IRIS Visual Planning + Design

Wagga Wagga Solar Farm

Visual Amenity Assessment

Terrain Solar

July 2018

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1. Introduction

The purpose of this study is to provide a visual impact assessment of the proposed solar farm to be located on 157 Windmill Road, Bomen.

2. Proposal scope

A 70-hectare solar farm is proposed for a site to the West of Bomen, Wagga Wagga. This solar farm would comprise the following elements:

- Solar arrays, with each panel up to 2.6 metres tall, dark grey with galvanised frames and posts
- Inverter stations of a shipping container size (approx. 2.5 metre height)
- Substation (approximately 60 x 20m) located at south western corner of site
- Transmission overhead lines south from proposed substation to Transgrid Wagga North substation
- Operations and maintenance building on East Bomen Road
- Chainwire site perimeter fencing (2.4 metre-high), including an access gate at East Bomen Road
- Gravel internal maintenance access tracks and vehicle turnaround areas.

Eleven trees would be cleared to install the solar farm. However, the existing blocks of vegetation on the site would be retained. The following additional vegetation would be provided:

Native screening vegetation

- 5-metre wide corridor with a mix of trees and shrubs (up to 5 metres tall) along the western site boundary, connecting existing vegetation patches
- 10-metre wide corridor (shrubs and trees up to 5 metres tall) along East Bomen Road
- 10-metre wide corridor (shrubs and trees up to 5 metres tall) to the west and north of the residence at 181 Windmill Road, Bomen.

Note: The location and width of this screening vegetation has been determined by the potential visibility of the site. (refer to Figure 6-1 and 6-2) No screening vegetation has been proposed for the southern site boundary as the existing vegetation and landform provides adequate screening for the southern areas of the site.

Creek revegetation

- Reach 1 - Supplementary planting (with trees and shrubs)
- Reach 2 and 3 - Revegetation (with grasses, trees and shrubs)
- Reach 4 –perennials, sedges and reeds would be established along the dry creek bed under the solar panel arrays.

Refer Figure 2-1 Landscape Concept Plan, Figure 2-2 Landscape concept sections and Figure 2-3 Plant list and landscape notes.

3. Existing environment

3.1. Site location and context

The site is located on the eastern outskirts of Bomen. Bomen is located to the north of the Murrumbidgee River, approximately 7.5 kilometres northeast of Wagga Wagga, a major regional centre in NSW. (Refer to Figure 3-1 Site location and context)

Bomen is located on the Olympic Highway and has predominantly service and heavy industrial land uses. This includes the Bomen Business Park, a transport and logistics industry hub, which straddles the railway corridor. This freight line is the main southern railway between Sydney and Albury and is identified as a part of the proposed Inland Rail Project.

INDUSTRIAL DEVELOPMENT IN BOMEN

In the centre of Bomen, the historic Bomen Railway Station (station group and residence) is State listed heritage, and … '*focal buildings in the small township of Bomen*' (NSWOEH, 2000).

BOMEN RAILWAY STATION

Surrounding Bomen the landscape is characterised by a predominantly rural landscape, which has been used for managing livestock since the mid-late 19th century.

There is Transgrid substation to the east of Bomen (south west of the site) on the outskirts of the business park. Several overhead transmission lines converge on this substation from the east, reducing the amenity of this rural landscape.

POWERLINE EASEMENT

3.2. Topography

The Euranoreenya valley is located generally between Bomen in the west and Euranoreenya, Hillside and Oura in the west. The valley is generally aligned north to south, and the site is located on the eastern slopes of the ridgeline and elevated areas of Bomen.

From the highpoint north of Bavin Street, several spurs lead down from the ridgeline, to the south and east, including a small ridge across the site. These create a gently undulating landscape and smaller enclosed visual catchments around dry creeks which lead to the valley floor in the vicinity of Windmill Road. These creek lines run east and south to the Murrumbidgee River.

There is scattered vegetation across the landscape, further filtering and enclosing views. From elevated locations, there are views across the valley, and in south facing locations, wider panoramic views are possible across the Riverina Region. Refer to Figure 3-2 Topography.

3.3. The site

The site is located on East Bomen Road and extends south and east towards Windmill Road. The site is a northeast facing slope and descends from a small spur along the southern boundary, below a ridgeline west of Byrnes Road in Bomen.

A seasonal dryland gully runs parallel to East Bomen Road, leading to a small tributary of the Murrumbidgee River floodplain, which follows the northeastern perimeter of the site, generally aligned parallel to Windmill Road.

The site consists of pastures and is currently used for sheep grazing. There are several other blocks of vegetation across the site including a block of revegetated native bushland on the most elevated area of the site, in the southwest, and on a lower slope to the south eastern corner, near neighbouring properties.

GRAZING ON THE NORTH EASTERN CORNER OF THE SITE

NORTH EAST FACING SLOPES OF THE SITE

3.4. Neighbouring properties

There are two rural residences and associated farm buildings located near to the eastern site boundary, accessed via Windmill Road. There are also several rural residences that are located further to the south of the site, along Windmill Road and Bavin Street.

There are residential properties located to the north of East Bomen Road, including one residence located prominently on a local hill. There are also several properties across the valley to the north east of the site, accessed via Dunns Road and Shepherds Siding Road, and to the east, accessed from Pattersons Road.

4. Planning context

The following review identifies key documents which provide relevant planning context for the visual assessment of the proposed solar farm. This should be read in conjunction with the Statement of Environmental Effects.

4.1. Wagga Wagga Local Environment Plan 2010

The site is located on land zoned RU1 – Primary Production under the Wagga Wagga LEP. A key objective of this zone is to '*maintain the rural landscape character of the land*' (Land Use Table Zone RU1).

Land to the north and west of the site is zoned IN1 - General Industrial and is part of Bomen Business Park (refer section 4.3 also *Bomen Strategic Master Plan*). The types of development permitted in this zone include depots; freight transport facilities; general industries; industrial training facilities; light industries, warehousing and distribution centres.

Items of historic and cultural importance which contribute to the visual character of the surrounding rural landscape include Bomen Railway Station to the west of the site (state heritage listed), and Hareenyha Slab Shed, Kurrajong Woolshed and Shearers' Quarters to the north of the site at 47 Shepherds Sidings Road, Eunonoreenya. None of these are within view of the site.

4.2. Wagga Wagga Development Control Plan 2010

The Wagga Wagga Development Control Plan (DCP) supports the Wagga Wagga LEP by providing additional objectives and controls for administering development.

The Wagga Wagga City LEP (2010) recognises the visual quality of the rural landscape, stating that any development in rural areas should be…' *compatible with the character of the locality in terms of buildings, structures and the nature of operations*' (s.8.1).

It also states that adequate … '*buffer areas and setbacks should be used to minimise potential conflicts with adjoining lawful land uses'* and landscaping and other screening options should be used to … '*help integrate new uses and developments into the rural landscape'*. It also suggests that … '*new buildings should be kept away from ridgelines and visually prominent locations*' using materials that '*…complement the landscape*' (s.8.1).

The western site boundary site adjoins the Bomen Urban Release Area. Key objectives for this precinct include:

- *'To require new development to respond to site features including ridgelines and slopes, significant vegetation and creek lines.*
- *To avoid adverse impact upon land which contributes significantly to the overall visual quality of the landscape*.'

Other key relevant development controls for this precinct include the retention of vegetation, including along creek lines and roads, and the protection of ridgelines as visual features, ensuring they are not impinged by development. It further states that '*roads and pathways should generally run along the contours of the land*' (clause 13.4).

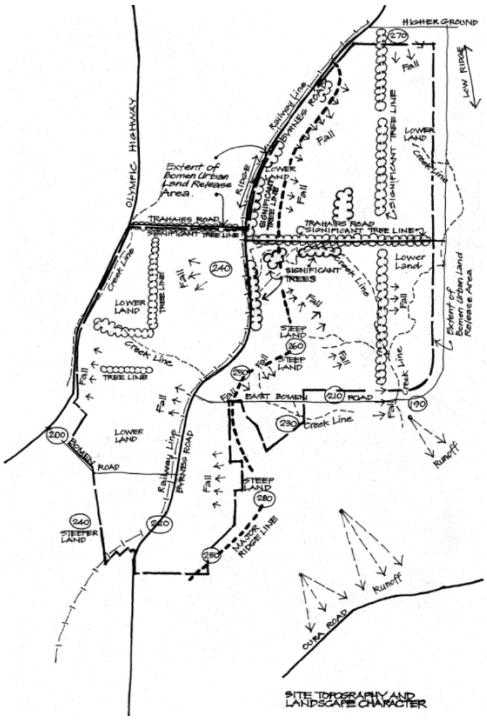


FIGURE 4-1 BOMEN URBAN RELEASE AREA – SITE TOPOGRAPHY AND LANDSCAPE CHARACTER (CLAUSE 13.4, FIGURE 4)

4.3. Bomen Strategic Master Plan, 2012

Wagga Wagga City Council commissioned this study to assist the preparation of planning policy and re-zoning for Bomen that is responsive to such challenges as increased urban development pressure and non-agricultural pursuits.

