

PART C

Impact assessment key
construction infrastructure



CHAPTER C2

Assessment of temporary workforce accommodation



Narromine to Narrabri
Environmental Impact Statement



The Australian Government is delivering
Inland Rail through the Australian
Rail Track Corporation (ARTC), in
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C2. Assessment of temporary workforce accommodation

This chapter provides a summary of the potential impacts of temporary workforce accommodation on the local environment as a result of the Narromine to Narrabri project (the proposal). A full copy of the assessment results is provided in relevant technical reports.

C2.1 Overview of temporary workforce accommodation

As described in section A8.9.4, to accommodate the construction workforce, the proposal includes provision of temporary workforce accommodation near the main towns along the proposal site. Temporary workforce accommodation would be established at the following locations:

- ▶ Within the Narromine South multi-function compound, about 8 kilometres (km) south of Narromine. Access to the site would be provided by a new connection off Tomingley Road.
- ▶ Narromine North, located on Euromedah Road about 11 km north-east of Narromine. Access to the site would be provided by a new connection off Euromedah Road.
- ▶ Gilgandra, located on the north-western edge of Gilgandra on Federation Street, about 1.5 km from the town centre. Access to the site would be provided by a new connection off Federation Street.
- ▶ Baradine, located on the western edge of Baradine on Lachlan Street, about 1 km from the town centre. The site is within the Baradine Showground. Access to the site is available off Lachlan Street.
- ▶ Within the Narrabri West multi-function compound, located about 4 km south-west of the Narrabri town centre. Access to the site would be provided by a new connection off Yarrie Lake Road.

The proposed locations are shown in Figure A1.3 and in the maps in Part E.

In addition, there is an existing temporary workforce accommodation facility located at Narrabri. This facility, known as Narrabri Village, is operated by Civeo and is located at 96 Old Gunnedah Road, Narrabri, about 2 km to the south of the town centre. Part, or all, of the workforce may be able to be accommodated at this facility, which provides about 500 rooms. In the event that accommodation at Narrabri Village is not available, temporary workforce accommodation would be provided within the Narrabri West multi-function compound, as noted above.

C2.1.1 Establishment

Establishment of temporary workforce accommodation would involve the following activities:

- ▶ Consult landowners/occupants (where required) and ensure land access is available
- ▶ Install site environment management and traffic controls, including drainage and erosion management controls, in accordance with the CEMP (see chapter D5)
- ▶ Erect site fencing to ensure construction areas and areas to be impacted are clearly delineated
- ▶ Vegetation clearing and removal, where required, including slashing, mulching and stockpiling for reuse
- ▶ Topsoil stripping (where present) and stockpiling for reuse
- ▶ Construct pads for the temporary workforce accommodation
- ▶ Establish access points off public roads
- ▶ Install site infrastructure and landscaping
- ▶ Utility relocation or protection where required.

C2.1.2 Use

Each temporary workforce accommodation is expected to operate concurrently for the duration of construction (about 48 months) and accommodate up to 500 people. As noted above, two temporary workforce accommodation locations are proposed at Narromine (Narromine North and Narromine South). In the event that both sites are established, they would have a combined capacity of up to 500 people.

During use of temporary workforce accommodation, a range of general activities would be undertaken to support the functions of the facility, such as general grounds maintenance, deliveries and waste removal, and worker movements. Workers would be transported between the proposal site and the temporary workforce accommodation via shuttle buses to help minimise potential traffic impacts on the local roads. This would mainly occur at the start and end of the working day.

It is proposed to supply potable water to the Narromine North and Baradine temporary workforce accommodation facilities by extracting groundwater from groundwater bores and treating the water (as required) onsite. For these facilities, it is proposed that wastewater generated by site amenities would be treated onsite using package treatment plants. The package plants would generate treated wastewater, which could be reused at the accommodation facilities (for irrigation) or at other locations.

For the Narromine South, Gilgandra and Narrabri West temporary workforce accommodation facilities, it is proposed to provide potable water by connecting the facilities to the towns' existing water supply network. For these facilities, it is proposed that wastewater would be disposed of by connecting the facilities to the towns' existing wastewater collection and treatment systems.

The preferred option/s for the provision of potable water and disposal of wastewater at the temporary workforce accommodation facilities would be confirmed by the construction contractor during detailed construction planning, in consultation with the relevant councils.

At the end of construction, all disturbed areas not required for the proposal's operational infrastructure would be rehabilitated. Finishing and rehabilitation would be undertaken progressively. Site rehabilitation would be carried out in accordance with the temporary workforce accommodation plan (see section C2.4) and rehabilitation strategy (see section A8.7).

C2.2 Existing environment

The existing environment at the Narromine North, Gilgandra and Baradine sites is summarised in Table C2.1. The existing environment at the Narromine South and Narrabri West sites has been described in section C1.1 (multi-function compounds) and has not been repeated here. Further information on the existing environment is provided in the relevant chapters in Part B.

TABLE C2.1 EXISTING ENVIRONMENT FOR THE TEMPORARY WORKFORCE ACCOMMODATION

Aspect		Narromine North	Gilgandra	Baradine
Site description	Location	The site is about 10 km north-east of Narromine within agricultural land. The site is bounded by Euromedah Road to the east and farmland on all other sides.	The site is located within agricultural land on the north-western edge of Gilgandra, about 1.5 km from the town centre. The site is generally bounded by Federation Street to the east, Gilgandra Airport to the west, Jack Towney Hostel aged care accommodation to the south and rural residential properties to the north.	The site is located within the Baradine Showground on the western edge of Baradine, about 1 km from the town centre. The site is generally bounded by farmland and open space.
	LGA	Narromine	Gilgandra	Baradine
Biodiversity	Threatened species and communities	No threatened species, suitable habitat for threatened species, or threatened ecological communities have been recorded at these sites.		No threatened species have been recorded at the site. The native vegetation in and around the site may provide potential habitat for threatened fauna species. The remnant native vegetation (PCT 435) in the northern part of the site is part of the BC Act listed threatened ecological community (TEC) White box-Yellow box-Blakely's red gum woodland.
	Native vegetation	The sites are entirely cleared for agricultural purposes and do not contain any native vegetation.		While the groundcover layer at this site is already heavily modified and removed, part of the site contains an overstorey of native trees. This native vegetation comprises about 6.1 ha of PCT 435—White box – White cypress pine shrub grass hills woodland in the Brigalow Belt South bioregion and Nandewar bioregion.
	Aquatic ecology	The sites do not contain any threatened aquatic ecological communities. There are a number of threatened species, endangered populations and aquatic matters of national environmental significance listed under the <i>Fisheries Management Act 1994</i> (NSW) (FM Act) and/or <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth) (EPBC Act) that may occur within watercourses in the study area, including the Macquarie River, Namoi River and Narrabri Creek.		

Aspect		Narromine North	Gilgandra	Baradine
Biodiversity [continued]	Groundwater dependent ecosystems	There are no aquatic or terrestrial groundwater dependent ecosystems within or near any of the sites.		
	Protected and sensitive lands	There are no protected and sensitive lands within or near any of the sites.		
Water resources (hydrology and groundwater)	Watercourses and groundwater	<p>The site is located within the catchment of the Macquarie River.</p> <p>The nearest defined watercourse is Kookaburra Creek about 400 metres (m) to the east.</p> <p>No site-specific groundwater data is available.</p>	<p>The site is located within the catchment of the Castlereagh River.</p> <p>The nearest defined watercourse is the Castlereagh River about 1 km to the north-east.</p> <p>No site-specific groundwater data is available.</p>	<p>The site is located within the catchment of the Narrabri Creek/Namoi River.</p> <p>The nearest defined watercourse is Baradine Creek about 1 km to the north-east.</p> <p>No site-specific groundwater data is available.</p>
Flooding	Flooding	The site is not known to be subject to flooding.	The site is not known to be subject to flooding in events up to the 1% AEP flood event.	The site is not known to be subject to flooding in events up to the 1% AEP flood event.
Soils and contamination	Soils	The site is located in the Cobboco hydrogeological landscape dominated by loams and medium clays. This landscape has a moderate likelihood of occurrence of salinity and sodicity. There is generally a low likelihood of encountering acid sulfate soils; however, these soils could be present close to the Macquarie River.	The site is located in the Pine Clump hydrogeological landscape dominated by kandosols, chromosols and vertosols. This landscape has a low likelihood of occurrence of salinity and moderate likelihood of occurrence of sodicity. There is generally a low likelihood of encountering acid sulfate soils; however, these soils could be present close to the Castlereagh River.	No hydrogeological landscape mapping is available for this site. Regional soil mapping indicates the area is dominated by solodic soils. It is unlikely that acid sulfate soils would be present.
	Contamination	There are no registered contaminated sites near the temporary workforce accommodation sites. There is the potential for soils to have been contaminated by existing and historical activities such as agriculture, illegal dumping and rail and road infrastructure. Contaminants could include heavy metals, hydrocarbons, herbicides, pesticides, micro-biological organisms and asbestos.		
Water quality	Water quality	The Macquarie River catchment generally has poor water quality, with elevated levels of electrical conductivity and nutrients, and low levels of dissolved oxygen, particularly during low flows.	The Castlereagh River catchment generally has poor water quality, with elevated levels of electrical conductivity and nutrients, and low levels of dissolved oxygen, particularly during low flows.	The Namoi River catchment generally has poor water quality, with elevated levels of electrical conductivity and nutrients, particularly during low flows.

Aspect		Narromine North	Gilgandra	Baradine
Aboriginal heritage	AHIMS sites	No AHIMS sites are located within or near the sites.		
	Aboriginal heritage potential	The sites are located within areas that are mostly cleared and have been previously disturbed. No areas of cultural sensitivity have been identified within the sites; however, there is the potential to encounter unknown Aboriginal items.		
Non-Aboriginal heritage	Listed heritage items	There are no listed non-Aboriginal heritage items within or near the sites.		
	Identified potential heritage items	None known		
Noise and vibration	Existing noise environment	The site is located within an agricultural landscape with low background noise levels. The main sources of noise would be roads and agricultural activities.	The site is located on the outskirts of Gilgandra with relatively low background noise levels. The main sources of noise would be roads, rail, urban activities, aviation and agricultural activities.	The site is located on the outskirts of Baradine with relatively low background noise levels. The main sources of noise would be roads, urban activities and agricultural activities.
	Sensitive receivers	The site is located within NCA 3. There are limited sensitive receivers around the site. The nearest sensitive receiver is about 1.2 km away.	The site is located within NCA 7. There are a number of sensitive receivers around the site, including Jack Towney Hostel and Aussie Kindies Early Learning Centre. The nearest sensitive receiver is about 115 m away.	The site is located within NCA 5. There are a number of sensitive receivers around the site. The nearest sensitive receiver is about 115 m away.
Air quality	Existing air quality	Regional air quality is generally good and mainly influenced by agricultural activities and road vehicle emissions.		
Traffic and transport	Nearest road	Euromedah Road	Federation Street	Lachlan Street
	Other features	Nil	Gilgandra Airport is located to the west. The Dubbo to Coonamble Line is located to the east.	Local residential streets
Land use and property	Land zoning	The site is zoned Primary Production (RU1) under the <i>Narromine Local Environmental Plan 2011</i> .	The site is zoned General Residential (R1) under the <i>Gilgandra Local Environmental Plan 2011</i> .	The site is zoned Primary Production (RU1) under the <i>Warrumbungle Local Environmental Plan 2013</i> .
	Existing land use	The sites are used for agricultural activities and are comprised of existing cleared and disturbed land dominated by cropping.		The site is located within the Baradine Showground. The showground hosts annual events such as the Baradine Show, leases land to the local school for cattle grazing and contains a not-for-profit tourist accommodation facility (Camp Cypress).

