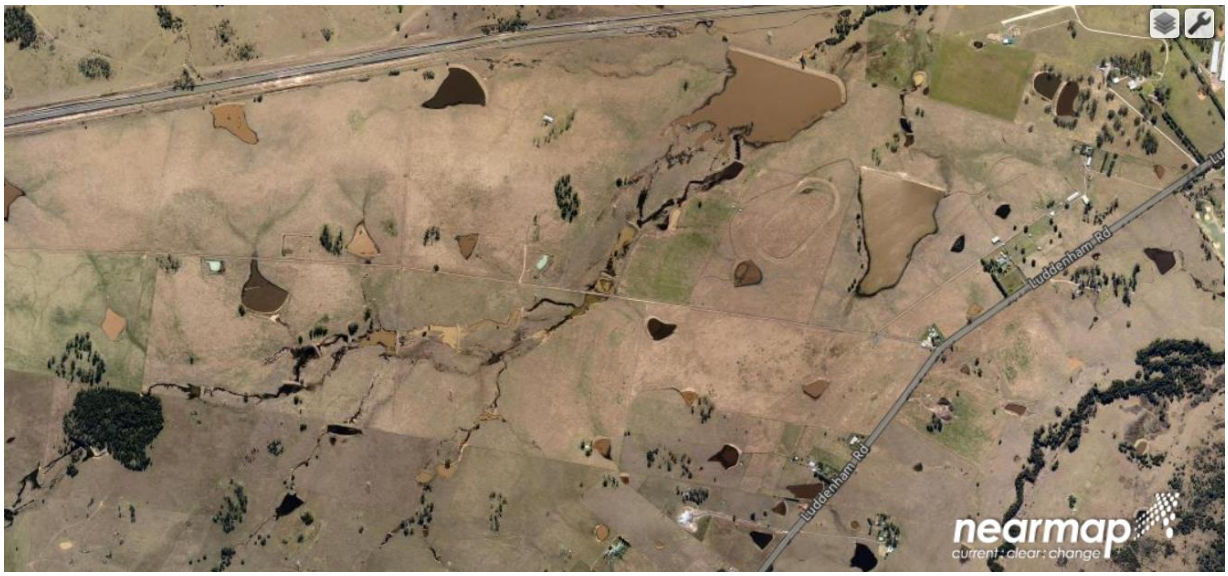
» Assessment of likely social infrastructure requirements and strategies for their provision.

2 Social context

This chapter presents an overview of the social context within which the development of the Sydney Science Park would occur. It considers issues of growth and change in this part of Western Sydney, the characteristics of the population currently living within the development area and the availability of existing social infrastructure in the surrounding area which could address some of the needs of the future Sydney Science Park residential and workforce populations.

2.1 Development context

The Science Park site currently contains agricultural and rural residential uses, and includes a small number of residences, with sheds, dams and access tracks being the only other structures.



Source: www.nearmap.com, accessed 20/11/13

Located approximately 50 kms west of Sydney's CBD and 10 kms south of Penrith, the site of the Sydney Science Park lies within the north-western quadrant of a large parcel of employment lands identified in the *Draft Metropolitan Strategy for Sydney to 2031* (NSW Government, March 2013) as the Broader Western Sydney Employment Area (BWSEA). The designation of this large employment zone is one of nine key city shaping projects within the *Draft Metropolitan Strategy*. The lands will help the NSW Government meet a major commitment to create employment opportunities for residents of western Sydney.

The BWSEA will be the biggest employment zone in NSW and expands the existing WSEA from 2,200 ha to more than 10,000 ha (NSW DP&I, June 2013). Around 57,000 jobs (half of all new jobs expected to be created within Sydney) are planned for this area over the next 30 years, to enable residents to work near their homes, spend less time commuting and support a more sustainable and efficient city. More than one third of the jobs are expected to be office jobs, while the remainder will be industrial jobs. Critical sectors likely to be targeted include transport, logistics and warehousing, research and development and industry as well as higher density employment opportunities such as business parks envisaged in the longer term. An early upgrade to Old Walgrove Road at Eastern Creek will be one of the first road upgrades, planned for 2013-14. Other features of the Draft Structure Plan for the BWSEA include:

- Proximity to a new Outer Sydney Orbital (OSO) corridor as identified in the Transport for NSW Long Term Transport Masterplan, a route that will connect the F3 to the Hume Highway south of Campbelltown. The corridor for the proposed Outer Sydney Orbital passes through the Sydney Science Park site;
- Additional major arterial road upgrades and a sub-arterial road network;
- Additional rail freight corridors and intermodal terminals eg between the BWSEA and Port Kembla;
- A possible passenger rail corridor connecting the South West and North West Growth Centres, with a railway station identified as being located within the site of the Sydney Science Park;
- More than 250 ha preserved for environmental protection, predominantly to preserve Cumberland Plain woodland;
- Two specialised centres to house new offices, shops and services, and a number of local centres, one of which is identified within the Sydney Science Park site.

A Draft Structure Plan for the BWSEA was exhibited for public comment in mid 2013.

The site's northern boundary is formed by the Warragamba Prospect Water Supply Pipeline that connects Warragamba Dam to Prospect Reservoir. Beyond the pipeline to the north lies a large parcel of Commonwealth Defence Restricted Land, including the Joint Ammunition Logistics Organisation Defence Establishment, Orchard Hills. There is potential for a future road linking the site to The Northern Road to the west.

Further to the north, the regional city of Penrith offers significant office, retail, administration, recreation and cultural facilities and services and transport connections. Penrith is known as Sydney's gateway to western NSW, including the Blue Mountains World Heritage Area. It is designated as a Regional City within the Draft metropolitan Strategy for Sydney.

To the south of the site is Commonwealth land reserved for Sydney's second international airport at Badgery's Creek. An announcement on the future of the second airport for Sydney is expected soon.

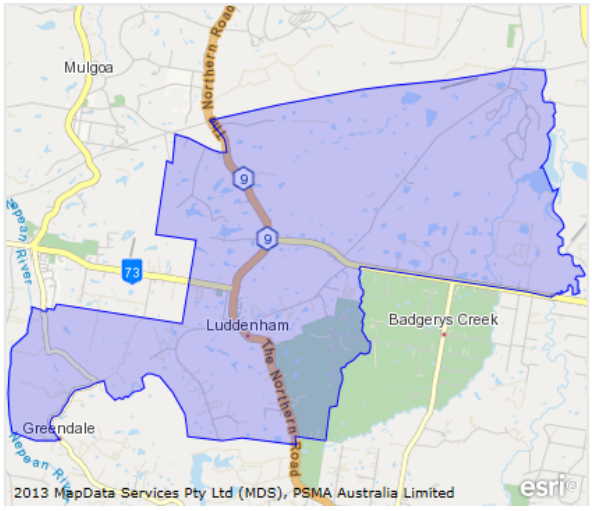
To the east of the site, across Luddenham Road, lies the newly developed Twin Creeks Residential Estate and Golf Club. The estate is marketed as a high-end private residential golf and country club, with a private entrance, low density, "luxury architecturally designed homes, backing onto golf course or bush reserves" and a Graham Marsh designed par 72 championship golf course set amongst 800 acres of Cumberland Plain bushland (sales brochure). Facilities, for the exclusive use of residents, their guests and Club members, include two tennis courts, spa, children's pool, barbeque, park, enclosed children's play area, clubhouse with a bar and restaurant, and an adjacent community facility. The Club also offers a large conference centre for meetings, business functions and private events, able to accommodate 250 guests for cocktails or 160 seated. The Club also hosts corporate golf events.

Dwelling standards within Twin Creeks are subject to architectural and environmental design standards governing appearance and materials. The development contains approximately 150 lots ranging in size from around 1,400m^2 to 4,000m^2, with more than half now appearing to be occupied.

2.2 Demographic context

The population of this part of western Sydney has changed little over the past 20 years, being beyond the formal growth areas on the fringe of the metropolitan area.

The Sydney Science Park site falls within the suburb of Luddenham for the purposes of the 2011 Census of Population and Housing (see adjacent figure). Analysis of census data indicates that the existing population in Luddenham is characterised by the following features:



- A population of around 1,500 residents;
- A reasonably high proportion (27.2%) of children and young people aged 0-17 years (compared with a Sydney average of 22.9% in this age group);
- A relatively small proportion (37.5%) of people aged 25-54 years (43.8% for Sydney), and a higher proportion of older people aged 55+ (24.4%, compared to a Sydney average of 23.7% and a Penrith LGA average of 21%);
- A very high proportion (84.2%) of family households (compared with 73.1% for Sydney; 78.3% for Penrith);
- A relatively low proportion (13.8%) of lone person households (22.6% for Sydney; 19.2% for Penrith);
- Around 53% of family households comprise couples with children (48.9% for Sydney);
- A very low proportion (14.1%) of overseas born residents (34.2% for Sydney; 20.9% for Penrith), which corresponds with the very low (17.9%) proportion of households who speak a language other than English at home (35.5% for Sydney);
- Above average median household income levels of $1,562 ($1,447 for Sydney; $1,398 for Penrith);
- A low proportion (11.5%) of people working in professional and managerial roles (25.5% for Sydney);
- A high proportion (21.2%) working as labourers, machinery operators and drivers (13% for Sydney);
- The proportion of the population with a university qualification at around half the Sydney average (16.3% in Luddenham compared with 33.1% for Sydney), but a high proportion (21.1%) of people with a certificate qualification (15.2% for Sydney);
- A predominance of separate houses (97.1% compared with 60.9% for Sydney);
- A higher proportion (35%) of houses which are fully owned (30.4% for Sydney).

Further details are provided in Appendix 1.

2.3 Existing social infrastructure

Existing and proposed social infrastructure, human services and open space uses in the areas surrounding the Sydney Science Park site have been identified for the purpose of understanding existing supply and any spare capacity. However, given the undeveloped nature of this area, existing facilities and services are very limited, and could not be expected to have capacity to serve the needs of a large incoming population or future workforce.

Sydney Science Park
Community Facilities

GOVERNMENT PRIMARY SCHOOLS
A1 Luddenham Public School
A2 Surveyors Creek Public School
A3 Glenmore Park Public School
A4 Mulgoa Primary School
A5 Blackwell Primary School
A6 Banks Public School
A7 Orchard Hills Public School

GOVERNMENT HIGH SCHOOLS
B1 Glenmore Park High School

NON-GOVERNMENT PRIMARY SCHOOLS
C1 Trinity Catholic Primary School
C2 Bethany Catholic Primary School

NON-GOVERNMENT COMBINED SCHOOLS
D1 Mamre Anglican School, Erskine Park
D2 Christadelphian Heritage College
D3 Penrith Anglican College
D4 Penrith Christian School

NON-GOVERNMENT HIGH SCHOOL
E1 Caroline Chisholm College
E2 Emmaus Catholic College

CHILDCARE CENTRES
F1 Luddenham Childcare Centre
F2 Kids World Kindy Long Day Care Centre
F3 Hopscotch Long Day Care
F4 Wiz Kids Child Care
F5 Harold Wheen Pre School

EMERGENCY SERVICES
G1 Erskine Park Fire Station
G2 Penrith Police Station

MAJOR SPORTING FACILITIES
H1 Sales Park- Robert Green Oval
H2 Ched Towns Reserve
H3 Blue Hills Reserve
H4 Surveyors Creek Softball Fields

CULTURAL, SOCIAL AND COMMUNITY FACILITIES
I1 Mulgoa Hall
I2 Floribunda Community Centre
I3 Glenmore Park Youth and Community Centre
I4 Surveyors Creek Community Centre
I5 Glenmore Park Child and Family Precinct

REGIONAL FACILITIES
J1 Penrith Community Health Centre
J2 Joan Sutherland Performing Arts Centre
J3 Nepean Hospital
J4 Penrith city Library
J5 Penrith Sports Stadium

TERTIARY EDUCATION
K1 University of Western Sydney-Penrith Campus
K2 Western Sydney Institute of TAFE

STUDY AREA

0 400 800 1200 1600 2000 m

2.3.1 Local facilities

There is no social infrastructure within the Science Park site at present and very limited facilities and services in surrounding areas. Map 1 on the previous page shows existing social infrastructure within the study area.

Shopping and neighbourhood services

Mulgoa village, accessed from the site via Littlefields Road, is the closest shopping centre, catering for a wide range of daily needs, including a supermarket, bakery, butcher, chemist, fruit and vegetable shop, newsagent, real estate agency, medical practice, café, restaurant, hair salon and bottle shop.

A little further afield, there are also local shopping centres in Glenmore Park, St Clair and Erskine Park. For requirements that cannot be met in these centres, major shopping facilities are available within the Penrith city centre and St Marys town centre.