Figure 4-3 is the Character Precinct Map. It identifies an area of light industry bordering the site to the north and east (lilac), an area of recreation (green) to the west of the light industry, with heavy industry (blue) and rail uses (orange) along Byrnes Road to the west and north.

In this plan East Bomen Road is identified as a Major Arterial Road. This document envisions an upgrade to this road to a 36m width with tree and median street trees.

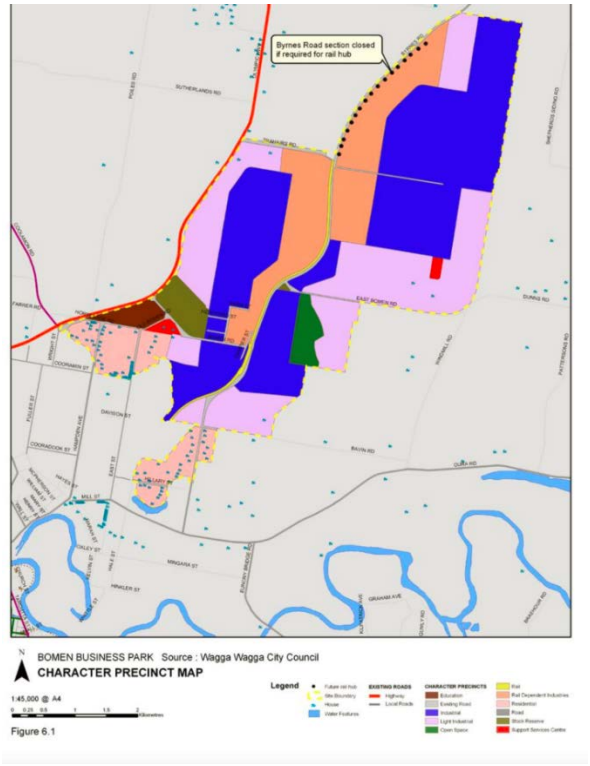


FIGURE 4-2 CHARACTER PRECINCT MAP (WCC, 2012, P.49)

The varying topography, creek lines and vegetation are identified in this plan as important elements of the local landsape, which should be preserved and reflected in the form of the development proposed.

A key outcome for land use planning is to preserve the '*amenity of adjoining land use and activities*' (clause 8.4.c).

5. Methodology

The following assessment considers the potential visual influence of the proposal on the surrounding landscape and an assessment of views from these locations.

5.1. Zone of visual influence

This assessment begins with the identification of a **Zone of visual influence (ZVI).** This establishes the theoretical area from which the proposal may be visible. It is created using topographic data and the height of the proposal elements.

To illustrate the visibility of different portions of the site, a series of **Viewsheds** from selected points on the site, have been prepared. These viewsheds have informed the location of screening vegetation in the landscape concept plan.

5.2. Visual absorption capacity

The **Visual absorption capacity** of the landscape surrounding the site and across the ZVI area is then determined. **Visual absorption capacity** is the ability for a landscape to accommodate change without the loss of its valued attributes. The visual absorption capacity of the landscape surrounding the proposal site has been described and the valued attributes identified.

5.3. Assessment of representative viewpoints

An assessment of views which are representative of the potential views has been undertaken. This assessment was undertaken in the following steps:

- Identify the **sensitivity** of the viewer (Refer Table 5-1)
- Identify the **magnitude of change** created by the proposal (Refer Table 5-2)
- Combine these characteristics to assign a level of **likely visual impact** (Refer Table 5-3)

Sensitivity refers to the susceptibility of a view to accommodate change without losing valued attributes. The 'values' of a view refer to any aspect of landscape or views people consider to be important. Visual values may be reflected in local, state or federal planning regulations, other published documents or be established through community consultation and engagement, or as professionally assessed. (refer Table 5-1)

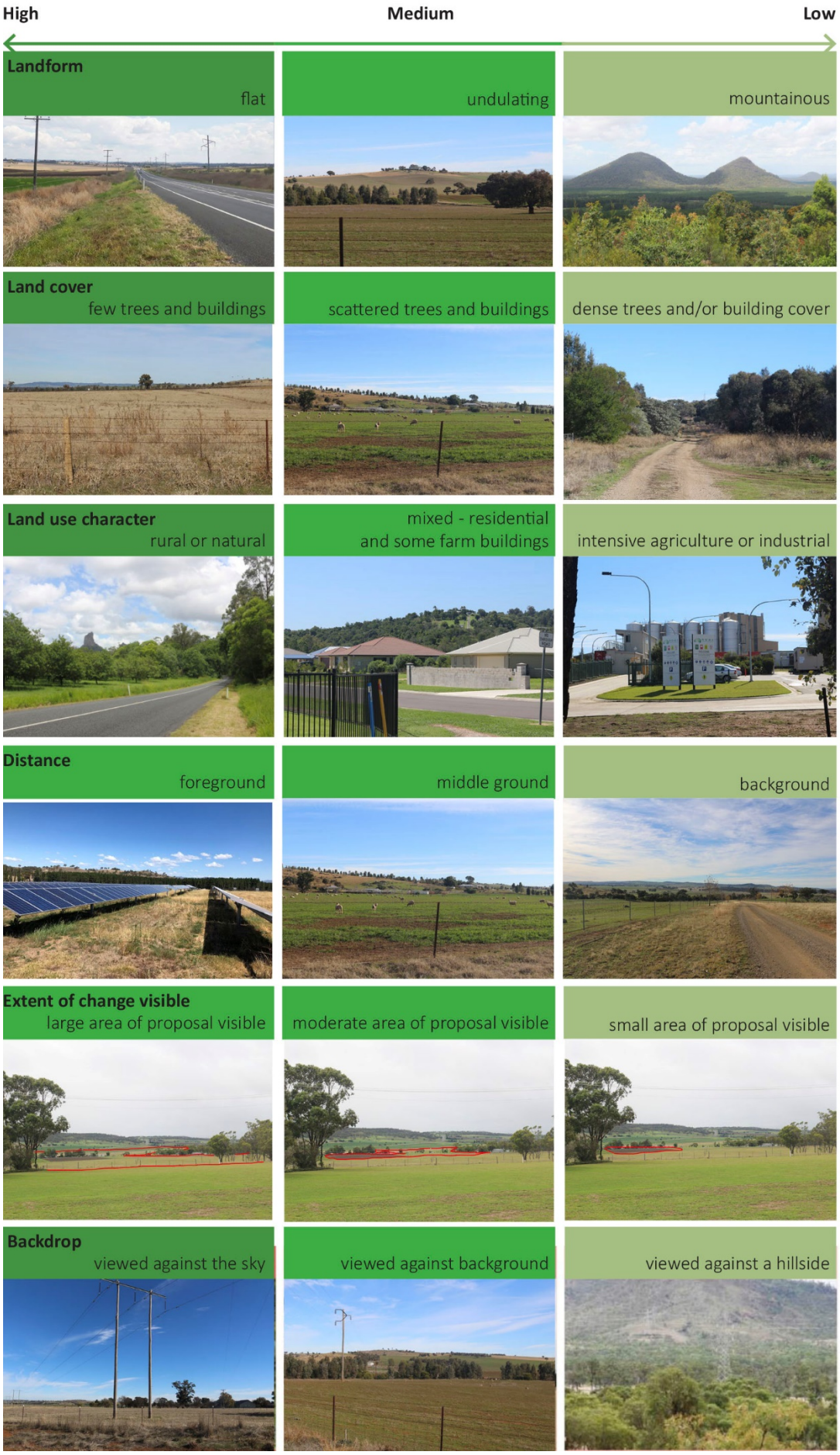
TABLE 5-1 VISUAL SENSITIVITY LEVELS

Visual sensitivity level	Description
Low	Views where visual amenity is important at a neighbourhood scale, such as views seen from local roads, briefly glimpsed views to landscape features, and views from small groups of residences.
Medium	View of high quality or experienced by concentrations of residents and/or local recreational users, and/or large numbers of road or rail users.
High	Heavily experienced view to a feature or landscape that is iconic to a major portion of a city or a non-metropolitan region, or an important view from an area of regional open space.

