EIS Volume 1 Chapter 13

Visual Amenity

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13. Visual Amenity

This chapter describes the potential effects of the construction and operation of the Project on visual amenity within the visual impact study area identified for the Project. This chapter provides an assessment of the likely effect on residents, workers and visitors within the visual impact study area and is based on the outcomes of the specialist Visual Impact Assessment, attached as Appendices L-1 and L-2.

13.1. Key Findings

- Visual impacts related to the Project have been mitigated through a detailed route selection process which has avoided visual receptors and visually sensitive landscapes where possible, alignment with other existing transmission infrastructure corridors and design of Project elements to reduce visual massing.
- The Project infrastructure will not be visible beyond 6.2 km (the Theoretical Zone of Visual Influence – TZVI). Modelling of Project infrastructure shows that the vast majority of the receptors within the TZVI will not have views of the transmission line and towers, while others will have limited visibility due to visual mitigation factors which reduce the level of impact such as vegetation shielding, topography and existing transmission infrastructure.
- Construction activities will not result in significant negative visual impacts as these activities are likely to be short-term involving days (rather than months) in one location before moving to the next tower location.

Table 13-1 below provides a summary of visual impact assessment for identified receptors.

Table 13-1: Summary of visual impact on receptors

Receptor	Summary of visual impact assessment
Social	The vast majority of potential social receptors, including residential properties (towns and agricultural areas) and structures for intermittent residency are located within the Negligible Visibility zone. Eleven receptors were located within the Very Low Visibility Zone and two receptors were located within the Low Visibility Zone. One receptor was located in each of the Moderate and High Visibility zones.
Town centres	The Project will not be visible from the townships of Morgan, Cadell and Renmark as these are located outside of the TZVI. Residents on the east of Robertstown may observe Project elements in the distance, but these views will not be dominated by the Project. Cooltong will likely experience a higher degree of visual impact however this will be mitigated by the presence of existing electricity distribution infrastructure, and vegetation shielding in the vicinity of most properties.
Tourism areas	Views of the Project will not be possible from the River Murray, or its immediate surrounds due to topographic barriers and vegetation shielding preventing views to the north. Other areas of conservation importance, such as Calperum Station and Taylorville Station, have a low number of receptors in the proximity of the proposed alignment (i.e. visitors that frequent the southern boundaries) which reduces the overall level of impact.
Road users	Views of the Project from major and minor roads within the TZVI will be possible for short sections of a journey. Impacts at the western end will be mitigated by the presence of existing transmission infrastructure and the transient and short duration of the views.

13.2. Setting the Context

This section provides the context for the impact and risk assessment. It describes:

- the relevant EIS Guidelines

- relevant requirements in legislation and other standards
- views of stakeholders and the environmental and social outcomes they would like the project to meet
- the assessment methodology used to identify baseline environmental values and to undertake the impact and risk assessment.

13.2.1. EIS Guidelines

The EIS Guidelines require an assessment of the visual effect of the constructed lattice transmission towers and wires along the alignment. This includes assessment of impacts on visual amenity of residents, road users and tourists during construction, operation, maintenance and decommissioning[1] aspects of the proposal. The EIS must also describe the likely impact and mitigation measures required to minimise the potential loss of visual amenity (refer Table 13-2).

Table 13-2: EIS Guidelines addressed in the Visual Amenity chapter

EIS Guidelines and Assessment Requirements	Assessment level
Visual Impacts / Interface with adjacent land users *Assessment requirement 8*: The effect of large number of lattice towers (i.e. approximately 475 towers – typically 50 m in height and spaced 450 – 600 m apart) along an approximately 190 km alignment, which would represent a significant visual element in the landscape.	
• 8.1: Describe the effects of the proposal on the visual amenity and landscape quality for residents, visitors and tourists (especially near the River Murray Valley, major road crossings and other sensitive landscapes). Refer to construction, operation, maintenance and decommissioning aspects of the proposal, and outline the methodology adopted for classifying landscapes and assessing visual and landscape impacts.	Medium
• 8.2 Describe alternative measures for minimising potential loss of visual amenity (e.g. structural design and placement, screening) and detail any compensatory and site rehabilitation measures that will be undertaken to minimise visual impacts as a result of vegetation clearance.	Medium

Aspects of assessment requirements identified in Table 13-2 which are not addressed in this chapter are listed in Table 13-3 together with the applicable chapter.

Table 13-3: Aspects of assessment requirements addressed in other chapters

Assessment requirement	Chapter
8.2 Measures to minimise visual impacts	Chapter 4 Route Selection

13.2.2. Requirements in legislation and other standards

As there is no specific South Australian legislation or guidelines which regulate the assessment of impacts to visual amenity, general guidance for assessment and management of visual impacts of significant infrastructure is provided through the State's statutory planning framework.

The Planning and Design Code provides for the design and siting of structures to reduce aesthetic impacts to rural vistas, minimise impacts on the natural environment, avoid obscuring existing public views to landscape and minimise impacts from key public vantage points and scenic routes. The planning assessment (including visual impacts of the Project) against the Code is provided in Chapter 5 Legislative and Planning Framework.

[1] The design life of the Project is approximately 100 years. Decommissioning will be conducted in accordance with environmental standards and legislative requirements at that date (refer Chapter 7 Project Description). The visual impacts of decommissioning have therefore not been considered further in this chapter.

The Visual Impact Assessment (VIA) was also designed to align with 'best practice' by utilising the following documents:

- Guidance Note for Landscape and Visual Assessment (2018), Australian Institute of Landscape Architects
- Western Australia Environmental Assessment Guideline for Environmental factors and objectives (EPA WA 2018)
- Visual Landscape Planning in Western Australia (2007), A manual for evaluation, assessment, siting and design, Western Australian Planning Commission
- Swanwick, C (2013), Guidelines for Landscape and Visual Impact Assessment. 3rd ed. United Kingdom: Landscape Institute and Institute of Environmental Management and Assessment
- Lothian, A (2000), Landscape Quality Assessment of South Australia. PhD Thesis Adelaide University.

13.2.3. Views of stakeholders

ElectraNet has undertaken a thorough stakeholder engagement program which has included engagement with affected landholders and known social receptors in close proximity of the transmission line corridor. Feedback received from local government, landholders and local residents regarding visual amenity addressed:

- the opportunity to underground the transmission line to reduce visual impact
- impact on property values as a result of the transmission lines obstructing views
- impact to quality of lifestyle due to large structures obstructing landscape
- avoiding impact on the tourism and recreation use on the River Murray
- avoiding townships and residential areas.

13.2.4. Assessment Method

The method of assessment has followed that set out in Chapter 8 Impact Assessment Methodology. The Visual Impact Assessment Report is provided at Appendix L-1.

The visual impact assessment (VIA) considers the impacts that are expected to occur as part of the construction, operation and maintenance of the proposed transmission line and Bundey substation and was undertaken in two phases as shown in Figure 13-1.

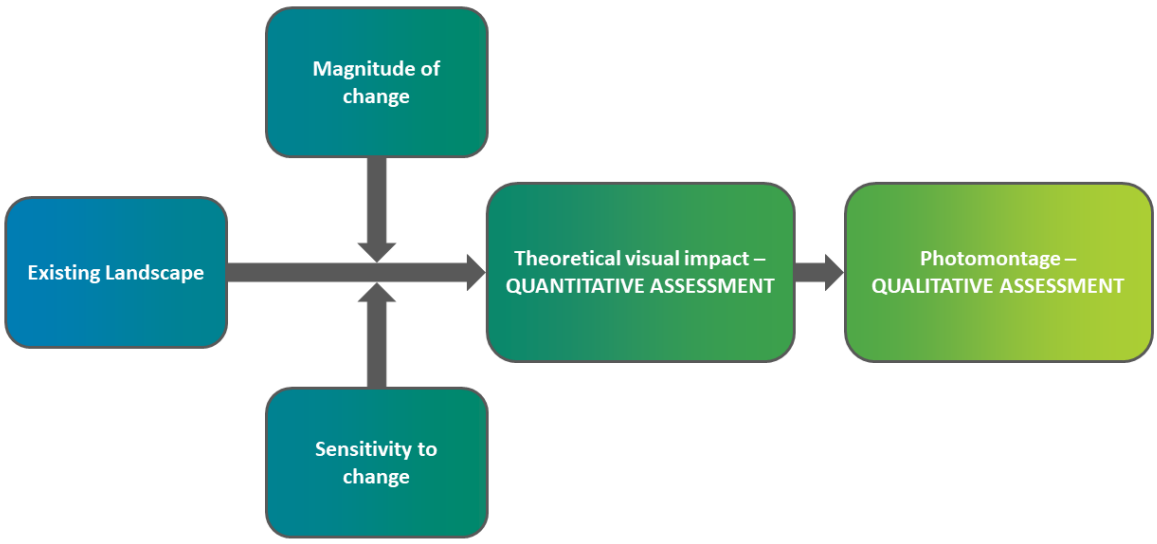


Figure 13-1: Visual impact assessment process

Phase 1 – Quantitative assessment – theoretical visual impact

A quantitative desktop assessment was undertaken to determine the theoretical visual impact of the Project and included the following:

- determination of the Theoretical Zone of Visual Influence (TZVI) to assist in defining the visual impact study area[2]
- classification and description of the existing visual landscapes within the study area
- identification of potential visual receptors within the visual impact study area
- determination of the key visual elements to be modelled
- assessment of the visual impact based on the incorporation of the magnitude of change with sensitivity to change criteria.

