

Chapter 7: Landscape and Visual Impact Assessment

Landscape Character and Visual Impact Assessment

- 7. Landscape Character and Visual Impact Assessment2
 - 7.1 Methodology2
 - 7.2 Assessment Findings.....5
 - 7.3 Mitigation.....9
 - 7.4 Conclusion.....10

7. Landscape Character and Visual Impact Assessment

The Landscape Character and Visual Impact Assessment assesses the potential visual impact of the proposed Keyneton Wind Farm. The assessment was carried out by Warwick Keates of WAX Design in association with Dr Brett Grimm of Brett Grimm Landscape Architect (BGLA) and is provided at Appendix E. This chapter summarises the main findings of that report, however for a greater understanding of the assessment methodology and findings, reference should be made to Appendix E.

The assessment aims to evaluate the existing landscape character and the degree of visual change that will be produced by the proposed wind farm and its associated infrastructure. The potential visual effect has been assessed using a detailed methodology that involves on-site assessments, consultation with the community in relation to landscape values, and the preparation of photomontages that illustrate the anticipated visual effect of the Keyneton Wind Farm.

7.1 Methodology

7.1.1 Visual Effect Assessment

An assessment of the visual effect on the landscape from the proposed wind farm development was undertaken using a specific matrix (GrimKe Matrix - See Appendix E) which takes into account the following aspects of landscape character and visual effect:

1. Topographic Relief (the complexity of the land that exists as part of the underlying landscape character)
2. Vegetation Cover (the extent to which vegetation is present and its potential to screen and filter views)
3. Infrastructure and Built Form (the impact of existing development on landscape and visual character)
4. Cultural and Landscape Value (an evaluation on the degree of sensitivity founded within the community engagement cognitive mapping)
5. Percentage of visual absorption (ability of landscape to absorb and screen the visual change).
6. Horizontal visual effect (spread of the development in the visual landscape).
7. Vertical visual effect (height of the development in proportion to the existing vertical scale of the visual landscape).
8. Distance of visual effect (distance between viewpoint and closest turbine of the proposed development).

The above eight criteria are used within two separate assessments i) landscape character and ii) visual assessment. In the first instance, items 1-4 were assessed in relation to the existing landscape character. Values out of 5 for each aspect were aggregated to form a baseline value out of 20. The higher the value the more sensitive the landscape is to changes in the existing visual character. This provides a baseline measurement of the landscape from which the degree of visual change can be assessed and considers the degree to which the introduction of the wind farm will alter the existing landscape character.

Secondly, items 5 - 8 are rated from 1 to 5 with 1 being minimal visual effect and 5 significant visual change caused by the proposed development. The scores are then aggregated out of 20 to provide an indication of the visual effect that will occur from selected viewpoints. The viewpoints were specifically selected in locations with clear views towards the wind farm.

The visual assessment is then combined with the landscape value to produce a measurement that represents the degree of visual change, that is to say, the extent to which the development will alter the existing landscape. This is measured as a percentage change (see Table 7.1 below) and is accompanied by a descriptive reference to qualify the visual effect.

Table 7. 1: Description of Visual Effects

Percentage Value of Visual Change	Descriptive Qualification of Visual Effect	Comments
80-100%	Extreme	Extreme change in view: change very prominent involving total obstruction of existing view or change in character and composition of view through loss of key elements or addition of new or uncharacteristic elements which significantly alter underlying landscape visual character and amenity
60-80%	Severe	Severe change in view involving the obstruction of existing views or alteration to underlying landscape visual character through the introduction of new elements. Change may be different in scale and character from the surroundings and the wider setting. Resulting in a perceived increase in proportional change to the underlying landscape visual character
40-60%	Substantial	Substantial change in view: which may involve partial obstruction of existing view or alteration of underlying landscape visual character and composition through the introduction of new elements. Composition of the view will alter. View character may be partially changed through the introduction of features.
20-40%	Moderate	Moderate change in view: change will be distinguishable from the surroundings whilst composition and underlying landscape visual character will be retained.
0-20%	Slight	Very slight change in view: change barely distinguishable from the surroundings. Composition and character of view substantially unaltered.

In addition to the matrix assessment a series of photomontages, depicting how the wind farm will look from a number of different publicly accessible viewpoints in the area, were used to aid the assessment.

Assessment site visits were undertaken on the 7 May, 29 June, 19 July, 19 August, 13 September 2011 and 13 January 2012. On each visit, the weather was fine with good visibility. Various additional site visits were undertaken for the purposes of undertaking montages from private properties (See Section 7.1.6).

