

PART B

Impact assessment
proposal infrastructure



CHAPTER B13 Visual amenity



Narromine to Narrabri
Environmental Impact Statement



The Australian Government is delivering
Inland Rail through the Australian
Rail Track Corporation (ARTC), in
partnership with the private sector.

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B13. Visual amenity

This chapter provides a summary of the potential impacts of the Narromine to Narrabri project (the proposal) on landscape character and visual amenity. A full copy of the assessment results is provided in technical report 12—Landscape and visual impact assessment.

B13.1 Approach

A summary of the approach to the assessment is provided in this section, including the legislation, guidelines and/or policies driving the approach and the methodology used to undertake the assessment. A more detailed description of the approach and methodology is provided in technical report 12.

B13.1.1 Legislative and policy context to the assessment

Relevant legislation, policies and guidelines

The assessment was undertaken in accordance with the SEARs and with reference to the requirements of relevant legislation, policies and/or assessment guidelines, including:

- ▶ The EP&A Act and *Brigalow and Nandewar Community Conservation Area Act 2005 No 56* (NSW)
- ▶ *Guidelines for Landscape and Visual Impact Assessment, 3rd Edition* (Landscape Institute and Institute of Environmental Management & Assessment, 2013)
- ▶ *Environmental Impact Assessment Guidance Note—Guidelines for landscape character and visual impact assessment (EIA-N04), Version 2* (Roads and Maritime Services, 2013a)
- ▶ *Landscape design guideline: Design guideline to improve the quality, safety and cost effectiveness of green infrastructure in road corridors* (Roads and Maritime Services, 2018a)
- ▶ *Bridge Aesthetics: Design guideline to improve the appearance of bridges in NSW* (Roads and Maritime Services, 2019)
- ▶ *Dark Sky Planning Guideline: Protecting the observing conditions at Siding Spring* (Department of Planning and Environment, 2016)
- ▶ *Forest Management Plan for the Western Forests of NSW* (Forestry Corporation, 2019).

Secretary's Environmental Assessment Requirements

The SEARs relevant to visual amenity, together with a reference to where they are addressed in the EIS, are provided in Appendix A.

B13.1.2 Methodology

Study area

The study area for the landscape and visual assessment has been defined as the proposal site and surrounding area of around 5 kilometres (km) in width.

Key tasks

The assessment involved:

- ▶ Desktop analysis, including analysing aerial photographs and topographic maps
- ▶ Site visit and analysis to understand the existing landscape and visual context of the study area
- ▶ Identifying landscape character zones and their sensitivity to change, and the ability of the landscape to absorb the proposal (the absorptive capacity)
- ▶ Identifying the zone of theoretical visibility, viewshed and key views of the proposal and potentially sensitive visual receivers
- ▶ Selecting representative viewpoints for the visual impact assessment
- ▶ Assessing the potential for landscape and visual impacts (described below)
- ▶ Determining the potential significance of impacts through a combined assessment of sensitivity and magnitude
- ▶ Recommending mitigation and management measures.

Landscape character impact assessment

Landscape character impacts refer to the relative capacity of the landscape to accommodate changes to the physical landscape through the introduction of new features or loss/modification of existing features.

During the contextual analysis for the assessment, distinct landscape character zones were identified, generally based on areas sharing the same environment or cultural qualities, such as topography, vegetation, hydrology, land use, built form, cultural and recreational characteristics.

The potential landscape character impacts were determined based on the sensitivity of the landscape character zone and the magnitude of the change. Sensitivity refers to how sensitive the existing character of the setting is to the proposed change. A high sensitivity means that a landscape is less able to absorb the impacts of a proposal and, therefore, there is more potential for impacts on landscape character.

Magnitude refers to the physical size and scale of the change at this location. The combination of sensitivity and magnitude determines the landscape character impact, which is rated from negligible to high, as shown in Figure B13.1.

Visual impact assessment

A total of 23 representative viewpoints were selected to illustrate the visual influence of the proposal.

The potential visual impacts were determined based on the sensitivity of the viewpoint and the magnitude of the change. The potential sensitivity of receivers to change was determined and rated (from negligible to high). Sensitivity depends on the location of receivers, the importance of their view, land uses and the extent of existing screening. Magnitude refers to the physical size and scale of a project and the proximity relative to the viewer. Magnitude also considers overshadowing during the day and lighting at night. The combination of sensitivity and magnitude determines the visual impact, from negligible to high, as shown in Figure B13.1.

The significance of potential visual impacts was determined by assessing the magnitude of change in combination with the sensitivity of the receiver. Potential impacts were rated according to their significance (severity), as shown in Figure B13.1. Technical Report 12 provides further information on how the impact, sensitivity and level of significance were assigned.

The landscape character zones and key viewpoints are shown in Figure B13.2 and discussed further in sections B13.2.1 and B13.2.2.

| | | Magnitude of impacts | | | |
|------------------------|------------|----------------------|------------------|-----------------|------------|
| | | High | Moderate | Low | Negligible |
| Sensitivity of feature | High | High | Moderate to High | Moderate | Negligible |
| | Moderate | Moderate to High | Moderate | Moderate to Low | Negligible |
| | Low | Moderate | Moderate to Low | Low | Negligible |
| | Negligible | Negligible | Negligible | Negligible | Negligible |

FIGURE B13.1 IMPACT SIGNIFICANCE RATING MATRIX

Photomontages

A series of locations were selected for the production of visual representations. These were prepared to visually represent the views from selected locations with the introduction of the proposal (i.e. during operation). These visual representations are provided in section B13.4.1.

B13.1.3 Risks identified

The environmental risk assessment for the proposal (see Appendix E) included consideration of potential risks to visual amenity. Visual amenity risks with an overall assessed risk rating of medium or above, identified by the environmental risk assessment, included permanent visual impacts on sensitive visual receivers, as a result of the introduction of new infrastructure visible from a number of viewpoints (including new rail overbridges, crossing loops, ancillary infrastructure and access road).

The landscape and visual assessment considered the potential risks identified by the environmental risk assessment, in addition to potential risks and impacts identified by the scoping report (see section A9.1), the SEARs and relevant guidelines and policies (as appropriate).

B13.1.4 How potential impacts have been avoided/minimised

The shortlist of route options, summarised in section A6.2, was subject to a detailed assessment, which included assessment of a broad study area to identify key constraints early in the design process and assist with avoiding and minimising impacts, including impacts on visual amenity, as far as practicable.

Approaches to designing the proposal to minimise the potential for biodiversity impacts as a result of clearing (see section B1.1.4) have also assisted in minimising the potential for visual impacts.

B13.2 Existing environment

The landscape and visual environment of the proposal site is characterised by its generally agricultural nature, with areas of State forest at the northern end. The townships of Narrabri and Narromine lie to the north and south of the study area, respectively, with typical urban land uses including residential, local centre, open space, infrastructure and industrial.

Although productive rural landscapes dominate the study area, built-form elements are features scattered throughout. These are typically associated with rural land uses and include large-scale farm machinery, such as silos, rural residential dwellings and sheds. Existing road and rail infrastructure are also visual features in the landscape.

The topography is relatively flat, with gentle slopes and characteristic steeper uplands associated with the Warrumbungle Ranges foothills. The terrain is slightly more elevated in the area associated with the Pilliga East State Forest. Major watercourses, including the Namoi River traversing Narrabri, the Macquarie River running through Narromine and the Castlereagh River near Curban are also significant landscape features.

There are some remnant vegetation and scattered trees within paddocks, along fence lines and waterways, and along roadsides. The riparian vegetation associated with waterways has a strong visual presence through the vast agricultural plains. Planted corridors of native trees along property boundaries are a relatively common feature within the rural landscape.

Features contributing to the visual environment of the urban areas include a mix of older commercial and residential buildings among new developments and general urban infrastructure.

B13.2.1 Landscape character zones

The following landscape character zones were identified in the study area:

- ▶ Landscape character zone 1—slopes and plains
- ▶ Landscape character zone 2—waterways and floodplains
- ▶ Landscape character zone 3—Warrumbungle slopes and uplands
- ▶ Landscape character zone 4—Pilliga forests
- ▶ Landscape character zone 5—township alluvial plain
- ▶ Landscape character zone 6—township floodplain.

The landscape character zones are shown in Figure B13.2 and described in Table B13.1. Representative photographs from each landscape character zone are provided in Table B13.1.

B13.2.2 Representative viewpoints

Sensitive visual receivers within the study area include:

- ▶ Residents of rural properties and residential areas of the outer edges of Narromine and Narrabri that have views to the proposal site
- ▶ Road users
- ▶ Rural and industrial workers
- ▶ Visitors to recreational areas/lookouts with views to the proposal site.

A total of 23 viewpoints were selected as representative locations to assess the potential visual impacts of the proposal. The locations of the viewpoints are representative of the range of views to the proposal site. The viewpoints are shown in Figure B13.2 and described in Table B13.2.