The quantitative desktop assessment comprised the components summarised in Table 13-4 which, when combined, produce the theoretical visual impact.

Table 13-4: Components of quantitative assessment

Component	Inputs	Model	Outputs
Magnitude of Change	• Proposed Project design • Distance to receptor	Magnitude of Change Model	Theoretical Visual Impact
Sensitivity to Change	• Visual Landscape Scenic Quality and Visual Absorption Capacity • Distance from existing transmission line infrastructure • Vegetation height	Sensitivity to Change Calculation	

An input table for each input component of the quantitative assessment was developed to rank each component of visual impact at different locations in the study area. The score from each input table was subjected to the following formula to calculate the visual impact rating:

- Distance of receptor from Project Infrastructure (**a**) is determined
- This number (**a**) is then multiplied by the average of the sum of the 'sensitivity to change factors' [Visual Landscape Scenic Quality (**b**), vegetation height (c), distance from existing transmission line infrastructure (d)] as summarised in the following formula:

a x (average of b+c+d) = quantitative visual impact model score

A description of the visual impact rating model scores and the corresponding degree of visual impact is presented below in Table 13-5.

Table 13-5: Theoretical visual impact matrix

Model Score	Description	Modelled visual impact rating
101 – 128	Developments dominate the visual field and dramatically alter the landscape.	**High Visibility**
76 – 100	Developments are very obvious in the visual field and alter the landscape.	**Moderate Visibility**
51 – 75	Developments are obvious, but do not dominate the landscape.	**Low Visibility**
26 – 50	Developments can be seen in the visual field and alter the landscape to a small degree.	**Very Low Visibility**

[2] For the purposes of the assessment discussed in this chapter, the 'visual impact study area' equates to the area described as the 'project area' in the Visual Impact Assessment at Appendix L

Model Score	Description	Modelled visual impact rating
1 – 25	Limited / no visual effect on the landscape, visible as a very minor feature in some locations.	**Negligible Visibility**
0	Outside the TZVI	**Outside TZVI**

Theoretical Zone of Visual Influence (TZVI) and visual impact study area

The Theoretical Zone of Visual Influence (TZVI) is the area within which the components of a development are theoretically visible to a human receptor standing on the ground. The key factors in determining this are the visual capability of humans (human field of vision), the dimensions of the development, the distance (visual attenuation) of the viewpoint, and the characteristics of the surrounding topography.

Through the use of spatial data analysis and photomontages, the visual impact of the Project was modelled. The analysis concluded that the study area for the purposes of the VIA is defined as the outer limit of the TZVI of the tallest infrastructure element of the Project (i.e. a maximum radius of 6.2 km from each tower location).

Phase 2: Qualitative assessment – Photomontage assessment

A qualitative photomontage assessment to verify and support the quantitative analysis / assessment included the following:

- Selection of viewpoint locations for the development of representative photomontages. Photomontage locations were selected to provide examples of a variety of views towards the Project infrastructure in a variety of landscape contexts.
- Photomontages were created using a combination of assessment with Global Positioning System (GPS) referencing, on-site photographic capture and computer-generated simulations. The base modelling of the development for photomontages was produced using Blender™ (3D computer graphics software tool set used for creating animated films, visual effects, art, 3D printed models, interactive 3D applications and video games). Kolor Autopano Giga Pro™ was used for stitching the individual photographs together into a panorama. Adobe Photoshop™ was used for combining the base photography with the 3D elements and for masking purposes. All three programs are commonly used within the development industry for visual assessment of infrastructure projects.
- Quantitative assessment of the photomontages to assess the level of visual impact.

13.3. Description of Existing Environment

The proposed Project infrastructure will be located within a variety of visual landscape types which will provide context to the perception of potential receptors of the various infrastructure elements.

A visual landscape type (VLT) is an area that can be described, assessed and classified based on distinctive visual elements and common visual characteristics. Eight VLTs have been defined for the purposes of the visual impact assessment based on the IBRA bioregions and dominant land uses in the area of the Project (refer Figure 10-3).

The vegetation and landform characteristics of the relevant IBRA bioregions are described further in Chapter 10 Physical Environment and Chapter 11 Flora and Fauna. Land uses are described further in Chapter 9 Land Use and Tenure.

VLTs in the area of the Project are shown on Figure 13-2 with examples of VLTs provided in Plate 13-1 to Plate 13-8.

Table 13-6: Description of visual landscape types

Bioregion	Visual landscape type	% of total alignment length	Description
Flinders Lofty Block	Low Hills	3.84%	Sparse low shrublands on plains between undulating hills, and Mallee woodland eucalyptus on the crest of hills. Significant clearing for agricultural purposes has confined remnant native vegetation primarily to hills, watercourses and roadsides. Used mainly for agricultural with scattered farm residences and a range of road types (refer Plate 13-1).
Murray Darling Depression	Degraded Agricultural Plains	28.68%	Relatively flat terrain with no specific focal aesthetic features, and no significant waterbodies present. Highly calcareous loamy earths with yellow to grey cracking clays vegetated predominately by low-lying shrubs and is very sparsely populated (refer Plate 13-2).
	Dryland Agriculture	18.09%	Matrix of cleared fields, where native mallee has been removed, and appears to be utilised primarily for grazing. Topography of the area is generally flat and featureless (refer Plate 13-3).
	Murray-Darling Depression Irrigated Agriculture	7.94%	Gently undulating to flat topography with calcareous soils that have been cleared of native vegetation for intensive irrigated horticulture activities. Population density is sparse, with few residences in the area. Due to the presence of agriculture infrastructure and lack of vegetation, the VLT is highly modified (refer Plate 13-4).
	Mallee Dunefield	19.54%	Second largest VLT within the area of the Project with highest density of vegetation cover. Brown calcareous soils with variable dune cover. Ephemeral waterbodies present with a number of reserves utilised for tourism, scientific and recreational purposes. Population density within this area is very low (refer Plate 13-5).
Riverina	Irrigated Agriculture	3.64%	Gently undulating to flat topography hosting a mixture of irrigated agricultural activities. This VLT largely consists of vineyards and orchards with scattered native eucalyptus vegetation. Also comprises the township of Cooltong and dispersed agricultural residences (refer Plate 13-6).
	Eastern Riverina	18.27%	Area includes the Riverland Ramsar site which hosts extensive flood plains, islands, lakes and wetlands. Comprises low lying shrub plains with views towards the vast low-lying wetlands of the River Murray floodplain. Landscape also comprises the township of Cooltong and the development of infrastructure has been limited (Plate 13-7).
	Western Riverina	0% – alignment bypasses the VLT, but is falls within the TZVI	Western section of the Riverina hosts views of the Murray River. There is an increase in height and density of vegetation underlain by brown sands, which consists of eucalyptus woodlands and irrigated horticultural lands (fruit orchards). This landscape type hosts scattered residences along the river banks as well as a camping and recreation sites. The townships of Morgan and Cadell are located in this VLT (refer Plate 13-8).