Magnitude of change refers to the extent of change that would be experienced by receptors. This change can be adverse or beneficial. Factors that could be considered in assessing magnitude are: the proportion of the view which is affected; the size and scale of the change; the rate and duration of the change; the level of contrast and compatibility.

A number of principles have been identified that relate to how well a solar farm can be absorbed into the landscape and what is considered to be more or less visually harmonious. The principles that will be applied generally to the visual assessment, are summarised in Table 5-2 Typical indictors of visual modification.

TABLE 5-2 TYPICAL INDICATORS OF VISUAL MODIFICATION



Visual impact is the combined result of sensitivity together with the magnitude of the change. The visual impact may be adverse or beneficial and at a level of very high through to negligible. (refer table 5-3)

TABLE 5-3 VISUAL IMPACT LEVELS

		Sensitivity		
		Low	Medium	High
Modification	High	Moderate adverse	High adverse	High adverse
	Medium	Minor adverse	Moderate adverse	High adverse
	Low	Negligible	Minor adverse	Moderate adverse
	Negligible	Negligible	Negligible	Negligible
	Improvement	Minor benefit	Moderate benefit	High benefit

6. Visual impact assessment

6.1. Zone of visual influence

A Zone of Visual Influence (ZVI) has been used to establish the theoretical area from which the solar farm may be visible. This theoretical extent is based on several reference points on the solar farm site and assuming the maximum height of the panels is 2.6 metres from finished ground level. The analysis uses a digital terrain model to identify the areas from which views to the site may be possible.

This model was based on data to a 5 metre accuracy and does not include the filtering effect of trees and buildings.

The analysis shows the ZVI for the site extending north, east and south across the valley.

Views to the site are generally contained to the west by the ridgeline extending north-south between Trahairs Road in the north and Oura Road in the south. The ZVI does not extend to the historic railway station.

To the north, the ZVI extends to the eastern areas of Trahairs Road, and fields surrounding Shepherds Siding Road, Newells Road. To the east, the ZVI extends across Dunns and Pattersons Roads, and ending at a ridgeline that then falls to Wheel of Fortune creek to the east. To the south, the ZVI extends to properties along Windmill Road, south to Oura Road and to the Murrumbidgee River.

The ZVI is also contained by a small ridgeline to the east of the site, east of Pattersons Road. This area formed the basis of field investigations.

Refer to Figure 6-1 Zone of visual influence, and Figure 6-2 Viewsheds.

6.2. Visual absorption capacity

Visual absorption is the ability of a landscape to accommodate change without the loss of its valued attributes. The valued attributes of this landscape are the undulating hills, areas of vegetation and rocky outcrops, scenic views across the rural landscape, and views to the middle-distance ridgelines to the east and west, and distant views across the Murrumbidgee River floodplain to distant ranges in the south.

Scattered trees and blocks of vegetation within the fields, along field boundaries and roads, and on the ridgelines contain and break-up views to and from the site.

At elevated locations within and around the site to the north, east and south east, the views are open and multilayered, extending across open undulating pasture fields and arable fields in low lying areas. A mountainous horizon is visible in the distance to the east, containing views beyond Pattersons Road. This layering allows for development to sit within the landscape without detracting from the horizon features.

The site and surrounding landscape includes a mix of built form with small clusters of farm buildings and homesteads accessed by gravel and sealed roads. The land use transitions into light industrial development on the outskirts of Bomen, along Byrnes Road and west. This includes large industrial sheds, large roads and heavy vehicle activity. The light industry, including a substation approximately 770 metres west of the site, and associated transmission towers and poles detract from the rural character in areas to the west of the site.

The site is considered to have a medium visual absorption capacity due to the undulating landform, scattered vegetation cover and the mix of built form.

6.4. Assessment of representative viewpoints

The following viewing locations were selected as representative of the range of views to the proposal:

1. View northwest from Windmill Road
2. View east from East Bomen Road
3. View south from Trahairs Road
4. View southwest from Dunns Road
5. View west from Pattersons Road
6. View north from Oura Road.

Refer to Figure 6-2 Viewpoint location plan.

6.4.1. Views northwest from Windmill Road and rural properties in the south

Windmill Road is an unsurfaced, rural road leading north from Oura Road to East Bomen Road and providing access for local residents to several rural properties.

The site varies from between 100 metres and 1 kilometres from the road. Adjacent to the driveway of 'Knaith' at 159 Windmill Road, the site is visible in the middle to background of the view.

This view includes open fields on the lower slopes of the valley, grazing sheep, irrigation equipment and tree lined driveways in the foreground. There are several homesteads and rural buildings in the middle ground of this view and undulating rural landscapes in the background.

The existing residences are located on a gentle rise, above the fields in the foreground, and oriented to the east. Behind these homes, the landform rises more steeply. Vegetation surrounding the residences screen parts of the southeastern corner of the site. (Refer to Figure 6-1, Viewpoint 1)

In the background, beyond the site, the elevated hills of the Bomen provide a backdrop to the view from Windmill Road. This hillside includes some further scattered residential properties and concrete water tanks. There are also a number of overhead power poles and lines crossing the view, both north to south and east to west.

VIEW WEST FROM WINDMILL ROAD TO THE CREEK ON THE EASTERN SITE BOUNDARY

Whilst this view is currently a predominantly rural landscape character, the hills in the background are zoned industry and will potentially be transformed over time by development. Furthermore, in some views from Windmill Road the existing industrial development around Trahairs Road can be seen to the north.

VIEW NORTHWEST FROM WINDMILL LANE TO INDUSTRY ON THE HORIZON

The proposed solar farm is largely screened by intervening vegetation and landform. This includes the panel arrays and substation on the southern areas of the site. (refer Figure 6-2)

The lower eastern slopes of the solar farm would be seen in the middle to background of this view, beyond the fields, residences and farm buildings in the fore and middle ground. (Refer to Figure 6-3, Viewpoint 1 and 1a).

Corridors of native vegetation would be provided along the south eastern corner of the site, adjacent to the neighbouring property. This vegetation would link with existing vegetation patches upon the site and over time screen the lower areas of the solar farm.

The landform of the site then drops away to the north, so that the northern areas of the solar farm, including arrays and the operations and maintenance building, would not be seen.

The visible areas of the solar farm would comprise a small part of the view, and be in the middle to background, resulting in a low extent of change visible. The solar farm would also be visible against the rural backdrop, and the arrays would not rise above the surrounding landscape.

The solar panel arrays would have a low-profile, following the contours which fall towards the viewer. The panels would be seen overlapping and visually merge in some areas.

The character of the rural landscape in the foreground of these views and surrounding the site would be retained. The existing landform of the site would also be retained, and the pasture would be retained for grazing. This would assist in the visual integration of the visible areas of the solar farm into the surrounding landscape.

Due to the distance, screening by landform and vegetation existing and proposed), there would be a low magnitude of change to these views which are of low sensitivity, resulting in a **negligible visual impact**

The neighbouring properties, in the middle ground of this view, would have close range views to the solar arrays from their driveway, northern side and rear windows of the residence, and from areas surrounding their shed. However, the existing and proposed planting around the perimeter of the site would screen views to the solar farm over time.

Views from East Bomen Road and rural areas to the north of the site

East Bomen Road extends east from the industrial areas of Bomen towards the site. As the road rises from Byrnes Road to cross a local ridgeline, there are scenic views across the rural landscape of the Eunanoreenya valley and across the site. East Bomen Road forms the northern boundary of the site and there are unobstructed middle and foreground views from the road to the site.

VIEW EAST FROM EAST BOMEN ROAD TOWARDS THE SITE

In the fore and middle ground of this view there are open pastures with several patches of vegetation. This includes areas of bushland regeneration along the dry creek bed, a block of vegetation on the local rise to the southwest of the site, a block of vegetation on the south eastern corner of the site, and vegetation along the creek on the eastern site boundary. The road is open with only a few scattered trees on the road verge, allowing for unfiltered views into the northern portion of the site. (Refer to Figure 6-4, Viewpoint 2)

Beyond the site there are distant views to the Eunanoreenya hills in the east, and to distant ranges to the south.

The solar farm would be seen in the middle and foreground of views from East Bomen Road, between the ridgeline to the west of the site

(right of view), and the intersection with Windmill Road in the east (left of view).