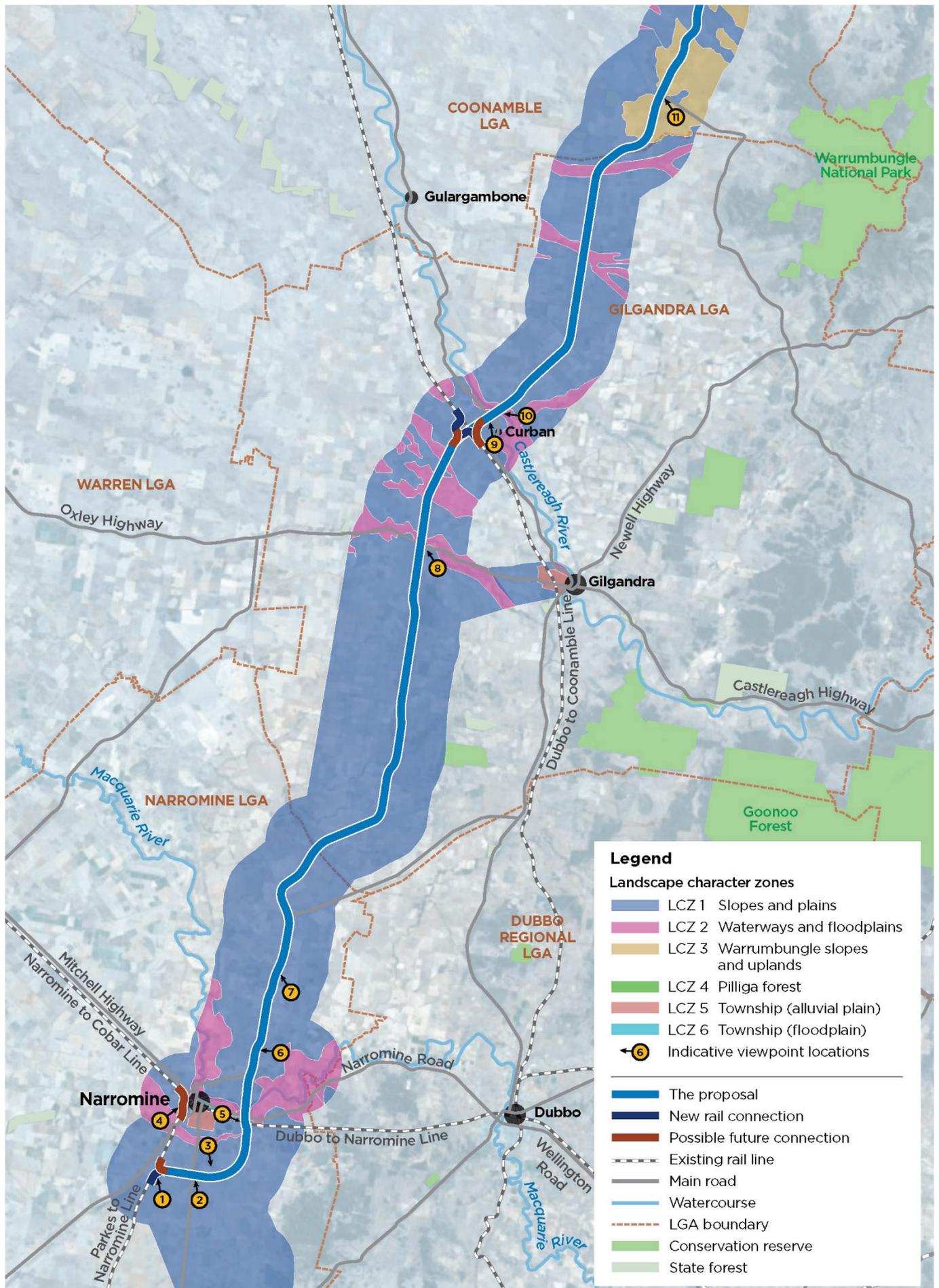


Figure B13.2 Landscape character zones and viewpoints (map 1)

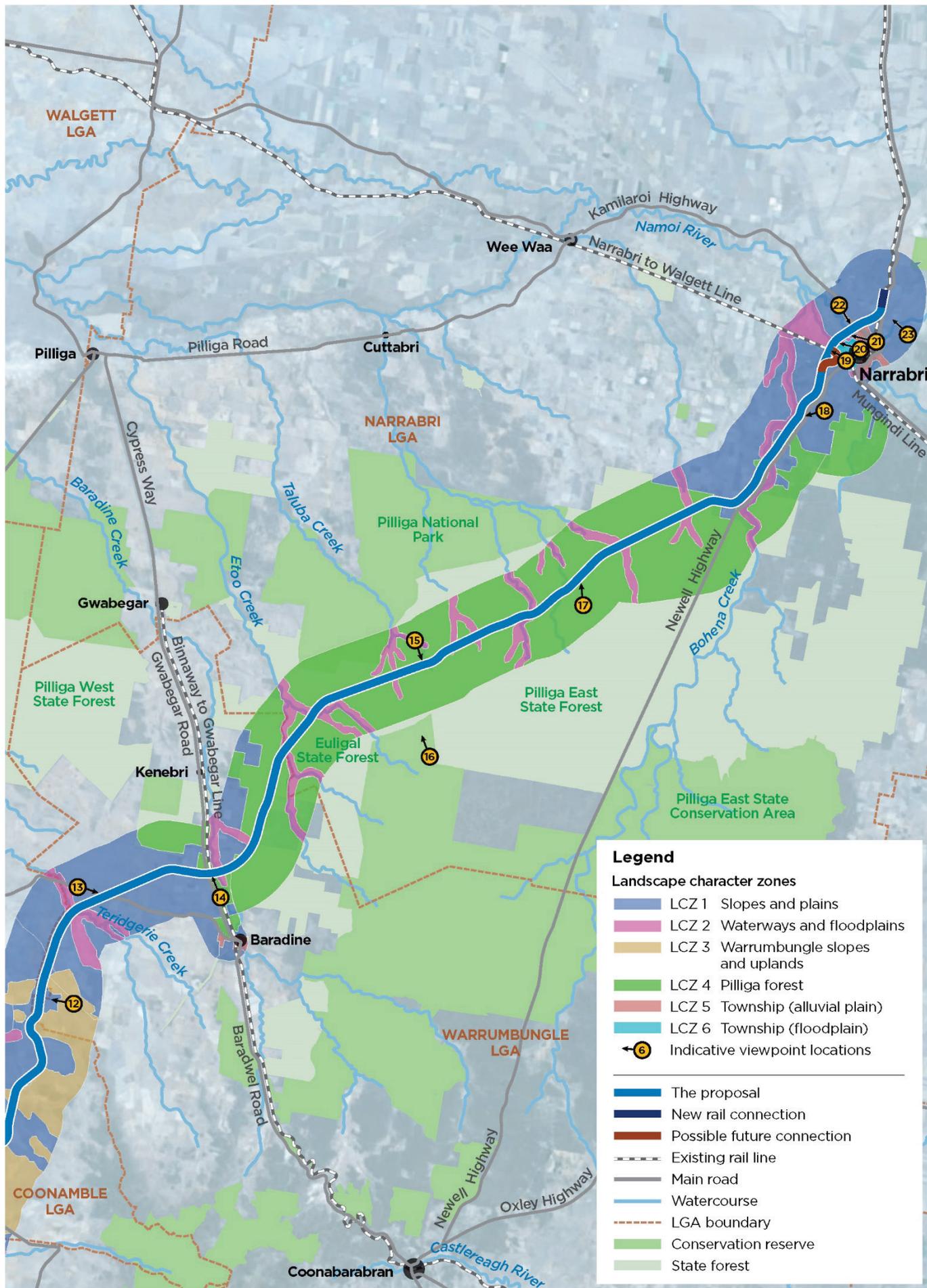


Figure B13.2 Landscape character zones and viewpoints (map 2)