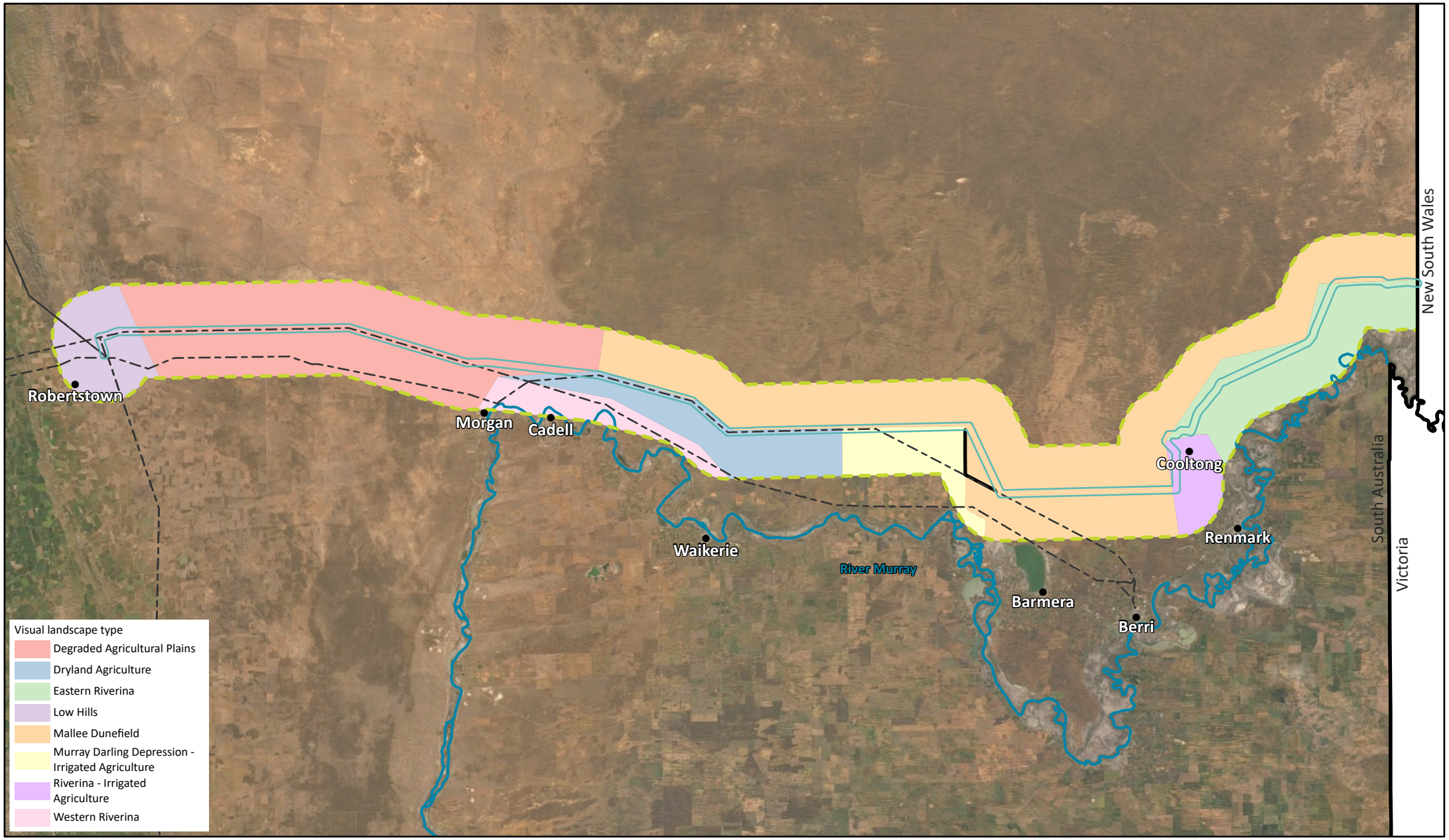


Figure 13-2
Visual landscape types on the transmission line corridor

Plate 13-1: Example of a typical Low Hills VLT

Plate 13-2: Example of Degraded Agricultural Plains VLT

Plate 13-3: Example of Dryland Agriculture VLT

Plate 13-4: Example of Murray-Darling Depression Irrigated Agriculture landscape

Plate 13-5: Example of Mallee Dunefield VLT

Plate 13-6: Example of Riverina Irrigated Agriculture VLT

Plate 13-7: Example of showing Western Riverina VLT

Plate 13-8: Example of Eastern Riverina VLT

13.4. Impact Assessment

The following aspects of the Project have been identified as sources of visual impacts on sensitive receptors:

- movement of construction vehicles, helicopters, establishment of laydown areas and construction camps
- light spill from night-time lighting at laydown areas and construction camps
- the presence of the operational towers and associated conductors in the landscape
- maintenance and other operational activities.

The potential impact events resulting from these aspects of the Project are discussed below.

13.4.1. Construction

Movement of construction vehicles, helicopters, establishment of laydown areas and temporary construction camps and clearance of native vegetation

Impacts related to the construction phase will be limited to the short period when construction is undertaken at each tower location and will be temporary and localised.

The construction phase will involve the presence of heavy machinery, light vehicles and potentially helicopters, temporary establishment of construction camps, laydown and staging areas and some clearance of native vegetation.

Very few visual impact receptors are located within the transmission line corridor, and these are located in the community of Cooltong. The construction camps will only be present during the construction phase of the Project and will be located close to the centre of the alignment and away from visual receptors. A high standard of 'housekeeping' at construction camps will be maintained and wastes will be appropriately stored and regularly removed from site to minimise visual impacts. The impact of construction on nearby receptors will be further mitigated as the Project will have a short construction duration at each tower location. Potentially impacted landholders will be notified in advance of construction activities.

Some short-term loss of amenity may be experienced by individual landholders in the transmission line corridor as a result of temporary changes to the visual aesthetic of the landscape. Small areas of vegetation will be cleared to facilitate the construction of the tower footings. Due to the predominance of low vegetation, limited vegetation clearing within the proposed easement is expected which will not result in a change to views unless the receptor is immediately adjacent to the clearing. Partial reinstatement of these clearings will occur post construction with operational clearances maintained for operations. Disturbed land will be re-contoured to match surrounding ground levels.

In areas of temporary clearance (e.g. laydown areas) cleared vegetation will be stockpiled and placed over returned topsoil to assist in natural regeneration. Based on the low levels of weeds present and level of regeneration observed in field surveys, areas of mallee are expected to regenerate well, particularly if rootstock is left in place. Rehabilitated areas will be actively monitored for weed species (particularly after periods of high rainfall.

Visual impacts to individual landholders from construction activities are expected to be **Negligible to Minor**.

Light spill from night-time lighting at laydown areas and temporary construction camps

Impacts from light spill from construction areas will be minimised by ensuring that lighting is directed inward and downward.

The construction camps are temporary and will only be present during the construction phase of the Project. Generally, these will be located close to the centre of the alignment and away from visual receptors. While there are very few receptors immediately adjacent to the proposed alignment, construction camps will be situated taking into consideration the shielding impact of topography and vegetation where receptors are present nearby.

Design guidelines within the Construction Environmental Management Plan for all construction areas will ensure that lighting impacts are contained while still meeting health and safety requirements.

No impacts to landholders from light spill are expected.

13.4.2. Operation and maintenance

Presence of the operational towers and associated conductors in the landscape

The modelling of the Project infrastructure shows that the majority of the receptors within the TZVI will not be aware of the presence of the transmission line.

In general, the towers will be evident as artificial structures on the landscape. The steel lattice towers will contrast with the largely natural visual setting, however the design of the towers as a lattice structure will allow the receptor to 'see through' the towers to the landscape and views beyond. Given the terrain is generally flat, most views of the towers will be skyline views, with the sky forming a backdrop to the towers across the landscape. The conductors appear almost invisible beyond a couple of kilometres and are not considered to constitute a significant component of the overall visual impact.

A key driver of the Project route selection process was to mitigate potential visual impacts by siting the proposed alignment away from areas that are visually sensitive e.g. towns or scenic tourism locations. This ensured that these locations are generally either at the periphery, or outside of the TZVI.

Key potentially sensitive receptors were identified early in the Project scoping process and included towns, and tourism hotspots. This assisted the refinement of the alignment away from the River Murray and its associated wetlands, as well as avoiding towns such as Morgan, Cadell and Renmark. In addition, consideration was given to locating the alignment close to existing linear infrastructure and areas of disturbance such as roads and existing transmission infrastructure.

Results of modelling of the TZVI area

The percentage of the area of the total TZVI (i.e. the visual impact study area) within each impact zone was modelled. Modelling showed that, prior to consideration of receptors, over 87% of the visual impact study area falls within the Negligible Visibility zone, with 8% of the area falling within the Very Low Visibility zone. The Low and Moderate Visibility zones each covered approximately 2%, with less than 0.5% of the area falling into the High Visibility zone as shown in Table 13-7.

Table 13-7: Visual impact matrix of TZVI Area

Description	Modelled visual impact rating	Percentage of area of total TZVI within each impact zone
Developments dominate the visual field and dramatically alter the landscape.	**High Visibility**	0.3%
Developments are very obvious in the visual field and alter the landscape.	**Moderate Visibility**	2.6%
Developments are obvious, but do not dominate the landscape.	**Low Visibility**	1.5%
Developments can be seen in the visual field and alter the landscape to a small degree.	**Very Low Visibility**	8.1%
Limited / no visual effect on the landscape, visible as a very minor feature in some locations.	**Negligible Visibility**	87.4%

Potential receptor locations within the TZVI were spatially analysed against the VIA model to determine the theoretical level of visual impact from different receptor locations as described below (and refer Appendices L-1 and L-2). Figure 13-3 to Figure 13-7 show the theoretical visual impact model outcome for the alignment and associated receptors[3].

[3] Receptors with potential for Negligible to No Visibility are not shown on the figures.

Verification of quantitative assessment

Photomontage locations were selected to provide examples of views towards the Project infrastructure in a variety of landscape contexts. Photomontages were produced to allow representative views of various landscape types where a number of towers could be seen across the landscape. Ten photomontages were generated and assessed (refer Appendix L) and a selection of six are listed in Table 13-8 and provided in Figure 13-8 to Figure 13-12 to demonstrate the theoretical visual impact.

Overall the photomontages were found to verify the findings of the quantitative assessment, that the visual impact of the Project infrastructure across the visual impact study area was generally Negligible (refer Appendix L for details).

Table 13-8: Viewpoint montage locations and theoretical visual impact assessment

Visual analysis	View direction	Distance from infrastructure (m)	Theoretical visual impact description	Comment
VP04	South-south-east	8005	Outside TZVI	Photomontage of viewpoints outside the TZVI were selected (e.g. VP04) to confirm the validity of the TZVI by demonstrating that the transmission infrastructure would not be visible from these points (refer Figure 13-8).
VP03	North-west	1951	Negligible Visibility	VP03 and VP14 illustrate locations of Negligible Visibility (refer Figure 13-9 and Figure 13-10)
VP14	North-east	2140	Negligible Visibility	
VP17	North-west	48	Very Low Visibility	Based on the model inputs, although VP17 is rated as having Very Low Visibility, the photomontages indicate that the Project infrastructure will be theoretically visible. This viewpoint could potentially be classified with a higher impact rating however it has been assessed at a lower impact level due to the presence of existing infrastructure and the low sensitivity of the visual landscape type (refer Figure 13-11).
VP05	North-east	78	High Visibility	The location at VP05 illustrates the highest visually impacted area, adjacent to the transmission towers (refer Figure 13-12)

Views from towns

The Project will only be visible from Cooltong and to a much lesser extent Robertstown. Visual impacts will be mitigated by topographic barriers, vegetation shielding and existing electricity distribution infrastructure.

