

SOCIAL ENVIRONMENT

19

19.1 INTRODUCTION

Roxby Downs has an estimated residential population of approximately 4,500 people, and has developed primarily to service the Olympic Dam mine. Roxby Downs has approximately 1,400 residential properties, two caravan parks, a commercial centre, light and heavy industrial areas, a variety of community and recreational facilities, and an airport. An administrator appointed by the South Australian Government exercises the powers and functions of the Roxby Downs Council and is advised by the Roxby Downs Community Board.

The communities close to the infrastructure and transport corridors include Andamooka, Woomera, Marree, Point Lowly, Port Augusta, Whyalla and small settlements to the north. These communities vary widely in terms of population, demography, industry and employment, housing and services.

Chapter 5, Description of the Proposed Expansion, identified the workforce requirements during the construction and operation of the proposed project and its supporting accommodation, services and infrastructure. This chapter:

- describes the existing demography, character and services in Roxby Downs, nearby townships and relevant regional areas
- sets out how the project has been designed and developed to meet social planning directives, in particular, through the Roxby Downs Draft Master Plan
- presents the findings of a social impact assessment and canvasses management measures to maximise potential benefits and minimise potential impacts, with particular reference to issues of community concern, including:
 - employment and business opportunities
 - crime and anti-social behaviour
 - housing supply and affordability
 - social services and facilities
 - social character, well-being and amenity
 - access and disturbance.

19.2 ASSESSMENT METHODS

The methods used to assess the social impacts of the proposed expansion involved desktop research, including a review of the literature, a survey of government service providers, the analysis of qualitative and quantitative data, and encompassed the following activities:

- profiling the existing social environment to establish baseline social conditions
- conducting social research and benchmarking to identify potential impacts
- consulting with members of the public and stakeholder groups to identify potential issues
- undertaking an impact and risk assessment and identifying management measures.

The social impact method was adapted from the principles and guidelines of the International Association for Impact Assessment (Vanclay 2003) and the International Finance Corporation (2003). The literature reviewed as part of the social impact assessment is referenced where appropriate throughout the chapter.

19.2.1 PROFILING THE EXISTING SOCIAL ENVIRONMENT

A profile of the existing social environment was prepared to establish baseline conditions. This involved:

- analysing data from the Australian Bureau of Statistics (ABS) (see Appendix Q1), including the 2001 and 2006 Census of Population and Housing (ABS 2002, 2003a, 2003b, 2006, 2007a, 2007b, 2007c, 2007d, 2007e, 2007f, 2007g and 2007h)
- reviewing information and statistics from government departments and other sources, including the Department of Health (2008), the Department for Families and Communities (2008), the Office of Crime Statistics and Research (2007 and 2008), the Public Health Information Development Unit (2006 and 2008) and the State Valuation Office (2008) (see Appendices Q2, Q3 and Q4)

- a survey and audit of existing social services and infrastructure
- reviewing community plans and reports, including the Roxby Downs '2007/08 Annual Business Plan and Budget' (Roxby Downs Council 2007), '2006 Annual Report on the Roxby Downs Community Plan' (Roxby Downs Community Board 2006), 'Roxby Downs Community Plan' (Roxby Downs Community Board 2005), 'Listening to Roxby' survey (Steer et al. 2001), 'Master Plan Consultation Report' (Arup HLA 2006), 'Community Perceptions Survey Report to Olympic Dam' (University of Queensland Social Research Centre and Centre for Social Responsibility in Mining 2007) and information from the Outback Areas Community Development Trust
- mapping community and governance structures.

19.2.2 SOCIAL RESEARCH AND BENCHMARKING

Social research and benchmarking was undertaken to identify potential impacts. This included studies on:

- demographics (undertaken by Planning Futures Pty Ltd (see Appendix Q1)
- housing costs (see Appendices Q2 and Q6)
- health indicators (see Appendix Q3)
- crime and safety (see Appendix Q4)
- social services and facilities (including a survey of expansion requirements undertaken by Janet Gould and Associates in 2006 and updated in 2008) (see Appendices Q5 and Q6)
- living costs (see Appendix Q6)
- labour force outlook (undertaken for the proposed expansion by the National Institute of Labour Studies; namely Lowry, Molloy and Tan in 2006 and again by Molloy and Tan in 2008)
- employment and training initiatives (see Appendix Q7)
- business implications and opportunities, including the ability of South Australian businesses to tender for future work on the proposed expansion
- the social impacts and lessons learnt from other major mining projects and developments (see Appendix Q8), including Pilbara iron ore in Western Australia, Bowen Basin coal in Queensland, Alberta oil sands and Diavik diamonds in Canada, and Escondida copper in Chile
- transport, energy and water infrastructure (including a traffic impact assessment undertaken by Arup in 2008, see Appendix Q9)
- social indicators (Appendix Q10)
- other developments in the region of Olympic Dam.

19.2.3 CONSULTATION

More than 8,300 members of the public and over 170 stakeholder groups were consulted in South Australia and the Northern Territory to identify potential impacts and issues (see Chapter 7, Stakeholder Consultation and Engagement). This included consultation with:

- current Olympic Dam employees and contractors in Roxby Downs and Adelaide
- community members in Roxby Downs, Andamooka, Woomera, Point Lowly, Port Augusta, Whyalla, Port Pirie, Marree, William Creek, Eyre Peninsula, Port Lincoln and Adelaide
- pastoralists
- staff and members of Arid Recovery
- the Roxby Downs Council administrator and state government agencies, including the Social Impact Township Working Group (consisting of senior representatives from state government service providers and planning agencies, BHP Billiton and the Roxby Downs administrator)
- local and regional service providers
- non-government organisations and interest groups
- industry and business
- members of the general public.

19.2.4 IMPACT AND RISK ASSESSMENT

The assessment of impacts and risks for the proposed expansion has been undertaken as two separate, but related, processes (see Section 1.6.2 of Chapter 1, Introduction, and Figure 1.11).

Impacts and benefits are the consequence of a known event. They are described in this chapter and categorised as high, moderate, low or negligible in accordance with the criteria presented in Table 1.3 (Chapter 1, Introduction).

Risk assessments describe and categorise the likelihood and consequence of an unplanned event. These are presented in Chapter 26, Hazard and Risk.

19.3 EXISTING ENVIRONMENT

The profile of the existing social environment focuses on local townships (Roxby Downs, Andamooka, Woomera and outlying settlements) and communities in the Upper Spencer Gulf and northern region of South Australia (see Figure 19.1). Varying levels of detail on townships and regions is provided, depending on the availability of statistical information and its relevance to assessing potential social impacts in those communities. Information on the socioeconomic and demographic characteristics of these townships and the northern region is based largely on data from the ABS. Further detail on the economic environment is provided in Chapter 21, Economic Assessment.



Figure 19.1 Townships and major roads in northern South Australia

19.3.1 OVERVIEW

Roxby Downs

Roxby Downs is the largest town in South Australia, north of Port Augusta.

From a population of approximately 450 people in 1986, Roxby Downs has grown steadily since the Olympic Dam operation started (in 1988) to provide accommodation and services for the Olympic Dam workforce and families.

In 2006, the estimated resident population of Roxby Downs was approximately 4,300 people (ABS 2007b), and is now estimated to be around 4,500 people (Northern Regional Development Board 2008; Roxby Downs Council 2008). The town is about 14 km south of the Olympic Dam operation and consists of approximately 1,400 residential properties, a commercial centre, a light industrial area, two caravan parks, accommodation for Olympic Dam workers and a variety of community and recreational facilities (see Plate 19.1). The township also provides services for neighbouring communities and pastoralists. Olympic Dam Village is located 10 km north of the township and includes the airport, a heavy industrial area and accommodation for mine workers (see Figure 19.2).



Plate 19.1 Roxby Downs

Roxby Downs has a number of distinct characteristics compared to other South Australian towns, including its municipal governance by an administrator, young age profile, the high proportion of families with children, high income and population mobility.

Andamooka

The settlement of Andamooka dates back to the early 1930s when opals were discovered in the region. The population has fluctuated over the years, with over 500 residents and 80 visitors counted at the 2006 census (ABS 2007a). The population also fluctuates seasonally, and the Andamooka Progress and Opal Miners Association estimates it rises to approximately 1,000 people in cooler winter months. Opal mining is no longer the only source of income in the town, with a number of residents employed at Olympic Dam. Andamooka remains unique in character, culture and layout (see Plate 19.2).

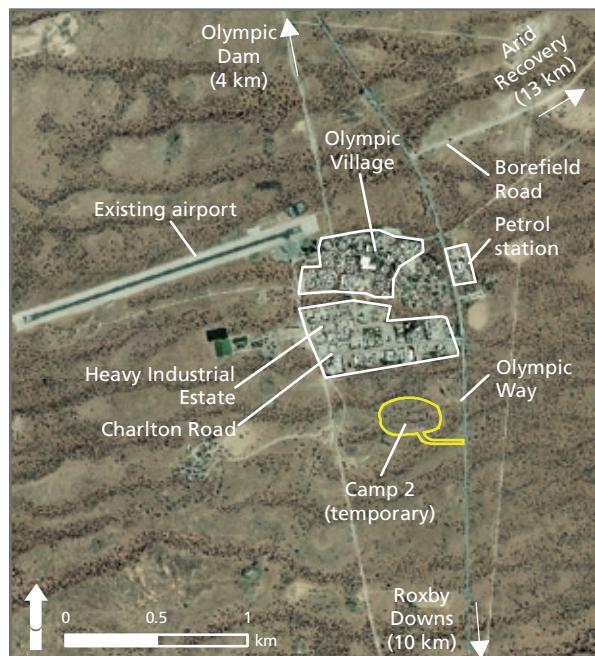


Figure 19.2 Components of Olympic Dam Village



Plate 19.2 Andamooka

Woomera

The township of Woomera was established in 1947 to accommodate the joint Australian and British project to test weapons and rockets at the Woomera Rocket Range. Until 1982, Woomera was classified as a military base with restricted public access. The Department of Defence continues to support and invest in the Woomera community, which has developed into a well-maintained and serviced remote township (see Plate 19.3).

Woomera's population has fluctuated over time. The residential population of Woomera at the 2006 census was approximately 300 people, with an additional 180 people counted in the town who usually live elsewhere (ABS 2007a). This is approximately half the number of people recorded at the 2001 census and well short of historic population numbers of 6,000 people when the testing program was at its peak in the 1960s. A number of Woomera residents are employed at Olympic Dam, and the town also accommodates varying numbers of short-term contractors.



Plate 19.3 Woomera

Pimba is also located in the Northern Statistical Division, about 7 km from Woomera. It is a small settlement on the national rail network, at the junction of the Stuart Highway to Alice Springs and the road to Woomera and Roxby Downs. It is approximately 95 km south of Olympic Dam and supports a roadhouse/petrol station and several houses (see Plates 19.4 and 19.5).



Plate 19.4 Pimba



Plate 19.5 Pimba housing

Northern region and Upper Spencer Gulf

The Northern Statistical Division covers approximately 810,000 km² in northern South Australia, and encompasses the three regional cities of Port Augusta, Whyalla and Port Pirie in the Upper Spencer Gulf and numerous smaller towns and settlements in the Flinders Ranges and Outback (see Figure 19.1). Industry in the region is varied, and includes mining, pastoral activities, agriculture and aquaculture, tourism and defence.

The remote Far North has a population of approximately 9,900 people, a quarter of whom are Aboriginal, scattered over approximately 671,660 km² in Outback South Australia (ABS 2007c). It includes the small settlements of William Creek (10 people), Innamincka (130 people) and Oodnadatta (280 people), which are connected by the Strzelecki, Birdsville and Oodnadatta Tracks (see Figure 19.1). The major regional industries are pastoral activities, oil and gas production, mining and tourism. The Moomba gas fields were discovered in 1966, with the first sale of gas to Adelaide in 1969, following the completion of the 790 km Moomba to Adelaide gas pipeline.

Port Augusta is located over 250 km south of Roxby Downs at the northern end of Upper Spencer Gulf. It is a major junction for road and rail traffic, and connects Adelaide, Darwin and Perth via the Stuart, Eyre and Princes Highways and rail network. Port Augusta also links other regional centres, including Whyalla, Port Pirie and Port Lincoln. The city is a major service centre for the northern region, and provides a regional base for many government services, access to the tourist destinations of the Flinders Ranges and Far North, and support for a range of industries including power generation, transport logistics, manufacturing and agriculture (see Plate 19.6).



Plate 19.6 Port Augusta

South of Port Augusta, on the western side of the Upper Spencer Gulf, is the site of the proposed landing facility (see Figure 19.3). Approximately 300 properties are located near the proposed pre-assembly yard in Port Augusta West and access corridor, and south along the 20 km coastal strip to Blanche Harbor, with 13 properties situated within 1 km of the proposed site of the landing facility (see Plate 19.7).

Approximately one-third of these properties were occupied by approximately 250 people at the 2006 census (ABS 2007a). Access to the area from Port Augusta is via Shack Road, with the Cultana Training Area, owned by the Department of Defence, located on the western side of the road. The area is also used for recreational purposes and offers views of the Upper Spencer Gulf and Flinders Ranges (see Plate 19.8).

Approximately 55 properties are located on the coast near Point Lowly (see Plate 19.9), approximately 2 km from the site of the proposed seawater desalination plant (see Figure 19.3).



Plate 19.7 Coastal homes near the proposed landing facility at Port Augusta

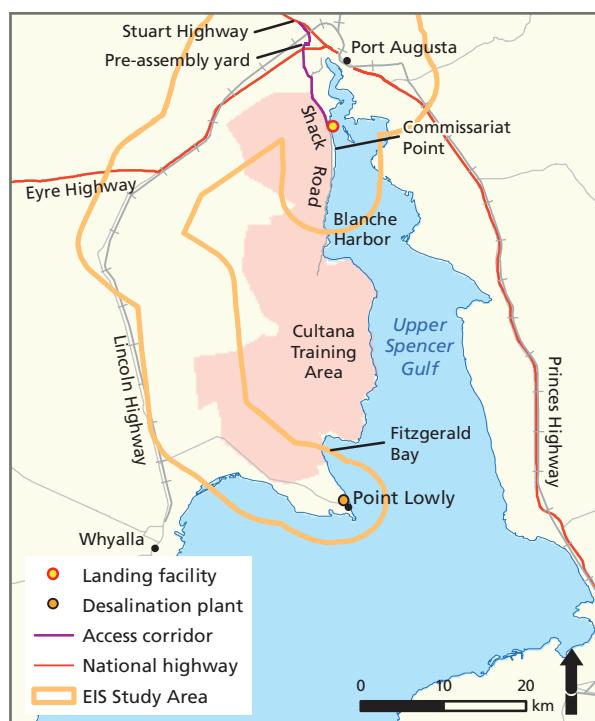


Figure 19.3 Port Augusta and surrounds

Most are privately owned and used either as principal residences or holiday houses. Point Lowly can be reached via a sealed road from Whyalla and includes a breakwater and boat ramp, playground, barbecue, toilet and shower, surf lifesaving facility, lighthouse and visitor accommodation. The boating facilities were established for the local aquaculture industry, visitors and coastal home owners to access Fitzgerald Bay.



Plate 19.8 Views of Upper Spencer Gulf from the proposed landing facility at Port Augusta



Plate 19.9 Point Lowly – with residential housing in the foreground and Santos facilities in the background

The population of the Northern Statistical Division at the 2006 census was almost 76,000 (ABS 2007c). The region experienced a decline in population from the 2001 census, as did a number of other parts of regional South Australia. The population of the Upper Spencer Gulf cities has been relatively stable since the 2001 census, with the three Local Government Areas (LGAs) recording resident populations of (ABS 2007c):

- Port Augusta 13,875 people (up 580 people from 2001)
- Whyalla 21,420 people (down 90 people from 2001)
- Port Pirie 17,145 people (similar to the population in 2001).

19.3.2 GOVERNANCE

Roxby Downs

Roxby Downs is located in the federal electorate of Grey and the state electorate of Giles.

The Roxby Downs Municipal Council Administrator (hereafter council) is responsible for managing the municipality in accordance with the provisions of the Ratification Act, the *Local Government Act 1999* and other relevant legislation.

Roxby Downs municipal governance is unique in South Australia for a township of its size. The council is responsible for providing a range of traditional local government functions and also manages electricity, water and sewerage services as commercial operations. The council levies rates on properties based on general valuations, with BHP Billiton and the South Australian Government equally funding shortfalls in its annual budget. The council also provides some services to Andamooka on a fee-for-service basis.

In 2003, the council established the Roxby Downs Community Board, consisting of 12 appointed members (10 from the community, one from BHP Billiton, and the administrator), to develop and implement a community plan. To enable broad participation in implementing the community plan, seven community forums and two community partnerships have been established. The Community Board and community forums are established as advisory committees under the Local Government Act.

In addition to the Community Board, the SA Arid Lands Natural Resources Management Board is responsible for the sustainable management of soil, water, pest plants and animals in the Roxby Downs area. It is one of eight statutory natural resources management boards across South Australia, and reports to the Minister for Environment and Conservation.

Andamooka

Town services are managed by the Andamooka Progress and Opal Miners Association, which is funded by the Outback Areas Community Development Trust (OACDT). The association has over 50 members and is run by a committee of eleven elected volunteers (as at September 2008).

Woomera

Woomera, like Roxby Downs and Andamooka, does not have an elected council. The Woomera Board was established in February 1949 to advise the Manager Base Services – Woomera, and to manage town amenities. It consists of nine volunteers (three nominated and six elected).

The board is linked to the OACDT and also advises the Department of Defence and BAE Systems Australia Pty Ltd on behalf of residents. BAE Systems has a contract with the Department of Defence to provide maintenance support for defence facilities and the township, including infrastructure (roads, water, sewage, waste management, electricity, parks and gardens), emergency and rescue services, the airfield and some community and commercial assets.

Northern region and Upper Spencer Gulf

Elected councils in the LGAs of Port Augusta, Whyalla, Port Pirie, Mount Remarkable, Flinders Ranges and Coober Pedy provide municipal services. The remainder of the Northern Statistical Division falls within the unincorporated (out-of-council) area of South Australia (see Chapter 6, Legislative Framework, for council boundaries), which is managed by the OACDT in conjunction with local communities, or forms part of the land that is held and managed by Aboriginal authorities.

19.3.3 DEMOGRAPHY

Table 19.1 summarises the socioeconomic and demographic characteristics of the Roxby Downs Municipality, Andamooka and Woomera, the Northern Statistical Division and South Australia. The Roxby Downs Municipality covers the entire local government area of Roxby Downs, and extends approximately 7 km south of the township and 10 km north of the township to the southern boundary of the SML (see Figure 19.1). Data for Andamooka and Woomera are based on ABS locality boundaries, which extend to the edge of each town. The ABS statistical boundaries used in this analysis are provided in Appendix Q1.

Data from the 2006 census (ABS 2007c) have been used wherever possible and, unless otherwise indicated, are based on where people live rather than where they were counted on census night. The number of residents counted on census night may vary from the official ABS estimate of the population (or estimated resident population), as the latter is adjusted for net census undercounts, overseas migration and natural increase (such as births and deaths).

Table 19.1 Demographic profile of Roxby Downs, the northern region and South Australia, 2001 and 2006¹

Census characteristics	Roxby Downs LGA	Andamooka locality	Woomera locality	Northern Statistical Division	South Australia
Population:					
– number (persons)	4,054	526	293	75,931	1,514,336
– change 2001–2006 ² (as %)	15.6	14.3	-25.8	-2.5	3.0
– ratio male: female	56:44	55:45	55:45	51:49	49:51
Aboriginal people:					
– number (persons)	67	16	16	6,504	25,557
– proportion of all people (as %)	1.7	3.0	5.5	8.6	1.7
Birthplace, language:					
– born in Australia (as %)	83.1	65.2	71.7	81.4	74.0
– English-speaking only (as %)	89.3	79.1	88.1	87.4	83.4
Length of residency in 2006					
Lived in same statistical area:					
– one year ago (2000) (as %)	71.9	75.3	62.2	86.3	85.0
– five years ago (1996) (as %)	43.0	62.7	28.9	73.2	66.6
Age:					
– median age (in years)	29	46	30	38	39
– 14 years or less (as %)	28.0	14.6	24.7	21.5	18.5
– 65 years or more (as %)	0.5	17.9	0.0	14.0	15.4
Households:					
– average household size (persons)	2.9	2.0	2.5	2.4	2.4
– family households ³ (as %)	77.9	54.5	66.7	67.5	69.0
– single-person ³ (as %)	18.3	42.3	33.3	30.3	27.7
Families:					
– couples with children (as %)	62.3	26.8	49.2	40.3	42.3
– couples without children (as %)	30.0	61.4	36.1	40.8	40.0
– one-parent families (as %)	7.0	9.4	14.8	17.7	16.1
Income (of people over 15 years):					
– median individual weekly income	\$1,116	\$370	\$796	\$369	\$433
– median household weekly income	\$2,033	\$597	\$1,462	\$737	\$887
Labour force participation (of people over 15 years) (as a %)	82.0	49.9	77.0	55.6	59.0

¹ Unless otherwise indicated, data are based on the 2006 census (ABS 2007c), place of usual residence, which excludes visitors.

² Population change is based on place of usual residence at the 2001 census (ABS 2003a), except in Andamooka and Woomera, which is based on location on census night (ABS 2002 and 2007d).

³ Applicable to occupied private dwellings, excluding 'visitors only' and 'other not classifiable' households. Based on 2006 census data, Expanded Community Profiles in Roxby Downs, the Northern Statistical Division and South Australia (ABS 2007e) and Quickstats (ABS 2007f) in Andamooka and Woomera.

Roxby Downs

The key demographic features that distinguish Roxby Downs from South Australia are its high population growth, its young age profile (see Figure 19.4), high proportion of families with children and high incomes.

A range of nationalities is represented in Roxby Downs, with a relatively large increase in overseas-born people arriving in Roxby Downs in 2006, although the majority of residents were born in Australia and speak only English. The population is highly mobile, with a large proportion of people reporting that they usually live elsewhere. Over 900 people who live outside the local area were counted in Roxby Downs at the 2006 census (ABS 2007a). Income levels are high, with people typically moving to Roxby Downs for work, and leaving after several

years, or as they near retirement. These characteristics are common to many mining towns in Australia.

On the ABS 2006 Socio-Economic Indexes for Areas (SEIFA), Roxby Downs was ranked the second most advantaged LGA in South Australia (based on 21 variables including income, occupation, education and internet connection), and the highest ranked LGA in terms of economic resources (based on 15 variables relating to income, housing expenditure and households assets) (ABS 2008).

Andamooka

The main demographic characteristics that distinguish Andamooka from the rest of South Australia are its older age profile, cultural diversity (with relatively more people born

outside Australia), lower income levels, and higher proportions of single-person households and couples without children. Like Roxby Downs, it also has a higher proportion of men to women and a relatively high proportion of people reporting that they usually live elsewhere. Andamooka had high population growth between the 2001 and 2006 censuses, with the current population, including temporary workers, estimated to be over 900 people (Planning SA 2008). Continuing population increases are forecast (Planning SA 2006).

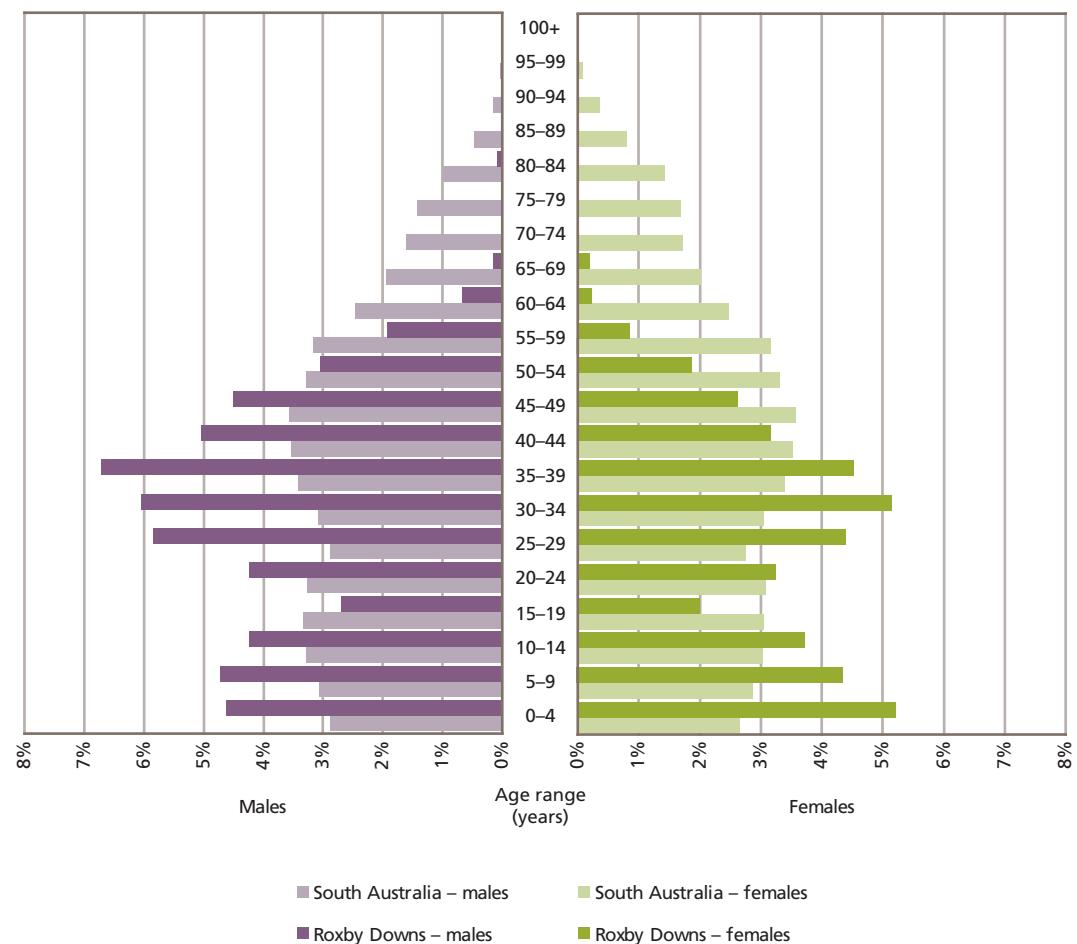
Woomera

Woomera has a similar demographic profile to South Australia with regard to the proportion of people born in Australia and household size. The key demographic differences are the large decline in population between the 2001 and 2006 censuses, the large proportion of people reporting that they usually live elsewhere, the young age profile and high income levels. It also has a predominance of men, and relatively few family

households. Continuing population declines are forecast (Planning SA 2006), although the potential expansion of aerospace and defence activities at Woomera and mining activities at Olympic Dam may reverse this trend.

Northern region and Upper Spencer Gulf

The Northern Statistical Division is similar to South Australia in its age profile, family and household structure, and household size. The key demographic differences are the large Aboriginal population, low income levels and high proportion of people born in Australia. It also had more people reporting they usually lived elsewhere (in South Australia or interstate), but fewer people reporting that they lived in another local government area five years ago. The population of the Northern Statistical Division declined between the 2001 and 2006 censuses, but this is forecast to reverse in the short-to-medium term (Planning SA 2007).



Source: ABS 2007c

Figure 19.4 Age by sex in Roxby Downs and South Australia

19.3.4 EMPLOYMENT AND LABOUR

Olympic Dam

The nature of the workforce employed at Olympic Dam varies, and includes permanent employees and contractors (both short- and long-term). An additional short-term contract workforce is engaged periodically on an as-needs basis (such as for maintenance shutdowns).

At present, the Olympic Dam operational workforce consists of:

- approximately 1,700 BHP Billiton employees and 2,450 contractors (1,400 long-term and 1,050 short-term), of whom approximately 60% reside locally
- a temporary group of up to 1,250 shutdown workers (major shutdowns require between 550 and 1,250 workers, depending on the size of the shutdown, with larger smelter shutdowns occurring approximately every three years).

The currently planned expansion of the existing underground mining operation is expected to involve a peak workforce of around 1,000 short-term contractors and require an additional 400 full-time equivalent people following commissioning (see Chapter 2, Existing Operation, for details).

The profile of the BHP Billiton workforce at Olympic Dam shows:

- 65% are residents of the local area (Roxby Downs, Andamooka and Woomera) and 35% are long distance commuters (LDCs) (32% from South Australia and 3% from interstate)
- the average age is 38 years
- 86% are male
- 54% are married, 29% are single, 16% are cohabitating or have a regular partner, and 1% are widowed, divorced or separated
- 40% of the workforce are labourers, 33% are employed in professional or associated professional occupations, 16% are tradespersons or related workers and 11% are employed in other occupations
- 57% of the female workforce are in professional or associated professional occupations, 17% are labourers or work in related occupations and 36% are employed in other occupations
- the median years of service is approximately two years
- workforce turnover is approximately 17% per annum
- 34 nationalities are represented in the Olympic Dam workforce, including Australian 87.3%, British 2.8%, South African 2.2%, New Zealand 1.7%, Chilean 1.0% and all other 5.0%.

Olympic Dam operates 24 hours a day. The workforce employed in the mine and metallurgical plant typically works 12-hour shifts, on a four-days-on and four-days-off roster. Administrative personnel work eight hours, five days a week. Contractors work different rosters depending on the type of work. For example, contractors employed on construction projects work for 28 days, followed by seven days leave.

The Charlton Road Heavy Industrial Estate, located in the Olympic Dam Village, has developed over the past 20 years to support operations at the Olympic Dam mine (see Figure 19.2 and Plate 19.10). A light industrial area, on the northern edge of Roxby Downs, also accommodates a range of industrial uses (see Plate 19.11). An expansion of these estates is planned to meet existing demand.



Plate 19.10 Charlton Road Heavy Industrial Estate at Olympic Dam Village



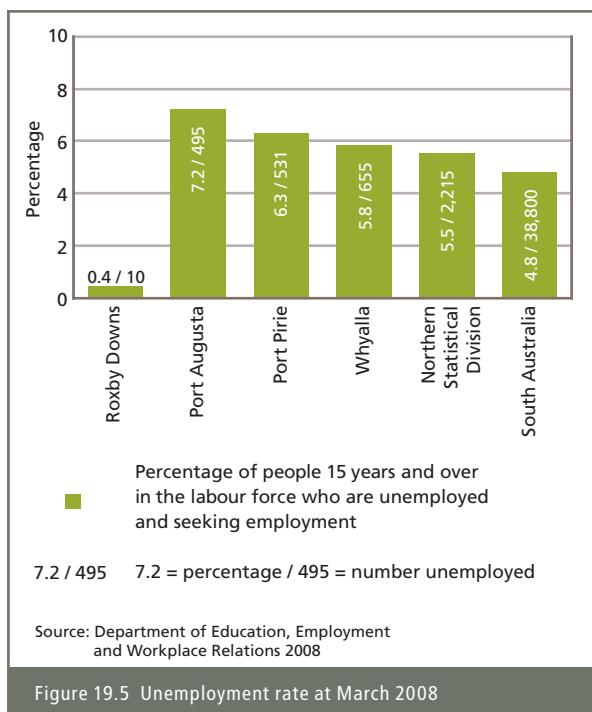
Plate 19.11 Light industrial area on the north edge of Roxby Downs township

In addition to the Olympic Dam workforce, more than 350 non-mine related workers live at Roxby Downs, including approximately 120 government employees.

Roxby Downs

Compared to South Australia, Roxby Downs has high workforce participation across all age groups and among females as well as males. Unemployment is low (Department of Education, Employment and Workplace Relations 2008, see Figure 19.5), with the highest unemployment among young people.

