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AIR SAFETY

The Civil Aviation Safety Authority (CASA) is currently reviewing its withdrawn Advisory Circular AC139-18 "*Obstacle Marking and Lighting of Wind Farms*" which, depending on the findings of a qualitative risk assessment undertaken by the proponent, may not require wind farms such as Stockyard Hill Wind Farm to provide obstacle lighting. Notwithstanding the review, and the current proposal to *not* provide obstacle lighting, options are available should lighting be deemed necessary during the assessment process or subsequently.

In support of this proposal, the following Section on air safety describes the methodology, findings and mitigation of the risk assessment undertaken in regard to obstacle lighting requirements and aeronautical impact assessment, which the Ambidji Group Pty Ltd. (Ambidji) undertook for the SHWF. These assessments are appended to this report at *Annex W*.

Obstacle marking and/or obstacle lighting is intended to reduce hazards to aircraft by indicating the presence of the obstacles.

14.1

METHODOLOGY

In 2008 Ambidji undertook an aeronautical impact and obstacle marking and lighting evaluation of the proposed Stockyard Hill Wind Farm (refer to *Annex W*), and recommended two alternative obstacle lighting options including:

- An obstacle lighting proposal that conformed with the general requirements of the Civil Aviation Safety Authority (CASA) Advisory Circular AC139-18 "*Obstacle Marking and Lighting of Wind Farms*"; and
- A reduced obstacle lighting arrangement supported by the declaration of a "Danger Area".

The evaluation of obstacle lighting in 2008 was undertaken in accordance with the CASA Advisory Circular (AC) 139-18(0). Although the AC had been withdrawn in September 2008, CASA had indicated that:

- provision of obstacle lighting at wind farms which are remote from a certified or registered aerodrome is the responsibility of the proponent; and
- the technical requirements of the withdrawn AC should apply if the proponent wishes to install obstacle lighting as a risk mitigator.

The aeronautical requirements for marking and lighting of wind farms are currently undergoing review by the International Civil Aviation Organization (ICAO), the Department of Infrastructure, Transport, Regional Development and Local Government (DITRD LG) and CASA. In addition, it is understood that ICAO will be issuing an amendment to ICAO Annex 14 (Aerodromes) later this year that addresses, *inter alia*, wind farms.

In addition, DITRDLG recently issued a Discussion Paper “*Safeguards for airports and the communities around them*” that implies an amendment to the criteria for wind turbine heights from 110m to 152m AGL as being applicable to wind farms in the vicinity of aerodromes. Furthermore, CASA has recently commissioned a review “*Man-made obstacle risk assessments and recommendations*” that will specifically address obstacles located outside the vicinity of certified and registered aerodromes.

These reviews, when finalised and promulgated, may result in the need to further evaluate the marking and lighting requirements for the Stockyard Hill Wind Farm. In the interim, following discussions with CASA, obstacle marking and lighting evaluations based on the withdrawn AC are considered appropriate if the wind farm is determined to be a potential hazard as defined in relevant CASA documentation.

Further to the studies listed above, SHWF recently engaged Ambidji to further investigate alternative options for obstacle lighting, including the possibility of no obstacle lighting, of the Stockyard Hill Wind Farm to reduce the potential for environmental concerns and impacts. As such, a qualitative risk assessment was undertaken to determine if the proposed SHWF presents a potential hazard to aircraft and airport operations as required by civil aviation safety regulations, standards and recommended practices, and therefore determine if the provision (or non provision) of obstacle lighting is required.

As part of the risk assessment, a review was undertaken to capture the requisite information and data. This included:

- A review of international and national aviation documentation applicable to aeronautical hazard assessments and obstacle marking and lighting requirements, with particular consideration of wind farms;
- Liaison with CASA and a review of their current position for marking and lighting of obstacles and, in particular, wind farms;
- Contact with other Australian wind farm developers and operators to ascertain the existence of obstacle lighting and the identification of what standards were applied;
- Contact with nearby aerodromes and operators to ascertain the volume and type of air traffic in the vicinity of the Stockyard Hill Wind Farm;
- The aeronautical impact assessment and obstacle marking and lighting evaluation of the SHWF conducted in 2008; and
- Consideration of alternative lighting arrangements for the proposed Stockyard Hill Wind Farm, given the current status of CASA advice and recommendations pertaining to wind farms remote from aerodromes.

The following factors were taken into account as part of the risk assessment methodology:

- The proximity of the wind farm to nearby airports;
- The proximity to protected airspace;
- The height of the surrounding terrain;
- The volume and type of aircraft operations in the vicinity of the proposed wind farm;
- The likely height of aircraft operations in the area; and
- Liaison with key stakeholders, including nearby aerodromes and operators.

As identified above, CASA was consulted during the preparation of the aeronautical impact and obstacle lighting assessments. In addition, consultation has continued between the proponent and CASA in regard to the recent risk assessment investigation.

14.2

KEY FINDINGS AND POTENTIAL IMPACTS

Key findings of the previous reports undertaken in 2008 concluded that the requirement for obstacle lighting of the proposed Stockyard Hill Wind Farm derives primarily from the proposal to install wind turbines with a height exceeding 110m AGL, a criterion height as defined in CASA Manual of Standards (MOS) and the above referenced AC.

As mentioned previously, the reports concluded that there were two possible options for lighting, including an obstacle lighting proposal that conformed with the general requirements of the CASA Advisory Circular AC139-18 "*Obstacle Marking and Lighting of Wind Farms*", and a reduced obstacle lighting arrangement supported by the declaration of a "Danger Area".

The second option, which involves a reduced lighting composition, was proposed in an endeavour to reduce potential environmental impacts. Such proposals have been considered for other wind farms; however it is acknowledged that it is unlikely to be supported by CASA as it would be inconsistent with international and national standards and recommended practices.

CASA's current position on obstacle lighting of wind farms that are remote from an aerodrome (which is the situation for Stockyard Hill Wind Farm) is summarised as:

- CASA cannot mandate obstacle lighting for wind farms that are "not within the vicinity" of an aerodrome (within 30km);
- Provision of obstacle lighting is the responsibility of the proponent;
- Any associated requirements placed on proponents by planning authorities, insurers or financiers are beyond CASA's scope;

- A wind farm proponent may have a duty of care to the aviation industry or local operators in terms of ensuring obstacles are made conspicuous; and
- Obstacle marking and lighting requirements as specified in the CASA Manual of Standards Part 139, Section 9.4 applies.

The review and risk assessment undertaken of the obstacle lighting requirements for the Stockyard Hill Wind Farm has determined that, in accordance with CASA regulations, standards and recommended practices, there is no operational justification for the provision of obstacle lighting of the wind farm turbines for the following reasons:

- The aeronautical impact assessment of the Stockyard Hill Wind Farm has determined that there is no impact on protected airspace due to the following:
 - the highest turbine will be 567m (1861ft) AMSL. This is approximately 683m (2239ft) below the minima for aircraft operating under Instrument Flight Rules (IFR);
 - the maximum height of the wind turbines (to rotor tip) will be 132m (433ft) AGL which is below the minimum height of 152m (500 ft) AGL (other than for specifically endorsed low level operations) for aircraft operating under Visual Flight Rules (VFR) by day;
 - the wind farm site is clear of all Obstacle Limitation Surfaces (OLS);
 - there are no penetrations of Procedures for Air Navigation – Aircraft Operations (PANS OPS) surfaces; and
 - the wind farm is located outside navigation aid and air traffic control radar clearance zones.
- The wind farm is not located within the vicinity (less than 30km) of a regulated aerodrome. The nearest regulated aerodrome (Ballarat) is 32.5km to the east of the wind farm.
- There is higher and unlit terrain within 10 – 15km of the wind farm including several mountains to the north-west, the highest having a maximum height of 966m (3168ft) AGL, some 399m (1307ft) higher than the highest turbine.
- Aircraft operating in the area, apart from those undertaking authorised low level operations, are required to be operating at heights significantly in excess of the highest turbine. The World Aeronautical Chart (WAC) for the area assigns a “Grid maximum elevation for Obstacle” of 3699ft, (approximately 1127m) AHD, which is some 1838ft (approximately 560m) higher than the highest turbine.
- For an aircraft to collide with an unlit turbine during night or low visibility operations would be the result of either the pilot has breached flight level requirements or the pilot has lost control of the aircraft due to such factors as pilot error, aircraft failure, meteorological conditions or poor situational awareness.