The Project will not be visible from the town centres located near the Project alignment (Morgan, Cadell and Renmark), as these centres all fall outside of the TZVI. The Project may be slightly visible from some properties located to the north of these towns, but generally local vegetation shielding will mitigate views of the distant Project infrastructure.

The settlement of Cooltong will be likely to experience higher degrees of visual impact as the Project traverses the southern boundary of Calperum Station, and north of the Cooltong Conservation Park.

Views in this area will be mitigated to some extent by the existing electricity distribution infrastructure, and a degree of vegetation shielding within the vicinity of most of the properties.

Robertstown residents on the eastern side of the settlement may observe elements of the Project in the distance, but these views will not be dominated by the Project. The Bundey substation, and connecting transmission towers are the key infrastructure elements which will be approximately 5.5 km away and will be largely shielded by topographic barriers.

Views from social receptor locations[4]

The highest density of residential development is located outside of the TZVI. The majority of social receptors fall within the Negligible Visibility and Very Low Visibility zones.

Very few residences fall within the TZVI, and the highest density of residential development (in the vicinity of the settlements of Morgan, Cadell and Renmark West) is located outside of the TZVI. Residential areas on the fringes of these settlements, and agricultural residences within farming areas within the TZVI, account for the majority of the social receptors.

As shown in Table 13-9, the largest grouping of social receptors is in the Negligible Visibility and Very Low Visibility zones, representing the lowest visual impact scores. Two receptor locations are likely to have Low Visibility of the transmission line, with only one receptor located within the Moderate Visibility areas. One residential receptor was identified to fall within the area of High Visibility near Cooltong.

Figure 13-3 to Figure 13-7 show the distance from the proposed Project infrastructure and the impacted social receptors identified as experiencing Very Low Visibility to High Visibility. Receptors identified as experiencing Negligible Visibility have not been mapped.

Table 13-9: Potential visual social receptors location impact analysis

Modelled visual impact rating	Social receptor numbers	Description
High Visibility	1	Developments dominate the visual field and dramatically alter the landscape. One social receptor at Cooltong is located within this impact zone (refer Figure 13-5 and Figure 13-6).
Moderate Visibility	1	Developments are very obvious in the visual field and alter the landscape. Two social receptors at Cooltong are located within this impact zone (refer Figure 13-5 and Figure 13-6).
Low Visibility	2	Developments are obvious, but do not dominate the landscape. Two social receptors at Cooltong are within this impact zone (refer Figure 13-5 and Figure 13-6).
Very Low Visibility	11	Developments can be seen in the visual field and alter the landscape to a small degree. Eleven social receptors are located within this impact zone (refer Figure 13-3, and Figure 13-6).
Negligible / No Visibility	463	Limited / no visual effect on the landscape, visible as a very minor feature in some locations. 463 social receptors are located within this impact zone.

Views from tourism areas

There will be a minimal impact on tourist areas as views of the Project will not be possible from the River Murray, or its immediate surrounds due to topographic barriers, and vegetation shielding preventing views to the north.

[4] Social receptors are defined as residents and transient / intermittent residents within the study area, with high frequency of exposure to the Project infrastructure.

The main tourism areas in the vicinity of the TZVI are those that are dependent on the scenic qualities of the River Murray floodplain. The Project passes more than 4 km north at its closest point on the Wentworth-Renmark Road, and the areas adjacent to the River Murray fall outside of the TZVI and therefore will not have views of the Project. The visual mitigation effect of the tall riparian vegetation, and the topographic variation within this area, assist in preventing views of the transmission infrastructure.

Limited numbers of tourists (mainly students and research-related visitors) may be visually impacted by the Project in areas of conservation importance, such as Calperum and Taylorville Stations. Although these visitors will be sensitive to changes to the visual landscape, the low frequency of views in the proximity of the proposed alignment will reduce the magnitude of the impact within the Calperum area. Views of the Project infrastructure will only be possible from the far southern extent of this area and will be mitigated by the height of the vegetation which will shield views from receptors.

Views from roads

Views of Project infrastructure will be possible from some major and minor roads within the TZVI for short sections of a journey.

Project infrastructure will be a dominant feature for transient visual receptors on the Wentworth-Renmark Road within the TZVI. The Wentworth-Renmark Road runs immediately adjacent to the transmission lines on the eastern end of the Project and direct (but fleeting) views will be experienced due to close proximity and lack of screening by vegetation and / or existing transmission infrastructure. Views from other major roads within the TZVI will be from the Goyder Highway between White Dam and Cadell. Major roads in the area of the project are detailed in Chapter 16 Traffic and Transport.

Maintenance

Maintenance activities such as vehicle movements on access tracks will have a negligible impact on visual amenity compared to the presence of the transmission towers.

Ongoing maintenance activities such as light and on occasion heavy vehicle or helicopter movements will have a negligible impact on visual amenity due to the infrequent nature and duration of these activities.

13.4.3. Cultural heritage avoidance alignment – Hawks Nest Station

As discussed in Chapter 4 Route Selection, the transmission line corridor assessed in the EIS was based on the proposed alignment as at January 2021. This alignment was adjusted in February 2021 following Aboriginal cultural heritage surveys on Hawks Nest Station. A review of the visual impact study area and assessment of the potential impacts to visual social receptors identified in the VIA was undertaken on the basis of the realignment and the consequent change to the TZVI (refer Appendix L-2).

A total of 21 new social receptors were identified within the study area (i.e. 6.2 km from towers located on the new alignment). These receptors are expected to largely comprise rural residences with at least two properties used for tourism purposes. There are no towns within the updated study area and transient receptors will be associated with vehicles travelling along the Goyder Highway. A small section of the River Murray at Overland Corner is within the revised TZVI.

All additional social receptors in the revised TZVI were assessed as having Negligible to No Visibility of the Project infrastructure due to topography and the presence of vegetation (refer Appendix L-2).

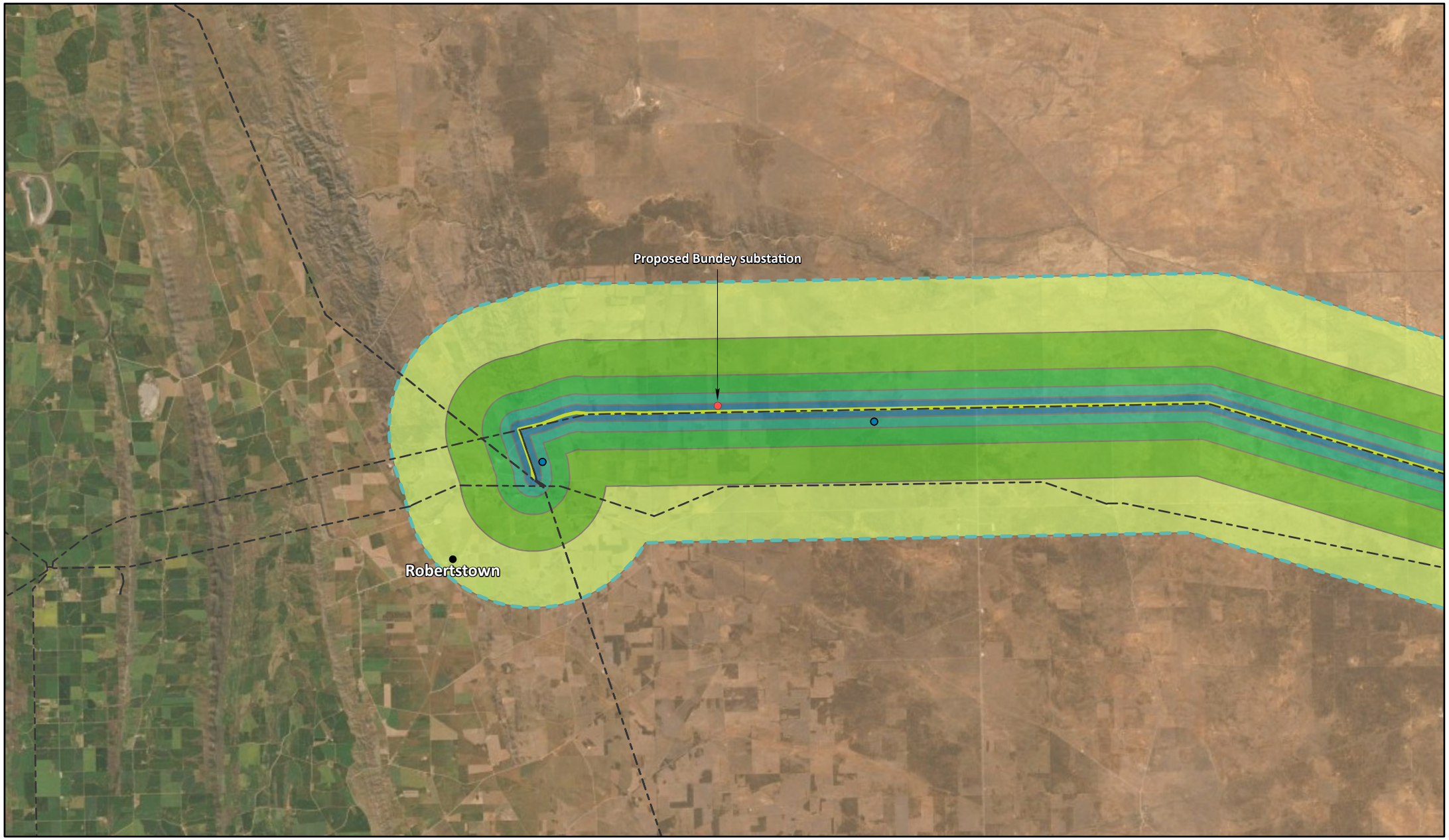
Modelling of views indicates that the small area of the River Murray at Overland Corner is within the Negligible Visibility impact range. Due to the presence of vegetation along the river, the river is not

expected to host views of transmission infrastructure. Views from other tourism areas are not expected to change significantly from the assessment of the previous alignment.