Schools and childcare

More than a dozen schools are located in suburbs surrounding the Sydney Science Park site, including a number of independent / non-government schools. The closest government primary school to the site is Luddenham Primary School to the south, although there are others in nearby Erskine Park, St Clair, Orchard Hills, Glenmore Park and Mulgoa. The primary schools at Luddenham, Mulgoa and Orchard Hills are all small rural schools, each with less than 100 students. The nearest government high school is in Glenmore Park, 10 kms to the north east. However, seven non-government / independent high schools are located throughout the surrounding suburbs, with the closest being Penrith Anglican College, Orchard Hills (8 kms north).

A review of the Myschool website (www.myschool.edu.au) illustrates enrolment patterns for these schools. Enrolments at most schools have been stable or increasing slowly over time.

Table 1 Schools near Sydney Science Park and historic enrolments

School	2008	2009	2010	2011	2012
Government Primary Schools					
Mulgoa Primary School, Mulgoa	62	62	60	72	76
Luddenham Primary School, Luddenham	63	69	61	56	81
Blackwell Primary School, St Clair	514	516	496	509	510
Surveyors Creek Primary School, Glenmore Park	436	421	422	434	434
Banks Public School, St Clair	411	392	357	330	324
Orchard Hills Public School, Orchard Hills	77	81	84	84	81
Government High Schools					
Glenmore Park High School, Glenmore Park	662	674	693	745	773
Non-government Primary Schools					
Trinity Catholic Primary school, Kemps Creek	380	364	345	335	362
Bethany Catholic Primary school, Glenmore Park	558	545	572	587	626
Non-government Combined Schools					
Nepean Christian school, Mulgoa (K – 10)	262	283	312	301	290

School	2008	2009	2010	2011	2012
Mamre Anglican School, Erskine Park (K – 12)	207	172	210	254	331
Christadelphian Heritage College Sydney Inc, Kemps Creek (K-12)	196	203	203	194	220
Penrith Anglican College (PAC), Orchard Hills (K – 12)	1,181	1,236	1,275	1,282	1,277
Penrith Christian School, Orchard Hills (K – 12)	650	624	632	630	621
Non-government High Schools					
Caroline Chisholm College Girls' Catholic High School, Glenmore Park (7 – 12)	974	955	950	950	985
Emmaus Catholic College, Kemps Creek (7 – 12)	864	873	912	921	932

Source: www.myschool.edu.au, accessed 26 August 2013

Several local schools also operate pre-school facilities. In addition, Mulgoa contains a stand-alone pre-school. Long day care services are offered at centres at Kemps Creek, Luddenham, Glenmore Park, St Clair and Erskine Park. Many appear from websites to have some vacancies on some days for some age groups.

Community facilities

Mulgoa Hall is the nearest community hall to Luddenham at present. The facility provides a simple hall for hire with capacity for 110 people.

Community facilities provided within Glenmore Park include:

- Floribunda Community Centre – containing a medium-sized hall as well as a meeting room and activity room
- Glenmore Park Youth and Community Centre - offering a large function hall with terrace, as well as two good sized meeting rooms.
- Surveyors Creek Community Centre –providing a good sized hall as well as three meeting rooms.

These facilities have been provided by Penrith Council to meet the local needs of the sizable Glenmore Park community, and, with their local focus, would not be able to also serve the future Sydney Science Park community.

The nearest library to the site is the St Clair branch library, within the St Clair Shopping Centre. The site is also served by the central library within Penrith City Centre. Being the largest library within the Penrith LGA, this library provides a range of digital resources (computer and internet facilities, photocopying and self-checkout facilities) and a range of study spaces for users.

Medical services

Medical centres with GPs are located at Mulgoa and Luddenham. Further afield, a variety of general and specialist medical services and allied health services are available in Glenmore Park and Penrith city centre.

Emergency services

The closest ambulance station to the site is located within the suburb of Penrith. There are a number of fire and rescue stations located within a 5km radius of the project site, including at

Erskine Park, Mulgoa and Wallacia. The nearest police stations to the site are in Penrith and St Mary's.

Open space and recreation facilities

There are currently no areas of developed public open space within the Sydney Science Park site. The area's rural character also means there are limited open space facilities within close proximity to the project site. Penrith Council's *Open Space Action Plan* (June 2007) notes that in this area, typical of other rural areas, "many recreational and leisure activities take place on private land" (p. 18).

There are a number of significant areas of open space with sporting facilities located in neighbouring suburbs, the closest being in Mulgoa and Glenmore Park. Gow Park in Mulgoa provides two soccer fields and a cricket pitch, while Mulgoa Park contains some tennis courts. Glenmore Park offers Blue Hills Reserve (comprising a cricket pitch and mini soccer fields), Ched Towns Reserve (a variety of different sized rugby league fields, two soccer fields, two cricket pitches and a skate park) and Surveyors Creek Softball Fields (containing a number of softball diamonds).

Beyond the LGA boundary to the south, three additional areas of open space also serve residents of the Luddenham area (Bill Anderson Park, Badgerys Creek Park and a baseball field south of Elizabeth Drive).

In addition to the provision of public open space, a range of private recreational facilities are provided within surrounding suburbs. The closest is the Twin Creeks Golf and Country Club, comprising a large scale leisure facility accessible to both paying members and guests. The Club offers a championship golf course set amongst 800 acres of bushland, together with tennis facilities, conference facilities, function spaces and dining and beverage facilities. Other facilities within proximity to the site include:

» Orchard Hills Golf Club

» Wallacia Golf Course

» Hubertus Country Club, Luddenham

» Glenmore Heritage Valley Golf Club, Mulgoa Road, Mulgoa

» Sydney School of Model Engineers Model Park

» Equestrian centres at Mulgoa and Wallacia

» Bill Spilstead Complex for Canine Affairs (Dog Showground).

Places of worship

A number of places of worship are located within proximity to the site. These include:

» St Thomas Anglican Church, Mulgoa

» Schoenstatt Fathers

» Schoenstatt Sisters of Mary

Conference facilities

The area offers a number of conference centres and retreats such as Winbourne Edmond Rice Retreat and Conference Centre, the Mount Shoenstatt Retreat Centre, Greenvale Lodge and Luddenham Lodge, in addition to the Twin Creeks facility noted above.

2.3.2 District and regional facilities

A range of district and regional level facilities are provided in the wider area, with facilities and services available in Glenmore Park, St Marys or in Penrith city centre. District and regional facilities and services accessible from the site include:

» Joan Sutherland Performing Arts Centre, providing a range of facilities including:

  - The 660 seat Richard Bonynge Concert Hall

  - The 380 seat Q Theatre Drama Theatre

  - The 100 seat multi-purpose Allan Mullins Hall

  - Penrith Conservatorium of Music (comprising music studios, orchestral and ensemble rooms);

» Penrith Valley Cultural Precinct at St Marys;

» Penrith City Library;

» Penrith Community Health Centre and St Marys Community Health Centre- providing a range of services in the Penrith area to children, young people and their families. Services range from health promotion, through prevention and early detection to assessment, treatment and continuing care;

» Nepean Hospital, located in Kingswood approximately 12km north of the project site. This hospital is a public facility and a teaching hospital of the University of Sydney. The hospital also provides nursing and allied health training for many other universities within Sydney.

» Blacktown Hospital and Liverpool Hospital provide secondary options should they be required, however these facilities are located approximately 25 north west and 25 km west of the site respectively.

» Tertiary and further education facilities, including Nepean Community College, the Penrith campus of the University of Western Sydney and Western Sydney Institute of TAFE. The University of Western Sydney's Penrith Campus at Kingswood and Werrington has about 9,000 enrolled students.

» A number of residential aged care facilities and home care support services for older people;

» Individual, youth and family support services focused in and around Penrith city centre;

» Regional shopping, entertainment and recreation facilities in Penrith city centre. St Marys town centre provides district level shopping;

» A variety of regional sports facilities, including Penrith Sports Stadium, Penrith Swimming Centre, the St Clair Leisure Centre and Ripples Leisure Centre at St Marys.

Westbus currently operates services northbound along The Northern Road to Penrith city centre and rail station. Services are infrequent and limited to morning and afternoon peak times for commuters. It is anticipated that bus services would be enhanced once the population of the area grows to make viable a more frequent service.

2.3.3 Summing up

Consistent with is nature as a predominantly rural residential area served by the small villages of Luddenham and Mulgoa, there is little in the way of existing social infrastructure in the area immediately surrounding the site. The facilities and services that do exist are generally small-scale and would not have the capacity to meet the needs of a large influx of new residents.

The established suburbs closest to the site, Glenmore Park and St Clair, contain a greater variety of local facilities and services, but these have been built to serve the needs of their immediate communities, and would not have the capacity to also meet demand generated by the Sydney Science Park. Nor would they be readily accessible to the new population (in terms of walking and cycling distance for local facilities).

This points to a need for a range of new facilities and services to meet the local needs of the future population.

In the wider area, district and regional facilities and services are focused in and around the Penrith City Centre, located about a 15 minute drive from the site along The Northern Road, and the St Marys town centre, accessed via Luddenham Road. The future population of the Sydney Science Park will contribute only marginally to the large catchment for these facilities, which could be expected to absorb such demand. There will be a need to improve public transport access to these facilities and services; however, the population growth envisaged within the Sydney Science Park will support such improvements.

3 Planning Context

A wide range of state and local government policies and plans set out the social objectives for new developments within the Penrith LGA and western Sydney more generally. The major issues relevant to an assessment of social planning issues associated with development of the Sydney Science Park are summarised in Table 1 below, with more detail provided in Appendix A. The policies and plans acknowledge a range of similarities and differences in expectations and approaches to development between urban and rural parts of the LGA.

Key issues which arise consistently across plans and policies which are relevant to future planning for Sydney Science Park include:

» Demand for more affordable housing supply and greater housing diversity;

» A need for adaptability of housing types to meet future changes in the population, particularly aging over time;

» The importance of creating communities rather than just housing estates, with a focus on meeting community needs through social infrastructure provision and urban design which encourages interaction, connections, safety and community well-being;

» The importance of access, including public transport, so that all groups in a community are able to access services and facilities necessary to meet social, recreational, employment and heath needs;

» Incorporation of employment opportunities into new developments to minimise travel and commuting needs.

Table 2: Summary of planning policy issues

Policy / Plan	Relevance to Sydney Science Park
Draft Metropolitan Strategy for Sydney to 2031	The Draft Metropolitan Strategy for Sydney to 2031, (NSW Government, March 2013) provides the overall context for the rezoning and development of Sydney Science Park. The Metropolitan Strategy 2031 provides a framework for Sydney's long term and sustainable growth, by focusing on five key outcomes: » Balanced growth » A liveable city » Productivity and prosperity » Healthy and resilient environment » Accessibility and connectivity. As noted in Section 2, the site is located within the Western Sydney Employment Area, a 10,000 ha site south of the City of Penrith and the M4 freeway, and west of the M7 freeway (NSW DP&I, June 2013). In planning for 'balanced growth', the WSEA is identified as one of nine 'city shapers', due to its size, scale and potential opportunities for change, investment and productivity by bringing jobs closer to where people live. Strategic planning is underway to develop a long term program for

Policy / Plan	Relevance to Sydney Science Park
	servicing and land release within the WSEA – initially through development of a structure plan (currently on exhibition). Other priorities for the WSEA identified in the Draft Metropolitan Strategy include: » Encourage industries that support our economy's global functioning and promote employment eg industrial uses, freight, logistics, and research and development functions, as well as opportunities for agribusiness and food production; » Identify opportunities to improve transport connections to the area, including protecting a corridor for the Western Sydney Freight Line and the Western Sydney Employment Area arterial network; » Identify and protect opportunities for a major intermodal terminal at Eastern Creek; » Investigate opportunities for better connections with surrounding centres eg possible transport connections to Mount Druitt, Fairfield and Leppington. In addition, the Strategy sets ambitious housing and employment targets, including 545,000 new houses and 625,000 new jobs across Sydney by 2031, and shorter term targets. The Sydney Science Park proposal is consistent with the Strategy's objectives, as it will provide infrastructure and employment opportunities within the WSEA. In addition, the project will support the Strategy's goal to create a 'liveable city', by delivering housing, providing good design, creating socially inclusive places and delivering accessible and adaptable recreation and open spaces for the population.
Penrith Local Environment Plan 2010	The Penrith LEP was developed prior to the development of the Draft Sydney Metropolitan Strategy 2031 and consequentially there is no mention of the Western Sydney Employment Area. The site is only mentioned as being located within the RU2 Rural Landscape Zone.
Penrith Regional City Community Strategic Plan 2031	The Penrith Regional City Community Strategic Plan 2031 provides a 'big picture' long term direction for the City – identifying key community aspirations as well as Council and community priorities and objectives. With its focus on liveability, affordability, accessibility and environmental quality, the Community Strategic Plan 2031 is consistent with many objectives of the draft Metropolitan Strategy for Sydney. It also emphasises the need for equitable access to essential services and facilities and adequate infrastructure (eg public transport, roads, education, hospitals and social services) to support growth within the region. Sydney Science Park will support these objectives and contribute