The predominant industry is mining (48.6%), followed by construction (8.2%), administrative and support services (6.2%), accommodation and food services (5.4%), retail trade (5.1%), and other industries (26.5%). The dominant occupation is technicians and trades workers (24.6%), followed by machinery operators and drivers (20.6%), and professionals (15.5%) (ABS 2007c). Approximately 5% of residents are employed in government (ABS 2007a).



The high turnover of the population has been identified as the issue that most affects all areas of life in Roxby Downs, with staff recruitment and retention affecting business, services and community groups (Roxby Downs Community Board 2005).

Andamooka

Andamooka has relatively low labour force participation and high unemployment, which accords with its older age profile.

Mining is the dominant industry, followed by construction, accommodation and food services, administrative and support services and manufacturing. Technicians and trades workers, machinery operators and drivers, and labourers make up over 60% of the workforce, with higher proportions of people employed in these occupations in Andamooka compared to South Australia and fewer professionals and managers (ABS 2007c).

Approximately 220 Olympic Dam workers (including contractors) live in Andamooka.

Woomera

The key features that distinguish the labour market in Woomera from South Australia are its high labour force participation (including among females) and low unemployment.

The largest industries in Woomera are manufacturing, mining, and accommodation and food services. This is reflected in the occupational structure of the workforce, with high proportions of technicians and trades workers, followed by professionals, managers, machinery operators and drivers, and clerical and administrative workers.

Approximately 40 BHP Billiton employees at Olympic Dam live in Woomera.

Northern region and Upper Spencer Gulf

Labour force participation is similar in the Northern Statistical Division to South Australia, but lower in the Upper Spencer Gulf cities and for women and Aboriginal people.

The northern region has relatively high unemployment compared to South Australia. Unemployment rates in the Upper Spencer Gulf cities were all above the northern region. This is illustrated in Figure 19.5, which shows unemployment rates for these local government areas at March 2008 (Department of Education, Employment and Workplace Relations 2008). The largest industry employers in the Northern Statistical Division are health care and social assistance, manufacturing and retail trade.

Approximately 12% of BHP Billiton employees at Olympic Dam come from the wider northern region, including Whyalla, Port Augusta and Port Pirie. Of these, approximately 90 workers live in Port Augusta, 65 live in Port Pirie and 15 live in Whyalla.

Current business-related activity in the northern region is wide and varied, and includes:

- mining and processing facilities and minerals exploration including:
 - Olympic Dam copper, uranium, gold and silver mine
 - OneSteel iron ore mine and steelworks facility in Whyalla, and the conversion of the Whyalla steelworks to operate using magnetite ore (Project Magnet)
 - Challenger gold mine in the north-west
 - Beverley and Honeymoon uranium mines in the state's north
 - OZ Minerals Prominent Hill copper and gold mine, south-east of Coober Pedy
 - Iluka heavy mineral sands deposit in the state's Far West
 - Leigh Creek coal mining
 - Goldstream magnesite mine at Mount Woods near Coober Pedy
 - oil and gas at the Cooper Basin
 - OZ Minerals lead smelter and refinery at Port Pirie
 - Teck Cominco copper and gold explorations and discovery at Carrapateena, south of Roxby Downs
 - Perilya Ltd Flinders Project zinc mine and explorations, near Leigh Creek
 - aerospace and defence industry at Woomera, with a contract awarded to Rocketplane-Kistler and Space Exploration Technologies (SpaceX) to begin testing a cargo delivery system to an international space station in late 2008
- tourism associated with the Flinders Ranges and Outback
- power generation, including two power stations at Port Augusta, capable of generating 780 MW of electricity
- pastoral activities including wool, beef and kangaroo production
- agriculture in the south of the region

- rail and road transport services, including the Adelaide to Darwin rail link and the Stuart Highway to Darwin
- army training facilities extending from Fitzgerald Bay to Port Augusta (Cultana Training Area)
- aquaculture and hatchery in the Upper Spencer Gulf and Eyre Peninsula at Port Augusta, Port Lincoln, Coffin Bay, Smoky Bay, Denial Bay, Franklin Harbour, Louth Bay and Whyalla.

A number of organisations in the region are devoted to economic development, with economic development boards taking a lead role. The Northern Regional Development Board is an incorporated association funded by state and local government, which provides business support and advice, assistance with training and employment and other economic development services to northern South Australia, including Roxby Downs, Port Augusta, the Flinders Ranges and Outback.

Further details on the labour force and industries in Roxby Downs, Andamooka, Woomera, the Northern Statistical Division and South Australia, based on the ABS 2006 census, are provided in Appendix Q1.

19.3.5 HOUSING

Housing the Olympic Dam workforce

The Olympic Dam workforce consists of approximately 2,500 workers who live locally and 1,650 long-distance commuters (LDCs). The LDC workforce, and a small proportion of the residential workforce, live in two BHP Billiton accommodation facilities at Roxby Village and Olympic Village (see Plates 19.12 and 19.13). These villages comprise single self-contained accommodation units, and have dining, bar and entertainment, and laundry facilities.



Plate 19.12 Roxby Village



Plate 19.13 Olympic Village

Olympic Village can accommodate approximately 1,365 workers, and Roxby Village approximately 500 people. An expansion of accommodation is planned to meet the optimisation of the existing Olympic Dam operations (see Chapter 2, Existing Operation, for details).

Table 19.2 outlines the existing accommodation profile for BHP Billiton employees at Olympic Dam. BHP Billiton owns approximately 300 houses in Roxby Downs and leases approximately 200 houses in Roxby Downs and Woomera.

Roxby Downs

Private dwellings in Roxby Downs include residential houses, townhouses and apartments (BHP Billiton-owned, privately owned and occupied, and private rental properties), and caravan accommodation. Housing and caravan accommodation in Roxby Downs is illustrated in Plates 19.14 and 19.15.



Plate 19.14 Roxby Downs housing



Plate 19.15 Myall Grove Caravan Park

Table 19.3 summarises the characteristics of private dwellings in Roxby Downs (including the township and properties at Olympic Dam Village, but excluding BHP Billiton-owned and hotel accommodation), Andamooka and Woomera, and the Northern Statistical Division compared to South Australia, based on the 2006 census (ABS 2007a and 2007d) and data from the Department for Families and Communities (2008a).

Table 19.2 Accommodation profile for the BHP Billiton operational workforce at Olympic Dam

Workforce	Accommodation	Number of properties	Proportion of all properties (as a %)
Residential workforce	Roxby Downs ¹	1,025	60.3
	Andamooka	35	2.1
	Woomera	40	2.1
Long-distance commute workforce	Village accommodation ²	600	35.3
Total long-term workforce	Total accommodation	1,700	100

¹ Includes caravan and village accommodation.² Roxby and Olympic Villages.**Table 19.3 Profile of private dwellings: Roxby Downs, Andamooka, Woomera, northern region and South Australia, 2006¹**

Housing	Roxby Downs LGA	Andamooka locality	Woomera locality	Northern Statistical Division	South Australia
Private dwelling²:					
– total (number)	1,445	497	277	36,205	679,662
– occupied (number)	1,328	279	120	31,234	609,911
– unoccupied (as %) ³	8.1	43.9	56.7	13.7	10.3
Type (as %):					
– separate house	82.1	89.5	89.4	78.3	79.9
– semi-detached, flat, unit	9.0	0	10.6	19.9	19.4
– other/not stated	8.9	10.5	0	1.8	0.7
Tenure (as %):					
– owned or purchasing ⁴	33.4	70.7	0	62.1	69.5
– rented	56.7	20.7	100.0	33.2	26.2
Costs:					
– median monthly housing loan repayment (\$)	1,300	400	0	680 ⁵	1,018
– median weekly rent (\$)	138	115	90	100 ⁶	150
– increase in average weekly rent Q4 2005–2007 (as a %) ⁷	18.6	66.7	n.a.	n.a. ⁸	24.3

¹ Based on 2006 census data (ABS 2007c) occupied private dwellings, unless otherwise indicated. This excludes 'visitors only' and 'other not classifiable' households and non-private dwellings (such as village accommodation/staff quarters, hotel/motel and hospitals).² Based on 2006 census data (ABS 2007f). Includes 'visitors only' and 'other not classifiable' households.³ This includes dwellings that are vacant or unoccupied on census night, such as holiday homes, shacks, newly completed dwellings, dwellings to let or due for demolition, or houses where the occupants are absent/elsewhere on census night.⁴ Includes dwellings being purchased under a rent/buy scheme.⁵ The median monthly housing loan repayment was \$706 in Port Augusta, \$737 in Whyalla, and \$650 in Port Pirie.⁶ The median weekly rent on bonds lodged for all private dwellings (houses) in the fourth quarter of 2007 was \$400 in Roxby Downs, \$160 in Port Augusta, \$145 in Port Pirie, \$170 in Whyalla and \$240 in South Australia (Department for Families and Communities 2008a).⁷ The rise in median weekly rent for all private dwellings (houses and flats) (Department for Families and Communities 2008a).⁸ The rise in median weekly rent for all private dwellings (houses and flats) of 7.7% in Port Augusta, 41.7% in Whyalla and 3.7% in Port Pirie (Q4 2005–2007) (Department for Families and Communities 2008a).

There were over 1,400 private dwellings in the Roxby Downs Municipality in 2006, of which 1,328 were occupied at the census, and approximately 20–25% were not related to the mining workforce. A number of new housing developments are planned or underway in Roxby Downs (see Chapter 2, Existing Operation, for details). Table 19.4 shows the number and type of occupied private dwellings in Roxby Downs at the 2006 census, plus 120 new dwellings completed in June 2008.

The majority of dwellings are separate houses, although Roxby Downs Municipality has a higher proportion of other dwelling types (such as caravans and cabins) and a lower proportion of semi-detached houses, flats and apartments than South Australia.

Table 19.4 Number of bedrooms in occupied private dwellings in Roxby Downs LGA¹

Number of bedrooms	Number of dwellings	Proportion of total properties (as a %)
One	60	4.1
Two	136	9.4
Three	608	41.9
Four	408	28.1
Five or more	43	3.0
Not stated/other	196	13.5
Total occupied private dwellings	1,451	100

¹ Based on 2006 census data (ABS 2007a). Includes additional dwellings associated with the Copper Sands accommodation project.

Roxby Downs Municipality also has fewer home owners or purchasers and a higher proportion of rental dwellings. At the 2006 census, approximately 34% of occupied private rental properties were rented from a real estate agent and 54% through employers or a caravan park. Approximately 220 people were counted in caravan parks at the 2006 census (ABS 2007d), including approximately 170 residents (ABS 2007a). Of usual residents living in caravan parks, the majority (65%) were single-person households, and 9% were families with children (ABS 2007a).

The housing market in Roxby Downs is constrained by supply, resulting in inflated house prices and rents. Figure 19.6 shows the rise in the median sales price of residential houses from 2003 to 2007 in Roxby Downs, Port Augusta, Port Pirie and Whyalla LGAs compared to South Australia (State Valuation Office 2008). The supply shortfall is also evidenced by waiting lists of approximately 200 people for BHP Billiton-owned houses and private rental properties. A report on housing affordability for key workers (including nurses, teachers, police, firefighters and ambulance officers) showed Roxby Downs was the least affordable town or rural area in South Australia (BankWest 2008a). Housing costs in Roxby Downs are also relatively high compared to a number of similar Australian mining communities (see Appendix Q6 for details).

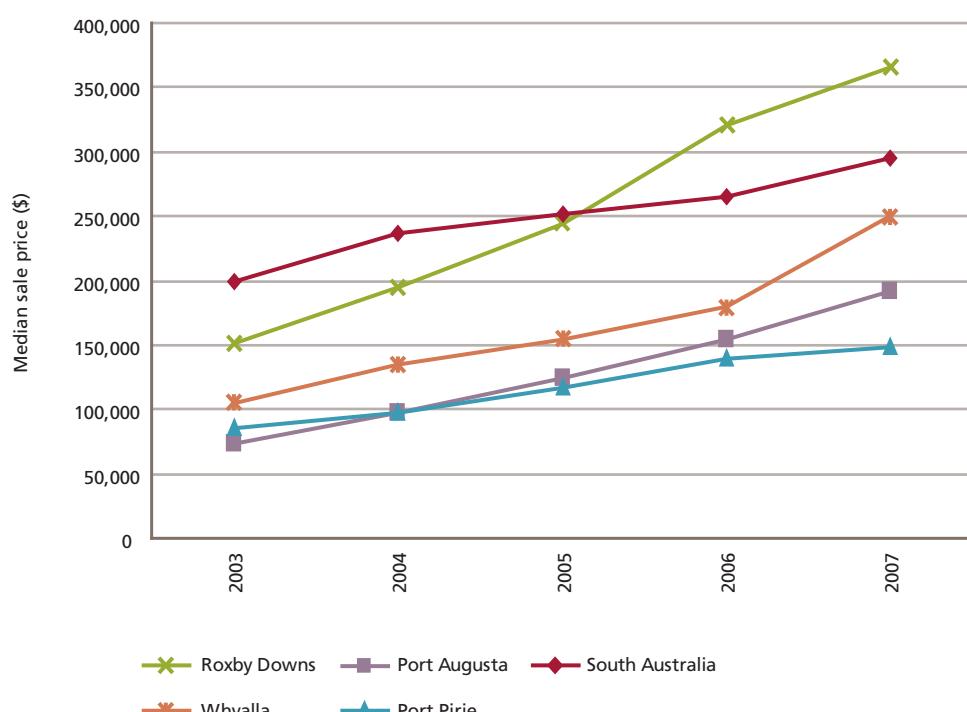
An analysis of 2006 census data shows that, in the Roxby Downs Municipality, approximately 7% of households on low-to-moderate incomes were paying more than 30% of income on housing costs, compared to over 40% in South Australia (ABS 2007a and 2007g, see Appendix Q2 for details). In March 2008, fewer than 40 people in Roxby Downs were receiving rent assistance from Centrelink, the majority of whom were women (Centrelink 2008).

Further information on housing and rental costs in Roxby Downs, and other townships in the northern region, is provided in Appendices Q1 and Q2. Housing costs in comparable mining communities in Australia are detailed in Appendix Q6.

Andamooka

Andamooka housing consists of many forms, including cottages, caravans, prefabricated and transportable buildings, and houses of corrugated iron, fibrocement and concrete block (see Plate 19.16).

The majority of dwellings in Andamooka are separate houses, although it also has a relatively large proportion of other dwelling types. Most houses are owned or are being purchased. At the 2006 census, a large proportion were unoccupied. Housing rentals have risen by over 60% from 2005 to 2007 (see Appendix Q2).



Source: State Valuation Office 2008

Figure 19.6 Residential house sales (median price)



Plate 19.16 Andamooka housing



Plate 19.17 Woomera apartment block

Woomera

In comparison to South Australia, Woomera has a relatively high proportion of flats, apartments and units, which were built mainly in the 1940s and 1950s to accommodate defence personnel and the associated workforce. The different types of housing in Woomera are illustrated in Plates 19.17 and 19.18.

At the 2006 census, almost 60% of all private dwellings were empty. All occupied private dwellings were rented from a housing authority, government or other employer or residential/caravan park (excluding a small per cent not stated) (ABS 2007a), indicative of the high proportion of Commonwealth (Defence) – owned housing.

Northern region and Upper Spencer Gulf

Despite rising housing costs in the three Upper Spencer Gulf cities and some other parts of the northern region, relatively low rentals and house prices remain features of the housing market in the Northern Statistical Division (see Figure 19.6).

Further information on housing and rental costs is provided in Appendices Q1, Q2 and Q6.

19.3.6 CHARACTER AND WELL-BEING

Roxby Downs

Roxby Downs is characterised as a safe and friendly place, with a strong community spirit and good lifestyle (Steer et al. 2001; Roxby Downs Community Board 2005; Arup HLA 2006). It is also seen as a good place to raise a family. Other positive aspects of living in Roxby Downs identified in community consultation are the quality of its facilities, open space and parks/reserves and that it is quiet and clean. Based on a Quality of Life Index recently released by BankWest (2008b), Roxby Downs ranked 16th out of 63 LGAs in South Australia and 108th out of 590 LGAs in Australia. Plates 19.19 to 19.22 illustrate some of the facilities in Roxby Downs, namely the council office, Cultural Precinct, Leisure Centre and shopping centre.



Plate 19.18 Woomera housing



Plate 19.19 Roxby Downs Council Office

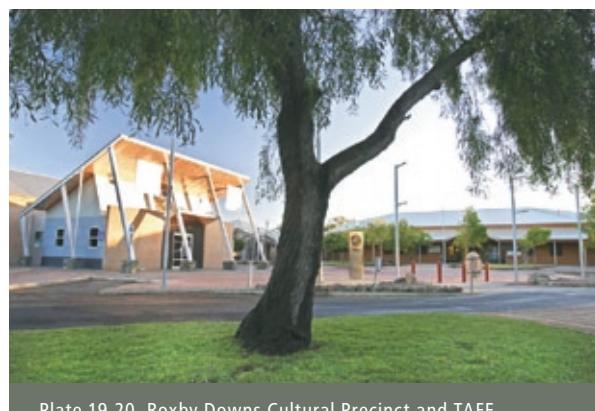


Plate 19.20 Roxby Downs Cultural Precinct and TAFE



Plate 19.21 Roxby Downs Leisure Centre and Swimming Pool



Plate 19.22 Roxby Downs shopping centre

During the consultation on the Roxby Downs Draft Master Plan (Arup HLA 2006), some community members expressed concern about the cost of living, limited competition and variety of shopping, the lack of specialist services, support agencies and secondary school options, poor streetscapes and maintenance, isolation and heat, and alcohol and drug misuse. A price comparison on 37 grocery items purchased in December 2007 showed overall costs were 10.3% higher in Roxby Downs than in Adelaide and 7.8% higher than in Port Augusta, although 30 items were the same price in Roxby Downs as one or both of these locations. In comparison to a number of similar Australian mining communities, Roxby Downs was a relatively cheap place to purchase groceries (see Appendix Q6).

Like many mining communities, employment is the principle reason many people give for living in Roxby Downs, with lifestyle options, children's education and proximity to family members contributing to the high level of residential mobility (University of Queensland Social Research Centre and Centre for Social Responsibility in Mining 2007).

Roxby Downs offers a range of community and recreational services and facilities as shown in Table 19.5. This table also identifies comments by the community or agencies on services in 2008, with further detail on capacity, staffing, service gaps and issues provided in Appendix Q5. Appendix Q6 analyses employment in social services in Roxby Downs with a number of other comparable Australian mining communities in 2006.

Visitor accommodation includes two caravan parks and a hotel/motel. Figure 19.7 shows the general location of community and recreational facilities and accommodation in Roxby Downs (see Appendix Q5 for further details). Plates 19.23 to 19.27 illustrate some of the existing recreational facilities in Roxby Downs, namely tennis courts, BMX track, a playground and parks.



Plate 19.23 Roxby Downs tennis courts



Plate 19.24 Roxby Downs BMX track



Plate 19.25 Roxby Downs playground

Table 19.5 Community and recreational services in Roxby Downs

Service	Detail	Comment
Municipal Council of Roxby Downs (see Plate 19.19)	<p>Community services staff (5.5 full-time equivalents) includes a Community Development Officer, Family and Youth Officer, Community Liaison Officer and library staff. Jointly funds an Arts Development Officer with Country Arts SA and an Economic Development Officer with the Northern Region Development Board.</p> <p>Services operated by the council include:</p> <ul style="list-style-type: none"> • Roxby Leisure (visitor information, cultural centre, leisure centre, youth services and other recreational facilities) • Roxby Power (electricity) and Roxby Water (water and sewerage) • motor vehicle and licensing services for Transport SA on Wednesday and Thursday 9 am to 4 pm • boardroom, with video and teleconferencing facilities, available for hire. 	<p>In 2006, Roxby Downs Council:</p> <ul style="list-style-type: none"> • was relatively well staffed, with one employee per 180 people compared to 1:200 in SA (Department of Transport and Regional Services 2006) • had a similar proportion of staff working in human services (26%) compared to a typical South Australian council (Local Government Association of South Australia 2006) • had fewer staff than several other comparable mining communities in Australia (see Appendix Q6). <p>The need for more community meeting space with crèche facilities identified in the Roxby Downs Community Plan (2005).</p> <p>The Roxby Downs Draft Master Plan (Appendix F4) sets aside land for expanding council office space and mixed-use community facilities, including meeting rooms and crèche facilities.</p>
Library	Shared school and community library.	Heavily used, but currently unable to increase its services due to space restrictions.
Department for Families and Communities	<p>Services provided via outreach from Port Augusta include:</p> <ul style="list-style-type: none"> • child protection (two to three times a month) • social work (two to three times a month) • alternative care (two days a month) • juvenile justice intervention and support (monthly) • anti-poverty counselling (as needed) • disability services (two to three days per month). 	<p>Disability SA will provide a level of service coordination in Roxby Downs and surrounding area based on client demand from September 2008.</p> <p>Limited availability of family support and specialist services identified as issues by service providers and in community consultation.</p>
Youth Centre	<p>Provides a drop-in recreational space for young people aged 12–20 years on a limited, scheduled basis.</p> <p>Opening times vary.</p> <p>Council's youth service activities have been integrated into the operation of the Roxby Downs Leisure Centre. Staff include a Youth Affairs Officer and Youth Support Worker.</p>	<p>Lack of building space constrains further expansion.</p> <p>Limited support services, facilities and activities for young people identified as issues by service providers and in community consultation.</p>
Cultural Centre (see Plate 19.20)	Includes a 350-seat auditorium, a 67-seat multipurpose theatrette/cinema, art gallery, visitor information centre, café and community radio station.	A number of improvements to community facilities have been identified in the Roxby Downs Draft Master Plan (Appendix F4).
Roxby Downs Leisure Centre (see Plates 19.21 and 19.23)	<p>Facilities include:</p> <ul style="list-style-type: none"> • two indoor basketball stadiums • three squash courts • area for aerobics • Fitness Centre with gym equipment • three tennis courts, two combined tennis and netball courts • swimming pool (six lane 25 m, a leisure pool, water slide, and toddler pool) • crèche. <p>Opening hours vary for the Fitness Centre, sports stadiums, squash centre and swimming pool.</p>	<p>The centre is well used, with over 700 fitness and swimming memberships.</p> <p>Function room/meeting venue not available with the expansion of the gym.</p> <p>Community views expressed in the Master Plan Consultation Report (Arup HLA 2006) were that sporting facilities are generally good but require upgrading.</p> <p>A range of new sports, recreation and leisure facilities have been identified in the Roxby Downs Draft Master Plan (see Appendix F4).</p>
Other sporting and recreational facilities (see Plates 19.24 to 19.27)	<p>Lions Park contains barbecues, playground and other public amenities:</p> <ul style="list-style-type: none"> • shared town and school oval • skate park • bowling green • golf course • BMX track • playgrounds • motor sports clubs and tracks • racecourse and pony club. 	<p>Open space and parks/reserves are liked by the community and seen as well-designed and laid out.</p> <p>High participation in sports and recreational activities, with 37 known sporting and recreation clubs in Roxby Downs, and a combined membership of over 2,200.</p> <p>Diversity and quality of sports and recreational activities noted by the Roxby Downs Community Plan (2005), although a shortfall in volunteers, funding and infrastructure are issues for some sporting groups.</p> <p>A number of expansions and improvements to public space have been identified in the Roxby Downs Draft Master Plan (see Appendix F4).</p>



Plate 19.26 Roxby Downs Lions Park



Plate 19.27 Roxby Downs Park

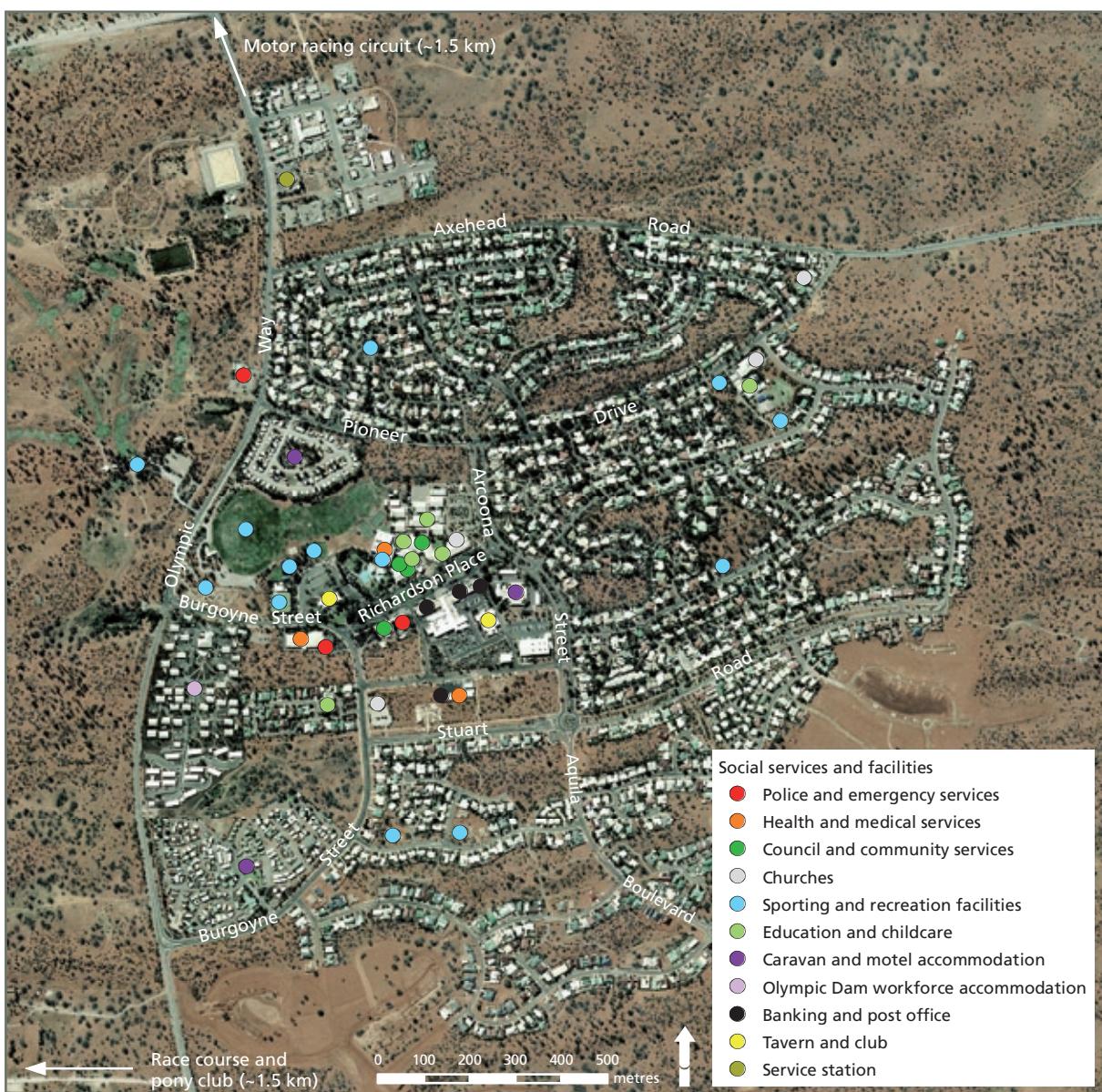


Figure 19.7 Existing social services and facilities in Roxby Downs

Andamooka

Residents of Andamooka often use services and facilities in Roxby Downs. Family and community services provided in Andamooka include:

- the Andamooka community support service and respite care centre (collocated with the Andamooka Community Health Service)
- a swimming pool
- various types of tourist accommodation, including two hotel/motels and caravan park
- a post office (which is also an agency for various banks and credit unions)
- a supermarket.

Woomera

The town has a range of community services and facilities, which have been maintained despite its declining population. These include:

- sporting and recreational facilities including a golf course, swimming pool, tenpin bowling alley, gym and fitness centre, playing fields and parks
- various types of tourist accommodation, including a hotel and caravan park
- retail, banking and postal services
- a heritage and visitor information centre
- a theatre and youth centre.

19.3.7 EDUCATION

Table 19.6 shows the educational attainment of residents of Roxby Downs Municipality, Andamooka, Woomera and the Northern Statistical Division compared with South Australia, based on the ABS 2006 census (ABS 2007c).

Roxby Downs

Figure 19.7 shows the general location of education and childcare facilities, with the specific location of services shown in Appendix Q5.

Roxby Downs has relatively high levels of educational participation, with a high proportion of residents who have a non-school qualification, most commonly a certificate in engineering or a related field, or who are attending school or technical and further education (TAFE).

Plate 19.28 shows the existing Roxby Downs Area School. The student-to-teacher ratio at the school is similar to the average for South Australian public schools (14 students per teacher) (ABS 2006) and several other comparable mining communities in Australia (see Appendix Q6). There are, however, a greater number of students per school (public and private) in Roxby Downs (400 students per school compared to 310 in South Australia) (ABS 2006). The Roxby Downs Community Plan identified education and training as the highest community priority (Roxby Downs Community Board 2005).



Plate 19.28 Roxby Downs Area School

Table 19.6 Educational attainment in Roxby Downs, the northern region and South Australia, 2006¹

Education	Roxby Downs LGA	Andamooka locality	Woomera locality	Northern Statistical Division	South Australia
Attending an educational institution (all people) (as %)	33.5	27.9	36.5	30.0	29.5
Completed Year 12 (people aged 15+ years) (as %)	40.8	24.0	41.5	24.9	38.3
Completed a tertiary education (people aged 15+ years) (as %) ²	56.1	44.7	52.9	43.2	48.3

¹ Based on 2006 census data (ABS 2007c), place of usual residence.

² Includes people whose level of tertiary education was not stated or inadequately stated.

Table 19.7 describes the education and childcare services provided in Roxby Downs in 2008.

Andamooka

Education services in Andamooka are provided from the Andamooka Children's Centre and Primary School, which includes a library and resource centre, swimming pool and multi-use sports court. Services include:

- early childhood and pre-school services for children under five years old for 30 families, including childcare for seven families and a kindergarten for nine children (capacity for 15 children)
- school services for 25 children up to Year 6 (capacity for 40 children).

Students from Andamooka can attend schools in either Andamooka or Roxby Downs.

Family day care is also available in Andamooka.

Woomera

Education services in Woomera include the Woomera Area School (Reception to Year 12), which had 75 students in 2007 and capacity for approximately 200, and a joint school/community library. A Child Parent Centre is also located at the school.