Proposed native screening vegetation along East Bomen Road would enclose this view, screening areas of the solar farm between East Bowmen Road and the dry creek bed. Further supplementary planting and revegetation works along this creek corridor would further screen views to the panel arrays in the middle of the site.

The western areas of the site would be seen over this vegetation as the landform rises. Native screening vegetation proposed to be established along the western boundary of the site, would screen the north western edge of the solar farm in this area.

The views from the elevated section of the road, in the west have a long depth of field, with several layers to the view. This wider landscape would continue to be seen, encosed by the eastern Eunanoreenya hills, and the distant ranges to the south.

Whilst the solar farm site would extend across a large area of the view, the screening afforded by the proposed native screening vegetation and the low profile of the panels, would limit views to the solar farm. Furthermore, the important views to the wider landscape would be unchanged. Overall, there would be a medium magnitude of change in the amenity of these views. These views are of low sensitivity. This would result in a **minor adverse visual impact**.

Views from Trahairs Road and rural areas to the north (1km+)

To the north of the site there is a mix of rural properties, between East Bomen Road and Trahairs Roads, and emerging heavy industrial uses, in areas of Trahairs Road adjacent to Byrnes Road.

VIEW ALONG TRAHAIRS ROAD

VIEW FROM TRAHAIRS ROAD TO INDUSTRY

Trahairs Road is surfaced as it leads from Byrnes Road to large industrial properties including the Riverina Oil and BioEnergy (ROBE) facility. It then becomes an unsurfaced track leading to several sheep grazing properties. The landscape contains substantial areas of vegetation, enclosing views along some sections of Trahairs Road. However, there are views from the eastern end of the road, and across adjacent fields, towards the site. (Refer to Figure 6-5 Viewpoint 3)

In these views, the elevated south western areas of the site can be seen, however, the undulating fields in the fore and middle ground of the view screen the norther areas of the site.

This view includes pastures in the foreground, and industrial areas, several residential and rural properties in the middle ground of the view. The view includes heavy industrial uses and several power lines, crossing the view, leading to the Bomen substation.

There would be a small portion of the proposed solar farm visible in this view. The existing landform of the site would not be altered, and the panels would be set amongst the retained pasture grass, assisting in the visual integration of the project. Furthermore, the panel arrays would have a low-profile, and not rise above the height of the vegetation on the south western upper slopes of site.

The proposed native screening vegetation proposed upon the site, and vegetation along the dry creek bed, would provide some further screening of areas to the north of the site.

Due to the distance, the small portion of the view that would be changed, and other detracting features in the view (including large-scale industry and power lines), there would be a low magnitude of change. This view is of low sensitivity and this would therefore result in a **negligible visual impact**.

6.5. View southwest from Dunns Road

Dunns Road is an unsurfaced road leading north east from the site. There is a small cluster of rural residences to the north of this road.

Views from this location include the site in the background of the view. Windmill Road and the lower eastern areas of the site are not visible due to intervening landform. However, the western areas of the site, on the upper slopes of the site are visible. (Refer to Figure 6-5 Viewpoint 4)

The site can be seen in the context of an undulating landscape, rising to a small ridgeline to the west of the site. There are some built elements detracting from the rural character of this view including several overhead transmission tower and lines leading to the Transgrid Wagga North Substation and concrete water tanks.

RESIDENCE ON DUNNS ROAD

The proposed solar farm would be visible in the middle ground of this view. The existing landform of the site would not be altered, and the panels would be set amongst the retained pasture grass, assisting in the visual integration of the project. However, the panels would be aligned north to south, and from this angle they would be seen overlapping and visually merge in some areas.

The solar panel arrays would have a low-profile and would not rise above the vegetation which exists on the site and is proposed for the northern and western boundaries of the site. The solar farm would be located below and not obstruct views to the ridgeline in the background of the view.

The native screening vegetation proposed for within the site, and vegetation along the dry creek bed, would enclose the view to the panel arrays, inverters and site buildings, and visually break the site up into smaller parcels.

The existing vegetation on the upper slopes to the south west of the site would screen views to the substation.

Due to the distance, low profile of the panels and inverters, ridgeline in the background, there would be a low reduction in the amenity of this view. This view is of low sensitivity resulting in a **negligible visual impact**.

6.5.1. View west from Pattersons Road

Pattersons Road is an unsurfaced rural road providing access to several rural properties in the valley to the west, and to the hills of Eunanoreenya in the east.

From this road there are views across the gently undulating pastures of the valley floor, with the site in the middle to back ground, and rising to the ridgeline which screens views to Bomen. There are several rural residences and properties on the land surrounding this view, which would have similar expansive valley views. (Refer to Figure 6-5 Viewpoint 5 and 5a)

Views to the north eastern corner of the site are blocked by intervening landform in this view. However, the upper slopes of the site can be seen in this view, set below the ridgeline in the background.

The proposed native screening vegetation would connect the existing blocks of vegetation on the site, creating a vegetated backdrop to the proposed solar farm, along the western site boundary. Similarly, vegetation along East Bomen Road would create a vegetated corridor to the north of the site, and native screening vegetation around the south eastern corner of the site would create a vegetated backdrop to the neighbouring rural properties.

The existing landform would be maintained, and pasture grasses retained on the site, assisting in the visual integration in views where the landscape can be seen between the panels. Due to the low-profile of the panel arrays and inverters, they would not rise above the vegetation along the western boundary.

The Operations and Maintenance building on East Bomen Road would not be seen in this view. However, the substation, which would be located on the south western corner of the site, would be visible, and would rise above the screen planting on the site. Similarly, the overhead transmission line connection, would be seen extending south from the substation.

These elements would be seen within a context of overhead power lines which are converging around the site as they connect with the Transgrid, North Wagga substation (out of view).

Overall, due to the location of the site, set below the ridgeline, and vegetation which would provide visual enclosure and screening to the site, there would be a low magnitude of change in this view. This view is of low sensitivity, and this would result in a **minor adverse visual impact**.

6.5.2. View north form Oura Road

Oura Road leads from Wagga Wagga North in the west to Oura in the east. This road follows the Murrimbidgee River plain, and there are several residential properties to the north and south of this road.

From this location, there are views to properties on Windmill Road and Bavin Road. However, an intervening spur, extending east from Bomen, screens views to the site.

As the site would not be seen in views from Oura Road, there would be a negligible magnitude of change in this view, which is of low sensitivity, and therefore a **negligible visual impact**.

7. Summary of visual impact

TABLE 7.1 SUMMARY OF VISUAL IMPACT

Viewing location	Sensitivity	Magnitude	Impact
1. View northwest from Windmill Road	Low	Low	Negligible
2. View east from East Bomen Road	Low	Medium	Minor adverse
3. View south from Trahairs Road	Low	Low	Negligible
4. View southwest from Dunns Road	Low	Low	Negligible
5. View west from Pattersons Road	Low	Medium	Minor adverse
6. View north from Oura Road	Low	Negligible	Negligible

8. Conclusions

In distant views to the site from the north and northwest, there would be **negligible visual impacts** as the site is located below the ridgeline to the west of the site, and the low profile solar arrays and inverters would not rise above the treeline. The proposed native vegetation screening would also visually enclose the site and partially screen the site.

In views from the south, on Windmill Road there would be **negligible visual impacts** due to intervening landform to the south of the site. The proposed native vegetation screening would also visually screen the visible, lower areas of the site.

There would be a **minor adverse visual impact** experienced in views from adjacent rural areas to the north and east, where the project would be seen in the middle and foreground of views. The proposed native vegetation screening along the west, north and eastern property boundaries would screen these views over time and allow for the visual integration of the project.

The solar arrays and inverters would be a new built feature in these views and would cover several fields. However, several factors mitigate the potential impact of the solar farm

The proposed solar farm would be seen within the patchwork of agricultural fields and blocks of vegetation. In this landscape there are other built elements such as other residences, sheds, power lines and heavy industrial development to the north of the site. The landform is undulating, which allows for landform to obstruct and visually enclose views to the lower slopes of the site in views from some locations.

The existing vegetation on the site, and proposed for around the perimeter of the site, would screen the edges of the proposed solar farm, reducing the overall visible area. The revegetated dry creek corridor, proposed to extend east from the existing area of revegetation, would also visually separate the proposed solar farm into two fields, in views from the north, and further integrate the proposal into the surrounding landscape.