Policy / Plan	Relevance to Sydney Science Park
	towards the infrastructure needs of its future residents.
Penrith Sustainability Blueprint for urban release areas	Penrith Council's Sustainability Blueprint for urban release areas is a guide for Council, developers and other stakeholders to ensure urban release areas are planned using the principles of sustainability. The Sydney Science Park proposal would address the objectives of the Sustainability Blueprint related to social sustainability, through its practical response to a number of key principles outlined within the document. These would include: » Principle 3 – Create communities - not just housing This principle highlights the requirement to develop places that foster social sustainability through the provision of formal and informal meeting places that encourage participation and interaction. The principle highlights the requirement for equitable, accessible and high quality recreational, educational, health and community facilities and services that are provided upfront to service an initial population. The principle highlights the requirement for a mix of dwelling sizes and types that are affordable to a range of demographic groups, key transport infrastructure and the possible consideration of a community development program. » Principle 4 – Create Employment - promote the economic growth of the City and minimise the need for commuting This principle highlights the need to provide localised opportunities for employment to minimise the need for commuting. The principle places a great emphasis on the importance of delivering new urban release areas that are self-sufficient and deliver enough jobs to match the incoming workforce participants moving into the community. To ensure the effective delivery of this principle, a diversity of business and employment opportunities must be provided to cater for a diverse demographic group. The Sydney Science Park is consistent with the principles relevant to social sustainability outlined within the document. The development proposes a mix of housing, employment opportunities and key infrastructure and services to support a new population. Sydney Science Park proposes a mix of industries that will provide a source of employment close to residences, ensuring the minimisation of long commutes to work.
Penrith Inclusion Plan: People with Disability 2009-2013	The Plan aims to improve Penrith City for people with disability and in doing so, deliver outcomes that benefit the greater community by making it easier for people to move around, access services and employment and obtain information about the City. The Plan envisages a "sustainable, inclusive and accessible community" and provides objectives, practical actions and strategies for Council to directly and indirectly achieve the vision.

Policy / Plan	Relevance to Sydney Science Park
	Sydney Science Park will address the objectives of this policy through its neighbourhood design, built environment and the provision of employment opportunities, facilities and services that foster and encourage interaction and inclusion for all people living and working within the Park.
Planning for an Ageing Community Strategy 2010+	This Strategy aims to ensure that by planning now, the needs of the future older community will be effectively met. The Strategy incorporates strategies to guide Council's urban, infrastructure and services planning to support older people to lead healthy, active and independent lives as they age and meet their diverse needs. Sydney Science Park will be attractive to residents across a range of age groups and life stages. Its built form will promote access and interaction for residents and the wider community. In addition, its features will encourage community participation in a range of activities, including cultural pursuits.
Penrith City Council Youth Action Plan 2010-2013	This is a brief document outlining strategies and actions for Council and its partners to improve Penrith City Council for young people, focusing on key, current priorities. These include providing opportunities for cultural experiences and improvements to accessibility to services for young people. Features of the Sydney Science Park of particular relevance to younger people will include the incorporation of sports facilities, open space and educational facilities that ensure young people who are living within Sydney Science Park have access to services and facilities that are not only instrumental for development, but enjoyable also.
Penrith Open Space Action Plan  Cluster 2 within Penrith LGA - Orchard Hills (south), Luddenham, Badgerys Creek, Kemps Creek, Mount Vernon	This plan identifies works required to enhance the quality of open space, sportsgrounds and facilities within Penrith LGA. The Open Space Action Plan was prepared in response to a need identified through People's Lifestyle Aspirations and Needs Study (PLANS) research, for improvements in the quality of open space and facilities across the LGA. The Action plan sets out Universal design principles, criteria for design of the open space network, open space requirements in new release areas and an open space planning approach based on 12 identified clusters. Sydney Science Park lies within Cluster 2 – Orchard Hills (south), Luddenham, Badgerys Creek, Kemps Creek, Mount Vernon (see Figure at left). Due to the area's rural character and areas 'limited potential for additional dwellings identified in Council's adopted Rural Strategy" (p.18), the cluster provides for only 3 neighbourhood parks, totalling 35.2ha in size, and 1 playground, to provide the public open space and meeting focal points for these communities. Improvements to two of these neighbourhood parks are recommended. The Open Space Action Plan also sets out Council's requirements regarding the provision of open space in areas of new urban

Policy / Plan	Relevance to Sydney Science Park
	development. These requirements are discussed in Section 6 of this report.

4 The need for residential uses

The vision for the Sydney Science Park is to be "a world class 'first of its kind' development for Australia. It will provide employment, research and development and educational opportunities for Western Sydney based on three fundamental themes of food security, energy and health".

As the 'first of its kind', there is little by way of precedent in Australia upon which to draw to identify social planning issues and needs associated with the Science Park. A research paper providing case studies of international science parks has been prepared for this project by Hill PDA, and it provides some useful research to demonstrate the critical role of residential uses in contributing towards successful research parks.

The Hill PDA study has found that science parks (variously also called research parks or technology parks) 'compete in an international market for highly skilled, qualified and specialised workers, who demand access to dwellings commensurate with their earnings. Research parks therefore compete with each other based on the attractiveness of their 'quality of life' offer in addition to the work opportunities they provide. Executive dwellings are an important part of this offer. The proximity to executive dwellings to research parks is also important given the impact of commuting on work/life balance' (p. 6).

The Hill PDA case studies of successful research parks illustrate the following issues:

- Residential uses are recognised as an important part of the infrastructure required for international science parks. Modern research parks recognise the importance of providing a comprehensive lifestyle offer to ensure their competitiveness in an international market.
- Science parks are marketed as self-contained lifestyle choices. The quality of the residential offer is particularly important to successful science parks:
  - workers command high salaries and this in turn drives demand for a range of 'executive' housing indicative of their financial means and life-style expectations;
  - workers also demand a high quality of life offer, demonstrating the importance of attaining a positive work/ life balance by minimising the need to commute;
  - A high quality residential offer is particularly important for fledgling research park locations, including other facilities to support a high quality of life.
- There is evidence that a lack of appropriate housing can restrict the development of a science park and can contribute to traffic congestion by encouraging commuting from off-site. Moreover, if not provided on site, workers will compete in the general residential market for executive housing.
- Residential uses within research parks also contribute to the social sustainability of the overall development. They help activate research park locations in evenings and weekends, thereby making them safer places and helping to create a sense of vibrancy and liveliness in the area. They also support and help make viable a range of retail, leisure and recreational facilities on site.
- A close association between science park and university supports successful science park development, in part by attracting graduates from the university to employment on site and by providing a source of qualified employees. Providing on-site and affordable housing opportunities for students and academic staff is an important component in creating an attractive and lively university campus.

» Research parks are commonly loss leading undertakings. For a privately funded research park to be financially viable in NSW there is a secondary need for residential uses to be incorporated as part of an overall development mix to underpin financial viability. Residential uses would mitigate the loss leading role of research park uses in the absence of government funding and allow the project to be financially viable.

The proposed development of the Science Park at Luddenham provides a critical opportunity to provide a source of highly skilled, quality jobs within Western Sydney. This stands in contrast to the types of jobs being created in other parts of the Western Sydney Employment Area, where the focus to date has been on warehousing, transport and logistics, in which job opportunities for those with high occupational skills and educational backgrounds are limited. The strategic value of the Science Park for this part of Western Sydney cannot be under-estimated, and the experience of science parks internationally suggests that including a residential component is a critical element in ensuring their success.

This is reinforced by the lack of housing, especially executive housing, in the immediate vicinity of the site which could serve the needs of an international research and development workforce. The exception to this is the Twin Creeks estate adjoining the site; however it is only small (150 lots) and already more than half occupied. Nearby suburbs of Glenmore Park and St Clair do not contain the types of housing likely to attract an international or executive workforce; nor do they, or the local villages of Luddenham and Mulgoa, contain the range of facilities likely to support the lifestyle needs and aspirations of such a group. This points to a need for a residential development designed to specifically address the needs of these groups.

The provision of such housing will help redress the social imbalance that exists in this part of Western Sydney, where the proportion of residents with university qualifications and in professional positions is well below the Sydney metropolitan average.

In terms of social integration between the existing Luddenham / Mulgoa population and the incoming Science Park population, it is noted that population growth will occur over a 25 year timeframe, enabling the existing community to absorb newcomers gradually and adjust to any changes. This growth must be seen in the context of the on-going and significant population growth that has been a feature of this part of Western Sydney and which is set to continue in the future.

The social integration of new and existing communities will be enhanced by:

» The proposed town centre within the Science Park, which will provide a range of retail and commercial facilities and services serving the wider area. It will draw the surrounding community into the development and encourage mixing with the new community;

» The local employment opportunities provided by the town centre and the business, research and development enterprises will also result in the mixing of new and existing populations;

» The proposed extensive open space and walking / cycling trails will be publicly accessible, providing valued recreation opportunities for the benefit of the wider area, and encouraging the mixing of new and existing populations;

» Access to and utilisation of community facilities within the Science Park by residents of the surrounding area (eg community centre, primary school, childcare centres);

» Science Park residents using facilities and services in the wider area, especially high schools, private schools, libraries and sporting / social clubs, where new residents will be drawn into the social networks of the district.

5 Housing and population projections

5.1 The development scenario

To help create a socially sustainable community within the Science Park, a mix of housing types and tenures will be provided. These will range from detached high-end homes to townhouses, apartments, studios, live/work settings and student accommodation, providing lifestyle, life stage, income and tenure choices to residents. Housing will be provided in a compact urban form which integrates multiple uses, encourages the creation of a walkable, pedestrian oriented community and facilitates access to parks, community facilities, shopping, employment and transport.

The proposed dwelling yield and mix are outlined in the following table.

Table 3: Proposed dwelling yield and mix

Year	2021	2026	2031	2036	2041
Dwelling type	Number of dwellings				
Detached dwellings	50	150	225	300	300
Terrace/townhouse	50	300	850	1200	1200
Apartments	50	450	575	875	1500
Student Dwellings	50	125	200	300	400
Total dwellings	200	1,025	1,850	2,675	3,400

This table shows that at full development around 2041, the Science Park is likely to contain around **3,000 dwellings, together with around 400 units of student housing**.

5.2 Forecast population numbers

Forecasting the size of the population for a development which will take place over a 25 year period is clearly an uncertain task.

In terms of estimating the likely size of the residential population, occupancy rates for different dwelling types across the Penrith LGA (derived from the 2011 Census) have been applied, as representative of trends across the area, although it is acknowledged that the average size of households for different dwelling types may vary over the 25 year development period. These occupancy rates are outlined in the following table.

Table 4: Average household size, Penrith LGA 2011

Dwelling type	Average household size
Detached dwelling	3.0 persons
Semi-detached, townhouse, terrace	2.3 persons
Apartment	1.9 persons

ABS Census of Population and Housing 2011

It has been assumed that student accommodation will take the form of college / bed-sit rooms, with 1 student per student dwelling.

The application of these occupancy rates to the dwelling yield table above indicates the likely size of the residential population at five year intervals over the development timeframe, as shown below.

Table 5: Growth of residential population

Year	2021	2026	2031	2036	2041
Detached dwellings	150	450	675	900	900
Terrace/townhouse	115	690	1955	2760	2760
Apartments	95	855	1093	1663	2850
Student Dwellings	50	125	200	300	400
Total population	410	2,120	3,923	5,623	6,910

This table shows that, at full development in 2041, the population of the Sydney Science Park is likely to be **around 6,900 people**.

In addition to the residential population, the Science Park will accommodate a large workforce which may contribute to demand for social infrastructure. The size and nature of the workforce has been considered in a separate study undertaken by Hill PDA. It has been estimated that, at full development, the Science Park may contain a workforce of around 9,800 people.

The university student population visiting the development each day will also be significant, with approximately 10,000 students envisaged to be enrolled in university courses on-site by 2041, (although many of these will be part-time students not attending the campus each day).

5.3 Likely population characteristics

It is difficult to forecast the likely age and household characteristics for a development which is uncharacteristic for this part of Sydney, and which will not be fully developed for another 25-30 years. Nevertheless, some indication of likely household characteristics can be drawn from recent experience with other higher density developments in outer Western Sydney.

Landcom's Thornton development in North Penrith is providing some experience of a new mixed density development in the Penrith context. While it is too early to confirm statistically the types of households that are attracted to this development, it is understood that the dwellings completed to date have been occupied by a broad mix of household types. This is consistent with the objectives for the development, which envisaged that the majority of households would comprise couples without children and single people, although families with children, especially smaller families, would still comprise a considerable component.