Aspect		Narromine North	Gilgandra	Baradine
Land use and property [continued]	Surrounding features	The site is located in an agricultural landscape with surrounding land use dominated by farmland.	The site is located within agricultural land on the outskirts of Gilgandra. Surrounding land uses include a mix of residential and rural uses. Gilgandra Airport is located to the west and the Dubbo-to-Coonamble Line is located to the east.	The site is located on the outskirts of Baradine. Surrounding land uses include the showground and farmland.
	Strategic agricultural land	The site does not contain any critical industry clusters or biophysical strategic agricultural land. Land immediately to the east is mapped as biophysical strategic agricultural land.	The sites do not contain any critical industry clusters or biophysical strategic agricultural land.	
	Land and soil capability	The site has a land and soil capability class 3 (high-capability land). This class is capable of sustaining land uses such as cropping, high-intensity grazing and horticulture.	About half of the site has a land and soil capability class 3 (high-capability land) with the other half is class 4. Class 3 is capable of sustaining land uses such as cropping, high-intensity grazing and horticulture. Class 4 has moderate-to-high limitations for land uses such as cropping, high-intensity grazing and horticulture.	The site has a land and soil capability class 4 (moderate-capability land). This class has moderate-to-high limitations for land uses such as cropping, high-intensity grazing and horticulture.
	Travelling stock reserves	None located within or near the sites.		None located within the site. One is located to the east of the site.
Visual amenity	Landscape character and views	The site is located in agricultural land within landscape character zone 1—slopes and plains. Landscape character and views are defined by farmland, forming a vast expanse of open, flat agricultural mosaic that is punctuated by scattered and linear trees.	The sites are located within landscape character zone 1—slopes and plains. Landscape character and views are defined by open farmland against a residential/rural residential backdrop.	

C2.3 Impact assessment

C2.3.1 Environmental impact screening

An assessment has been carried out to compare the potential environmental impacts of temporary workforce accommodation relative to the potential environmental impacts of the proposal's key infrastructure (described in Part B).

Table C2.2 provides a summary of the environmental screening of the potential impacts of temporary workforce accommodation. The assessment identified the potential for impacts on biodiversity, noise and vibration (construction), air quality, traffic and transport, visual amenity, socio-economic and waste management. These potential impacts are considered further in sections C2.3.2 to C2.3.12.

The potential impacts on the other environmental aspects are minor and/or consistent with those described in Part B and, therefore, have not been considered further in this chapter.

TABLE C2.2 ENVIRONMENTAL IMPACT SCREENING—TEMPORARY WORKFORCE ACCOMMODATION

Environmental aspects	Comments	Considered in Part C?	Where?
Biodiversity	The establishment and use of the temporary workforce accommodation at Baradine and Narrabri West would require clearing of native vegetation, affecting threatened ecological communities and habitat for threatened species.	Yes	Section C2.3.2
Water resources (hydrology and groundwater)	The sites are not located immediately near any defined watercourses and are unlikely to result in any significant change to local hydrological conditions. The potential hydrological impacts are expected to be consistent with those identified for the proposal's key infrastructure, as described in chapter B2. Additionally, as only minor subsurface works would be required, the establishment and use of temporary workforce accommodation is not expected to intercept the water table. As such, impacts on surface water and groundwater hydrology are not considered further in this chapter. The extraction of groundwater from groundwater bores for potable water has the potential to affect groundwater levels and availability. This potential impact has been considered further.	Yes	Section C2.3.3
Flooding	The Narromine North, Gilgandra and Baradine temporary workforce accommodation sites are not known to be subject to flooding. The western end of the Narromine South temporary workforce accommodation site is partially inundated in the 50% AEP event. The Narrabri West temporary workforce accommodation site is inundated in the 5% AEP flood event.	Yes	Section C2.3.4
Soils and contamination	As only minor subsurface works would be required during establishment of the temporary workforce accommodation, the potential to encounter saline or sodic soils, acid sulfate soils or existing contamination would be low. If encountered, the impacts would be consistent with those identified for the proposal's key infrastructure, as described in chapter B4. As such, these impacts are not considered further in this chapter. The treatment and potential reuse of wastewater from the Narromine North and Baradine temporary workforce accommodation facilities, as irrigation, has the potential to affect soils. This potential impact has been considered further.	Yes	Section C2.3.5

Environmental aspects	Comments	Considered in Part C?	Where?
Water quality	<p>The establishment and use of temporary workforce accommodation would have the potential to affect water quality, mainly as a result of litter, sediments or nutrients being exported offsite leading to downstream pollution of a watercourse. In addition, any spills of oils or grease could enter soil, groundwater or surface water. These potential impacts would be consistent with those identified for the proposal's key infrastructure, as described in chapter B5. As such they are not considered further in this chapter.</p> <p>The treatment and potential reuse of wastewater from the Narromine North and Baradine temporary workforce accommodation facilities, as irrigation, has the potential to affect surface water and groundwater quality. These potential impacts have been considered further.</p>	Yes	Section C2.3.6
Aboriginal heritage	<p>No AHIMS sites or culturally sensitive areas have been identified within the sites; however, there is potential to encounter unknown Aboriginal heritage items.</p> <p>If unknown Aboriginal heritage items are encountered, the impacts and mitigation measures would be consistent with those described in chapter B6. As such, they are not considered further in this chapter.</p>	No	Mitigation measures to be implemented are provided in chapter B6
Non-Aboriginal heritage	<p>There are no known non-Aboriginal heritage constraints associated with any of the sites.</p> <p>If unknown items are encountered, the impacts and mitigation measures would be consistent with those described in chapter B7. As such, they are not considered further in this chapter.</p>	No	Mitigation measures to be implemented are provided in chapter B7
Noise and vibration (construction)	<p>There are a number of sensitive receivers located in close proximity to the Narromine South, Gilgandra, Baradine and Narrabri West temporary workforce accommodation sites. There are limited sensitive receivers near the Narromine North temporary workforce accommodation site. Sensitive receivers located near the sites would have the potential to be impacted by construction noise.</p> <p>The potential vibration impacts during the establishment and use of temporary workforce accommodation would be consistent with the impacts described in chapter B8. As such they are not considered further in this chapter.</p>	Yes	Section C2.3.7
Air quality	<p>The establishment and use of temporary workforce accommodation would have the potential to impact on air quality for surrounding sensitive receivers.</p>	Yes	Section C2.3.8
Traffic and transport	<p>Access to and from the temporary workforce accommodation sites would be via the public road network. During establishment and use of temporary workforce accommodation, there would be increased heavy vehicle movements on the local road network.</p>	Yes	Section C2.3.9
Land use and property	<p>The temporary workforce accommodation facilities are temporary in nature and the sites would be rehabilitated and returned to the existing land use following construction.</p> <p>The potential land use and property impacts would be consistent with the impacts described in chapter B12. As such, they are not considered further in this chapter.</p>	No	Mitigation measures to be implemented are provided in chapter B12
Visual amenity	<p>The establishment and use of temporary workforce accommodation would have the potential for temporary impacts on visual amenity.</p>	Yes	Section C2.3.10

Environmental aspects	Comments	Considered in Part C?	Where?
Socio-economic	The temporary workforce accommodation would have the potential for temporary socio-economic impacts, including amenity impacts.	Yes	Section C2.3.11
Cumulative impacts	The potential cumulative impacts of the proposal as a whole are described in chapter D1. As such, they are not considered further in this chapter.	No	Mitigation measures to be implemented are provided in chapter D1
Waste management	The temporary workforce accommodation would generate a range of waste streams requiring management.	Yes	Section C2.3.12
Sustainability	The establishment and use of the temporary workforce accommodation would include consideration of sustainability measures. The sustainability assessment for the proposal as a whole is provided in chapter D3. As such, it is not considered further in this chapter.	No	Mitigation measures to be implemented are provided in chapter D3
Climate change	As the temporary workforce accommodation would be temporary facilities, potential climate change impacts would be minimal and consistent with the impacts described in chapter D4. As such, they are not considered further in this chapter.	No	Mitigation measures to be implemented are provided in chapter D4

C2.3.2 Biodiversity

The assessment approach, existing environment, potential impacts and mitigation measures for the proposal are described in chapter B1 and Technical Report 1—Biodiversity development assessment report. The findings of this assessment for the establishment and use of temporary workforce accommodation are summarised in this section.

Establishment

There is no native vegetation or potential habitat for threatened species at the Narromine North and Gilgandra sites. While the larger area of the Narromine South multi-function compound, within which the Narromine South temporary workforce accommodation is proposed to be located, contains native vegetation, the temporary workforce accommodation site has been cleared for agricultural purposes and does not contain any native vegetation. Therefore, for these three temporary workforce accommodation sites, there would be no biodiversity impacts and they are not considered further in this section.

Clearing of native vegetation would be required at the Baradine and Narrabri West sites. The Narrabri West temporary workforce accommodation is proposed to be located within the Narrabri West multi-function compound and the potential biodiversity impacts are considered in section C1.2.2.

While the Baradine site is heavily disturbed, it contains an overstorey of native trees. This native vegetation comprises about 6.1 hectares (ha) of PCT 435—White box—White cypress pine shrub grass hills woodland in the Brigalow Belt South bioregion and Nandewar bioregion. This vegetation, while disturbed, is part of the BC Act listed TEC White box-Yellow box-Blakely's red gum woodland. The biodiversity assessment (see Technical Report 1 and chapter B1) included an assessment of impacts for this TEC.

Detailed design and construction planning would seek to minimise the construction footprint and avoid impacts on native vegetation and hollow-bearing trees as far as practicable (see mitigation measures BD1 and BD2). The biodiversity management plan (see mitigation measure BD7), which would be prepared and implemented as part of the CEMP, would detail measures to minimise the potential for biodiversity impacts during construction. The requirements for the biodiversity management plan are provided in the CEMP outline in Appendix I.