7.1.2 Landscape Character Assessment

In order to understand how the proposed wind farm will visually affect the landscape character, a detailed assessment of the existing landscape was undertaken. This assessment considers landscape character units (LCU) that express similar visual patterning through line, colour, texture and scale resulting in unique landscape characteristics in relation to topography, vegetation cover and land use.

7.1.3 Zone of Theoretical Visual Impact (ZTVI)

ZTVI assessment is a tool used to illustrate the potential visibility of turbines from locations around the wind farm site. Wax design have presented a conservative ZTVI of the number of turbines that are potentially visible using a bare ground 10m digital terrain model, which assumes bare ground i.e. no vegetation, buildings or other structures.

7.1.4 Community Consultation and Landscape Values

As part of the community engagement an assessment of the landscape value was undertaken through a cognitive mapping exercise and the completion of a designated landscape survey. The cognitive mapping exercise involved the analysis of a series of qualitative values relating to the landscape surrounding the Keyneton Wind Farm. The locations of these values were then identified by local members of the community on a reference map. Each participant was asked to identify landscape values, special places, activities, or any spatial attributes of interest. Markers were provided and each one assigned a landscape value (i.e. rural and agricultural, natural, scenic, recreation, history and culture) so that members of the community could locate landscape areas or features that most strongly represented the assigned landscape value.

This process allowed the community's responses to the perceived value of the landscape to be included in the landscape assessment methodology and the responses provided by members of the community were fed directly into the landscape assessment.

7.1.5 Design Review

Following the community consultation sessions Warwick Keates and Brett Grimm participated in a review of the turbine layout with Pacific Hydro.

7.1.6 Visual Effects from Private Properties and Dwelling

Through the community consultation process conducted by Pacific Hydro, a number of local residents specifically requested photomontages from their properties. As a result during the course of the LVIA a total of 19 photomontages from 10 private properties were produced by Wax

Design and BGLA in order to provide members of the community with an understanding of the potential visual effect from their dwellings.

7.2 Assessment Findings

7.2.1 Landscape Character

The landscape that surrounds the Keyneton Wind Farm is defined by a series of landscape character units (LCU) that relate to the underlying topography and vegetation of the region. To the west, the Eastern Mount Lofty Ranges form an undulating topography with extensive areas of remnant woodland cover that provide a moderate to high degree of landscape amenity as well as significant localised visual screening.

By contrast the landscape character of the Eastern Mount Lofty Ranges Plateau has an open visual character with little or no remnant or native vegetation. This creates an exposed rural landscape punctuated by rocky outcrops and smaller areas of vegetation (particularly around the North Rhine Valley and Marne River).

The Ranges' escarpment also forms an exposed agricultural landscape devoid of vegetation. The elevated topography produces a prominent landscape feature within the regional context of the wind farm development. From the ridgeline of the escarpment there are panoramic views across the Murray Plains.

To the east are the Murray Plains, a low lying, predominantly flat agricultural landscape punctuated by belts of vegetation associated with the underlying creeks and the field pattern of the area. The Eastern Mount Lofty Ranges' Escarpment is the prominent visual element in the landscape to the west. The elevated topography of the escarpment produces a defined visual envelope with an un-vegetated landscape character. Other views around the plains to the east are screened by vegetation and localised minor ridgelines.

7.2.2 Community Consultation and Landscape Values

From the community consultation sessions at Keyneton, Cambrai and Eden Valley, approximately 75 people provided information in relation to the value of the regional landscape as they perceived it. These findings were taken into account during the visual effect assessment and as part of the Wind Farm Design Review.

The community identified the surrounding landscape as having a rural landscape character. In addition the North Rhine Valley, Keynes Gap and the Marne Valley were identified as having significant natural and scenic value and both Sedan Hill Road (also known as Angaston – Sedan Road) and Pine Hut Road were identified as having high scenic value. Generally, values associated with recreation and leisure were located within the towns and associated with sports clubs, ovals and open space. Additional recreational value was identified throughout the landscape particularly in relation to the Marne River and local ridgelines (the escarpment and Keynes Gap). The stone walls were recognised as representative of the landscapes cultural value.

7.2.3 Design Review and Management of Visual Effects

As outlined in Chapter 5, a 57 turbine layout was proposed by Pacific Hydro and announced in March 2011 and this layout was presented at the community consultation sessions. Following these community consultation sessions this layout was reviewed by Wax and Pacific Hydro.