Analysis of Penrith census data from 2006 regarding households moving to or within Penrith LGA has shown that families with children purchasing in Penrith have chosen to live mainly in detached housing, followed by semi-detached styles. Only 13% of couple families with children chose to live in an apartment. By contrast, households without children (both couples and singles) predominantly chose apartments, although around one third of couples purchased detached houses, and one third of singles purchased a terrace / townhouse. Single parent families expressed a preference for detached or semi-detached housing, with only one fifth choosing apartments.

Further analysis of the data has shown:

» Of the households who moved into separate houses, 45% were couple families with children. Couples without children and one parent families each made up around 20% of those occupying houses;

» Semi-detached, row or townhouse style housing was most likely to be chosen by lone person households (34%). The remainder of semi-detached housing was relatively equally split between couples with children, couples without children and one parent families;

» Flats are most likely to have been occupied by lone person households (40%), followed by couples without children (31%). Around 11% of flats, units and apartments were occupied by couples with children and a similar proportion was occupied by one parent families;

» Other types of families, multiple families and group households differ in their characteristics, but accounted for only 4-8% of households within each of these dwelling types.

This profile is broadly consistent with the findings of a study of the medium and higher density housing market in Penrith undertaken by Randolph and Holloway from the City Futures Research Centre (2005). It found that:

» Medium and higher density housing in Penrith caters for a distinctive housing market, in which single people, couples without children and single parents predominate;

» A high proportion of households in medium and higher density dwellings comprised young people aged 15-34, and those aged 65+;

» More than half of all medium and higher density dwellings were rented privately (61% of semis / townhouses, 58% of low rise flats, and 68% of high rise flats), with associated high rates of population mobility;

» The medium and higher density market caters primarily for lower income groups, although older people comprise a more mixed income profile;

» Couples with children, the dominant household type in Penrith, account for only one in ten households in higher density housing;

» The majority of smaller households in Penrith were still living in detached family dwellings – only 10% of couples without children and 38% of lone person households lived in higher density housing.

Medium and higher density dwellings in new developments at both Rouse Hill (The Hills Shire) and Park Central (Campbelltown) also give some indication of likely household characteristics for higher density developments. These projects have been attractive to a wide range of households, including:

» Empty nesters and retirees, seeking a smaller home requiring low maintenance;

» Young people, often renting and sharing accommodation, and benefitting from convenient; access to TAFE, apprenticeship training schemes and town centre employment;

» First home owners, seeking to get a start in the market with a smaller dwelling;

» Couples, including those with children, who are willing to sacrifice a larger garden in a detached property for close access to shops, transport and schools;

» Health professionals, in the case of Park Central, associated with the proximity of the development to Campbelltown Hospital;

» Single people;

» Approximately 40-50% of properties have provided rental accommodation; the balance are owner occupied.

This data shows that while there is no direct causal relationship between dwelling type and household type, there are trends or tendencies for different types of dwellings to be occupied by certain types of households. On the whole however, a broad mix of household types can be expected in developments that offer a range of dwelling types and sizes.

On the basis of this experience, it is likely that a wide range of household types at different lifecycle stages and in varying socio-economic circumstances will be attracted to live in the Sydney Science Park:

» The detached dwellings are likely to be occupied predominantly by families with children, consistent with the housing profile for the Penrith LGA. These dwellings are likely to appeal particularly to executive, professional and academic staff working at the Science Park and university campus, who wish to live in a high amenity area close to their place of employment.

» The terrace/ townhouses will contain a mix of sizes / number of bedrooms and are likely to appeal to a wide variety of household types, including couples without children (both young and empty nester), families with children, single people and student shared households.

» The apartments will also contain a mix of sizes and are likely to appeal mainly to households without children, although larger apartments (3+ bedrooms) may also be occupied by family households.

The residential elements of the Science Park are intended to provide local housing opportunities for the people who will work there. Given the focus on research and development, technology, business and education, the incoming population is expected to be well educated, employed, and on moderate to higher incomes. Apartments will also be occupied by staff visiting the Science Park / university for short-term assignments. Proportions of retired people or those not in the workforce are expected to be small.

6 Requirements for community facilities and human services

This chapter considers how the needs of the residential, student and workforce populations for community facilities and human services will be addressed. The following chapter considers open space, sporting and recreation facilities.

6.1 Approach to provision of facilities and services

Social infrastructure is provided by a wide variety of agencies, including all levels of government, non-government organisations and the private sector. At the concept planning phase, the strategy needs to focus on the facilities which may have known land requirements, to ensure that sufficient land is identified in appropriate locations to meet future need. This focuses particularly on facilities and services provided by local government and State Government agencies (such as schools). Services provided by the Commonwealth Government have land requirements that are likely to be relatively modest, and most likely will use available commercial office space within designated centres. Such sites can be identified in subsequent detailed levels of planning.

Sites for facilities provided by the non-government and private sectors can be accommodated in residential, mixed use or commercial zonings, and do not need to be specially identified at the rezoning stage. They are usually acquired through the private market and will need to be considered at a later stage of development as demand is established. Types of private / non-government facilities that may have land requirements include private schools, private health care services, churches, childcare services, commercial gym and fitness facilities, residential aged care facilities and entertainment facilities such as cinemas, hotels and restaurants. The Master Plan will need to allow sufficient scope and flexibility to accommodate such uses as demand emerges.

For the Sydney Science Park, the proposed university campus elements represent further opportunities for the provision of social infrastructure, which might be shared with residential and workforce populations. At this stage, it is too early in the planning process for the universities to confirm the range of facilities that might be included within their campuses, or commit to any provision. However, in the longer term the development may present a variety of opportunities to provide access to facilities, programs, activities and lifestyle opportunities that are linked to and integrated with the university components. The extent to which this potential may be realised, and the nature of such integration, will be matters for future consideration.

6.2 Likely needs of the future population

6.2.1 The residential population

The future residential population, forecast to be around 6,900 people at completion of the development, will be large enough to justify the provision of a variety of local level community facilities. A population of this size will create a viable and reasonably self-contained catchment for local facilities, given the lack of adjoining development. These facilities will not be required until population thresholds have been reached to trigger their provision, likely to be around 2026-2031 for most facility types.

At the local level, residents will require access to the following:

» Neighbourhood retail and commercial services;

» Spaces for informal social interaction, such as cafes;

» Indoor spaces for community activities, programs and services;

» Medical services such as GP's;

» Childcare and out of school hours care;

» Pre-schools and primary schools;

» Local leisure and entertainment facilities;

» Places of worship.

The population will not be large enough to warrant the provision of new district and regional facilities and services that serve a larger catchment, but will instead rely on those existing in the surrounding area, principally in and around Penrith city centre and St Marys town centre. Such facilities will include:

» A range of higher order retail and commercial services

» Information and library resources

» Specialist medical, community health, allied health and hospital services

» High schools and technical and further education

» A range of family and individual support services, including youth, family, disability and aged care services

» Cultural and entertainment facilities (theatres, cinema etc)

6.2.2 The workforce and student populations

Societal expectations are increasing that workplaces should provide an attractive and pleasant environment to support the health and well-being of their workforce, giving rise to higher expectations about the range of services and facilities that can be accessed during the working day and the level of amenity of the working neighbourhood. This is consistent with aspirations for the Sydney Science Park to be a leading edge science park that provides a high quality of life for its workers, as well as for residents.

To help attract leading research and development companies and contribute to the lifestyle benefits of the Science Park, the workforce is likely to require access to the following range of facilities at the local level:

» Shops and personal services for daily convenience needs

» Spaces to have a break and relax away from the workplace and to socialise and network at lunchtime or after work. This includes cafes, pubs, restaurants, entertainment and leisure facilities

» Childcare for parents with babies and pre-school children, and vacation care for workers with primary school aged children

» Access to medical services, both for accidents / illness at work and to support busy lifestyles

» Spaces for corporate events, functions, business meetings, training courses

» A workforce may also make use of local libraries and hobby / interest / personal development classes and groups after work in the local area.

University students are also likely to seek access to a similar range of facilities and services, with the exception of spaces for corporate events, business meetings and training courses. Providing access to such facilities, whether as part of a university campus or in the wider public realm, will be an important factor in attracting students to the Science Park.

Large corporations and the universities are likely to provide some of their own facilities in-house. This makes it difficult to determine requirements for public facilities at this stage, or to identify opportunities for the development of facilities, programs and activities that might be shared with the residential community. These issues will require further consideration in subsequent more detailed stages of planning and as the development gathers pace.

6.3 Social infrastructure objectives

Based upon contemporary trends and leading practice for social infrastructure, the following principles should guide the provision of community facilities and human services within the Sydney Science Park.

Community facilities will be designed to:

» Respond to local needs and reflect the local community's identity, values and aspirations;

» Contribute to the health, well-being and quality of life of residents, workers and students, support their lifestyle needs and choices, and encourage the development of social capital and social cohesion;

» Make the most efficient use of limited resources, where appropriate being multipurpose, co-located with other facilities and able to accommodate shared and multiple use arrangements;

» Be provided in an efficient, timely and co-ordinated way, ensuring that they are available to residents as early as possible and residents are not disadvantaged through delays in delivery;

» Ensure flexibility in their use, so they can respond and adapt as needs change. Where appropriate, buildings should be capable of delivering a range of services, rather than designated for single uses or specific target groups that may quickly become outdated;

» Promote equitable access for all sections of the population, through the distribution, design and management of facilities. In particular facilities should be affordable for their target population;

» Comply with Crime Prevention through Environmental Design principles and reduce risks of vandalism and poor security;

» Promote innovation and creativity in the way agencies come together to deliver services, recognising the need for collaborative planning and partnerships to achieve effective and efficient delivery of human services;

» Provide environmentally and economically sustainable buildings;

» Develop sustainable ownership, governance, management and maintenance arrangements for facilities.

The location of community facilities has been guided by the following criteria. Community facilities should be:

» Central to their catchment population and easily accessible by the majority of their users;

» Visually prominent, with a main street location and presentation to the street;

» Accessible by public transport, and located to maximize access for pedestrians and cyclists;

» Located to enhance a sense of community, vibrancy and local civic identity, and to help create a focal point or hub for the community. This includes places where people already have cause to congregate, rather than on standalone sites, for reasons of safety, accessibility and

convenience. Shopping centres and schools are recognised as the key destinations where people tend to congregate within a neighbourhood. Locations within or adjacent to commercial centres also add to the activity level and critical mass needed to create a vibrant mix of activities and lively centre;

» Where appropriate, clustered together or co-located on a single site to provide opportunities for shared use of resources (management, parking, meeting rooms, amenities, play equipment) and for convenience, visibility and capacity for a "one stop shop". Clustering will also create synergies that promote better utilisation of services (for example, through cross referral of clients, or young people being more inclined to use a service that is adjacent to a place they already know);

» Located to provide a high level of safety and security, particularly at nights and weekends. This is most usually associated with high levels of activity and casual surveillance, as well as lighting and proximity to public transport;

» Where possible, located adjacent to open space to allow for larger outdoor community events, spill-over activities and children's play. Locations adjacent to outdoor recreation facilities such as tennis or netball courts can also provide a leisure focus as well as space for community activities;

» Located to ensure access to safe and convenient parking, including shared parking with surrounding land uses where appropriate.

6.4 Local government social infrastructure

Penrith City Council has a wealth of experience in social infrastructure provision in new release areas. In setting requirements for community facilities in areas of new development, it seeks to apply precedents and lessons learnt from previous projects, rather than having fixed standards or benchmarks for different facility types.

Community centres

To create a socially sustainable community which supports the health and well-being of its members and which promotes social interaction and the development of community networks, the residential, student and workforce populations of the scale outlined above will generate demand for spaces for:

» organised community activities, programs and classes, such as playgroups, fitness groups, art and craft classes and after school programs;

» meetings of local organisations and community groups;

» accommodation for community services and the delivery of sessional and outreach services;

» a base for community development activities and community cultural events, such as concerts and multi-cultural displays;

» leisure and support activities for young people and older people;

» adult education classes, training courses and business meetings;

» hire for corporate or private functions, such as birthday parties. This is particularly important in medium and higher density developments, where dwellings typically lack the private space for larger gatherings and celebrations.