TABLE B13.1 LANDSCAPE CHARACTER ZONES AND SENSITIVITY RATINGS

| Landscape character zone | Description | Sensitivity | Indicative appearance |
|-----------------------------------|--|-------------|--|
| 1—slopes and plains | <p>This zone includes rural land to the north of Pilliga surrounding Narrabri, between Baradine and Narromine, and areas to the south of Narromine. Land use is predominantly agricultural, forming vast, flat land with scattered and linear trees. The road and rail network are generally linear, emphasising the flatness of the topography.</p> <p>Built form includes large-scale farm machinery and infrastructure, such as silos and sheds, and residential dwellings located in isolated clusters throughout the expansive plains. A number of other land uses occur on the outer edges of Narrabri, including an agricultural education facility and a publicly accessible viewing area.</p> | Low |  |
| 2—waterways and floodplains | <p>This zone is located along the main drainage channels within the study area and generally has a local relief of between 5 and 15 metres (m). It includes the Macquarie, Castlereagh and Namoi rivers and associated tributaries. Land use consists of agriculture and forestry. Existing infrastructure typically includes road and rail bridge crossings.</p> <p>The waterway characteristics vary from permanent streams to dry creeks. Vegetation typically includes woodland with River red gum (<i>Eucalyptus camaldulensis</i>), Brimble box (<i>Eucalyptus populnea</i>) and White cypress pine (<i>Callitris glaucophylla</i>). Vegetation typically forms dense, winding tree-lined corridors through cleared rural land.</p> <p>The landscape zone creates spatial definition within the rural landscape, creating contrast and often acting as a visual backdrop to the horizon.</p> | Moderate |  |
| 3—Warrumbungle slopes and uplands | <p>This zone is located on the western edge of the Warrumbungle Ranges, between the intersection of National Park Road with Box Ridge Road and Munns Road. Land use is predominantly agricultural, with existing infrastructure mostly confined to gravel roads, rural residences and related structures, such as sheds and silos.</p> <p>Elevations range between 300 and 450 m, with a local relief of between 50 and 250 m. Topography is characterised by stony ridges and isolated elevations with steeper slopes associated with the Warrumbungle Tops ecosystem, rising above flatter terrain.</p> <p>Landscape features include Mount Tenandra, Looking Glass Mountain, Square Top Mountain and Black Hollow. The rocky topographic elevations provide visual interest, contrasting with the slopes and plains dominating much of the proposal site. Roadways are situated on the lowest elevations, winding through valleys, creating a visually interesting journey among characteristic landscape features.</p> | Moderate |  |

| Landscape character zone | Description | Sensitivity | Indicative appearance |
|-----------------------------|--|-------------|--|
| 4—Pilliga forests | <p>This zone is located across an extensive area to the north of the study area, between Gwabegar Road near Baradine and the intersection of Bohena Creek and the Newell Highway, south of Narrabri.</p> <p>Land use primarily consists of State forests associated with the Pilliga East, Euligal, Cumbil, Baradine, Merriwindi, and Coomore State forests, which are accessed by direct tracks. A portion of the Pilliga State Conservation Area is also located in this area.</p> <p>Elevations range between 240 and 300 m, with a local relief of between 5 and 10 m. Slopes are long and gentle, broken by sandy channels, patches of heavy grey clay and incised stream channels, with some rock outcrops.</p> <p>Vegetation consists of continuous open forest with a dense sub canopy. Species include White cypress pine, Bimble box, Pilliga box, Blakey’s red gum and Narrow-leafed ironbark. The forest is largely characterised by the proportion of cypress pines. Ephemeral wetlands are also characteristic within the broader Pilliga forest.</p> <p>There are minimal buildings within this landscape zone. Infrastructure includes roads, a rail line and gas pipeline. All infrastructure easements are cleared of vegetation, creating a highly defined spatial linear pattern through the forest, which is visible from within the easements.</p> | Moderate |  |
| 5—township (alluvial plain) | <p>This zone is located on the alluvial plains around Narromine and Narrabri.</p> <p>The main land use is urban development and includes a main street characterised by two-storey buildings with retail or commercial use on the ground level, with a number of historic buildings. Beyond this is a residential area with single storey detached dwellings interspersed with community facilities such as churches, schools, parks and recreational facilities.</p> <p>The topography is flat to gently sloping terrain on elevations of around 240 m at Narromine and around 210 m at Narrabri. This landscape unit sits above the floodplain of the adjoining Macquarie River in Narromine and Namoi River in Narrabri. Within Narrabri, the Narrabri Creek and associated waterside parkland is located within the landscape zone.</p> <p>Vegetation includes street trees, lawn and garden beds within urban parklands, and private residential gardens.</p> <p>The outer edges of town are characterised by lower density residential development, with larger scale community facilities. In Narrabri, light and general industrial uses are also located in this area, including large-scale sheds.</p> | Low |  |

| Landscape character zone | Description | Sensitivity | Indicative appearance |
|--------------------------|--|-------------|---|
| 6—township (floodplain) | <p>This zone is located on the low-lying floodplains within the towns of Narromine and Narrabri.</p> <p>The urban setting has few boundaries; such as fences, kerbs and gutters, with areas of development interspersed with paddocks. Development is typically lower density with larger lot sizes compared to landscape character zone 5. The zone appears to be undergoing growth, with new low-density residential development on the outskirts of the township.</p> <p>Parkland and low-density rural residential development are common land uses. Where industrial and urban residential development occur, the landform has either been modified, or the built form is elevated above the floodplain.</p> <p>The topography is flat with depressed vegetated channels associated with water courses. The elevations are around 230 m at Narromine and 210 m at Narrabri. Vegetation includes urban plantings and riparian vegetation along waterways, interspersed within parkland areas, roadways and scattered irregularly through open paddocks.</p> <p>The spatial characteristics are defined by the low elevation and relief, lower density built form and riparian vegetation, creating a sense of dispersion and openness.</p> | Low |  |

TABLE B13.2 KEY VIEWPOINTS AND SENSITIVITY RATINGS

| Viewpoint | Location | Description | Sensitivity | Existing view |
|-----------|---------------------------|---|-------------|---|
| VP01 | Narwonah Road, Narromine | <p>This view includes rural land, with Narwonah Road in the foreground. Scattered trees feature within the road verge and fields. The flat, expansive alluvial plains stretch across the view in the background. A large storage shed is located at Narwonah Station adjacent to the existing Parkes to Narromine Line. Power poles and fencing also feature within the view.</p> <p>This viewpoint represents views experienced by local road users and nearby residences.</p> | Moderate |  |
| VP02 | Tomingley Road, Narromine | <p>This view includes Tomingley Road, comprising of one traffic lane in each direction, with asphalt surface, gravel verge and swale. Dense native vegetation is located on both sides of the road, including a combination of tall mature eucalypts, clumps of smaller trees and large shrubs. Some gaps in vegetation allow filtered views to rural land beyond.</p> <p>This viewpoint represents views experienced by road users.</p> | Low |  |

| Viewpoint | Location | Description | Sensitivity | Existing view |
|-----------|-------------------------------------|--|-------------|---|
| VP03 | Villeneuve Drive, Narromine | <p>This view includes large-lot residential land associated with houses along Villeneuve Drive. Beyond the property fence lies flat expansive rural land on alluvial plains. Along the horizon, a layering of trees forms a continuous backdrop to the view, associated with plantings along fence lines.</p> <p>This viewpoint is representative of views from nearby residences.</p> | Moderate |  |
| VP04 | Old Backwater Road, Narromine | <p>This view includes flat rural grazing land beyond the road corridor. Infrastructure associated with the existing rail line is present, including a white dome building and tall mesh tower. A number of silos can also be seen to the right in the background. Canopy vegetation surrounding these elements forms a consistent green backdrop to the view.</p> <p>This viewpoint is representative of views from nearby residences, and road users.</p> | Moderate |  |
| VP05 | Mitchell Highway, Narromine | <p>This view is along the highway, comprising one lane in each direction, with grassy verges. Mature native canopy trees are located on either side of the road. These are situated within a wide road corridor. To the right of the view, filtered views to paddocks and distant trees can be seen beyond the road corridor.</p> <p>The viewpoint is representative of road users travelling east.</p> | Low |  |
| VP06 | Eumungerie Road, Narromine | <p>This view is across rural land north of Narromine associated with landscape character zone 1—slopes and plains. Eumungerie Road appears to the left of the view, curving around a bend before straightening out towards the background of the view. Some scattered native vegetation is located on the roadside and adjoining paddocks.</p> <p>This view is representative of views experienced by road users travelling south-west.</p> | Low |  |
| VP07 | Eumungerie Road/Dubbo–Burroway Road | <p>Eumungerie Road can be seen to the right of the image with dense roadside vegetation. Dubbo–Burroway Road extends across the foreground of the view, with road signage and road markers. The dense vegetation wraps around the corner beyond the intersection, with white timber fencing indicating the corners of fencing. Vegetation is set back from the intersection, with grass to the foreground. Filtered views can be seen to the rural land beyond the tree row.</p> <p>This view is representative of views experienced by road users travelling north.</p> | Low |  |