- Australian policy, standards and recommended practices for obstacle marking and lighting of wind farms are currently under review. A current proposal includes a change to the criterion height of 110m (361ft) to 152m (500ft) AGL for wind farms within the vicinity of a certified or registered aerodrome. Although the Stockyard Hill Wind Farm is not within the vicinity of a certified or registered aerodrome, the turbines at 132m (433ft) AGL are below this revised criterion height.
- There are precedent examples within Australia for the non-provision of obstacle lighting of wind farms with turbine heights in excess of 110m (361ft) AGL on the grounds that the wind farm:
 - does not penetrate protected airspace and has been assessed as not representing an obstacle or hazard to aviation;
 - is not sited within the vicinity of a regulated aerodrome; and
 - is located in an area where there is higher and unlit terrain.

14.3

MITIGATION AND MONITORING

The following section describes the mitigation required with reference to air safety.

In view of the above findings, it is recommended that:

- CASA be advised that, as the Stockyard Hill Wind Farm does not present an obstacle to aircraft operations obstacle lighting is not considered necessary on the grounds outlined above; and
- Formal notification of the proposed Stockyard Hill Wind Farm be provided to relevant stakeholders in the vicinity of the wind farm, including aircraft and airport operators, and relevant aviation associations; e.g. nearby airports, local aviation companies, emergency services operators, (police, aerial ambulance, fire services), Aerial Agricultural Association of Australia, Regional Aviation Association of Australia, Gliding Federation of Australia, Recreational Aviation Australia, Australian Ballooning Federation, Aircraft Owners and Pilots Association.

Notwithstanding the above findings, as the Stockyard Hill Wind Farm turbine tip heights will exceed 110m AGL, formal notification to CASA is to be provided in accordance with:

- CASA Advisory Circular 139-08 “Reporting of Tall Structures” to enable inclusion of the wind farm location and height of turbines in relevant aeronautical information publications; and

CASA Form 406 “Operational Assessment of Existing or Proposed Structure”. These submissions to CASA would be supported by the reports prepared by Ambidji.

Additional and separate notification to CASA will also be provided in relation to the use of cranes (temporary obstacles) during the on-site wind farm development and the wind turbine construction process if the crane height exceeds 110m AGL.

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NOISE

This Section summarises the noise assessment undertaken by Marshall Day Acoustics for the Stockyard Hill Wind Farm (*Annex X*). The Section describes the methodology used, the potential noise impacts, and the mitigating measures that can be implemented to reduce any impacts.

15.1

METHODOLOGY

Background noise monitoring was undertaken between June and October 2008 at 13 residential properties in the vicinity of the proposed Stockyard Hill Wind Farm. Environmental Noise Loggers were used to conduct 24 hour ambient noise level measurements. Measurements were taken at ten minute intervals over a period of at least ten days at all locations as recommended. Background noise monitoring was undertaken to determine both night time and 24 hour noise limits by correlating data against wind speeds recorded for periods from 10 pm - 7 am and the entire 24 hour period.

It is noted that noise limits determined for six of the 13 monitored sites were applied to eight other assessable properties in close proximity, and with similar adjacent vegetation.

The results of this monitoring was assessed in accordance with the New Zealand Standard 6808:1998 - Acoustics - The assessment and measurement of sound from wind turbine generators (NZS 6808:1998), the ISO9613 Acoustics - Attenuation of sound during propagation outdoors - Part 1: Calculation of the absorption of sound by the atmosphere (1993) (ISO9613-1:1993) and the European Working Group on Noise from Wind Turbines (ETSU-R-97, item 24, p {viii}). A brief description of these three standards are outlined further below.

NZ6808:1998

Under this requirement the noise level from a wind turbine generator at a residential site should not exceed the background noise level (LA95) by more than 5 dBA or a level of 40 dBA, whichever is greater. The criteria are set to establish acceptable levels based on existing ambient noise levels at a range of wind speeds. Based on these variables, predictions of the noise emissions of the wind turbines are then compared against the limits at individual residences around the Stockyard Hill Wind Farm to establish compliance.

Implicit in the standard is the fact that residents which expect a worse case scenario of 35 dBA or less will automatically comply with NZS 6808:1998.

ISO9613-1:1993

NZ6808:1998 stipulates that residences with an expected noise impact of 35 dBA or more should be included in a noise assessment.

However, the standard has a simple non-spectral prediction methodology based on hemispherical spreading and a typical air absorption coefficient (i.e. how much the

noise fades with distance). As wind turbines have become larger, this value of air absorption coefficient assumed in NZS 6808:1998 can be too high.

ISO9613-1:1993 is a method of noise assessment which accounts for a spectral air absorption using an algorithm that factors items such as: terrain, meteorological effects, ground effects and spectral propagation. The data of this standard can be analysed using software to obtain a more representative air absorption coefficient. The use of ISO9613-1:1993, therefore, allows for a more accurate choice of air absorption coefficient that can then be applied to the method in NZ6808:1998 for final assessment.

ETSU-R-97

ETSU-R-97 is the term applied to a UK report published detailing the recommendations of the Working Group on Noise from Wind Turbines (WGNWT). The working group was established in 1993 by the Department of Trade and Industry as a result of difficulties experienced in applying the noise guidelines existing at the time to wind farm noise assessments.

The report describes a framework for the measurement of wind farm noise and further gives indicative noise levels recommended for those that are financial beneficiaries of wind farm projects. More specifically, the report stated that 'both day and night-time lower fixed limits can be increased to 45dBA and that consideration should be given to increasing the permissible margin above the background where the occupier has some financial involvement in the wind farm' (1996: viii). Therefore this level surpasses those noise levels above, only for host landholders.

15.2

KEY FINDINGS AND POTENTIAL IMPACTS

Suitable noise limits were calculated for the external noise level of 13 of the 93 assessable residential sites located near the proposed Stockyard Hill Wind Farm. Using the New Zealand Standard for wind farms (NZS6808:1998) noise limits were set depending on the relationship between measured existing (pre-wind farm) background noise levels and wind speed. The minimum possible NZS6808:1998 noise limit of 40dBA at all wind speeds was used for the remaining assessable properties.

It was found that both the 24 hour and night-time NZS6808:1998 noise limits are achieved at all assessed non-host landholder's residential properties. Furthermore, noise emissions from the proposed Stockyard Hill Wind Farm at all assessed non-host landholder's residential properties were predicted below the lowest possible NZS6808:1998 noise limit of 40dBA.

The NZS6808:1998 noise limits were exceeded at 25 of the 52 host landholder's residential properties. 23 of the 25 host landholders' properties exceeding the NZS6808:1998 noise limits comply with the ETSU-R-97 recommended noise limit of 45dBA.

The remaining two host landholders' properties exceeding the ETSU-R-97 recommended noise limits will be rented by Stockyard Hill Wind Farm for the life of the wind farm. These two properties together with other properties with options to

purchase by Stockyard Hill Wind Farm will be utilised for wind farm operational purposes.

Table 15.1 *Summary of those residences exceeding predicted noise level at reference conditions (compliance or not – at all conditions)*

HOUSE REFERENCE	L _{AEQ} LEVEL DUE WIND FARM (DBA)	24 HOUR NOISE LIMIT (DBA)	24 HOUR COMPLIANCE (FIGURE NO.)	NIGHT-TIME NOISE LIMIT (DBA)	NIGHT-TIME COMPLIANCE (FIGURE NO.)
B39 (S)	43	44	✗ (F1)	42	✗ (F1)
B41 (S)	44	46	✗ (F2)	42	✗ (F2)
B42 (S)	41	40*	✗	40*	✗
H10 (S)	48	40*	✗	40*	✗
H14 (S)	43	40*	✗	40*	✗
H16 (S)	42	40*	✗	40*	✗
H18 (S)	41	40*	✗	40*	✗
H25 (S)	44	40*	✗	40*	✗
H27 (S)	44	40*	✗	40*	✗
H29 (O)	45	40*	✗	40*	✗
H30 (O)	47	40	✗ (F5)	40	✗ (F5)
H32 (S)	44	44	✗ (F6)	41	✗ (F6)
H35 (S)	42	40*	✗	40*	✗
H36 (S)	41	40*	✗	40*	✗
I11 (S)	42	40*	✗	40*	✗
I18 (S)	43	40*	✗	40*	✗
I5 (S)	44	40*	✗	40*	✗
L7 (S)	44	43	✗ (F9)	40	✗ (F9)
L8 (S)	46	43	✗ (F9)	40	✗ (F9)
M1 (S)	44	40*	✗	40*	✗
M11 (S)	40	40*	✗	40*	✗
M12 (S)	44	40*	✗	40*	✗
M20 (S)	44	40*	✗	40*	✗
M5 (S)	45	48	✗ (F10)	45	✗ (F10)
M6 (S)	41	40*	✗	40*	✗
M9 (S)	41	40*	✗	40*	✗
N16 (S)	39	44	✗ (F11)	40	✗ (F11)
N21 (S)	42	40*	✗	40*	✗
N26 (S)	44	47	✗ (F12)	43	✗ (F12)
N28 (S)	44	40*	✗	40*	✗
N32 (S)	41	40	✗ (F13)	40	✗ (F13)
N8 (S)	40	40*	✗	40*	✗

Note 1: * minimum possible NZS6808:1998 noise limit

✓ = compliance

✗ = non-compliance

(S) host landholder

(O) property optioned by SHWF

Note 2: where properties (B41 and N26) are wind dependent site specific noise limits have been calculated and compared to predicted noise levels from the wind farm.