These uses are best provided for in a multi-purpose community centre which can incorporate:

- a variety of flexible spaces suitable for a range of social, leisure and cultural activities. These typically include a hall suitable for large gatherings and events, together with some additional meeting and activity rooms of different sizes;
- office space for a community development worker, and for other human service providers;
- rooms for sessional or outreach health and welfare services such as baby health clinic, counselling or family support services;
- a room for children's activities which opens onto an enclosed garden. This might be used for child-minding for parents attending centre activities, for playgroups, and for before and after school or vacation care;
- spaces suitable for activities for young people, usually a multi-purpose room rather than one designated just for young people, but one which may open onto an outdoor barbecue or recreation area (eg half court basketball hoop);
- kitchen suitable to support private functions such as birthday parties;
- plenty of storage to meet the needs of a variety of user groups;
- adjacent outdoor space with children's play equipment and barbecue, to provide for spill over social events and activities for children.

As outlined in Chapter 2, the closest community space to the Science Park is the Mulgoa Hall, located in Mulgoa village to the west of The Northern Road. The limited scope of that facility, its lack of capacity as a flexible multi-purpose community centre and its distance from the proposed Science Park mean that it will not be suitable to meet the needs of the incoming population.

A residential population of the size proposed, together with the anticipated workforce and student populations, will be large enough to warrant the provision of a new multi-purpose community centre within the Science Park.

Advice from Penrith Council social planning staff indicates that Council would seek a multi-purpose community centre of around 810 sqm building area /4000 sqm site area. This is based upon the standard used for Jordan Springs Community Resource Hub, which will serve a population of a similar size. This standard, in turn, was based upon the standard adopted for Glenmore Park, where a child and family centre (including childcare) was included as part of the required community facilities.

In our experience, this would produce an overly generous community centre, and one which in practice would be bigger than Council is likely to want to manage and maintain. We recommend instead that a community centre of around 550 sqm be provided, based upon a benchmark of around 80 sqm per 1000 residents (a common benchmark for multi-purpose community centres adopted across a number of other councils in Western Sydney). For a facility of this size, a site of approximately 2,500 sqm will be required (subject to design details and capacity for shared parking).

As outlined above, community centres should be located in places where people already have cause to congregate, such as near shops and primary schools. It is recommended that a community centre within the Sydney Science Park be located within or adjacent to the proposed town centre core, to create a community focal point and reinforce the role of the town centre as the heart of the community.

Facilities for young people

Within the Science Park, there will be a need for "things for young people to do" at the local level, within walking distance, given likely limited public transport services until the rail line is built.

Leading practice now steers away from providing separate facilities just for young people, on the grounds of their under-utilisation for much of the time while young people are at school or work. Instead, the focus is now on ensuring that facilities and spaces are multi-purpose and able to meet the needs of the whole community, including young people.

At the local neighbourhood level, the needs of young people for space for social and leisure activities may be met through the proposed multi-purpose community centre, a well-designed public domain, and the open space, sporting and recreation facilities described in the following chapter.

Libraries

As outlined previously, the closest branch library to the site is currently at St Clair, with the central library located in Penrith city centre. Penrith City Council has recently adopted a plan to develop a new district library at Glenmore Park to serve the South Ward (which includes the Science Park site).

The Science Park will not be big enough to support its own library, but instead should contribute towards the proposed district library at Glenmore Park.

Cultural facilities

Specialist cultural facilities such as spaces for performing and visual arts are provided on a regional basis for large population catchments. Penrith Council has a Development Contributions Plan, adopted in 2003, which seeks contributions from all new residential development towards the expansion or redevelopment of facilities at the Joan Sutherland Performing Arts Centre and Penrith Valley Cultural Precinct (St Marys) in line with projected population growth across the LGA to 2022. Council would therefore expect to levy contributions from the Sydney Science Park towards the provision of these facilities, within the life of this Plan.

However, changes to arrangements for the funding of regional social infrastructure are proposed under the draft new planning legislation, and the proposed VPA will need to reflect these changes.

The proposed multi-purpose community centre will provide spaces suitable for cultural expression at the local level, including a hall suitable for local concerts, display space for local exhibitions and activity spaces for music, dance, arts and crafts.

The draft Master Plan has identified a site for a future Cultural Precinct in the central part of the development, close to the proposed recreational lake. At this stage in the planning process, this represents part of the vision and aspiration for the Science Park to promote cultural development and expression, rather than a firm commitment for the construction of specific facilities. The Cultural Precinct may contain outdoor spaces such as an amphitheatre suitable for events such as outdoor movies, concerts etc. The concept for the Cultural Precinct will be further developed in subsequent stages of the planning process.

6.5 State Government social infrastructure

Schools

The Department of Education and Communities (DEC) Advisory Notes for School Site Selection sets out the following criteria for the provision of schools in areas of new residential development:

» One public primary school per 2,000 to 2,500 new dwellings;

» One public high school per 6,000 to 7,500 dwellings (ie catchment of three primary schools).

The DEC Advisory Notes for School Site Selection also advises as follows:

» Primary schools require a site area of approximately 3 ha. There may be opportunities to reduce the site size to a minimum of two hectares if joint use of open space facilities can be negotiated;

» High schools require a site of approximately 6 ha, although there may be some scope to reduce this to a minimum of four hectares if schools are co-located with community sporting fields.

Locational guidelines for DEC schools include:

» Schools should be located relatively central to their residential catchment (within approximately 1.6kms by road) and on distributor or collector roads to alleviate noise and traffic problems;

» High schools should be located at a distance from commercial centres, especially where liquor outlets may be located;

» Urban design features should include:

– Has a number of frontage (three frontages required),
– Main street frontage should not be located opposite a T-intersection,
– Desirable to be adjacent to a community playing field,
– Allows for security and privacy through visibility and appropriate surrounding development,
– Is not overly overshadowed by surrounding development,
– Considers future form and structure of centres, towns and future development.

» Land should not be located within or immediately adjacent to:

– Land zonings for: Industrial (IN1 – IN4), Conservation (E1-E4), Waterways (W1-W3),
– Special uses such as electricity substations, mobile phone towers, sewage treatment plants, sewage systems, transmission lines, waste disposal facility, waste or resource management facility, water recycling facility, water supply system, wind farms and the like,
– Inappropriate retail and commercial development,
– Development with potential undesirable impacts or risks such as hazardous or offensive development, mining and extraction industries.

Other design requirements for new school sites included in the DEC guidelines include:

» Sites should have a slope no greater than 1:10;

» Sites must not be located within or immediately adjacent to land mapped as within the 1 in 100 year flood level;

» Sites should have a substantially regular shape;

» Schools should not be within or adjacent to land mapped as Bush Fire Prone or on a site that requires an Asset Protection Zone;

» Site will not give rise to significant issues associated with dust, smoke, odours or the like;

» Sites must not be contaminated, waste filled, have high soil erosion, stability or acid sulphate concerns;

» Sites should be free of ecological and heritage concerns or restrictions;

» Site should allow for other socially inclusive uses such as election days, community markets, emergency meeting points etc.

Application of the DEC dwelling thresholds above would suggest that the Science Park would generate a need for one primary school. However school planning also takes account of capacity in the surrounding area and opportunities to augment existing schools, rather than provide new schools in every new development.

Preliminary advice from DEC representatives includes the following:

» The nature of the development and proposed dwelling mix suggest that numbers of children living in the Science Park may not be as high as in other new release areas in Western Sydney, indicating that the usual threshold of 2,500 new dwellings may not necessarily trigger the need for a primary school.

» In any new area, the initial DEC strategy is typically to turn the smaller, rural schools in the surrounding area into larger urban style schools (with capacity for up to 500 students) with additional buildings or additional storeys to accommodate population growth. With regard to the Science Park, there are small rural schools with less than 100 students and with potential for growth nearby in Mulgoa, Luddenham and Orchard Hills. DEC is assessing the potential for

redevelopment of these sites to meet at least part of the demand generated by the Science Park. This assessment has not yet been completed by DEC.

» As the development will not achieve a critical mass of residents for many years, it is not feasible to commit to the provision of a new primary school at this stage. There is a lot of other development going on or expected across this part of Western Sydney (eg Kemps Creek and infill) and over the next 20 years it is expected that this part of Sydney will be transformed. The cumulative effects of continued development pressures will need to be considered in the planning of schools for this area. Badgerys Creek will be a catalyst for development and will place further pressures for development on land around the site. Depending on timing of other changes, this means there will not necessarily be a need for a school within the Science Park, or the Science Park may not be the best location for a new school in the area.

» Recognizing the 20-30 year planning horizon, maintaining flexibility is a key consideration. Identifying a "potential" school site in the draft Master Plan is supported, so long as the statutory zoning remains flexible. The underlying zoning should be 'residential', with the draft Master Plan showing an "indicative" site for a school, along with commentary that the landowner will continue to consult with DEC. Even if DEC provides advice that a school will be needed for the project, DEC cannot guarantee a school will actually be built 25 years into the future. It is important to manage community expectations about this.

Based upon this advice, the draft Master Plan has identified a site for a future primary school, but this site retains a 'mixed use' zoning.

With regard to the potential site for a primary school identified within the draft Master Plan, the following comments were made by DEC:

» There is a preference for schools to be at least 500m distance from transmission lines;

» If the school site is less than 3ha, there should be no road between school and oval. If the site is 3ha or more, it may be separated from the adjacent sporting fields by a road;

» It may be appropriate to move the school closer to the Town Centre so there are synergies with other community uses eg transport, cafes, community centre etc.

In terms of high schools, the Science Park population will not be large enough to support a new high school, but will instead form part of the catchment of the existing high school at Glenmore Park. It is too early for the DEC to project enrolment trends and capacity over a thirty year timeframe, but DEC anticipates that Glenmore Park High School will be able to absorb demand from the Science Park.

Public health services

The forecast population will not be large enough to warrant the provision of community health or hospital facilities within the development, but will instead rely on those in the wider region. These include community health centres in Penrith and St Marys and the Nepean Hospital at Kingswood.

The proposed multi-purpose community centre will contain spaces that may be used on a sessional or outreach basis to deliver community programs, such as an early childhood clinic.

Emergency Services

Bases for existing emergency and justice services (including police, ambulance, fire and rescue, rural fire and SES) were identified in Chapter 2.

It is too early for emergency services to identify needs for sites for additional services in this area. The future strategy for servicing this area will depend upon the nature and extent of other development within the BWSEA and cumulative development in the wider area, particularly the potential development of Badgerys Creek lands for a second international airport. It will also depend on further details about the future road network, given that response times are a key driver of need.

At this stage, no need has been identified for sites for emergency services within the Sydney Science Park.

6.6 Private / non-government sector facilities

The provision of private sector facilities and services will rely on population growth and market forces to establish demand and commercially viable services. Non-government sector organisations will also have to demonstrate need before funding will be made available for new facilities and services.

Neighbourhood shopping

Neighbourhood shopping and commercial services will be available in the proposed town centre. In the shorter term, until the permanent town centre has been built, some limited retail and commercial services will be provided in the initial stages of the development.

Higher order district and regional shopping facilities will be available in St Marys and Penrith.

Childcare facilities and pre-schools

A number of different forms of childcare and activities for young children are generally provided in a community, including long daycare, family daycare, pre-school, occasional care and playgroups. Additionally, services to support families with young children may be provided. It is not appropriate at this stage of the planning process to try to anticipate need for the various specific types of services. Instead, leading practice encourages planning of flexible multi-purpose childcare centres, which can provide a mix of services or adapt as precise needs are identified.

The provision of childcare has changed substantially in recent years, associated with shifts in government regulation and funding policy, such that the private sector is now the provider of the majority of childcare centres in Australia. As such, the provision of childcare in most new developments is commonly now left to market forces, once need can be demonstrated. This is consistent with the position of Penrith Council, which no longer provides Council childcare centres in new release areas.

In common with the provision of childcare in most new developments, childcare within Sydney Science Park will be provided by private sector providers, as demand develops. This will need to take account of demand from students and the workforce, as well as the residential population.

It is clearly too early to determine the number of childcare places, or number of centres, likely to be required. Larger employers and the university faculties may provide their own childcare centres.

It is not necessary that precise requirements for childcare are identified at this rezoning stage. Childcare centres are a permitted use within residential and commercial areas and do not necessarily require land to be designated at the master planning stage.

As planning proceeds, locational considerations for childcare centres should include:

» Central and conveniently accessible locations, to reinforce the role of the town centre as the focal point for the community;

» Adjacent to complementary uses such as schools and community centres;

» Avoid locating inappropriately in residential areas with amenity impacts on adjoining residents (particularly in terms of traffic generation).

Planning for childcare will also need to address the need for out of school hours care for primary school aged children. Such need is usually met through multi-purpose childcare centres, through before and after school programs co-located with schools or through out of school care programs accommodated in community centres.

Private schools

Providers of independent schools undertake detailed demographic and feasibility assessments before committing to new release areas. They also tend to acquire their sites through market processes, rather than necessarily acquiring sites designated in master plans.