| Viewpoint | Location | Description | Sensitivity | Existing view |
|-----------|--|---|-------------|---|
| VP08 | Oxley Highway/ Marthaguy Creek | <p>This view is along the Oxley Highway and right towards the Marthaguy Creek riparian corridor. The highway appears in the view, with one lane in each direction, wide grassy verges and rural fencing. Nancarrows Road is a gravel roadway appearing to the left of the view. Some scattered native roadside vegetation can be seen along the roadside, primarily in the middle ground, with a large gap in this location revealing open views towards the creek. Pastoral land is located on either side of the highway.</p> <p>This view is representative of views experienced by road users.</p> | Low |  |
| VP09 | National Park Road, Curban | <p>This is an open view across the floodplain adjacent to the Castlereagh River. The view is dominated by the field of pasture beyond the wire boundary fence in the foreground. On the horizon, the native riparian vegetation associated with the Castlereagh River corridor can be seen extending across the view. The view is generally flat and expansive, defined by a distant layer of vegetation.</p> <p>This view is representative of road users and viewers from the nearby small township of Curban.</p> | Moderate |  |
| VP10 | National Park Road/ Castlereagh River, Curban | <p>This view includes pasture grass on the southern bank of Terrabile Creek. The wire fence in the foreground forms the boundary to National Park Road. Mature eucalypt trees can be seen extending across the view within the dry creek bed of Terrabile Creek. Limited filtered views can be achieved of the background, with visibility to the northern grassy bank of Terrabile Creek and the riparian vegetation along the Castlereagh River in the distance. The National Park Road bridge barrier appears to the right of view. East Coonamble Road can just be seen through vegetation on the far side of the bridge.</p> <p>This viewpoint is representative of views experienced by road users on National Park Road travelling north-west.</p> | Low |  |
| VP11 | Gumin Gumin Road, Mount Tenandra | <p>This is an open view, which comprises of Gumin Gumin Road to the centre of the view, with wide grassy road corridor and gravel roadway. To the left, Mount Tenandra is located within rural land. To the right, flat rural grazing land is present. Scattered native trees appear in the background of the view and on Mount Tenandra.</p> <p>This viewpoint is representative of road users travelling west.</p> | Low |  |

| Viewpoint | Location | Description | Sensitivity | Existing view |
|-----------|--------------------------------------|--|-------------|--|
| VP12 | Munns Road, Baradine | <p>The view comprises gravel road and grassy verge of Munns Road to the centre. Private rural land is located on either side, including a residence and farm buildings to the left, among scattered trees. Findlays Road can be seen to the right. The geological formation of Square Top Mountain can just be seen, to the far left. This formation is within landscape character zone 3—Warrumbungle slopes and uplands. In the distance, vegetation can be seen on the horizon.</p> <p>This viewpoint is representative of views experienced by road users on Munns Road travelling west.</p> | Low |  |
| VP13 | Baradine Road, Baradine | <p>This view includes Baradine Road to the centre of the view, with a dense corridor of native roadside vegetation on either side, including eucalypts, casuarinas and cypress pines. This vegetation creates a visual barrier and sense of enclosure to the view. Roadside, vegetation is slightly less dense, revealing filtered views to rural land beyond.</p> <p>This viewpoint is representative of road users travelling east.</p> | Low |  |
| VP14 | Gwabegar Road, Baradine | <p>This view includes Gwabegar Road, with dense roadside vegetation on either side. Vegetation is typical of the Pilliga, largely consisting of cypress pines and taller eucalypts, characterised by blue-green foliage and dense mid-storey vegetation. Dappled shadows appear across the road surface and verge.</p> <p>This viewpoint is representative of road users.</p> | Low |  |
| VP15 | Pilliga Forest Way/Country Line Road | <p>This view includes Country Line Road, with the Pilliga East State Forest on either side. The gravel road ascends towards a hill away from the intersection. A clearing is located in the foreground, beyond which the dense forest appears, casting shadows across the road. Signage and road markers are located in the foreground. Vegetation is typical of the forests of the Pilliga, comprising a medium dense open forest with cypress pines and eucalypts.</p> <p>This viewpoint is representative of road users, some of which may include visitors to Salt Caves Picnic Area, a popular recreational area within the Timmallallie National Park.</p> | Low |  |

| Viewpoint | Location | Description | Sensitivity | Existing view |
|-----------|--|--|-------------|--|
| VP16 | Salt Caves Lookout, Timmallallie National Park | <p>This view includes Pilliga forest vegetation, appearing dark brown-green in colour with varying densities of foliage. Sandy red soil can be seen through this vegetation in the foreground. The horizon line is a horizontal linear expanse with slight undulations. Wellyard Road, a gravel road providing access to the picnic area, can be seen in the lower left foreground.</p> <p>This viewpoint is representative of what visitors to the lookout at the Salt Caves Picnic Area within the Timmallallie National Park would experience.</p> | High |  |
| VP17 | Pilliga Forest Way/Twenty Foot Road | <p>This view includes Twenty Foot Road—a red gravel road joining Pilliga Forest Way at an intersection. Pilliga Forest vegetation is located on either side of the road corridor, casting shadows across the roadway. Vegetation consists of medium-height open forest with a dense sub-canopy of cypress pine and canopy of eucalypts. The road is informal, with infrastructure limited to road edge markers and signage.</p> <p>This viewpoint is representative of road users.</p> | Low |  |
| VP18 | Newell Highway, Narrabri | <p>This view is through a gap in roadside vegetation along the Newell Highway. A number of informal trees are located in the foreground, with rural land, a residence and associated buildings. Dense continuous vegetation forms a backdrop to the view, situated along Bohena Creek. The Newell Highway is located in the foreground.</p> <p>This viewpoint is representative of road users travelling south.</p> | Low |  |
| VP19 | Yarrie Lake Road, Narrabri | <p>This is an open and expansive view over the flat plain. The view is comprised of Yarrie Lake Road, with a wide verge to the left and overhead power lines to the right. A driveway to an industrial property can be seen to the left. Two rural residence houses and associated buildings can be seen to the right, one close to the road and the other, close to the Namoi River. To the far right, dense riparian vegetation associated with the river can be seen. Vegetation continues across the view forming a continuous backdrop, associated with existing vegetation within rural land.</p> <p>This viewpoint is representative of local road users, nearby workers and residents.</p> | Moderate |  |

| Viewpoint | Location | Description | Sensitivity | Existing view |
|-----------|-----------------------------|---|-------------|--|
| VP20 | Genanagie Street, Narrabri | <p>This view includes Genanagie Street, open flat pastureland to the centre of the view, and riparian canopy vegetation forming a backdrop, associated with the Namoi River. Some built form can be seen to the left among vegetation, which is associated with the industrial area on the edge of Narrabri. To the right, a power pole is just out of view, which is adjacent to a private property access way.</p> <p>This viewpoint is representative of nearby residences and local road users.</p> | Moderate |  |
| VP21 | The Island Road, Narrabri | <p>This view includes The Island Road—an asphalt road with grassy verge, swale, and overhead power lines. To the centre, a clump of roadside vegetation can be seen in the middle ground where the road crosses a drainage line. Flat rural land is located beyond the road corridor fencing, consisting of pasture grasses, water from recent rainfall, and individual canopy trees. Built form associated with residences and farming uses can be seen in the distance among eucalypt trees. To the right, the driveway of a residence built at elevation above the floodplain can be seen. This is the extent of suburban residential development associated with the Narrabri township. A riparian vegetation corridor associated with Narrabri Creek forms the distant backdrop to the view.</p> <p>This viewpoint is representative of local road users and nearby residents.</p> | Moderate |  |
| VP22 | Kamilaroi Highway, Narrabri | <p>This is a view along the Kamilaroi Highway, a sealed single carriage road with wide grassy verges, overhead power lines and irregular roadside tree planting. A residence is located to the left side of the road corridor just out of view, with industrial properties among dense screening vegetation to either side of the road. Riparian vegetation associated with Narrabri Creek forms a dense green buffer to the background on the right side of the road corridor. Grassy land is located in the foreground beyond roadside fencing, associated with a grazing easement to the right, and the Narrabri Speedway to the left.</p> <p>This viewpoint is representative of road users and a nearby residence.</p> | Moderate |  |

| Viewpoint | Location | Description | Sensitivity | Existing view |
|-----------|----------------------|--|-------------|---|
| VP23 | Lookout, Narrabri | <p>This is an expansive view over the landscape on the outer edge of Narrabri. Low shrubs are located in the foreground, which define the edge of the clearing associated with the lookout area. To the centre of the view, a residence located on Stoltenbergs Road can be seen among canopy vegetation. Beyond this, fields of cropland and pasture are present, with scattered trees along the horizon. Industrial sheds appear to the left of view, located on the outer edge of Narrabri along the Newell Highway. Far distant trees to the right on the horizon are associated with minor geographic elevations west of the Newell Highway, above the riparian floodplain.</p> <p>This viewpoint is representative of visitors to the lookout.</p> | Moderate |  |

B13.3 Impact assessment—construction

The proposal would result in temporary changes to visual amenity during the construction period. These changes would be experienced by sensitive visual receivers, such as residents, motorists, workers and visitors of recreational areas in the vicinity of the proposal site, particularly those at sensitive viewpoints listed in Table B13.2. Visible elements during construction of the rail and road infrastructure would include work sites, machinery and equipment, site fencing, compounds, storage areas, stockpiles, waste materials and partially constructed structures.

The potential impacts on visual amenity of these changes would depend on the nature and intensity of the construction activity. The change in the visual environment would generally be experienced from a relatively short distance. Visual impacts would be more significant at locations where residential or other sensitive receivers have unscreened views towards the proposal site. The greatest potential for visual impacts would be at sensitive receivers with views towards construction compounds and bridge structures under construction.