15.3***MITIGATION AND MONITORING***

The noise limits required by NZS6808:1998 are predicted to be achieved at all non-host landholder neighbouring properties. 23 of the 25 host landholder properties exceed this limit; however they comply with the ETSU-R-97 recommended noise limits which are considered acceptable for a wind farm development. The remaining two properties are to be occupied by Stockyard Hill Wind Farm for the life of the project.

Accordingly no mitigation measures are required in terms of noise impacts as the relevant standards are met.

16 *LANDUSE*

This Section describes the landuse situation of the proposed Stockyard Hill Wind Farm site and its environs and assesses the likely impact of the proposal on land use. Mitigation measures (if any) are also discussed.

16.1 *METHODOLOGY*

An assessment of landuse impacts required a review of the existing landuses on and surrounding the site, and a subsequent assessment of whether these landuses are likely to change or be impacted by the development of the proposed wind farm.

As detailed earlier, the site and its surrounds are predominantly used for agriculture, particularly grazing and cropping with limited residential dwellings present.

16.2 *KEY FINDINGS AND POTENTIAL IMPACTS*

The potential impacts of the proposed Stockyard Hill Wind Farm on the predominant land uses are outlined below.

16.2.1 *Agriculture*

The development of the proposed wind farm will not prohibit the site and neighbouring properties from continuing existing agricultural activities.

The operation of the wind farm will not limit the host landholders in relation to the type and methods of agricultural activities that can occur on site.

It is expected that the current agricultural regimes occurring on site, e.g. stock rates, will not require any reductions. Based on previous experience with wind farm projects, less than 1% of the total site area will be required for access tracks, wind turbines and associated infrastructure and therefore potential impact to agriculture practices be negligible.

During the construction phase, slightly larger areas will be required to provide a safe environment for construction staff. However, through continued consultation with host landholders it is anticipated that this should have minimal impacts on agricultural activities.

Furthermore, it is accepted that other potential impacts of the proposed wind farm (such as noise and shadow flicker) will not adversely affect livestock.

Similarly, the presence of the wind farm will not impact on surrounding properties' ability to continue their agricultural activities.

16.2.2

Dwellings

The majority of existing dwellings that are currently located on the wind farm site and in the surrounding area can continue to be occupied and are not expected to suffer significant adverse impacts in terms of noise and shadow flicker or visual amenity (as discussed in greater detail in other sections of this report).

There is, however, the potential for future dwellings to be located on lots adjacent to the wind farm, which may be impacted in terms of noise, shadow flicker or visual amenity.

The issue of potential impact on possible future dwellings and how to deal with these impacts is addressed in a number of previous Panel reports, with a general approach adopted in each of these hearings. This issue was summarised in the Bald Hills Panel Report (page 280) that was prepared in June 2004, where it states:

The proponent should enter discussions with the McDougall family and any similarly located owners of rural tenements over 40 hectares close to the proposed wind farm which currently lack a farm dwelling. The purpose of these discussions should be to advise of areas within their land where a dwelling site can be selected to ensure appropriate amenity standards, equivalent to those of existing dwellings, will apply.

In relation to all other dwellings that post date the wind farm planning process whether as of right or subject to a permit, the following principle should apply: the onus of responsibility – for the cost of management of turbine noise and blade shadow amenity impacts- should fall upon the agent of changes.

Where a new dwelling is as of right, it should not be subject to the amenity protections otherwise provided in the wind farm development approval.

Where a new dwelling is subject to a permit, it will be normal to expect that the wind farm operator may object and request the application of a permit condition to ensure appropriate siting and or design measures to reasonably control amenity impacts.

It is expected that a similar approach will be adopted for the Stockyard Hill Wind Farm.

16.2.3

Other Landuses

Although not located within the wind farm site boundary, other landuses within the vicinity of the proposed Stockyard Hill Wind Farm include the Lake Goldsmith steam rally complex, located to the east of the proposed wind farm. This facility comprises a range of buildings including 46 individually operated engine sheds, boiler house, canteen and meeting rooms over 15.5 hectares.

In addition, Lake Goldsmith Hall is a small community hall with associated kitchen facilities, located on Cushings Road in Lake Goldsmith. Black Creek Nature Conservation Reserve is located to the west of the site, on the north side of the Carngham-Streatham Road, between Stockyard Hill Road and Blacks Creek. This site is considered a high quality grassy ecosystem on the Victorian Volcanic Plains Bioregion. The reserve covers an area of 233.95 hectares.

It is not anticipated that the proposed wind farm will have an impact on the other landuses within the vicinity of the site, due to their location in relation to the proposed wind turbines and the nature and usage patterns of these uses.

16.3

MITIGATION AND MONITORING

The proposed wind farm has the potential to have some minor impacts on existing landuse during the construction and operation. Wind turbines have been located to ensure potential impacts on off-site dwellings are minimised.

The results of the assessments, coupled with the proposed mitigation measures and ongoing consultation with landowners, will ensure that any impacts associated with the Stockyard Hill Wind Farm are minimised.

Further mitigation and monitoring measures include:

- Development of an EMP, providing detailed management procedures and controls including dust, sediment, erosion, water run-off, weed management, noise and traffic;
- Rehabilitation of the wind farm site following construction, including surface revegetation of hard-stand areas and certain access tracks with pasture species to allow agricultural grazing;
- Decommissioning of the wind farm infrastructure in accordance with legal agreements with landowners, including removal of infrastructure and revegetation of hard stand areas and any access tracks not required by the landowner, with pasture species to allow agricultural grazing;
- Development of procedures, in consultation with landowners, to ensure existing agricultural activities can continue around the majority of the site;
- Limiting construction activities to specific construction impact zones and access tracks as agreed with landowners; and
- Maintaining discussions with landowners within 1 km of the wind farm site boundary to provide information to assist with the location and screening of future dwellings, as requested.

Possible future residential development in close proximity to the site has the potential to be impacted, however, the proposed mitigation measures will ensure that these impacts are minimised and avoided where possible.

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SOCIO ECONOMIC IMPACT ASSESSMENT

Parsons Brinckerhoff (PB) was engaged to prepare a socio-economic assessment of the construction and operation of the proposed Stockyard Hill Wind Farm. The purpose of this Section is to describe the socio-economic predictions for the proposed wind farm and its surrounds. In addition this Section describes the potential impacts.

For further information on the socio-economic impact of the proposed wind farm refer to *the Stockyard Hill Wind Farm Socio-Economic Assessment, PB, Nov 2008 (Annex Y)*.

17.1

METHODOLOGY

A general socio-economic profile of the Pyrenees and Corangamite Shire Councils (Local Government Areas (LGA)) and the townships of Beaufort and Skipton were undertaken to determine the potential social and economic impacts of the project. These regions were selected on the basis of the location and proximity to the proposed Stockyard Hill Wind Farm. The construction of the wind farm components and associated electrical infrastructure will fall entirely within these LGA boundaries and hence the report focuses on these areas. However, it is likely that other LGAs and townships will also benefit from the project (such as Ballarat and Ararat).