Due to the low height of the panel arrays (approximately 2.6 metres tall) the proposal would not obstruct views to the rural landscape beyond in middle and long-distance views. The panels and inverters would sit well below the ridgeline and adjacent vegetation.

The substation is located on the south western corner of the site, on the upper slopes of the site. Whilst it would be visible in some views, rising above the adjacent proposed native screening vegetation it would not be a solid visual element, and blend somewhat into the background of the view. It would also be seen in the context of other transmission facilities.

The operations and maintenance building would be visible in views from East Bomen Road, however, this building would be consistent in character with other rural sheds and buildings which are scattered across the rural landscape, and the proposed native screening vegetation would screen this building over time.

9. References

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Wagga Wagga Solar Farm

FIGURE 3-1:
SITE LOCATION & CONTEXT

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Site boundary

SOURCE:
Cadastral Boundaries: (c) NSW Land & Property Information 2018
Watercourse: Geoscience Australia 2015
Aerial Photo: (c) NSW Land & Property Information 2014

N
W E
S

0 0.5 1 1.5
Kilometers

A3 Scale: 1:30,000

File:WaggaWaggaSolarFarm_FIG3_AerialPhoto_180627 Date: 27/06/2018

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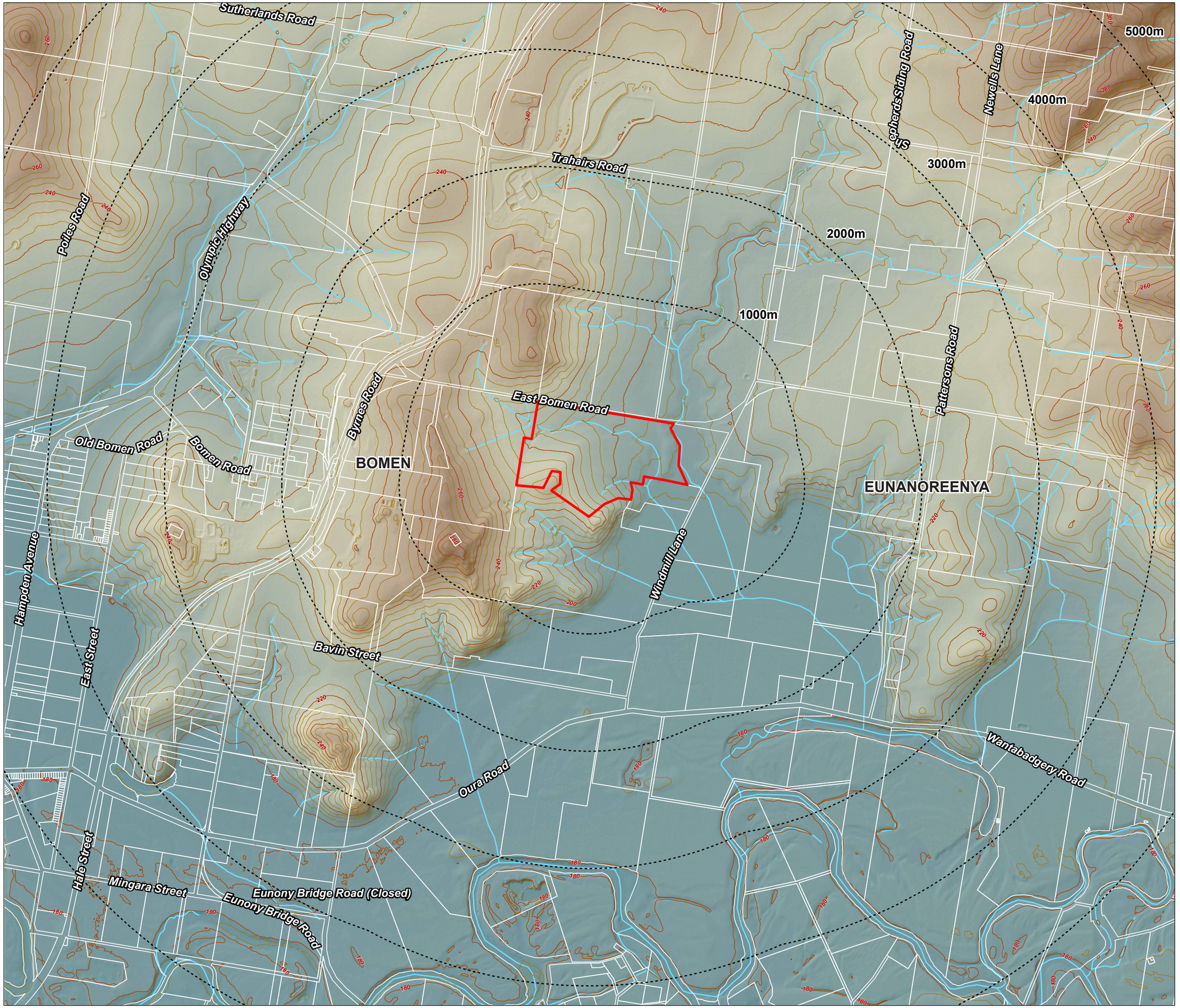

Wagga Wagga Solar Farm

FIGURE 3-2: TOPOGRAPHY

IRIS Visual Planning + Design

Site boundary
Watercourse
Contour (20m)
Contour (5m)

Elevation

High: 310.8m

Low: 172.6m

SOURCE:
Cadastral Boundaries: (c) NSW Land & Property Information 2018
Watercourse: Geoscience Australia 2015
Surface analysis: Derived from TARCUTTA and WAGGA WAGGA 2kmx2km 5 metre Resolution Digital Elevation Model 2014

N
W E
S

0 0.5 1 1.5
Kilometers

A3 Scale: 1:30,000

File:WaggaWaggaSolarFarm_FIG2_Elevation_180627 Date: 27/06/2018

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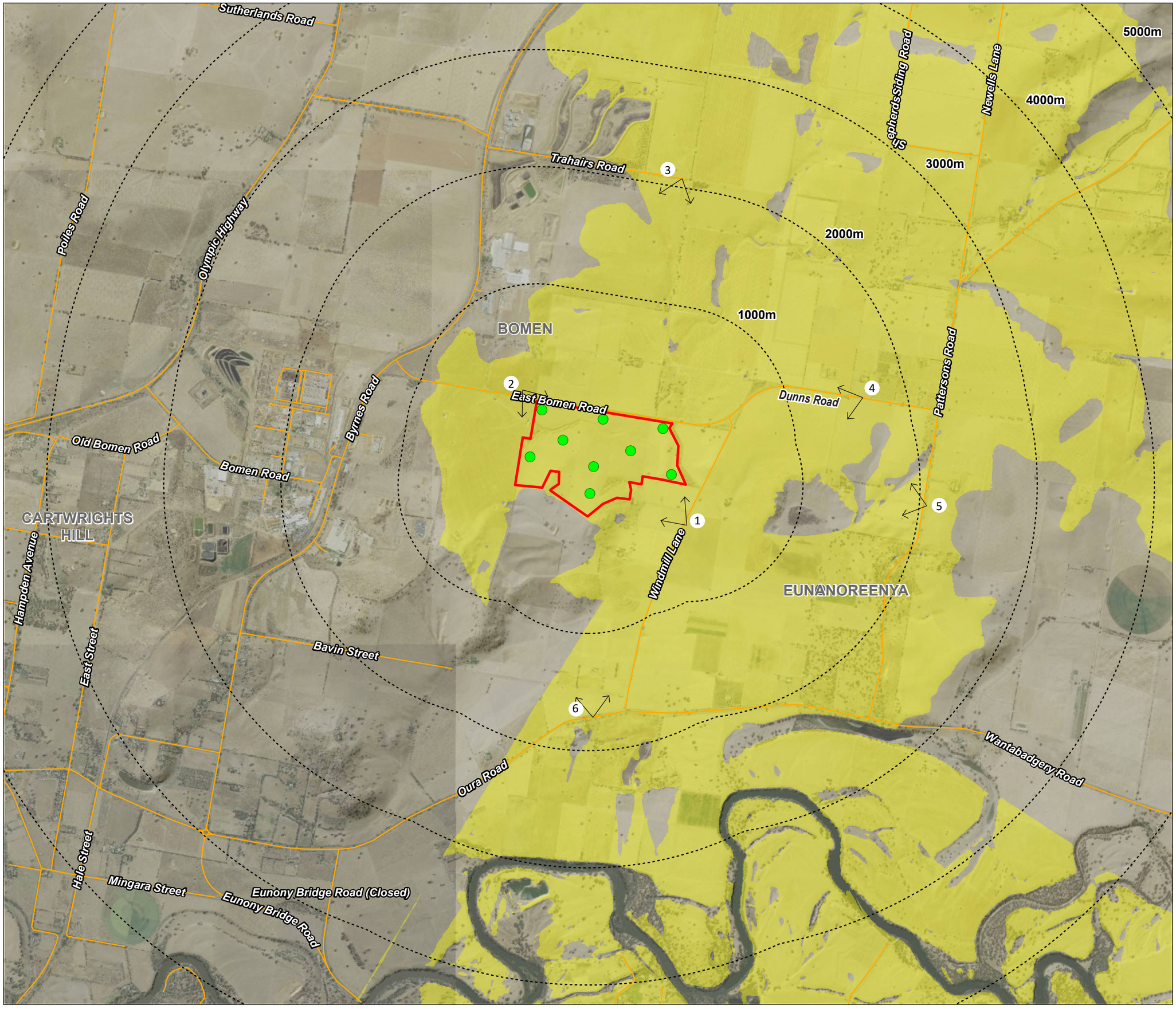