Demand for private schools reflects the socio-economic and religious profile of an area as well as the availability of private schools in the surrounding area. As noted previously, there are already a number of private schools in the surrounding area, including Catholic, Anglican and other Christian primary and high schools. Given the proposed size of the Science Park population, it is unlikely that another private school would be feasible within the development.

Medical services

A population of around 6,900 people will generate a need for about 5 local general practitioners, based on a Western Sydney benchmark of one GP per 1,500 people. When the needs of the workforce and student populations are included, it is likely that 2-3 medical centres providing group practices might be feasible.

The proposed town centre will provide sufficient commercial space for local medical centres, which are also a permitted use within residential areas. Commercial space within the town centre will also be suitable for local services such as dentists and allied health services (eg physiotherapists).

Welfare and support services

As discussed in the previous chapter, the Science Park population is expected to be reasonably affluent and active, and demand for welfare and support services will be modest. However, given the experience of nearby release areas, there may be a need generated for some family support services.

Welfare and support facilities serve a wide catchment population and are best located in major centres where they are accessible by public transport. For this reason, they are currently concentrated in and around the Penrith city centre and St Marys town centre. The proposed town centre within the Science Park, while providing for some commercial uses, is not considered to be sufficiently central to the regional catchment to provide a good location for such services.

However, as for community health services, the proposed multi-purpose community centre will contain spaces that may be used on a sessional or outreach basis to deliver support services, such as family counselling.

Places of worship

As well as providing places of worship, churches can provide an important base for community development, youth, volunteer and welfare support activities in new communities, and are important in building community spirit and identity. Churches may also provide halls and other spaces which can be utilised for community activities by the general community. For these reasons, it is important that places of worship can be established within the Sydney Science Park area.

The acquisition of sites for places of worship is generally left to market forces, according to their ability to purchase sites, and it is difficult to specifically identify sites in the precinct planning process. However, the relatively high cost of zoned and serviced sites, particularly in central, accessible locations, often precludes places of worship from establishing in new communities.

At the same time, it is recognised that not every religious organisation needs its own facility, and that such organisations may also utilise other community facilities for their meetings, (such as community centres and schools), particularly as these are often not used by others when demand for space for religious activity is at its highest (for example on a Sunday morning for most Christian denominations).

The following issues should be taken into consideration in the future planning of places of worship within the Sydney Science Park:

» Places of worship can contribute significantly to community identity and activity. They should be located close to other types of community facilities to create synergies and help provide a focal point for the community (eg located within centres).

» Places of worship need to be readily accessible and visible, and located so as not to impact on adjoining residential areas.

» Given the limited utilisation of such facilities across the week, it is important that opportunities for shared or joint use be explored with other types of facilities, or multiple church groups, in the interests of making the most efficient use of land resources. This includes shared provision of parking and meeting/activity space.

» Church design and placement can offer significant urban design benefits in terms of providing iconic buildings, landmark features, community identity and way finding.

The draft Master Plan for Sydney Science Park does not need to identify specific sites for places of worship. It will be important, however, that consideration be given to the issues raised above regarding churches as detailed planning of the precinct gets underway.

Residential aged care

Residential aged care facilities are funded by the Commonwealth Government according to planning benchmarks based on numbers of people aged 70+. As these numbers cannot be forecast at this early stage of planning, (and as the planning benchmarks are regularly changed in line with policy shifts) it is not possible to predict precise needs now.

However, as the focus of the residential component of the Science Park will be on providing housing for the workforce and student populations, the development is not expected to have a high population of older people, nor to provide a particularly appropriate location for residential aged care facilities.

Should such facilities be developed within the Science Park, it is noted that residential aged care is a permitted use within residential neighbourhoods (in keeping with the principle of integrating, rather than segregating older people and people with a disability) and so may be provided within any of the proposed residential areas, without the need to identify sites at this stage. Sites for these facilities are purchased through market processes and do not need to be identified at the rezoning stage. Site criteria include proximity to shops, services, community facilities and public transport, and so such facilities should be located close to the town centre or transport interchange.

Leisure and entertainment opportunities

Entertainment and leisure facilities such as restaurants, cinemas, bars, clubs and pubs are provided on a commercial basis according to market demand. Such demand will be generated by the workforce and student populations as much as by the residential component.

It is anticipated that, over time, the town centre within the Sydney Science Park will provide a variety of such facilities. The population will also draw on facilities in the wider area, such as the Twin Creeks Golf and Country Club, the Penrith Panthers entertainment complex at Penrith and cinemas in Penrith Plaza.

6.7 Funding and delivery arrangements

The only facility recommended from this assessment that would need to be provided to Council as Works in Kind through a Voluntary Planning Agreement is the multi-purpose community centre. This facility would be owned and managed by Penrith City Council. Detailed specifications and inclusions for this facility will need to be negotiated with Council as part of the VPA.

The timing of provision of the community centre will be dependent upon development of the town centre, and the population reaching sufficient levels to warrant provision of the facility, typically around 50% of the proposed catchment population. Based on the staging schedule outlined in the previous chapter, this may not occur until around 2030.

Given this length of time, it is recommended that some form of temporary community centre should be made available in the meantime, in order that initial residents still have some form of basic meeting and activity space available to meet their needs. This might take the form of a

shopfront, dwelling, office or sales space which can later be converted to other uses once the permanent facility has been constructed.

6.8 Conclusion

This chapter has considered the needs of the future residential, workforce and student populations for community facilities and human services, and the ways in which those needs should be met.

The Sydney Science Park will generate a population of sufficient size to form a fairly self-contained catchment for local level facilities and services.

In terms of facilities to be owned and managed by Penrith City Council, it is recommended that a multi-purpose community centre of around 550 sqm be provided on a site of around 2,500 sqm within or adjacent to the town centre. This will meet needs for indoor spaces for structured community activities and programs for all age groups, and for private and community functions and events.

The population forecasts suggest that a new primary school will be required within the Science Park, but this will depend upon the extent to which existing small rural schools in the surrounding area might instead be redeveloped as urban schools. As the need for a primary school cannot be confirmed by the DEC at this early stage of planning, the draft Master Plan should indicate a site for a "potential" primary school, with underlying residential / mixed use zoning to maintain future flexibility.

The population will also generate demand for a variety of local facilities and services to be provided by the private or non-government sectors. These include childcare centres and pre-schools, medical centres, family support services, places of worship and leisure and entertainment facilities. Sites for such facilities do not need to be identified at the rezoning stage, and will be acquired through market forces as demand is identified.

The Science Park population will not be large enough to support higher order district and regional facilities and services, but will rely on those in the surrounding area. The future population will make use of Council's district and regional community facilities, including libraries and cultural facilities, and, under current Council policies, contributions towards the development or augmentation of these facilities will be sought through VPA arrangements. The relatively small size of the Science Park population will make only modest demands on these facilities and impacts are expected to be marginal.

7 Requirements for open space and recreation facilities

7.1 Open space and recreation needs

As for community facilities and human services, it will be difficult to anticipate precise needs for recreation and sporting facilities for a development which will grow over a thirty-year timeframe. Sport and recreation preferences and patterns of participation are constantly changing, indicating a need for flexibility in planning open space and sporting facilities to respond to changing needs.

At this stage, the planning of open space and sporting facilities needs to take account of general demand trends in recreation preferences and participation across Australia, as well as the likely needs of the future Science Park residential, workforce and student populations. These are outlined below.

7.1.1 Broad trends in demand

National trends in recreation participation and facility use across Australia include:

» A swing from organised outdoor team sports to individual fitness activities and social sport;

» Substantial growth in indoor sport and recreation;

» A growth in year-round swimming;

» Increasing participation by women and girls in traditional male sports such as AFL, soccer, rugby union and rugby league;

» Apparent decline in the physical activity levels of children causing concerns about obesity;

» Changes in participation in competitive sport (greater diversity of codes, reduced younger participation, greater participation in seniors and masters sports) and more participation in informal recreation activities;

» Continuing emergence of new activities as a result of overseas trends and increasing levels of cultural diversity (eg. cultural events, dancing, outdoor table tennis);

» Changing recreation preferences amongst older groups, as the population ages and "baby boomers" enter retirement;

» Demand for greater access to public open space in areas of higher density housing, where dwellings lack 'back yards' for everyday outdoor play;

» Increase in the proportion of families with two parents working full time (with probable reduced time for leisure);

» Flexibility in the times that people enjoy their recreation, as demands on time increase and work practices change. This means greater demand for lighting to enable night-time use of outdoor facilities, and indoor facilities that are available all day, every day of the year;

» Increasing impact of design technology on leisure choices, such as computer games and new recreational equipment. Associated with this a decreasing involvement by young people in

active recreation activities, and an increase in indoor 'passive' activities such as computer use and watching television, videos and DVDs;

It will be important to ensure that the quality and design of open space within the Sydney Science Park reflects these liftestyle trends.

7.1.2 Likely needs

Based on the likely characteristics of the future population outlined in Chapter 3, the broad needs of the Sydney Science Park population will potentially include the following:

» A variety of parks for informal play and passive recreation that support family and community activities. There will be demand for both locally accessible parks (ie within 400-500m walking distance of most dwellings) and larger recreation parks and linear parks that provide a focus for family activities such as walking, bike riding, play, picnics and social gathering opportunities.

» The quality of facilities and open space is as important as the quantity. Open space should be carefully designed and embellished to provide a diversity of recreation settings and opportunities for all age groups and all abilities. High quality and well maintained facilities should be provided to support recreation and play, including shade, water, seats, play equipment and bike areas.

» There will be a need for pleasant outdoor spaces within the town centre and employment areas for workers to have a break away from the workplace or eat lunch. This includes plazas and town squares as well as parks with seating.

» There will be demand for outdoor areas for larger gatherings and cultural events e.g. extended family and group picnics, amphitheatre, markets. The increase in community events within parks requires additional facilities and utilities such as power, water and parking infrastructure.

» A significant proportion of children is likely and this highlights the need for playgrounds and other outdoor activity opportunities such as bike tracks, mounds for BMX and skateboarding. Playgrounds should offer a range of play experiences for different age groups and include paths, play equipment, fencing, landscaping and shelter from sun, wind and rain. Opportunities for adventure play for older children and young people should also be provided.

» The likely significant proportion of young people highlights the need for parks and public spaces that are designed to be friendly to young people, providing meeting places that are safe and welcoming and allow for social interaction and informal games.

» The large proportion of adults suggests potential high demand for lower impact and flexible physical activity opportunities such as walking and bike riding. Linear connections and a network of walking and cycling tracks should be provided to support the potential high participation in walking and provide links to key destinations and recreation nodes. This network of paths will also be used by the workforce for fitness activities, such as jogging and walking.

» National health issues will continue to stress improving opportunities within the built environment for everyday incidental physical activity. Opportunities that increase incidental physical activity, through design of footpaths, road networks and accessible, safe and well lit walking and cycling tracks should be provided. Bike tracks that provide safe and appealing activity and transport opportunities, particularly for children and young people, will be essential.

» Options to enhance individual fitness in parks and trails will also be important, pointing to a need for fitness equipment. This demand will come from the workforce and student populations, as well as local residents.

» The open space network should also include areas to walk dogs, and off leash exercise areas for dogs.

» Opportunities to enjoy bushland, water and other natural settings, for picnics, bushwalking and as spaces for reflection, rest and relaxation will be valuable to broaden recreation opportunities.

» Demand for sporting facilities will be generated by the residential population (including children, young people and adult competition sports), the workforce (including informal lunchtime games as well as office team sports) and students (inter-university competitions and informal games). To meet the demand for organised sport, multi-purpose playing fields that are suitable for a variety of field sports, and able to accommodate both junior and adult sporting activities for males and females, will be required. Access to multi-functional outdoor courts will also be a necessity.

» There will also be demand for access to indoor courts for court sports, and indoor spaces for activities such as dance, martial arts, yoga, fitness, gym. Demand for indoor facilities for health and fitness will also be generated by the student and workforce populations.

» Access to aquatic facilities that include a variety of leisure and fitness activities and programs consistent with local needs and preferences will also be required.

Some of these needs will be satisfied by local open space and facilities to be provided within the Sydney Science Park, while others will be addressed by accessing higher order facilities in the wider district and more broadly in the region.

7.2 Planning and design principles

Penrith Council's current Recreation and Cultural Strategy was prepared in 2003 and is now somewhat outdated. While the Strategy and associated Open Space Action Plan (2007) contain a number of objectives and actions, they do not contain best practice principles to guide the provision of open space. In the absence of current Council open space design principles, the Landcom Open Space Design Guidelines have been used to provide the core principles that should guide open space and recreation provision for Sydney Science Park.

The Seven Principles described in those guidelines propose that all open spaces:

1. Are meaningful and appealing to the community. They should integrate the geographic and heritage features of the precinct, reflect and complement the natural and visual character of the local topography, vegetation and riparian corridors, and capitalise on features unique to the area, such as views from elevated areas.

