

11.0 CUMULATIVE VISUAL IMPACT

11.1.1 Existing development in the region

Currently, the landscape is a predominantly rural landscape with infrastructure associated with nearby towns extending into the surrounding landscape. Travelling along Mudgee Road towards Wellington a combination of developments have altered the appearance of the natural landscape. Transgrid's Wellington Substation is a high voltage 330kV / 132kV substation located 2.4 km north east of Wellington on Mudgee Road. Associated with the Wellington Substation, a number of high voltage power lines run through the landscape servicing the region. Wellington Correctional Centre is also sited on Mudgee Road approximately 5.5 km north east of Wellington along the Mudgee Road. Both of these developments are partly concealed from view by screen planting.

11.1.2 Proposed local developments

In addition to the Bodangora Wind Farm project there are a number of projects proposed and awaiting approval, that may commence works in the near future. (As shown in figure 18)

Proposed projects in the area (as of September, 2011), include:

- Ungula Wind Farm (DGRs issued)
- Narrabri to Wellington Gas Pipeline (DGRs issued)
- Young to Wellington Gas Pipeline (Approved)
- Wellington Gas-Fired Power Station (Construction to commence 2012)

A plan showing the location of these proposed projects is included as Figure 18 of this report.

UUNGULA WIND FARM

An application was submitted to the Department of Planning for proposed Ungula Wind Farm in March 2011 and DGRs have since been issued to the developer. The Ungula Wind Farm proposes approximately 330 wind turbines and associated infrastructure located to the south of Mudgee Road on land surrounding Ungula.

WELLINGTON GAS FIRED POWER STATION & GAS PIPELINES

ERM Power gained approval to construct a 600 megawatt gas fired power station north of Wellington adjacent the existing Transgrid Substation. In addition to this application, ERM Power have also proposed the construction of a 219 kilometre natural gas pipeline from the Young gas hub centre to gas power station. Eastern Star Gas have also proposed to supply a natural gas pipeline from the Narrabri Coal Seam Gas Project to the Wellington Gas Fired Power Station. The cumulative visual impact resulting from these proposed developments would be insignificant.

11.1.3 Cumulative effects of existing and proposed wind farms in the region

The main cumulative impact of the multiple wind farm developments of the area is likely to be related to the visual impact. The visual impact will be greater at vantage points from which more than one development is visible.

The Ungula Wind Farm is in some areas within 12km of the proposed Bodangora Wind Farm resulting in a low cumulative visual impact. As the proposals are separated by a distance of approximately 10 km at their closest point it is unlikely that receptors will view both developments in combination.

The proposed developments may be viewed in succession as travellers move through the landscape. This may occur for motorists travelling through the landscape however this will result in what is recognised as a perceived cumulative visual impact. A perceived visual impact results from the reoccurrence of wind farms or similar scaled infrastructure / developments within a particular region that changes the perspective of the overall landscape character (EPHC).

11.1.4 Limitations on broad scale expansion

The landscape of the area allows for optimum harvest of wind energy. There are minimal obstructions in the landscape and smooth topography and easy access to the grid which is beneficial to the output of a wind farm. However it is conceivable that if wind farms in the local area were to become more prevalent, the spatial and landscape separation between the farms would decrease, resulting in limitations for continued development.

The factors which will potentially constrain wind farm development in the area include:

- Topography
- Lake Burrendgong as an area of regional significance
- National Parks
- Town centres and associated developed areas

12.0 SUMMARY OF VISUAL IMPACT

12.1 OVERVIEW OF VISUAL IMPACT

In addition to the viewpoint assessment and zone of visual influence analysis, the following provides an overview of the potential visibility from residence and roads surrounding the site. The analysis of the visibility from nearby residence has been undertaken using the receptors identified by Infigen within close distance of the project site (See figure 19).

An analysis of these individual receptors was undertaken using a combination of the zone of visual influence, aerial photography and topographic maps. This analysis has been used to provide an overview of the potential visual impact from these public and private receptors and assist in developing mitigation methods. Receptors identified as having a moderate to high visual impact were assessed in further detail during the field work and viewpoint analysis process.

12.2 NEARBY RESIDENCES

A total of 26 homesteads located within close proximity (within 6km) of the proposed wind turbines (refer to Figure 19) have been assessed as part of the visual impact assessment. These residents have been identified by Infigen as receptors for assessment due to variations in the distance and viewing direction.

Due to the predominantly rural land use of the area residential properties are generally remotely situated on unsealed minor roads from Mudgee Road and to the south of Mudgee Road. Tables 16 and 17 on the following pages assess the visual impact from these residences based on the distance from the proposed wind turbines taking into account topography, existing vegetation and screen planting. It is important to note these assessments have been undertaken with the aid of aerial photographs and topographic maps and therefore provide a general assessment. Further assessment was undertaken during field work from residences with a visual impact exceeding low.

Of the 26 receptors assessed, (of which 12 are involved landowners), the proposed wind turbines will not be visible from 9 receptors. A total of 13 residences assessed will have a low visual impact. Three residences were identified as having a moderate visual impact, however two of these were involved landowners.

Of all the receptors assessed, only one non-associated residence (house 11) is located within 2km of the proposal. Although located within close proximity to the proposed wind farm, the residence is orientated to the west and views of the wind farm will be minimal. A slight rise in topography to the south east of the homestead and an extensive group of native vegetation will reduce views of the proposal to filtered glimpses. The visual impact from this viewpoint was assessed as low - moderate, however it is likely with proposed mitigation methods, this would be significantly reduced.