The socio-economic assessment was based on the input-output analysis (I-O). This type of an assessment examines how a project affects an economy through all of the backward and forward linkages between all industries in the economy. It takes the initial effect of a project, and traces all the multiplier or 'flow-on' effects – known as direct, indirect and induced. The final result is an overall picture of a project's expected contribution to the regional, state and national economies. The analysis was supported by information provided by SHWF, the work undertaken by Dr Robert Passey for the Australian Wind Energy Association (AusWEA, 2003) and the existing literature on wind farm project development.

Several constraints to the methodology used were identified, such as the multipliers used in the study rely on those obtained from the Australian Bureau of Statistics I-O Multiplier Tables. I-O multipliers, however, are not readily available for state and local economies in Victoria. Therefore, in the absence of these multipliers, national multipliers are used and are modified to provide regional and state estimates. Despite these limitations, the I-O framework provides a means of estimating the economic impact of the project and is intended to be indicative only.

17.2 *KEY FINDINGS AND POTENTIAL IMPACTS*

17.2.1 *General Socio-Economic Profile of the Region*

The socio-economic profile of the region where the proposed Stockyard Hill Wind Farm is located within is summarised below.

Pyrenees LGA

The Pyrenees LGA has a total population of 6,556 and comprises predominantly prime agricultural land. Key industries in the region include livestock grazing, cropping and viticulture, as well as a growing tourism sector. The region also supports associated agricultural activities, such as agricultural component manufacture, timber industry services (such as milling and timber treatment) and food manufacture.

A large proportion of the LGA's population resides in the two main towns of Beaufort and Avoca (1,073 and 947 persons respectively), with the remainder spread amongst the smaller towns and rural areas (ABS, 2006). The Pyrenees LGA has an ageing population (ABS, 2006).

Corangamite LGA

Corangamite LGA is a rural area producing wool, grain and cattle, with a population of 16,616 people. The labour force is generally employed in dairy cattle farming (1,651) as well as in the sheep, beef cattle and grain farming sectors (635).

Although the median age in the LGA is 41 years, there is a large ageing population, with 5,014 people 55 years and over.

Skipton is located approximately four kilometres to the south of the proposed wind farm, on Mount Emu Creek. It is a farming region, producing wool, grain and cattle. The population of Skipton is 482 (ABS Census, 2006).

Population Growth

Population growth in the Corangamite LGA declined between 2001 and 2006. This decline, however, was not observed in the Pyrenees LGA, where a 2.2% increase in population growth was recorded. The total resident population in this LGA is expected to decline over the period 2006 to 2031, averaging minus 2.2% over the forecast period (DSE, 2004). By contrast, total resident population in the Pyrenees LGA is expected to fall over the shorter term (2006 to 2021), however thereafter increase slightly.

Economic Activity

The economic base of the Pyrenees and Corangamite LGA's is dominated by the agricultural sector. The largest numbers of businesses in the Pyrenees LGA include agricultural, forestry and fishery (62%), followed by property and business services (9.2%), and construction (6.3%). Corangamite LGA, by contrast, comprises agriculture, forestry and fishing (64.2%), property and business services (7.2%) and construction (6.9%).

The 2006 Census identified; the top five industries of employment for Pyrenees LGA were sheep, beef cattle and grain farming (20%), followed by hospitals (4.6%), school education (4%), beverage manufacturing (3.8%) and road freight transport (3.0%).

For Corangamite LGA, the top five industries of employment were dairy cattle farming (22%), followed by sheep, beef cattle and grain farming (8.4%), school education (4.2%), hospitals (3.9%) and supermarket and grocery stores (3.5%).

Skipton's industry employment mainly comprises of agriculture (41%), whereas Beaufort has a more widely distributed and diverse employment base with agricultural employment (19%) accounting for a smaller base.

Both townships have a small number of people involved in construction and trade industries. The data indicates that both the townships do not have skills or an employment base in electricity, gas, water and waste services, which represents the closest similarity to the employment needs for the proposed wind farm.

With the exception of Corangamite LGA, unemployment for the other localities was identified as above the state and national averages.

Income, Earnings and Housing

Median family incomes were the highest for Corangamite (\$1,060 per week), followed by Pyrenees (\$790 per week), Beaufort (\$788 per week) and Skipton (\$715 per week). This trend is consistent with the level of employment in these localities, with Corangamite (3.7%) having the lowest unemployment percentage compared to the other localities examined. However, the greater affluence of Corangamite in terms of earnings is also accompanied by higher cost of housing. Specifically, median housing loan repayments were the highest for Corangamite (\$867 per month), followed by Pyrenees (\$715 per month), Skipton (\$693 per month) and Beaufort (\$650 per month). Similarly, rental prices from the 2006 Census, shows that the median rent paid per week is relatively low with, \$100 per week for Corangamite, \$90 per week for Pyrenees, \$65 per week for Beaufort and \$50 per week for Skipton.

Based on the 2006 Census, the data indicates that Pyrenees LGA has the highest vacancy rate (21%), followed by Skipton (16%), Corangamite (14%), Beaufort (13%), Victoria (10%). Thus these vacancy rates suggest that the Pyrenees LGA would have a greater capacity to cater (at least initially) for increased housing demand resulting from the development of the proposed wind farm.

17.2.2

Potential Impacts*Regional, State and National Economic Impacts during Construction*

Regional, state and national economic benefits are expected during the construction phase of the proposed Stockyard Hill Wind Farm project.

At the regional level, the construction of the wind farm is expected to contribute up to \$166 million per year in revenues associated with the increase in demand for goods and services (including up to \$68 million initially, \$25 million directly, \$23 million indirectly and \$50 million induced). This is expected to support between 164 and 246 full-time equivalent jobs related to the initial construction for the proposed wind farm as identified in *Table 17.1*.

At the state level, it is expected that revenues from the additional demand for goods and services would contribute up to \$145 million per year resulting from the development of the proposed wind farm. This is expected to support between approximately 440 and 665 jobs per year for the period of construction (refer to *Table 17.1*).

At the national level, the flow-on output of all industries is expected to increase by up to \$12 million per year. This is expected to support 38 to 56 full-time equivalent jobs nationally across all upstream and downstream industries in the economy.

Table 17.1 *Regional, state and national economic impacts, during construction (per year)*

Impact type	Output (Gross Product, \$m)		Employment (Full-Time Equivalent Jobs)	
	Lower	Upper	Lower	Upper
REGIONAL				
Initial impact	55	68	164	246
Direct flow-on impact	19	25	82	123
Indirect flow-on impact	17	23	55	82
Induced flow-on impact	38	50	164	246
Total	129	166	465	697
STATE				
Direct flow-on impact	28	37	121	182
Indirect flow-on impact	26	34	81	120
Induced flow-on impact	55	74	242	363
Total	109	145	444	665
NATIONAL				
Direct flow-on impact	2	3	10	15
Indirect flow-on impact	2	3	7	10
Induced flow-on impact	5	6	21	31
Total	9	12	38	56

Notes: Values are in 2008/09 dollars. Figures may not sum precisely due to rounding.

Source: PB estimates.

Regional, State and National Economic Impacts during Operation

Regional, state and national economic benefits are expected during the operation phase of the project as detailed below.

At the regional level, the operation of the wind farm is expected to contribute up to \$21 million per year in revenues associated with the additional demand for goods and services. This is expected to support up to 84 full-time equivalent jobs regionally across all industries, of which 32 would be initially related to the operation of the proposed wind farm (refer to *Table 17.2*).

At the state level, it is expected that revenues associated with the additional demand for goods and services will contribute up to \$4 million per year. As identified within *Table 17.2*, this is expected to support up to 17 full-time equivalent jobs across all upstream and downstream industries in Victoria.

At the national level, the flow-on impact of all industries is expected to increase by up to \$3 million per year. This is expected to support up to 13 full-time equivalent jobs nationally (refer to *Table 17.2*).

Table 17.2 *Regional, state and national economic impacts, during operation (per year)*

Impact type	Output (Gross Product, \$m)		Employment (Jobs, Full Time Equivalents)	
	Lower	Upper	Lower	Upper
REGIONAL				
Initial impact	6	9	26	32
Direct flow-on impact	3	3	8	13
Indirect flow-on impact	2	3	4	6
Induced flow-on impact	4	6	22	32
Total	15	21	60	84
STATE				
Direct flow-on impact	1	1	3	4
Indirect flow-on impact	1	1	1	2
Induced flow-on impact	1	2	7	11
Total	3	4	11	17
NATIONAL				
Direct flow-on impact	1	1	2	3
Indirect flow-on impact	0	1	1	2
Induced flow-on impact	1	1	5	8
Total	2	3	9	13
Notes: Values are in 2008/09 dollars. Figures may not sum precisely due to rounding.				