2. Are multi-functional and adaptable to changing needs to allow a range of users to enjoy them. Open spaces should maximise joint use and co-location with other uses to minimise duplication, (including co-location with infrastructure easements where feasible) and maximise use of sporting facilities outside of training and competition periods.

3. Provide diverse recreational opportunities to meet a wide range of needs. They should cater for all age groups, both genders, different cultural backgrounds, physical abilities and levels of socio-economic status. This means incorporating universal access principles and incorporating features such as shade and shelter, BBQs, seating, lighting and pathways.

4. Encourage social interaction, recognising that the public domain provides a focal point for meeting and gathering and design features should encourage both incidental and planned social interaction and cultural activity.

5. Promote health and wellbeing, through encouraging physical activity, providing spaces for rest and relaxation and enhancing a sense of safety and personal security through the application of

Crime Prevention through Environmental Design (CPTED) principles. Chief among these is the principle of promoting natural surveillance of open space areas, with parks having a frontage to a road where possible.

6. Provide equity and accessibility. Open space should be largely publicly provided to ensure public access, and it should provide recreation opportunities that are inclusive of all members of the community. It is important to ensure that all public spaces are visibly and evidently public in nature to encourage use by all members of the community. To provide convenient and equitable access, international best practice suggests that a maximum walking distance of 400-500 metres (or a 10 minute walk) from any residential property to a park as optimum in urban or semi urban areas. To make access to public open space convenient, easy and safe, open space areas should also be linked and connected physically to provide an open space network. Links should include a network of off-road paths, shared paths, cycle ways and bush paths that connects major activities and open spaces to encourage walking and cycling.

7. Embody sustainability (environmental, social, cultural and financial). This includes to protect and conserve watercourses, water bodies and wetlands and incorporate natural areas and riparian corridors into the open space corridors where possible. It also includes to integrate the network of open space with stormwater management and water-sensitive urban design.

7.3 Site opportunities and constraints

The opportunities and constraints presented by the site and development concept have influenced the open space plan.

Opportunities include:

- The extensive system of creeks and riparian corridors allows for significant areas of linear open space for informal recreation and pedestrian and cycle linkages, as well as the formation of wetlands and water bodies which can provide visual attraction and appealing recreation settings;
- The Warragamba Prospect Water Supply Pipeline along the northern perimeter of the site presents opportunities to integrate a regional linear parkway with walking and cycling trails;
- The area's natural vegetation and topography can provide a distinctive character to the development and areas in which to enjoy natural settings;
- Topography - Elevated sites along ridge lines are favoured for informal open space because of views and interest. Flat land is preferred for sporting fields and facilities to minimise earthworks required;
- A key objective for the development is to create a high quality public domain which will attract businesses, workers and students to the Science Park. There are opportunities to create an extensive public domain which can make a significant contribution to place-making, community identity and achieving a high level of scenic quality;
- There are opportunities to create open space for civic uses associated with the town centre, such as a town square;
- The research and development activities of the Science Park will focus on the themes of health, food and energy. The extensive areas of proposed open space will provide opportunities to create community gardens where local food may be grown;
- The presence of university faculties will create opportunities to provide campus sport and recreation facilities that may be shared with business and residential components of the development.

Constraints include:

» Utilities – the site is bisected by electricity transmission lines. While Penrith Council will accept responsibility for the management of the open space underneath the transmission lines, it will not provide embellishments to enhance this space for active or passive recreation.

» Flooding along creeks and drainage lines – Flood liable land can potentially impact on the location, quality and usability of recreation infrastructure and sporting facilities. Council policy allows drainage areas to be used for passive recreation and walking / cycle pathways, but will not allow active open space or buildings to be located in flood affected land.

» The main creek corridor may act as a barrier to easy access throughout the precinct, effectively cutting it in half. However, this has been addressed in the draft Master Plan by providing east-west walking and cycling, as well as road links, at a number of points across the corridor to enhance access throughout the precinct;

» Any conservation land such as bushland with high environmental values and /or containing threatened species will be likely to be excluded from recreation access.

7.4 Council policy and standards

Penrith Council's requirements for open space in new release areas are documented in the Penrith Open Space Action Plan (2007). This document states that it is important to apply qualitative or needs based standards in conjunction with quantitative standards. Discussions with Council officers have indicated that consideration should be given to likely demands, site opportunities and constraints and the merit of what is proposed, rather than just a simple and strict application of the numerical standards.

Table 6: Penrith Council open space requirements in new release areas

Type of open space	Minimum quantum	Features
Local active open space	1.4 ha per 1000 people Additional required if higher than average demand anticipated	Requires high quality embellishment of less constrained land Not to be constrained by: – Power line corridors – Underground easements – Flooding (should be above 1% AEP flood event zone) – Steep gradients or slopes
Local passive open space	1.64 ha per 1000 people	May include: Neighbourhood park (up to 5 ha) Local park (0.5 to 3 ha) Pocket park (0.25 to 1 ha) and within 5 minute walk of all dwellings
Total local open space	3.04 ha per 1000 people	Does not include land required for drainage or designated biodiversity corridors, or land classified as natural areas
Linear open space /		Primarily serves a drainage function, but

Type of open space	Minimum quantum	Features
drainage reserve		also allows pedestrian and cycle paths. No formal recreation structures.
District open space	Embellish existing district open space to enable more intense utilisation	Separate contribution required as per District Open Space Development Contributions Plan

Penrith City Council Open Space Action Plan 2007.

The *Penrith City District Open Space Facilities Development Contributions Plan* (2007) states that Council's existing district (higher order) open space facilities do not have the capacity to absorb the recreation needs of the additional population resulting from future development. This is based on the findings of the PLANS Study undertaken in 2003, which found that Council's existing district open space facilities were only just sufficient to meet demand generated by the existing population. The Contributions Plan sets the contribution for district open space for the current phase of the City's growth ie 15 years to 2022. It proposes that existing land and facilities for district open space be upgraded through substantial embellishments to enhance their utilisation to meet demand generated by future development, rather than acquiring additional land in proportion to population growth. A works program is included for embellishments to major parks that play a district or city-wide role and major sporting complexes for specific sports eg soccer, tennis, swimming, softball.

Contributions are sought from all new residential development within the City of Penrith towards the cost of proposed district open space embellishments.

In addition to the provision of its own local open space, it is expected that the Science Park project will need to contribute towards the embellishment of district open space, in line with the requirements of this Contributions Plan and changes to the development contribution system foreshadowed in the proposed new planning legislation.

7.5 The overall quantum of open space

The quantum of public open space to be provided within Sydney Science Park has been determined with regard to:

» The vision for the development and aspirations of the landowners;

» The likely characteristics and needs of the forecast population;

» The opportunities and constraints of the site;

» The leading practice principles outlined above;

» Council policies and requirements.

The proposed quantum has considered likely requirements for:

» Sporting fields and outdoor courts;

» Local parks for informal recreation;

» Local playgrounds;

» Linear open space and linkages for walking / cycling trails.

The draft Master Plan proposes a total of 61.92 ha of land to be provided as open space, with a RE1 Public Recreation zoning. This includes land under the transmission line easement (approx. 10.49 ha) and land used for water management, but excludes the designated riparian corridors.

A comparison of this provision against Council's minimum open space requirements for the forecast population of 6,900 people is provided in the table below.

Table 7: Comparison of Council requirements and proposed provision

Type of open space	Council requirement	Proposed provision
Local passive open space	11.31 ha	56.77 ha
Local active open space	9.66 ha	5.15 ha
Total local open space	20.97 ha	61.92 ha

From this table, it is clear that the draft Master Plan provides well in excess of Council's minimum requirements for public open space. However, the proposed 61 ha includes some land of low recreation value, such as under transmission lines, along the Warragamba Prospect Water Supply Pipeline and several wetlands/ water bodies / detention basins and drainage corridors, which should not be considered as part of the Council minimum requirement. In addition, much of the open space is in the form of linear corridors, which, while useful for walking and cycling paths, are of more limited use for recreation purposes.

Taking account of these factors, the proposed provision of open space will still more than satisfy the Council benchmark requirement for 21 ha of quality, unconstrained open space suitable for a variety of recreation purposes.

Proposed areas of open space are indicated in the draft Master Plan on the following page.

7.6 Open space for sporting facilities

The sporting facilities likely to be required by the future residential, student and workforce populations will include playing fields, outdoor courts, indoor courts and aquatic facilities. The forecast population will not be large enough to make feasible the provision of aquatic facilities, indoor courts and some types of outdoor courts within the site, and will instead make use of existing facilities in the wider region. It will, however, be large enough to create demand for playing fields and some types of outdoor courts for active recreation. It will also generate demand for gyms / fitness centres, typically provided on a commercial basis in appropriately zoned areas.

As noted previously, it could be expected that the presence of university faculties within the Science Park will generate some provision of sporting facilities by the universities to attract and support the student population. By way of example, the UWS Penrith campus, with around 8,500 students in 2011, provides playing fields for rugby, hockey and soccer, tennis and basketball courts and a gym. It is too early in the planning process to anticipate what sport and recreation facilities might be provided by the universities. Opportunities for community and workforce access to any future university facilities and their provision on a shared basis will need to be explored as planning for the Science Park proceeds.

At this stage, the master plan has focused on the baseline facilities to be provided through a Voluntary Planning Agreement with Penrith Council, recognising that additional commercial and university sport and recreation facilities may be provided as the Science Park is developed and specific needs can be identified.

In terms of the quantum of open space for sporting facilities, as can be seen from Table 7, the draft Master Plan has identified a little more than half of what would be required under the Council standards for active open space. However, given the abundance of open space overall, there is capacity to increase the provision of active open space as the detailed design of the parklands occurs. It should be noted that at this stage, the 5.15 ha proposed for active open space includes

Key

- Proposed Broader WSEA Boundary (Responds to Topography)
- Mixed Use Zone
- Commercial Road - Major Collector Course Grain Uses
- City Road - Main Street Character Fine Grain Uses
- Local and Park Edge Streets
- Town Centre Core
- Cultural Precinct
- Village Centre
- University Administration Hub
- Urban Primary School
- The Dress Circle - Mixed Use Residential
- Open Space
- Urban Lakes / Detention Basins
- Wetlands / Detention Basins
- Community Urban Garden
- Structured Sports and Recreation
- Regional Play
- Landscape Buffer to Luddenham Road
- Pedestrian / Cycle Network
- Potential Regional Pedestrian & Cycle Network along Sydney Water Pipeline
- Potential Road Linkages
- Broader WSEA Structure Plan Proposed Railway Alignment and Potential Station
- Station Location For Underground Railway Option
- Transgrid Power Easement

Scale

0 100 200 400 600 800 1000m

design iQ

shaping the urban canvas

Sydney Science Park Master Plan

only land for playing fields and has not taken account of the other active recreation uses described below.

Sporting fields

The draft master plan has made provision for three single (soccer size) playing fields, with two fields together (4 ha), able to be used also as a cricket /AFL oval, to the west of the transmission lines, and a single field (1.14 ha) in the eastern part of the development. The proposed distribution provides for equitable access across the development and particularly ensures that residents of the eastern part of the development will also have access to local active (and passive) open space, should the proposed rail and Outer Orbital corridors act as a barrier to easy access to facilities in the balance of the precinct.

At this early stage of planning, the playing fields are proposed as multi-use facilities, rather than being allocated for specific sporting codes. Many sports can share space, and flexibility to respond to emerging demand is required at this stage of the development process. In the detailed design stage, consideration should be given to including features that will help to maximise use of the sporting fields, including lighting for training and evening games.

To meet Council requirements, the sporting fields will need to be located on relatively flat land outside of the flooding zone, and not underneath the transmission lines. The locations proposed in the draft Master Plan meet these requirements.

Council requirements for embellishment of sporting fields have not been identified, but are likely to include parking (eg 50 spaces per single field) and amenities buildings (toilets, change rooms for both men and women, canteen). Lighting to enable evening use and synthetic surfaces to enable intensive use in all weathers are further issues for negotiation with Council.

Additional space for active recreation will be provided in the form of "kick about areas" which allow for informal games and less structured use, without the need for formal full-sized playing fields. Such areas might be used particularly by the workforce for lunchtime and after-work games. The separate Landscape Strategy for the Sydney Science Park indicates locations for a number of such kick about areas.

Outdoor sports courts

In line with trends in many council areas, staff of Penrith Council have expressed a preference for outdoor courts (eg tennis, netball) to be clustered together at a district or regional level to allow for competitions and use by regional sporting associations, rather than scattering small numbers of courts throughout residential areas. In the experience of Council officers, such scattered courts are characteristically under-utilised, pose management and maintenance difficulties, and cannot support competition use. Penrith Council has regional tennis court complexes at Penrith and St Marys, and netball courts at sporting complexes in Londonderry, St Clair and Penrith and Erskine Park.