The overall loss of native vegetation, and potential impacts on threatened species and communities, have been taken into account in the impact assessment and calculation of biodiversity offsets described in chapter B1. Biodiversity offsets for the proposal (see mitigation measure BD4) would address the impacts of the temporary workforce accommodation.

Use

There would be no direct impacts on biodiversity during use of temporary workforce accommodation facilities, as all clearing would be at the establishment stage. Other impacts associated with construction activities, such as vehicle strike and construction lighting, would potentially occur and are consistent with those described in chapter B1.

At the end of construction, all disturbed areas not required for the proposal's operational infrastructure would be rehabilitated. Finishing and rehabilitation would be undertaken progressively. Site rehabilitation would be carried out in accordance with the rehabilitation strategy (see section A8.7 and mitigation measure BD11).

Mitigation measures

The mitigation measures to address potential biodiversity impacts are provided in chapter B1. No specific mitigation measures are provided for the establishment and use of temporary workforce accommodation.

C2.3.3 Water resources

The assessment approach, existing environment, potential impacts and mitigation measures for the proposal are described in chapter B2, Technical Report 4—Groundwater assessment and Technical Report 5—Surface water quality assessment. The findings of these assessments for the establishment and use of temporary workforce accommodation are summarised in this section.

Establishment

Where potable water is proposed to be supplied by extracting groundwater from deep groundwater bores (at the Narromine North and Baradine facilities), the construction of these bores could result in connectivity between aquifers. This has the potential to cause contamination and pressure loss across aquifers if the bores are not adequately constructed.

Use

Aquifer interference

The direct extraction via pumping of groundwater could lower the groundwater table or result in drawdown within the surrounding aquifer. This could reduce water availability within the aquifer, decreasing the amount of groundwater available for groundwater users, groundwater dependent ecosystems and surface water baseflows.

Further assessment would be undertaken during detailed design to confirm the potential for drawdown impacts associated with using groundwater bores to provide potable water for the Narromine North and Baradine facilities.

Further assessment would also be required to determine the suitability of extracted groundwater for its intended use as potable water. Treatment systems may need to be designed, and a monitoring program established, to ensure the groundwater is suitable for use as potable water.

Water availability

To meet potable water demand for the construction workers at the Narromine North and Baradine facilities, about 14.7 mega litres (ML) per year would need to be extracted for the Narromine North facility, and about 29.4 ML per year for the Baradine facility. Groundwater at these locations would be extracted from the Southern Recharge Groundwater Source (part of the *NSW Great Artesian Basin Groundwater Sources 2008 Water Sharing Plan*).

The Southern Recharge Groundwater Source is currently 93 per cent allocated. As such, a controlled allocation in the Southern Recharge Groundwater Source is considered unlikely, based on entitlement limits and existing allocation volumes; therefore, the entitlement to cover groundwater extraction for the Narromine North and Baradine facilities would need to be purchased from the market. The exact volumes required would be confirmed during detailed design and construction planning.

Mitigation measures

Specific mitigation measures for the establishment and use of temporary workforce accommodation are provided in section C2.4. In addition, the mitigation measures provided in chapter B2 would be implemented to minimise potential impacts on water resources.

C2.3.4 Flooding

The assessment approach, existing environment, potential impacts and mitigation measures for the proposal are described in chapter B3 and Technical Report 3—Flooding and hydrology assessment. The findings of this assessment for the establishment and use of temporary workforce accommodation are summarised in this section.

Establishment

Potential flooding impacts during establishment of temporary workforce accommodation would be similar to those described below for use.

Use

The Narramine North, Gilgandra and Baradine temporary workforce accommodation sites are not known to be subject to flooding.

The western end of the Narramine South temporary workforce accommodation site is partially inundated in the 50% AEP event, with depths up to about 0.25 m under existing conditions. In the 1% AEP flood event, the extent of flooding increases slightly but maximum depths do not change.

The Narrabri West temporary workforce accommodation site is inundated in the 5% AEP flood event, with depths typically up to about 0.5 m and up to 1 m in isolated areas under existing conditions. In the 1% AEP flood event, the extent of flooding does not change but maximum depths of up to 1 m occur across more of the site.

For those sites likely to be subject to flooding, appropriate protection measures, such as elevating buildings on stilts and storing hazardous materials above flood levels, would be required.

The potential impacts of construction infrastructure (including the temporary workforce accommodation) within floodplains are described in chapter B3.

Mitigation measures

Specific mitigation measures for the establishment and use of temporary workforce accommodation are provided in section C2.4. In addition, the mitigation measures provided in chapter B3 would be implemented to minimise flooding impacts.

C2.3.5 Soils and contamination

The assessment approach, existing environment, potential impacts and mitigation measures for the proposal are described in chapter B4. The findings of these assessments for the establishment and use of temporary workforce accommodation are summarised in this section.

Establishment

Wastewater treatment plants at the Narramine North and Baradine facilities would not operate during establishment. As a result, there would be no additional impacts on soil during the establishment of these facilities beyond those described in chapter B5.

Use

An estimated 0.5 ML of wastewater per day would be generated by the temporary workforce accommodation. For the Narramine North and Baradine facilities, it is proposed that wastewater would be treated onsite using a package wastewater treatment facility. It is expected that the treatment facility would have membrane biological reactor technology, which produces high-quality reclaimed water suitable for various beneficial reuses, including recycling and irrigation.

Recycling opportunities include the reuse of reclaimed water for onsite irrigation or offsite reuse or dust suppression. Irrigation areas would be designed and operated in accordance with relevant guidelines (see sections C2.3.3 and C2.4).

The key risks to soils associated with the irrigation of reclaimed water include adverse physical or chemical changes, which may lead to an ongoing reduction in fertility and potential to grow turf or pasture. The principal cause of these risks is excess irrigation, causing waterlogging, leaching of nutrients, rising water tables and increases in soil salinity or other soil properties. It is expected that these risks could be adequately managed by the appropriate planning, design and operation of the irrigation area, including active control of water application rates.

Mitigation measures

Specific mitigation measures for the establishment and use of temporary workforce accommodation are provided in section C2.4. In addition, the mitigation measures provided in chapter B4 would be implemented to minimise potential impacts associated with soils and contamination.

C2.3.6 Water quality

The assessment approach, existing environment, potential impacts and mitigation measures for the proposal are described in chapter B2, Technical Report 4—Groundwater assessment and Technical Report 5—Surface water quality assessment. The findings of these assessments for the establishment and use of temporary workforce accommodation are summarised in this section.

Establishment

Wastewater treatment plants at the Narromine North and Baradine facilities would not operate during establishment. As a result, there would be no additional water quality impacts during the establishment of these facilities, beyond those described in chapter B5.

Use

The key risks to surface water and groundwater, associated with irrigation of reclaimed water, are runoff to surface water or infiltration to groundwater. Runoff could include increased levels of nutrients, harmful chemicals and disease-causing bacteria from human waste, which could affect human health through direct contact. Runoff of contaminated reclaimed water could also increase the toxicity and reduce dissolved oxygen levels in downstream watercourses, impacting on aquatic organisms and ecosystems. Infiltration of contaminated reclaimed water into groundwater could also exacerbate groundwater salinity and contaminant levels, which could have implications for the environment, including groundwater dependent ecosystems (where present) and existing and proposed bores and their users.

These risks would be limited, as the package treatment plants would produce reclaimed water of relatively high quality (see section C2.3.5). In addition, appropriate management practices would be adopted, such as balancing storages and proper irrigation scheduling, to avoid excessive irrigation.

Any irrigation areas would be designed and operated in accordance with the risk framework and management principles contained in the *National Guidelines for Water Recycling: Managing Health and Environmental Risks* (Environment Protection and Heritage Council, et al., 2006) and the *Environmental guidelines: Use of Effluent by Irrigation* (DEC, 2004) (see section C2.4). This approach would avoid harm to surface water and groundwater quality.

Mitigation measures

The measures to manage impacts on water quality from the potential irrigation of reclaimed water would be the same as those proposed to manage impacts on soils (see section C2.4). In addition, the mitigation measures provided in chapter B5 would be implemented to minimise potential water quality impacts.

C2.3.7 Noise and vibration (construction)

The assessment approach, background noise levels, management levels/criteria, potential construction impacts and mitigation measures for the proposal are described in chapter B8 and Technical Report 8—Noise and vibration assessment—construction and other operations. The findings of this assessment for the establishment and use of temporary workforce accommodation are summarised in this section.

The establishment and use of temporary workforce accommodation would require the use of plant and equipment, which could generate high noise and vibration levels at nearby sensitive receivers. The potential impacts would vary depending on the intensity and location of the activities, the type of equipment used, existing background noise, intervening terrain, and prevailing weather conditions.

The predicted highest exceedance and number of exceedances of the construction noise management levels (see section B8.2.1) at sensitive residential receivers for the establishment and use of temporary workforce accommodation are provided in Table C2.3. There are no predicted exceedances at any non-residential sensitive receivers.

All sensitive receiver locations are shown in the maps in Part E.

TABLE C2.3 SUMMARY OF NOISE EXCEEDANCES—TEMPORARY WORKFORCE ACCOMMODATION

Criteria	Construction noise management level (dB(A))	Temporary workforce accommodation	Establishment	Use
Residential receivers				
Highest exceedance (dB(A))				
Highly affected	75	Narromine South	0	0
		Narromine North	0	0
		Gilgandra	9	0
		Baradine	0	0
		Narrabri West	0	0
Primary proposal construction hours and out-of-hours work (all periods)	35	Narromine South	16	6
		Narromine North	18	8
		Gilgandra	49	39
		Baradine	31	21
		Narrabri West	21	11
Number of exceedances				
Highly affected	75	Narromine South	0	0
		Narromine North	0	0
		Gilgandra	4	0
		Baradine	0	0
		Narrabri West	0	0
Primary proposal construction hours and out-of-hours work (all periods)	35	Narromine South	7	3
		Narromine North	3	1
		Gilgandra	505	141
		Baradine	289	81
		Narrabri West	129	16
Non-residential receivers (when in use)				
Number of exceedances				
Childcare	52	All	0	0
Worship	52	All	0	0
Hospital/health	52	All	0	0
Educational	52	All	0	0
Community	52	All	0	0
Recreation, passive	60	Narromine South	0	0
		Narromine North	0	0
		Gilgandra	0	0
		Baradine	15	11
		Narrabri West	0	0
Recreation, active	65	Narromine South		
		Narromine North	0	0
		Gilgandra	0	0
		Baradine	1	0
		Narrabri West	0	0
Commercial/industrial	70	All	0	0

Establishment

As shown in Table C2.3, during establishment of temporary workforce accommodation, exceedances of the construction noise management level are predicted at a number of sensitive receivers, as follows:

- ▶ Narromine South—at up to seven residential receivers and no non-residential receivers. The highest level of exceedance predicted is up to 16 dB(A).
- ▶ Narromine North—at up to three residential receivers and no non-residential receivers. The highest level of exceedance predicted is up to 18 dB(A).
- ▶ Gilgandra—at up to 505 residential receivers and no non-residential receivers. The highest level of exceedance predicted is up to 49 dB(A). Exceedances of the highly affected noise level of 75 dB(A) are predicted at four residential receivers.
- ▶ Baradine—at up to 289 residential receivers and up to 16 non-residential receivers (all of which are associated with Camp Cypress and the Baradine Showground). The highest level of exceedance predicted is up to 31 dB(A).
- ▶ Narrabri West—at up to 129 residential receivers and no non-residential receivers. The highest level of exceedance predicted is up to 21 dB(A).