Source: (PB estimates, 2008)

Implications for Business and Industry Development in The Region

The proposed Stockyard Hill Wind Farm will have a number of positive implications for business and industry development in the region. It is expected that there would be greater private sector investment in the Pyrenees and Corangamite regions as new and emerging businesses seek to supply the increase in demand for goods and services resulting from the development of the wind farm.

The proposed wind farm may also generate greater profitability across new and existing development areas, reflecting increased commerce and demand for goods and services.

Implications for Economic Base for the Region

The proposed Stockyard Hill Wind Farm will stimulate additional economic activity during construction in non-residential building and construction trade services. During operation additional economic activity and employment is expected in electricity, gas and water supply.

Implications for Local Services and Infrastructure

The proposed wind farm would increase the demand for local services and infrastructure through suppliers in larger regional centres such as Ballarat, Ararat, Portland, Warrnambool and Colac, and accommodation for the workers could be serviced through existing vacancy rates. This increase in demand presents an opportunity for growth for local and regional services and suppliers. Local workers would be upskilled and hence encouraged to be involved in the proposed wind farm. There would also be local and regional benefits through improved project related infrastructure.

Implications for greenhouse gas emissions

The proposed wind farm would result in the generation in excess of 1,890 gigawatt hours per year of wind generated electricity with a saving of just over 1,890,969 tonnes of CO₂e, based on a long term average forecast. This equates to a greenhouse gas saving of \$37 million per year and about \$490 million net present value over the life of the project.

Implications on property values

A review of the available research found that there was no conclusive evidence of negative impacts of wind farms on the value of agricultural land and therefore, the proposed Stockyard Hill Wind Farm is unlikely to have a major influence on the value of property in the region.

Implications on Tourism

The proposed wind farm is likely to have positive impacts on tourism in the area through:

- An increase in travellers stopping in the local area;
- Expenditure of stopping travellers purchasing items such as food and fuel;
- A potential increase in demand for overnight accommodation; and
- A broader exposure of the Pyrenees and Corangamite LGAs.

Implications for change to the community lifestyle and values

A literature review indicated that generally communities are not averse to having wind farms in their immediate locality particularly when considered in the context of climate change and renewable energy awareness.

Implications of the Community Fund and Council Rates

SHWF has committed to the establishment of a Community Fund as part of the development of the proposed wind farm. Funds will be spent on projects that would benefit the local community in the Pyrenees and Corangamite Shires and that would have a lasting contribution to the area. In the first full year of operation the expected contribution would be \$121,000. Assuming 3% CPI, the total contribution to the Community Fund over a 25 year period would be approximately \$4.7 million.

SHWF would be required to pay Pyrenees Shire Council rates in lieu following the completion of the wind farm. In the first full year of operation the expected contribution would be \$475,000. Assuming 3% CPI, the total contribution to the Pyrenees Shire over a 25 year period would be approximately \$18 million.

17.3

MITIGATION AND MONITORING

Local labour and materials should be used wherever possible to enhance the benefits to the local community. When local sources are not available purchase of materials and services should be taken from the region.

The report identifies that economic impacts from the wind farm during the operational phase are longer term and, therefore, have the potential to be more significant. The boost to the local economy in terms of direct and indirect employment opportunities is likely to focus around the construction phase and will be less significant during operation. The Community Fund has potential to have a significant impact on the local community for the life of the project.

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18

LANDSCAPE AND VISUAL

This Section describes the likely range of visual impacts associated with the construction and operation of the proposed Stockyard Hill Wind Farm. This section also describes the surrounding landscape and proposes mitigation and monitoring measures that will assist to minimise the visual impacts of the wind farm site within the surrounding landscape.

For further information on the landscape and visual assessment undertaken by ERM refer to the *Landscape and Visual Impact Assessment 2009*, (Annex Z).

18.1

METHODOLOGY

The methodology used within the visual assessment was based on the *Wind Energy Guidelines (Annex B)* as well as past projects undertaken by ERM in the visual assessment of wind farms in Victoria, South Australia, New South Wales, Queensland and New Zealand.

The methodology used within the visual impact assessment of the Stockyard Hill Wind Farm includes the following:

- Description of the visual components of the Stockyard Hill Wind Farm. These include, but are not limited to, wind turbines, substations and access roads;
- Description of the relevant sections of the Planning Policies that apply within the viewshed;
- Description of people's perception of wind farms in the landscape;
- A Definition of the viewshed of the wind farm, including the Zones of Visual Influence (ZVI) within the viewshed;
- Description of the landscape characteristics, landscape units and landscape sensitivity within the viewshed;
- Carrying out a GIS based Seen Area Analysis to illustrate those within the viewshed from which wind turbines are visible in whole or part;
- Utilising the ZVI and Seen Area Analysis to locate indicative viewpoints within the public domain (i.e. from roadsides or from recognised lookout or other vantage points) from which wind turbines will be visible, as a means of explaining the visual impact of the proposed wind farm on publicly accessible locations;
- Examine the potential visual impact and landscape mitigation measures that may apply to residences within the vicinity of the wind farm;
- Examine the potential landscape and visual impact of the proposed 132kV powerline route within and around the terminal station site;
- Analyse the potential of cumulative visual impact of the proposed development; and
- Describe the potential impact of night lighting should this be required.

Photomontages were also used to illustrate the potential visual impact from selected public and residential locations, and assist in the assessment of the visual impact of the proposed Stockyard Hill Wind Farm.

18.1.1 *Visible components of the proposed wind farm*

The proposed wind turbines are the most visually apparent element of a wind farm proposal.

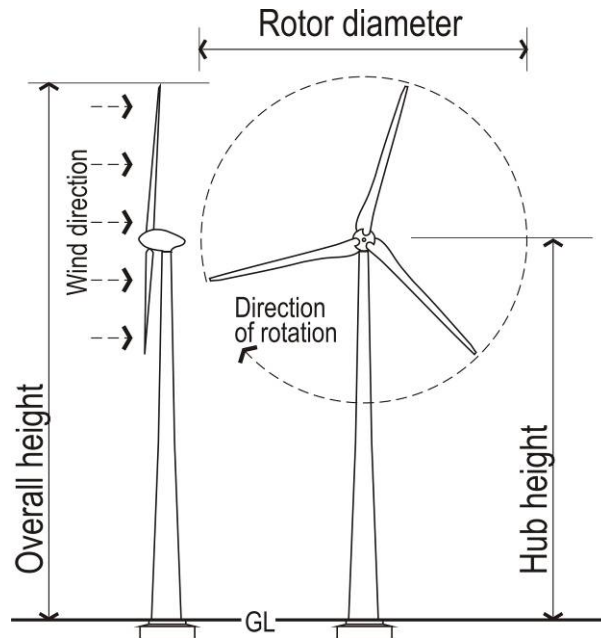


Figure 18.1 *Wind turbine specifications*

ITEM	Maximum Values
Hub Height	80 metres (Approx)
Rotor Diameter	104 metres (Approx)
Overall Height	132 metres (Approx)
Proposed number of turbines	242 turbines (Approx)

All values in *Figure 18.1* are maximums and may differ slightly between turbine models.

Other visible components associated with the construction and operation of a wind farm include access tracks, transformers as well as buildings and small car park areas associated with substations and switchyards. Whilst these elements may be visible, the largest of the proposed structure will be the proposed wind turbines.

Therefore the wind turbines have been used to determine the viewshed of the proposed Stockyard Hill Wind Farm.

18.1.2

The Viewshed

The viewshed is the area from which the wind turbines may be potentially noticeable. The viewshed can be defined by understanding the extent to which a wind turbine could impact on the horizontal and vertical field of view of an observer.

The viewshed is dependent on the dimensions of the proposed wind turbines and the parameters of the human vision. For Stockyard Hill Wind Farm the proposed viewshed has been defined at 17 km. Zones of Visual Influence within the viewshed assess, empirically, the visibility of wind turbines at increasing distances from the extent of the viewshed to the proposed wind farm.

The visual impact of a wind turbine at 17 km is obviously less than the visual impact of a wind turbine seen from a distance less than 1.5 km. Distance ranges are used as a guide only to determine zones of visual impact.

Views to the wind farm may be possible beyond 17 km, however, it is considered that the wind turbines will no longer cause a visual impact on the landscape beyond this distance.