Views from houses located along Mudgee / Goolma Road (Houses 16, 13, 13B and 14) are generally screened by a combination of low rises in topography and screen planting surrounding the properties. Views from houses to the south of Mudgee / Goolma Road are generally contained by the undulating topography typical of the area. Due to both the sloping topography and low fertility of soils the area remains generally uncleared and vegetation assists in screening views.

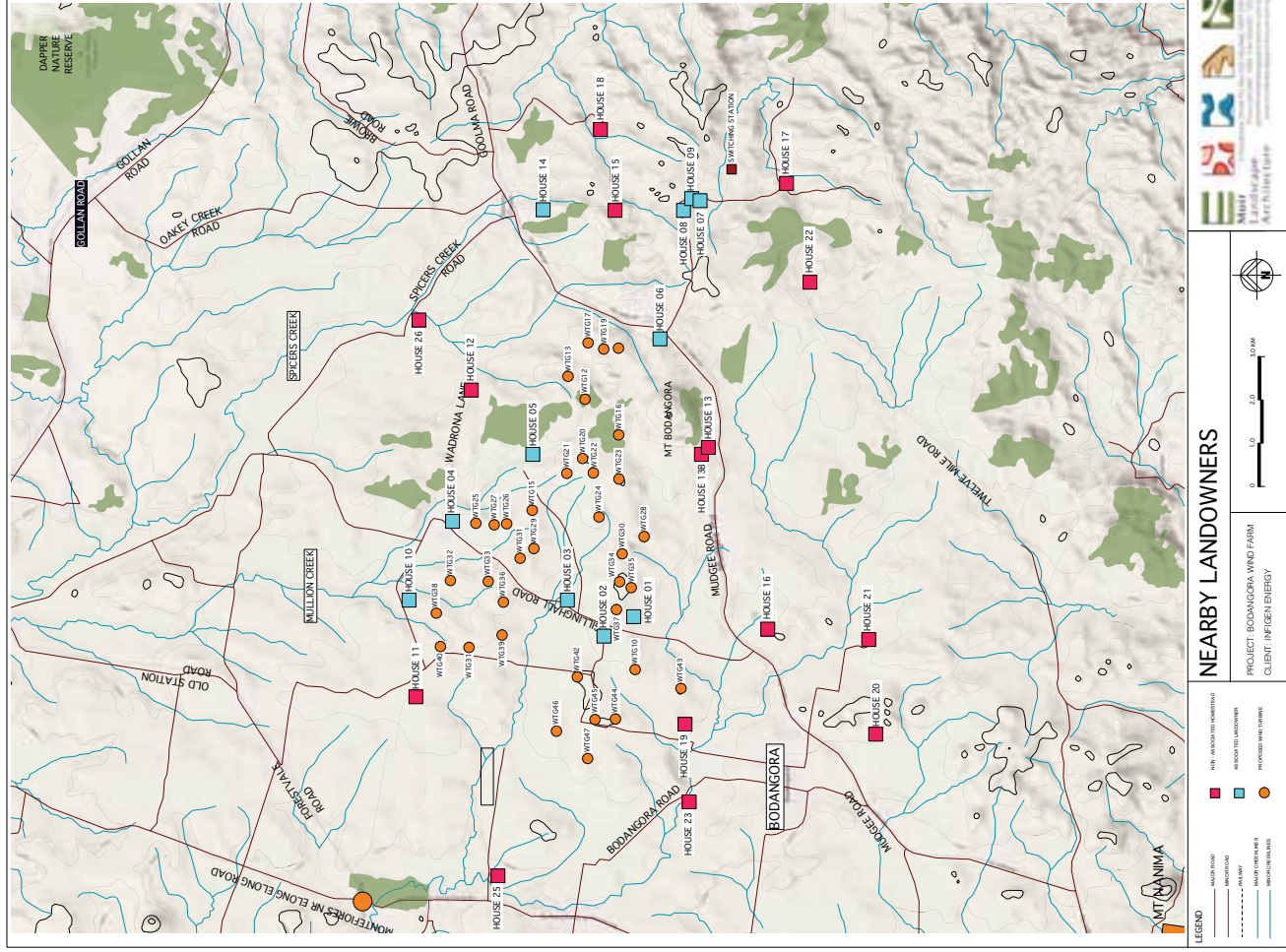


FIGURE 19: Residence within close proximity of the Site.