The potentially affected receivers are shown in Figure C2.1 to Figure C2.5. These potential impacts would be managed in accordance with a construction noise and vibration management plan (see mitigation measure CNV3) which would be prepared as part of the CEMP. The requirements for the noise and vibration management plan are provided in the CEMP outline in Appendix I.

Use

As shown in Table C2.3, during use of temporary workforce accommodation, exceedances of the construction noise management level are predicted at a number of sensitive receivers as follows:

- ▶ Narromine South—at up to three residential receivers and no non-residential receivers. The highest level of exceedance predicted is up to 6 dB(A).
- ▶ Narromine North—at up to one residential receiver and no non-residential receivers. The highest level of exceedance predicted is up to 8 dB(A).
- ▶ Gilgandra—at up to 141 residential receivers and no non-residential receivers. The highest level of exceedance predicted is up to 39 dB(A).
- ▶ Baradine—at up to 81 residential receivers and up to 11 non-residential receivers (all of which are associated with Camp Cypress and the Baradine Showground). The highest level of exceedance predicted is up to 21 dB(A).
- ▶ Narrabri West—at up to 16 residential receivers and no non-residential receivers. The highest level of exceedance predicted is up to 11 dB(A).

No exceedances of the highly affected noise level of 75 dB(A) are predicted.

The potentially affected receivers are shown in Figure C2.1 to Figure C2.5. These potential impacts would be managed in accordance with a construction noise and vibration management plan (see mitigation measure CNV3). The plan, which would be prepared as part of the CEMP, would also include specific measures to manage the potential for noise generation at temporary workforce accommodation facilities.

Mitigation measures

Where exceedances at sensitive receivers are predicted, the mitigation measures provided in chapter B8 would be implemented to minimise potential construction noise impacts. No specific mitigation measures are provided for the establishment and use of temporary workforce accommodation.

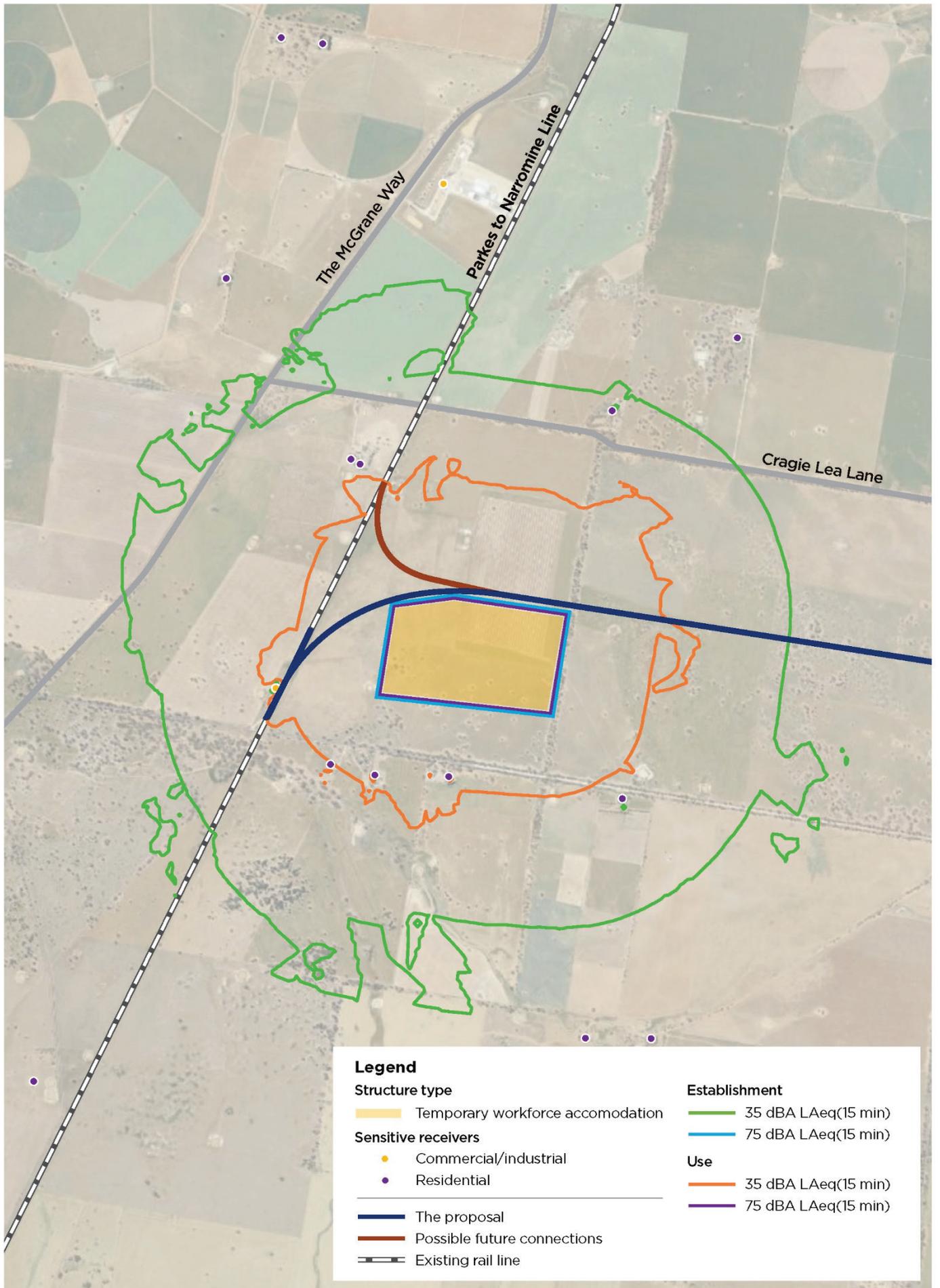


Figure C2.1 Noise impacted receivers – Narromine South temporary workforce accommodation

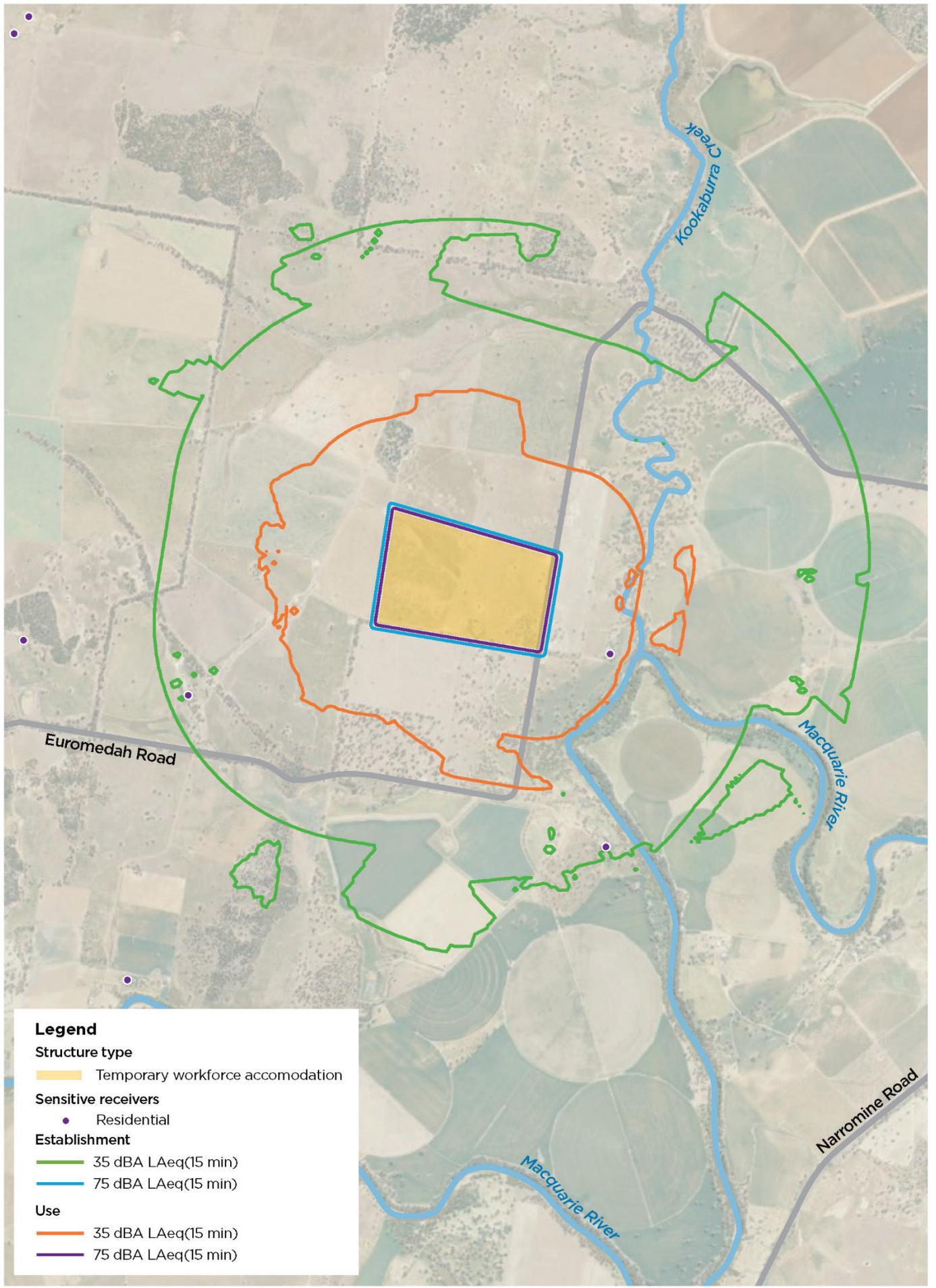


Figure C2.2 Noise impacted receivers - Narromine North temporary workforce accommodation