Table 18.1 shows the varying degrees of impact relative to distance.

Table 18.1 *Zones of visual impact*

Distance from an observer to the nearest wind turbine	Visual impact
> 17 km	<i>Visually insignificant</i> A very small element in the viewshed, which is difficult to discern and will be invisible in some lighting or weather circumstances.
8.5 km – 17 km	<i>Potentially noticeable, but will not dominate the landscape.</i> The degree of visual intrusion will depend on the landscape sensitivity and the sensitivity of the viewer, however, the wind turbines do not dominate the landscape.
3.0 km -8.5 km	<i>Potentially noticeable and can dominate the landscape.</i> The degree of visual intrusion will depend on the landscape sensitivity and the sensitivity of the viewer.
1.5-3.0 km	<i>Highly visible and will usually dominate the landscape</i> The degree of visual intrusion will depend on the wind turbines' placement within the landscape and factors such as foreground screening.
< 1.5 km	<i>Will be visually dominant in the landscape from most viewing locations.</i> The turbines dominate the landscape in which they are sited.

18.1.3 *Landscape Units*

There are four distinct landscape units surrounding the proposed Stockyard Hill Wind Farm. These have been determined on the basis of visual characteristics relating to topography, geology and vegetation. These landscape units are:

- Landscape Unit 1 - Flat Farmland;
- Landscape Unit 2 - Hilly Farmland;
- Landscape Unit 3 - Forested Hills; and
- Landscape Unit 4 - Rural Townships.

18.2 *LANDSCAPE UNIT 1 – FLAT FARMLAND*

'Landscape Unit 1 – Flat Farmland' is the most common landscape unit within the view shed, and an illustrative view of this landscape unit is shown in *Figure 18.2*. The Flat Farmland Landscape Unit describes those areas with low slopes (usually less than 5%) and which are generally cleared with only occasional remnant vegetation or, more commonly, planted windbreaks.



Figure 18.2 *Flat Farmland Landscape Unit - Illustrative view*

Figure 18.1 illustrates the view from the Streatham – Carngham Road, looking north towards the proposed wind farm. The figure shows the cleared farmland with shelter belts visible on the horizon.

Within this landscape unit, constructed elements are usually apparent as they are not screened by topography or vegetation and typically the road network, farm buildings and fences are visible. This landscape unit also accommodates railway lines and existing high and low voltage electrical transmission lines and overhead telephone lines.

18.3 *LANDSCAPE UNIT 2 – HILLY FARMLAND*

‘Landscape Unit 2 – ‘Hilly Farmland’ describes those areas within the viewshed that are cleared but are steeper than the surrounding flat farmland. These hills usually have slopes in excess of 10% and are used for farming, typically grazing or crop production.

Figure 18.3 illustrates the view of this landscape unit looking south-west from the Beaufort Carngham Road.



Figure 18.3 *Hilly Farmland Landscape Unit - Illustrative view*

The Hilly Farmland Landscape Unit contains areas of remnant and planted vegetation, which often follows drainage lines, fence lines and property boundaries.

18.4 *LANDSCAPE UNIT 3 – FORESTED HILLS*

‘Landscape Unit 3 – Forested Hills’ describes those areas that also have slopes generally greater than 10%, however these areas appear as forested landscapes. The ‘Forested Hills’ Landscape Unit is usually limited to parcels of land that lie within State Forests, State Parks, Regional Parks or local reserves.

Figure 18.4 illustrates the view of this landscape unit looking east towards the summit of Mount Cole.



Figure 18.4 *Forested Hills Landscape Unit – Illustrative view*

The Langi Ghiran State Park, approximately 10 km north-west of the nearest wind farm site boundary and Mount Buangor State Park, approximately 8 km north-west of the nearest wind farm site boundary, are two areas which contain forested hills within the viewshed. The Trawalla State Forest lies adjacent to the northern boundary of the wind farm.

18.5 *LANDSCAPE UNIT 4 – RURAL TOWNSHIPS*

‘Landscape Unit 4 – Rural Townships’ describes the towns and villages within the viewshed. The major rural centres within the viewshed are Beaufort, located approximately 4.5 km north of the nearest wind farm site boundary, and Skipton, located approximately 4.0 km south of the nearest wind farm site boundary.

The following townships/localities are within the viewshed:

- Beaufort to the north;
- Trawalla to the north-east;
- Skipton to the south;
- Streatham to the south west;
- Buangor to the north-west;
- Pittong to the south-east;
- Snake Valley to the west;
- Carngham to the west; and
- Linton to the south-east.

Ararat is the nearest large town located approximately 30 km to the north-west, Ballarat is located approximately 35 km to the east.

Figure 18.5 shows the main street of Beaufort, which is the largest town in the viewshed of the Stockyard Hill Wind Farm. The figure shows a view from the Western Highway looking west towards the centre of Beaufort.



Figure 18.5 *Rural Township Landscape Unit - Illustrative view*

Rural townships have both single and sometimes double story buildings along the main road and are often well planted with numerous street trees as well as vegetation within the private gardens.

Townships, such as Beaufort, also contain existing infrastructure such as lighting, poles, signage and overhead electrical wires as shown in the Figure above.

18.5.1 *Landscape Sensitivity*

Landscape sensitivity can be defined as the ability of a landscape to absorb visual change. While visual change occurs within any landscape, development and infrastructure are significantly different to natural change. The sensitivity of views to change within each of the landscape units will depend upon a number of factors, such as:

- **The sensitivity of a view varies according to viewing location.** For example, visitors to a National or State Park where the landscape appears untouched or pristine will be more sensitive to the imposition of new or artificial elements within that landscape. Viewers travelling along a rural highway, which contains existing examples of modifications and artificial elements, will be less sensitive to the presence of new elements. The sensitivity of a view can also vary according to immediate surroundings. For example views from a highly sensitive location such as a national park can be limited to the foreground due to the enclosed character of the vegetation.
- **The rarity of a particular landscape.** Landscapes that are considered rare or threatened are valued more highly by a particular community with an attachment to the particular landscape.
- **The scenic qualities of a particular landscape.** Landscapes that are considered scenic due to dramatic topographical changes, the presence of water, coastlines, etc, may be extensive, however viewers have greater sensitivity to alterations within these scenic landscapes. Modified landscapes including built form, roads, tracks, fences, silos and rail as well as farming practices including land clearing, cropping and burning, all decrease the sensitivity of a landscape's scenic qualities.

The pre-European landscape of the area surrounding the proposed Stockyard Hill Wind Farm has been heavily modified through agricultural practices that have included the clearing of native vegetation for cropping and grazing. The resultant cleared landscape is interspersed with agricultural buildings including farmhouses, outbuildings, sheds, stockyards, access roads, silos as well as road and rail networks. Associated with these structures are plantings along roadsides or in the form of shelter belts. The 'Flat Farmland' landscape unit is not rare, nor is it high in scenic quality and, for these reasons, the landscape sensitivity is considered to be low. However, it must be recognised that some people value the appearance of cleared farmland with minimal signs of built form such as houses and farm sheds. For these viewers the presence of wind turbines may be perceived as a high visual impact due to the presence of large-scale structures in a rural landscape.

The Volcanic Cones are obvious and often dramatic features within this otherwise flat rural landscape. These cones are reasonably common across the volcanic plains, however because they are an unusual feature their landscape sensitivity is rated as moderate.

'Forested Hills' usually have a high landscape sensitivity due to their natural vegetated appearance.

The Rural Townships include commercial and public buildings as well as recreational areas, light sources and other visible infrastructure. In these areas the scenic qualities are not particularly high as they often contain many forms of infrastructure and development. However given the concentration of housing, which is a sensitive land use, Rural Townships have been given a moderate sensitivity rating.

Table 18.2 below rates the sensitivity of the various landscape units within the visual catchment of the wind farm.

Table 18.2 *Landscape Sensitivity*

Landscape unit	Sensitivity
Unit 1 Flat Farmland	Low This unit is highly modified, contains visible infrastructure, is not topographically dramatic and does not contain large areas of water.
Unit 2 Hilly Farmland	Moderate The Volcanic Cones are visually identifiable features within the surrounding flat landscape.
Unit 3 Forested Hills	Moderate to High This landscape is attractive.
Unit 4 Rural Townships	Moderate The concentration of houses increases the visual sensitivity of this landscape unit.

The landscape Units and landscape sensitivity is used to assess the level of visual impact of the proposed Stockyard Hill Wind from selected viewpoints.