Views of Project infrastructure from towns in the vicinity of the study area and the Goyder Highway are not expected to change as a result of the realignment.

13.4.4. Summary of key mitigation measures

Potential impacts to visual amenity for sensitive receptors have been mitigated as far as practicable in the route selection, alignment of the Project infrastructure and siting of towers (refer to Chapter 4 Route Selection) . The Project has been aligned away from areas with high numbers of visual receptors and adjacent to existing linear infrastructure where possible. Further mitigation measures are not proposed.



VIA study area (6.2km)
Proposed alignment
Existing ElectraNet transmission line
River Murray
Proposed Bundey substation

Distance from proposed project infrastructure
0 - 400m
400 - 900m
900 - 1750m
1750 - 3500m
3500 - 6200m

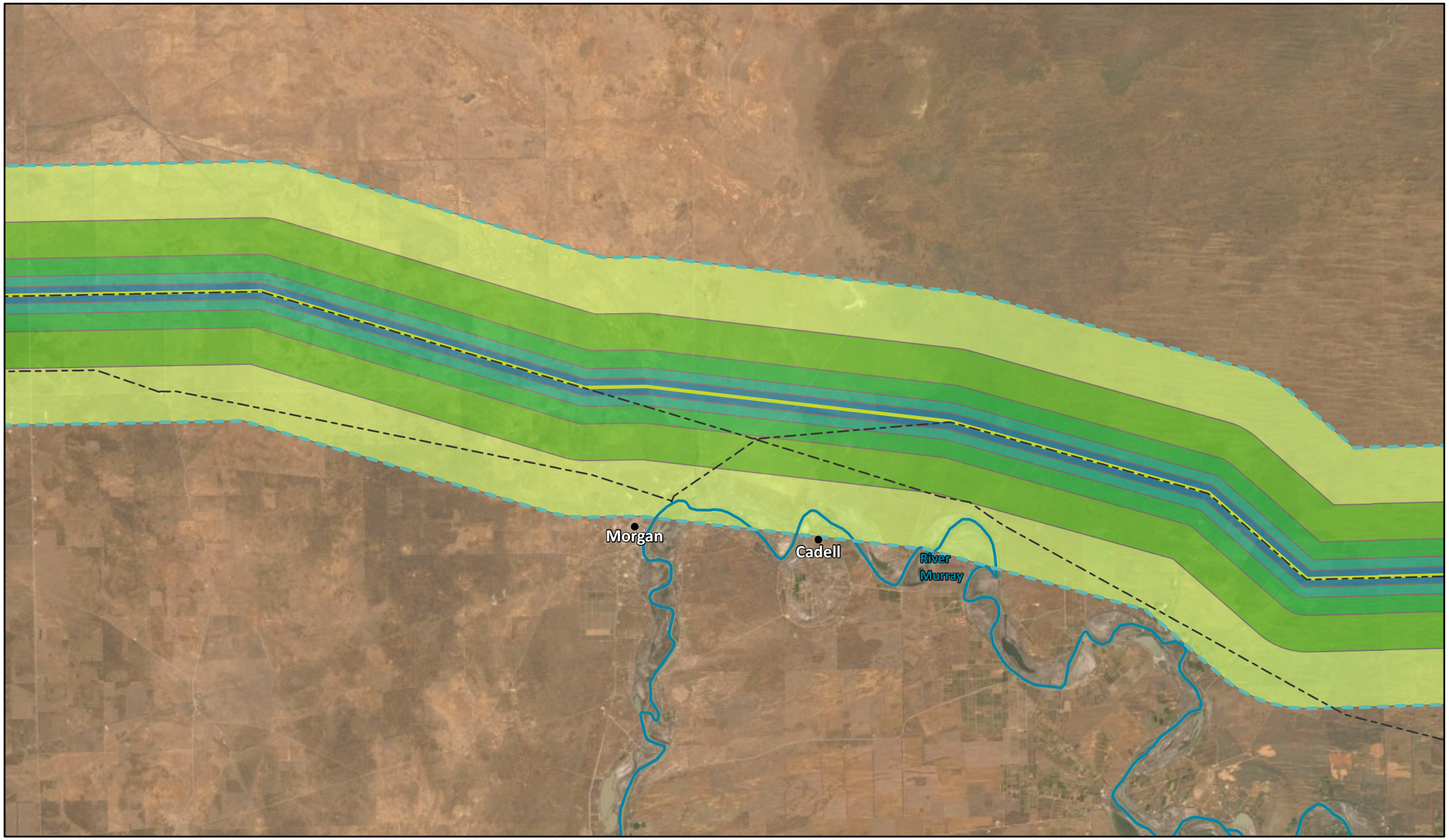
Potential social receptor visibility
Very Low

Figure 13-3
Distance from proposed Project infrastructure to potential social receptors - Robertstown

0 5
Kilometres

N

ElectraNet
energy connect
JBS&G



VIA study area (6.2km)
Proposed alignment
Existing ElectraNet transmission line
River Murray

Distance from proposed project infrastructure
0 - 400m
400 - 900m
900 - 1750m
1750 - 3500m
3500 - 6200m

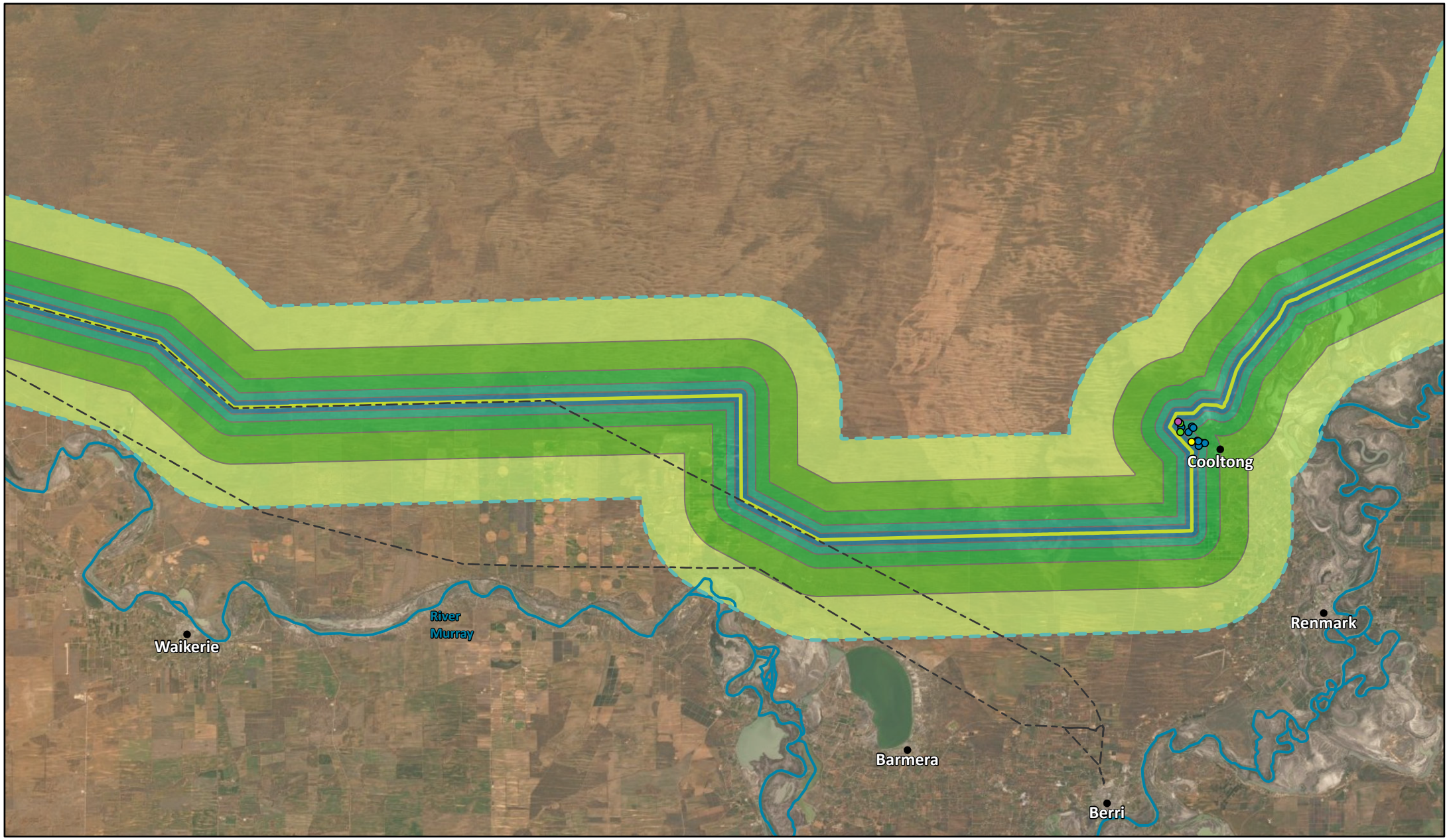
Figure 13-4
Distance from proposed Project infrastructure to potential social receptors - Morgan and Cadell