The design review was based on a preliminary visual assessment and identified a number of wind turbines that presented a noticeable visual effect when compared with the overall visual effect created by the wind farm. The review considered individual wind turbines assessing whether certain turbines increased the visual prominence of the wind farm, whether the location of turbines increased the visual complexity and contrast to the surrounding context or whether particular wind turbines impacted on more sensitive landscape areas as identified by the landscape character assessment and the community consultation

The design review, alongside ecological and cultural heritage assessments, resulted in the removal of 15 wind turbines and relocation of a number of other turbines. The removal of the turbines resulted in an improvement in the overall visual effect and reduction in the visual complexity of the proposed development.

Zone of Theoretical Visual Influence maps were used to assess both the 57 and 42 turbine development proposals. The assessment indicates a discernible reduction in the visual effect to the south of the proposed wind farm. The number of turbines and the locations from which turbines are visible from the Marne River is reduced; similarly the intensity of visible turbines from the Eden Valley Lookout is reduced. Generally, there a reduction from all location in the number of wind turbines that will be visible.

7.2.4 Visual Effect Assessment

Eight viewpoints were included in the detailed visual assessment of the 42 turbine layout that is the subject of this Development Application and photomontages were produced from each viewpoint to illustrate the likely visual change that will be experienced in the surrounding landscape.

The viewpoints identified represent a range of locations and landscape characters around the proposed development. Each viewpoint has been selected to illustrate locations that are publicly accessible, representing typical views of landscape character units and where a large number of wind turbines will be visible in the landscape. In this regard, they generally represent the greatest degree of visual change that will be experienced as a result of the proposed development within the LCU.

A summary of the assessment (assessment criteria provided in Table 7.1) findings for each of the eight viewpoints is provided below.

Viewpoint 1: North of Cambrai at the intersection of the Ridley Road and Black Hill Road

The viewpoint illustrates the potential visual effect that will be experienced from the northern outskirts of the Cambrai township and in relation to culturally significant features such as the cemetery and local area primary school.

The visual effect experienced from this viewpoint and surrounding locality is described as moderate. Due to the relatively moderate landscape amenity value attributed to the agricultural landscape with limited areas of scenic value, the introduction of the turbines will have limited impact. The separation of the two distinctive clusters provides sufficient landscape absorption capacity whilst reducing the visual mass of the development array. The development is seen as a legible form with limited scope for further mitigation. From this viewpoint the development will not alter the underlying landscape visual character.

Viewpoint 2: West of Sedan on Banks Road

Viewpoint 2 is located on the outskirts of Sedan near to the Pilgrims of Zion Lutheran Church. The viewpoint is located on Banks Road and is typical of the visual character that will be experienced

to the western edge of the township as well as from other locations in and around the Murray Plains to the northwest of the proposed wind farm site. The viewpoint is also typical of the potential visual effect that will be experienced from Sedan's oval and other public spaces within the town where views out of town towards the west are present.

The visual effect from this viewpoint and surrounding locality is described as moderate. Due to the relatively moderate landscape amenity value associated with the agricultural landscape with limited unique scenic qualities, the visual integration of the turbines is suggested to have minimal impact. The ability of the landscape to absorb the southern cluster and the presence of the existing landscape vertical scale provides a proportionate reference to limit the degree of contrast in scale. Hence the existing landscape scale is sufficient to limit the overall presence of the turbines within the field of view. Therefore from this location the development is seen to be within keeping of the underlying landscape visual character.

Viewpoint 3: Towitta Road and Chain Road

Viewpoint 3 is located on the Towitta Road and represents the potential visual effects that will be experienced from the north eastern extent as a result of the proposed wind farm development. The location is also selected to demonstrate the potential visual effect that will be experienced along the Sturt Highway, approximately 16 kilometres north.

The visual effect from this viewpoint and surrounding locality is described as slight to moderate. Due to the relatively moderate landscape amenity value associated with the agricultural landscape, coupled with the mid ground vegetation associated with Red Creek, there will be proportional integration of the turbines from this perspective. On the other hand the northern cluster will be visually prominent, but with limited visual layering of turbines. This enhances legibility, enabling comprehension of the development, reducing the overall visual mass and complexity, which is beneficial to the preservation of the underlying landscape visual character.

Viewpoint 4: South of Henschke Winery on the Eden Valley-Moculta Road

Viewpoint 4 is located adjacent to the Henschke Winery on the Eden Valley-Moculta Road. The viewpoint, approximately 400m south of the Winery's entrance, represents the visual effect that will potentially be experienced when travelling to or from this tourist destination and within the scenic landscape character on the eastern edge of the Barossa Valley. Views in this area will be subject to topographic and vegetation variance which fragments and screens the majority of views towards the development site. Views from the Henschke cellar door itself will be substantially screened by topography and vegetation.