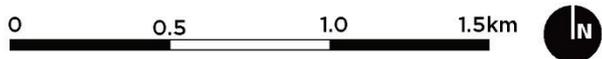
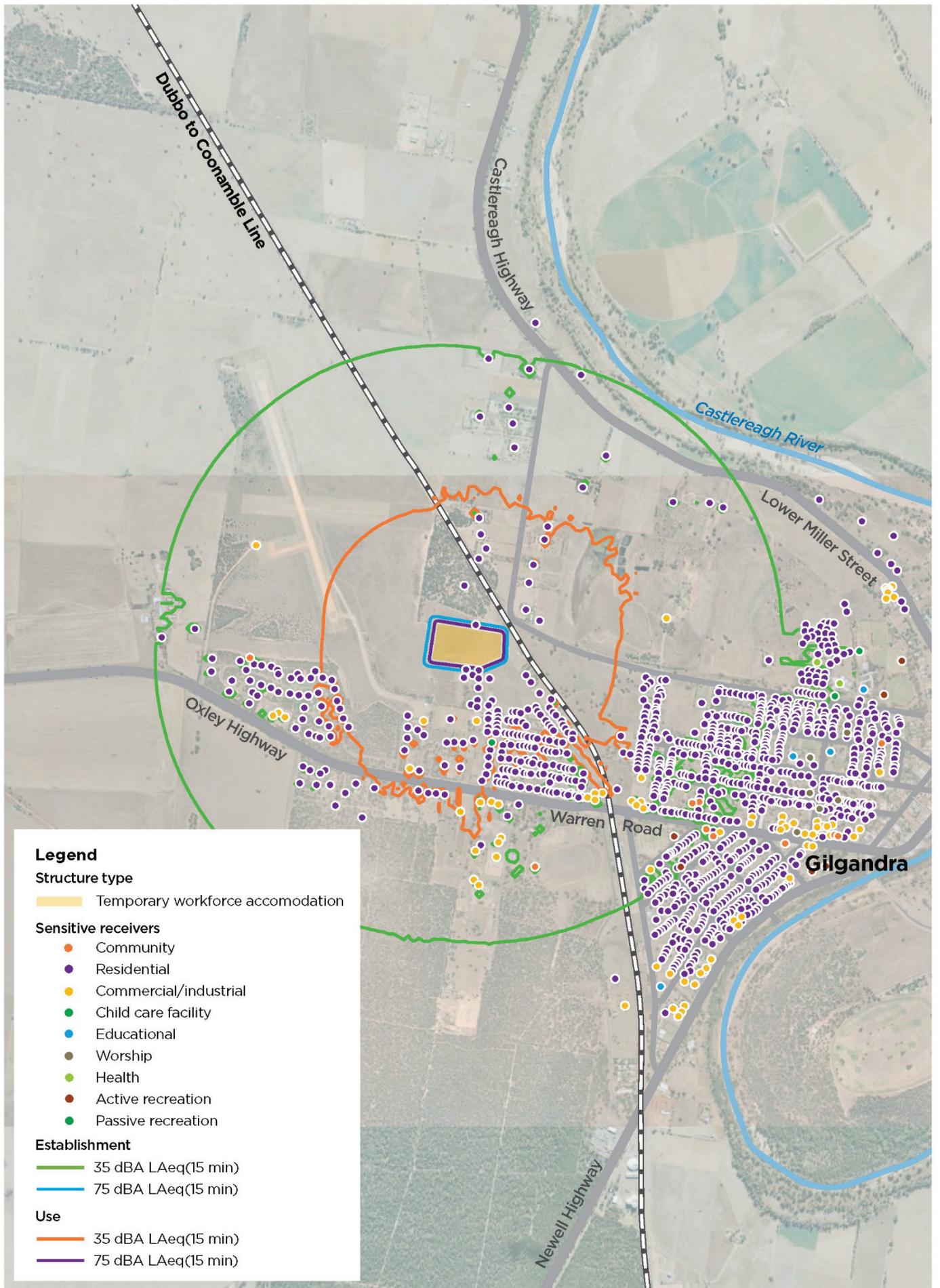


Figure C2.3 Noise impacted receivers - Gilgandra temporary workforce accommodation

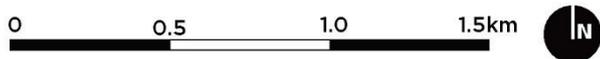
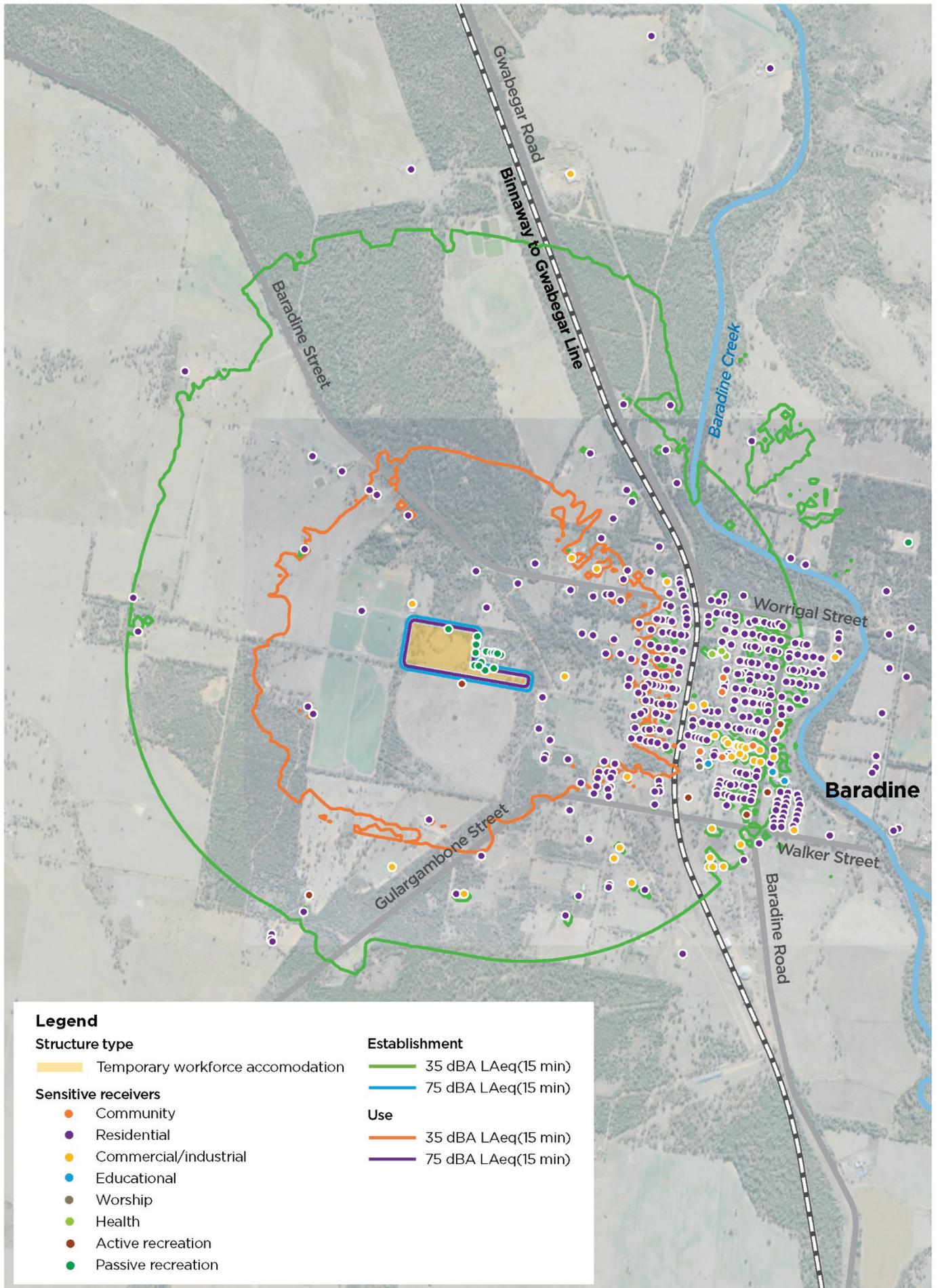
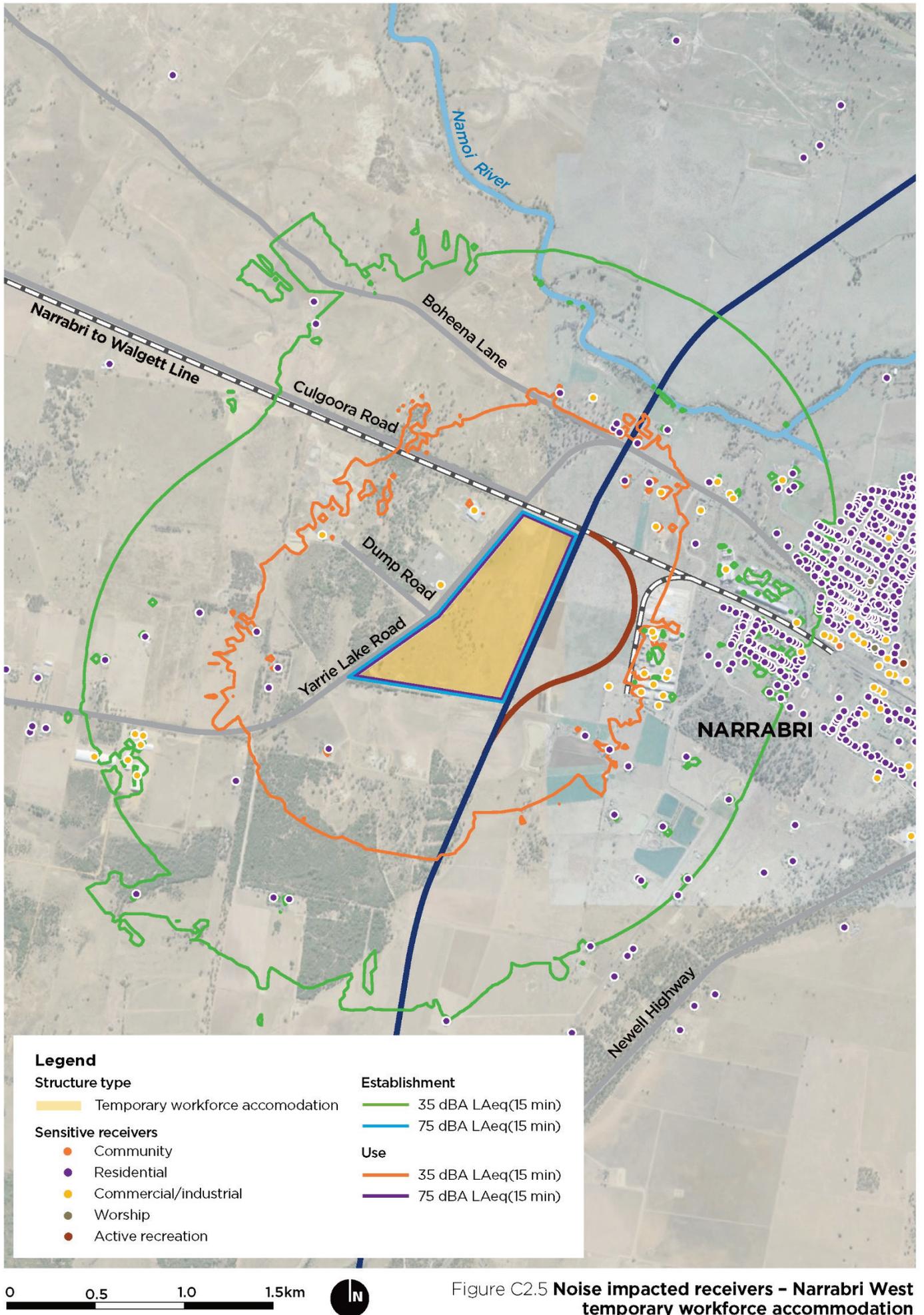


Figure C2.4 Noise impacted receivers - Baradine temporary workforce accommodation



0 0.5 1.0 1.5km



Figure C2.5 Noise impacted receivers – Narrabri West temporary workforce accommodation

C2.3.8 Air quality

The assessment approach, background air quality, management levels/criteria, potential impacts and mitigation measures for the proposal are described in chapter B10. The findings of this assessment for the establishment and use of temporary workforce accommodation are summarised in this section.