0 5
Kilometres

N

ElectraNet
energy connect
JBS&G

Note: no impacted social receptors identified



VIA study area (6.2km)
Proposed alignment
Existing ElectraNet transmission line
River Murray

Distance from proposed project infrastructure
0 - 400m
400 - 900m
900 - 1750m
1750 - 3500m
3500 - 6200m

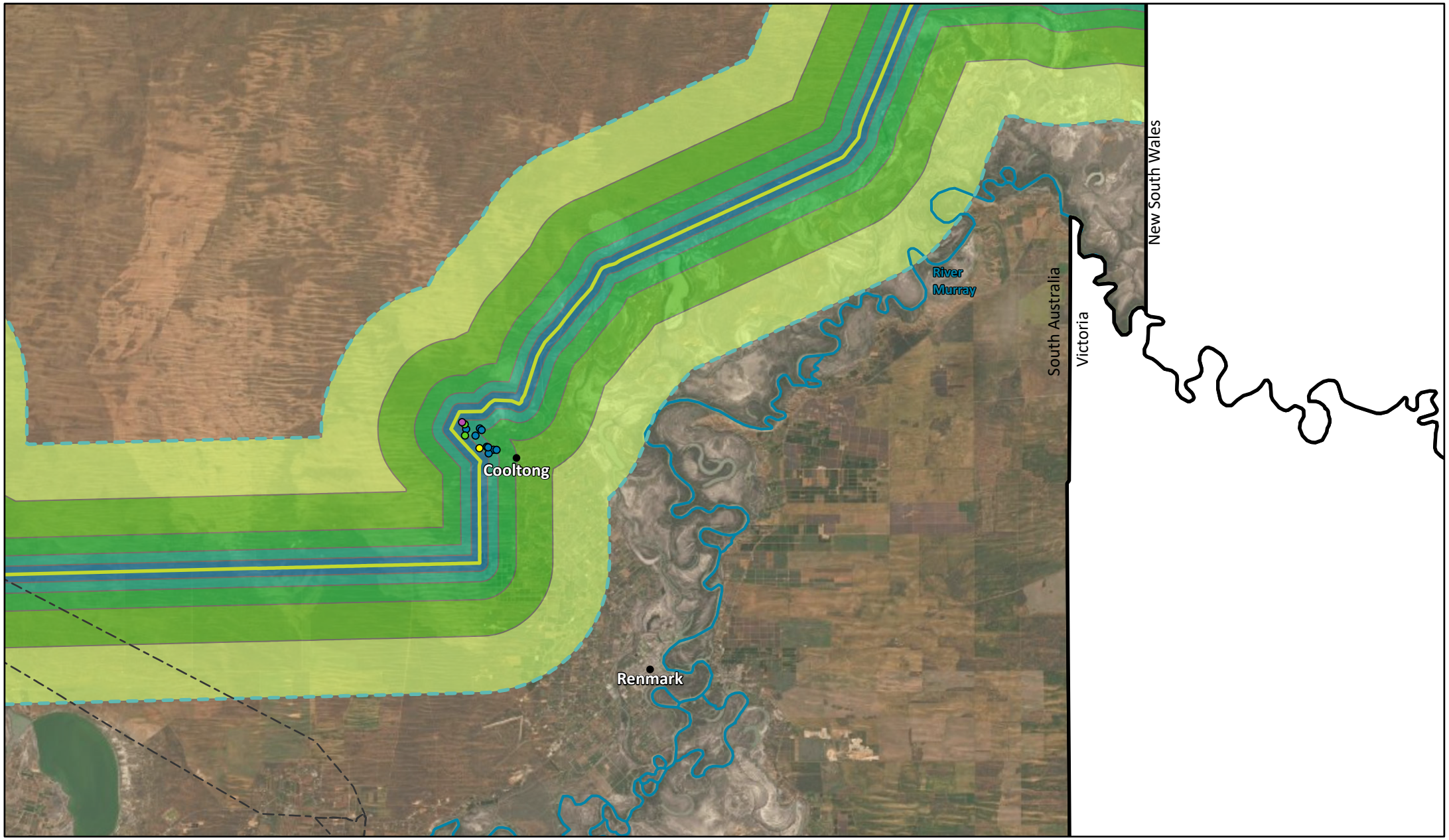
Potential social receptor visibility
High
Moderate
Low
Very Low

Figure 13-5
Distance from proposed Project infrastructure to potential social receptors - Waikerie and Barmera

0 5
Kilometres

N

ElectraNet
energy connect
JBS&G



VIA study area (6.2km)
Proposed alignment
Existing ElectraNet transmission line
River Murray

Distance from proposed project infrastructure
0 - 400m
400 - 900m
900 - 1750m
1750 - 3500m
3500 - 6200m

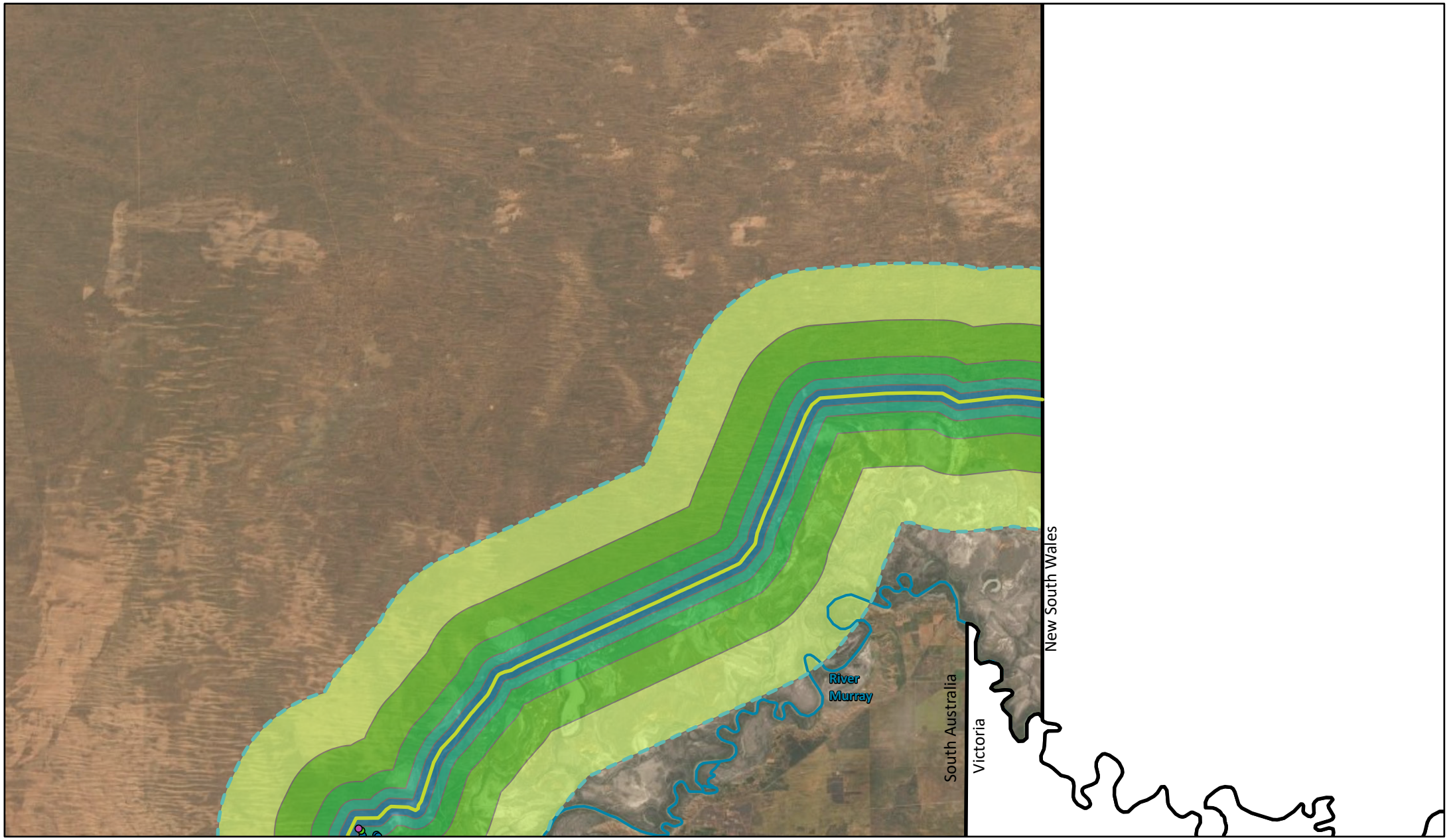
Potential social receptor visibility
High
Moderate
Low
Very Low

Figure 13-6
Distance from proposed Project infrastructure to potential social receptors - Cooltong and Renmark