19.3.8 HEALTH

Roxby Downs

Comparative health data (Public and Environmental Health Unit 2006 and 2008 and Department of Health 2008, see also Appendix Q3) show that Roxby Downs residents:

- generally experience good health, with a lower incidence of premature death, avoidable mortality, and total hospital admissions than South Australia, after taking account of differences in the age profile
- generally rate positively on maternal and child health indicators
- have a higher rate of contact with community mental health services than other South Australians on several indicators including mood, neurotic and stress-related disorders

Table 19.7 Education and childcare services in Roxby Downs

Service	Detail	Comment
Roxby Downs Area School (see Plate 19.28)	Opened in 1987 to cater for 600 students from Reception to Year 12, and in 2007, it had 690 enrolled students. Offers out-of-school hours care program for 20 students and is licensed for 15 children for before-school care.	At capacity, with further expansion constrained by a lack of building space. The Roxby Downs Draft Master Plan provides for an expansion of education facilities (see Appendix F4). A number of senior students (Years 11 and 12) leave Roxby Downs for boarding schools in the Upper Spencer Gulf region, Adelaide or elsewhere. Waiting list for after-school care and vacation care programs.
St Barbara Parish School	Catholic primary school, caters for up to 250 students from Reception to Year 7.	Has capacity for an additional 60 students.
Roxby Downs Kindergarten	Licensed for 90 children or 47 places, two sessions daily. Provides pre-school education and pre-entry kindergarten on Friday for 15 children. Collocated with other education services.	Provides the only pre-school education in Roxby Downs and is at full capacity. Service could be extended by 15–20 places but would reduce open space. Additional support provided to 13 children with special needs and six children from non-English speaking backgrounds.
Roxby Downs Childcare Centre	Provides childcare for babies to five year-olds. Licensed for a maximum of 58 places.	Is operating at about half its capacity.
Little Rascals Childcare Centre	Privately run, licensed for a maximum of 70 places for babies to eight year olds. Provides childcare and out-of school hours and vacation care for students up to 12 years of age, including school drop off and pick up.	Highest demand is for casual childcare for rostered staff. Centre is close to full capacity.
Family day care	Two home-based childcare services used by 20 families in Roxby Downs and two families in Andamooka.	Currently no waiting list for this service. Additional carers are being trained.
TAFE Regional (see Plate 19.20)	Provides post-secondary courses to advanced diploma level, pre-vocational training and continuing education at Roxby Downs and other Upper Spencer Gulf and Outback campuses. Rooms available to hire for meetings.	Need for higher education and expanded TAFE options identified in community consultation. Expansion of TAFE constrained by limited building space. The Roxby Downs Draft Master Plan provides for an expansion of TAFE facilities (see Appendix F4).

- have a relatively high rate of accident and emergency presentations at the Roxby Downs Health Service, and a declining rate of hospital separations
- have a lower number of general practitioners per head of population than South Australia or country South Australia.

Health-related issues identified in the Roxby Downs Community Plan (Roxby Downs Community Board 2005) concern the availability of some health services, including mental health support, problems with alcohol and drugs, and the turnover of medical staff.

Table 19.8 shows the community health and medical services provided in Roxby Downs in 2008 (see Figure 19.7 for the general location of health and medical services and Appendix Q5 for specific details). Additional services are provided from Adelaide, Port Augusta or other regional centres on a sessional or appointment basis. The Roxby Downs Health Service is shown in Plate 19.29.



Plate 19.29 Roxby Downs Health Service

Table 19.8 Community health and medical services in Roxby Downs

Service	Detail	Comment
Roxby Downs Health Service (see Plate 19.29)	<p>Eight in-patient beds (including maternity room and nursery), theatre and central sterile supply department</p> <p>Services include:</p> <ul style="list-style-type: none"> accident and emergency services (with two treatment cubicles, one resuscitation room) limited imaging services general community health services, including health screening, parent education and child youth services antenatal and postnatal services minor surgical procedures visiting specialist and paramedical services <p>Allied health services provided from Port Augusta include:</p> <ul style="list-style-type: none"> dietician, physiotherapist, podiatrist, occupational therapist, speech pathologist and mental health (fortnightly) diabetes educator, women's health, and drug and alcohol counselling (monthly) <p>Other specialists and paramedical services from Adelaide or Port Augusta include ear, nose and throat specialist, optician, chiropractor, paediatrician, clinical psychologist and orthodontist</p> <p>The health service also accommodates:</p> <ul style="list-style-type: none"> Strengthening Our Families Coordinator (0.4 FTE) funded by BHP Billiton to provide counselling and social work Roxby Downs Medical Practice, staffed by three general practitioners (GPs), open Monday to Friday and Saturday morning private dental service, full-time Monday to Friday, including dental x-rays private physiotherapist 	<p>Theatre is unused and low-risk obstetric and elective day surgery is not available</p> <p>For specialised medical treatment, including pharmacy, pathology and specialist imaging, residents travel to Port Augusta, Whyalla or Adelaide.</p> <p>The health service has the capacity to increase to 14 beds within existing infrastructure</p> <p>Mental health services (including child and adolescent mental health) are fully booked</p> <p>The health service accommodates other visiting outreach services including:</p> <ul style="list-style-type: none"> Centacare Catholic Family Services Centacare Whyalla gambling help services Uniting Care Wesley community health services The Roxby Downs Draft Master Plan provides for an expansion of health facilities (see Appendix F4)
General practitioners	Roxby Downs has two community-based general practices (in addition to the medical practice located at the Roxby Downs Health Service): <ul style="list-style-type: none"> Roxby Downs Family Practice, open Monday to Friday, staffed by one full-time GP and one fly-in fly-out GP (Monday to Thursday) Grace Surgery, with one general practitioner 	Subsidies provided by BHP Billiton to privately owned medical practices to secure and retain doctors
SA Ambulance Service	Ambulance and troop carrier based at the Roxby Downs Health Service Currently a volunteer service with one crew rostered on to respond to incidents	Difficulties recruiting and retaining volunteers BHP Billiton Emergency Services operate two ambulances at Olympic Dam
Royal Flying Doctor Service	Patient transfers to hospitals in Port Augusta and Adelaide	Highly regarded service

Andamooka

Health services are provided through the Andamooka Community Health Service, which is open from 9 am to noon, and 2 pm to 5 pm weekdays (except Wednesday afternoon). The service is run by Frontier Services (a national agency of the Uniting Church), through two remote area nurses, and provides a health clinic, community health, education, and emergency services (including after-hours and an ambulance).

The health service is collocated with the Andamooka Community Support Services, which provides home and community care service for the elderly and disabled. This service is run by Frontier Services and operates five days a week, using paid staff and volunteers.

Frontier Services also operates a troop carrier ambulance in Andamooka. The Royal Flying Doctor Service, based at Port Augusta, provides phone support for medical advice.

A child and youth health nurse visits monthly from the Roxby Downs Health Service to provide health screening and parent education.

Woomera

Health services in Woomera include:

- the Woomera Community Hospital, which has 10 beds and includes 24-hour emergency care, an accident and emergency facility, on-call duty doctor and x-ray facilities
- a general practitioner (available for consultations 10 am to 2 pm Monday to Friday), and a pharmacy located at the hospital
- community health services, including immunisations, prenatal and postnatal care provided by the community health nurse from Roxby Downs on monthly and needs-based visits, and other visits from the Port Augusta Regional Health Service
- the Royal Flying Doctor Service, which transfers patients to hospitals in Port Augusta and Adelaide, and funds bimonthly visits by a general practitioner.

Woomera and Roxby Downs health services function as a combined service, with allied health and dental services available at Roxby Downs.

The South Australian Department of Health, via Country Health SA, in conjunction with the Australian Government, are investigating alternative models of service delivery to better service the needs of the current and projected populations of Woomera and surrounding communities. This may affect the way services are accessed and delivered in the future.

19.3.9 CRIME

Roxby Downs

Roxby Downs has a low crime rate and is regarded as a safe community by residents and service providers.

As a consequence of the large number of workers who commute long distances to Olympic Dam, and the variability in construction workforce numbers (such as temporary shutdown contractors), it is difficult to accurately estimate the population of Roxby Downs. Some caution is therefore needed in interpreting crime rates based on ABS population estimates. To overcome this difficulty, crime rates for Roxby Downs Municipality have been calculated using the estimated resident population (ABS 2007b) (to determine the number of people who reside permanently in Roxby Downs), the number of people recorded at the census who usually live elsewhere (to estimate the LDC workforce) (ABS 2007h), and BHP Billiton estimates of the annual average number of temporary construction workers. Further details of these calculations can be found in Appendix Q4.

Data from the Office of Crime Statistics and Research (OCSAR) (2007) show that Roxby Downs and Olympic Dam Village recorded 725 offences in 2006, an average of 60 per month, and a crime rate of 147 offences per 1,000 people.

Figure 19.8 compares the total rate of recorded offences in Roxby Downs with South Australia and regional South Australia from 1996–2006 (OCSAR 2007 and 2008). This shows Roxby Downs Municipality had a lower offence rate than South Australia and a similar rate to regional South Australia in 2006 (146.7 per 1,000 people in Roxby Downs compared to 145.5 per 1,000 people in regional South Australia and 167.9 per 1,000 people in South Australia).

The most common types of recorded offences in Roxby Downs in 2006 were offences against property (37%), driving offences (31%), offences against good order (19%) and offences against the person (including sexual offences) (13%). Figure 19.9 shows the trend in the different types of offences in Roxby Downs from 1996–2006. Over the period from 2005 to 2006, the largest increases were recorded in offences against the person (including sexual offences), offences against good order and driving offences, and the largest declines were recorded in offences against property.

Much of the crime and anti-social behaviour is reported to be alcohol related. Some youth issues have also been identified, and they relate to under-age drinking and drug use, and anti-social behaviour (Roxby Downs Community Board 2005; Wade 2005). Further information on crime rates in Roxby Downs is provided in Appendix Q4, including an analysis of trends in victim and police reported crime.

Table 19.9 shows the justice and emergency services provided in Roxby Downs in 2008 (see Figure 19.7 for the general location of police and emergency services and Appendix Q5 for specific details).

Andamooka and Woomera

Both Andamooka and Woomera have a police station staffed by one officer, which is open during business hours Monday to Friday, and after hours as required. Police from Roxby Downs and Port Augusta also support Andamooka and Woomera.

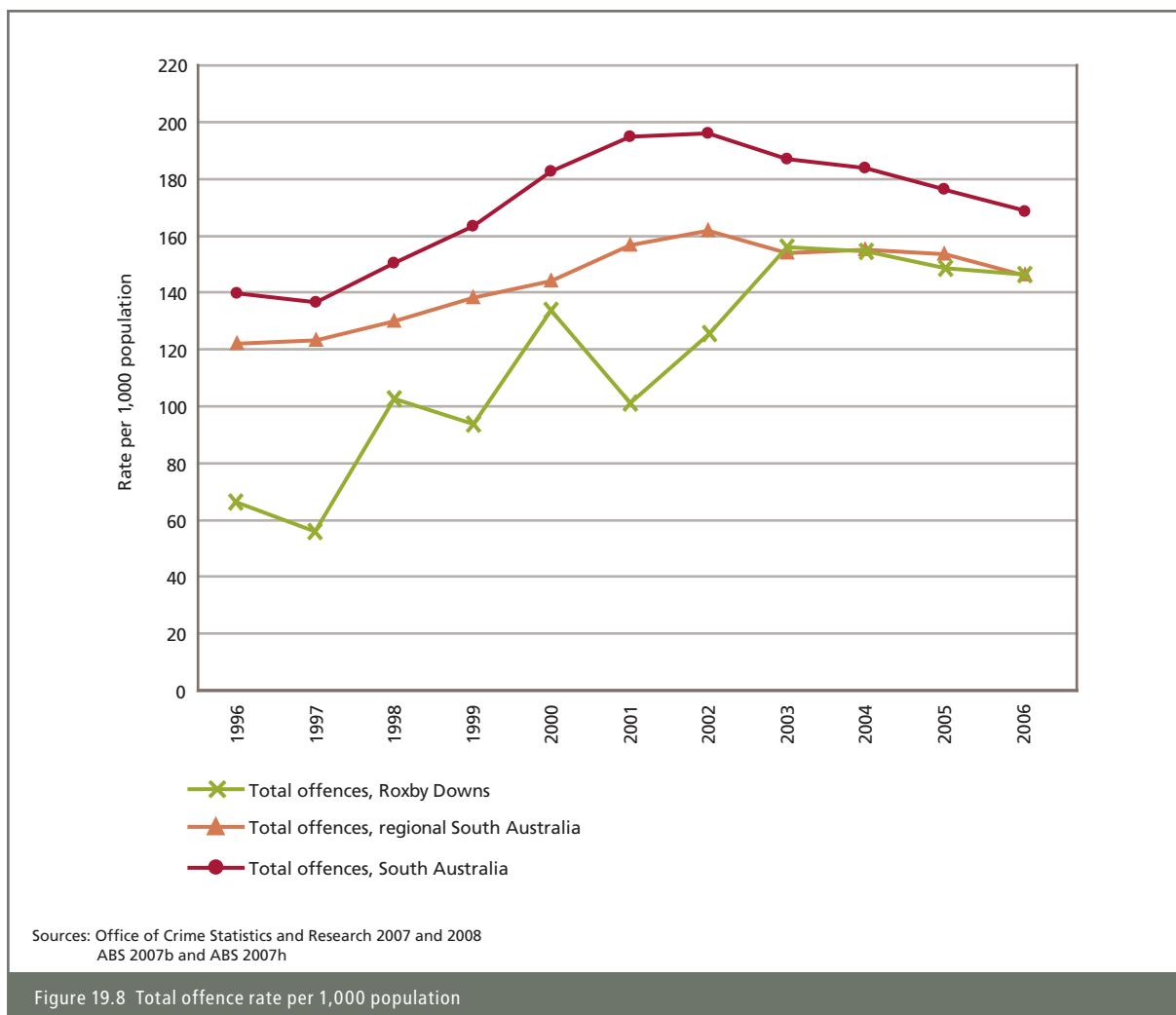


Figure 19.8 Total offence rate per 1,000 population

Table 19.9 Justice and emergency services in Roxby Downs

Service	Detail	Comment
Police	Staffed by one sergeant, eight uniformed officers and a detective Open seven days a week during business hours Officers are recalled to duty after hours as required Provides support for Woomera and Andamooka	Police currently take domestic violence victims to Port Augusta, as Roxby Downs does not have any emergency accommodation or a safe house The Roxby Downs Draft Master Plan makes allowance for expanded police and court facilities (see Appendix F4)
Courts	Bimonthly Magistrates' sittings in council offices Other court services provided on a visiting basis from Port Augusta or Adelaide	Many matters coming before the court are reportedly alcohol-related
Legal Services Commission	Legal services provided via a free telephone advisory service	No physical presence in Roxby Downs
Correctional services	Services provided via outreach from the Port Augusta Community Corrections Centre (approximately once per six weeks)	Services provided from council office space
Families SA (Department for Families and Communities)	Juvenile Justice Outreach Services provided from Port Augusta District Office including supervision of young offenders 10–18 years (monthly)	
Emergency services	Country Fire Service (CFS) brigade and the State Emergency Service (SES) unit (co-located) Currently a volunteer service	Difficulties recruiting and retaining volunteers

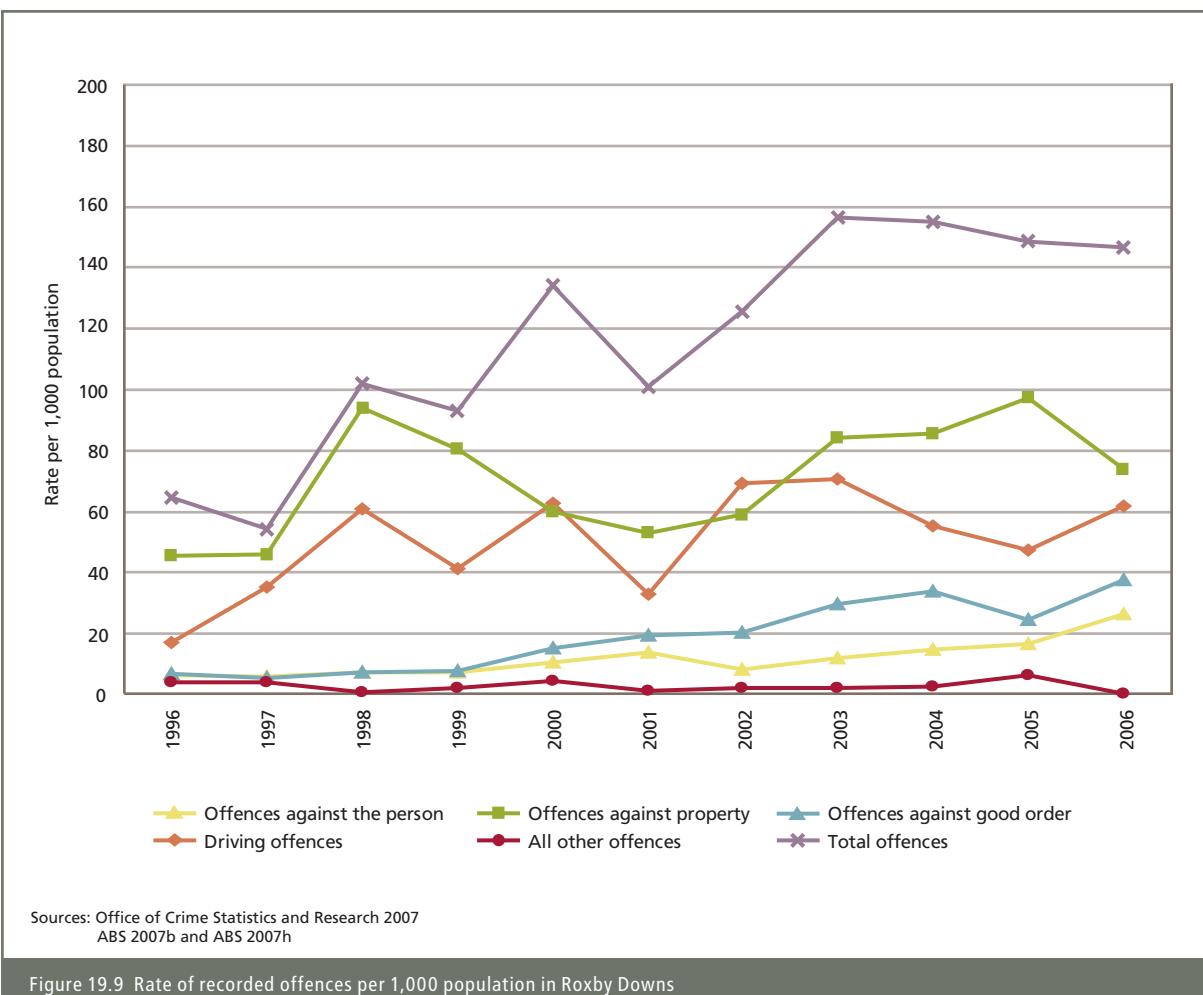


Figure 19.9 Rate of recorded offences per 1,000 population in Roxby Downs

Emergency services are located in both townships and include the CFS, SES and an ambulance service. The Woomera Emergency Service has a full-time crew of eight officers, which operates 24-hours a day, seven days a week, and provides ambulance, fire and rescue services to Woomera, the Woomera Prohibited Area, and Stuart Highway between Port Augusta and Coober Pedy.

19.3.10 TRANSPORT, ACCESS AND MOBILITY

Townships in the far north of South Australia, including Roxby Downs, Andamooka and Woomera, are isolated from other major towns and regional centres, and are rated as remote in terms of their physical distance from goods and services (ABS 2003b). Figure 19.1 shows the road linkages between Roxby Downs and Adelaide via Olympic Way and the Stuart and Princes Highways. Road distances and travel times by car between Roxby Downs and various locations are provided in Table 19.10.

The Stuart Highway is the major intercity linkage for the movement of freight and passengers between Adelaide and Darwin and provides access to mining operations, pastoral properties, tourist destinations, and rural and remote communities (Department of Transport and Regional Services 2007). It is predominantly a single-lane carriageway road,

and the only sealed north-south road crossing central Australia. The Princes Highway links Adelaide and Port Augusta, and is a double-lane carriageway from Adelaide to near Port Wakefield and a single carriage highway through to Port Augusta. Olympic Way is a single carriageway that connects Olympic Dam and Roxby Downs to the Stuart Highway at Pimba. Estimated daily traffic volumes from Port Wakefield to Olympic Dam and Roxby Downs to Andamooka and the Northern Territory (NT) border are outlined in Table 19.11.

Table 19.10 Road distances and travel times by car from Roxby Downs

Destination	Distance by road (kilometres)	Approximate driving time (hours)
Andamooka	33	0.5
Woomera	78	1.0
Port Augusta	256	3.0
Quorn	296	4.0
Whyalla	330	4.0
Port Pirie	347	4.0
Coober Pedy	450	5.0
William Creek	265	6.5
Adelaide	561	7.0
Port Lincoln	593	7.0

Table 19.11 Estimated annual average daily traffic (24-hour two-way flows), 2008¹

Road section	Estimated daily vehicle traffic	Estimated daily commercial vehicle traffic (% of all traffic)
Roxby Downs to Olympic Dam	4,600	400 (8.5%)
Roxby Downs to Andamooka	550	47 (8.5%)
Roxby Downs to Woomera	550	140 (25.5%)
Woomera to Pimba	700	130 (18.5%)
Pimba to Coober Pedy	340	90 (26.5%)
Coober Pedy to the NT border	330	80 (24.2%)
Pimba to Port Augusta	800	190 (23.8%)
Port Augusta to Whyalla	2,400	470 (19.5%)
Port Augusta to Two Wells	7,800	1,400 (18%)

¹ Sourced from the South Australian Department for Transport, Energy and Infrastructure 2008a and 2008b. Traffic volumes vary on different road segments and are a guide only. For example, immediately south of Port Augusta, traffic peaks at 9,100 vehicles and 1,000 (11.0%) commercial vehicles.

The community has raised issues about the cost, frequency and arrival times of transport services between Roxby Downs and Adelaide.

In October 2008, Greyhound Australia commenced a daily bus service between Olympic Dam and Pimba, via Roxby Downs and Woomera, which connects with its Adelaide to Alice Springs services. The bus departs Roxby Downs in the late evening, and takes about eight hours to reach Adelaide. A bus service between Roxby Downs and Adelaide was previously run by Premier Stateliner.

BHP Billiton also operates a daily bus service to transport workers from Adelaide, Port Augusta and Woomera to Olympic Dam, and between Roxby Downs and Olympic Dam.

The Roxby Downs airport is 10 km north of the township and can be used by light jets and regional turboprop aircraft. Alliance Airlines began air services between Olympic Dam and Adelaide in July 2007 using two Fokker 50 (F50) aircraft, which can carry 56 passengers. The flight schedule varies daily, with between two and five flights per day and a total of 29 weekly flights, and has a flight time of about one and a half hours. The airport also provides access to the Royal Flying Doctor Service for emergency evacuations.

Andamooka has an airstrip for light planes of a maximum weight of 5,700 kilograms. The airfield at Woomera is operated by BAE Systems for the Department of Defence and can accommodate Royal Flying Doctor Service aircraft.

The Adelaide to Darwin rail link passes through Port Augusta and Pimba and incorporates the standard gauge line from the Tarcoola junction through to the Port of Darwin (East Arm). The rail link carries approximately one-third of the freight volumes from Adelaide to Darwin (Department of Transport and Regional Services 2007). Mining is the largest single freight user of the rail link, which supports dedicated bulk mineral rail services from the Prominent Hill mine in South Australia and mines sites in the Northern Territory, with a total of 34 freight trains transiting Darwin each week (FreightLink 2008). The rail

link also supports regional and interstate passenger services through 'The Ghan', which runs twice weekly (Department of Transport and Regional Services 2007).

East Arm is used for all freight operations at the Port of Darwin. Port Adelaide is the main service point for shipping in South Australia.

19.4 DESIGN MODIFICATIONS TO PROTECT ENVIRONMENTAL VALUES

19.4.1 ENVIRONMENTAL VALUES

For the purposes of this section, environmental values encompass social values.

Section 19.3 has described the social characteristics of Roxby Downs, Andamooka and Woomera, and other townships and communities within the EIS Study Area.

Maintaining the amenity and social fabric of these communities is a project planning, design and operational management objective.

19.4.2 MAJOR ELEMENTS OF THE PROJECT DESIGN

Planning provides the opportunity to protect the social character, well-being and amenity of Roxby Downs and other communities that would be affected by the proposed expansion.

A major element includes siting of project infrastructure to reduce social impacts:

- the location of Hiltaba Village reflects the views of residents, known heritage sites, the need for separation from dust and noise sources at the mine and proximity to the new airport (see Chapter 4, Project Alternatives, for details)
- the location of the landing facility considered the number and proximity of adjacent coastal homes, in addition to environmental and other factors (see Chapter 4, Project Alternatives, for details)

- new infrastructure has been situated adjacent to existing infrastructure corridors wherever possible to minimise impacts on landholders.

The Roxby Downs Draft Master Plan provides for the future expansion of the Roxby Downs township and considers the requirements for housing and accommodation, retail and social services, recreation and open space, access and mobility, and industry (see Section 19.5). Once finalised, implementation of the Draft Master Plan will occur through the actions of BHP Billiton, the Roxby Downs Council, government agencies, private developers and community groups.

19.5 IMPACT ASSESSMENT AND MANAGEMENT

A review of major mining projects in Australia, feedback from community consultation and an understanding of the existing social environment identified the following potential effects relevant to assessing the impact of the proposed Olympic Dam expansion:

- the supply of labour, skill shortages, job creation (both direct and indirect) and new business opportunities, and diverting resources from other ventures in the region
- crime and anti-social behaviour, including perceptions of increased crime
- housing supply and affordability
- the provision of social services and infrastructure to meet increased and diverse demands
- social character, amenity and well-being, including increases in the population and long-distance commute workforce, and the influx of a predominantly male construction workforce on community identity, the potential effects of migrant workers on lifestyle and culture, outcomes for more socially and economically disadvantaged people, and community engagement and participation
- access and disturbance from increased road traffic, the construction and operation of off-site infrastructure and energy demands.

Each of these is addressed below, with proposed management measures provided where relevant.

19.5.1 LABOUR SUPPLY

The labour requirements for the proposed expansion are discussed below, followed by initiatives to recruit and retain the required workforce, and business opportunities associated with the proposed expansion.

Labour requirements

Table 19.12 outlines the projected peak labour requirements for the proposed expansion to 2022 (excluding planned shutdowns and the existing workforce) based on estimated full-time equivalent positions.

The expansion is expected to require an increase in the operational workforce at Olympic Dam from approximately

100 in 2010 to approximately 4,000 by 2022. In addition, a construction workforce averaging approximately 4,000 workers from 2010 to 2021, and reaching a peak of approximately 6,000 workers in 2015 and 2016, is predicted. The size of the total Olympic Dam workforce (including shutdowns and the existing workforce) would peak at over 14,000 in 2016. Figure 19.10 shows the total Olympic Dam workforce numbers (existing and proposed), including the maintenance shutdown and other short-term contractors, based on annual average workforce data.

The additional workforce required to construct and operate off-site water, energy and transport infrastructure is outlined in Table 19.13.

Based on the residential arrangements of the current workforce, BHP Billiton predicts that the project would employ up to 1,000 workers from the Upper Spencer Gulf and surrounding areas in the peak construction period, and over 1,000 workers from this region in the operation phase. The profile of the operational workforce is expected to be similar to the present, while the construction workforce would be made up largely of young men employed in the trades or in semi-skilled, labour and related occupations. BHP Billiton anticipates some international workers would be employed in the construction and operation phases, in management, construction and commissioning positions. Existing workforce rosters (described in Section 19.3.4) would also be reviewed for the expanded operation to meet safety requirements, employee preferences, productivity objectives and contemporary practice.

Further information on the workforce and skills requirements (including the size, make-up and sourcing of the workforce) would be made available to government, training organisations and other relevant stakeholders as detailed planning and refinement occurred during the project definition phase and construction phase. Workforce planning would continue to be responsive to labour market conditions, national and international project demands, and refinements to the project configuration and associated infrastructure.

Table 19.12 Projected peak labour requirements for the proposed expansion at Olympic Dam

Year	Construction	Operations	Total
2010	1,500	100	1,600
2011	2,700	400	3,100
2012	2,700	1,100	3,800
2013	3,900	1,900	5,800
2014	5,000	2,300	7,300
2015	5,900	2,700	8,600
2016	5,900	3,000	8,900
2017	4,800	3,300	8,100
2018	4,800	3,300	8,100
2019	4,700	3,500	8,200
2020	2,300	3,800	6,100
2021	1,200	3,900	5,100
2022	0	4,000	4,000

Table 19.13 Labour requirements for proposed water, transport and energy infrastructure

Infrastructure component	Construction timeframe	Peak construction workforce	Operations timeframe	Ongoing operational workforce
Landing facility and access corridor at Port Augusta	2011–2012	100	From 2013	30
Road infrastructure	2011–2012	50	From 2013	n.a.
Pimba intermodal and rail spur	2011–2015	120	From 2016	80
Energy transmission line	2011–2012	90	From 2012	2
Gas supply pipeline	2011–2012	100	From 2012	2
Water desalination plant, supply pipeline and pumping stations	2013–2015	500	From 2015	32
Port facilities at Darwin	2014–2015	50	From 2016	50
Port facilities at Port Adelaide	2014–2015	50	From 2015	50

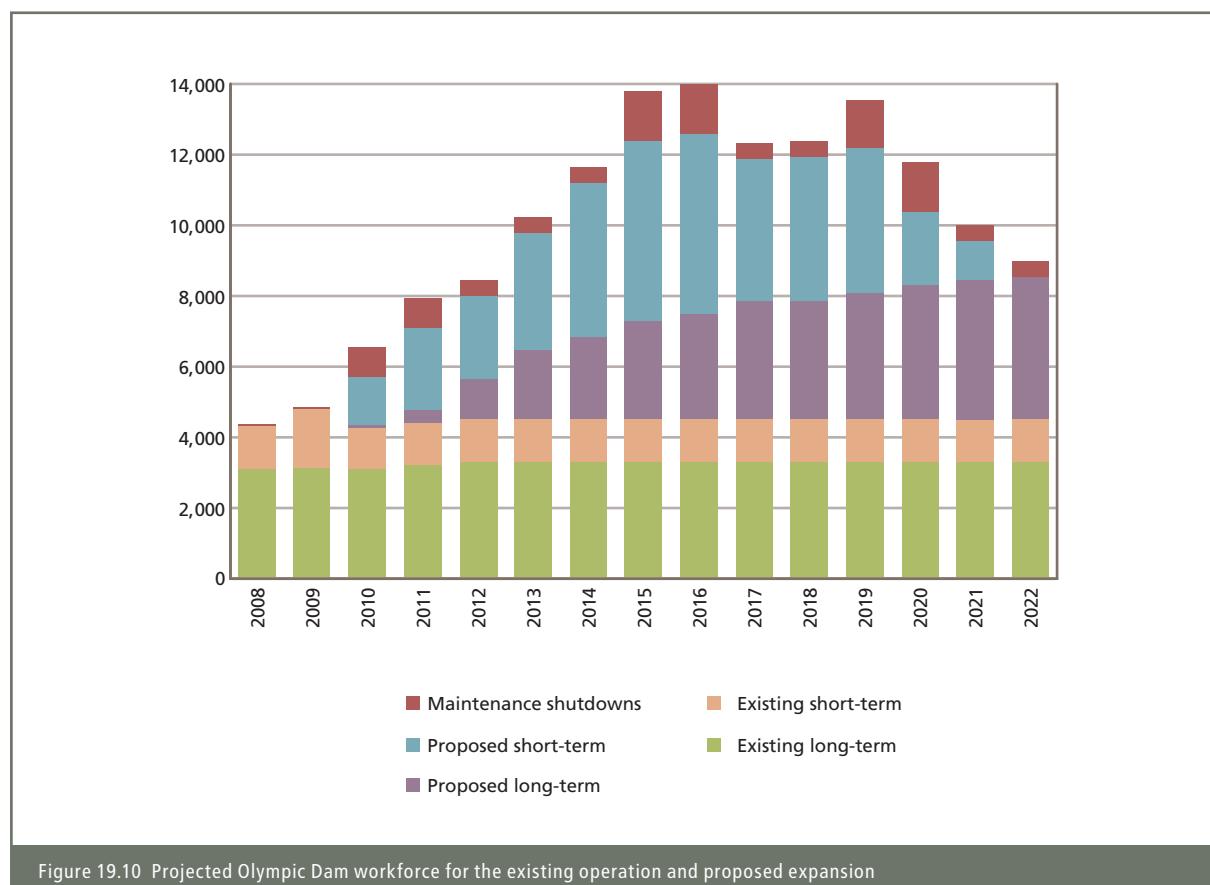


Figure 19.10 Projected Olympic Dam workforce for the existing operation and proposed expansion

The increase in the workforce would be expected to provide significant benefits including:

- new business and employment opportunities locally, regionally and state-wide (see Chapter 21, Economic Assessment, for details) and for particular population groups, including women and Aboriginal people (see Chapter 17, Aboriginal Cultural Heritage, for information on the Olympic Dam Agreement and Heritage Management Protocol)
- an increased membership base for local community, recreational and volunteer organisations
- a diversity of lifestyles and cultures

- a viable economic base for Roxby Downs and the surrounding region for the foreseeable future.