Other construction activities that may result in changes to visual amenity include:

- ▶ The removal and/or trimming of vegetation that contributes to the amenity and character of the local area and/or screens views from properties surrounding the proposal site
- ▶ Night works resulting in potential lighting impacts on neighbouring properties and residents
- ▶ Increase in heavy vehicle movements on the road network, which would be visible to some receivers.

The removal of vegetation would lead to visual impacts until the works are complete and disturbed areas rehabilitated. The rehabilitation of disturbed areas would be undertaken progressively, consistent with the rehabilitation strategy (see section A8.7) and individual property agreements (where relevant) (see section B12.5).

Light generated during construction would be designed to comply with *AS 4282-1997 Control of the Obtrusive Effects of Outdoor Lighting* (Standards Australia, 1997) and consider the good lighting design principles documented in the *Dark Sky Planning Guideline: Protecting the observing conditions at Siding Spring* (Department of Planning and Environment, 2016). Generally, lighting would be designed to minimise offsite light spill.

Potential visual impacts during construction would be minimised by implementing the measures provided in section B13.5.

B13.3.1 Visual impact

Table B13.3 provides a summary of changes and the significance of potential impacts at representative viewpoints during construction. Overall impact significance ratings at key viewpoints ranged from negligible to moderate. Six viewpoints (VP01, VP04, VP09, VP14, VP19 and VP22) are predicted to have a moderate potential for impact as a result of vegetation clearing and construction of major features close to the viewpoint.

Further information on the ratings and assessment for each key viewpoint is provided in chapter 6 of Technical Report 12.

TABLE B13.3 SUMMARY OF CONSTRUCTION VISUAL IMPACTS

| Viewpoint | Description of change | Magnitude of change | Significance of impact |
|-----------|---|---------------------|------------------------|
| VP01 | Vegetation would provide some screening of the proposal site. Site fencing and the movement of machinery associated with the construction of the rail line would be visible from this viewpoint. | Moderate | Moderate |
| VP02 | Construction vehicles on Tomingley Road and Pinedean Road would be visible from this viewpoint. Construction activities associated with the construction of rail infrastructure would be visible, including machinery, site fencing, and vegetation removal. | Moderate | Moderate–low |
| VP03 | Construction activities are not likely to be visible from this location. | Negligible | Negligible |
| VP04 | Activities associated with the construction of the rail line would be visible from this location, including the presence of vehicles and machinery. | Moderate | Moderate |

| Viewpoint | Description of change | Magnitude of change | Significance of impact |
|-----------|---|---------------------|------------------------|
| VP05 | <p>A construction compound would be situated behind the proposed rail bridge within this view. Construction activities associated with the bridge would include the presence of large machinery as well as tree removal.</p> <p>Construction vehicles on the Mitchell Highway may be visible to the west of this viewpoint.</p> | Moderate | Moderate–low |
| VP06 | <p>A construction compound would be located within rural land to the right of this view, between the proposed rail line and Eumungerie Road. This would include a storage area and construction activities. Due to the absence of roadside vegetation in this location, this compound would be visible from the roadway.</p> <p>Construction vehicles may be visible on Eumungerie Road.</p> | Moderate | Moderate–low |
| VP07 | <p>No construction compounds are proposed in this view. During construction, vegetation clearing and construction activities associated with the rail line and level crossings would be visible. Construction vehicles on Eumungerie Road may be visible from this viewpoint.</p> | Moderate | Moderate–low |
| VP08 | <p>A construction compound is proposed to the left of this view within rural land beyond Nancarrow Road. This would include storage areas for materials and construction activities associated with the proposal. Due to limited roadside vegetation, the compound would be visible from this location.</p> <p>Construction vehicles along The Oxley Highway and Nancarrow Road may be visible from this viewpoint.</p> <p>Construction activities, including vegetation removal and construction of the Marthaguy Creek bridge, would be visible in this view.</p> | Moderate | Moderate–low |
| VP09 | <p>A construction compound would be located to the left of the southern bridge abutment within the view. This would be visible at a distance. The movement of vehicles and construction activities would be visible from this location.</p> | Moderate | Moderate |
| VP10 | <p>Construction vehicles along National Park Road and East Coonamble Road may be visible from this viewpoint.</p> <p>Construction activities associated with the rail line and the new bridge over Castlereagh River in the background are not likely to be visible through the mature vegetation.</p> | Negligible | Negligible |
| VP11 | <p>Construction activities, including vegetation removal associated with the new rail line and a level crossing, would be visible in the immediate foreground of this view.</p> | Moderate | Moderate–low |
| VP12 | <p>A construction compound is proposed in this area, which may be visible to the far right of this view, beyond the tree line.</p> <p>Construction activities may be visible in the distance. Construction vehicles along Munns Road would also be visible from this viewpoint.</p> | Low | Low |
| VP13 | <p>A construction compound is proposed within the rural land to the right, which would be visible within the view. This may include views of storage areas for materials and construction activities associated with the proposal. Construction vehicles along Baradine Road may be visible from this viewpoint.</p> <p>Construction activities, including removal of roadside vegetation associated with construction of the new rail line and a level crossing, would be visible.</p> | Moderate | Moderate–low |

| Viewpoint | Description of change | Magnitude of change | Significance of impact |
|-----------|---|---------------------|------------------------|
| VP14 | A construction compound is proposed adjacent to the rail corridor, which would be visible within this view, to the right. Visible elements may include storage areas, construction machinery and activities. Construction vehicles on Gwabegar Road would be visible from this viewpoint. Construction activities, including removal of roadside vegetation associated with construction of the new rail line and a level crossing, would be visible in this view. | High | Moderate |
| VP15 | A construction compound is proposed about 350 m to the right of this view but would not be visible from this location. Construction vehicles along Pilliga Forest Way would be visible from this viewpoint. Construction activities, including removal of vegetation associated with the construction of the new rail line and a level crossing, would also be visible. | Moderate | Moderate–low |
| VP16 | A construction compound would be located within the distance of this view. It is unlikely that this would be noticeable within this view due to the distance from the viewer and layering of canopy vegetation. | Negligible | Negligible |
| VP17 | A construction compound is proposed about 230 m to the left of this viewpoint but would not be visible from this location. Construction vehicles along Pilliga Forest Way would be visible. Construction activities, including removal of vegetation associated with the construction of the new rail line, a level crossing and realignment of Twenty Foot Road, would also be visible. | Moderate | Moderate–low |
| VP18 | No construction compounds would be visible from this location; however, the Newell Highway is a designated construction access route. A construction compound is located nearby, about 430 m to the right of this viewing location. It is unlikely that this would be seen from the highway due to dense existing vegetation. Construction activities, including removal of vegetation associated with the construction of the new rail line, would also be visible. | Moderate | Moderate–low |
| VP19 | A construction compound is proposed to the left of Yarrie Lake Road. Tall construction machinery and built form above the bridge level may be visible from this view. Construction vehicles along Yarrie Lake Road would be visible from this viewpoint. Construction activities would also be visible. | Moderate | Moderate |
| VP20 | A construction compound is proposed adjacent to the proposed bridge but would not be visible from this location. Construction of the bridge would be screened by existing riparian vegetation. | Negligible | Negligible |
| VP21 | Construction vehicles along The Island Road would be visible along the roadway. Construction activities would be seen along the proposed rail alignment associated with bridge construction works. | Low | Moderate–low |
| VP22 | Construction vehicles along the Kamilaroi Highway and construction activities associated with bridge works would be visible across the extent of this view. | Moderate | Moderate |
| VP23 | Construction vehicles on the Newell Highway and construction activities associated with the rail line may be seen within this view. | Negligible | Negligible |

B13.4 Impact assessment—operation

The proposal would result in the introduction of infrastructure in what is currently mainly a rural area. This would result in a change in the character of properties that are directly impacted by the proposal and a change in views to the proposal site.

An overview of the visual features of the proposal and the potential landscape character and visual impacts are considered in the following sections.

B13.4.1 Main visual features of the proposal

The main features of the proposal with the potential for landscape and visual impacts include:

- ▶ A 306-km long rail corridor cleared of existing vegetation
- ▶ Rail infrastructure along the rail corridor, including crossing loops at Burroway, Balladoran, Curban, Black Hollow/Quanda, Baradine, The Pilliga and Bohena Creek
- ▶ A 1.2-km long rail junction to the west of Narromine (the Narromine West connection)
- ▶ Bridges over rivers and other watercourses (including the Macquarie River, Castlereagh River and the Narrabri Creek/Namoi River system), floodplains and roads
- ▶ Ancillary infrastructure to support the proposal, including signalling and communications, signage and fencing
- ▶ Road realignments, including realignment of the Pilliga Forest Way for a distance of 6.7 km
- ▶ New access roads
- ▶ Presence of double-stacked freight trains along the new rail line, with a height of 6.5 m and up to 1,800 m in length (an example is shown in Figure B13.3).