Wagga Wagga Solar Farm

FIGURE 6-1:
ZONE OF VISUAL INFLUENCE & VIEWPOINT LOCATION PLAN

IRIS Visual Planning + Design

Site boundary

Observer location (+2.6m)

Zone of Visual Influence

6 Viewpoint location

SOURCE:

Surface analysis: Derived from TARCUTTA and WAGGA WAGGA 2kmx2km 5 metre Resolution Digital Elevation Model 2014

N
W E
S

0 0.5 1 1.5
Kilometers

A3 Scale: 1:30,000

File:WaggaWaggaSolarFarm_FIG5_ZVI_180627 Date: 27/06/2018

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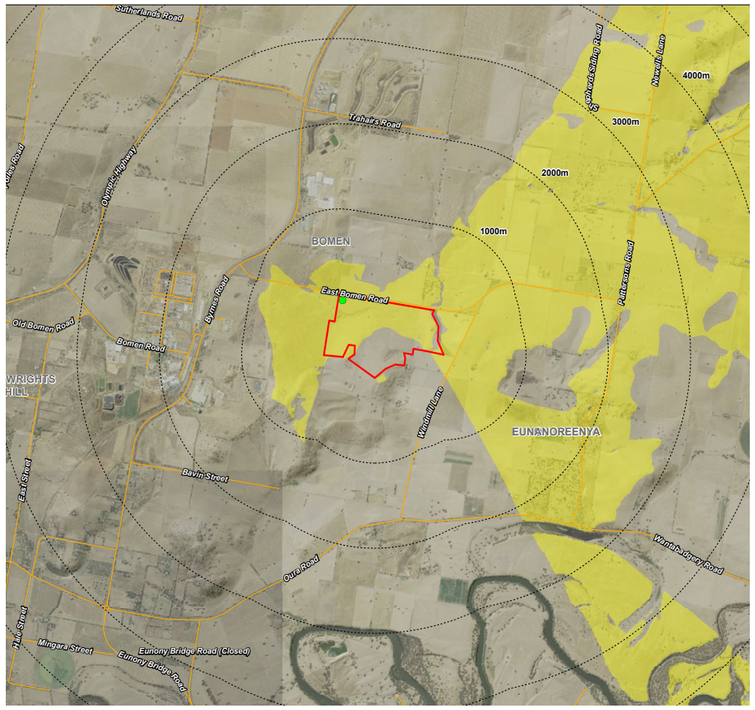

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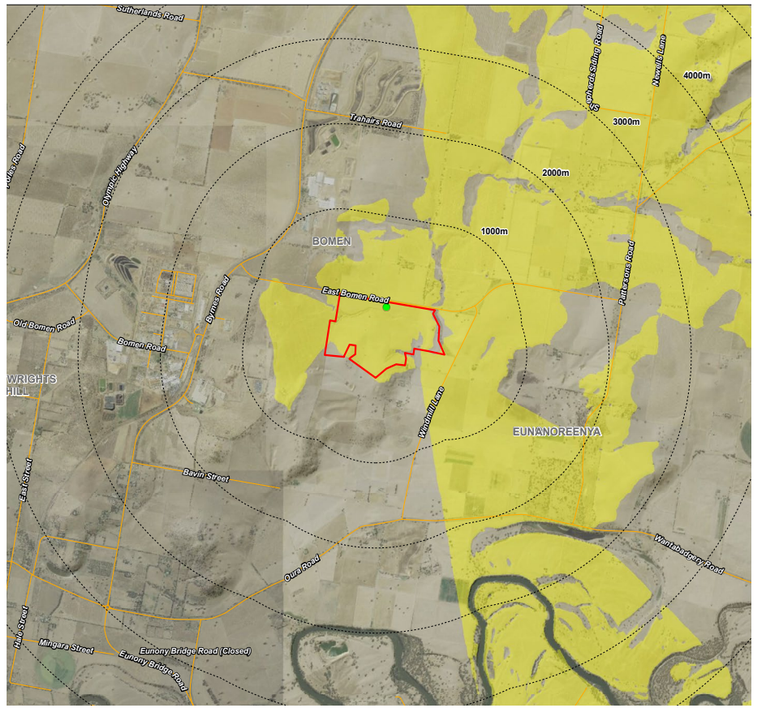

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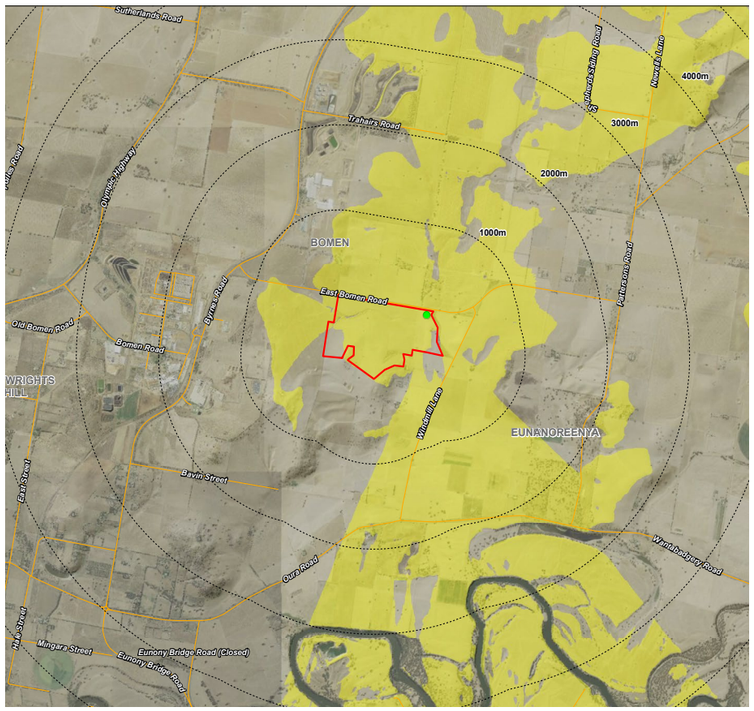

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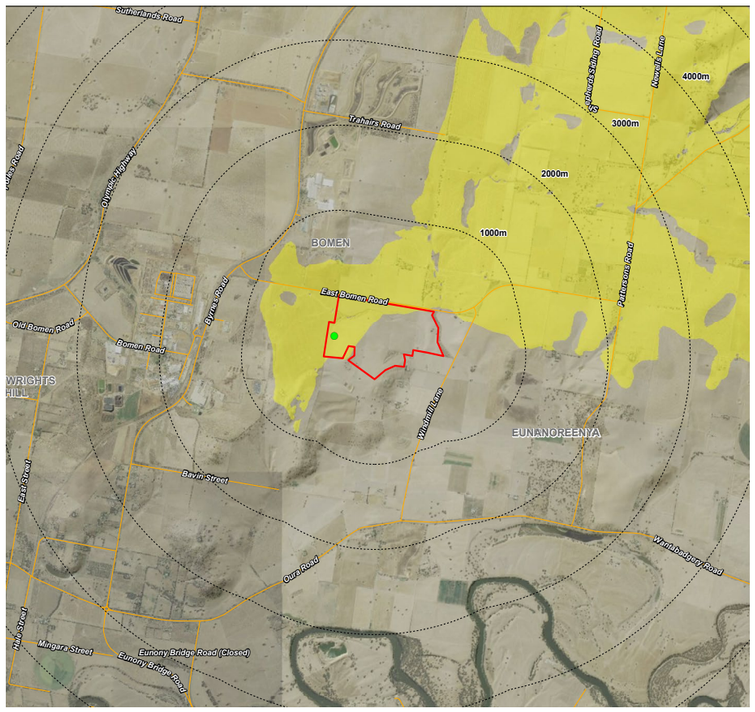