The increased workforce also presents challenges, including:

- recruiting and retaining the required workforce
- attracting workers from existing local, regional and state-wide ventures, which would lead to greater competition for skilled workers
- capacity constraints in the South Australian business sector
- the need for additional social services and facilities, including culturally appropriate services.

Workforce recruitment and retention

Recruiting and retaining the workforce for the proposed expansion would be likely to present significant challenges. The proposed expansion would occur during a period of growing demand for labour in the minerals sector at a national and state level and a declining supply of labour in a number of occupational categories.

The labour force outlook specific to the proposed expansion was assessed by the National Institute of Labour Studies. This built on their published work for the Minerals Council of Australia, Chamber of Minerals and Energy Western Australia and Australian Government (Lowry et al. 2006).

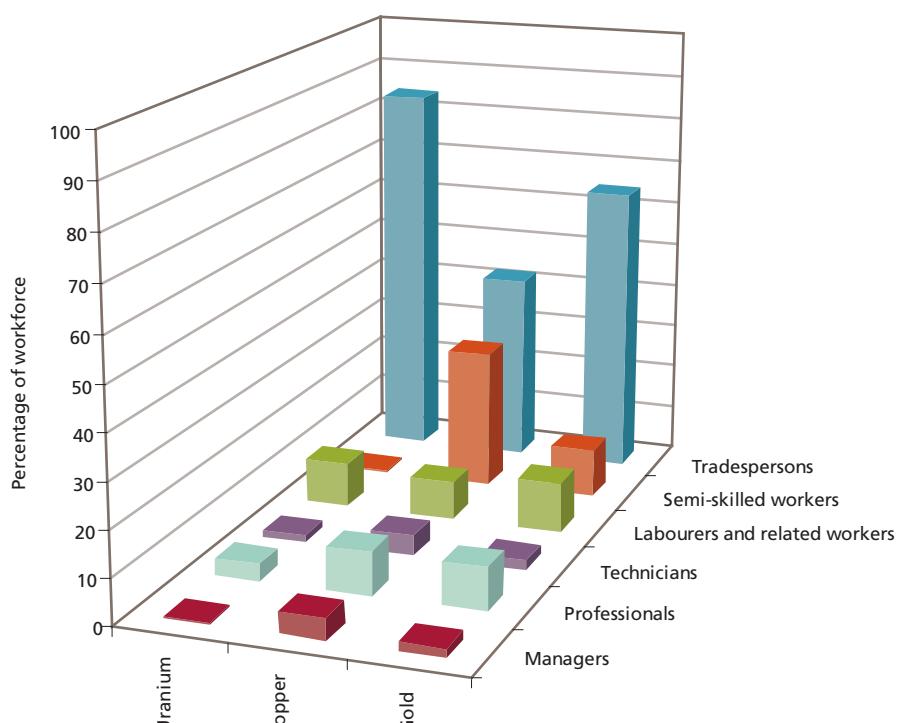
The assessment shows the greatest demand for labour from the proposed expansion could be expected to be in the trades and intermediate to lower skilled occupational categories. This includes tradespersons and related workers, intermediate production and transport workers, and labourers and related workers. This is illustrated in Figure 19.11 (adapted from Lowry et al. 2006), which shows the projected occupational requirements in Australia for three of the four commodities mined at Olympic Dam – copper, gold and uranium.

Assessments by the National Institute of Labour Studies (Lowry et al. 2006) and the South Australian Centre for Economic Studies (2006) forecast demand for labour in the minerals resources sector will increase significantly in all

states, and double in South Australia by 2015. The greatest demand will be for tradespersons and semi-skilled workers. Over the same period, employment growth rates are forecast to decline due to the changes in the age of the workforce, an increasing number of retirements and associated declines in labour force participation. In South Australia, declines are predicted in a number of occupational categories, including tradespersons, labourers and related workers.

Table 19.14 shows the projected increase in demand for labour in the minerals resources sector in Australia and South Australia compared to projected economy-wide employment growth (as an indicator of supply) for six occupational categories from 2008–2015 (National Institute of Labour Studies and BHP Billiton workforce data). This indicates the share of employment growth the minerals resources sector would need to attract to achieve targeted growth, assuming supply currently meets demand. It also highlights the decline in supply in several occupational categories in South Australia, which is occurring at the same time as demand from the resources sector is increasing.

Projected labour availability in 2015 (as indicated by the growth in employment economy-wide versus demand, assuming supply currently meets demand) by major occupations is illustrated in Figure 19.12. This shows the projected demand for labour generated by the proposed expansion relative to the total demand from the minerals resources sector. This suggests the expansion project would more than double the demand for



Source: Adapted from Lowry, Molloy and Tan 2006

Figure 19.11 Labour demand by commodity in Australia

Table 19.14 Projected employment and demand in Australia and South Australia by 2015¹

Occupational category	Projected growth in employment in Australia 2008–2015 (number of people)		Projected growth in employment in South Australia 2008–2015 (number of people)	
	Economy-wide	Demand from the resources sector	Economy-wide	Demand from the resources sector
Managers and administrators	164,600	3,200	8,400	50
Professionals	265,300	9,600	7,200	450
Associate professionals	208,500	5,700	11,000	100
Tradespersons and related workers	25,100	23,600	-3,800	4,300
Intermediate production and transport workers	36,000	31,100	6,100	3,800
Labourers and related workers	26,500	8,400	-3,900	2,300
Total	726,000	81,600	25,000	11,000

¹ Sourced from the National Institute of Labour Studies 2008 and BHP Billiton workforce data.

workers in the trades and intermediate to lower skilled occupational categories in the resources sector in South Australia, and would account for around a quarter of the demand for labourers in the Australian resources sector.

Table 19.14 and Figure 19.12 emphasise the challenge BHP Billiton faces in finding sufficient skilled employees to meet expected demand, particularly in the trades, semi-skilled and labourer occupational categories (the same categories shown in Figure 19.11 as being in high demand for mining operations throughout Australia). The greatest difficulties would be expected to occur in the mechanical, electrical and other trades (Lowry et al. 2006).

This may result in increased competition for skilled labour, and have flow-on effects in other areas and ventures in the state, and potentially other Australian states. A skills audit undertaken by the South Australian Centre for Economic Studies for the Heavy Industry Sector of the Upper Spencer Gulf Region (2005) identified an existing skills shortage for the ongoing operation of facilities in the region, and challenges for the future.

The high turnover in the resources sector and workers leaving the industry exacerbates these challenges. The minerals industry has the highest labour mobility rate of any industry sector in the Australian economy, with 22% of the workforce changing jobs or employers in 2001 and 8.5% leaving the industry each year. The average time that a fly-in fly-out worker remains in the same job is three to five years. Turnover rates vary with occupation, roster patterns, long-distance commute, wages, workplace culture and conditions, commitment to employment and training, and management practices. Recruitment strategies would also need to take account of skill set turnover, with a proportion of the workforce turning over, as new skills are required during different stages of construction.

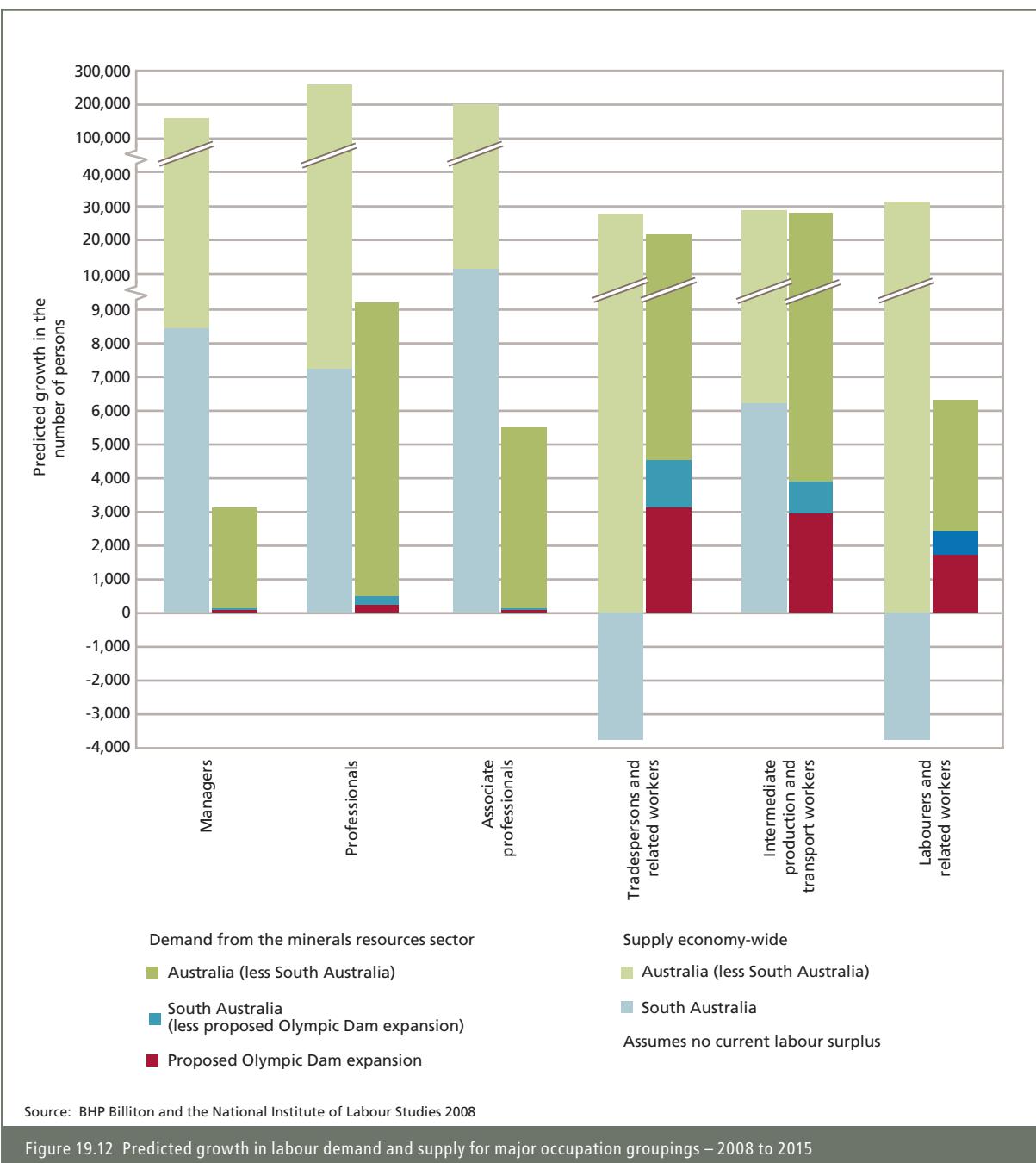
While labour shortages might be offset by declines in other industry sectors (such as manufacturing), the labour market in identified skills groups is nonetheless expected to become

increasingly competitive. Recommendations from the Lowry, Molloy and Tan report (2006) relate to the compression of wage differentials between professional and non-professional employees, a heightened focus on training, including on-the-job training, identifying and targeting alternative labour sources (including the manufacturing sector, women, Aboriginal communities), and importing labour from outside Australia.

The BHP Billiton strategy for the proposed expansion recognises that attracting and training the workforce for the expanded operation would require a program of initiatives that would be flexible and responsive to labour market conditions. This would focus on providing training to suitable individuals interested in careers in the resources sector, rather than seeking to attract experienced mining operators from elsewhere. Programs to attract, train and retain the necessary workforce would be implemented by BHP Billiton, in collaboration with government, providers and other relevant organisations. Opportunities may also exist for cross-company cooperation on labour by BHP Billiton and other regional enterprises. Workforce recruitment and training would also accord with BHP Billiton Group's sustainable development policy, to encourage a diverse workforce and provide a work environment in which everyone is treated fairly, with respect and can realise their full potential.

Employment and training initiatives

In response to the skills shortage, the South Australian and Australian governments have announced a range of new employment and training initiatives. These include 'Skilling Australia', the Australian Government's new strategy to address the skills shortage, and the South Australian Government's 'South Australia Works' program and 'Skills Strategy'. Training and employment opportunities are also provided at the local and regional level through organisations including TAFE SA, regional economic boards, the Australian Technical College – Spencer Gulf and Outback, and industry partnership projects. Many of these will afford opportunities for skills development and job placement, including in areas with high unemployment, such as the northern region, and among less traditional labour



sources (including females, Aboriginal communities, mature-aged, retrenched and unskilled). Appendix Q7 details specific employment and training initiatives relevant to the mineral resources sector.

In addition to supporting a number of these initiatives, BHP Billiton is currently undertaking the following measures, with the aim of increasing as appropriate:

- initiatives targeting employment and skills formation for Aboriginal people, which include:
 - an Indigenous Master of Business Administration Scholarship to increase opportunities for Aboriginal people in business and management

- support for the 'Young Indigenous Entrepreneur' program to encourage young Aboriginal people to pursue business skills and higher education
- the 'Pathways to Success' program, providing study assistance for Aboriginal high school students in Port Augusta
- the Olympic Dam Indigenous Participation Program, aimed at increasing Aboriginal participation in the Olympic Dam workforce
- expanding its traineeship and apprenticeship intake (with 13 new apprentices at Olympic Dam in 2008 and a recent call for new graduates, taking current totals to 96 and 56 respectively)

- bursaries for two students a year to study mining engineering for four years at Adelaide University
- supporting TAFE SA programs in Roxby Downs, including the 'Job Readiness' program and pre-vocational training in mechanical engineering
- supporting a Careers Expo in Roxby Downs
- working with South Australian and Australian governments, universities, TAFE colleges and high schools to encourage the development of curricula relevant to the mining industry
- targeting high schools and universities to attract new employees
- proactively working with government, regional development boards, TAFE and other training and education providers to build the capacity of South Australian businesses and to meet skills requirements.

BHP Billiton is also proposing to address potential skills shortages and labour impacts by participating in government and industry groups to consider:

- recommendations raised in recent reports by the National Institute of Labour Studies
- the extent and composition of labour force requirements and demand-supply issues
- vocational and education training requirements for both new and older workers, including pre-vocational training, traineeships and apprenticeships, on-the-job training, retraining and multiskilling
- more flexible and 'family friendly' work environments
- the location, training and other issues associated with the potential use of labour from industry sectors in decline (such as manufacturing).

Aboriginal engagement

Proactive engagement with local and regional Aboriginal people is an objective of BHP Billiton. BHP Billiton places a high value on its relationship with Aboriginal communities and is committed to ensuring that the Aboriginal communities in the region are able to benefit from the presence of BHP Billiton.

This objective has been reflected in the Olympic Dam Agreement, which is described in Chapter 17, Aboriginal Cultural Heritage. The Olympic Dam Agreement outlines a range of specific financial and social development commitments that BHP Billiton (and therefore its contractors) has made to Aboriginal people and communities in the region.

BHP Billiton would develop an Aboriginal Engagement Plan, which would cover the following aspects:

- details of commitments under the Olympic Dam Agreement
- outline of persons within the organisation who have responsibility for Aboriginal engagement and delivery of the commitments
- cross-cultural training for all employees and contractors

- plans for employment and training of local Aboriginal people and identification of potential positions for Aboriginal people, including training programs and apprenticeships
- identification of contracting or subcontracting opportunities that could be made available to local Aboriginal businesses
- consideration of wider business or joint venturing opportunities with local Aboriginal businesses
- support for local Aboriginal business development.

As part of this overall approach, BHP Billiton is developing an Olympic Dam Indigenous Participation Program, which is aimed at increasing Aboriginal employment in the Olympic Dam workforce and enabling Aboriginal enterprises to secure contracts at site. This approach builds on BHP Billiton's overall experience in Aboriginal engagement.

Workplace and living conditions

In order to meet employment targets, a range of additional strategies may be required to attract employees from other occupational categories, industries (including non-mining) and interstate. Key variables that differentiate and attract an employee in the marketplace and influence workforce stability include the physical environment, management practices, workplace culture and conditions, and reputation. Related factors such as job design, career opportunities, remuneration, housing, perceptions of lifestyle and community, education and training, and impacts on family and health are also important.

One option to attract operational staff in a tight labour market is long distance commuting (LDC), which may be preferred by some workers. The benefits of LDC arrangements for employees include the opportunity to retain the lifestyle and choices of more populated city areas, and their partners continuing in their current employment. Disadvantages include separation from family, disruption to family routines and problems associated with family communication and role definition, a reduced ability to participate in the local community, disruptions to professional and workforce relationships, and increased travel. Accommodation arrangements and integration into the community also influence employees' experience and acceptance of LDC (see Appendix Q7 for further details on other Australian mine sites that employ an LDC workforce and the advantages and disadvantages of LDC).

BHP Billiton anticipates the majority of the long-term operational workforce would live in Roxby Downs although an increase in the proportion of LDC may occur during the construction phase of the expansion, in order to attract and accommodate the required workforce. By 2021, the proportion of LDC to residentially-based operational staff is expected to be approximately 50:50.

Maintaining and enhancing the amenity and lifestyle of Roxby Downs is critical to workforce recruitment and retention. This includes the provision of high-quality education, health and other services. The National Institute of Labour Studies has identified critical challenges with targeting women, including

providing childcare, family-friendly policies (such as flexible rosters), and changing the traditionally masculine culture of mining (Lowry, Molloy and Tan 2006).

Management measures and initiatives for the proposed expansion by BHP Billiton in relation to workplace and living conditions include:

- offering competitive remuneration and rewards
- providing attractive and flexible career prospects
- providing employee development opportunities, such as study cost reimbursement, conference attendance and in-house training
- providing high quality living environments and workplace conditions
- working with the community and government to improve amenities and facilities in Roxby Downs.

Overseas recruitment

While BHP Billiton's intention is to recruit locally and nationally in the first instance, skills shortages in Australia may affect the level of overseas recruitment. Although detailed workforce recruitment strategies are yet to be determined, BHP Billiton anticipates overseas labour would be largely confined to contractors employed directly on construction activities and commissioning. Estimates by BHP Billiton suggest between 200 and 500 construction contractors could be drawn from overseas during the peak construction and commissioning periods, with Eastern Europe and the Philippines providing the most likely countries of origin of these workers. In addition, approximately 5% of operational staff (or approximately 200 people) could be required to fill a range of professional and senior operational roles, and could be drawn from around the world, depending on their skills and experience. Only families of operational employees would be directly supported by BHP Billiton to live in South Australia.

The temporary business (long stay) visa and labour agreements are the most commonly used program for employers to sponsor overseas workers to fill nominated skilled positions in Australia. English literacy would be one of the key selection criteria in recruiting overseas workers. In mid 2007, the Australian Government Department of Immigration and Citizenship introduced a new English language requirement to the temporary business visa program to enable overseas workers to respond to occupational health and safety issues, raise concerns about their welfare and benefit Australia by sharing their skills with other workers.

The existing operation at Olympic Dam currently manages a diverse workforce, comprising over 34 nationalities, and up to 50 overseas workers (or 5%) in the shutdown maintenance workforce. As a global organisation, the BHP Billiton Group has an established history of providing for the needs of a culturally diverse workforce. Such needs may include a range of culturally appropriate services and facilities, such as settlement and integration services, housing and health services, special catering, and religious, social and recreational facilities.

Employees and their families and children may require bridging language lessons. Part of the induction program for new workers at Olympic Dam would also include cultural awareness. Appendix Q5 provides further information on the types of facilities and services that may be required to support an overseas workforce.

The South Australian and Australian governments are lending support for skilled business migration in various ways. This includes \$5.3 million (over four years) provided in the 2008–2009 State Budget to attract and retain skilled migrants in South Australia (Department of Treasury and Finance 2008a). The State Government is also experienced in planning for multicultural services.

BHP Billiton would continue to review and implement targeted programs for overseas employees and would collaborate with government and non-government agencies to provide a range of services and facilities to support the overseas workforce, including the settlement of operational staff and their families.

Residual impact

The assessment of labour requirements categorises the impacts associated with drawing labour and resources from other areas and ventures in the state as high, because they may affect local and state-wide enterprises over an extended period, and particularly during the peak construction period from 2014 to 2019. The proposed expansion would, however, have a high residual benefit as a result of creating sustainable long-term employment.

Business development

The expanded operation would be expected to provide substantial direct and indirect business opportunities for Roxby Downs and elsewhere in the state. Direct business opportunities would relate to the provision of goods and services to BHP Billiton and its contractors, and indirect opportunities through flow-on effects such as the servicing of residents and workers at Roxby Downs. Other indirect benefits include tourism in Roxby Downs (to view the mine) and flow-on visits to nearby communities and Arid Recovery. Complementary tourism services showcasing Aboriginal heritage and culture could also provide business and employment opportunities for Aboriginal people. This could benefit a range of business types from small one-person ventures to larger companies.

These opportunities would change over the construction and operation phases of the proposed expansion but could include cement supply, fuel supply, aircraft charters, communications, engineering services, counselling, drilling, logistics and transport, site general services (i.e. light earthworks, road maintenance), catering, training, prefabrication works and the provision of materials. In addition, there are likely to be other indirect business opportunities in areas such as tourism, retail/wholesale trade, vehicle maintenance, town services, bulk supply of domestic goods, vehicle purchase and maintenance, and entertainment.

In order to support the development of new businesses and industries, BHP Billiton plans to expand the supply of serviced industrial land, as outlined in the Roxby Downs Draft Master Plan (see Appendix F4 for details). This includes the development of a new heavy industrial estate near the junction of Olympic Way and the heavy vehicle bypass, 6 km north of Roxby Downs (see Figure 19.13). The new estate would accommodate the relocation of facilities from Charlton Road (when the mine pre-strip commences) and new business ventures. The estate would cover approximately 70 ha, include approximately 150 new serviced allotments, and provide for a minimum workforce of approximately 500 people.

An extension of the existing light industrial area on Olympic Way would provide approximately 90 serviced allotments (see Figure 19.14). The development of industrial land north of the township, and tree planting for screening purposes, would reduce impacts on residential amenity and the surrounding landscape.

Master plans are also being developed in the Upper Spencer Gulf cities by the Department of Planning and Local Government to ensure a supply of well-located, serviced land is available for commercial, industrial and residential purposes to support expansion in the region.

BHP Billiton recognises that the expanded operation could enhance opportunities for local and regional businesses in sectors such as tourism and it would work with local and regional industry organisations to identify such opportunities.

Many of the business opportunities identified could be taken up by new or existing Aboriginal businesses. Economic development for Aboriginal people can be realised through a proactive focus on Aboriginal businesses. The Olympic Dam Agreement commits BHP Billiton to supporting the development of Aboriginal-owned enterprises and to enable such enterprises to contract with Olympic Dam project work. This would be detailed in the Olympic Dam Indigenous Participation Program.

The opportunities for South Australian based businesses are significant, and BHP Billiton is liaising with supply industries and regional economic development boards to best position local, regional or state suppliers to maximise their opportunities. The volume of goods and services required is large (see Chapter 5, Description of the Proposed Expansion, for details) and is likely to exceed the capacity of South Australia and even Australia.

As part of the 2008–2009 Budget, the South Australian Government announced funding of \$1.7 million over two years for the Olympic Dam Taskforce (Department of Treasury and Finance 2008a). One of the roles of the Taskforce is to facilitate and maximise flow-on benefits of the expansion project to South Australia. An Industry Participation Policy has also been developed by the SA Department of Trade and Economic Development (DTED 2005) to give local businesses a full, fair and reasonable opportunity to be considered for major work in South Australia, in both the public and private sectors. In awarding contracts, BHP Billiton would take account of this policy.

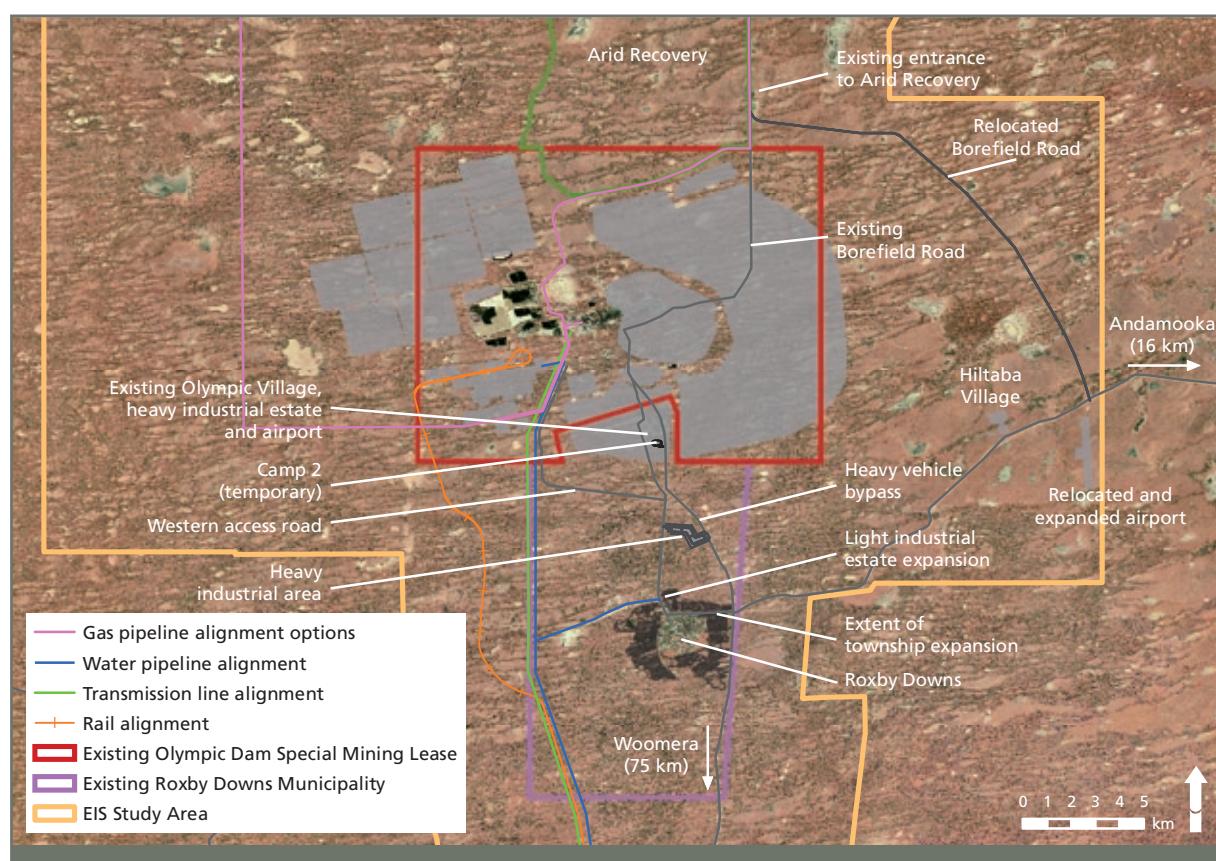




Figure 19.14 Key features of the Roxby Downs Draft Master Plan

In addition, BHP Billiton is working with the Industry Capability Network (ICN) South Australia and other economic development organisations to promote the participation of South Australian businesses in the expansion of Olympic Dam. To support this, BHP Billiton has established a website address for potential suppliers to register and express interest in tender packages for the project. An online project supplier database has also been created by BHP Billiton and the ICN to provide a snapshot of business capability and capacity in South Australia and Australia, and to enable potential suppliers to register their interest in the expansion project. Information would also be provided on current and future business opportunities, tendering processes and BHP Billiton standards to facilitate pre-qualification of South Australian businesses.

Organisations such as regional development boards are well positioned to provide an important support mechanism for regional skills and business development. BHP Billiton is working with the State Government, Regional Development Boards, TAFE and other education and training providers to address business capacity and skills requirements, and to link existing or potential suppliers to improve local competitiveness.

The current shortage of commercial facilities and the high prices in Roxby Downs may limit local business opportunities, with some people preferring to travel to Port Augusta to purchase goods and services. Proposed amendments to the Roxby Downs Municipality Development Plan (see Chapter 6, Legislative Framework, for details) and implementation of the Roxby Downs Draft Master Plan would enable an expansion of retail and commercial facilities, with the aim of increasing competition and reducing prices.

Residual impact

The assessment of business opportunities shows the proposed expansion would have a high residual benefit by creating both direct and indirect business opportunities in the short, medium, and long term. This assumes that South Australian and Australian companies increase their capacity to competitively supply the goods and services required for the proposed expansion.

19.5.2 CRIME AND ANTI-SOCIAL BEHAVIOUR

The experiences reported by residents and agencies about the previous expansion, crime rates, and consultation for the Draft EIS, identify crime and anti-social behaviour as a concern for the proposed expansion. Issues raised during community consultation and in feedback from government agencies included:

- misuse of alcohol and drugs
- increased crime, prostitution, assault and sexual assault, and domestic violence
- unauthorised access to station properties and irresponsible behaviour causing damage to property and roads and tracks, vandalism, theft of equipment and stock losses
- off-road driving around Roxby Downs, surrounding pastoral stations and Arid Recovery, causing damage to flora and fauna and culturally-sensitive sites

- potential racial tensions
- the shortage of police.

Concerns about increasing levels of crime associated with population growth and an influx of construction workers have been identified in other mining developments (see McMahon and Remy 2001; Rolfe et al. 2003; Beattie et al. 2005). Crime statistics in Roxby Downs and anecdotal reports by police and residents (Roxby Downs Community Board 2005) suggest a high rate of alcohol-related offending. This is supported by research on factors contributing to crime (National Centre for Research into the Prevention of Drug Abuse 1995; Makkai 1998; Weatherburn 2001). Studies from Australia and Canada also point to certain industries and occupations, job qualities and population groups that are associated with higher alcohol and drug use, with many of these characteristics common to mining and construction (Hagen et al. 1992; Midford et al. 1997; Drugs and Crime Prevention Committee Victoria 2004; Alberta Alcohol and Drug Abuse Commission 2006).

The desktop review and benchmarking studies undertaken for the Draft EIS point to several factors that may increase the potential for crime and fear of crime associated with the proposed expansion, including (see Appendix Q4 for details):

- the large number of young, single male construction workers
- alcohol and substance misuse
- population turnover and the presence of 'strangers'
- physical and social disruption
- increased opportunities for crime, including vandalism and theft from building sites
- young people and 'at risk groups' engaging in potentially unsafe and anti-social behaviours.

To reduce the likelihood of adverse impacts associated with the construction workforce, BHP Billiton would construct separate, high-quality accommodation (i.e. Hiltaba Village) with on-site entertainment, recreation and sports facilities. This accommodation could also be used after the construction phase to provide maintenance shutdown accommodation for contractors engaged by the ongoing Olympic Dam operations. The intention would be to respond to the concerns of residents by locating the facility at a distance from Roxby Downs and encouraging the construction workforce to remain at the village for social and recreational activities, thereby reducing the demand on facilities in the town and reducing the potential for negative interactions between permanent residents and construction workers.