12.0 SUMMARY OF VISUAL IMPACT

12.2.2 Summary of visibility from nearby residences

RESIDENT	INVOLVED LANDOWNER	PROPERTY NAME	DISTANCE TO NEAREST WIND TURBINE	NUMBER OF VISIBLE WIND TURBINES **BASED ON TOPOGRAPHY	POTENTIAL VISUAL IMPACT	COMMENTS
House 01	YES	PANORAMA	0.47km	40%	LOW	Views from House 01 are generally contained to the north by a rise in topography. Due to the close proximity of the proposed wind turbines, approximately 40% are visible to the east and west. Screen planting surrounding the house will obstruct views of the proposed wind turbines. (Note: Associated Landowner)
House 02	YES	STRATHMORE	0.82km	100%	LOW	Dense screen planting surrounds the property in all directions. Views of the proposed wind turbines would be significantly impeded by the dense vegetation. (Note: Associated Landowner)
House 03	YES	GLEN OAK	1.39km	100%	MODERATE	Roadside vegetation associated with Gillinghall Road and screen planting surrounding the homestead would obstruct views to the proposed turbines to the west. Some isolated planting to the north, south and east would reduce the visual impact from the homestead. (Note: Associated Landowner)
House 04	YES	LANDSGROVE	0.67km	60%	LOW	Homestead is orientated to the north in the away from the proposed wind turbines. Dense screen planting surrounds the east and south of the residence in the direction of the wind turbines, significantly reducing potential views. (Note: Associated Landowner)
House 05	YES	GLEN OAK	1.10km	80%	MODERATE	Existing screen planting and ancillary buildings impede views to the south east. Wind turbines to the west will have a moderate visual impact, however established screen planting on the western edge of the homestead will significantly reduce the impact. (Note: Associated Landowner)
House 06	YES	AWAHNEE	1.10km	40%	LOW	Homestead is sited on a local rise in topography with expansive views to the south east over Mudgee Road. Views are contained within the homestead by a combination of dense screen planting vegetation and retained native vegetation. (Note: Associated Landowner)
House 07	YES	GUNNEGALDERIE	4.63km	-	-	Views are contained from this homestead by retained native vegetation. Some filtered views of the proposed over head power lines may be visible to the south west. (Note: Associated Landowner)
House 08	YES	GUNNEGALDERIE	4.53km	-	-	Views towards the proposed wind turbines are interfered by both undulating topography and retained native vegetation surrounding the homestead. The proposed over head power line may be visible from the residence, however it will appear as a small element of the landscape. (Note: Associated Landowner)
House 09	YES	GUNNEGALDERIE	4.55km	-	-	A local rise to the east of the property impedes views towards the proposed wind turbine. Screen planting along the south west of the homestead will screen views of the proposed over head power lines. (Note: Associated Landowner)
House 10	YES	MEADOWLANDS	0.87km	80%	NIL - LOW	An extensive coverage of established vegetation surrounds the homestead containing views. It is unlikely any of the proposed wind turbines would be visible from this residence. (Note: Associated Landowner)
House 11	NO	WESTVIEW	1.63km	80%	LOW	Residence appears to be orientated away from the proposed wind farm with expansive views to the west. Woodland vegetation to the east would screen views of the proposed wind turbines.
House 12	NO	WANDRONA	2.72km	20%	NIL - LOW	Views to the south are largely concealed by a local rise in topography densely covered by native woodland vegetation. It is unlikely the proposed wind turbines will result in a significant visual impact from this residence.
House 13	NO	MT BODANGORA	2.41km	-	-	Views to the north are contained by sloping topography associated with Mount Bodangora. Dense screen planting surrounds the property and no visual impact will result from the development from this receptor.
House 13B	NO	MT BODANGORA	2.27km	20%	NIL - LOW	Views of several of the proposed wind turbines may be available to the east, however native woodland vegetation in the foreground would significantly lower the extent of visibility. A local rise in the topography to the north east of the residence obstructs most views of the proposed wind farm.

TABLE 16: Summary of nearby residences (Houses 01- 13B)

**Note: Number of visible turbines is based on topographic mapping alone and is worst case scenario. Views are based on the height of the wind farm and does not allow for existing screening by vegetation or buildings.

12.0 SUMMARY OF VISUAL IMPACT

12.2.2 Summary of visibility from nearby residents (continued)

RESIDENT	INVOLVED LANDOWNER	PROPERTY NAME	DISTANCE TO NEAREST WIND TURBINE	NUMBER OF VISIBLE WIND TURBINES **BASED ON TOPOGRAPHY	POTENTIAL VISUAL IMPACT	COMMENTS
House 14	YES	BUDGALONG	3.89km	-	-	In addition to dense screen planting surrounding the house, an extensive coverage of vegetation dominates the local rise in topography to the east of the property, containing views to the east towards the proposed wind farm.
House 15	NO	MOUNT VIEW	3.71km	-	-	Homestead is surrounded by a large extent of native woodland vegetation, containing views from the homestead. Combined with the topography, the proposed wind farm will have no visual impact from this receptor.
House 16	NO	GEENOBBY	2.76km	80%	NIL - LOW	Views of the proposed win turbines are significantly obstructed by native vegetation. Some filtered views of the proposed wind turbines may be visible to the north, however for the most part the wind turbines will not be noticable.
House 17	NO	GLENWOOD	6.30 km	-	-	Views are contained by a small ridge line to the east of the property. There will be no visual impact resulting from the proposed wind turbines from this receptor.
House 18	NO	GREEN HILLS	5.85km	-	-	A large ridge in the foreground screens views to the west from this residence, completely obstructing views to the proposed wind farm.
House 19	YES	BODANGORA STATION	1.00 km	20%	NIL - LOW	Topography obstructs views to the majority of proposed wind turbines. In addition, extensive retained vegetation surrounding the homestead would screen views of the wind turbines. (Note: Associated Landowner)
House 20	NO	Unknown	5.37 km	20%	NIL - LOW	Homestead is orientated in a northern direction and views from the property are screened by a band of dense screening vegetation. Some filtered views may be available from the property.
House 21	NO	Unknown	5.06 km	80%	LOW	Homestead is located on an elevated slope and orientated to the north looking towards the proposed wind turbines. A number of filtered views would be available through screen planting surrounding the residence. Due to the distance from the site visible turbines would form only a small visual element of the landscape.
House 22	NO	MERAMI	5.46 km	-	-	Views towards the proposed wind turbines are interfered by both undulating topography and retained native vegetation surrounding the homestead. There will be no visual alteration to the landscape from this viewpoint.
House 23	NO	Unknown	2.92km	-	-	Homestead is located within close proximity to the proposed wind turbines, however due to the dense screening vegetation surrounding the hosue, it is unlikely there will be any significant visual alteration to the landscape from this house.
House 24	NO	Unknown	4.33km	-	-	Dense vegetation surrounds the homestead, containing views to the surrounding landscape. The proposed wind turbines will not be visible from this house.
House 25	NO	Unknown	4.07km	10%	NIL - LOW	Homestead appears to be orientated towards the proposed wind turbines, however dense vegetation would obstruct most views. Some filtered views may be available, however these would be limited.
House 26	NO	Unknown	4.42km	-	-	From this homestead it is unlikely any of the wind turbines would be visible due to the dense vegetation that surrounds the house.