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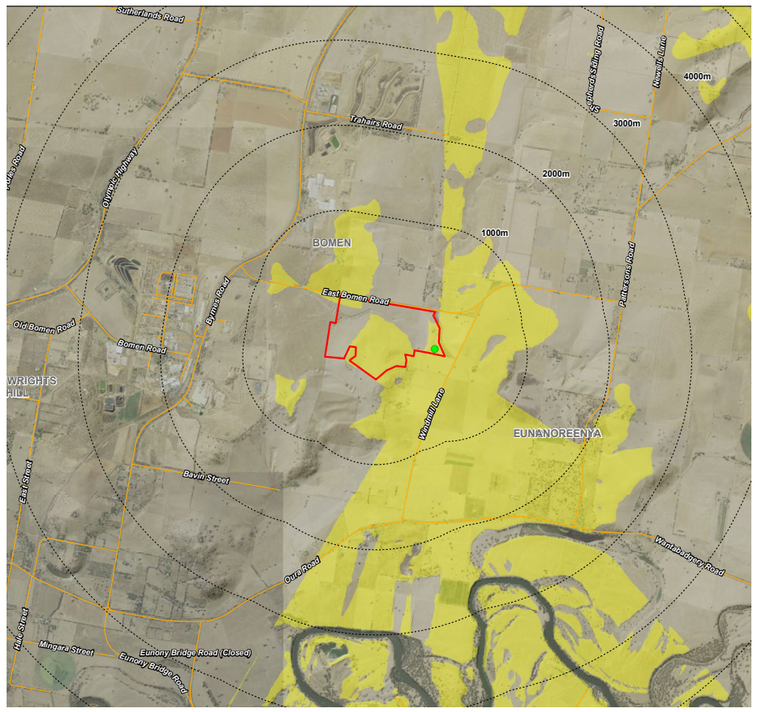

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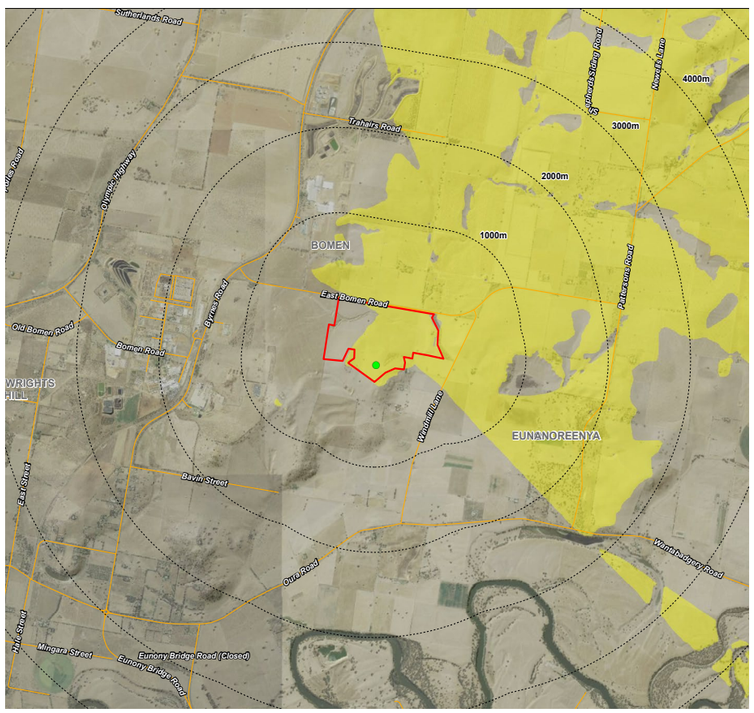

F.

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FIGURE 6-2: VIEWSHEDS

Date: June 2018
Job Number: 2018-108
Scale: NTS

Drawn: Beluca
Issue: DRAFT
Dwg Number: 2018108-01

1. View northwest from Windmill Lane

1.

1a. View northwest from Windmill Lane, Artists impression

1a.

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FIGURE 6-3: SITE PHOTOGRAPHS

Date: June 2018
Job Number: 2018-108
Scale: NTS

Drawn: Beluca
Issue: DRAFT
Dwg Number: 2018108-01

2. View east from East Bomen Road

2.

2a. View east from East Bomen Road, Artists impression

2a.

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FIGURE 6-4: SITE PHOTOGRAPHS

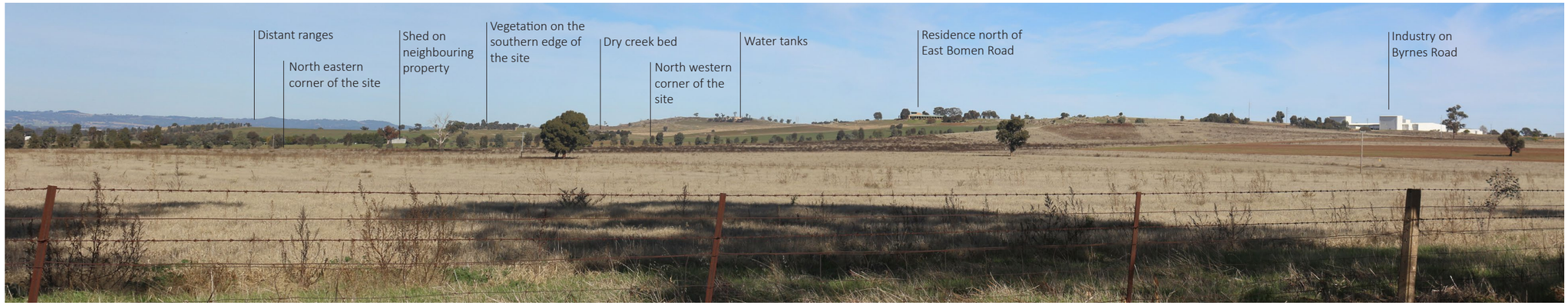
Date: June 2018
Job Number: 2018108
Scale: NTS

Drawn: Beluca
Issue: DRAFT
Dwg Number: 2018108-02

3. View south from Trahairs Road

4. View southwest from Dunns Road

6. View north from Oura Road



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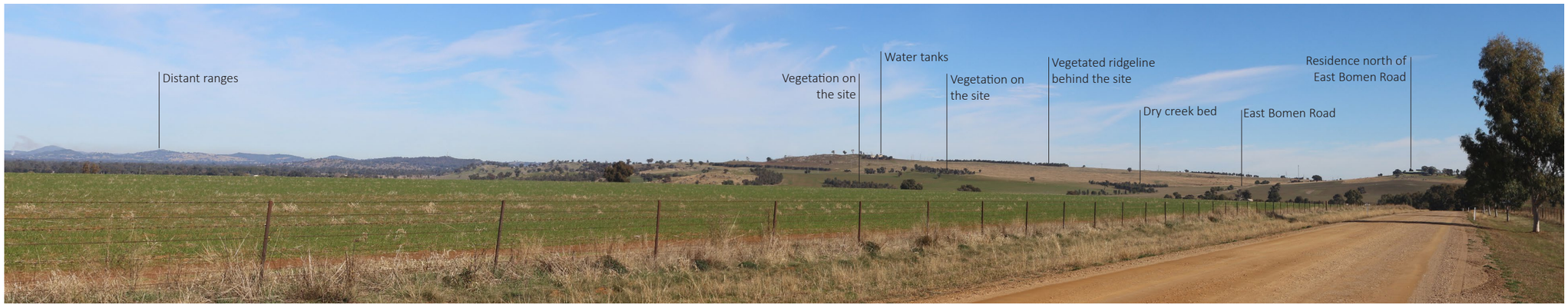

4.

6.

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FIGURE 6-5: SITE PHOTOGRAPHS

Date: July 2018
Job Number: 2018-108
Scale: NTS

Drawn: PK
Issue: DRAFT
Dwg Number: 2018108-03

5. View west from Pattersons Road

5.

5a View west from Pattersons Roadartists impression

5a.