The visual effect from this viewpoint is described as substantial. Due to the close proximity and visual sky lining of the turbines the degree of contrast is accentuated with reduced scope to integrate the development to the existing landscape character. However the extent of this experience is confined to a small section of the road leading to the Henschke winery from the south, with the winery itself internalised with cadastral planting limiting views to the east towards the proposed wind farm. Consequently the degree of visual presence of the wind farm within this sub regional locality can be argued to be at worst substantial with the majority of potential visual effects moderate to slight due to extensive vegetation screening limiting potential views of the proposed development.

Viewpoint 5: Sedan Hill Road between Angaston and Sedan

Viewpoint 5 is located on Sedan Hill Road between Angaston and Sedan. The location was selected due to the prominence of the main arterial road as well as the local properties that exist in and around Ram's Head Corner which is approximately 300 metres to the south east of the viewpoint. The viewpoint is representative of the visual effect that will be experienced within the sub-regional area to the west and from main roads and other dwellings within the locality.

The visual effect is described as moderate from this perspective. Due to the separation of the northern and southern cluster, there will be no view of the southern cluster which is screened behind vegetation and the local ridgeline. Hence the degree of visual change is limited to the northern cluster, which is also fragmented, with glimpsed views through vegetation canopies. From this local to sub regional area there is limited scope or need for additional mitigation.

Viewpoint 6: Intersection of Jutland Road and Rhine Park Road

Viewpoint 6 is located at the intersection of Jutland Road and Rhine Park Road. The viewpoint has been selected to demonstrate the potential visual effect that will occur to the southwest particularly in relation to Keynes Gap, properties along Jutland Road and the surrounding agricultural landscape. While it is recognised that the more elevated views from Keynes Gap will increase the potential visual effect from that location, the context and likely character of this effect will be similar from the more accessible road network represented by Viewpoint 6.

The visual effect experienced from this viewpoint is described as substantial. The proximity and vertical scale of the turbines as pronounced visual elements defines the view. However the vegetation coverage in this area is able to fragment the visual presence of the development which will provide differing views of the southern cluster. Similar to viewpoint 4, the separation of the two clusters, and predominate screening of the northern cluster, enables the landscape to absorb and mitigate the extent and degree of visual change and thus retain the underlying landscape character. Importantly views will not be seen from the western side of the ridge that defines Keynes Gap.

Viewpoint 7: Eden Valley Scenic Lookout

Viewpoint 7 is located at the Eden Valley Scenic Lookout. The viewpoint represents a well-known tourist destination for both locals and regionally within South Australia. The viewpoint provides almost 270 degree views of the Eden Valley to the west, south and east. To the south and east views extend across the rural landscape of the Barossa Valley characterised by local undulating topography and well-vegetated landscape, as well as prominent rocky outcrops and ridgelines (associated Keynes Gap). Further to the backdrop of this view is the more distant undulating horizon line of the Eastern Mount Lofty Ranges escarpment. The lookout is also located on the Lavender Federation Walking Trail (which connects Murray Bridge to Truro).

Due to the distance of the visual effect being sub regional to regional the visual change to the landscape is considered to be moderate. The orientation of the view which is affected by the development is confined and does not overlay the backdrop of the high scenic qualities of the township of Eden Valley or Keynes Gap which are further to the south and south-east.

Viewpoint 8: River Marne Campground

The River Marne and campground is a viewpoint location that was identified by the community as having significant value and was thus specifically included in this assessment. This value relates to scenic and natural qualities of the River Marne as well as the recreational opportunities provided by the river corridor and associated facilities.

The visual effect of the development is described as substantial being pronounced on the leading eastern edge of the ridgeline which is an elevated defining landform. However, the visual effect created by the southern cluster is visually separated from the Marne River corridor, mitigating visual intrusion on the natural qualities of this defined corridor. The development is seen in a modified landscape which is characterised by agricultural paddocks. The separation of the development and the natural characteristics of the Marne River help preserve the amenity and qualities of the Marne River, whilst there will be partial visual alteration experienced to the agricultural landscape character to the north.

Summary of Visual Effects

The assessment of the visual effect demonstrates that the degree of visibility will be experienced predominantly on the eastern side of the escarpment with the majority of effects moderate, with localised areas of substantial visual effect. Isolated areas associated with greater cultural or scenic values as assessed by WAX Design, BGLA and as indicated by members of the community during the consultation session have elevated the potential visual effect to sub regional areas such as the Marne River.