Hiltaba Village would be located 17 km from Roxby Downs and 16 km from Andamooka on the northern side of Andamooka Road (see Figure 19.13). A gatehouse would monitor the entrance to the village. The Olympic Dam Airport would be relocated and upgraded opposite the village on the southern side of Andamooka Road. This would facilitate easy access into and out of the village by construction workers employed on an LDC basis. Internal security arrangements would be provided in

the village to manage inappropriate behaviour by workers or visitors, and would include a closed circuit television system, and a security team, who would undertake continuous patrols 24 hours a day, seven days a week, to prevent and respond to potential incidents.

Workers accommodated at Hiltaba Village would be inducted on arrival and would be required to sign an agreement to comply with village rules, which would cover behavioural expectations, illegal activities and drugs, and the right to remove accommodation privileges for non-compliance. The code of conduct and conditions of occupancy would also cover discrimination, intimidation or harassment on the basis of race, gender, national origin, religious belief or other personal characteristics. Similar conditions would apply in the workplace. Practices relating to the responsible service of liquor would also be implemented at Hiltaba Village and other workforce accommodation facilities.

In other locations, interactions between the off-site construction workforce and local communities would be constrained by the rural and remote location of construction work sites, limited private transport and long working hours. The off-site workforce would be required to comply with codes of practice and behaviour as at other accommodation and work sites. The selection of sites for remote mobile work camps along the gas supply pipeline would also occur in consultation with landholders, to avoid homesteads and to minimise potential social impacts.

The BHP Billiton Group has policies about the use of alcohol and other drugs affecting fitness for work, with employees subject to random testing of breath or body fluids, to control drug use. BHP Billiton would continue to enforce its 'Fit for Work/Fit for Life' standards and testing of the construction workforce for drugs and alcohol.

Appropriate design can assist in minimising the potential for crime to occur and influence perceptions of safety. The principles of Crime Prevention Through Environmental Design (CPTED), as outlined in 'Designing out crime – Design solutions for safer neighbourhoods' (Planning SA 2004) and 'CPTED Essentials' (Attorney-General's Department 2005), are based on the premise that people's behaviour, including the inclination to offend, can be influenced by cues in the physical environment. These principles encompass four key concepts relating to controlling access, surveillance, territorial definition and maintenance. The expanded township and Hiltaba Village have been designed with regard to the principles of crime prevention through urban design. The Roxby Downs Draft Master Plan incorporates urban design strategies that maximise the visibility of pedestrians and property in residential areas, encourage passive surveillance of open space and pathways, and provide lighting along pathways to enhance safety and security. Hiltaba Village has similarly been designed to provide open and accessible spaces and to minimise unsafe areas. BHP Billiton would progress its detailed design for both the township and Hiltaba Village to further incorporate the CPTED principles to reduce the potential for crime and anti-social behaviour.

Although the design, location and security of the Hiltaba Village would reduce many of the interface issues between the construction workforce and permanent residents, construction workers could visit Roxby Downs to use services, or for social and recreational purposes. The location of the village on the road to Andamooka also means workers could visit Andamooka. The relative isolation and character of Andamooka, and limited police presence, may increase the likelihood of prostitution, anti-social behaviour or illicit activities. Concerns about prostitution in Roxby Downs have also been raised by residents and some service providers. The isolation of other remote settlements, such as William Creek and Marree, may also increase the potential for unruly or irresponsible behaviour, such as unauthorised access to stations, off-road driving and property damage or vandalism.

The 2007–08 and 2008–09 State Budgets outlined funding commitments to the SA Police to upgrade and expand the existing police station and provide housing to accommodate additional police officers to support the proposed expansion (Department of Treasury and Finance 2007 and 2008b). The additional police officers would provide a 24-hour policing service to Roxby Downs, and policing support to Hiltaba Village, and nearby townships and properties. An expanded police presence in Andamooka may also be warranted, particularly after-hours and around licenced premises, and to meet continuing population growth. In addition, the development and implementation of crime prevention strategies by the police, council, residents, business and other stakeholders could reduce opportunities for crime and increase safety.

The increase in population and police activity as a result of the proposed expansion would have flow-on effects for a range of justice agencies, including courts, corrections, legal services and juvenile justice. At present, only the police have a permanent presence in Roxby Downs, with other justice services provided on an outreach basis from Adelaide, Port Augusta or other regional centres. A doubling of the population would increase demand for court and related services. It would also have flow-on effects to other support services and programs, such as health and mental health services, and substance misuse, family violence and diversionary programs. Planning arrangements for the provision of social services and infrastructure by state government agencies and other service providers are discussed further in Section 19.5.4.

BHP Billiton proposes to implement additional measures to address concerns relating to crime and anti-social behaviour resulting from the expansion, including:

- initiating visitor management policies and procedures for Hiltaba Village and initiatives relating to crime and anti-social behaviour
- developing a code of practice/behaviour for Hiltaba Village
- providing for a proactive community-policing style of security and surveillance presence in Hiltaba Village to prevent and respond to incidents

- developing, in collaboration with police, a strategy to ensure a rapid response to incidents
- continuing to implement the 'Fit for Work' program, including routine drug and alcohol monitoring of workers
- continuing to implement the workforce induction and education information strategies to communicate safety and security expectations
- liaising with police management and providing regular updates of workforce schedules
- working with the council and police to develop safety awareness education and information programs
- establishing a complaints procedure whereby any reported incidents of unacceptable behaviour would be investigated
- providing internal security arrangements in accommodation villages to manage inappropriate behaviour by workers and visitors
- proactive discussion and engagement with the community and other stakeholders to establish a social management system to monitor and respond to issues, including the implementation of additional management strategies where necessary.

Residual impact

Discussions with the South Australian Government have established that police and support services would be provided commensurate with the projected population numbers. The design and location of Hiltaba Village and implementation of proposed management measures would also reduce adverse impacts associated with the increased workforce. On this basis, the residual impact associated with crime and anti-social behaviour has been categorised as low.

19.5.3 HOUSING SUPPLY AND AFFORDABILITY

Housing issues have been raised as priorities in consultation with residents of Roxby Downs and regionally. Concerns include housing affordability, the logistics of supply and the role of neighbouring towns in providing accommodation. Service providers have also pointed to housing costs as a factor contributing to the difficulties in attracting and retaining staff.

The experience of other mining projects highlights the impact of population growth on housing markets, including housing shortages, a lack of choice and inflated prices, the difficulty in getting people to fill lower-paid jobs (particularly in non-mine and support industries) because of the high cost of housing, and the vulnerability of some people (including women, young people, single parents and non-mine workers) to housing stress (Rofle et al. 2003 and 2006; Beattie et al. 2005; Scheltens and Morris 2006).

From a social impact assessment perspective, the housing issues associated with the proposed Olympic Dam expansion would be:

- the supply of land and housing to meet the increased residential population and to attract the required workforce

- (including non-mine personnel), particularly during the initial growth period
- housing affordability for low and moderate income households in Roxby Downs, which would largely affect non-mine personnel
- the potential for speculative land and house purchasing in Roxby Downs, Andamooka, Woomera and the Upper Spencer Gulf
- the potential for skills shortfalls in the building industry
- flow-on effects on housing construction, supply and affordability locally and regionally, if these factors were not adequately addressed.

Accommodation would be required for a range of different groups as a result of the proposed expansion, including:

- the permanent and construction workforce at Olympic Dam, including contractors providing secondary or indirect support (e.g. caterers, transport/truck drivers delivering materials)
- the construction and operational workforce associated with the infrastructure components of the project (i.e. transport, energy and water)
- government and non-government workers, including teachers, police, retail workers and other non-mine staff
- families of workers.

The Roxby Downs Draft Master Plan has been prepared by BHP Billiton to plan for housing, services and facilities for an estimated population in Roxby Downs of 10,000 people, including permanent LDC operational workers (see Appendix F4 for details). The Draft Master Plan forecasts a long-term operational workforce of 50:50 residentially-based and LDC workers but has flexibility to allow for variances in the residential:LDC ratio.

Accommodation is being planned to meet the growth in the current Olympic Dam operation and to integrate existing LDC operational staff within Roxby Downs. This includes the potential expansion of Roxby and Olympic Villages and the development of a new private accommodation village on the southern side of Roxby Downs, east of Olympic Way (see Chapter 2, Existing Operation, for details). Figure 19.14 highlights current and proposed residential development to accommodate growth in the existing and expanded Olympic Dam operational workforce.

The South Australian Government has committed funding as part of its 2007–08 and 2008–09 Budgets to provide additional government housing in Roxby Downs to encourage the recruitment of essential staff, including teachers and police, to support the town's expansion (Department of Treasury and Finance 2007 and 2008c).

BHP Billiton has prepared concept plans for Hiltaba Village (see Figure 19.15), which would accommodate the construction workforce and other short-term contractors.



BHP Billiton has consulted Aboriginal groups claiming an interest in the Olympic Dam region about the proposed expansion generally, and in particular about its impact on any heritage sites in the region, including in areas of new housing and the construction camp (see Chapter 17, Aboriginal Cultural Heritage).

BHP Billiton would collaborate with relevant stakeholders so that accommodation provided would match the project's construction profile and socio-demographic requirements of Roxby Downs' future population.

Construction workforce

The proposed Hiltaba Village would accommodate the construction workforce and has been designed to create an urban village around a 'main street' rather than being a stereotypical 'camp'. The village would offer a standard of accommodation and facilities commensurate with best practice contemporary remote villages for the mining and construction sector to attract and retain a quality workforce. Facilities in Hiltaba Village would include the following: swimming pools, dining hall, security, first aid facility, taverns, gymnasiums, internet cafés, indoor and outdoor ball game and sporting areas, retail outlets, perimeter running track and landscaped areas for passive outdoor recreation and socialising (see Figure 19.15). Depending on the size and make-up of the workforce, accommodation facilities would also take account of the needs of workers from different cultural backgrounds, for example, in food preparation and choices; recreation, leisure and social activities; communication; and religious practices.

The concept plans for Hiltaba Village provide capacity for up to 8,000 single-bed rooms (with en suite) and a limited amount of accommodation for couples. The village could accommodate a workforce of up to 10,000 people, although it is anticipated that a reduced number of rooms (approximately 7,000) would be required. This would be used to accommodate a peak construction workforce of 6,000 workers (including contractors managing and operating the village), up to 1,500 maintenance shutdown contractors, and the relocation of up to 1,000 short-term contractors from Olympic Village, on a rotating motel-style basis. A pioneer workforce camp would be established at the Hiltaba Village site for an initial period for the workforce required until accommodation is available in Hiltaba Village to meet demand, including for workers building Hiltaba Village, town infrastructure and preliminary work on the SML.

The village would be built in stages, as the construction workforce expanded, in self-contained modular precincts of approximately 2,000 rooms per annum. Following the construction period, the average capacity of the village would be reduced to approximately 2,000 rooms (to accommodate up to 3,000 short-term and maintenance workers), but it would retain the capacity to be recommissioned to meet future needs as required. A workforce commuter bus service would link the village to the airport and work sites.

A temporary, 250-bed accommodation facility (Camp 2) is also proposed south of Charlton Road, which would be used by pre-strip contractors for a two to three year period from 2010, until sufficient accommodation became available at Hiltaba Village (see Figure 19.2). The self-contained facility would be operated and managed by the pre-strip contractor and would include on-site dining, tavern, laundry and office facilities.

In addition to the accommodation provided at Hiltaba Village, short-term accommodation would be required for over 1,000 construction workers associated with the off-site infrastructure. A peak workforce of up to 700 workers would be required for the proposed transmission line, water supply and transport projects in 2014. Workers would be accommodated in short-stay accommodation in local townships (including Whyalla, Port Augusta and Woomera) and would commute to work daily. A range of short-term accommodation facilities are available in the Upper Spencer Gulf region.

The construction workforce for the gas supply pipeline would be accommodated in dedicated mobile work camps, and workers may commute up to 70 km a day to the work site. Up to four temporary camps would be established on the preferred gas pipeline route between Olympic Dam and Moomba. The location of camps would be determined during detailed design and construction planning, but they would typically comprise prefabricated transportable buildings with communal eating facilities. Sites would be selected in consultation with landholders and would avoid homesteads and sensitive areas of environmental or cultural heritage value. Accommodation would also be provided in line with the objectives and principles of development control for short-term workers' accommodation, outlined in the Land Not Within a Council Area (Eyre, Far North, Riverland and Whyalla) Development Plan, recently approved by the Minister for Urban Development (Planning SA 2008).

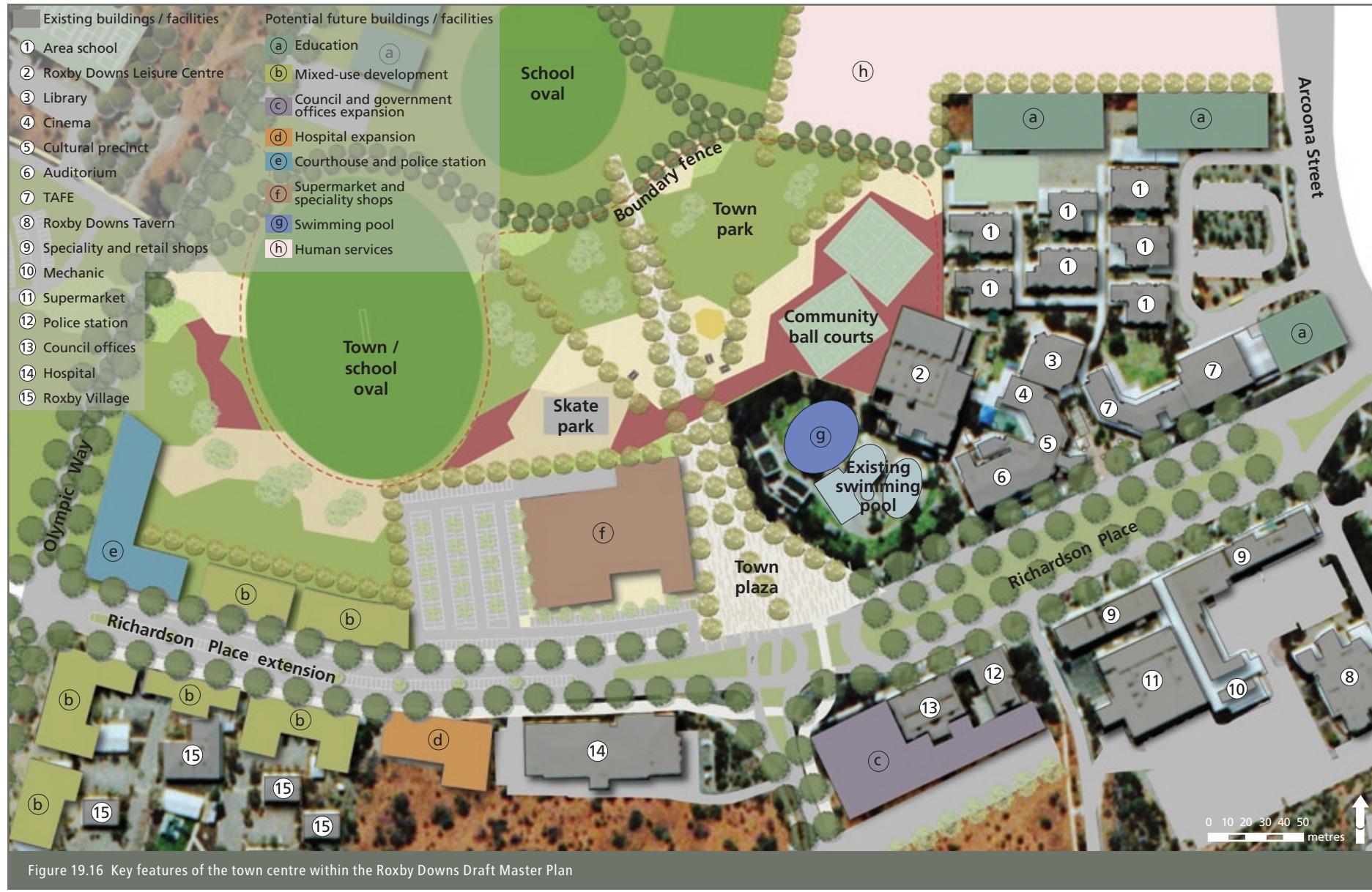
Residential population of Roxby Downs

The Roxby Downs Draft Master Plan allows for over 2,500 additional allotments and a 5% vacancy rate in accommodation, which is critical to the issue of housing supply and affordability (see Appendix F4 for details). The key objectives of the Draft Master Plan design are to:

- realise BHP Billiton Group's sustainable development policy by minimising impacts on the natural environment and achieving leading industry practice
- create 'positive' residential precincts
- enhance landscape amenity value
- create a vibrant community and commercial district
- improve vehicle, bicycle and pedestrian movement throughout the town.

Specific features envisaged in the Draft Master Plan (see Figures 19.14 and 19.16) to meet residential requirements are:

- a mix of housing types and styles, including medium-density housing focused around the town centre



- a new caravan park for approximately 300 caravans on the eastern edge of Roxby Downs
- expanding retail and commercial development to provide for a new supermarket, hotel, mixed-use civic centre, tourist information, restaurants and other social facilities
- an expanded road network
- upgraded sports facilities, including a new sports precinct
- upgraded education and community facilities
- expanded infrastructure and recycled water for landscaping.

The Draft Master Plan also provides for the majority of housing to be located within 2 km of the town centre and a network of pedestrian and cycle pathways to enhance accessibility to major facilities and to reduce the reliance on public and private transport.

In addition to residential housing, the Roxby Downs Draft Master Plan provides for transitional housing for key operational staff and a new accommodation site for permanent LDC workers (see Figure 19.14) to maximise the operational workforce who live in Roxby Downs. This would also have the effect of moderating housing demand during the initial stages of the proposed expansion, and contribute to maintaining stability in house prices and housing affordability.

The proposed transition housing village (Axehead Village) on Axehead Road would provide initial accommodation for residential operational workers and their families pending other housing becoming available. This would consist of about 350 transportable one, two and three bedroom cottages.

The proposed accommodation village on the western side of Olympic Way near Richardson Place would incorporate approximately 1,800 accommodation units, including 500 self-contained cabins and 1,300 units, a café, gym, pool and open space area for up to 2,000 permanent LDC workers.

Pressures on housing supply as a result of the large workforce influx and the predicted lag time in housing construction would also be reduced by undertaking some off-site prefabrication.

The Draft Master Plan has been developed in consultation with the community. Further consultation is to occur with residents and service providers on the Draft Master Plan, in conjunction with public exhibition of the Plan Amendment Report on the Roxby Downs Development Plan (see Chapter 6, Legislative Framework, for details) during the EIS process.

The management and release of land to meet demand, including non-mine requirements, is important to ensure an adequate supply of affordable housing. In most parts of South Australia, the State Government manages the release and sale of large tracts of government-owned land for residential development. BHP Billiton is responsible, as developer, for the provision of housing, accommodation and certain other services necessary to provide for the needs of its employees and their dependents.

It also assists in providing housing to meet the needs of other people and their dependents who provide necessary services in the town. The State provides land required by BHP Billiton for development in the town under the Indenture. To meet its Indenture obligation, BHP Billiton would ensure that the release of land and provision of the required housing occurs in a timely and orderly manner. To minimise the potential for housing impacts, BHP Billiton would manage land releases to accommodate supply and demand requirements, with the goal of achieving 5% vacancy rates in Roxby Downs, to address issues of housing supply and affordability. BHP Billiton would also seek to enter development agreements with South Australian building companies as soon as practicable, to secure competitive resourcing and timely delivery of future housing supplies.

The South Australian Government has a target of 15% affordable housing in all new residential developments (10% affordable housing and 5% high-needs housing). An analysis of 2006 census data indicates approximately 7% of households on low-to-moderate incomes may find housing unaffordable in Roxby Downs (i.e. pay more than 30% of income on housing costs, see Appendix Q2 for details). The strategies identified by government to deliver affordable housing include the design and construction of smaller homes, and innovative home financing and partnering opportunities (Department for Families and Communities 2008b and 2008c, see also Appendix Q2). BHP Billiton would work collaboratively with the South Australian Government to develop and implement a strategy to ensure the provision of an appropriate diversity of accommodation to meet the socioeconomic requirements of the demographic mix of the Roxby Downs community as it expanded, including meeting the housing needs of the services and non-mining sector as well as BHP Billiton residential workers and families. The development of a Social Management Plan (see Section 19.5.7) also would provide a mechanism to monitor issues and identify areas for action, in light of emerging needs.

BHP Billiton would facilitate the implementation of the Roxby Downs Draft Master Plan, in collaboration with the Roxby Downs Council, the State Government, developers and community organisations by:

- providing for the timely and orderly release of serviced land to meet housing demand in the mine and non-mine workforce
- seeking to achieve a 5% vacancy rate in housing to encourage a stable housing market
- utilising the Draft Master Plan and 'Good Residential Design SA', published by Planning SA (1999), as the basis for residential design
- developing residential areas to provide a leading example of environmentally sustainable urban development, for example, in energy and water use efficiency, building materials and construction methodology
- providing for a range of allotment sizes across residential precincts to offer a diversity and choice of housing types and densities, and to meet demographic requirements

- allowing for long-term contractors and the permanent long distance workforce to be accommodated in Roxby Downs
- locating a new caravan park for 300 caravans on the eastern edge of Roxby Downs
- providing for the majority of housing to be within 2 km of the town centre to minimise the distance between the town core and residential areas
- providing a landscape plan for new residential areas
- providing the necessary infrastructure (including sewage treatment, reclaimed water irrigation, potable water, landfill, and power) to support the growth in the township, and establish mandatory installation of AAA water saving appliances and fittings in each new household; provide for additional potable water storage and systems; upgrade the existing waste water treatment system; construct a new landfill facility and transfer station; and upgrade the power substation
- collaborating with relevant stakeholders to facilitate the timely provision of other facilities, including open space and recreational, civic and commercial infrastructure
- facilitating ongoing consultation on the Draft Master Plan and Development Plan Amendment as part of the EIS process.

Housing impacts on other areas

Given the high housing costs in Roxby Downs, some workers and their families may choose to live in Andamooka, Woomera or other townships in the northern region, particularly during peak periods. BHP Billiton does not intend to construct housing in these locations.

In recent years, Andamooka has experienced growing housing demand and rising costs, evidenced by the two-fold increase in average weekly rental costs between 2005 to 2007 and over 90 applications for accommodation units (both large unit style and smaller group dwellings) received by the Development Assessment Commission over a six month period in 2007 (Planning SA 2008). The location of the proposed airport between Roxby Downs and Andamooka, lower living costs and unique character of Andamooka may enhance its attractiveness as a place to live, lead to further population gains (including short-term workers, and lower income and non-mine related households) and compound current housing pressures.

The Minister for Urban Development and Planning recently approved a 'Land Not Within a Council Area Plan Amendment Report' (Planning SA 2008) to assist in addressing immediate growth and development pressures for Andamooka's on-site waste water disposal. This includes new controls (minimum allotment sizes and site area requirements for dwellings) to ensure new development has the capacity to accommodate on-site management and disposal of waste water. The Department of Planning and Local Government is also working with the OACDT, Andamooka Progress and Opal Miners Association and government agencies to develop a structure plan that will facilitate the coordinated and orderly development of the town and enable infrastructure and services to be provided.

The proposed expansion at Olympic Dam may also result in increased housing demand in Woomera, particularly among the 80 workers (and their families) required for the ongoing operation of the intermodal facility at Pimba and rail spur to Olympic Dam. This would be limited to some extent by the availability of housing for rent or purchase in Woomera, as most housing is owned and managed by the Department of Defence.

Demand for accommodation in nearby regional townships may also result from other developments – including the space delivery test work at Woomera – and compound housing shortages for the Olympic Dam expansion (see Chapter 25, Cumulative Effects, for details). Increases in housing costs in nearby townships, the Upper Spencer Gulf, Flinders Ranges and Mount Remarkable regions are therefore likely to continue, particularly with other developments and projects starting in the state's north. Responsibility for planning in regional areas rests primarily with state and local government, in conjunction with private developers. This will need to take account of future growth and ensure an adequate supply of well located and serviced land is available for residential, industrial, commercial and civic purposes.

An indirect impact associated with the high level of building activity from the Olympic Dam expansion may be to draw building contractors and tradespeople away from other areas and ventures. The experiences of other states highlight the skills shortfalls as a result of the resources boom, the difficulties in contracting builders to regional areas, and resulting pressures on housing affordability.

The Housing Industry Prospects Forum (March 2008) forecasts new dwelling starts in South Australia of approximately 11,050 in 2008–2009, based on relatively strong population growth and investor interest, positive economic conditions as a result of major defence and mining projects, and building activity that has been approved, but has not yet commenced. Although this represents a small decline in starts from the previous two years, constraints on the building industry are likely to remain, and the dwelling construction industry will continue to operate at full capacity. Under current conditions, the upper limit in the new housing market is between 10,500 and 11,000 starts, with 8,000 starts considered a 'comfortable' level of activity, based on the current supply of building trades (Housing Industry Prospects Forum 2008). This optimum level of housing activity is also evidenced by the large number of jobs 'in the pipeline', and waiting commencement.

To meet demand for housing in Roxby Downs as a result of the expansion, over 100 dwellings per annum (up to a maximum of about 300 dwellings per annum) would need to be constructed to meet household projections, excluding transitional housing. This represents between one and three per cent of current dwelling starts for the state.

Residual impact

The short-term residual impact on housing supply and affordability is assessed as low, with the provision of transitional housing and an increase in accommodation for LDC workers planned to reduce housing demand. When supply matches demand and the 5% vacancy rate is achieved, the proposed expansion would have a long-term moderate residual benefit.

19.5.4 SOCIAL SERVICES AND INFRASTRUCTURE

The population growth anticipated in Roxby Downs as a result of the expansion would require an increase in social services, facilities and infrastructure. This would need to take account of the future residential and LDC population (estimated to be up to 10,000 people), the needs of overseas workers, and the short-term construction workforce associated with the expansion. Service planning would also need to respond to projected population growth in Andamooka, Woomera and the Upper Spencer Gulf as a result of the expansion and other non-mine developments.

Table 19.15 provides population estimates in Roxby Downs as a result of the proposed expansion for both the residential and LDC population. Detailed population projections would need to be prepared and monitored over time, as further workforce planning and refinement occurs and the proposed expansion progresses. The demographic profile of an expanded Roxby Downs community is expected to be similar to the present profile (see also Appendix Q1), with some differences as follows:

- a high proportion of men to women, which is likely to increase as a result of a growing LDC workforce
- a relatively young population, notwithstanding the expected increase in the population aged 50 years and over
- a high proportion of families (particularly couples with children), although the number of single-person households is likely to increase as the size of the LDC workforce increases

- greater cultural diversity, with an increase in overseas workers and potentially in the number of Aboriginal people as a result of new employment opportunities
- continued high labour force participation and low unemployment
- greater occupational diversity, as a range of direct and indirect services and industries develop (such as retail, entertainment, restaurants, accommodation, and personal services)
- relatively high income levels, although there may be greater numbers of people on low to middle incomes working in non-mine or support industries.

During consultation for the Draft EIS and other planning processes, the community has consistently prioritised the need for increased social services and infrastructure in Roxby Downs and surrounding areas. Consultation with service providers has identified additional services and facilities that may be required in Roxby Downs (see Appendix Q5 for details). These include:

- education, pre-school and other family support services
- medical services, such as accident and emergency, general surgery, obstetrics and paediatrics, and paramedical ambulance service
- community health services, including mental health and counselling
- accommodation for short-term, emergency and office purposes
- increased policing and other justice-related services and programs, including juvenile justice
- culturally appropriate services and programs, depending on workforce recruitment strategies
- services to assist people with alcohol and drug problems, and smoking and gambling addictions
- youth programs, services and facilities, including support for Aboriginal youth and young people from culturally and linguistically diverse backgrounds

Table 19.15 Population estimates in Roxby Downs to 2021

Year	Resident population	Long distance commute operational workforce ¹	Total
2010	4,700	500	5,200
2011	5,100	600	5,700
2012	5,900	900	6,800
2013	6,600	1,200	7,800
2014	7,000	1,400	8,400
2015	7,300	1,600	8,900
2016	7,500	1,600	9,100
2017	7,700	1,800	9,500
2018	7,800	1,800	9,600
2019	8,100	1,900	10,000
2020	8,300	1,900	10,200
2021	8,400	2,000	10,400

¹ Excludes short-term operational contractors and construction contractors. The number of full-time equivalent positions will be more than shown. Due to rostering, however, the number of LDC at Roxby Downs at any given time for population projections is as shown.

- family support and crisis services, including domestic violence and child protection services
- support services and facilities for people with special needs, including a disability
- emergency services
- expanded municipal services
- public and community transport services, including expanded transport options between Roxby Downs, Port Augusta and Adelaide.

A large number of overseas workers may also justify the provision of some culturally-specific services, such as bilingual support staff, English language courses, community liaison workers and meeting places, and interpreting and translating services (see Appendix Q5 for further details).

Most government service providers acknowledge that some increase in the level of services would be necessary. The type and level of services would depend on the size, characteristics and timing of the increased population. Some agencies have also commented on the difficulties in attracting and retaining suitably qualified human services staff, which is exacerbated by the high housing and living costs at Roxby Downs. Consideration of subsidised housing by government and other incentives may be necessary to overcome difficulties in recruiting health and other services staff. As part of its 2007–08 and 2008–09 Budgets, the South Australian Government committed funding to upgrade and replace housing, and to purchase new housing for government employees to enable the recruitment of staff (Department of Treasury and Finance 2007 and 2008c). Rental subsidies are also provided by some government agencies to employees.

The Roxby Downs Draft Master Plan has been developed with input from the South Australian Government, human service providers, Roxby Downs Council, local residents and the current Olympic Dam workforce. Figure 19.16 shows the key features of the town centre within the Draft Master Plan (see also Appendix F4). The Draft Master Plan sets aside land for:

- expanding hospital and health facilities
- expanding the secondary school, TAFE facilities and the library
- a new early childhood services centre and primary school
- a new police station and courthouse and expanded emergency services
- new sports, recreational and leisure facilities, including a consolidated sports and recreational complex, a new oval, playgrounds, tennis and netball courts, two regional parks, and a relocated racecourse and pony club
- expanding government and council office space, with the community centre to provide for a range of mixed-use community facilities, such as community meeting rooms, performing arts space, childcare facilities and a visitor information centre.

The Draft Master Plan has been developed in light of population and household projections and social service requirements. BHP Billiton would collaborate with relevant stakeholders to facilitate the timely provision of other facilities, including recreational, civic and commercial infrastructure to create a positive living and working environment.

The concept plan for Hiltaba Village (see Figure 19.15) provides for a range of on-site entertainment, recreation and sport facilities, to meet the social and leisure needs of the construction workforce. It also provides for an on-site first aid facility (to be staffed by qualified nursing or other paramedical staff), and security and culturally specific services as necessary, so that the draw on government and community services in Roxby Downs is expected to be limited. During more detailed planning, the concept plan would be reviewed to enable service providers (such as police or health services) to have facilities there as appropriate.

To meet the transport needs of its workforce, BHP Billiton would expand the existing workforce commute bus service between Roxby Downs and Olympic Dam as the township expands. A workforce bus service would also be provided between Hiltaba Village and Olympic Dam. An expansion of the existing LDC workforce bus service between Roxby Downs and Port Augusta would be provided if there was sufficient demand.