For these reasons, the draft Master Plan has not identified sites for outdoor sports courts. The population will rely on provision at district sporting complexes in the surrounding area. Contributions towards the development or augmentation of district sporting facilities will be sought by Council in line with Council's District Open Space Facilities Development Contributions Plan.

However additional small areas of active open space may be provided throughout the proposed open space network, in the form of 'multi-use recreation zones' which provide an outdoor health and fitness area with fitness equipment, half basketball court and other embellishments to encourage physical activity. These zones would occupy the approximate size of a basketball court. This recognises the trend towards individual active leisure and fitness activities, in addition to the need to provide for structured team sports.

Indoor sports and aquatic facilities

As stated above, the forecast population will not be large enough to support Council indoor recreation or aquatic facilities, but will instead rely on those available in the wider area, particularly the St Clair Leisure Centre and the Ripples Leisure Centre at St Marys.

Gyms and fitness centres are likely to be provided on a commercial basis by the private sector, as the workforce and residential populations grow and such facilities become viable. There is also potential for the universities to provide such facilities in the longer term. The proposed multi-purpose community centre for the Science Park will contain spaces suitable for physical activities such as yoga, aerobics and martial arts.

7.7 Open space for informal recreation

Areas of open space for informal recreation (neighbourhood, local, pocket and linear parks) are shown in the draft master plan and amount to 56.77 ha. It is understood that some additional small urban parks will also be proposed as the detail of the mixed use areas emerges in subsequent stages of planning.

The proposed parks range in size from small pocket parks to the large linear park along the main creek corridor, allowing for a diversity of recreation opportunities. The parks have been distributed to ensure that all residents will be within about 400m walking distance from an area of open space to support accessible participation in recreation.

It is too early in the planning process to identify the particular facilities to be included in each of the various parks. However, as a general principle, the parks together should aim to meet the likely needs of the future population identified in Section 7.1 above, providing for a range of different experiences which complement each other. The major parks should include seating, shelters, picnic and barbecue facilities, water and toilets in line with Council requirements.

An indication of likely embellishments is provided in the separate Landscape Strategy for the Sydney Science Park. These include kickabout spaces, play equipment, skate parks, youth activity areas, community gardens, and garden feature spaces.

The proposed location of the town centre core, adjacent to the main creekline park, will enable the development of a quality town park, to enhance the appeal and amenity of the centre. This large park will contain a substantial water body, developed as a formal recreational lake, and is likely to include picnic and barbecue facilities, play areas and walking and cycling paths, creating a major recreation destination. As noted in the previous chapter, an outdoor performance space is also proposed as part of a cultural precinct adjacent to the proposed lake.

The main and secondary creekline corridor parks will also include other water bodies and wetland areas, which will provide a pleasant setting for picnics and play and an aesthetic backdrop to walking and cycling trails.

Based upon a common standard of around 1 playground per 1300 residents (from other Western Sydney councils), the development is likely to require around 5 playgrounds, although this will depend upon the number of children living in the development. These should be provided across the precinct according to Council's preferred hierarchy, to include:

» One central district level playground with high quality equipment which caters to both young and older children, along with picnic and barbecue facilities to meet the need for "something for everyone" family activities;

» Around 4 local playgrounds in local parks, with some for toddlers and some for older children.

Together the playgrounds should ensure that there is a range of play equipment and play opportunities for children of different ages across the precinct. Each play area should offer a

different experience, and provide fencing if adjacent to water, road, or steep slope, seating, shade, and drinking water.

The likely high proportion of older children and young people will also justify some facilities for this age group with more of an adventure focus. Subject to Council strategies, this might include facilities for skateboarding, bike riding, a climbing wall, BMX dirt jump facility or half court for informal games.

7.8 Linear open space

The extensive riparian corridors throughout the site and associated land which is flood affected present opportunities to create a network of linear open space for informal recreation along the main creek lines and its tributaries. The location of the Warragamba Prospect Water Supply Pipeline along the northern site perimeter provides further opportunity for additional linear open space. This is reflected in the draft Master Plan.

These parks will be appropriately vegetated to create the amenity of a natural setting. These spaces will be an integral feature of the urban design, connecting the community to the town centre and playing fields, encouraging walking and cycling. These areas will also provide high levels of amenity for surrounding mixed use areas.

The extensive network of linear open space will be embellished to provide low key recreation opportunities such as:

- defined pathways and cycleways,
- seating,
- directional signage,
- lighting,
- barbecue and picnic facilities,
- fitness equipment, and
- playgrounds.

It is understood that the detailed planning of these areas will need to locate embellishments such as play and fitness equipment, cycleways and associated activity nodes outside of any core conservation areas so as not to impinge on the identified ecological value of the area. However, they may be located adjacent to these areas, within the buffer to the core riparian zones, or in adjoining areas of open space.

The pathway network should include shared-use 2.5-3m wide pathways along the main creek and tributaries. The critical success factor for these pathways is ensuring that they are safe by having passive surveillance and regular activity nodes and points of interest which may, for example, offer play areas for children, fitness equipment, seating, community gardens, public art or picnic facilities.

The walking and cycle tracks should link with key destinations within the precinct, including the town centre, community centre, primary school and sporting fields to create a linked network throughout the precinct. This network should also link with the wider regional network.

7.9 Delivery

In terms of delivery, it is understood that the open space identified as RE1 Public Recreation in the zoning map will be embellished to Council specifications and handed over to Council as 'works in

kind' to own and maintain. Staging will be consistent with the overall staging of the development, with details of thresholds, triggers and embellishments to be negotiated within the Voluntary Planning Agreement.

7.10 Conclusion

This chapter has identified the likely needs of the residential, workforce and student populations for open space and sporting and recreation facilities, and the ways in which those needs will be addressed.

The open space plan for Sydney Science Park provides a total of 61.92 ha of land with a proposed RE1 Public Recreation zoning, to be handed over to Council. This quantum of open space will be more than sufficient to meet future needs. It will provide for a diversity of recreation opportunities, including spaces for informal recreation and enjoyment of natural settings, spaces for the workforce to enjoy a break from the workplace, playgrounds for children and young people, community gardens, walking and cycling trails and outdoor spaces for community cultural activities. It will also provide spaces for active recreation, including three playing fields (or one oval and one playing field), a number of kick about areas for informal games and multi-use recreation zones containing embellishments for individual fitness activities.

The future population will rely on existing facilities in the wider Penrith area for district level sporting facilities, aquatic facilities and regional open space. Penrith Council is likely to seek contributions towards the development of off-site district open space in accordance with its *District Open Space Facilities Development Contributions Plan* (2007). This will be a matter for negotiation with Council as part of the VPA negotiations.

It is too early in the planning process to anticipate what sport and recreation facilities might be provided by the universities. Opportunities for community and workforce access to any future university facilities and their provision on a shared basis will need to be explored as planning for the Science Park proceeds.

8 Conclusion

This report has been prepared to support a Planning Proposal to Penrith City Council for a mixed use development within Luddenham, known as the Sydney Science Park. The proposal is to rezone a 288 hectare parcel of land at 565-609 Luddenham Road, Luddenham to accommodate a new integrated mixed use research and development, employment, education, retail and residential specialised centre. The report has considered the social infrastructure needs of the future Sydney Science Park community and described how those needs are proposed to be addressed.

The concept of a Science Park is new to Australia. Research conducted by Hill PDA for this project on international case study examples point to the critical importance of including residential uses, along with a range of lifestyle amenities, within science parks if they are to be internationally competitive and financially successful.

With a forecast residential population of about 6,900 people, along with a workforce of around 9,800 people and a student population of around 10,000, Sydney Science Park will provide a catchment that will warrant the provision of the following local community facilities and services:

- A multi-purpose community centre of about 550 sqm, subject to agreement with Penrith City Council, who would own and manage such a facility;
- Potentially a public primary school on a site of 3 ha, subject to further consideration by the Department of Education and Communities. Apart from the potential primary school, no other state government facilities are proposed for the development area;
- A range of facilities to be provided by the commercial / non-government sectors, as demand emerges and according to their own feasibility assessments. These facilities are likely to include:
  - Shops and commercial services,
  - Childcare centres and pre-schools,
  - Medical centres,
  - Private schools,
  - Places of worship,
  - Leisure and entertainment facilities.

The future population of Sydney Science Park will not be big enough to support district, sub-regional and regional level services and facilities, but will rely on those in the wider area. These include:

- Higher order shopping and commercial services in Penrith and St Marys,
- High schools, TAFE and lifelong learning,
- Health, welfare and support services,
- Libraries and cultural facilities,
- Leisure and entertainment opportunities,
- Emergency and safety services.

The relatively small size of the Science Park population will make only modest demands on these facilities and impacts are expected to be marginal.

In terms of open space, sporting and recreation facilities, the open space plan for Sydney Science Park provides a total of 61.92 ha of land with a proposed RE1 Public Recreation zoning, to be handed over to Council. This quantum of open space will be more than sufficient to meet future needs. It will provide for a diversity of recreation opportunities, including spaces for informal recreation and enjoyment of natural settings, spaces for the workforce to enjoy a break from the workplace, playgrounds for children and young people, community gardens, walking and cycling trails and outdoor spaces for community cultural activities. It will also provide spaces for active recreation, including three playing fields (or one oval and one playing field), a number of kick about areas for informal games and multi-use recreation zones containing embellishments for individual fitness activities.

The future population will rely on existing facilities in the wider Penrith area for district level sporting facilities, aquatic facilities and regional open space.

Elements of social infrastructure to be included in a Voluntary Planning Agreement with Council include the multi-purpose community centre, open space and sporting and recreation facilities. The extent to which Council may require contributions towards the provision of district level facilities in the wider area (library, cultural facilities, district open space and sporting facilities) will be a matter for negotiation with Council, as part of the VPA negotiations.

It is too early in the planning process to anticipate what sport and recreation facilities might be provided by the universities. Opportunities for community and workforce access to any future university facilities and their provision on a shared basis will need to be explored as planning for the Science Park proceeds.

9 References

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Appendices

Table 1 Demographic Analysis of Luddenham and comparison areas, 2011

Indicator	Luddenham suburb	Penrith LGA	Greater Sydney Region
Population (2011)	1496	178465	4391676
Age groups (%)			
0-4	7.0	7.6	6.8
5-11	10.1	9.8	8.7
12-17	10.1	8.7	7.4
18-24	11.0	10.4	9.5
25-54	37.5	42.5	43.8
55-64	11.8	11.4	10.8
65 and over	12.6	9.6	12.9
Median age (yrs)	36	34	36
Household type (%)			
Family household	84. 2	78.3	73.1
Lone person	13.8	19.2	22.6
Group household member	2.0	2.5	4.3
Average household size (no. people)	3.2	2.9	2.7
Family household structure (%)			
Couples with children	53.1	49.7	48.9
Couples without children	31.7	29.6	33.5
Single parent families	14.1	19.2	15.7
Other family	1.0	1.5	1.9
Cultural diversity (%)			
Aboriginal or TSI heritage	2.3	3.0	1.2
Overseas born	14.1	20.9	34.2
Speaks language other than English at home	17.9	18.4	35.5
Median household income ($)	1562	1398	1447
Labour Force Status persons aged 15+ (%)			
Employed full-time	41.5	42.2	38.2
Employed part-time	19.2	16.3	16.5
Unemployed	2.6	3.6	3.5
Employment Industry (%)			
Professionals	11.5	13.9	25.5
Clerical and administrative workers	16.2	19.1	16.2
Managers	16.4	10.1	13.3
Technician and trade workers	14.4	15.2	12.2

Indicator	Luddenham suburb	Penrith LGA	Greater Sydney Region
Sales workers	10.4	9.9	9.0
Labourers, machinery operators and drivers	21.2	20.3	13.0
Community and personal service workers	8.4	9.7	8.8
Population aged 15+ and not in the labour force (%)	26.9	29.3	32.4
Qualification Level (persons aged 15 +)			
University Qualification	16.3	17.7	33.1
Certificate (Tafe etc.)	21.1	22.1	15.2
Housing types (%)			
House	97.1	81.5	60.9
Semi-detached house	0.0	10.8	12.8
Apartment	1.1	7.1	25.8
Other	1.8	0.4	0.5
Housing tenure (%)			
Fully owned	35.0	26.8	30.4
Being purchased	34.8	43.8	34.8
Rented	26.0	26.7	31.6
Other / not stated	1.1	0.5	0.8
Dwelling status (%)			
Occupied private dwellings	89.3	94.8	92.8
Unoccupied private dwellings	10.7	5.2	7.2

Source: Australian Bureau of Statistics Basic Community Profile 2011.

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