Further infrastructure on the key operational features is provided in chapter A7.



FIGURE B13.3 EXAMPLE OF A DOUBLE-STACKED FREIGHT TRAIN

B13.4.2 Landscape character impact

The assessment concluded that the significance of permanent landscape character impacts would range from negligible to moderate–low. Landscape character zones 1 to 4 were assessed as having a moderate–low significance of impact, while landscape character zones 5 and 6 were assessed as having a low and negligible significance of impact, respectively. Many of the features associated with the proposal are already located in the existing environment of the study area. The general appearance of the proposal would be consistent with the existing form of this infrastructure.

Table B13.4 provides a summary of changes and the significance of potential impacts for landscape character zones.

TABLE B13.4 SUMMARY OF LANDSCAPE CHARACTER IMPACT RATINGS

| Landscape Character Zone | Description of change | Magnitude of change | Significance of impact |
|-----------------------------------|---|---|------------------------|
| 1—slopes and Plains | <p>Anticipated changes to this zone include the new rail corridor, which would require a clear corridor to be maintained.</p> <p>The rail line is predominantly at-grade, except for grade separations and bridges. Where required, proposed cut-and-fill batters would be much steeper than existing slopes within this zone.</p> <p>In some locations, the rail line follows existing linear road corridors and traverses rural land or along linear property boundary lines or fence lines. When alongside existing roads or linear tree rows, the rail corridor is often sited at a distance to allow for the retention of the existing linear vegetation corridor.</p> <p>New bridges would span across floodplains (and roadways, where appropriate), including the bridge over Narrabri Creek/Namoi River.</p> <p>Multiple new level crossings at public and private road intersections are proposed. Road realignments are proposed at various locations along the rail corridor.</p> | <p>Low</p> <p>The rail corridor has been located to minimise tree removal. The rail line is generally at-grade, and the road and rail corridors are features within the existing landscape character; however, proposed batter slopes would be different to existing landscape characteristics. The changes are relatively minor, overall, with potential to be mitigated during detailed design.</p> | Low |
| 2—waterways and Floodplains | <p>Anticipated changes to this zone include the new rail corridor, which would require a clear corridor to be maintained.</p> <p>Rail bridges are proposed at various locations, including, but not limited to, the Narrabri Creek/Namoi River bridge, two bridges at Bohena Creek at separate locations, Mitchell Highway/Macquarie River bridge, Emogandy Creek bridge, Kickabil Creek and Kickabil Road bridge, Marthaguy Creek bridge, Castlereagh River bridge, and the Baradine Creek bridge. These bridges, which would vary in length, would be concrete in material.</p> | <p>Low</p> <p>Although the rail corridor would result in the permanent removal of vegetation at river and creek crossings, these would occur for short sections within the zone, with the majority of vegetation retained. The proposed rail bridges are existing features within the landscape.</p> | Moderate–low |
| 3—Warrumbungle slopes and uplands | <p>Anticipated changes to this zone include the new rail corridor, which would require a clear corridor to be maintained.</p> <p>The corridor would cross through the zone in various locations, winding around the base of key topographic features, including Mount Tenandra and Square Top Mountain. Some cut-and-fill batters and road realignments are also proposed.</p> | <p>Low</p> <p>The location of the new rail corridor would be similar to the existing pattern of roads. The cut-and-fill batters would contrast with the existing landform, particularly on the western side of Square Top Mountain; however, this has potential to be mitigated during detailed design.</p> | Moderate–low |

| Landscape Character Zone | Description of change | Magnitude of change | Significance of impact |
|-----------------------------|---|--|------------------------|
| 4—Pilliga forests | <p>Anticipated changes to this zone include the new rail corridor with multiple level crossings, requiring a clear corridor to be maintained.</p> <p>The new rail corridor would be located adjacent to existing roads, including Cumbil Road, as well as traversing through areas of open forest. When located adjacent to existing roads, the rail line generally shares the clearing already established by the road; however, this would be widened to accommodate the clear corridor width required.</p> <p>The Pilliga Forest Way would be realigned for a distance of about 6.7 km in this zone. The realigned section of road would be located parallel with the rail corridor.</p> | <p>Moderate</p> <p>The proposal would result in a noticeable change to character of this zone due to the removal of a linear corridor of vegetation. This change would contrast with the existing landscape but would not be uncharacteristic due to existing linear infrastructure.</p> | Moderate |
| 5—township (alluvial plain) | <p>Anticipated changes to this zone would be limited to the northern areas of Narrabri, and the western edge of Narromine. There would be a new rail connection on the western edge of the zone and a new rail corridor adjacent to the Newell Highway. The Narromine West connection would be located on the western edge of the zone, to the west of Narromine.</p> | <p>Low</p> <p>The introduction of the rail corridor on the edge of the zone would not be uncharacteristic within the existing landscape, where existing rail corridors are already present.</p> | Low |
| 6—township (floodplain) | <p>Anticipated changes to this zone would be limited to the north-western area of Narrabri. The proposed Narrabri Creek/Namoi River bridge would be located adjacent to the western edge of this zone.</p> | <p>Negligible</p> <p>Imperceptible changes in the landscape character are predicted.</p> | Negligible |

B13.4.3 Visual impact

The extent to which the proposal would be visible from the identified viewpoints would vary depending on existing topography, vegetation, land use and the form of the proposal when viewed from each viewpoint. The potential permanent visual impacts were assessed in relation to the identified 23 key viewpoints shown in Figure B13.2 and described in Table B13.2.

General visual impacts would occur as a result of vegetation loss, introduction of a new rail corridor, changes to existing roads, and associated infrastructure in a typically rural landscape setting.

Visual representations of representative bridge structures are provided in Figure B13.4 to Figure B13.6 to illustrate how the proposal may appear and affect views at these locations.



FIGURE B13.4 MITCHELL HIGHWAY RAIL BRIDGE AT NARROMINE (VIEWPOINT 5)



FIGURE B13.5 RAIL BRIDGE AT YARRIE LAKE ROAD, NARRABRI (VIEWPOINT 18)



FIGURE B13.6 KAMILAROI HIGHWAY RAIL BRIDGE, NARRABRI (VIEWPOINT 22)

Table B13.5 provides a summary of the proposed changes and the potential significance of impacts at each viewpoint. Moderate impacts were predicted at viewpoints 14 and 22, due to the extent of vegetation removal and the introduction of a new rail bridge, respectively. Fourteen viewpoints (viewpoints 1, 2, 4 to 9, 11, 13, 17 to 19 and 21) were found to have a moderate–low visual impact. One viewpoint (viewpoint 15) was found to have a low visual impact and six viewpoints (viewpoints 3, 10, 12, 16, 20, 23) were found to have a negligible visual impact. Impact to views from the two recreational areas assessed were found to be negligible.

The proposal has been designed to minimise the potential impacts as far as practicable, through routing and siting of infrastructure elements and by minimising clearing in areas of significant vegetation. A number of mitigation measures have been developed to further reduce the visual impacts of the proposal. These would be implemented during the detailed design phase.

Mitigation measures are provided in section B13.5 to minimise the adverse visual impacts as far as practicable. Potential visual impacts on heritage-listed items are considered in section B7.4.1.

TABLE B13.5 SUMMARY OF OPERATION VISUAL IMPACTS

| Viewpoint | Description of change | Magnitude of change | Significance of impact |
|------------------|---|---|-------------------------------|
| VP01 | The proposed rail line would be noticeable within the view. During operation, double-stacked freight trains would be visible at various times, moving across the view. The rail line would be slightly elevated above the existing surface. Proposed new fencing to either side of the rail corridor may also be visible. Some tree removal would also be noticeable. | Low Trains are already characteristic within the view due to the existing rail line. | Moderate–low |