While the western landscape areas associated with Viewpoints 4, 5, 6 and 7 demonstrate a moderate to substantial degree of visual change, the topography and vegetation of the area significantly reduces the potential for this degree of visual effect to be experienced, particularly in relation to sub-regional and regional locations.

Those areas described as having substantial visual effect to the west are isolated to small pockets. The landscape character of these areas is typically heavily vegetated or has defined local ridgelines which fragment and screen views and the resulting visual effect.

In summary, the proposed wind farm will be more visible to the eastern side of the escarpment than west. However, the degree of visual change is generally moderate, increasing and decreasing in response to local landscape characters. By contrast, to the west the assessment has recorded varying levels of substantial visual effect. While the assessment of the degree of visual change is more pronounced, the amount of screening and visual mitigation offered by the surrounding landscape limits the overall visual effect.

7.2.5 Review of Visual Effects from Private Properties and Dwelling

Of the 19 private photomontages that were produced for members of the community, an interpolation of the visual effect concluded that 18 locations, near or adjacent to private residences, would experience a moderate degree of visual effect and that one property would potentially experience a substantial visual effect.

While a moderate degree of visual effect is likely to be experienced by the majority of the properties that received photomontages, the actual degree of visual change will vary depending on the location of each property and the surrounding local landscape character.

7.3 Mitigation

During the design development process, the visual effect of the proposal was reduced by either removing or reviewing turbines for their individual and collective degree of visual impact. The planning and development of the project has recognised the need to manage the visual effect and the need to reduce the visual impact of the wind turbines on certain locations. In particular the removal of 15 turbines from the Keyneton Wind Farm, 57 turbine, proposal has helped to reduce overall visual impact with deletion of turbines. The turbines that were considered to have more elevated visual effects were located to the southern tip of the southern cluster. These turbines 50, 56 and 57, impacted more significantly on the Marne River corridor which has a higher degree of landscape amenity and also community value. By managing the visual effect in this locality as a priority (and deleting these turbines), the development is seen to respond to the existing landscape values.

Pacific Hydro recognises the potential visual effect that may occur from certain properties and propose that a landscape vegetation screening programme will be offered to eligible properties in order to provide local visual mitigation.

7.4 Conclusion

The visual assessment process has considered the existing landscape character value coupled with an overlay of local community sensitivities and cultural associations to places of scenic amenity as identified through a detailed community engagement process.

The visual effect of the proposed development will vary from slight to moderate on the eastern side of the escarpment with higher degrees of visual change generally to the west and a localised area of substantial visual change associated with areas of increased landscape and tourist value.

The visual assessment demonstrates the relative visual effect of the wind farm within the landscape from a sub-regional and regional context. From locations to the east, the agricultural land use, lack of landscape amenity (absence of natural vegetation cover) and prominent topographic form of the Eastern Mount Lofty Ranges off-sets the potential visual impact of the wind turbines. While the wind farm will be visible, its overall scale is mitigated by the landscape character, underlying topography and panoramic visual qualities of the regional landscape areas to the east. The wind farm is described as producing a slight to moderate degree of visual change within a modified rural landscape.

To the west, the amount of vegetation cover and undulating topography provides significant screening and framing of views throughout the landscape. While the degree of visual change is described as moderate increasing to substantial, the actual visual effect is mitigated by the surrounding landscape context which limits both the number of locations from where the wind farm is visible and the amount of visual effect that will be experienced. By contrast, from the east the visibility of the wind farm increases, due to the elevated position of the wind farm. However, the majority of the proposed wind turbines are located within the transitional and agricultural landscapes of the Eastern Mount Lofty Ranges Plateau and Escarpment. The associated modified agricultural landscape value and increased topographic variations of the escarpment reduce the potential degree of visual change. Through the iterative design process the visual effect has been further reduced by the deletion of certain wind turbines (reducing the wind turbine number from 57 to 42).

In conclusion, the proposed Keyneton Wind Farm will for the majority of regional landscape be experienced as a moderate visual effect. Although areas of substantial effect were recorded to the west, these visual effected locations are contained within a well vegetated and topographically varied landscape where views of the wind farm are often partially or fully screened.

Based on the visual assessment, the Landscape and Visual Impact Assessment concludes that the degree of visual change that will result from the development of a Keyneton Wind Farm will not cause a significant adverse visual impact and that the existing landscape character can accommodate the proposed development. In the opinion of Wax Design and BGLA while the visual effect of the wind farm will be moderate to substantial, the underlying rural and agricultural regional landscape character will be preserved.