18.5.2

Seen Area Analysis

A Seen Area Analysis shows those areas within the viewshed from which wind turbines, either whole or in part, may be visible.

The extent to which a wind farm is visible depends upon the topography and surrounding vegetation.

The areas from which the proposed wind turbines can be seen either in part or in full can be mapped using Geographical Information Systems (GIS) software. The GIS mapping is based solely on topography and does not take into account screening by vegetation, minor topographic changes and building. These factors will assist to reduce the visibility from many locations. Therefore the GIS analysis is a conservative approach to mapping the extent of visibility and is used to assist in selecting the assessment viewpoint locations.

Figure 18.6 and Table 18.3 show the turbine components and visibility ranges that have been mapped using the GIS analysis.

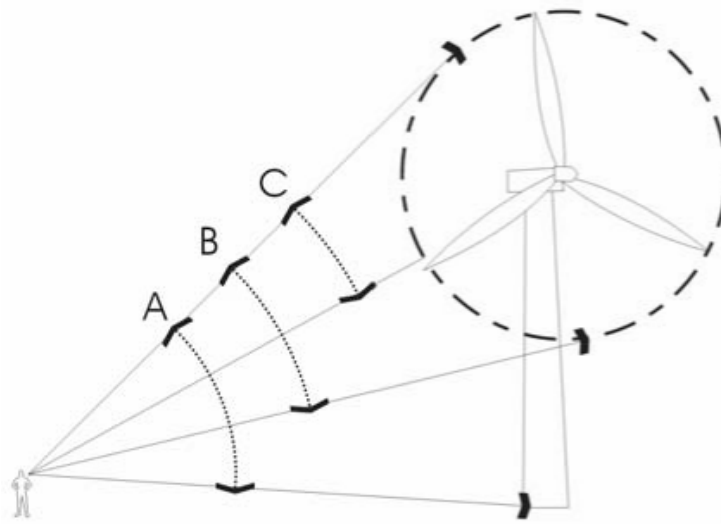


Figure 18.6 *Visibility parameters (not to scale)*

The ranges shown in Figure 18.6 are discussed in Table 18.3 below.

Table 18.3 *Mapping visibility parameters*

Zone	Extent that wind turbines are visible
Zone A	One or more wind turbines in their entirety
Zone B	The entire swept path of the blades of one or more wind turbines
Zone C	At least half of the swept path of one or more wind turbines
Zone D	Any part of the wind turbine blades of one or more wind turbines

These zones are not exclusive. For example a location that has the potential to view a wind turbine in its entirety falls into Zone A. A viewer at this location will also be able to see “any part of the wind turbine blades” and this location will also fall into Zone D.

The results of this GIS based visibility mapping is discussed below.

18.5.3 Zone A - Areas from which viewers can potentially see one or more wind turbines in their entirety

Figure 18.7 Zone A maps those areas from which one or more wind turbines may be visible in their entirety. This figure shows that a large area in the viewshed has the potential to see one or more wind turbines. This is due to the generally flat and gently undulating landscape of the area surrounding the Stockyard Hill Wind Farm.

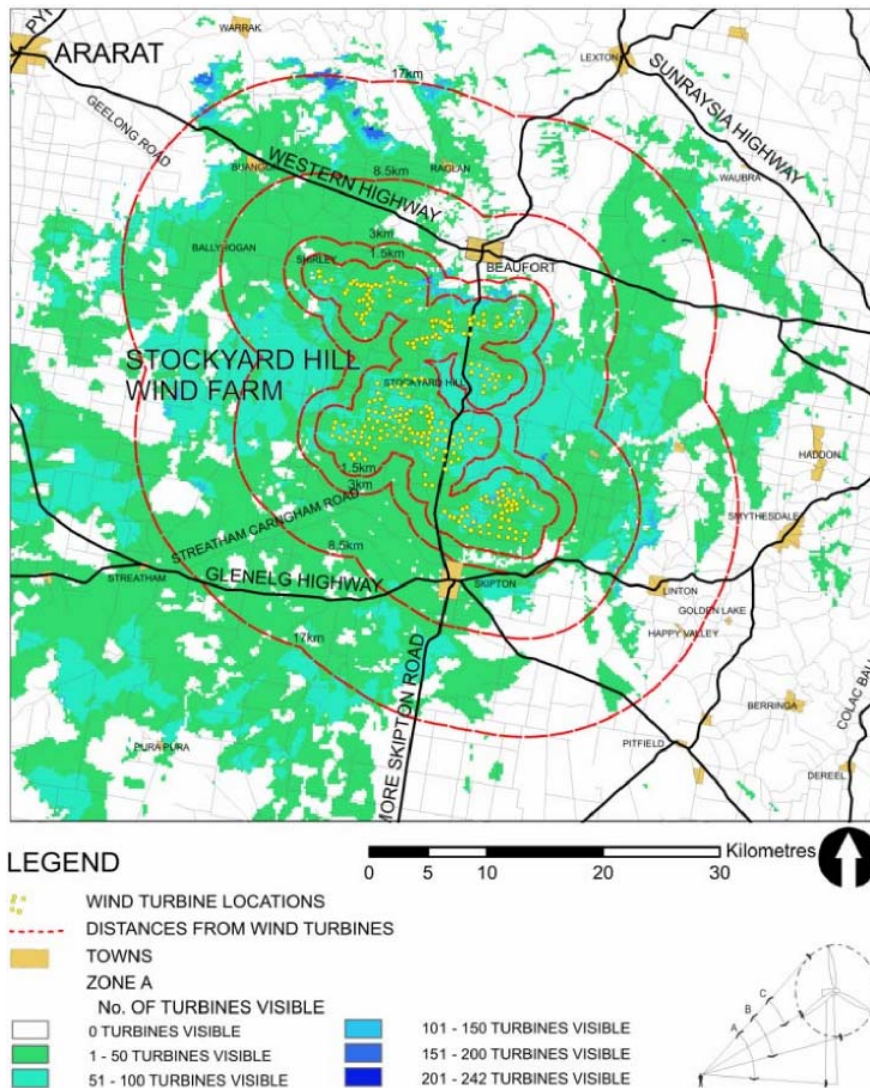


Figure 18.7 Zone A - Areas from where viewers can potentially see wind turbines in their entirety

The areas that have the greatest potential visibility are within the 8.5 km viewshed band. The township of Skipton to the south and the locality of Buangor to the north-west are within this viewshed band.

Areas to the north have less potential to view entire wind turbines. Within the centre of Beaufort, which is the nearest town to the proposed wind farm, residents will not be able to see any part of any wind turbine; however, there may be limited visibility around the periphery of the town.

The summit of Mount Cole to the north is the only location where all 242 wind turbines are potentially visible in their entirety.

It must be recognised that this assessment is based on topography only, and does not take into account the effects of vegetation, buildings and their ability to filter views to the surrounding landscape. This is particularly pertinent in the area surrounding Mount Cole, where the extensive canopy trees restrict most views to the surrounding landscape.

18.5.4

Zone B - Areas from which viewers can potentially see the entire swept path or one or more wind turbines

Figure 18.8 is the area where viewers could potentially see at least the entire swept path of the wind turbine blades. This includes those areas from which entire turbines are visible.