A screening level assessment was undertaken with consideration of the approved methods. An emissions inventory for potential particulate sources was derived for the proposal and is provided in Appendix M. Table C2.4 summarises the estimated total dust emissions from temporary workforce accommodation.

TABLE C2.4 ESTIMATED EMISSIONS DURING CONSTRUCTION—TEMPORARY WORKFORCE ACCOMMODATION

Proposal component— source of emission	Assumed dimensions for the purposes of the assessment	Total emissions of PM ₁₀	Total emissions of PM _{2.5}	Separation distance
Establishment	250 x 250 m (indicative)	0.00000951 grams per square metre per second	0.00000095 grams per square metre per second	140 m

The predicted worst-case 24-hour PM₁₀ and PM_{2.5} concentrations are presented in Appendix M as concentration versus distance graph for establishment and use of temporary workforce accommodation.

The number of potentially impacted receivers are provided in Table C2.5. There are no significant air emissions expected during use of temporary workforce accommodation. As a result, no modelling has been undertaken.

TABLE C2.5 SUMMARY OF AIR QUALITY IMPACTED RECEIVERS—TEMPORARY WORKFORCE ACCOMMODATION

Construction activity	Temporary workforce accommodation	Number of potentially impacted receivers
Establishment	Narromine South	0
	Narromine North	0
	Gilgandra	8
	Baradine	18
	Narrabri West	0

Establishment

During the establishment of temporary workforce accommodation, air quality issues may arise from increases in dust emissions associated with vegetation clearing and disturbance of soils and emissions (exhaust fumes) from plant and equipment.

As shown in Table C2.5, during establishment of temporary workforce accommodation, exceedances of the relevant air quality criteria are predicted at sensitive receivers as follows:

- ▶ Narromine South—no exceedances predicted
- ▶ Narromine North—no exceedances predicted
- ▶ Gilgandra—at up to eight sensitive receivers
- ▶ Baradine—at up to 18 sensitive receivers of which 16 are associated with Camp Cypress and the Baradine Showground
- ▶ Narrabri West—no exceedances predicted.

The potentially affected receivers are shown in Figure C2.6 and Figure C2.7. These potential impacts would be managed in accordance with an air quality management plan (see mitigation measure AQ1), which would be prepared as part of the CEMP. The requirements for the air quality management plan are provided in the CEMP outline in Appendix I.

Use

During use of temporary workforce accommodation, no significant air emissions are predicted that would impact nearby sensitive receivers.

Mitigation measures

Where receivers are identified within the separation distance, mitigation measures provided in chapter B10 would be implemented to minimise potential air quality impacts. No specific mitigation measures are provided for the establishment and use of temporary workforce accommodation.

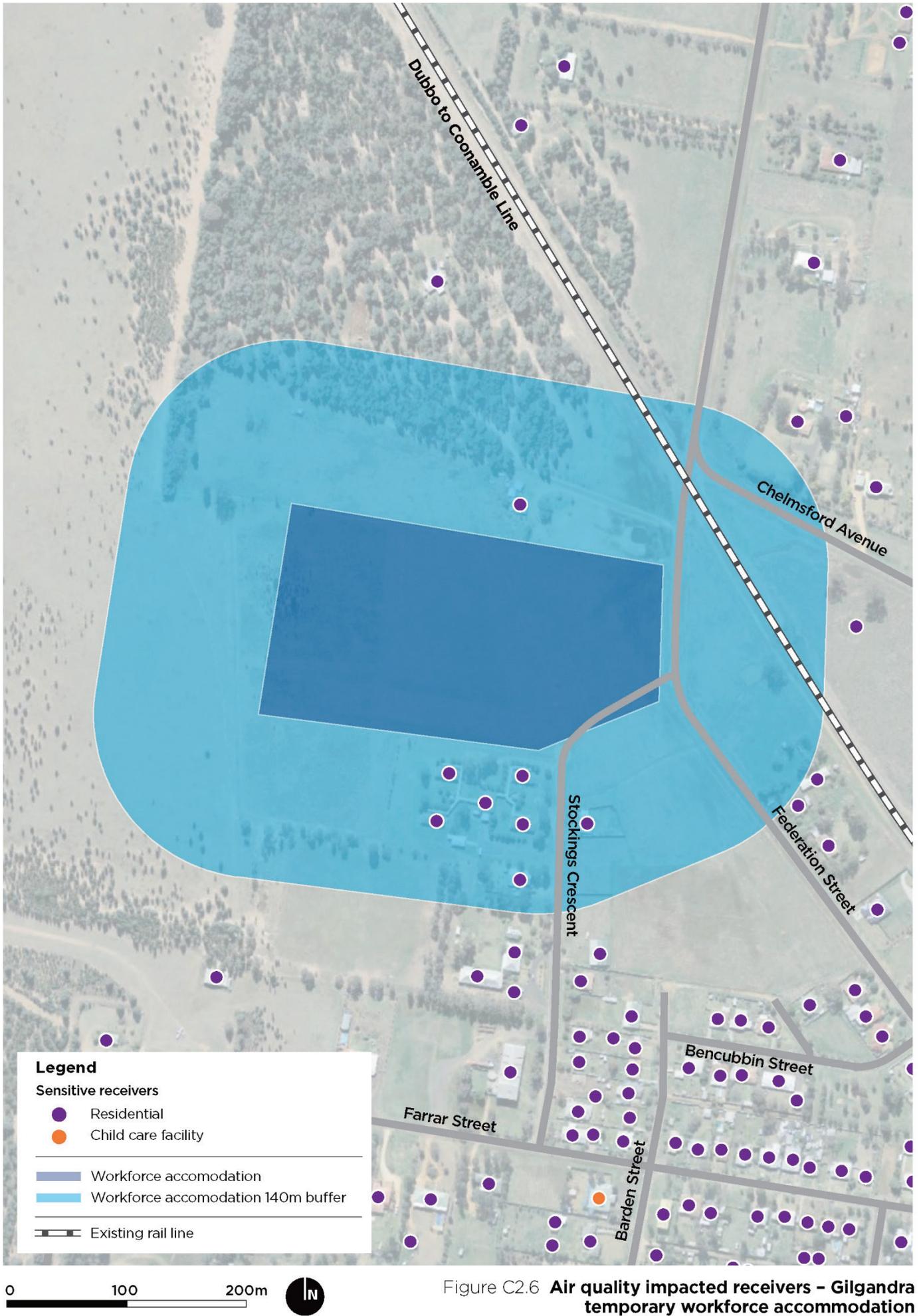


Figure C2.6 Air quality impacted receivers – Gilgandra temporary workforce accommodation

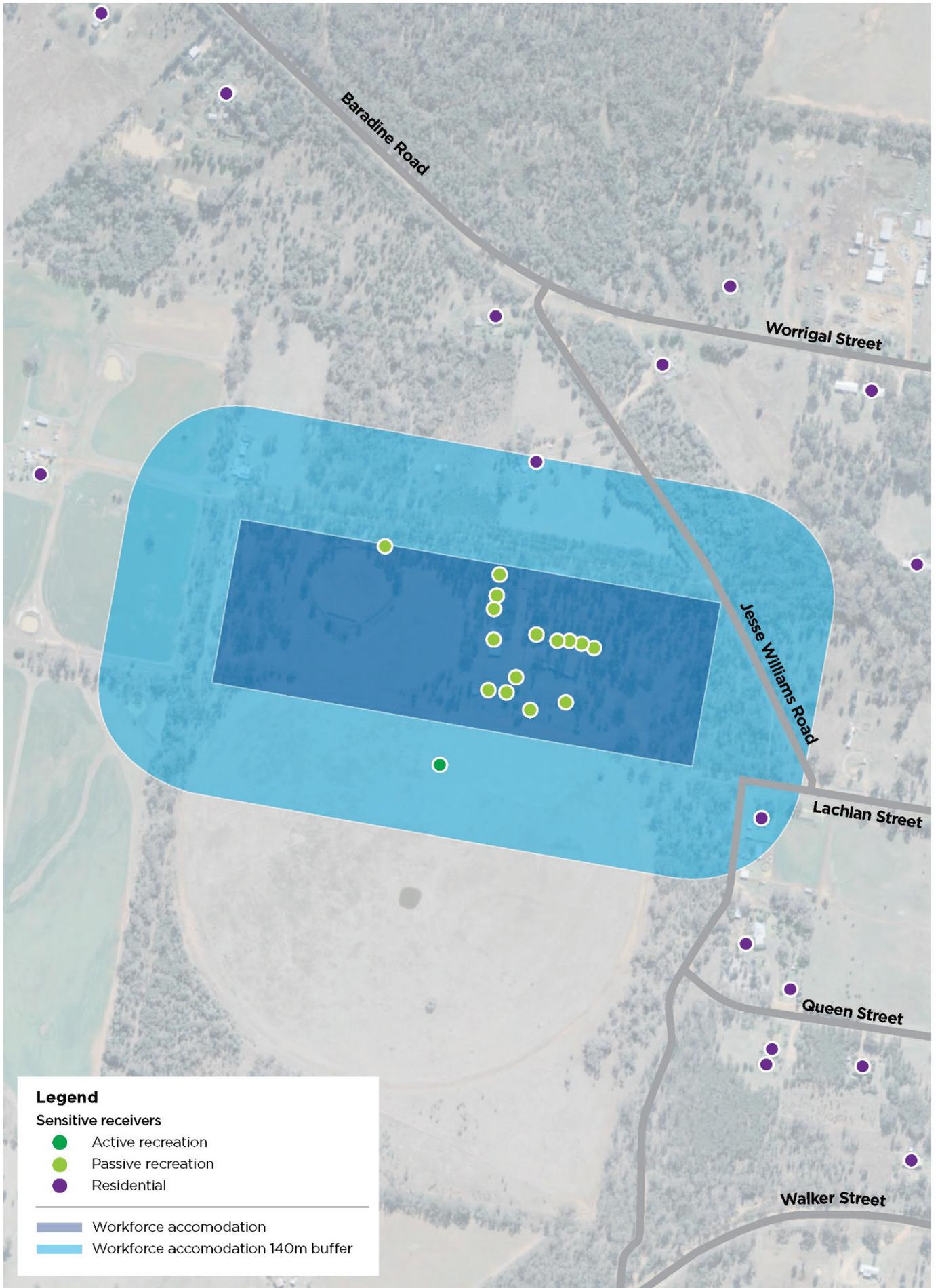


Figure C2.7 Air quality impacted receivers - Baradine temporary workforce accommodation

C2.3.9 Traffic and transport

The assessment approach, existing environment, potential impacts and mitigation measures for the proposal are described in chapter B11 and Technical Report 10—Traffic and transport assessment. The findings of this assessment for the establishment and use of temporary workforce accommodation are summarised in this section.