TABLE 17: Summary of nearby residents (Houses 14 - 26)

**Note: Number of visible turbines is based on topographic mapping alone and is worst case scenario. Views are based on the height of the wind farmand does not allow for existing screening by vegetation or buildings.

12.0 SUMMARY OF VISUAL IMPACT

12.3 NEARBY ROADS

12.3.1 Summary of visibility from nearby roads

MAJOR TRAVEL CORRIDORS

There are four major travel corridors within the study area, including Mudgee Road, Mitchell Highway, Gollan Road and Montefiores Nr Elong Elong Road. Of these four roads the proposed wind turbines would have glimpse views from Mudgee Road and Monte Flores Nr Elong Elong Road. The proposed wind turbines have the potential to be noticed travelling along these roads due to the close proximity and potential number of visible turbines. However due to the speed of travel along both Mudgee Road and Monte Flores Nr Elong Elong Road, direction of travel, and local influences including roadside vegetation the proposed wind turbines are likely to have a very low visual impact.

LOCAL ROADS

Local roads within the Study Area have been identified as Bodangora Road, Comobella Road, Gillinghall Road and Forestvale Road. These roads have a low frequency of use, and are generally utilised by local residents and agricultural vehicles. Of the local roads assessed, Gillinghall Road had the highest potential visual impact (moderate) as the road runs through the centre of the proposed wind farm. The potential visual impact from Bodangora road was assessed as low as the period of view was short term due to the direction of travel, distance of travel and local influences such as roadside planting.

UNSEALED MINOR ROADS

A number of unsealed minor roads run through the study area. As there is a low frequency of use and short period of view from these roads, visual impact from these roads is predominately low. Unsealed minor roads that were assessed include: Spicers Creek Road, Oakley Creek Road, Driel Creek Road, Old Station Road and Gunnegalerie Road. Of these road, Driel Creek Road had the highest visual impact (moderate).

12.4 SUMMARY OF VISUAL IMPACT

Wind turbines create a strong contrast in the landscape as a result of their large scale and lack of visual integration. The visual effects of the wind turbines are lessened as the distance of the vantage point from the Site is lengthened.

The proposed wind turbines are located within rural land occupied by a small number of isolated properties. Due to the large scale and significant contrast to the rural landscape, the proposed turbines become a dominant feature of the landscape when viewed within a close proximity. However, as the distance between the viewer and the proposed development increases the visual impact decreases.

The highest visual impact of the proposed development is felt within a 2km radius of the wind farm. There are a number of homesteads located within 2km of the wind farm, however all except one of these residents are associated landowners. The visual impact from each homestead varies depending on the orientation of the house, and local landscape features (eg. screen planting, small rises in topography).

The topography surrounding the wind turbines significantly alters the visibility of the proposed development from many vantage points. There are limited areas within the local area from which the proposed wind farm can be viewed from a short range in its entirety. As the viewer distance is extended (eg. from Mitchell Highway, Forestvale Road) the entire project is visible, however it becomes smaller in scale and hence becoming a less significant visual element within the landscape.

Land to the south of Mudgee Road is generally undulating and views tend to be limited by rises in topography. Retained vegetation is a character of the landscape in this area and when planting occurs in the foreground of the viewing location the vegetation screens views.