Depending on the availability and cost of housing in Roxby Downs and the extent of prefabrication work in the Upper Spencer Gulf, other townships, particularly Andamooka, Woomera and Port Augusta, may experience population growth and a commensurate increase in demand for services. Based on the residential addresses of current Olympic Dam workers, and the expected growth in the operational workforce, Andamooka and Woomera could see population growth as a result of the proposed expansion. The operation of off-site infrastructure at Pimba, Port Augusta and Whyalla, development of related support industries, and other projects in the region could amplify anticipated population increases. Ongoing monitoring of population trends and service capacity would therefore be required to ensure services are available to meet emerging needs in these areas.

Even though the Roxby Downs population would benefit most from an increase in the range and availability of services and facilities, residents in Andamooka and Woomera, as well as pastoralists and others living in surrounding areas would also benefit. The demand for goods and services in Roxby Downs may also increase as a result of other developments in the region, including space delivery test work at Woomera and continuing mining and geothermal exploration and development in the Far North, including the mine at Prominent Hill (see Chapter 25, Cumulative Effects, for details on other projects in the region of relevance to the expansion of Roxby Downs). Roxby Downs township may become a major service centre for the Far North of South Australia, attracting people from elsewhere who want to access services.

Detailed planning for social services and infrastructure would continue prior to and throughout the early years of the expansion, involve a range of agencies from the public and private sectors, and take account of population growth in nearby townships, such as Andamooka and Woomera, as well as Roxby Downs. It is anticipated that planning would be based on demographic and household projections that reflect increasingly refined workforce and population projections, guidelines and thresholds for service provision, the availability and capacity of existing services, identified community needs and lead times for constructing new facilities and recruiting staff. Figure 19.17 outlines the key stages involved in planning for social services and facilities.

The provision of services depends on capital and recurrent funding by BHP Billiton and government. The Indenture establishes the legal framework for existing and future operations at Olympic Dam and defines the roles and responsibilities of the South Australian Government and BHP Billiton. As outlined in Chapter 6, Legislative Framework (Section 6.4.1), the Indenture is likely to require amendments to accommodate the proposed expansion. An important aspect of this may be a commitment by government to provide necessary social services and infrastructure, with some flexibility to meet changing, or as yet unidentified, infrastructure and servicing requirements.

In order to investigate and deliver appropriate social services and infrastructure, BHP Billiton would:

- actively participate in the development of a plan by the State Government to address social services and infrastructure prior to the expansion proceeding and involving a range of agencies covering:
 - the requirements for, and commitments to, providing social services to meet the needs of the expanded Roxby Downs population and workforce, including overseas workers
 - establishing a social services and infrastructure planning group to manage the plan, assess population projections, review existing services and capacity, determine priorities and requirements for new services, secure necessary funding commitments and monitor implementation
 - establishing an advisory committee in Roxby Downs to plan for new or expanded social service sites, including the potential to collocate services
- arrange for a recreation officer/events coordinator to organise a range of recreational, cultural, social and sporting activities for the construction workforce
- work in partnership with the State Government and non-government agencies to support and contribute to the provision of essential services in Roxby Downs.

Health

A range of existing health-related concerns among residents of Roxby Downs and service providers was described in the existing environment section of this chapter (see Sections 19.3.1 and 19.3.7). In particular, the lack of obstetric services, specialist medical services and a functioning hospital theatre have been identified as an issue for Roxby Downs residents.

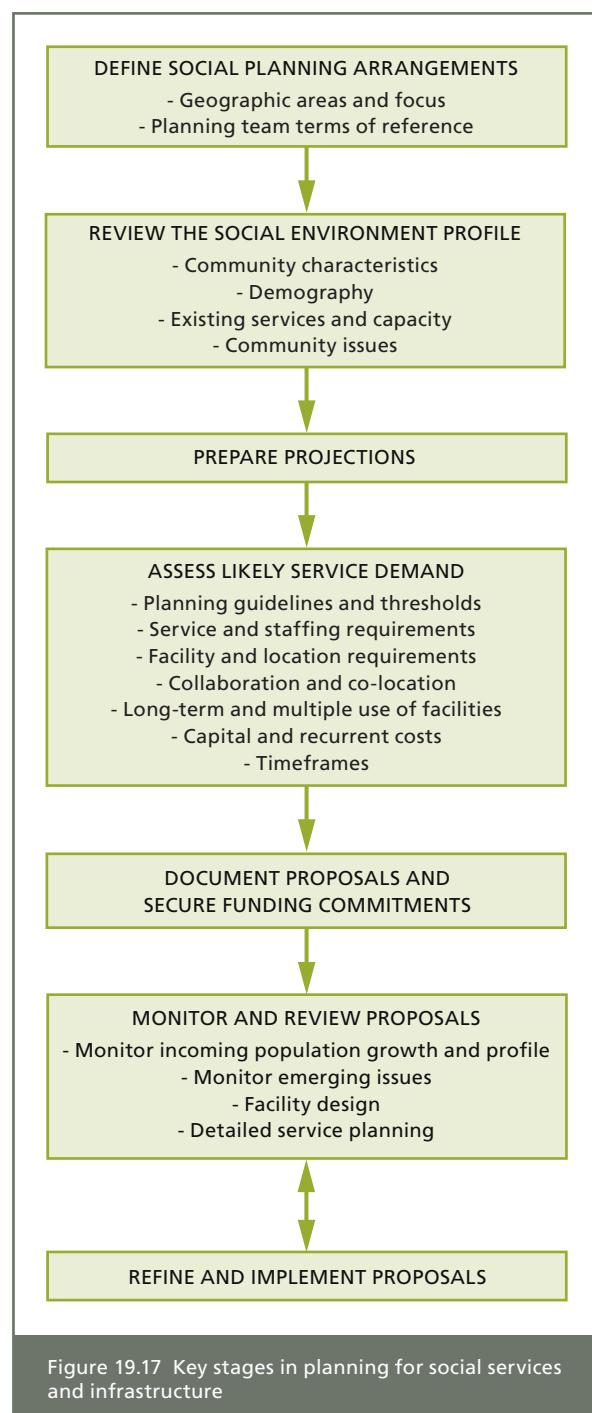


Figure 19.17 Key stages in planning for social services and infrastructure

The possible health issues associated with the construction workforce and expanded population (identified through a survey of service providers and review of other mining projects) include:

- increased accidents and trauma from road traffic and workplace injuries (including equipment usage, manual handling and falls) (see Chapter 22, Health and Safety, for details)
- increased alcohol and drug use, and associated injuries
- increased family stresses and issues associated with domestic violence and child abuse

- mental health issues
- an increase in violence and assault
- an increase in sexually transmitted diseases
- increased dust and associated respiratory conditions
- greater demand on health services and changing needs associated with overseas or Aboriginal workers and residents.

The previous section described the type of health services that would be needed for the expansion and a process to plan for these services.

BHP Billiton would collaborate with government and non-government organisations in maintaining health services in Roxby Downs to a reasonable standard, including:

- community health services, including health promotion and education, mental health support and drug and alcohol services
- domestic violence and anger management programs
- health screening and culturally-specific services
- dental services.

As part of the recruitment process, potential workers at Olympic Dam are required to take a comprehensive medical examination and be 'Fit for Work'. It is also anticipated that chronic conditions or serious health incidents (other than emergencies) among the LDC workforce would be treated by the individual's own health practitioner, while that worker was on rostered leave. To respond to medical incidents at Hiltaba Village, a qualified paramedic would be available 24 hours a day, seven days a week, with only serious medical emergencies expected to be referred to Roxby Downs Health Service or other medical services. The manager of the facilities at Hiltaba Village would also provide a first response to all medical and fire emergencies. In addition, the induction of workers would cover emergency response and evacuation procedures and a monitored fire alarm system would be incorporated into the village's central control system.

Other management measures to address health-related issues include BHP Billiton Group's drug and alcohol testing policies and its Employee Assistance Program, which is an external counselling service to assist employees with personal or work-related problems.

BHP Billiton would also promote safe-sex messages and drug and alcohol awareness programs in Hiltaba Village and the workplace to minimise potential impacts on community health.

Other health issues associated with the expansion are addressed in Chapter 22, Health and Safety.

Potential impacts on critical population groups

The desktop review, research from other mining towns and consultation with service providers point to a number of critical population groups, including women, children, young adults, Aboriginal people and people on low incomes, who would be

more susceptible to adverse impacts from the proposed expansion. The vulnerability of these groups arises from:

- the geographic remoteness of the town and isolation from extended family (Scheltens and Morris 2006; Sharma and Rees 2007)
- family lives that revolve around long working hours and shiftwork (Gibson 1994; Heiler et al. 2000; Grosswald 2003; Sharma and Rees 2007)
- the male-dominated culture (Gibson 1994; Collis 1999; Lievore 2003; Neame and Heenan 2004; Iacuone 2005; Sharma and Rees 2007)
- high levels and tolerance of alcohol consumption within particular industries, occupations and population groups (Hagen et al. 1992; Midford et al. 1997; Health West 1999; Barton 2002; Drugs and Crime Prevention Committee Victoria 2004; Iacuone 2005; Roxby Downs Community Board 2005; Alberta Alcohol and Drug Abuse Commission 2006; Butler 2006)
- an increasing threat of, and potential for, crimes against the person, including assault, sexual assault and rape (Neame and Heenan 2004), and higher reported incidence of domestic violence in rural and remote communities than in metropolitan settings (Women's Services Network 2000)
- barriers to reporting offences associated with reduced anonymity in rural and regional communities and a transient population (Sturkey 1989; Ruback and Menard 2001; Lievore 2003; Neame and Heenan 2004)
- limited parental supervision of young people, combined with relatively high household income and adolescent allowances, which may increase the susceptibility of young people to experiment with drugs and engage in potentially risky behaviours
- potential growth in gambling and related social effects, with a higher prevalence of problem gamblers found among adult males and the 25–34 year age group (South Australian Centre for Economic Studies 2001)
- limited access to a full range of services, including domestic violence counselling services, emergency accommodation and obstetrics (Neame and Heenan 2004; Roxby Downs Community Board 2005)
- potential marginalisation of people employed outside the mining sector or in low income jobs as a result of high living costs (Scheltens and Morris 2006).

The mitigation measures outlined in Section 19.5.2 on crime and anti-social behaviour, Section 19.5.3 on housing supply and affordability, and Section 19.5.4 on social services and infrastructure, provide mechanisms to plan for the needs of critical population groups. Some issues associated with Aboriginal cultural heritage are also addressed in Chapter 17, Aboriginal Cultural Heritage.

Residual impact

No assessment has been made of the residual impact of social services and facilities as the provision of government and non-government services is largely outside the control of BHP Billiton.

19.5.5 SOCIAL CHARACTER AND WELL-BEING

Identity and cohesion

Maintaining Roxby Downs as a cohesive and harmonious community, where residents participate in civic life and have a strong sense of community identity and pride, is important. Aspects of social interaction, attachment and cohesion can be easily affected by change. Consultation on the Roxby Downs Draft Master Plan identified social change, loss of community spirit, and a transient community as key concerns for the future. Residents in Andamooka identified as an issue the changing nature and character of the community as a result of the proposed expansion. Roxby Downs residents echoed these concerns, although to a lesser extent.

The results of benchmarking studies identify the potential impacts on community identity and culture associated with a large, transient and predominantly male construction workforce, migrant workers (whose customs may differ from local practice), and population increases. For example, assessments of mines at Coppabella in Queensland and Iluka in western Victoria, report changes to social character as an important emerging issue (see Rolfe et al. 2003; Beattie et al. 2005).

The presence of a large construction workforce would give rise to community concern. Accommodating the construction workers in a satellite village outside Roxby Downs is likely to lessen the concerns of some Roxby Downs residents. The proposal to locate the Hiltaba Village 16 km from Andamooka has met with varying responses from the residents of Andamooka – with some voicing concern and others welcoming the business opportunities that would emerge. Concerns would be likely to decrease, commensurate with the reduction in numbers of construction workers, once an expanded mine became operational.

Labour from non-traditional sources, including overseas, may result in some tensions and difficulties with assimilation in the short term. Including cultural awareness as part of workforce inductions, providing information to new and existing residents of Roxby Downs and Hiltaba Village on cultural diversity within the workforce and community, and implementing community-wide programs to facilitate positive social and cultural interaction, would contribute to maintaining Roxby Downs as a friendly and welcoming community. The development of a Social Management Plan (see Section 19.5.7) would also provide a mechanism for BHP Billiton and other stakeholders to identify and respond to issues associated with cultural diversity and sensitivities, should they arise.

The increase in the size of the LDC workforce may give rise to some concern among Roxby Downs residents because of the larger male population, mobility of the workforce, and perceived effects on the social, cultural and economic fabric of the community. Perceptions of inequity (in conditions, call-out or benefits such as free meals, accommodation and facilities) can also affect community acceptance. Integration with the existing community would be encouraged by locating accommodation for the LDC operational workforce within Roxby Downs and by continuing to support community building activities.

In the medium to long term, the population increase would be expected to have a positive impact on Roxby Downs and the surrounding townships, bringing different lifestyles, cultures and opportunities. It would also provide an expanded membership base for local community, recreational and volunteer organisations.

BHP Billiton recognises there are many factors that influence the sense of community and cohesion in Roxby Downs and would continue to implement the following strategies:

- support community groups and community-based activities, volunteer programs, and community liaison in Roxby Downs
- support community-building activities being undertaken by the council
- target support to providers of services that attract families and mature age workers, and retain young people through diverse education, employment and recreation
- work in partnership with third-party groups to undertake conservation and restoration education programs
- work with the Family and Youth Forum to develop and implement a youth strategy
- maintain the community development grants program
- liaise with the local community and regional stakeholders.

In order to encourage community identity and cohesion, BHP Billiton would also:

- provide accommodation for the permanent LDC workforce in Roxby Downs, as outlined in the Roxby Downs Draft Master Plan, to support the development of ongoing relationships between residential and non-residential workers
- implement education programs promoting responsible social and environmental behaviour and ethics
- hold regular community forums on the expansion project in Roxby Downs and Andamooka
- work with the council to provide an ongoing and proactive new residents' program and community-building activities to facilitate positive cultural and social interactions.

The Olympic Dam Agreement also recognises the importance of cross-cultural training of staff in protecting the Aboriginal cultural values in the region (see Chapter 17, Aboriginal Cultural Heritage, for details).

Amenity

In the short term, the construction and development activities associated with transport and infrastructure developments would be likely to cause some inconvenience and disturbance to residents of Roxby Downs (e.g. through building activity, increased traffic, access restrictions, noise, dust and untidiness). Detailed planning has yet to be undertaken, but would aim to minimise these disturbances. This would include regular communication with the community and the provision of timely information on planned works and project updates to assist in reducing disruptions and complaints.

The Roxby Downs Draft Master Plan makes provision for new recreational and sporting facilities to meet the requirements of the expanded population. Ongoing liaison and collaboration would occur between BHP Billiton, the South Australian Government, Roxby Downs Council and sporting groups about detailed development strategies, including the timing of construction and contributions of each party, to ensure the adequacy of facilities as the town expands.

The development of facilities, as outlined in the Draft Master Plan, would involve the demolition and relocation of a number of social and recreational facilities, including the bowling club and RSL club, social club, pony club and racecourse (see Figure 19.14), and result in some disruption and inconvenience to club users and residents in the short term. New community recreational facilities are also proposed to accommodate various sporting bodies (including the golf club, social club, Australian Rules Football clubs, cricket club, tennis club and soccer club). The joint use of recreational facilities by multiple sporting clubs could create some scheduling issues initially, but would be likely to result in lower costs and greater use of facilities over time. The expansion of informal recreational spaces and parks (including a new town park and plaza, two new regional parks facilities and town ovals) and an extensive network of walking and cycle paths would also provide additional opportunities for residents to enjoy a range of recreational pursuits.

In the medium term, development activities would result in a high-quality living environment in the township. Together with the South Australian Government and other third-party service providers, BHP Billiton would contribute to improving the amenity of Roxby Downs by upgrading and enhancing landscaping and streetscapes, improving infrastructure and providing an expanded range of services and facilities, in accordance with the Draft Master Plan.

The effects of dust on health and amenity have been raised in consultation with residents (see Chapter 7, Stakeholder Consultation and Engagement; Arup HLA 2006; Heylen 2007a). The experience of other communities near mining or industrial activity highlights the negative public reactions that may occur as a result of increased dust concentrations (e.g. visibility degradation and dust deposition in Whyalla, Port Hedland, Yallourn and the Hunter Valley). Research into amenity impacts suggests that the community perceptions and sensitivity to dust may be influenced by factors other than dust concentrations, including existing air quality, its rate of change and other community and environmental characteristics (Dean et al. 1987; Australian Coal Association Research Program 1999). Incoming workers and new residents in Roxby Downs may also have concerns about exposure to radiation from dust emissions.

Chapter 13, Greenhouse Gas and Air Quality, assesses the predicted levels of emissions from the proposed expansion against applicable limits and its potential effects on residential amenity. Chapter 22, Health and Safety, assessed the predicted radiation dose to the public from the expanded operation,

which would be below recommended limits. BHP Billiton would meet regulatory dust limits at Roxby Downs and Hiltaba Village through operational controls to ensure amenity and would conduct monitoring of dust levels to confirm this (see Chapter 13, Greenhouse Gas and Air Quality, for details).

In addition, BHP Billiton would provide information to employees, and make available information to all new and existing residents of Roxby Downs and Hiltaba Village on:

- dust
- radiation
- feral animals control
- weed control
- care for the environment
- cultural diversity within the workforce and community
- other social considerations as appropriate.

Community governance

The expansion of Roxby Downs may lead to pressures for greater community involvement in town decision-making. Governance and community leadership were among the issues raised by local residents in consultation for the 1997 EIS (Kinhill 1997), the Roxby Downs Community Plan (Roxby Downs Community Board 2005) and community perceptions survey report (University of Queensland Social Research Centre and Centre for Social Responsibility in Mining 2007). The participation of residents in the administration and management of the community can contribute to their sense of attachment and commitment, and avoid them seeing themselves as short-term or transient visitors.

The Roxby Downs Community Board and associated partnerships provide a forum for community participation in the town's future development. A review of the governance structures in the Outback areas, including Roxby Downs and Andamooka, was undertaken by the State Government in response to the challenges faced by many Outback communities from, for example, mining and tourism booms. The conclusions from community engagement were that governance structures should reflect each community's individual aspirations, support local decision-making about strategic priorities and involve local communities in identifying essential services and decisions about ownership, management and resourcing of services (Heylen 2007b).

Residual impact

The residual impact on social character and well-being in Roxby Downs has been assessed as moderate, in terms of reduced community cohesion and nuisance and disruption over an extended period. The benefit in terms of long-term community character and well-being is considered moderate as a result of the vitality and diversity in lifestyles, cultures and opportunities the expanded town would provide.

19.5.6 ACCESS AND DISTURBANCE

Landholders, businesses, visitors and the general public who may be affected by the proposed expansion include:

- road and rail users (including tourists and commercial drivers) and landholders near transport corridors who may be affected by increased traffic volumes associated with the expansion or the relocation of Borefield Road
- landholders and pastoralists whose properties fall within the infrastructure easement, or who live in proximity to port facilities and other project infrastructure, and visitors using the Upper Spencer Gulf for recreational purposes
- South Australian electricity users.

Access and disturbance impacts associated with land use, groundwater supplies, air quality, noise and vibration, introduction of weeds, visual amenity, and health and safety, are discussed elsewhere in the Draft EIS. The remaining social issues associated with increased traffic volumes and changed road conditions, disturbance and inconvenience for landholders and visitors near port facilities and other project infrastructure, and the increased energy demands from the project, are addressed below.

Road and rail access and usage

Increased traffic volumes would be associated with the expansion, particularly during the period before the rail spur was constructed (i.e. up to 2016). The proposed expansion would also require the relocation of the existing Borefield Road (see Figure 19.13). The increased traffic and changed traffic conditions would potentially affect public access and involve periodic interruptions and delays to road users and landholders living near transport corridors. These effects would be associated with:

- increased road traffic associated with the transport of goods and materials from Adelaide and other locations in Australia to Olympic Dam during both the construction and operation phases
- increased traffic volumes from the construction and operational workforce
- increased traffic from third-parties associated with supporting the Olympic Dam operation and Roxby Downs
- the movement of over-dimensional loads as they cross public roads between the proposed landing facility and the pre-assembly yard in Port Augusta West via the access corridor, primarily during the construction phase
- the movement of over-dimensional loads on public roads from Adelaide and the pre-assembly yard to Olympic Dam, primarily during the construction phase
- increased rail traffic associated with the transport of goods and materials between Adelaide and other locations to Olympic Dam and between Olympic Dam and the Port of Darwin
- increased travelling time as a result of the relocation of Borefield Road.

Safety impacts associated with the increased road and rail traffic are addressed in Chapter 22, Health and Safety.

Effects of road traffic volumes on road users

A traffic impact assessment has been undertaken to assess the existing condition and usage of the public roads that would be used by vehicles associated with the proposed expansion, and to determine the extent of change (see Appendix Q9 for details). The assessment was undertaken on the basis that about half of the road transport for the proposed expansion would travel via Port Adelaide (about 50–55%); 5–10% would originate from Port Augusta via the landing facility; and less than 1% would originate in Whyalla; with the remainder originating from interstate (about 35–45%). The main public road links that would be used are:

- the Princes Highway (A1) between Adelaide and Port Augusta – a four lane, two-way dual carriageway from Adelaide to near Port Wakefield and a two lane, two-way single carriage highway to near Port Augusta, with 28 overtaking lanes between Port Wakefield and Port Augusta
- the Stuart Highway (A87) between Port Augusta and Pimba – a single carriage highway (two lane, two-way), with two overtaking lanes approximately 20 km south of Pimba
- Olympic Way (B97) from Pimba to Olympic Dam via Roxby Downs – a two lane, two-way single carriageway
- Olympic Way (B97) from Pimba to Olympic Dam via the heavy vehicle bypass – a two lane, two-way single carriageway.

The transport of construction and mining equipment to Olympic Dam would primarily be by road from the commencement of the construction program in 2010 until the completion of both the Pimba intermodal facility in 2012 and the rail spur from Pimba to Olympic Dam in 2016. Rail would then become the primary mode of transport for equipment and commodities to and from the mine site.

Over-dimensional loads greater than 8 m wide (and some less than 8 m wide) would be transported from the landing facility in the Upper Spencer Gulf to the pre-assembly yard in Port Augusta West and the Stuart Highway via an access corridor. From the Stuart Highway, the over-dimensional loads would use the same route as the travelling public, along the Stuart Highway, Roxby Downs Road and Olympic Way to Olympic Dam (see Figures 19.18 and 19.19).

While transport of over-dimensional loads by road would occur, BHP Billiton proposes to construct the Pimba intermodal facility and rail line to maximise the transport of materials by rail and reduce road traffic volumes (see Figure 19.20 and Chapter 4, Project Alternatives).

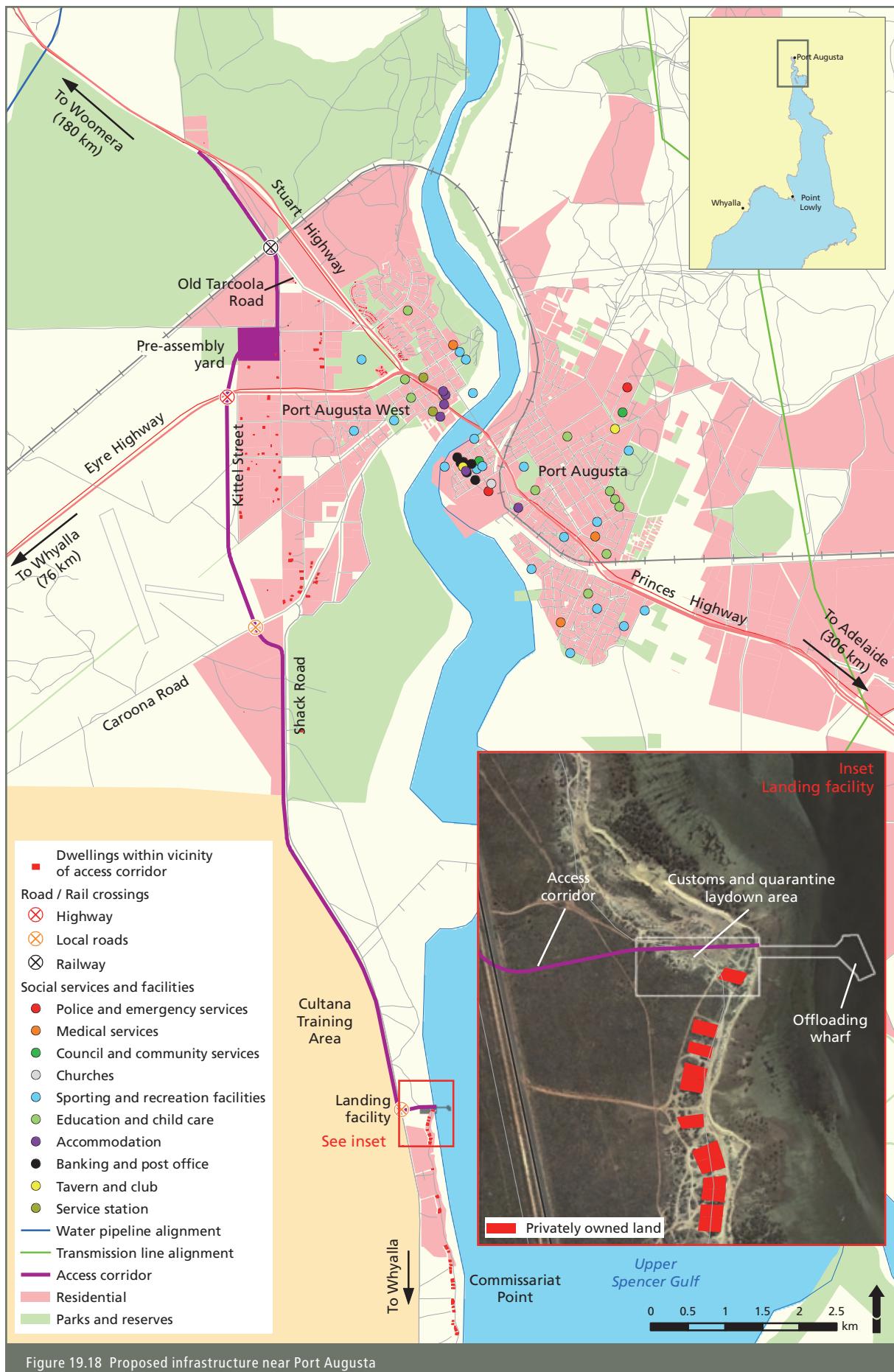
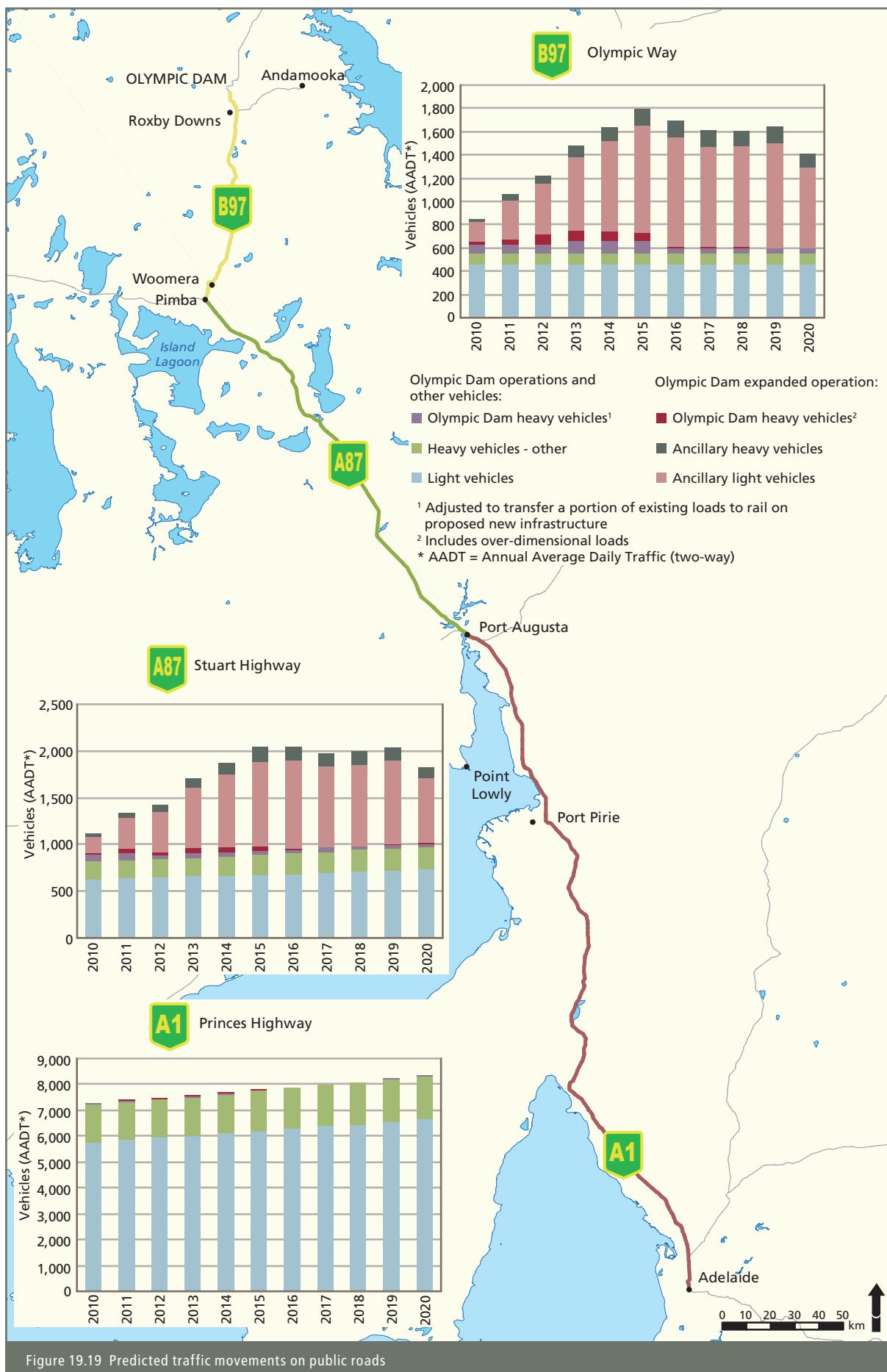


Figure 19.18 Proposed infrastructure near Port Augusta



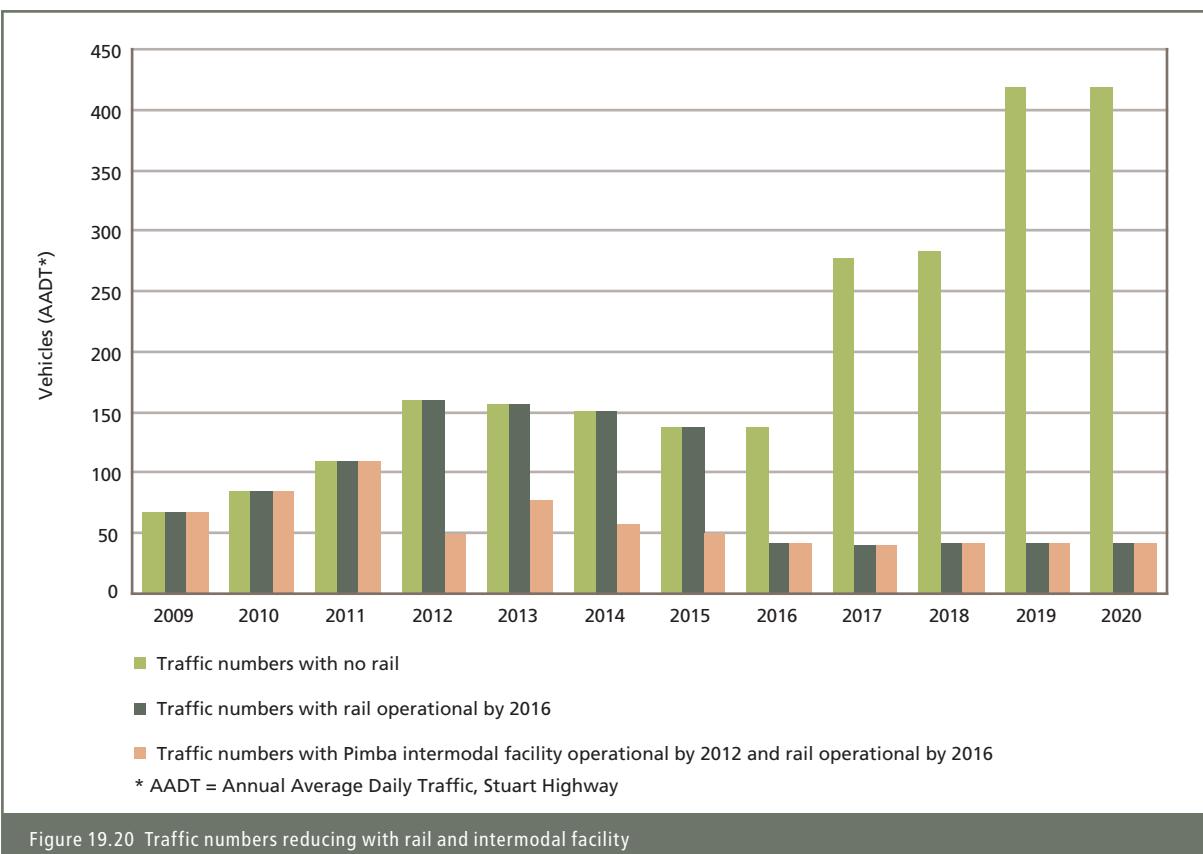


Figure 19.20 Traffic numbers reducing with rail and intermodal facility

Figure 19.19 shows the predicted traffic movements on major public roads in South Australia to 2020, where traffic volumes take into account the use of the Pimba intermodal facility and rail spur by the current Olympic Dam operation and the proposed expansion. The data are based on recent traffic surveys undertaken as part of the traffic impact assessment and both direct and indirect (ancillary) vehicle forecasts for the proposed expansion. Based on two-way traffic movements in the peak road transport year of 2015, the proposed expansion would:

- decrease overall vehicle traffic on the Princes Highway (in the vicinity of Two Wells, near Adelaide) by less than 1%, and heavy vehicle movements by less than 2% (as a result of barging prefabricated material to the landing site and maximising rail transport to the Pimba intermodal facility)
- more than double overall vehicle traffic on the Stuart Highway and increase heavy vehicle movements by approximately 40%
- triple overall vehicle traffic on Olympic Way, south of Roxby Downs, and double heavy vehicle movements.