Establishment

The establishment of temporary workforce accommodation would have minimal impacts on traffic and transport, as most of the activities would be carried out within the site.

Estimated construction traffic movements associated with construction of the proposal as a whole (including establishment of temporary workforce accommodation) are provided in chapter B11 and in Technical Report 10. The assessment identified that there is unlikely to be any significant impacts on the existing road network. As such, the movements associated with establishment of temporary workforce accommodation are not expected to impact the existing road network.

Use

Access to each temporary workforce accommodation would be provided, as follows:

- ▶ Narromine South—a new temporary access road would be constructed off Tomingley Road
- ▶ Narromine North—access to the site would be provided off Euromedah Road
- ▶ Gilgandra—access to the site would be provided off Federation Street
- ▶ Baradine—access to the site would be provided via Lachlan Street
- ▶ Narrabri West—access to the site would be provided off Yarrarie Lake Road.

The design of site access points would be undertaken with regard to relevant standards and guidelines and in consultation with the road manager (i.e. council or Transport for NSW).

The temporary workforce accommodation for each construction area is located relatively close to the main construction areas, minimising travel distances. The general workforce would be transported between the work areas and the temporary workforce accommodation via shuttle buses to minimise potential traffic impacts on local roads. It is anticipated that the majority of workforce movements would occur at the beginning and end of the work day. Some personnel would use light vehicles for more flexible mobility.

During construction, there would be increased bus movements, with up to 16 vehicle movements per day (two-way) in most construction areas to and from the temporary workforce accommodation. These are not expected to result in any substantial impacts on residential streets associated with the Gilgandra and Baradine facilities. In addition, these movements would be distributed across various public roads within each construction area depending on the activity being undertaken. The roads used to access the temporary workforce accommodation are listed in Table C2.6.

To minimise construction traffic movements on public roads, temporary construction haul roads would be constructed within the construction footprint. The haul roads would be used to transport materials and people to work areas and compounds.

Vehicles entering and exiting the temporary workforce accommodation at Baradine may have the potential for minor disruptions for users of Baradine Showground; however, this is not expected to be significant.

Potential traffic impacts would be managed in accordance with a traffic, transport and access management plan (see mitigation measure TT5), which would be prepared and implemented as part of the CEMP. The requirements for the traffic, transport and access management plan are provided in the CEMP outline in Appendix I.

TABLE C2.6 LOCAL ROAD ACCESS NEAR TEMPORARY WORKFORCE ACCOMMODATION SITES

Temporary workforce accommodation	Primary access routes	
Narromine South	▶ Tomingley Road ▶ Webbs Siding Road	▶ Mitchell Highway
Narromine North	▶ Euromedah Road	▶ Eumungerie Road
Gilgandra	▶ Federation Street ▶ Castlereagh Highway ▶ Kamber Siding Road	▶ Hargraves Lane ▶ Newell Highway ▶ Leeches Creek Road
Baradine	▶ Lachlan Street ▶ Namoi Street ▶ Worrigal Street ▶ Baradine Road	▶ Gwabegar Road ▶ Cumbil Road ▶ Gulargambone Road ▶ Munns Road
Narrabri West	▶ Yarrie Lake Road	▶ Newell Highway

Mitigation measures

Specific mitigation measures for the establishment and use of temporary workforce accommodation are provided in section C2.4. In addition, the mitigation measures provided in chapter B11 would be implemented to minimise potential traffic and transport impacts.

C2.3.10 Visual amenity

The assessment approach, existing environment, potential impacts and mitigation measures for the proposal are described in chapter B13 and Technical Report 12—Landscape and visual assessment. The findings of this assessment for the establishment and use of temporary workforce accommodation are summarised in this section.

Establishment

During establishment of temporary workforce accommodation there would be the potential for impacts on visual amenity from the clearing of vegetation and earthworks associated with the change in land use. These impacts would be similar to the use impacts, as described below.

Use

The Narromine South and Narromine North temporary workforce accommodation would be located in an open agricultural landscape where the temporary change in land use would be noticeable. The Gilgandra and Baradine workforce accommodation would be located on the outskirts of these towns and are relatively close to a number of residences. As such, the changes would be more noticeable. The Narrabri West site would be located on the outskirts of Narrabri in a mixed agricultural and commercial/industrial setting where the temporary change would be less noticeable.

During use of temporary workforce accommodation, there would be potential impacts on visual amenity from the introduction of built (temporary) infrastructure, vehicle movements (within and around the sites), lighting and other activities at the site. The main potential for visual impacts would be for residences located near the sites. The distances to the nearest sensitive receivers are listed in Table C2.1.

The Narromine South temporary workforce accommodation would potentially be visible from surrounding residences and users of local roads, such as Tomingley Road, Craigie Lea Lane and Narwonah Siding Road. A viewpoint analysis undertaken in this vicinity (at viewpoint 1) identified that, during construction, the overall visual impact would be moderate. Construction activity, the multi-function compound and temporary workforce accommodation would be discernible changes in the existing view, although these would be temporary and for the duration of the construction period only.

The Narromine North and Narrabri West temporary workforce accommodation would be potentially visible from distant surrounding residences and industrial/commercial facilities, and local roads such as Euromedah Road and Yarrie Lake Road.

The Gilgandra and Baradine temporary workforce accommodation would be visible from surrounding residences and local roads. The Baradine facility would also be visible from within the Baradine Showground. Provision of visual screening in accordance with the proposed workforce accommodation plan (see section C2.4) would minimise these potential impacts.

Temporary workforce accommodation would be designed and orientated to minimise potential visual impacts, as far as practicable.

The temporary workforce accommodation would be one of the main sources of light. The lighting is not expected to be significant and would be managed in accordance with relevant guidelines (see mitigation measures LV4 and LV8). Lighting at temporary workforce accommodation is not expected to impact surrounding residences or the Dark Sky Region centred on the Siding Spring Observatory.

The temporary workforce accommodation are temporary facilities and the sites would be rehabilitated and returned to their previous land use following construction. Site rehabilitation would be carried out in accordance with the temporary workforce accommodation plan (see section C2.4) and rehabilitation strategy (see section A8.7 and mitigation measure BD11). The impacts on landscape character and visual amenity would be temporary, with no major change to the overall landscape character predicted.

Mitigation measures

Specific mitigation measures for the establishment and use of temporary workforce accommodation are provided in section C2.4. In addition, the mitigation measures to address potential impacts on landscape character and visual amenity, provided in chapter B13, would also be implemented as appropriate.

C2.3.11 Socio-economic

The assessment approach, existing environment, potential impacts and mitigation measures for the proposal are described in chapter B14 and Technical Report 13—Social assessment. The findings of this assessment for the establishment and use of temporary workforce accommodation are summarised in this section.

Establishment

Establishment of temporary workforce accommodation would have the potential for socio-economic impacts associated with changes in visual amenity, including clearing of vegetation. These impacts would be similar to those described below for use.

Use

Use of the five temporary workforce accommodation would have the potential for amenity impacts, including noise, air quality, visual and traffic impacts. These potential impacts are particularly relevant to the Gilgandra and Baradine facilities, which are proposed to be located near residential areas and community facilities. Depending on the proximity of temporary workforce accommodation facilities to residential properties, some residents may be affected by a change to their level of privacy. Privacy and amenity impacts, such as noise, may be more likely in Gilgandra, as the temporary workforce accommodation would be located near the Jack Towney Hostel, which is an aged care facility for Aboriginal and Torres Strait Islander people. Residents of the hostel would be more vulnerable to potential impacts.

Ongoing consultation with representatives of Jack Towney Hostel and Gilgandra Council, in accordance with the communication management plan and the mitigation measures in chapter B14, and provision of visual screening and appropriate layout design and built form, in accordance with the temporary workforce accommodation plan (see section C2.4), would minimise these potential impacts.

Increases in traffic movements may impact on perceptions of road safety for some road users and local residents. Shuttle buses would be used to transfer most workers between the temporary workforce accommodation and construction areas, which would help to minimise potential traffic impacts on local roads.

The temporary workforce accommodation would be sufficient to accommodate at least the majority of the non-resident workforce. This would minimise potential impacts on the availability of short-term accommodation within towns for tourists and other workers; however, some workers, such as those that are present onsite for a short period of time, may choose to stay in local accommodation, resulting in benefits to these facilities. Consultation undertaken for the proposal indicates that given the overall low occupancy rates, and as the demand for accommodation facilities is likely to be spread across the proposal site at different times during the construction period, it is expected there would generally be capacity in the region to accommodate the small numbers of temporary non-resident workers that may wish to stay in towns. This is considered in chapter B14 and Technical Report 13.

Due to the close proximity of temporary workforce accommodation facilities to towns, it is expected that some local businesses (including food and beverage, hospitality and retail businesses) would benefit from purchases made by the temporary workforce and in providing services to these facilities. Provision of adequate connectivity with local towns would provide further opportunities for the workforce to purchase goods and services, benefiting the local economy. There may also be opportunities for local residents to be employed at temporary workforce accommodation facilities through local employment strategies by the construction contractor.

A non-resident construction workforce is typically dominated by male workers under 45 years. It is therefore expected that the majority of temporary non-resident construction workers would be males. There is potential for the presence of non-resident workers within towns to result in actual or perceived safety concerns for residents and sensitive community facilities, such as Jack Towney Hostel in Gilgandra (location shown in the maps in Part E).