12.0 SUMMARY OF VISUAL IMPACT

12.2.2 Summary of visibility from nearby roads

LOCATION	DISTANCE TO NEAREST WIND TURBINE	PERIOD OF VIEW	POTENTIAL VISUAL IMPACT	VIEWING CONTEXT / SCREENING FACTORS
MAJOR TRAVEL CORRIDORS				
MUDGEES ROAD	0.66 km	Very Short Term	LOW	A combination of dense roadside vegetation, topography and the direction of travel screen views for the majority of Mudgee Road. In addition the period of view is very short term due to the speed of travel along Mudgee Road. Glimpse views may be available, however they will be fleeting and typically out of the drivers sight.
MITCHELL HIGHWAY	11.88 km	-	-	It is unlikely views of the proposed wind turbines will be noticeable from the Mitchell Highway. A combination of distance from the site, speed of travel and the direction of travel will prevent views.
GOLLAN ROAD	13.20 km	-	-	Dense roadside vegetation along the majority of Gollan Road will obstruct views of the proposed wind turbine.
MONTE FIORES NR ELONG ROAD	4.27 km	Very Short Term	NIL - LOW	Some glimpse views of the proposed wind farm may be available from Monte Fiores Elong Road however these will be very short term and potentially unnoticeable to motorists travelling along the road at the permissible speed limit.
LOCAL ROADS				
BODANGORA ROAD	2.49 km	Short Term	LOW	Travelling south east along Bodangora Road the proposed wind turbines will be visible beyond the topography to the east. The short distance of travel along the road combined with the roadside planting associated with Mitchell Creek results in a short term period of view. The visual impact for motorists travelling along Bodangora Road has been assessed as low.
COMOBELLA ROAD	5.30 km	Very Short Term	NIL - LOW	Comobella Road runs in an east - west direction towards the proposed wind farm. Travelling west away from the wind farm the direction of travel prevents views of the site. Travelling east towards the site, vegetation becomes dense and any potential views would be limited to glimpses.
GILLINGHALL ROAD	0.45 km	Short Term	MODERATE	Gillinghall Road is a local road servicing isolated homesteads and providing access to unsealed minor farm roads. Gillinghall Road runs through the centre of the proposed wind farm, however the period of view is short term due to the short distance. The potential visual impact has been assessed as moderate.
FORESTVALE ROAD	5.48	Very Short Term	NIL - LOW	A combination of the speed of travel, direction of travel and period of view results in a minimal visual impact from Forestvale Road.
UNSEALED MINOR ROADS				
SPICERS CREEK ROAD	4.79	Short Term	LOW	Spicers Creek Road roughly follows Spicers creek to the north east of the site. Views of the proposed wind farm would be limited to glimpses due to distance and the direction of travel. The road is used intermittently by local residents and farm vehicles. Some riparian vegetation towards the southern end of the road screens views of the site.
OAKLEY CREEK ROAD	8.42 km	Very Short Term	NIL - LOW	The proposed wind turbines would be unnoticeable from Oakley Creek Road due to distance and existing roadside planting. The road is isolated used very infrequently. The visual impact for the road has been assessed as nil to low.
DRIEL CREEK ROAD	0.15 km	Short Term	MODERATE	Driel Creek Road runs through the centre of the proposed wind farm and is used intermittently by local residents. The wind turbines are located as close as 150m from the road, however as the period of view would be short term for motorists travelling along the road and some existing woodland vegetation would obstruct some views, the potential visual impact has been assessed as moderate.
OLD STATION ROAD	7.22 km	Very Short Term	NIL - LOW	It is unlikely views to the proposed wind turbines will be available from Old Station Road. Dense roadside vegetation, direction of travel and distance from the site result in a nil to low visual impact.
GUNNEGALDERIE ROAD	1.57 km	Very Short Term	NIL - LOW	Travelling in a northern direction along Gunnegalderie Road glimpses of several of the proposed wind turbines may be visible, however a combination of the roadside vegetation and short period of view result in a nil - low visual impact.

TABLE 18: Summary of nearby roads

13.0 COMMUNITY PERCEPTION

13.1 COMMUNITY PERCEPTION

Research from previous projects, both national and international has found that community perceptions and general acceptance of wind farms varies greatly. Viewers perception to cultural and natural elements is difficult to define and can differ on the basis of a variety of elements eg. whether the viewer is a resident or a visitor.

According to Gipe (1995) 'People unconsciously realise that opposition on aesthetic grounds is subjective, and is therefore, often dismissed by public officials. Opinion shapes policy and aesthetics or how the public views the wind industry, shapes opinion. Stanton (1995) puts forward that wind farms should not be judged solely on their visual properties ; indeed, they may be greatly valued for other qualities, such as what they symbolise.

As visual resources belong to the public it is of utmost importance to utilize guidelines derived from background research and past experience to ensure the outcomes contribute positively to the evolving landscape character of the area.

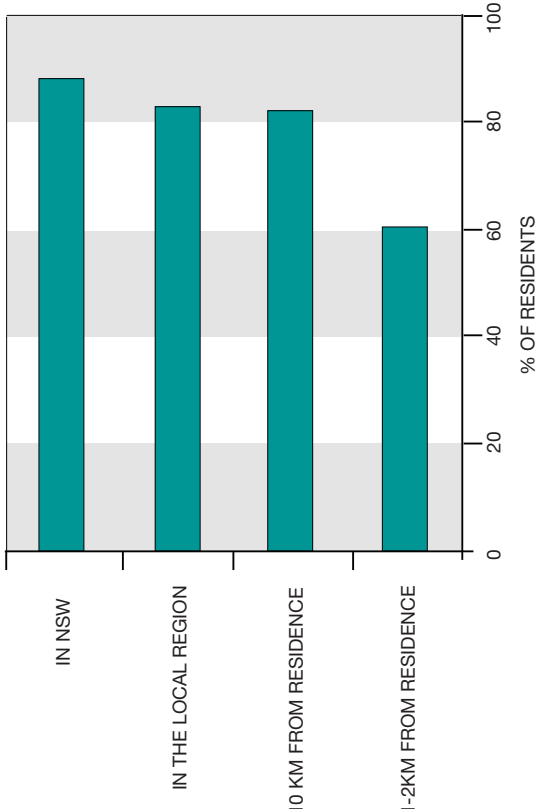


FIGURE 20: Support for wind farms in NSW (EPHC)

13.2 COMMUNITY CONSULTATION

Community consultation and engagement is key to the success and acceptance of large infrastructure projects. Since the project was announced Infigen has received a high degree of support for the proposed project both informally through conversations with community members and formally through responses to surveys.