0 5
Kilometres

N

ElectraNet
energy connect
JBS&G



VIA study area (6.2km)
Proposed alignment
Existing ElectraNet transmission line
River Murray

Distance from proposed project infrastructure
0 - 400m
400 - 900m
900 - 1750m
1750 - 3500m
3500 - 6200m

Potential social receptor visibility
High
Low
Very Low

Figure 13-7
Distance from proposed Project infrastructure to potential social receptors - Wentworth-Renmark Road

0 5
Kilometres

N

ElectraNet
energy connect
JBS&G

Note: no impacted social receptors identified

Current Landscape

Landscape and Project

Project Highlighted

Project Location Overview

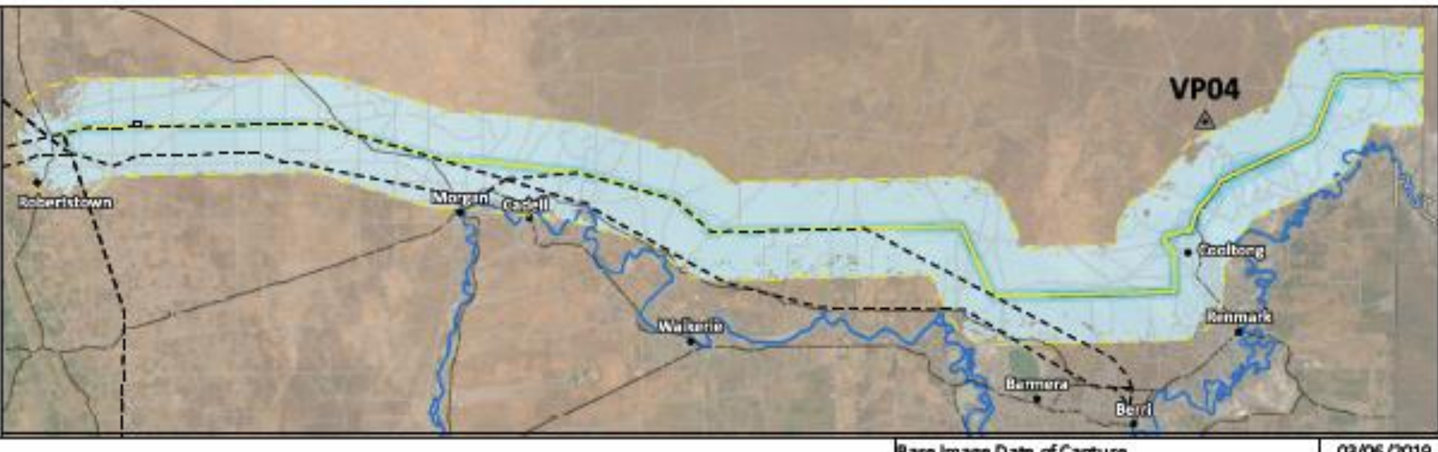


Figure 13-8
Photomontage VP04

Base Image Date of Capture	03/06/2019
Base Image Time of Capture	10:38 AM
View Direction (compass bearing)	160
Eastings	472,282.49
Northings	6,245,446.68
Elevation (mAHD)	43.19
Horizontal Field of View (degrees)	120
Vertial Field of View (degrees)	36
Distance from Project Infrastructure (m)	8,005.57
Associated Visibility	Outside TZVI
Visual Landscape Type	Outside TZVI
Sensitivity to Change	Outside TZVI
Average Vegetation Height	Outside TZVI
Sensitivity to Change	Outside TZVI
Distance of receptor from Existing powerline Infrastructure	Outside TZVI
Sensitivity to Change	Outside TZVI
Theoretical Visual Impact Level	Outside TZVI

Job No: 55766	
Client: ElectraNet	
Not to Scale at A3	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB
Image Reference: JBS&G / Convergen	

Legend:
Project Tower Designs
(presented in 'Projected Highlighted' image)

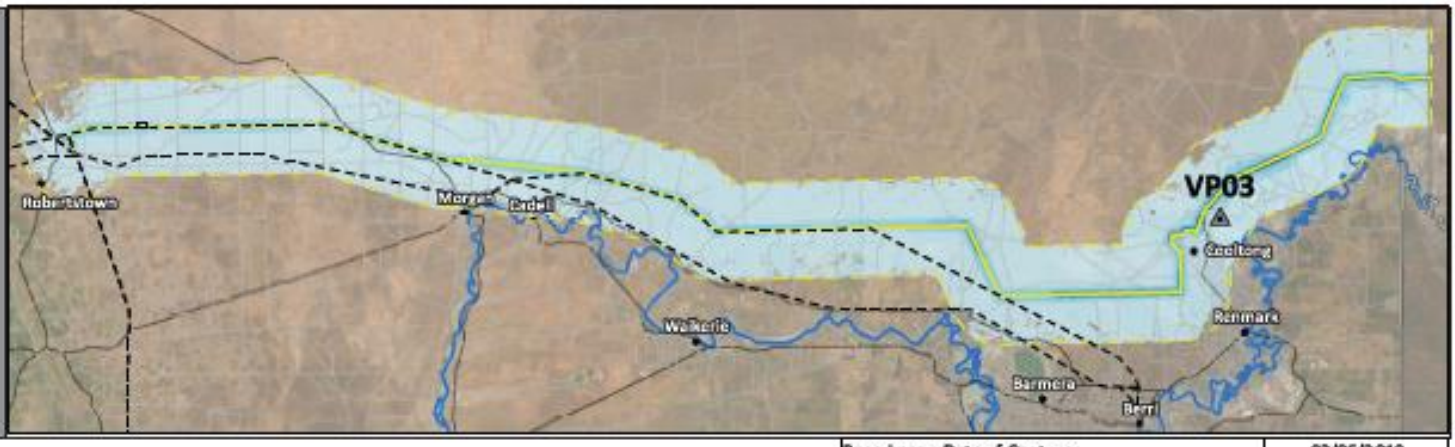
64.5m (Medium Angle Strain) Tower

Current Landscape

Landscape and Project

Project Highlighted

Project Location Overview



JBS&G

Figure 13-9
Photomontage VP03

Base Image Date of Capture	03/06/2019
Base Image Time of Capture	11:27 AM
View Direction (compass bearing)	298
Eastings	473,338.51
Northings	6,233,119.94
Elevation (mAHD)	18.31
Horizontal Field of View (degrees)	120
Vertial Field of View (degrees)	36
Distance from Project Infrastructure (m)	1,951.04
Associated Visibility	Low
Visual Landscape Type	Eastern Riverina
Sensitivity to Change	High
Average Vegetation Height	<1m
Sensitivity to Change	High
Distance of receptor from Existing powerline Infrastructure	>3,351m
Sensitivity to Change	High
Theoretical Visual Impact Level	Negligible Visibility

Job No: 55766	
Client: ElectraNet	
Not to Scale at A3	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB
Image Reference: JBS&G / Convergen	

Legend:
Project Tower Designs
(presented in 'Projected Highlighted' image)

64.5m (Medium Angle Strain) Tower

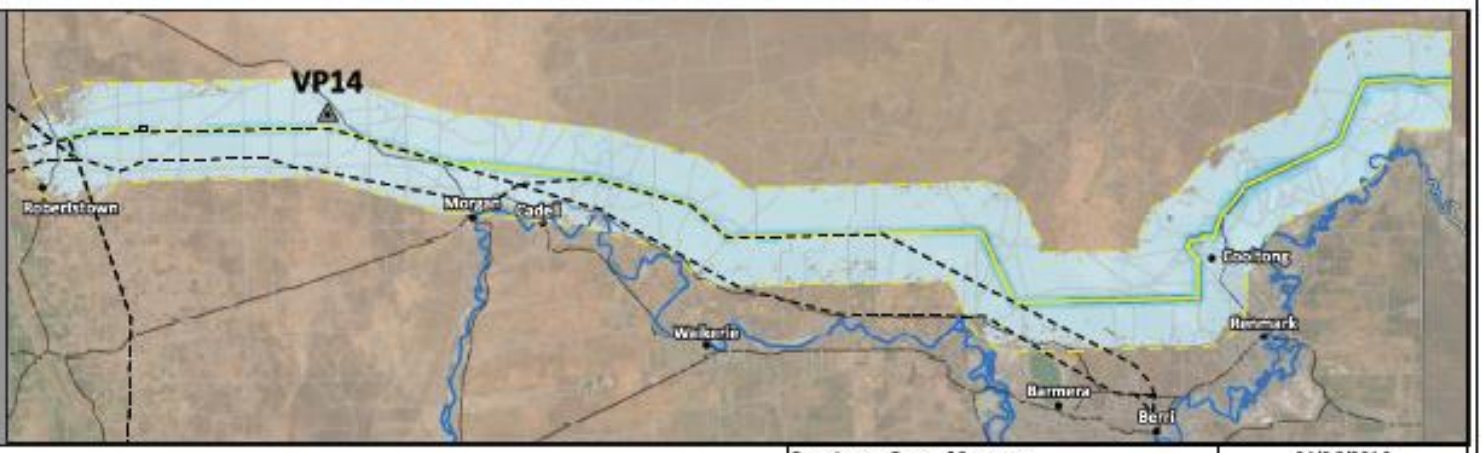
Document Path: V:\05 Project\Electranet\55377_Electranet EnergyConnect Environment and Planning\03_VIA\07_Photomontage\03_RevC_2020_11_19\12_20_55\377_RevC_2020_11_25.cdr