The expansion would also result in increased local traffic movements around Olympic Dam. Based on peak hour traffic movements in 2015, the proposed expansion would:

- triple overall vehicle traffic on the Roxby Downs heavy vehicle bypass, with up to 40% of the additional traffic movements being heavy vehicles (primarily buses)

- increase overall vehicle traffic by approximately 50% on Olympic Way, north of Roxby Downs, with up to 10% of the additional traffic movements being heavy vehicles (primarily buses).

BHP Billiton would install a new access road from the northern intersection of the heavy vehicle bypass and Olympic Way to a new main gate at Olympic Dam (see Figure 19.13). The new western access road would be two lanes in both directions, separated by a median strip, and would provide for the safe movement of traffic. The western access road would be a private road, although it would be open to the public for access to the Olympic Dam main gate.

By 2020, traffic activity from the expansion would be expected to reach a 'steady state' when construction was complete and Olympic Dam was operating at the expanded rate.

The effects of the changes in traffic flow levels resulting from the expansion, using the 'level of service' (LoS) measurement, are shown in Table 19.16 and detailed in Appendix Q9 (see Figure 19.1 and 19.13 for major road links). This method ranks road operational conditions from A to F, with A representing free-flow conditions through to F, which represents 'forced flow' conditions (i.e. heavily congested).

Three key intersections have also been identified in the vicinity of Roxby Downs that would experience changes in traffic volumes and patterns, primarily as a result of the anticipated

workforce movements between Roxby Downs, Hiltaba Village and Olympic Dam. These key intersections are (see Figure 19.1):

- Olympic Way and the heavy vehicle bypass, south of Roxby Downs
- Andamooka Road and the heavy vehicle bypass
- Olympic Way and the heavy vehicle bypass, north of Roxby Downs.

The operation of the three intersections has been assessed using signalised and unsignalised intersection design and research aid (SIRDA) computer software to measure the 'degree of saturation' (DoS) of turning movements at each intersection, and to provide a measure of the 'level of service' (LoS). A DoS of 1.0 would indicate that an intersection is 'saturated' (i.e. the intersection is operating at 100% of its total capacity) and excessive queuing would result. The assessment was undertaken for predicted peak hour traffic volumes in 2015 and 2020, and took account of the proposed upgrade of the intersection of Olympic Way and the heavy vehicle bypass, north of Roxby Downs, to provide a roundabout at this location, as part of the expansion.

For an intersection to operate within capacity, the DoS should generally be below 0.85 (i.e. the intersection is operating at less than 85% of its total capacity), taking into account daily fluctuations in traffic volumes, and the LoS should be 'C' or better during normal operations. It was found that each of the three intersections would have a DoS of below 0.85 and a LoS of C or better, and that queue lengths could be accommodated within the intersection layout during peak traffic conditions in 2015 (see Appendix Q9 for details). The conclusions of the assessment were that there would be no adverse impacts on these intersections, which would operate satisfactorily during peak traffic conditions.

The assessment further indicates that despite increased traffic volumes and the periodic movement of over-dimensional loads as a result of the expansion, there would be no reduction in terms of the LoS, with the exception of Olympic Way, north of Roxby Downs, between Roxby Downs and the intersection with the heavy vehicle bypass (see Figure 19.1). During daily peak periods (at the shift change over at the Olympic Dam site), this section would be likely to experience a reduction from a ranking of C (stable but restricted flows) to D (severe restriction in terms of speed and ability to manoeuvre within the traffic stream) during the peak construction years, and return to an LoS of C in 2020 and for ongoing operations (see Table 19.16). The reduction in the LoS in peak periods is principally due to the increase in the Olympic Dam workforce travelling by private vehicle to the mine site from Roxby Downs. As outlined in Section 19.5.4, BHP Billiton would expand the existing workforce commute bus service between Roxby Downs and Olympic Dam, and Hiltaba Village and Olympic Dam, to meet the transport needs of its workforce and to reduce traffic volumes. The traffic conditions along this section of road would also be monitored, and consideration given to other options to improve traffic conditions as required.

In terms of the implications for the travelling public, the increase in vehicle numbers associated with the proposed expansion is unlikely to have a significant effect on traffic flow (not taking into account the intermittent effects of over-dimensional load transport, which is described below).

Effects of transporting over-dimensional loads on road users

The transport of large pieces of equipment to Olympic Dam during the construction period (2010 to 2020) would involve the movement of over-dimensional loads along the Princes Highway, Stuart Highway and Olympic Way. It is estimated that approximately 11,500 over-dimensional loads would require

Table 19.16 Predicted level of service by road link

Road Link	Section/Location	Existing (2008)	No expansion (2015)	Expanded operation (2015)	No expansion (2020)	Expanded operation (2020)
Olympic Way	Heavy vehicle bypass to existing Olympic Dam site access gate	C	C	n.a.	C	n.a.
Western Access Road	Heavy vehicle bypass to new Olympic Dam site access gate	n.a.	n.a.	B	n.a.	A
Andamooka Road	Hiltaba Village to the heavy vehicle bypass	A	A	A	A	A
Heavy vehicle bypass	Andamooka Road to Olympic Way	A	A	A	A	A
Olympic Way (north of Roxby Downs)	Roxby Downs to heavy vehicle bypass	C	C	D	C	C
Olympic Way (south of Roxby Downs)	Pimba to Roxby Downs	A	A	A	A	A
Stuart Highway	Port Augusta to Pimba	A	A	A	A	A
Princes Highway	North of Port Wakefield	A	A	A	A	A
Princes Highway	Lower Light	A	A	A	A	A

transport between 2010 and 2020, peaking in 2011 at approximately 45 per week (see Figure 19.21). Table 19.17 outlines the categories of over-dimensional loads, estimated volumes, origin and route used, typical travel speed and times, traffic management arrangements and impact on road users.

Most over-dimensional loads (94%) would be less than 8 m wide and over 50% of these would originate from Adelaide and be transported to Olympic Dam along the Princes and Stuart Highways and Olympic Way. For the purposes of traffic management, loads that are less than 8 m wide are manageable within existing government policies and guidelines, even if they require escort by either pilot vehicles or both police and pilot vehicles. Appendix Q9 provides further detail on the traffic management procedures that would apply in this case.

For over-dimensional loads greater than 8 m wide, special assessment by the Department for Transport, Energy and Infrastructure (DTEI) is required. Under normal circumstances, vehicles would not be able to pass these loads in either direction, creating a high likelihood for significant concern and annoyance to the general travelling public. To address this issue, BHP Billiton proposes constructing 15 passing bays, nine on the Stuart Highway and six on Olympic Way, to reduce travel delays to a maximum of 45 minutes (see Appendix Q9 for details).

Based on estimated annual average daily traffic in 2015, the predicted 45 minute delay at each passing bay would affect a maximum of about 80 vehicles (including 15 heavy vehicles) in each direction on the Stuart Highway and approximately 65 vehicles (including 10 heavy vehicles) in each direction on Olympic Way, south of Roxby Downs.

Over-dimensional loads less than 8 m wide could also use passing bays to enable built up traffic to pass, so that the greatest distance for a driver travelling behind a load would, on average, be approximately 17 km before there was an opportunity to overtake. For loads between 5.5 m and 8 m wide, the opportunity to pass would depend on directions from the South Australian police escort. The dual carriageway road from Adelaide to Port Wakefield and the 28 overtaking lanes between Port Wakefield and Port Augusta would also provide opportunities for the travelling public to overtake over-dimensional loads on the Princes Highway.

All over-dimensional loads originating at the landing facility would be moved to the pre-assembly yard in Port Augusta West via the access corridor, which would join the Stuart Highway approximately 3 km north-west of Port Augusta. The access corridor would traverse public roads/rail lines at the following locations in the vicinity of Port Augusta (see Figure 19.18):

- two local roads (Shack Road and Caroona Road)
- the Eyre Highway (to Whyalla)
- the Port Augusta – Whyalla rail line in one location.

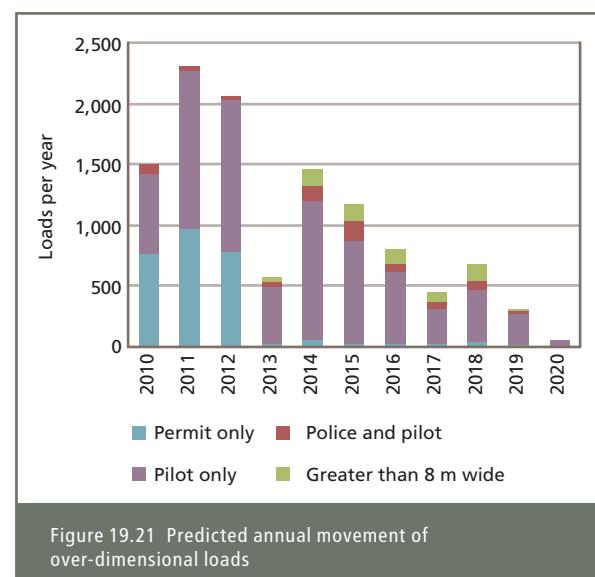


Figure 19.21 Predicted annual movement of over-dimensional loads

The movement of over-dimensional loads across public roads around Port Augusta would require temporary road closures and may create delays in the order of five minutes (assuming loads do not travel in convoy). The peak traffic movements for these loads would occur between 2014 and 2018 (up to 12 individual load movements per week in 2018) and may lead to some inconvenience for local landholders and road users. Movements across rail lines would not impact on freight and passenger rail services because crossings over rail lines would be controlled and coordinated with the Australian Rail Track Corporation Ltd (ARTC). There would also be an increase in traffic associated with the construction and operation of the landing facility and access corridor, and a minor increase in support traffic on local roads during the operation phase. This would include around 10 light vehicles per day when a vessel was unloading.

Detailed traffic management plans and procedures would be prepared, and would require approval by government, prior to the transport of over-dimensional loads on public roads, with the focus of the plan being to minimise the delays and traffic disruption to road users. The traffic management plan would ensure that all over-dimensional loads use passing bays/points and/or other alternative means to minimise delays to other users of the road system by allowing vehicles to overtake safely. Other measures that would be employed to reduce the potential annoyance to the travelling public due to these delays would include:

- regular community announcements and notification of the timing of over-dimensional load movements through regular announcements so travel times may be altered accordingly (for example, through variable message signs, on the internet, newspapers and radio)
- aiming to transport loads at times that are outside of peak traffic periods. The prospect of night-time load haulage to reduce the potential effect on the travelling public is being discussed with the DTEI

Table 19.17 Estimated volumes and delays from transport of over-dimensional loads (2010 to 2020)

Type and size of load ¹	Movement period and frequency	Origin and route	Typical speed and travel time ²	Traffic management ³	Impact
Preassemblies greater than 8 m wide	2013 to 2019; 6% of loads Average: approximately 2 loads/week Peak (2018): approximately 5 per fortnight	Access corridor from landing facility to pre-assembly yard in Port Augusta then via the Stuart Highway and Olympic Way to Olympic Dam	30 km/h Port Augusta to Pimba: 9–10 hours Pimba to Olympic Dam: approximately 5 hours	As defined in traffic impact assessment Police and pilot vehicle escort Temporary road closures on the Stuart Highway and Olympic Way, with southbound traffic held in passing bays and northbound traffic travelling behind the load Approximately 10 light support vehicles, including police and pilot vehicles and traffic management crews	In the order of a 5-minute ⁴ delay where the access corridor crosses public roads from the landing facility to the pre-assembly yard Up to 45 minute delay on public roads, with traffic held in passing bays
Loads between 5.5 m and 8 m wide	2010 to 2019; 6% of loads Average: approximately 3 loads/fortnight Peak (2015): approximately 3 per week	Mainly from the landing facility and pre-assembly yard in Port Augusta via the access corridor, then along the Stuart Highway and Olympic Way to Olympic Dam Some from Adelaide via the Princes Highway; Whyalla via the Lincoln and Eyre Highways; and interstate via the Barrier Highway; and then along the Stuart Highway and Olympic Way	40–50 km/h Port Augusta to Pimba: 4–5 hours Pimba to Olympic Dam: 2–2.5 hours	Police and pilot vehicle escort Traffic temporarily held on roadside, then directed around the load as per police direction Approximately five light support vehicles	In the order of a 5-minute delay ⁴ where the access corridor crosses public roads from the landing facility to the pre-assembly yard Disruptions to motorists would depend on police escort decisions and directions
Loads between 3.5 m and 5.5 m wide	2010 to 2020; 64% of loads Average: approximately 13 loads/week Peak (2011): approximately 4 per day	Mainly from Adelaide via the Princes and Stuart Highways and Olympic Way Some interstate origins and via the landing facility	70–80 km/h Port Adelaide to Pimba: 6–7 hours Pimba to Olympic Dam: more than 1 hour	Pilot vehicle escort Normal driver care required with minimal delay likely	Minor increase in traffic numbers with minimal effect on level of service (see text) All loads originating from the landing facility would create delays where the access corridor crosses public roads
Loads between 2.5 m and 3.5 m wide	2010 to 2019; 24% of loads Average: approximately 5 loads/week Peak (2011): approximately 4 per day	Mainly from Adelaide via the Princes and Stuart Highways and Olympic Way	80–90 km/h Port Adelaide to Pimba: 5–6 hours Pimba to Olympic Dam: more than 1 hour	DTEI permit; escort not required Normal traffic care required with minimal effect on traffic flow likely	Minimal increase in traffic numbers with negligible effect on level of service (see text) All loads originating from the landing facility would create delays where the access corridor crosses public roads

¹ Length restrictions also apply – see Appendix Q9, Figure 37 Categorisation of Non-divisible Loads.² The speed of over-dimensional loads would depend on load design, mass, stability and would vary within and between categories.³ The movement of all over-dimensional loads would be subject to approval by DTEI.⁴ This assumes loads do not travel in convoy, which would require DTEI approval.

- the use of convoys (as opposed to individual truck loads) in certain circumstances to reduce the number of potential disruptions to traffic flow from the movement of over-dimensional loads, and particularly those that would require road closures (this is also being discussed with the DTEI)
- the provision of amenities, refreshments and information to motorists at each of the passing bays.

Given the implementation of the above management measures, the adverse impact on the public during the construction period is categorised as moderate, reflecting a long-term impact to a common receiver. After the construction period (i.e. post 2020), the number of over-dimensional loads travelling to Olympic Dam would be very low, with no movements of over-dimensional loads requiring temporary road closures expected. As a consequence, there would be minimal adverse impacts on the travelling public in the longer term.

Rail traffic effects

The proposed expansion would result in increased utilisation of rail infrastructure to transport goods and materials to and from Olympic Dam. This would include additional rail services using the existing Adelaide to Darwin rail line and new rail services between Pimba and Olympic Dam using the proposed rail spur as follows:

- an additional two trains per day each way between Adelaide and Pimba (i.e. a total of four trains a day)
- one train per day each way between Pimba and the Port of Darwin (i.e. two trains a day)
- three trains per day each way between Pimba and Olympic Dam (i.e. six trains a day).

Appendix Q9 addresses the potential effect of this increased utilisation on existing services. It was found that the increased utilisation was within the design usage levels of the existing rail corridor.

The rail line between Adelaide and Darwin crosses a number of active and passive level crossings. The increased rail usage would increase the potential for delays to the travelling public at these crossings. Train lengths would be either 1,200 m or 1,800 m long (the maximum length allowed on the defined interstate network), which would result in a typical delay of up to 120 seconds based on a train speed of 80 km/h. The length of delays would vary, depending on the speed of the train. For example, in Alice Springs, speed limits of 20 km/h apply in some areas, and could result in delays in the order of six to seven minutes. Such delays are considered negligible, given the short time frames and infrequent occurrence of the train movements.

Effects on landholders near transport corridors

The remaining social issues from the increased road and rail traffic are associated with the loss of amenity and nuisance for landholders near transport corridors.

The north-western suburbs of Adelaide may experience some noise, traffic congestion and delays as a result of increased movements of trucks, over-dimensional loads and rail traffic from the proposed Outer Harbor port facilities. Recent and planned improvements to the road and rail networks by the Australian and South Australian governments, including the Port River Expressway (see Figure 19.22), completed in August 2008, the Northern Expressway, due for completion by 2010 and the Northern Connector, planned for construction in 2016–2017, would divert traffic from built-up areas and reduce the impact of traffic.

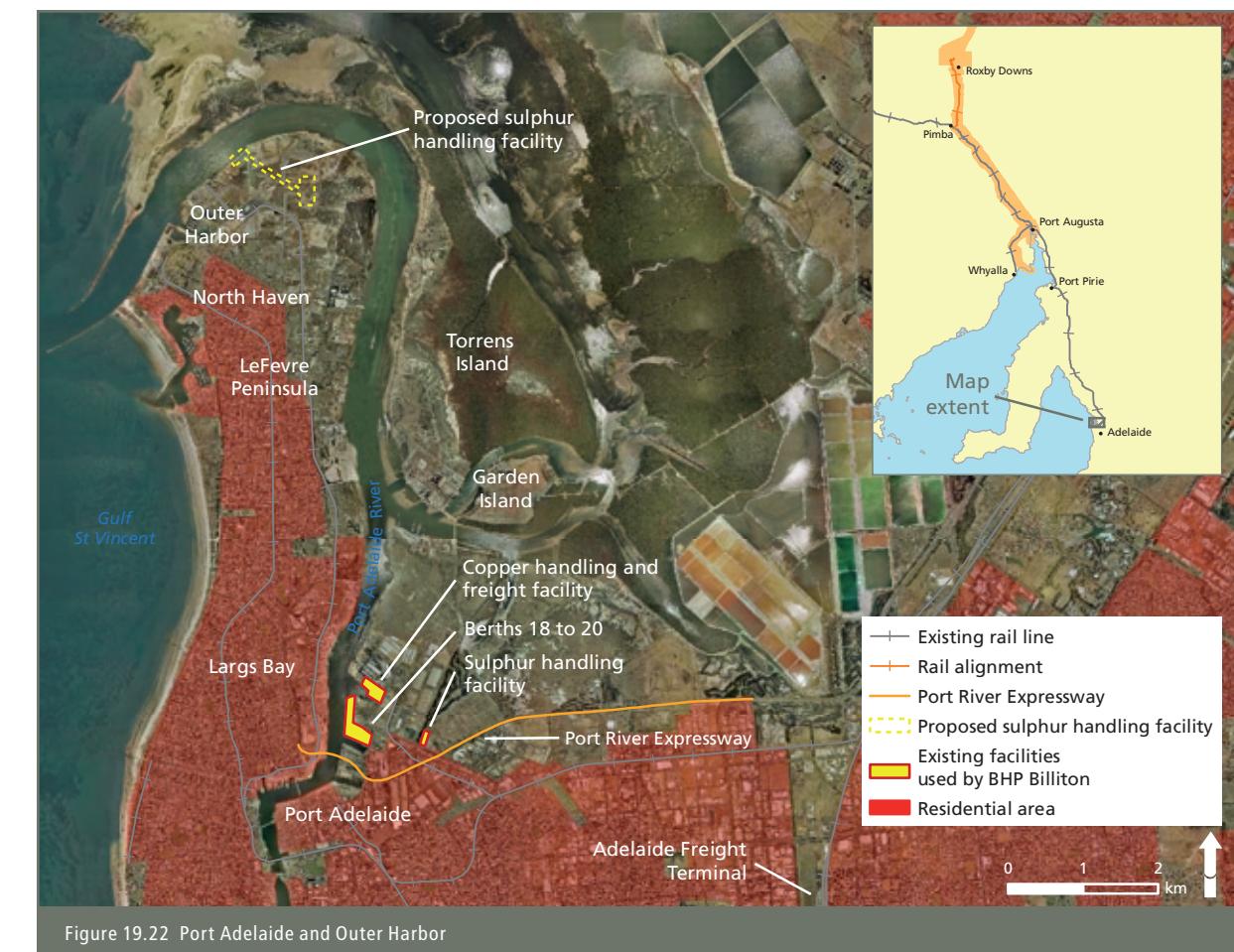
The township of Woomera would experience minimal direct impacts from the increased road and rail traffic. The volume of road freight and traffic along the road from the Stuart Highway to Olympic Dam would increase, but this would not directly affect the populated area of Woomera as the road is located on the western edge of the township. The proposed rail link to Olympic Dam would also bypass Woomera (see Figure 19.23).

The impacts from the proposed intermodal facility at Pimba are expected to be negligible, given the nature of the existing transport-related activities at Pimba, the location of the facility 1 km north of residences and its predominantly day-time operations. Noise impacts from the facility have been assessed and would comply with relevant standards and guidelines (see Chapter 14, Noise and Vibration, for details).

A number of properties are located within 100 m of the existing rail line between Adelaide and Pimba, and Pimba to the Port of Darwin. Chapter 14, Noise and Vibration, assessed the overall increase in noise and vibration as a result of the increased rail traffic between Pimba and Darwin, and Pimba and Outer Harbor. Modelling of the impact of rail traffic indicated that noise criteria would be met at sensitive receivers greater than approximately 100 m from the rail line (based on the South Australian Environment Protection Authority criteria for rail noise and an assessment of the rail spur between Roxby Downs and Woomera), with noise levels approaching typical background noise levels at a distance of approximately 1 km from the rail line. In practice, residents and other sensitive receivers situated adjacent to the existing rail line are presently exposed to noise from trains. As the additional trains resulting from the proposed expansion would be no louder than the trains that currently travel on the rail line, the assessment concluded that the impacts on residents would be expected to be negligible.

Relocation of public roads

It is proposed that the existing Borefield Road would be relocated as part of the expansion (see Figure 19.13). The new road alignment would add 17 km to the existing road from Roxby Downs to the entrance of Arid Recovery. Based on the state speed limit of 100 km/h, this would increase travel time by an estimated 10–15 minutes. This is not considered significant given the distances to visit local attractions and towns in this relatively isolated region. Road works would be undertaken in a manner to minimise



disruption to traffic movements. The new road would be located entirely within the Andamooka pastoral lease, which is held by BHP Billiton and, as such, would not impact any third-party landholder.

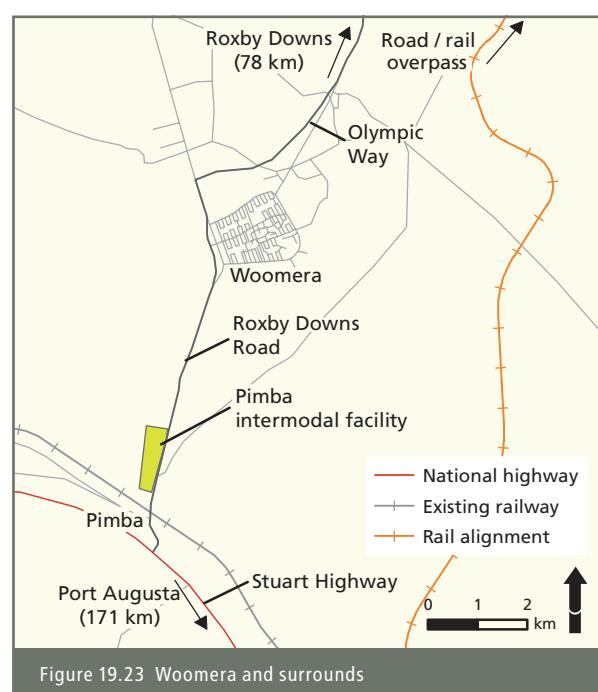
Residual impact

The residual impact from the increase in road and rail traffic associated with the construction phase of the expansion is categorised as moderate as a result of the delays and nuisance to roads users over a period of years. After the construction period (i.e. post 2020), the impact on the travelling public and nearby landholders would be minimal.

Effects on other landholders

Landholders and other members of the public who may experience a loss of amenity, inconvenience or disturbance as a result of the proposed expansion include:

- residents, visitors and other landholders near Port Augusta, and other port facilities
- pastoralists and landholders whose properties fall within the infrastructure easement
- Arid Recovery, which is situated partly within the Olympic Dam SML and partly on adjoining pastoral properties
- other landholders who live in proximity to off-site infrastructure.



Landholders around Port Augusta

The potential social impacts for landholders around Port Augusta include the loss of amenity, inconvenience and disturbance associated with the construction and operation of the proposed access corridor, landing facility and pre-assembly yard. Delays for residents, visitors and other road users associated with the movement of over-dimensional loads across existing roads have been discussed in the previous section.

A number of properties are located close to the proposed landing facility, access corridor and pre-assembly yard in Port Augusta West (see Figure 19.18). This includes 13 properties within a 750 m radius south of the proposed landing facility, and 13 properties north of the proposed landing facility, on or adjacent to the proposed access corridor and pre-assembly yard. Coastal home owners have expressed concern about the impacts on the character and ambience of the area and the local coastal environment from the development of this infrastructure.

Residents and visitors to properties near these facilities would experience some disturbance, inconvenience and loss of amenity associated with the construction and operation of the proposed landing facility, access corridor and pre-assembly yard.

Over seven years from 2013 to 2019, the landing facility is expected to accommodate about 280 vessels (including roll-on roll-off and lift-on lift-off vessels and barges) unloading pre-assembled metallurgical plant and prefabricated infrastructure modules. Over the peak period from 2014 to 2018, this would involve about one vessel a week, although the landing facility could accommodate a roll-on roll-off or lift-on lift-off vessel and a barge at the same time, each being unloaded separately. It would also be used on an infrequent basis to unload equipment for ongoing operational replacement and maintenance. Vessels would remain at the landing facility for two to three days to unload the cargo. Unloading operations from the facility would only occur during daylight hours (typically 7am to 7pm). Some vessels would anchor in the gulf for two to three days as the smaller barges unloaded the cargo. These vessels would moor at holdings sites identified in conjunction with the DTEI.

Noise from the construction and operation of the landing facility has been assessed and elevated noise levels would occur during unloading operations and this could affect the 13 nearby residences (see Chapter 14, Noise and Vibration, for details). Management options are currently being discussed with potentially affected landholders.

The landing facility would comprise a piered jetty structure, approximately 200 m long and 20 m wide. In order to meet maritime security requirements and to ensure its secure use by BHP Billiton, public access to, and use of, the landing facility would not be permitted. To ensure public safety, there would also be some minor limitations on swimming, diving, mooring or anchoring in the immediate vicinity of the landing facility (similar to those in place at the Port Augusta boat ramp), and around vessels during berthing, unloading and departure. There would be no restrictions on vessels transiting

past the landing facility, accessing the coastline, or moving into the channel.

Figure 19.24 shows the proposed landing facility in the context of the Upper Spencer Gulf channel. Only a small proportion of the landing facility would be located in the channel (approximately 50 m or one-twelfth of the 600 m wide channel) and most of it would lie in the shallow subtidal zone. It also illustrates the relationship of the landing facility to nearby home owners, with approximately 100 m between the low tide mark and an indicative 25 m safety zone around the facility and berthed vessel. The impact on recreational, boating or other marine activities by local residents and the general public is therefore expected to be minimal. BHP Billiton would continue to consult with coastal home owners, maritime users and other community stakeholders about the landing facility and provide regular updates and advertise vessel movements as detailed planning progresses.

The visual impact on the landing facility on home owners has been assessed and is presented in Chapter 20 as having a slight impact from a local viewpoint.

BHP Billiton would also continue to consult with landholders potentially affected by the proposed landing facility, access corridor and pre-assembly yard in Port Augusta. The access corridor would be screened by tree-planting. An environmental management plan for the construction and operation of the access corridor and landing facility would also be communicated to residents (see Chapter 24, Environmental Management Framework, for details). Traffic management measures would be required to move over-dimensional loads across public roads and advance notice would be given of transport movements to reduce access issues or delays.