| Viewpoint | Description of change | Magnitude of change | Significance of impact |
|-----------|--|---|------------------------|
| VP02 | The proposed rail line would appear within the view as it crosses Tomingley Road at a level crossing. This would appear as rail tracks at the same level as the road, with road line marking, signage, warning lights and boom gates. Some existing vegetation would be removed to accommodate the cleared rail corridor. Some vegetation would also be cleared along the roadway, including foreground trees to the right of the view and trees close to the roadway along the left of the view. | Moderate The proposal would result in the loss of trees at this location. The proposed level crossing and associated infrastructure would be a new feature in the view. Although the changes would be obvious, the tree removal could be partially mitigated with future plantings. | Moderate–low |
| VP03 | The proposed double-stacked freight trains would be seen at various times, appearing to the left of the view, where a clearing is located towards the proposed rail line. The height of the trains would appear at a lower height than the tree canopy. Although the changes would be obvious, the tree removal could be partially mitigated with potential future planting. | Negligible The impact is considered negligible due to the distance and almost unnoticeable change to the existing characteristics of the view. | Negligible |
| VP04 | The proposed rail line and trains would extend across the extent of the view. The rail line may be visible. There are two existing rail lines in this location. New fencing is proposed on either side of the rail corridor, which would be visible. The trains would be seen at various times, travelling across the view. The height of the trains would appear at a lower height than the tree canopy. | Low The proposed change would be visible when trains are using the new rail line. | Moderate–low |
| VP05 | The proposed new grade separation of the rail line and the Mitchell Highway would appear in the centre of the view, extending across the roadway. To the right, a batter and bridge abutment would be located partially behind foreground trees and shrubs. From the abutment, the concrete rail bridge would extend over the roadway and continue, elevated, to the left, towards the Macquarie River, partially screened by foreground trees. The bridge would be elevated on vertical structural piers. Within the view, a number of trees would be removed to accommodate the rail infrastructure. Double-stacked freight trains would be visible on the bridge at various times each day. | Moderate The new road bridge and associated elements would be new built-form features extending across the view. They would not appear out of scale due to the existing canopy vegetation. Vegetation removal has the potential to be partially mitigated over time. Tree removal would also be partly visually mitigated by the presence of retained foreground and background trees. | Moderate–low |
| VP06 | The proposed level crossing with Eumungerie Road would be visible. The rail tracks would continue across the extent of the view to the right within rural land. The tracks would be at a similar level to the existing land. All dense vegetation along the left of the roadway would be removed, as well as the tall eucalypts, and all foreground vegetation within rural land to the right. Rail corridor fencing would be located on either side of the rail corridor. Double-stacked freight trains would be visible at various times. | Moderate The anticipated changes would be noticeable, particularly when trains are visible, and out of character with the existing open rural view. | Moderate–low |

| Viewpoint | Description of change | Magnitude of change | Significance of impact |
|-----------|---|--|------------------------|
| VP07 | The level crossing over Dubbo–Burroway Road would be visible. Existing trees to the centre of the view would be removed to allow for the rail corridor clearing. Roadside vegetation along Eumungerie Road would be retained. The rail line would disappear from view behind these trees, to the right. All foreground vegetation to the left of Dubbo–Burroway Road would be removed to accommodate the rail corridor. Double-stacked freight trains would be visible at various times. | Moderate The extent of vegetation removal across the view, which cannot be replaced, would affect this view. The level crossing and presence of trains would also be a new feature within the view. | Moderate–low |
| VP08 | The proposed new level crossing of the Oxley Highway would be visible beyond the Nancarrow Road intersection. The rail tracks would cross over the road at-grade, and associated line marking, signage, warning lights and boom gates would be visible. To the right of the level crossing, the rail line would rise in elevation on a landform batter to a bridge. This would extend across the view over the floodplain towards the creek. Vegetation removal would include roadside vegetation within the view, as well as scattered vegetation within land to the left. Riparian vegetation would also be removed to accommodate the rail corridor to the far right of the view. Double-stacked freight trains would be visible at various times. Fencing would be visible along the rail corridor. | Moderate The scale and extent of new rail infrastructure would not be characteristic of the existing view. | Moderate–low |
| VP09 | The rail line would extend across the view. This would be visible mainly at the southern abutment where the line elevates from the existing level to the Castlereagh River bridge. Some tree removal would be required; however, this may be visually mitigated by surrounding vegetation. Double-stacked freight trains would be visible at various times on the rail line and bridge. Fencing would be visible. | Low The new rail infrastructure would be similar in character to the existing view. | Moderate–low |
| VP10 | The proposed new bridge over the floodplain and Castlereagh River would be located behind riparian vegetation within the foreground of this view. Some train movements may be visible from this location when trains are passing through; however, this is likely to be the only visual change. | Negligible Dense intervening vegetation screens views to the proposal site. | Negligible |
| VP11 | The proposed level crossing would appear within the immediate foreground of the view. This would include new rail tracks at the same level as the existing grade, extending across the view. Signage would be seen at the crossing location. Fencing would be located on either side of the rail corridor with the adjoining rural land. The roadside trees to the left of the road would be removed to accommodate the proposal. Double-stacked freight trains would be visible at various times on the rail line and bridge. | Moderate The level crossing and rail line would be new visible elements in the existing view, although they would be predominantly at ground level and within the existing view composition, with limited tree removal. | Moderate–low |
| VP12 | The proposed rail line would be largely screened by existing vegetation; however, trains may be visible beyond the extent of existing trees at various times. | Negligible The proposed rail line would be screened by vegetation. | Negligible |

| Viewpoint | Description of change | Magnitude of change | Significance of impact |
|-----------|---|---|------------------------|
| VP13 | The proposed new at-grade crossing over Baradine Road would be visible in this view. New road line-marking, signage, warning lights and boom gates would be visible. Roadside vegetation would be removed to accommodate the proposal. This would open up views towards rural land and the rail line. Double-stacked freight trains would be visible at various times on the rail line. Fencing would be visible along the rail corridor. | Moderate Vegetation removal would change the composition of the view but this change could be partially mitigated over time with new plantings. | Moderate–low |
| VP14 | The proposed level crossing would appear across the road corridor at the same grade as the existing road. Signage, road line marking, warning lights and boom gates would be visible. Vegetation removal would include existing roadside vegetation within this view, revealing an open clearing to the rail line and a nearby access track. Double-stacked freight trains would be visible at various times on the rail line. Rail corridor fencing would be visible along the rail corridor. | High The large extent of vegetation likely to be removed within the view has potential to be mitigated to some extent with future plantings. | Moderate |
| VP15 | The proposed new rail line would be visible crossing over Country Line Road at a similar level to the existing ground. The rail line would increase in elevation towards a nearby bridge on batter slopes. The tracks would be visible crossing the roadway at the level crossing, together with associated signage. Double-stacked freight trains would be visible on the line at various times. A thin row of trees may be retained along Pilliga Forest Way to the right and left of the view. There would be filtered views through these trees to the rail corridor behind. Vegetation would also be removed to either side of Country Line Road, opening up views along the road corridor to the centre. | Low The retention of some foreground vegetation would mitigate the change and the new elements would not be in contrast to other transport-related features within the view. | Low |
| VP16 | The proposed rail line would traverse the extent of this view in the distance. Vegetation would be permanently removed within the rail corridor; however, it is unlikely that the proposal would create a noticeable change to this view due to the distance from the viewer and layering of canopy vegetation. | Negligible This view is unlikely to change. | Negligible |
| VP17 | Twenty Foot Road is proposed to be realigned in this location. The new roadway and proposed level crossing would appear to the far left of the existing view. The rail line would be seen at a similar level to the existing ground level, with warning signs at the level crossing location. Double-stacked freight trains would be visible using the rail line at various times. Vegetation would be removed across the majority of the left side of the existing roadway. | Moderate Vegetation removal and new level crossing within the view would result in moderate impact but there is potential for some visual mitigation of the existing roadway. | Moderate–low |
| VP18 | The proposed rail line would be located parallel to the Newell Highway on the northern side. The landform and rail line would be located behind existing roadside vegetation and in the approximate location of the centrally located trees, which would be removed. The landform would be relatively high, screening built form behind; however, some vegetation would be seen, associated with Bohena Creek. Double-stacked freight trains would appear on the elevated rail line at various times. | Moderate The new landform and rail line would be a new feature within the view. This change would not substantially change the view's overall composition but views to the floodplain and built form would be removed, and the depth of the view would no longer remain. | Moderate–low |

| Viewpoint | Description of change | Magnitude of change | Significance of impact |
|-----------|--|--|------------------------|
| VP19 | The proposed rail line would be elevated above the roadway and extend across the floodplain to the right, towards the Namoi River, behind the existing residential properties. The elongated bridge would have associated structural concrete piers at various intervals, raising it above the ground level, which would be seen within the view. Double-stacked trains would be visible on the bridge at various times. Some vegetation along Yarrie Lake Road in the foreground of the bridge would be removed. | Low The bridge would be a new feature within the view at a relatively small scale. The composition and overall character of the view would not be substantially impacted by the change. Any tree removal to the foreground could be mitigated by future planting along the roadway. | Moderate–low |
| VP20 | The proposed new bridge would be located behind multiple layers of existing riparian vegetation within the view and within rural land beyond the Namoi River. Although the bridge would be elevated above the floodplain, it would not be visible from this location, due to the intervening vegetation and the distance from the viewpoint. | Negligible There would be no change to the existing view due to the distance and presence of screening vegetation. | Negligible |
| VP21 | The proposed new rail bridge would be visible extending across the floodplain behind foreground vegetation and built form. The bridge would be below the height of background riparian trees. To the left of the road, the bridge would be largely screened by intervening vegetation and built form. Double-stacked freight trains would be visible on the bridge at various times. These would appear above the distant horizon line. | Low The bridge would be a new feature within the view, albeit at a relatively small scale. The composition and overall character of the view would not be substantially impacted by this change. | Moderate–low |
| VP22 | The proposed new rail bridge would extend across the view elevated above the road. The bridge would descend in elevation from the right of the view as it crosses Narrabri Creek, to the left towards the speedway. The bridge would be elevated on vertical structural piers. The majority of the bridge would be visible within this view. A number of foreground trees along the highway and riparian vegetation may need to be removed to accommodate the rail corridor. Trees along the industrial property interface to the left of the view in the location of a proposed road realignment may also need to be removed. Double-stacked freight trains would be visible on the rail bridge at various times. | Moderate A new built-form element would feature across the extent of this view. Although much of the background vegetation would remain, the overall character of the view would change. The change would be permanent. There is potential for partial mitigation. | Moderate |
| VP23 | The trains using the line would be visible due to the open nature of the landscape and the height and length of proposed trains. | Negligible The proposal would only be visible when trains are operating and this is at a distance from the viewpoint. | Negligible |

Lighting impacts

During operation, it is expected that the main potential contributors to lighting impacts would be trains and warning lights associated with active level crossings.