Community information open days were held on Friday the 2nd and Saturday 3rd of September 2011, at the Comobella Hall. During the open days, community members had the opportunity to discuss their concerns with members of the project team. Infigen also provided a questionnaire to attendees with general questions regarding the proposal. A total of 17 questionnaires were submitted to Infigen. Generally, community members supported the proposal and felt the proposal would be beneficial for the local area.

Visual impact was not raised as a major concern during the open day. General comments submitted were positive providing the construction and operation benefitted the local community and businesses.

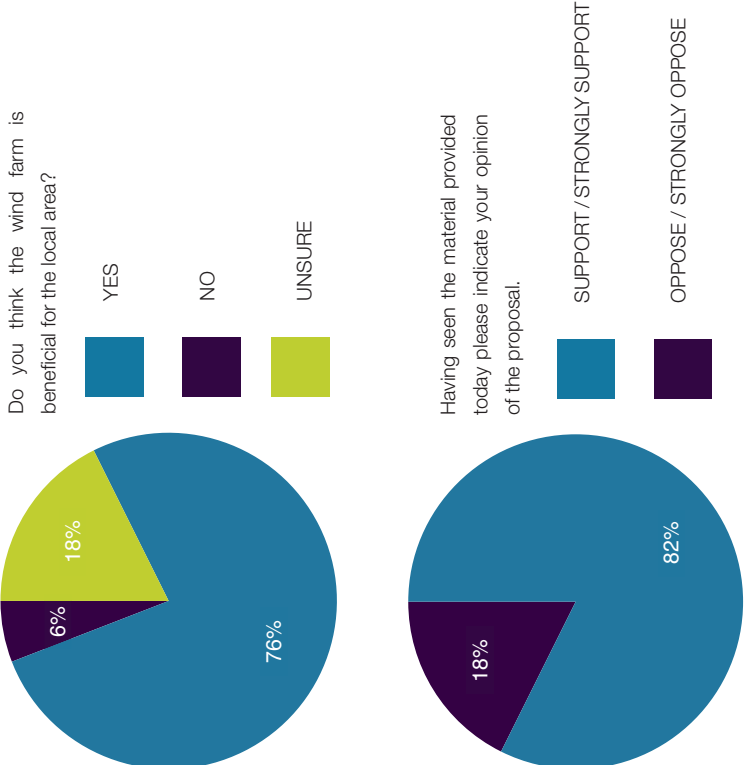


FIGURE 21: Support for Bodangora Wind Farm (Results from community open day- Infigen)

14.0 MITIGATION METHODS

14.1 SUMMARY OF MITIGATION METHODS

These recommendations seek to achieve a better visual integration of the proposal and the existing visual character at both, local and regional scales. The mitigation measures attempt to lessen the visual impact of the proposed wind farm extension whilst enhancing the visual character of the surrounding environment.

Mitigation measures are best considered as two separate phases. These include:

- primary measures that form part of the development of design through an interactive process;
- secondary measures designed to specifically address the remaining (residual) negative (adverse) effects of the final development proposal. (The Landscape Institute et al 2008)

A range of methods for mitigating the visual impact of the proposed Bodangora Wind Farm have been identified and are outlined in this section of the VIA. The recommendations seek to achieve a better visual integration of the proposed Bodangora Wind Farm and retention of existing landscape character at both local, and regional scales.

It is important to note that the mitigation methods proposed in this report are made notwithstanding issues raised by other consultants (eg. engineering, ecology, geology etc.) When site planning the wind farm the design should consider some or all of the following mitigation strategies to lessen the visual impact of the proposal. This is by no means an exhaustive list, however the adoption of these recommendations will assist considerably in ensuring the proposal contributes positively to the visual quality and character of the area.



Existing Homestead foreground planting.



Existing roadside planting.