The non-resident construction workforce would access community services and recreational facilities in towns near temporary workforce accommodation facilities. It is expected that most services and facilities would have capacity to meet the increased demand. In addition, the contractor would be required to provide personnel to handle minor injuries and other health issues; however, there may be some existing challenges for local health service provision, such as long wait times for local doctors. There is potential for the construction workforce to exacerbate these challenges in Narromine, Gilgandra, Baradine and Narrabri. Consultation also indicates some local emergency services may need to increase staffing levels in towns to meet the potential increased demand.

Provision of a high level of amenity, including recreational opportunities, within the temporary workforce accommodation facility for workers, along with ready access to local facilities, would assist in integrating the workforce within the local community. ARTC would continue to consult with regional and local emergency services during detailed design. The contractor would also develop appropriate processes and measures to manage potential increased demand on health and emergency services. Relevant mitigation measures are provided in chapter B14.

These impacts would likely be greatest for Gilgandra and Baradine, where the sites are located near residential areas. Larger towns, such as Narromine and Narrabri, are likely to be more accustomed to seasonal and construction workforces; in particular, Narrabri, where a large temporary workforce accommodation facility is already present.

Potential impacts of the non-resident workforce would be managed by the development and implementation of a workforce management plan (including a code of conduct, monitoring of accommodation demand and consultation with service providers) and local industry participation plan, to maximise benefits for local businesses and employment opportunities (see mitigation measure SE8).

The presence of the temporary workforce accommodation near Camp Cypress could contribute to potential amenity and access changes for users of the facility. Camp Cypress is a tourist accommodation facility located on a portion of land at Baradine Showground (locations shown in the maps in Part E). Visitors staying at Camp Cypress may experience amenity impacts, such as noise and visual impacts, as a result of the proximity to the proposed temporary workforce accommodation. There is also potential for vehicles entering and exiting the facility to affect access to Camp Cypress. Consultation indicates other users of the showground are not expected to be disrupted.

ARTC would undertake further consultation with Baradine Showground Trust during detailed design and construction to minimise potential impacts and explore any potential permanent benefits to Baradine Showground following the completion of construction (see section C2.4).

Mitigation measures

The mitigation measures to address potential socio-economic impacts are provided in chapter B14. Site-specific mitigation measures for the establishment and use of temporary workforce accommodation are provided in section C2.4.

C2.3.12 Waste management

The assessment approach, potential impacts and mitigation measures for the proposal are described in chapter D2. The findings of this assessment for the establishment and use of temporary workforce accommodation are summarised in this section.

Estimated waste quantities and classifications for the proposal as a whole are provided in chapter D2. These would be confirmed during detailed design and construction planning and incorporated into the construction waste management plan (see mitigation measure WM3), which would be prepared and implemented as part of the CEMP.

Establishment

Establishment of temporary workforce accommodation would generate a range of waste streams, including green waste from clearing of vegetation, spoil (comprising virgin excavated natural material or excavated natural material), potentially contaminated soils (including asbestos-containing materials) and waste metal/timber posts from fencing.

Potential impacts and the proposed approach to waste management would be similar to those described below for use.

Use

The use of temporary workforce accommodation would generate a range of waste streams, including food and organic waste, wastewater, waste paper and cardboard, waste containers (plastics, glass and metals) and other domestic waste, as summarised in Table C2.7. These estimates are for all temporary workforce accommodation sites for the duration of construction. Estimates would be confirmed during detailed design and construction planning and would be incorporated into the construction waste management plan, which would form part of the CEMP.

TABLE C2.7 WASTE ESTIMATES AND CLASSIFICATION—TEMPORARY WORKFORCE ACCOMMODATION

Waste streams that may be produced	Likely Classification of waste streams	Estimated quantity (tonnes unless indicated)
Food and other organic waste	General solid waste (putrescible)	310
Wastewater	Liquid waste	470 ML
Waste paper and cardboard	General solid waste (non-putrescible)	210
Waste containers—plastics, glass, metals	General solid waste (non-putrescible)	100
Other domestic waste	General solid waste (non-putrescible)	420

Inappropriate management of waste could result in a range of impacts on air quality, water quality and soils. The proposed approach to classification and management of waste streams, in accordance with the *Waste Classification Guidelines* (NSW EPA, 2014a) and waste management hierarchy (avoid, reduce, recycle, reuse, dispose), including measures to facilitate segregation and prevent cross contamination, is considered in chapter D2.

Waste that would be taken offsite would be stored temporarily at the temporary workforce accommodation before being transferred for recycling and disposal at licensed waste management facilities. Waste segregation bins (colour coded) would be located at temporary workforce accommodation to facilitate segregation and prevent cross contamination.

The proposed onsite treatment of wastewater from the Narromine North and Baradine facilities would limit the potential impacts on the towns' wastewater disposal services locations and would be managed in accordance with the specific mitigation measures provided in section C2.4.

For the Narromine South, Gilgandra and Narrabri West facilities, it is proposed to connect to the towns' existing wastewater collection and treatment systems. All site services (e.g. waste, wastewater, stormwater) would be designed in accordance with relevant NSW codes and guidelines, including those of local councils where connections to local infrastructure is proposed. Site services would be designed and managed to avoid unacceptable impacts on local infrastructure networks (e.g. wastewater treatment plants, stormwater systems) and the generation of odour from the site, and would include measures for control of pests and vermin.

The construction waste management plan (see mitigation measure WM3), which would be prepared and implemented as part of the CEMP, would detail measures to manage potential waste impacts during construction. The requirements for the waste management plan are provided in the CEMP outline in Appendix I.

Mitigation measures

The mitigation measures for waste management are provided in chapter D2. No specific mitigation measures are provided for the establishment and use of temporary workforce accommodation beyond those referred to in the preceding sections.

C2.4 Specific mitigation measures

Specific mitigation measures that will be implemented to address potential impacts of temporary workforce accommodation are listed in Table C2.8. For other environmental aspects, the mitigation measures provided for the proposal (compiled in chapter D5) would be applied, as relevant, to the temporary workforce accommodation.

TABLE C2.8 TEMPORARY WORKFORCE ACCOMMODATION—SPECIFIC MITIGATION MEASURES

Stage	Aspect	Issue/impact	Ref	Mitigation measures
Detailed design/ pre-construction	Water resources	<i>Groundwater drawdown impacts</i>	WR-CI1	Further investigation would be undertaken to determine the potential for the bores associated with the Narromine North and Baradine temporary workforce accommodation facilities to cause drawdown impacts. This would include ensuring any impacts on existing bores are below the <i>NSW Aquifer Interference Policy</i> (DPI, 2012a) minimal impact considerations.
	Water resources	<i>Suitability of groundwater</i>	WR-CI2	The quality of groundwater from the proposed bores at the Narromine North and Baradine facilities would be assessed for the suitability of its intended use. Where required, treatment systems would be designed, and a monitoring program established, to ensure water quality does not exceed the relevant drinking water criteria from the <i>National Water Quality Management Strategy: Australian Drinking Water Guidelines 6 2011</i> (National Health and Medical Research Council, 2018).
	Soils and contamination	<i>Soils and water quality</i>	SC-CI1	The final approach to reusing wastewater from the Narromine North and Baradine temporary workforce accommodation facilities would be confirmed during detailed design.
	Soils and contamination	<i>Soils and water quality</i>	SC-CI2	Any irrigation areas would be designed and operated in accordance with the risk framework and management principles contained in the <i>National Guidelines for Water Recycling: Managing Health and Environmental Risks</i> (Environment Protection and Heritage Council et al., 2006) and the <i>Environmental Guidelines: Use of Effluent by Irrigation</i> (DEC, 2004). This would include the following design requirements: <ul style="list-style-type: none"> ▶ Irrigation area/s would be delineated based on the expected rate of irrigation and the drainage characteristics of the receiving soil
Detailed design/ pre-construction [continued]				<ul style="list-style-type: none"> ▶ The quality of treated water would be determined to prevent accumulation of contaminants, with reference to the relevant guidelines ▶ Irrigation area/s would be designed to include capacity to store treated water for the duration of typical wet weather events ▶ The rate of irrigation would be optimised to avoid waterlogging or ponding of reclaimed water ▶ Soil and groundwater conditions would be monitored to identify and correct trends in soil salinity or other potential effects of irrigation.

Stage	Aspect	Issue/impact	Ref	Mitigation measures
Detailed design/ pre-construction	Socio-economic	<i>Impacts on Baradine Showground</i>	SE-CI1	ARTC would continue to consult with the Baradine Showground Trust to manage access and temporary land requirements at the showground.
	Socio-economic	<i>Temporary accommodation on facilities</i>	SE-CI2	<p>A temporary workforce accommodation plan would be prepared to guide the design and provision of temporary accommodation. The plan would be developed in accordance with ARTC's Inland Rail Program Accommodation Principles, relevant council development codes and guidelines and the following overarching principles:</p> <ul style="list-style-type: none"> ▶ Temporary workforce accommodation is designed to be integrated into the existing communities ▶ Temporary workforce accommodation adequately provides for occupants and has a high level of onsite amenity. <p>The plan would define:</p> <ul style="list-style-type: none"> ▶ The arrangement and layout of facilities, to minimise amenity impacts on surrounding sensitive receivers (including visual amenity, lighting and privacy) ▶ Proposed built-form heights to ensure heights are appropriate within their surrounding context ▶ Opportunities for retention of screening vegetation (where present) and provision of additional landscaping, as required ▶ How services (such as water, waste, stormwater, wastewater) would be provided and managed, to ensure consistency with relevant codes and guidelines, and minimise potential impacts on local infrastructure networks and the environment ▶ Provision of adequate parking onsite ▶ How sites would be decommissioned and rehabilitated consistent with the rehabilitation strategy. <p>The plan would be developed in consultation with relevant key stakeholders, including the relevant local council.</p>
Construction	Flooding	<i>Flooding impacts (temporary accommodation on facilities)</i>	FH-CI1	The Narromine South and Narrabri West temporary workforce accommodation facilities would incorporate appropriate flood-protection measures, such as elevating buildings on stilts and storing hazardous materials above the flood levels that inundate these sites.
	Traffic and transport	<i>Construction traffic impacts (temporary workforce accommodation)</i>	TT-CI1	The traffic, transport and access management plan would include measures to manage potential traffic impacts at and near temporary workforce accommodation facilities. The plan would include approved access routes and any restrictions on the use of residential streets.
	Visual amenity	<i>Visual impact from construction activities (temporary accommodation on facilities)</i>	LV-CI2	The temporary workforce accommodation plan (mitigation measure SE-CI2) would include requirements for the design and visual screening of facilities to minimise the potential for visual impacts, particularly where facilities are visible from sensitive receivers.