As the trains are freight trains, the only source of night-time lighting is likely to be a single light source or a group of lights at the front of the train. These lights, together with the warning lights at active level crossings, are not expected to result in significant impacts on the Dark Sky Region, given the relatively limited output.

B13.5 Mitigation and management

B13.5.1 Approach

Approach to mitigation and management

The assessment identified that the proposal would result in visual impacts at some viewpoints and landscape character changes for some landscape character zones. There would also be temporary visual impacts during construction.

Approach to managing the key potential impacts identified

Design development has included a focus on avoiding and/or minimising the potential for impacts on visual amenity during all key phases of the process. Further information on the urban design objectives and how these have been integrated in the design process to date, is provided in section A7.5. The urban design objectives would continue to be refined and tested during the detailed design. This would assist in minimising the potential for adverse impacts on visual amenity and the broader landscape.

ARTC's *Inland Rail Landscape and Rehabilitation Strategy* and *Inland Rail Landscape and Rehabilitation Framework* have been developed to establish governing landscape objectives and principles, as well as outline landscape and rehabilitation treatment solutions for various phases of the overall program.

During detailed design, an urban design and landscape plan would be prepared by a suitably qualified consultant to provide a consistent approach to design and landscaping. This would be context specific, and include a vision and place-specific objectives and principles to ensure the design is well integrated into its surrounding environment. Further information is provided in section A7.5.

As described in section A8.7, a rehabilitation strategy would be prepared to guide rehabilitation planning, implementation, monitoring and maintenance of disturbed areas. The strategy would include measures to provide for the long-term rehabilitation of areas disturbed by construction. This would assist in minimising the potential for visual impacts as a result of construction.

Approach to other impacts

Other mitigation measures are listed in Table B13.6.

Expected effectiveness

Urban design objectives have been incorporated into the concept design and would be further refined during detailed design. A range of mitigation measures are provided. These measures, combined with implementing the urban design and landscape plan and rehabilitation strategy, would develop a solution that maximises the protection of the existing visual values and landscape character of the proposal site and adjoining areas.

Audits and reporting of the effectiveness of environmental management measures is generally carried out to show compliance with management plans and other relevant approvals and would be outlined in detail in the CEMP. As described in section A8.7, the rehabilitation strategy would include procedures for monitoring and maintaining landscaped areas to ensure planting becomes established and ensure the effectiveness of these treatments are appropriately implemented and maintained.

Interaction between measures

Measures to mitigate and manage the potential for biodiversity, erosion, heritage and land use and property impacts (described in chapters B1, B4, B7 and B12) would also assist in mitigating the potential for visual impacts.

B13.5.2 List of mitigation measures

Measures that will be implemented to address potential impacts on visual amenity are listed in Table B13.6.

TABLE B13.6 VISUAL AMENITY MITIGATION MEASURES

| Stage | Ref | issues/Impacts | Mitigation measures |
|--------------------------------------|-----|--|--|
| Detailed design/ pre-construction | LV1 | <i>Minimising the potential for visual and landscape impacts</i> | Detailed design and construction planning would seek to minimise the construction and operation footprints and avoid impacts on mature native vegetation as far as reasonably practicable. |
| | LV2 | <i>Minimising the potential for visual and landscape impacts</i> | An urban design and landscape plan would be prepared to provide a consistent approach to design and landscaping. The urban design and landscape plan would include: <ul style="list-style-type: none"> ▶ Vegetation screening in strategic locations to visually mitigate impacts from new structures and rail operations, including around bridges and locations where the proposal would be visible from sensitive receivers, where the presence of screening does not impact safe rail operations ▶ Appropriate species that respond to the existing landscape character setting and environmental conditions ▶ Design guidelines to minimise the visual impacts of bridges, with consideration of the existing landscape and visual context and with regard to <i>Bridge aesthetics: design guidelines to improve the appearance of bridges in NSW</i> (Roads and Maritime Services, 2019). Detailed design would be undertaken in accordance with the urban design objectives developed for the design, and the urban design and landscape plan. |
| | LV3 | <i>Batter slopes in contrast with the existing landform</i> | Batter slopes would be integrated into the surrounding landscape as far as practicable. Appropriate slope stabilisation would be integrated into batter design to ensure successful rehabilitation and stabilisation. |
| | LV4 | <i>Minimising light spill</i> | Temporary and any permanent lighting would be designed and sited in accordance with: <ul style="list-style-type: none"> ▶ <i>AS 4282-1997 Control of the Obtrusive Effects of Outdoor Lighting</i> (Standards Australia, 1997) ▶ <i>Dark Sky Planning Guideline: Protecting the observing conditions at Siding Spring</i> (Department of Planning and Environment, 2016). |
| Construction | LV5 | <i>Visual impacts of construction compounds</i> | Construction compounds would be located, as far as practicable, within cleared areas and away from sensitive receivers. Compounds would be designed and orientated to minimise visual impacts. This would include locating areas of low visual amenity away from sensitive receivers and erecting boundary screening around compounds, where appropriate. |
| | LV6 | <i>Protection of trees</i> | Trees to be retained would be protected prior to the commencement of construction in accordance with <i>AS4970-2009 Protection of trees on development sites</i> (Standards Australia, 2009b). |
| | LV7 | <i>Landscape character and visual impacts</i> | Rehabilitation of disturbed areas would be undertaken progressively in accordance with the rehabilitation strategy (mitigation measure BD11) and individual property agreements (mitigation measure LP3) (where relevant). |
| | LV8 | <i>Minimising light spill</i> | Lighting of work areas, compounds and work sites would be oriented to minimise glare and light spill impact on adjacent receivers. |
| Operation | LV9 | <i>Landscape character and visual impacts</i> | Vegetation provided in accordance with the rehabilitation strategy (mitigation measure BD11) and urban design and landscape plan (mitigation measure LV2) would be subject to ongoing monitoring and maintenance in accordance with ARTC's standard operating procedures. |

B13.5.3 Managing residual impacts

Residual impacts are impacts of the proposal that may remain after implementation of:

- ▶ Design and construction planning measures to avoid and minimise impacts (see sections A7.2 and A8.1)
- ▶ Specific measures to mitigate and manage identified potential impacts (see sections B13.5.1 and B13.5.2).

The key potential landscape and visual issues and impacts originally identified by the environmental risk assessment (see section A9.1) are listed in Table B13.7. The (pre-mitigation) risks associated with these impacts, which were identified by the environmental risk assessment, are provided. Further information on the approach to the environmental risk assessment, including descriptions of criteria and risk ratings, is provided in section A9.1.

The potential issues and impacts identified by the environmental risk assessment were considered as part of the landscape and visual impact assessment, summarised in sections B13.3 and B13.4. The mitigation and management measures (listed in Table B13.7) that would be applied to manage these impacts are also identified. The significance of potential residual impacts (after application of these mitigation measures) is rated using the same approach as the original environmental risk assessment. The approach to managing significant residual impacts (considered to be those rated medium or above) is also described.

An assessment of the residual risks associated with visual impacts is included in Table B13.7.

TABLE B13.7 RESIDUAL IMPACT ASSESSMENT—VISUAL AMENITY

| Assessment of pre-mitigated risk (see section A9.1 and Appendix E) | | | | | Mitigation measures (see Table B13.6) | Residual impact assessment | | | |
|--|--|------------|-------------|-------------|---------------------------------------|----------------------------|-------------|-------------|---|
| Phase | Potential impacts | Likelihood | Consequence | Risk rating | | Likelihood | Consequence | Risk rating | How residual impacts will be managed ¹ |
| Operation | Permanent visual impacts on sensitive visual receivers as a result of the introduction of new infrastructure visible from a number of viewpoints (including new rail overbridges, crossing loops, ancillary infrastructure and access road). | Likely | Moderate | High | LV1 to LV4 and LV9 | Possible | Moderate | Medium | The urban design and landscape plan would consider the use of materials and treatments to minimise potential impacts with consideration of the surrounding landscape and context. |

Note: 1. For residual impacts with a risk rating of medium or above.