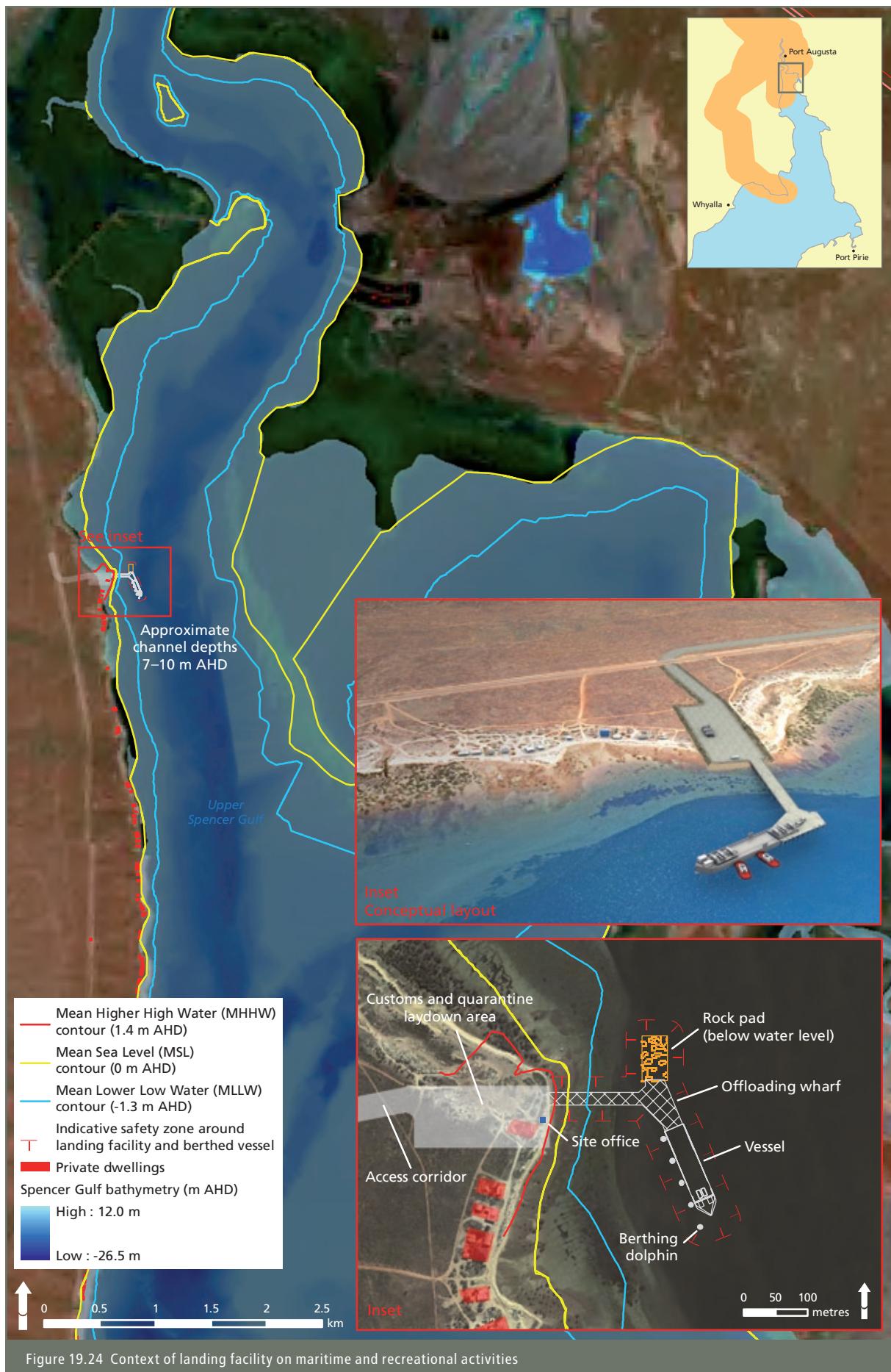
Landholders around Point Lowly

Coastal home owners and visitors near the proposed desalination plant at Point Lowly may experience some disruption and disturbance during the construction of the plant and its associated intake and outfall pipes.

Approximately 55 properties, located within 2 km of the proposed desalination plant at Point Lowly, are used as principal residences and holiday homes. The area is also frequented by visitors to access the boat ramp, heritage lighthouse, holiday cottages, barbecue and other facilities. The beach and water around Point Lowly is also popular for recreational and marine activities, including swimming, boating, fishing and diving.

Depending on the geology of the chosen pipeline route, and therefore the findings of detailed geotechnical studies, the method of installing the pipelines would be chosen. Options investigated as part of the Draft EIS include:

- a wheel trencher or large excavator on land and a clamshell bucket operated by a crane on a temporary jetty or flat-top barge
- a combination of the above and blasting.



Should blasting be required, it would be likely to involve approximately 15 land-based blasts every two to three days over a period of 40–60 days and approximately 25 underwater blasts every two days over a period of approximately 50 days. A maximum charge size of 10 kg would be used, and would involve sequential detonations to minimise potential airblast, overpressure and vibration impacts. Blasting would only occur during daylight hours, and would not occur on a Sunday or a public holiday.

Appropriate exclusion zones would be established to ensure public safety for people on land, and on or in the water, and to protect marine life (see Chapter 16, Marine Environment, for details of marine studies). Estimated safety limits for land-based blasts would be approximately 300 m for people (where the maximum charge size would be 10 kg) and 100 m for unoccupied residences (or less, where the charge size would be adjusted to comply with noise and vibration limits). The safety exclusion zone for underwater blasting would be 1,350 m for people in the water and 70 m for a boat or other ship or vessel on the water. The establishment of the marine exclusion zone would also involve a coordinated approach between marine blasting operations and divers at the aquaculture farm in Fitzgerald Bay.

An assessment of blasting and the potential impacts from noise and vibration (waterborne, ground borne and airborne) on residential receivers, the heritage lighthouse and marine life at Point Lowly has been undertaken (see Appendix O12.2, Blasting). The conclusions of that assessment were that adverse effects on human comfort and building damage as a result of blasting could be readily managed, based on Australian and international standards and criteria. Other potential impacts of blasting on the Point Lowly Lighthouse and management measures are discussed in Chapter 18, Non-Aboriginal Cultural Heritage.

In order to minimise potential impacts on breeding cuttlefish, blasting would be confined to the period from 1 November to 1 May, and therefore outside of the breeding period. This may result in some minor disturbance for coastal home owners and visitors, particularly during holiday periods, when residences are more likely to be occupied and visitor numbers are likely to increase. The impact on recreational, leisure or maritime activities would be expected to be minimal, however, as blasting would only occur intermittently, for short periods, during daylight hours.

In order to further reduce the impact of blasting on people and buildings at Point Lowly, BHP Billiton would:

- provide advance notice of the blasting schedule to people in the Point Lowly area
- place prominent signs on blasting days at the boat ramps at Point Lowly and Whyalla, and at the two dive shops in Whyalla
- undertake surveillance of the blast area two hours prior to a blast, intensify water surveillance during blasting, and patrol upstream of the blast area to safeguard drift divers

- monitor blast patterns to ensure compliance with the appropriate airblast and vibration criteria
- keep accurate records describing the location of each blast and blastholes, the design of the blast in terms of explosives and initiating system usage, and ground vibration and airblast measurement data.

Coastal home owners and visitors at Point Lowly may also be affected by other construction activities, such as increased road traffic and noise. This may result in some minor short-term disturbance and loss of amenity, with low impacts anticipated during the construction phase.

Landholders around the Port of Darwin

As detailed in Chapter 5, Description of the Proposed Expansion, East Arm would be used for the continued export of uranium oxide and the proposed export of concentrate.

The existing operations at East Arm are industrial and located well away from urban areas (see Figure 19.25). Chapter 13, Greenhouse Gas and Air Quality and Chapter 14, Noise and Vibration, assessed the potential impacts associated with air quality, and noise and vibration, on residents and other sensitive receivers during the construction and operation of proposed facilities at East Arm. It was concluded that the impacts would be negligible.

The remaining social issues are associated with community perceptions about the transport of increased volumes of uranium oxide, and the new product of concentrate, through towns and settlements along the rail corridor from Olympic Dam to East Arm. The product would be transported on a daily train, about 1.5 km long, which would clearly display signs advising that it contained radioactive material. The nature of the product, perception by the public of the risks associated with the transport, storage and handling of concentrate, and potential protest activity, could exacerbate these concerns.

The arrangements for the transport, storage and handling of the products are discussed elsewhere in the Draft EIS (see Chapter 5, Description of the Proposed Expansion; Chapter 6, Legislative Framework; Chapter 22, Health and Safety; and Chapter 25, Cumulative Effects, for a discussion of the nuclear fuel cycle) and are detailed in Appendix E4. Chapter 22, Health and Safety, and Chapter 26, Hazard and Risk, assess the hazards and risks to human health and conclude the impacts would be low.

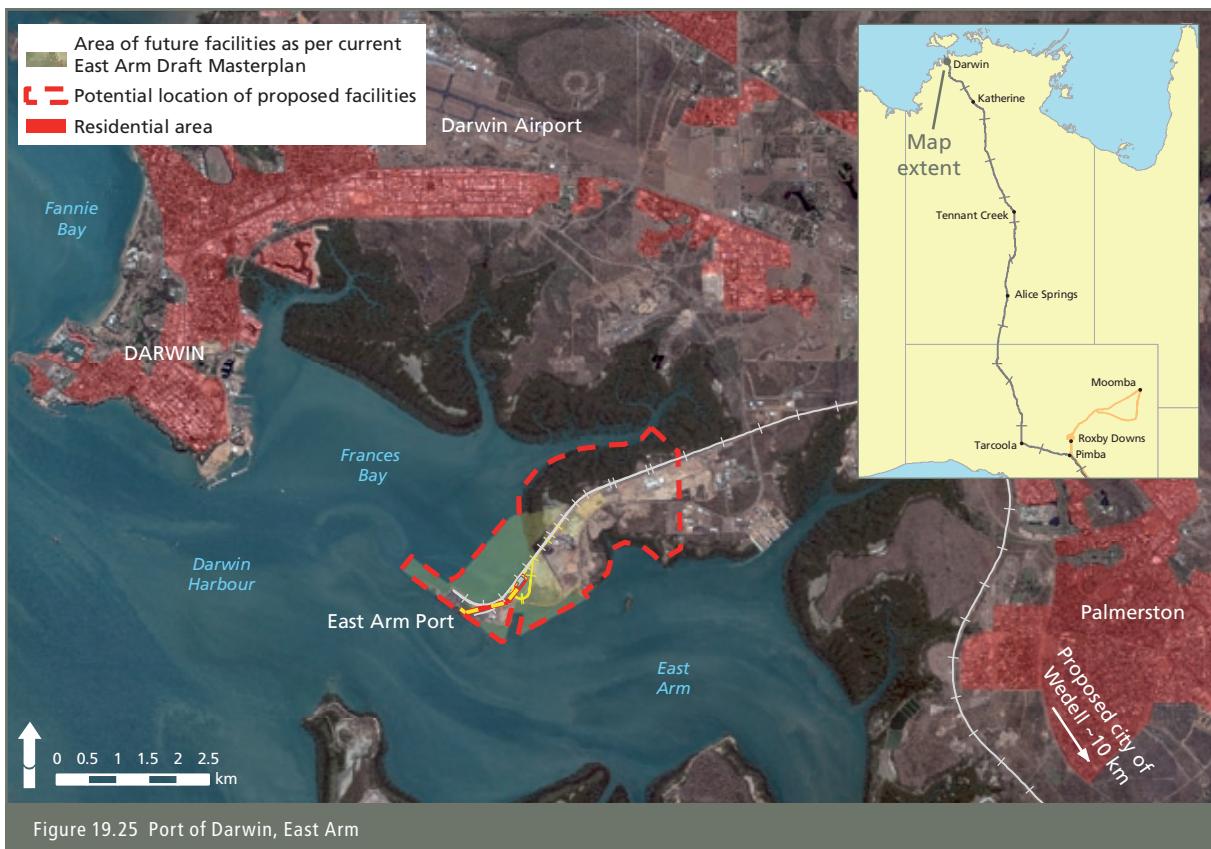


Figure 19.25 Port of Darwin, East Arm

Landholders around Outer Harbor

It is proposed that a new sulphur handling facility would be constructed at Outer Harbor for the importation, storage and handling of the increased quantities of sulphur required for the expansion.

Potential impacts associated with air quality, noise and vibration, and health and safety have been assessed elsewhere in the Draft EIS (see Chapter 14, Noise and Vibration; Chapter 13, Greenhouse Gas and Air Quality; and Chapter 22, Health and Safety, for details). The site of the proposed sulphur handling facility is located at Outer Harbor, with the nearest sensitive receiver being the suburb of North Haven, 1 km south of the proposed site (see Figure 19.22). The potential social impacts arising from the construction and operation of this facility is considered low, representing a short-term social impact to receivers.

Pastoralists

Thirty pastoral stations fall within the EIS Study Area, including four pastoral leases surrounding the Olympic Dam mine that are held by BHP Billiton and Finniss Springs. Fourteen of these are traversed by either the existing transmission line from Port Augusta to Olympic Dam or the gas supply pipeline from Moomba to Adelaide.

Chapter 9, Land Use, assessed the potential impacts on land use as a result of the proposed expansion and its associated infrastructure. It concluded that the impacts on land uses are

likely to be negligible and could be adequately managed through design considerations and by implementing the identified mitigation measures and safeguards.

The majority (99%) of affected pastoral land is held by BHP Billiton. Excluding the pastoral land held by BHP Billiton, approximately 3,000 ha would be affected by a short-term change of use and 160 ha would be permanently affected by the proposed expansion.

The gas pipeline corridor options from Olympic Dam to Moomba include three alternative routes. These options traverse a number of pastoral stations, three of which are held under pastoral lease by BHP Billiton. The number of pastoral stations affected by the three alternative gas pipeline options are (see Chapter 9, Land Use, Figure 9.3 for details):

- Option 1: 13 pastoral stations (including Finniss Springs) are within the EIS Study Area, one of which is traversed by the existing gas pipeline from Moomba to Adelaide. Of these, 11 would be affected by the gas pipeline alignment.
- Option 2: 12 pastoral stations (including Finniss Springs) are within the EIS Study Area, two of which are traversed by the existing gas pipeline. Nine pastoral properties would be affected by the gas pipeline alignment.
- Option 3: 14 pastoral stations (including Finniss Springs) are within the EIS Study Area, four of which are traversed by the existing gas pipeline. Twelve pastoral properties would be affected by the gas pipeline alignment.

There are 17 pastoral stations within the EIS Study Area from Point Lowly to Olympic Dam, 10 of which would be traversed by the proposed infrastructure and transport alignments (see Chapter 9, Land Use, Figure 9.4 for details). BHP Billiton holds the lease to three of these stations and the existing transmission line corridor traverses ten of these properties.

Consultation with pastoralists as part of the Draft EIS, and a review of the 1997 EIS (Kinhill 1997) identified the following social issues for pastoralists.

Potential benefits include:

- improving access to a wider range of commercial and community services and facilities in Roxby Downs
- increasing business and employment opportunities, including for young people
- providing a greater range of goods and services, potentially at lower cost, in the longer term.

Potentially negative impacts include:

- the division and loss of pastoral land, access issues, including access to stock watering points, and inconvenience in constructing and maintaining infrastructure (see Chapter 9, Land Use)
- livestock injury and loss from the movement of over-dimensional loads, increased road and rail traffic, and from falling into the excavated water supply pipeline trench (see Sections 15.5.11, Terrestrial Ecology, and 19.5.6 for traffic volumes)
- introduction of weeds to pastoral properties during the construction and maintenance of infrastructure (see Chapter 15, Terrestrial Ecology)
- vandalism, property damage and stock loss caused by unauthorised access to properties, off-road driving and irresponsible behaviour, particularly during the construction phase (see Section 19.5.2 and 19.5.5)
- unauthorised use of the private roads and infrastructure access tracks by members of the public, and associated property damage and stock losses during the operation phase (see Section 19.5.2 and 19.5.5)
- increased competition for labour (see Section 19.5.1)
- access to groundwater supplies (see Chapter 12, Groundwater).

A number of potential impacts on pastoralists are discussed elsewhere in the Draft EIS (see Chapter 9, Land Use, for changes to existing land uses; Chapter 12, Groundwater, for potential impacts on groundwater supplies affecting third-party users; Chapter 15, Terrestrial Ecology, for potential impacts from the introduction of weeds; and Chapter 18, Non-Aboriginal Cultural Heritage, for potential impacts on sites of non-Aboriginal heritage).

Management measures to reduce other social impacts would also negate effects for pastoralists, and include: burying

infrastructure wherever practicable; developing workforce codes of practice and behaviour; consultation in selecting sites for mobile work camps; and education programs and information to promote socially and environmentally responsible behaviour.

BHP Billiton would continue discussions with directly affected landholders in relation to infrastructure easements, including land access, fencing along access tracks, crossing points for pastoral activities and strategies for dealing with potential incidents during construction and operation phases.

Arid Recovery

Arid Recovery is a joint conservation initiative involving BHP Billiton, the South Australian Department for Environment and Heritage, the University of Adelaide and Friends of Arid Recovery. The 86 km² reserve is located partly within the Olympic Dam SML and four neighbouring pastoral stations (two of which are managed by BHP Billiton).

Consultation with management, staff and Friends of Arid Recovery has highlighted the following social issues:

- the proposed relocation of Borefield Road would affect travel time to Arid Recovery from Roxby Downs
- potential vandalism and damage to Arid Recovery
- the ability of staff and infrastructure to handle more visitors
- opportunities created by the expansion in terms of its public profile; tourism and expanded membership; and volunteer and support base.

Arid Recovery is accessed via Borefield Road (see Figure 19.13). The relocation of Borefield Road would increase the travelling time to Arid Recovery by an estimated 10–15 minutes, which is not considered significant in its remote location. The works would be undertaken in a manner to minimise disruption to traffic movement. No relocation of Arid Recovery fencing would be required as a result of the Borefield Road relocation or other proposed infrastructure.

Maintaining fencing and controlling access to the area would reduce the potential for vandalism and damage from unauthorised vehicles.

The increase in residents and visitors to the area as a result of the expansion would also be likely to increase the profile and support base of Arid Recovery.

Other landholders

The proposed new airport would enhance access to Adelaide and other locations around Australia for residents of Roxby Downs, Andamooka and surrounding areas as a result of its capacity to accommodate larger aircraft (such as Boeing 737–800 or Airbus 320), night flights and an all-weather runway. The location of the proposed airport would also enhance access to Andamooka and may result in a number of indirect effects, including increased visitors, and greater numbers of workers and families attracted to living in the town.

BHP Billiton would continue to communicate and liaise with other landholders who would be affected by the expansion and associated infrastructure to reduce any inconvenience or disruptions from construction or operational activities.

Residual impact

The residual impact associated with access and disturbance issues on landholders would be low, as a result of generally short-term and localised effects during the construction phase.

Energy

The potential for blackouts in other parts of South Australia, due to the increased energy demand from the expansion affecting the reliability of existing and future supplies, has been raised in community consultation.

Chapter 4, Project Alternatives, discusses the energy supply demand balance for South Australia over the 10 years to 2017–2018, the additional investments required to meet forecast demand, and the options for new generation capacity for the proposed expansion of Olympic Dam. This showed that whether or not the proposed expansion proceeds, South Australia is likely to require new generation capacity by about 2012 (see Chapter 4, Project Alternatives, Figure 4.4).

In order to meet some of the additional energy demands from the proposed expansion of Olympic Dam (of around 650 MW), an on-site cogeneration plant is proposed. This would recover the energy generated in waste steam from on-site processing operations. It would deliver between 100 and 250 MW as the expansion project progressed. Some minor reductions in electricity demand may also be achieved through the use of solar energy at Hiltaba Village and Roxby Downs and from renewable electricity sources for the coastal desalination plant. An additional generating capacity of around 400 MW would therefore be required to meet the energy requirements for the proposed expansion, taking the electricity supply from the cogeneration plant into account.

Two key supply options (or a combination of these options) are proposed to meet the additional energy requirements for the project and associated demands (e.g. in Roxby Downs and Hiltaba Village):

- the off-site generation of electricity from a third-party supplier and delivery via a new 275 kV transmission line from Davenport (Port Augusta)
- the construction of a 600 MW capacity on-site gas-fired power station, using gas delivered from the Moomba hub by a dedicated gas supply pipeline.

Expressions of interest sought by BHP Billiton indicate there is considerable market interest in building and operating a third-party power plant to supply the future electricity requirements for the expansion of Olympic Dam. Discussions will continue with the energy industry to secure the future supply needs for Olympic Dam. In the event that a mutually acceptable agreement could not be reached in time to construct

the required power plant, BHP Billiton would build the on-site gas-fired power plant to meet its electricity requirements.

Residual impact

With the implementation of the on-site cogeneration plant, the development of either (or both) of the above options, and ongoing discussions to notify the South Australian Government of the Olympic Dam requirement, the expansion project would not increase the potential for supply failure in other parts of South Australia. The residual impact is therefore categorised as negligible.

19.5.7 MONITORING OF SOCIAL PERFORMANCE OUTCOMES

A review of major mining projects undertaken both nationally and internationally, including the previous expansion of Olympic Dam in 1997, reveals very few well-documented studies of the social impacts of developments over time, beyond the economic and employment benefits.

The social effects of the proposed expansion have been assessed on the basis of historical data, experiences reported from the previous expansion at Olympic Dam and elsewhere, and other social research and benchmarking.

Although the broad social effects have largely been identified, the scarcity of information on social impacts from other mining projects, coupled with the scale and unique nature of this proposed expansion, makes accurately predicting the social impacts over time challenging. Nonetheless, the project is likely to have a significant effect on the dynamics of Roxby Downs and the surrounding region. BHP Billiton is committed to understanding and, where required, managing these impacts in collaboration with the South Australian Government. In planning the expansion, BHP Billiton has participated in the State Government's Olympic Dam committees and working groups and would continue to be involved in addressing emerging issues and enhancing the benefits of the project to the state.

The proposed expansion provides an opportunity to develop a plan to monitor and assess socially-related parameters beyond those economic, employment and policing statistics commonly recorded. The development, implementation and monitoring of a Social Management Plan would provide a mechanism for responding to changes in social conditions, measuring the effectiveness of programs or initiatives in reducing potential adverse effects, and identifying new opportunities to maximise potential social benefits. The Social Management Plan would be developed by BHP Billiton, in collaboration with government and other stakeholders, and would monitor the effects of the expansion on Roxby Downs and relevant communities in the northern region and identify areas for future action. The plan would also establish programs for consultation and communication with the community and other stakeholders on the proposed expansion and emerging issues, which is recognised by BHP Billiton as critical to the monitoring process and the long-term success of the expanded operations.

Further research, discussion with social planning experts, and liaison with relevant organisations is required to develop the framework for the Social Management Plan, which would occur through the project's Definition Phase. Indicators that may be used to assess socially-related parameters (see also Appendix Q10) include:

- population trends (including cultural mix)
- employment and recruitment
- business activity
- household wealth and well-being
- housing
- education and training
- recreation
- community cohesion and well-being
- community participation
- health
- discriminatory, anti-social or criminal behaviour
- infrastructure and services
- support services (including financial and personal)
- community perceptions and satisfaction.

The plan would include a set of indicators to monitor social impacts and provide a mechanism to identify and respond to emerging issues and concerns. The results of this monitoring would be publicly reported.

The development of a Social Management Plan, including a set of social indicators to monitor social impacts over time, and establishing a social management partnership between BHP Billiton, the State Government and the community, would provide a mechanism to identify and respond to changes in social conditions, to maximise social benefits and reduce adverse impacts.

19.6 FINDINGS AND CONCLUSIONS

The social impact assessment has identified a range of potential social effects from the proposed expansion, which would vary over time and place. It has also canvassed management measures to maximise potential benefits and minimise potential adverse impacts. The findings and conclusions from the social impact assessment, including residual impacts, follow.

Labour supply and business development

A short-term construction workforce averaging approximately 4,000 workers and peaking at 6,000, and an increase in the long-term operational workforce of approximately 4,000 workers, would be required for the proposed expansion. The assessment of labour requirements established the following:

- The proposed expansion of Olympic Dam would give rise to substantial new employment and business opportunities locally, regionally and state-wide, and for Aboriginal people, disadvantaged groups and other less traditional sources of labour.

- Recruiting and retaining the workforce would occur during a period of growth in demand for labour in the minerals resources sectors across Australia and a declining supply of labour, particularly in the trades, transport and production workers and labourers and related, and is likely to be challenging.
- A potential consequence of the proposed expansion may be increased competition for labour, drawing labour and resources away from other areas and ventures in the state.
- An increase in the proportion of the long distance commute (LDC) workforce would be likely in the initial growth period, to attract operational workers in a tight labour market, as it is preferred by some workers. However, the intention is that Olympic Dam would remain a predominantly residential site. By 2020, the proportion of LDC to residentially-based operational workers is expected to be around 50:50.
- Some overseas recruitment would also be required in occupations where there are skills shortages. This would be a relatively small component of the workforce strategy, involving between 200 and 500 construction contractors and up to 200 operational staff. Culturally appropriate services would be required to support the overseas workforce – these would be developed in cooperation with the South Australian and Australian governments.
- A continuing emphasis is needed on skills development and training to reduce potential labour impacts and maximise state-wide social benefits. To this end, BHP Billiton and the mining industry are collaborating, and will continue to do so, with the South Australian and Australian governments, regional development boards and education and training providers.
- The adverse impact from skills and labour shortages as a result of the expansion is expected to be high during the construction phase. It would, however, have a high long-term residual benefit by creating sustained employment.

The assessment of business opportunities established the following:

- While the direct and indirect business opportunities from the proposed expansion are significant, the scale and speciality of the goods and services required may extend beyond the capacity of many local companies.
- A high residual benefit is predicted in the short, medium and long term for South Australian and Australian businesses as a result of the proposed expansion, assuming that companies can increase their capacity to competitively supply goods and services.

Crime and anti-social behaviour

The assessment of crime and anti-social behaviour established the following:

- The potential for increased crime and anti-social behaviour as a result of the proposed expansion is of concern to residents in Roxby Downs and Andamooka.

- The design, location and management of Hiltaba Village is intended to encourage the construction workforce to remain at the village for social and recreational activities, in order to minimise the demand on facilities and services in Roxby Downs, reduce the potential for negative interactions evident during the previous expansion, and lessen residents' concerns.
- The relative isolation and character of Andamooka and limited police presence in the town, and in other remote locations, may increase the likelihood of anti-social behaviour in these locations.
- A number of measures are proposed to reduce crime and anti-social behaviour, including: workforce induction and education; codes of practice/behaviour; enforcement of BHP Billiton Group's drugs and alcohol policies and testing; and other community safety initiatives. The South Australian Government has indicated that additional police services would be provided to support the proposed expansion.
- Interaction between the linear infrastructure off-site construction workforce and local communities would be constrained by the rural and remote location of mobile construction work sites, limited availability of private transport, and long working hours. The off-site workforce would also be expected to comply with established codes of practice and behaviour.
- As a result of the proposed management measures, the residual impact from crime and anti-social behaviour is considered low.

Housing supply and affordability

The Roxby Downs Draft Master Plan provides for over 2,500 residential allotments and a 5% vacancy rate to meet predicted increases in the population up to an estimated 10,000 people, including the LDC operational workforce. Hiltaba Village has been designed to include approximately 7,000 single-bed rooms (and a capacity for 8,000 beds if required) to accommodate, on a rotating motel-style basis, a maximum on-site construction workforce of 6,000 and other short-term contractors associated with the existing Olympic Dam operations. The off-site construction workforce associated with transport, energy and water infrastructure projects would be housed in short-stay accommodation in local townships and mobile work camps. The assessment of housing supply and affordability established the following:

- The proposed accommodation for the permanent LDC workforce and transitional housing for operational workers and their families would reduce housing demand during the initial period of growth and contribute to maintaining stability in house prices.
- An indirect impact of the proposed expansion may be increased demand for housing in Andamooka, Woomera and the northern region. This may be compounded by other developments in the state's north. The high level of building activity in Roxby Downs may also draw building contractors and tradespersons away from other areas and ventures, with flow-on effects in housing costs, as evidenced in other states.

- As a result of the proposed increase in accommodation for the LDC workforce and transitional housing, the residual impact on housing supply and affordability is assessed as low. With an increase in the supply and choice of housing through the implementation of the Roxby Downs Draft Master Plan, and realisation of a 5% vacancy rate, the proposed expansion would have a long-term moderate residual benefit.

Social services and infrastructure

The assessment of social services and infrastructure established the following:

- Planning for social services and facilities in Roxby Downs should reflect:
 - the future residential and operational LDC population, estimated to be up to 10,000 people
 - the presence of a short-term construction workforce and other short-term contractors, on a temporary commute basis
 - the requirements of additional overseas workers
 - the needs of critical population groups who may be more susceptible to adverse impacts from the expansion
 - projected growth in the nearby townships of Andamooka and Woomera and other relevant communities in the northern region, as well as Roxby Downs.

The Roxby Downs Draft Master Plan has been developed with input from service providers, local residents and other stakeholders, and sets aside land for a range of new and expanded social services, and recreational spaces and facilities. BHP Billiton would actively participate in the development of a plan by the State Government to address social services and facilities requirements. The provision of an expanded range of education, health and other services would provide long-term benefits to existing and incoming residents of Roxby Downs and surrounding communities.

Social character and well-being

The assessment of social character and well-being established the following:

- The large construction workforce, increases in the residential and LDC populations, and additional overseas workers may affect community identity, particularly in the early phases of the project. In the medium term, the effect is expected to be positive, with the population increases bringing a critical mass to support different lifestyles, cultures, services and leisure opportunities.
- Construction and development activities in Roxby Downs would cause some inconvenience and disturbance, but would contribute to enhanced amenity on completion, by creating a more diverse built form and housing, upgrading landscaping, streetscapes and public space, improving infrastructure, and providing for an expanded range of services and facilities.

- The effects of dust on health and amenity are an issue for residents and organisations in Roxby Downs and surrounding areas. BHP Billiton would meet regulatory dust limits through operational controls to ensure amenity, conduct monitoring of dust levels, and provide information on dust and related issues. The community may nonetheless perceive some adverse impacts as a result of dust nuisance and visibility degradation.
- The residual impact on social character and well-being in Roxby Downs is assessed as moderate in terms of local effects on community cohesion, nuisance and disruption over an extended period. In the long term, it would have a moderate residual benefit in terms of improved amenity and opportunities.
- The proposed expansion would require additional energy generation capacity to meet on- and off-site electricity requirements and to avoid adverse impacts on the supply of electricity to other users in South Australia. Two key supply options are proposed to meet the additional energy requirements, involving the off-site generation of electricity by a third-party supplier, and/or the construction of an on-site gas-fired power station at Olympic Dam by BHP Billiton. Implementation of one or both of these options would occur and thus enable the energy requirements for Olympic Dam to be met. The residual impacts associated with the potential for supply failure and blackouts to other parts of South Australia are therefore considered negligible.

Access and disturbance

The assessment of access and disturbance established the following:

- The increased traffic volumes associated with the expansion, and particularly by the movement of over-dimensional loads on public roads and associated road closures, would cause changed traffic conditions and involve periodic delays and disruptions to road users during the construction phase. The residual impact associated with access and delay to the travelling public has been categorised as moderate during the construction phase, but is expected to be minimal in the long term (i.e. in the operation phase).
- The relocation of Borefield Road would occur prior to the closure of the existing road to avoid disruption. It would result in a small increase in travelling time of between 10 and 15 minutes to gain access to Arid Recovery and towns north of Olympic Dam (including Marree and William Creek). This is not considered significant given the large distances to visit sites of interest and towns in this relatively isolated region.
- Landholders, residents and visitors to properties around Port Augusta would experience some loss of amenity, disturbance and inconvenience associated with the construction and operation of the landing facility, access corridor and pre-assembly yard.
- Other impacts on pastoralists and landholders associated with access and disturbance are considered to be readily manageable. The construction of off-site infrastructure (including the desalination plant, water and gas pipelines, transmission line and rail spur) would result in a minor loss of amenity and disruption in localised areas during construction, but would not permanently obstruct access or movement or lead to ongoing disturbance in the operation phase. The residual impact in the long term is therefore categorised as low.