FIGURE 22: Roadside Screen Planting

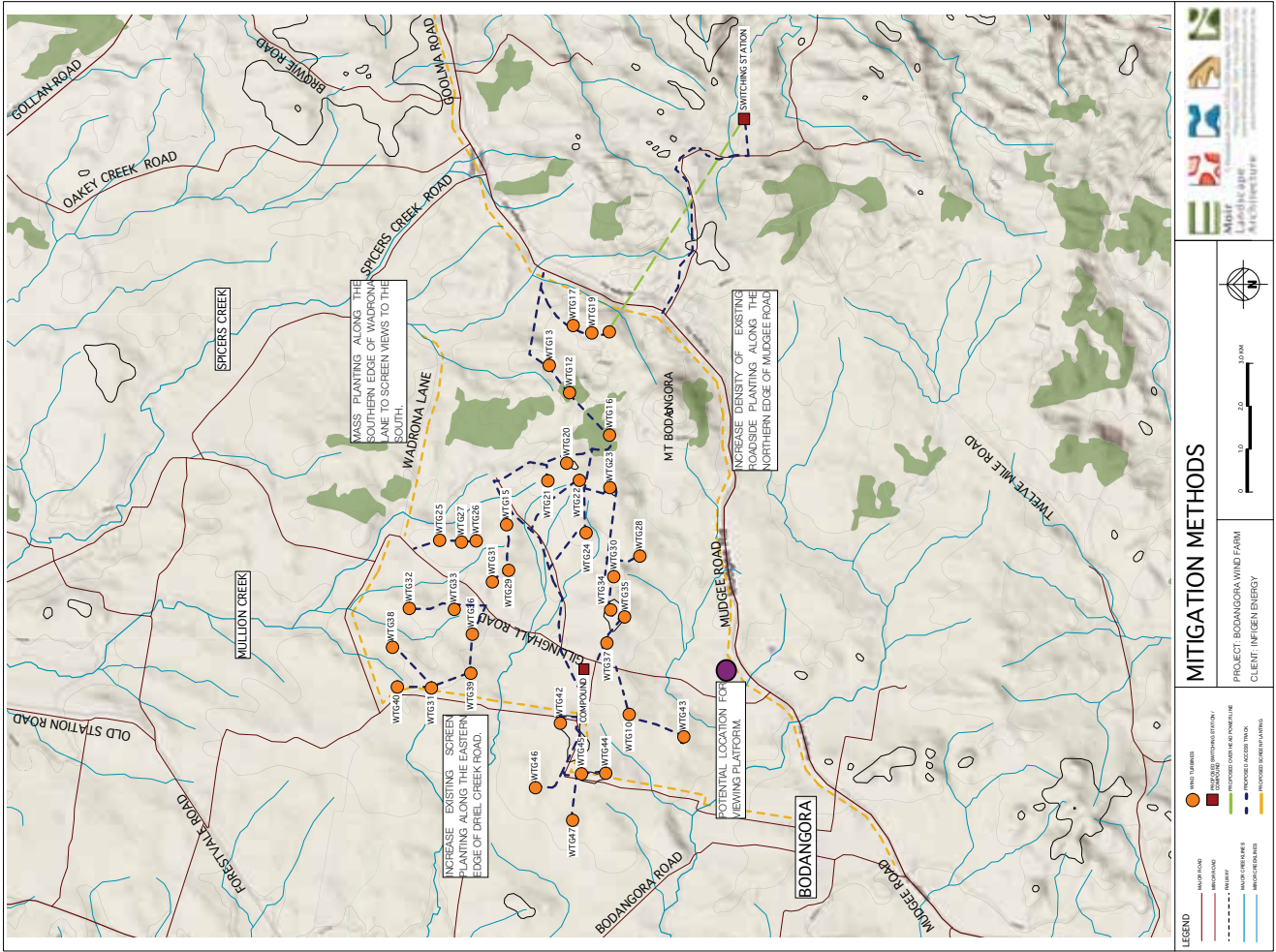


FIGURE 23: Mitigation Method Plan

14.0 MITIGATION METHODS

14.2 WIND FARM DESIGN CONSIDERATIONS

The design of the proposed wind farm is a primary measure of mitigation. The general principles employed through the project design phase can significantly reduce the visual impact. These include the siting principles, access, layout and other principles which directly impact the appearance of the proposed development. General guidelines for the design development of the proposed wind farm have been outlined in the following section.

14.2.1 Wind Turbines Layout and Size

The layout and size of the wind farm is the significant factor in the visual impact on the landscape. According to Stanton (1995) the intrusiveness of a wind plant is not directly proportional to the number of turbines in an array, and instead, more a factor of design feature. For example, large wind plants (defined as more than 70 turbines) may appear less dominating than a smaller project when the large wind plant is subdivided into several visually comprehensible units.

It is suggested that fewer and more widely spaced turbines present a more pleasing appearance than tightly packed arrays. (URBIS, 2009)
The following principles should guide the design process of the wind farm:

- Controlling the location of different turbine types, densities and layout geometry to minimise the visual impacts.
- The lines of turbines should reflect the contours of the natural landscape as best as possible.
- Ensure the turbines are evenly spaced to give a regular pattern creating a better balance within the landscape.

14.2.2 Wind Turbine Design and Colouring

Turbine design and colouring are an important factor. The proposed wind turbines have a matte white finish and consist of three blades which is consistent with the existing turbines. It is understood that wind turbines with three blades are generally more balanced than turbines with only two blades (Arkesteijn and Westra, 1991).

The important factors to achieving a visual consistency through the landscape include:

- Uniformity in the colour, design, rotational speed, height and rotor diameter.
- The use of simple muted colours and nonreflective materials to reduce distant visibility and avoid drawing the eye.
- Blades, nacelle and tower to appear as the same colour.
- Prohibit lighting except where required for the safety of aircraft to minimise the contrast between the wind farm and existing night time landscape of the area.

14.2.3 Associated Infrastructure

The following section outlines principles to assist in reducing the visual impact of the associated infrastructure.

ACCESS ROADS

- Existing access roads will be utilised as much as possible to reduce the need for new roads.
- Allow for the provision for down sizing roads or restoring roads to existing condition following construction.
- Where possible utilise or upgrade existing roads, trails or tracks to provide access to the proposed turbines.
- Any new roads must minimise cut and fill and avoid the loss of vegetation.

TRANSMISSION LINES

- Where possible underground cabling is to be used to connect wind turbines to the electricity grid.
- Utilise existing transmission lines where possible.
- The route for any proposed overhead transmission lines should be chosen to reduce visibility from surrounding areas.