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FIGURE 6-6: SITE PHOTOGRAPHS

Date: July 2018
Job Number: 2018-108
Scale: NTS

Drawn: Beluca
Issue: DRAFT
Dwg Number: 2018108-04

Key:

1. Native screen planting (10 metres wide)
2. Native screen planting (5 metres wide)
3. Dry creek bed- Reach 1 Established vegetation
4. Dry creek bed- Reach 2&3 Riparian corridor planting
5. Dry creek bed - Reach 4 Perennials, sedges and reeds
6. Existing vegetation

Trees to be retained

Trees to be removed

N

0m 50m 100m 150m

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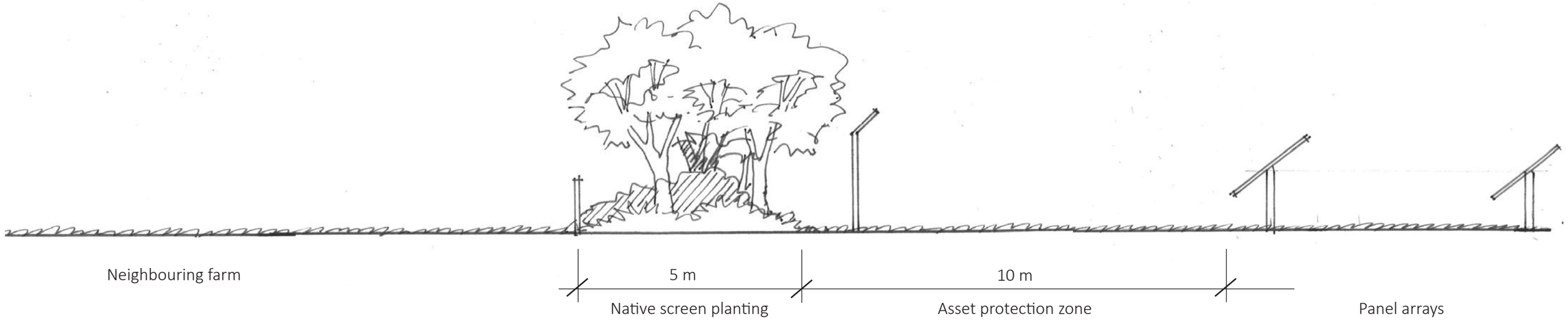
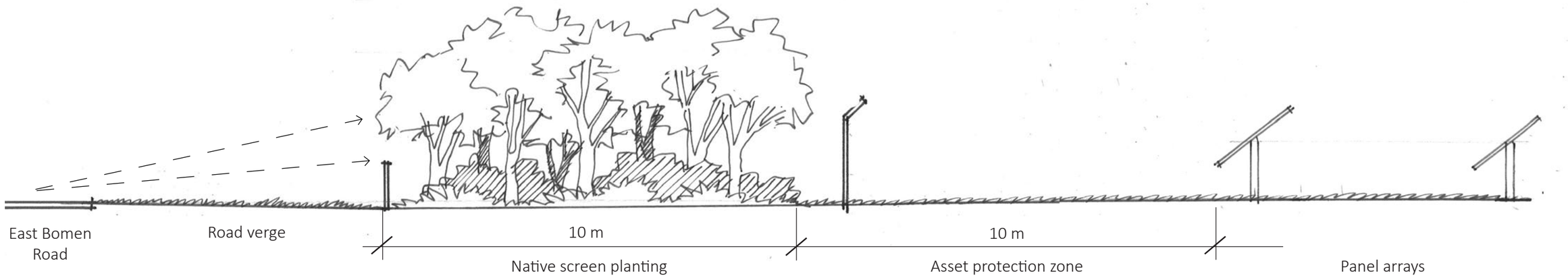
FIGURE 2-1: LANDSCAPE CONCEPT PLAN

Date: July 2018
Job Number: 2018-108
Scale: NTS

Drawn: PK
Issue: DRAFT
Dwg Number: 2018108-05



A-A



B-B

Scale: 0m 1 2 5m

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FIGURE 2.2: LANDSCAPE CONCEPT SECTIONS

Date: July 2018
Job Number: 2018-108

Drawn: PK
Issue: DRAFT
Dwg Number: 2018108-06

PLANT COMMUNITY TYPES

According to the NSW BioNet Vegetation Map Collection there are two existing Plant Community Types (PCTs) present on the site. These are the:

- *Blakelys Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion*
- *White Box - Blakelys Red Gum - White Cypress Pine shrubby woodland on metamorphic hills in the Wagga Wagga - Cootamundra region of the NSW South Western Slopes Bioregion.*

The following plant lists include plant species found in these PCTs. This will ensure they are suited to local site conditions, including soils, aspect and rainfall.

LANDSCAPE TYPES

The following landscape types will be used. Refer to Landscape Concept Plan key.

1 & 2. Native screen planting (5-10m)

A mix of trees and shrubs have been selected, with a maximum height of 5 metres, and including species with a dense habbit to provide a maximum screening effect whilst not unreasonably shading the solar arrays.

Proposed plant list:

Trees
Acacia dealbata
Acacia pycnantha
Banksia marginate
Pittosporum phylliraeoides

Shrubs
Acacia acinacea
Acacia brachybotrya
Acacia decora
Acacia hakeoides
Acacia verniciflua
Dodonaea viscosa subsp. Cuneate
Maireana microphylla

It is proposed that these trees and shrubs be planted in the existing pasture grasses to minimise disturbance to the landscape.

3. Dry creek bed - Reach 1

This area of existing established vegetation is to remain fenced and potected during construction.

4. Dry creek bed - Reach 2 & 3

Additional native tree, shrub and grasses will be provided within Reach 2 amongst the existing areas of revegetation.

Reach 3 will be revegetated with a mix of trees and shrubs within existing pasture grasses to minimise disturbance to the dry creek corridor.

Proposed plant list:

Trees
Acacia dealbata
Acacia pycnantha
Banksia marginate
Pittosporum phylliraeoides

Shrubs
Acacia acinacea
Acacia brachybotrya
Acacia decora
Acacia hakeoides
Acacia verniciflua
Dodonaea viscosa subsp. Cuneate
Maireana microphylla

Grasses
Aristida ramosa
Austrodanthonia caespitose
Austrostipa densiflora
Austrostipa densiflora
Bothriochloa macra
Lomandra filiformis subsp. Coriacea
Poa sieberiana
Themeda australis

5. Dry creek bed - Reach 4

Deep rooting rooted native perennials, sedges and reeds.

Proposed plant list:

Perennials, Sedges and Reeds
Carex tereticaulis
Juncus filicaulis
Lomandra filiformis subsp. Coriacea
Poa labillardieri
Poa sieberiana

NOTES

- New planted areas are to be cultivated to a minimum 150mm depth and have a minimum 300mm depth improved / ameliorated site soil.
- Individual planting holes are to excavated one & half times the depth and twice the width of the pot. Plant pot so that the base of the plant is level with the surrounding ground and backfill with ameliorated site soil. Form a shallow basin around each plant to retain water.
- All planting to be planted in Jute mesh or have a 100mm depth organic mulch. Jute mesh is to be overlapped min 300mm and pin fixed to manufacturer's specification. Align jute mesh perdicular to the contours and secure the perimeter in a 300x300mm deep trench with pin fixing.
- Organic mulch shall be free from deleterious material, including rocks, plastic and any material toxic to plant growth. Mulch shall comply with the requirements of AS4454 Composts, soil conditioners and mulches.
- Install proprietary Tree guard sleeves (Tree Max or approved equivalent) and stakes for each tree & shrub. Install as per manufacturer's specification.
- Install 1 x Agriform tablet (or approved equivalent) per plant as per manufacturers specification.
- Maintain setbacks from services as shown on the engineering plans.
- A star picket, or durable temporary fence, is to be erected around the perimeter of the drip line of retained trees in accordance with AS4970 Protection of trees on development sites.
- No materials or equipment are to be stored at the base of the retained trees.
- Areas outside the construction footprint which are impacted during construction should be reinstated.
- All plant stock to be minimum 50x50x120mm tubestock. Plants are to be healthy and well formed. No rootbound stock.
- A planting density of 2 x plants per m^2 will be achieved for native vegetaiton screening.
- Perennials, sedges and reeds to be planted at 3 x plants per m^2.
- Plant Establishment Period is to be 13 weeks commencing from the date of Practical Completion.
- The establishment period is to include watering, weeding, and replacement of failed or damaged plants.
- Tree guard sleeves and stakes to be removed upon establishment.

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FIGURE 2-3: PLANT LISTS & LANDSCAPE NOTES

Date: July 2018
Job Number: 2018-108
Scale: NTS
Drawn: PK
Issue: DRAFT
Dwg Number: 2018108-07