Current Landscape

Landscape and Project

Project Highlighted

Project Location Overview



JBS&G

Figure 13-10
Photomontage VP14

Base Image Date of Capture	04/06/2019
Base Image Time of Capture	2:00 PM
View Direction (compass bearing)	195
Eastings	358,831.66
Northings	6,246,969.31
Elevation (mAHD)	108.14
Horizontal Field of View (degrees)	120
Vertial Field of View (degrees)	36
Distance from Project Infrastructure (m)	2,139.96
Associated Visibility	Low
Visual Landscape Type	Degraded Agricultural Plains
Sensitivity to Change	Low
Average Vegetation Height	3 – 10m
Sensitivity to Change	Low
Distance of receptor from Existing powerline infrastructure	1,676 - 3,350m
Sensitivity to Change	Moderate - High
Theoretical Visual Impact Level	Negligible Visibility

Job No: 55766	
Client: ElectraNet	
Not to Scale at A3	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/DB
Image Reference: JBS&G / Convergan	

Legend:
Project Tower Designs
(presented in 'Projected Highlighted' image)

64.5m (Medium Angle Strain) Tower

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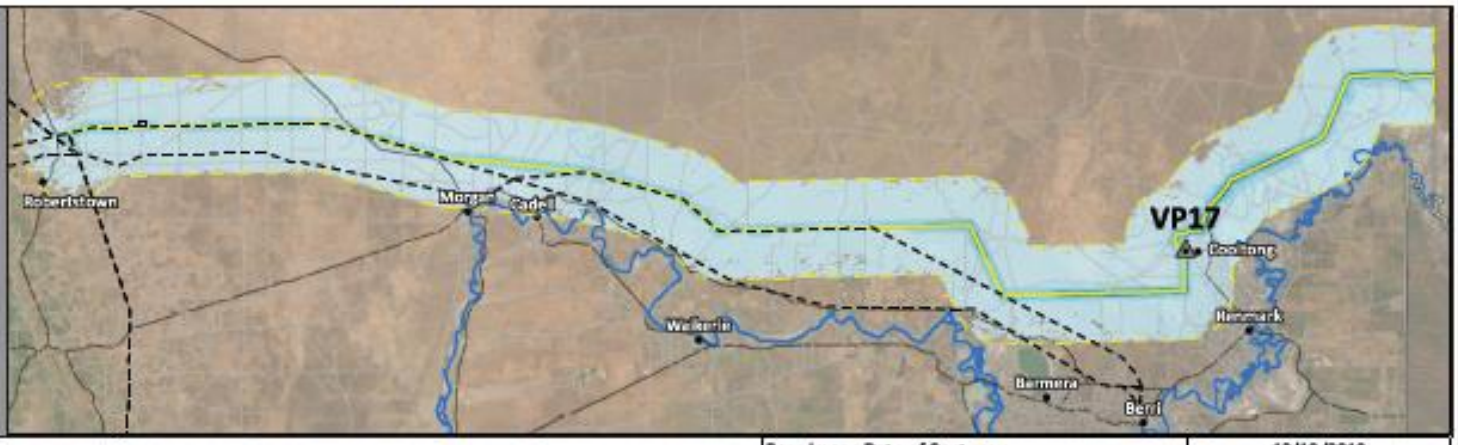
Current Landscape

Landscape and Project

Project Highlighted

Project Location Overview



JBS&G

Figure 13-11
Photomontage VP17

Base Image Date of Capture	12/10/2019
Base Image Time of Capture	10:14 AM
View Direction (compass bearing)	290
Eastings	468,597.21
Northings	6,228,951.02
Elevation (mAHD)	41.67
Horizontal Field of View (degrees)	120
Vertial Field of View (degrees)	36
Distance from Project Infrastructure (m)	555.87
Associated Visibility	Moderate
Visual Landscape Type	Riverina - Irrigated Agriculture
Sensitivity to Change	Low
Average Vegetation Height	<1m
Sensitivity to Change	High
Distance of receptor from Existing powerline Infrastructure	>3,351m
Sensitivity to Change	High
Theoretical Visual Impact Level	Very Low Visibility

Job No: 55766	
Client: ElectraNet	
Not to Scale at A3	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB
Image Reference: JBS&G / Convergen	

Legend:
Project Tower Designs
(presented in 'Projected Highlighted' image)

64.5m (Medium Angle Strain) Tower

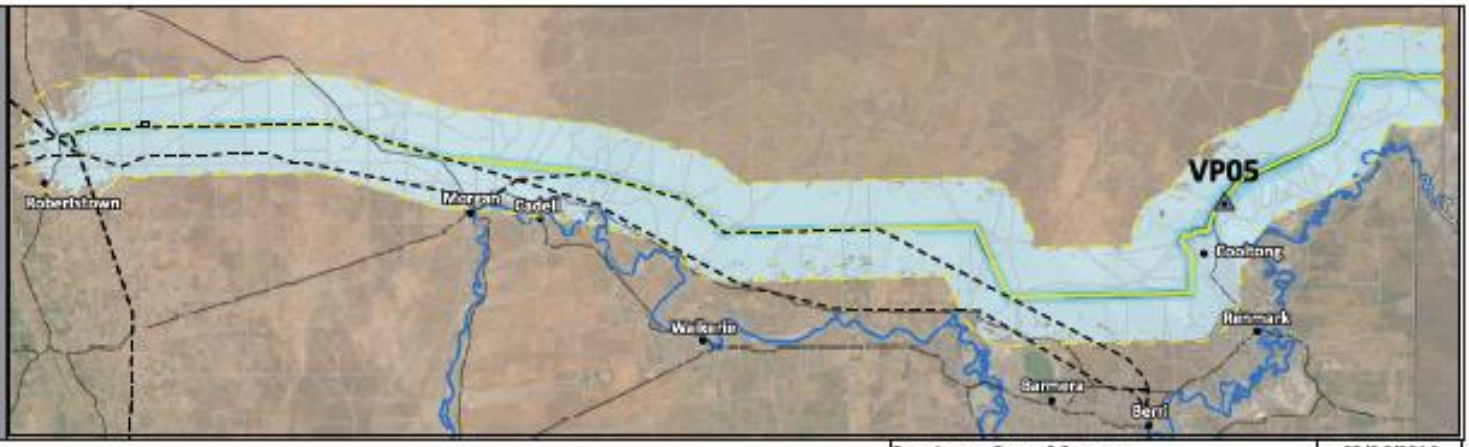
Document Path: V:\05 Project\ElectraNet\55377_ElectraNet EnergyConnect Environment and Planning\01_VIA\05_Photomontage\03_RevC_2020_11_19\12_20_55877_RevC_2020_11_25.cdr

Current Landscape

Landscape and Project

Project Highlighted

Project Location Overview



JBS&G

Figure 13-12
Photomontage VP05

Base Image Date of Capture	03/06/2019
Base Image Time of Capture	12:51 PM
View Direction (compass bearing)	22.6
Eastings	472,549.74
Northings	6,235,091.35
Elevation (mAHD)	33.96
Horizontal Field of View (degrees)	120
Vertial Field of View (degrees)	36
Distance from Project Infrastructure (m)	78.76
Associated Visibility	High Visibility
Visual Landscape Type	Eastern Riverina
Sensitivity to Change	High
Average Vegetation Height	1-2m
Sensitivity to Change	Moderate
Distance of receptor from Existing powerline Infrastructure	>3,351m
Sensitivity to Change	High
Theoretical Visual Impact Level	High Visibility

Job No: 55766	
Client: ElectraNet	
Not to Scale at A3	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB
Image Reference: JBS&G / Convergen	

Legend:
Project Tower Designs
(presented in 'Projected Highlighted' image)

64.5m (Medium Angle Strain) Tower

Document Path: V:\05 Projects\Electranet\55377_ElectraNet Energy Connect Environment and Planning\01_VIA\07_Photomontage\03_RevC_2020_11_19\12_20_55377_RevC_2020_11_25.cdr

13.5. Conclusion

Project EnergyConnect traverses several landscape types from cleared grazing land to extensive mallee woodland with low population densities. Given these landscape types, the proposed towers will be a dominant feature. The route selection and alignment of the Project infrastructure has considered locations away from visually sensitive areas, and adjacent to existing linear infrastructure, resulting in a relatively low overall visual impact where high numbers of visual receptors have been avoided. Highly sensitive landscapes have been largely avoided, and where they are crossed (for example in the eastern sector) there are very few receptors.

The vast majority of the TZVI will not be significantly impacted by the transmission infrastructure with 87% of the area falling to the Negligible Visibility zone. Conversely, only 0.3% of the area (1,038 ha) within the TZVI falls into the High Visibility zone.

The Project infrastructure will not be visible beyond 6.2 km (the TZVI). The highest visual impact will be from areas closer to the transmission line, which decreases exponentially as the receptor moves away towards the outer edge of the TZVI. Within the TZVI, the visual impact experienced by a receptor is influenced by landscape sensitivity and receptor types, vegetation screening and other mitigation factors.

In general, the Project will have limited visual impact. There will be a few, localised areas within the TZVI, close to the alignment that will be visually affected with the Project infrastructure being visually dominant.