GENERAL PRINCIPLES

- No above ground infrastructure apart from the turbine itself and the transformer at the base of the turbine.
- Avoid the use of brand names logos etc.
- Avoidance of unnecessary lighting, signage on fences logos etc.
- Consideration should be given to controlling the type and colour of building materials used especially with the use of light, highly reflective cladding and brick and tile materials which contrast dramatically with the landscape character.
- Any proposed buildings to be sympathetic to existing architectural elements in the landscape.
- Minimise cut and fill throughout the construction process

14.0 MITIGATION METHODS

14.3 LANDSCAPING AND VISUAL SCREENING

Visual screen planting is a beneficial mitigation method used to assist in the reduction of the wind farms visual impact. Wind break screen planting around homesteads and along property boundaries and roadsides forms apart of the existing visual character of the Bodangora region. General guidelines to adhere to when planning for landscaping and visual screening include:

- Planting should remain in keeping with existing landscape character.
- Species selection is to be typical of the area.
- Planting layout should avoid screening views of the broader landscape.
- Avoid the clearing of existing vegetation. Where appropriate reinstate any lost vegetation.
- Allow natural vegetation to regrow over any areas of disturbance.

In order to achieve visual screen planting between the intrusive element visual screen planting is to be undertaken. The existing character of the landscape allows for a variety of methods of visual screening which will remain in keeping with the landscape character.

Foreground visual planting is to be undertaken in areas of high visual sensitivity, such as close to residences and other areas requiring amelioration. Due to the large scale nature of the wind turbines, the most effective method of visual mitigation is through off-site screen planting. This is best undertaken close to the viewpoint. Locations of recommended foreground visual screening are shown in Figure 23 and examples of screen planting in place are demonstrated in the Figure 24 below.

In circumstances where residences are subject to a high level of visual impact, screen planting is proposed. In order to achieve visual screening between the intrusive element and the homestead, tree planting should be undertaken in consultation with the relevant landowners to ensure that desirable views are not inadvertently eroded or lost in the effort to mitigate views of the turbines.

14.3.1 Mitigation Methods- Photomontage



Photomontage of proposed wind turbines from Mudgee Road.



Photomontage of proposed wind turbines from Mudgee Road with mature roadside planting.

FIGURE 24: Photomontage mitigation method- Roadside planting.

14.4 VISUAL OPPORTUNITIES

The proposed Bodangora Wind Farm is a progressive development for renewable energy which, due to the relatively large scale and new technology, is bound to be of interest to viewers. Opportunities exist for the provision of education viewing areas at various locations around the site. The integration of a viewing area where visitors would be able to safely view the wind farm as a positive attribute to the development. Combined with interpretive signage these viewing areas would provide insight into the function, output and benefits of large scale wind farms.

An indicative location is shown on Figure 23 for a proposed viewing platform.



Waubra Wind Farm Viewing Platform (Source: Joh Architects)



Informative Signage- Hopetoun WA.



Informative Signage- Starfish Hill Wind Farm

15.0 CONCLUSION

The proposed development is renewable energy source located within an area of low level of habitancy. It is undeniable that the placement of wind turbines into the rural landscape will alter the existing landscape character of the area. Wind turbines have a simplicity in form especially when compared to transmission lines, towers and associated infrastructure, and can almost be considered a temporary installation in the landscape due to their modular construction.

The Bodangora Wind Farm would result in impacts on the existing surrounding environment in terms of landscape and scenic values. The proposed wind farm contrasts with the existing landscape character of the region which is typically a combination of rural and pastoral land.

With all visual impact assessments the objective is not to determine whether the proposed impact is visible or not visible, it is to determine how the proposal will impact on the existing visual amenity, landscape character and scenic quality. If there is a potential for a negative impact on these factors it must then be investigated if and how this impact can be mitigated to the extent that the impact is reduced to an acceptable level.

Although this VIA quantifies the visual impact of the proposed wind turbines, the overall visual impact of the wind farm will vary greatly depending on the individual viewers sensitivity to and acceptance of change. The sensitivity towards change varies greatly depending on the users connection with the landscape. For example visitors of the region travelling along Mudgee Road (especially tourists) may perceive the wind farm as an interesting feature of the landscape. This may contrast with a nearby residents perception of the change who may be more critical of the development.

The greatest visual effect is most likely to be felt from residents in the immediate vicinity of the wind farm. However in most instances, the hornsteeds have screening vegetation protecting the house from strong winds which may assist in screening views to the wind farm.

From many vantage points within the local setting, a combination of the topography and local influences such as existing natural and introduced vegetation significantly reduce visibility. Due to the undulating topography of the local area, there are limited opportunities for the proposed development to be viewed in its entirety within close proximity. Areas from which the proposal can be viewed in its entirety are predominately a long distance from the site and the proposal would be viewed as a small element of the visual landscape from these areas.

Mitigation methods incorporated into the design process in conjunction with landscape and visual screening will have a positive effect on reducing any visual impact of proposed wind farm. Through mitigation methods described it will be possible to significantly reduce the visual impact to an acceptable level at sensitive viewpoints such as rural residential properties.

Considering the character of existing and proposed development in the region in addition to the suggested mitigation methods, the visual landscape of the region has the capacity to absorb the proposed development.

When implemented with appropriate environmental management, the development of wind farms can be undertaken with low impact on the surrounding environment whilst providing positive local, regional and national benefits.

It is the professional opinion of Moir Landscape Architecture that considering the extent of quantified impact and community response the social, economical and environmental benefits significantly outweigh any visual impact that may result from the proposal.

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