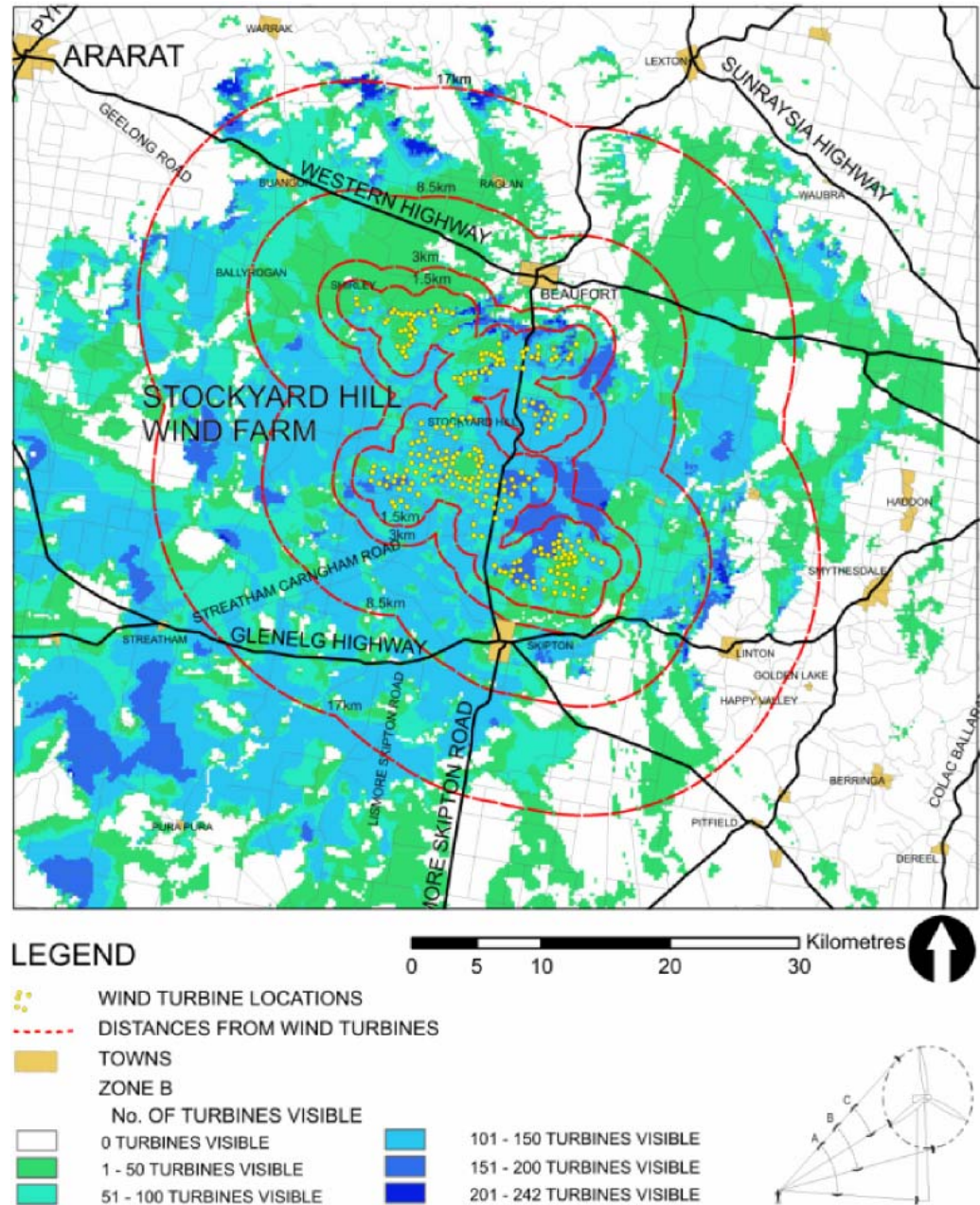


Figure 18.8

Zone B - Areas from where viewers can potentially see the entire swept path of wind turbines

The overall visibility pattern of Zone B is similar to those areas mapped in Zone A. However, the number of potentially visible wind turbines has increased in most areas. The areas from where viewers can potentially see the entire swept path is still primarily within 3 km however, there are a greater number of turbines visible, especially to the south east and west, in the 5-8.5 km zone.

The majority of areas within 3 km are locations from which viewers could potentially view the swept path of 101-150 turbines, with several areas able to see up to 200 turbines towards the centre and east of the proposed wind farm.

Viewers within Skipton will have the greatest potential to view the entire swept path of several wind turbines, however viewers within Beaufort will remain largely unable to see the swept path of any wind turbines.

18.5.5 Zone C - Areas from which viewers can potentially see the nacelle and above of one or more wind turbines

Figure 18.9 maps those areas from which a viewer can potentially see the nacelle and above, that is at least the upper half of the swept path of the wind turbine blades and the numbers of wind turbines that are visible.

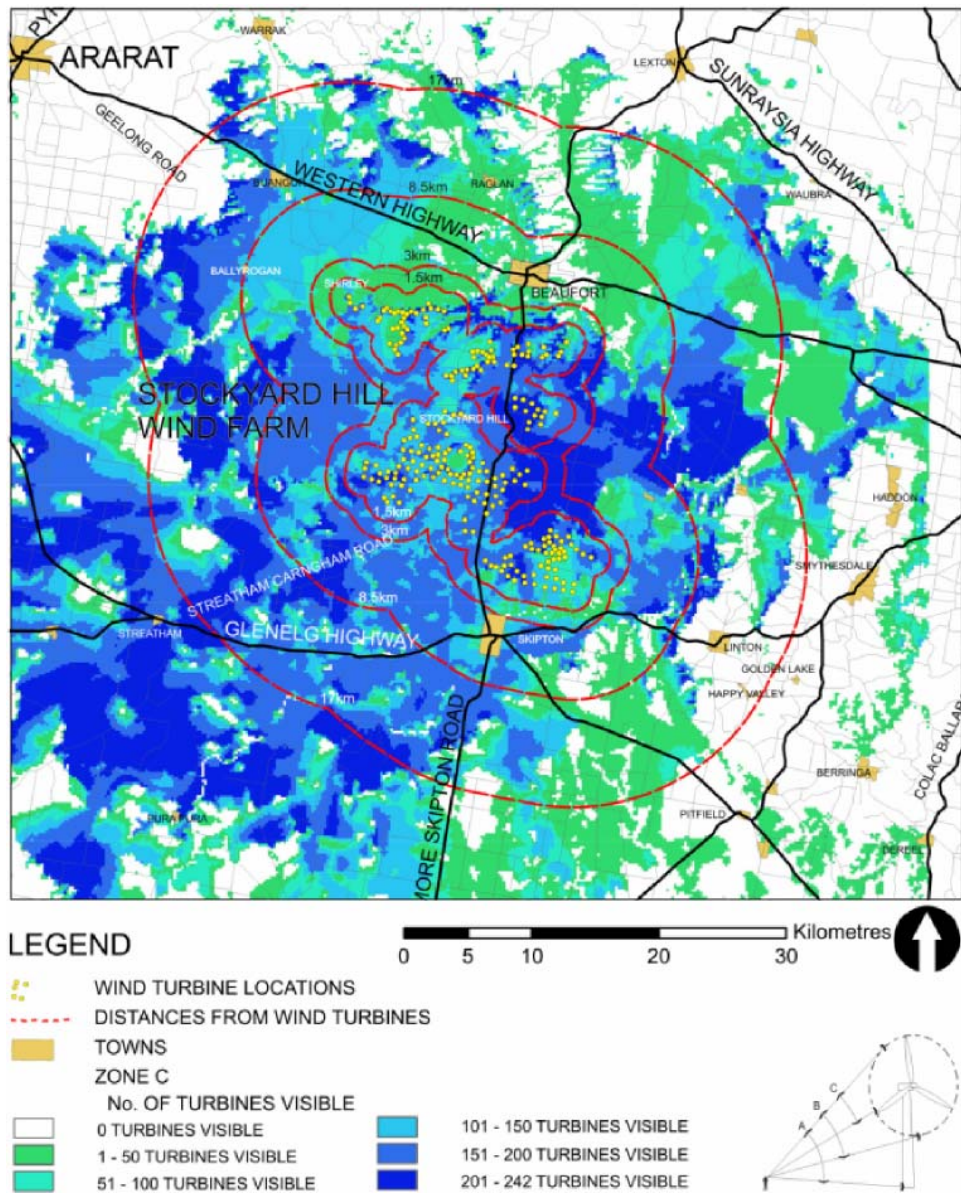


Figure 18.9 Zone C - Areas from where viewers can potentially see the nacelle and above of one or more wind turbines

The pattern is again similar to that in *Figure 18.8*, however there is an increase in the number of turbines visible. This is to be expected when the area that is mapped shows those locations that can see the nacelle and above.

The areas with the most visibility are inside of the 8.5 km band. The majority of this area has the potential for viewing up to 200 turbines from the nacelle and above. The area shown in dark blue will be the most potentially affected with the potential to view all of the 242 wind turbines from the nacelle and above.

The main change in this Seen Area Analysis is that for the first time potential viewing locations are identified within Beaufort, where some locations have the potential to see the nacelle or above of one or more wind turbines.

18.5.6

Zone D – Areas from Which Viewers Can Potentially See Any Part Of One Or More Wind Turbines

Figure 18.10 maps those areas in which a viewer may be able to see any part of a wind turbine, even those areas in which only the very tip of a turbine blade is visible. As such, it is the most conservative “seen-area” map.

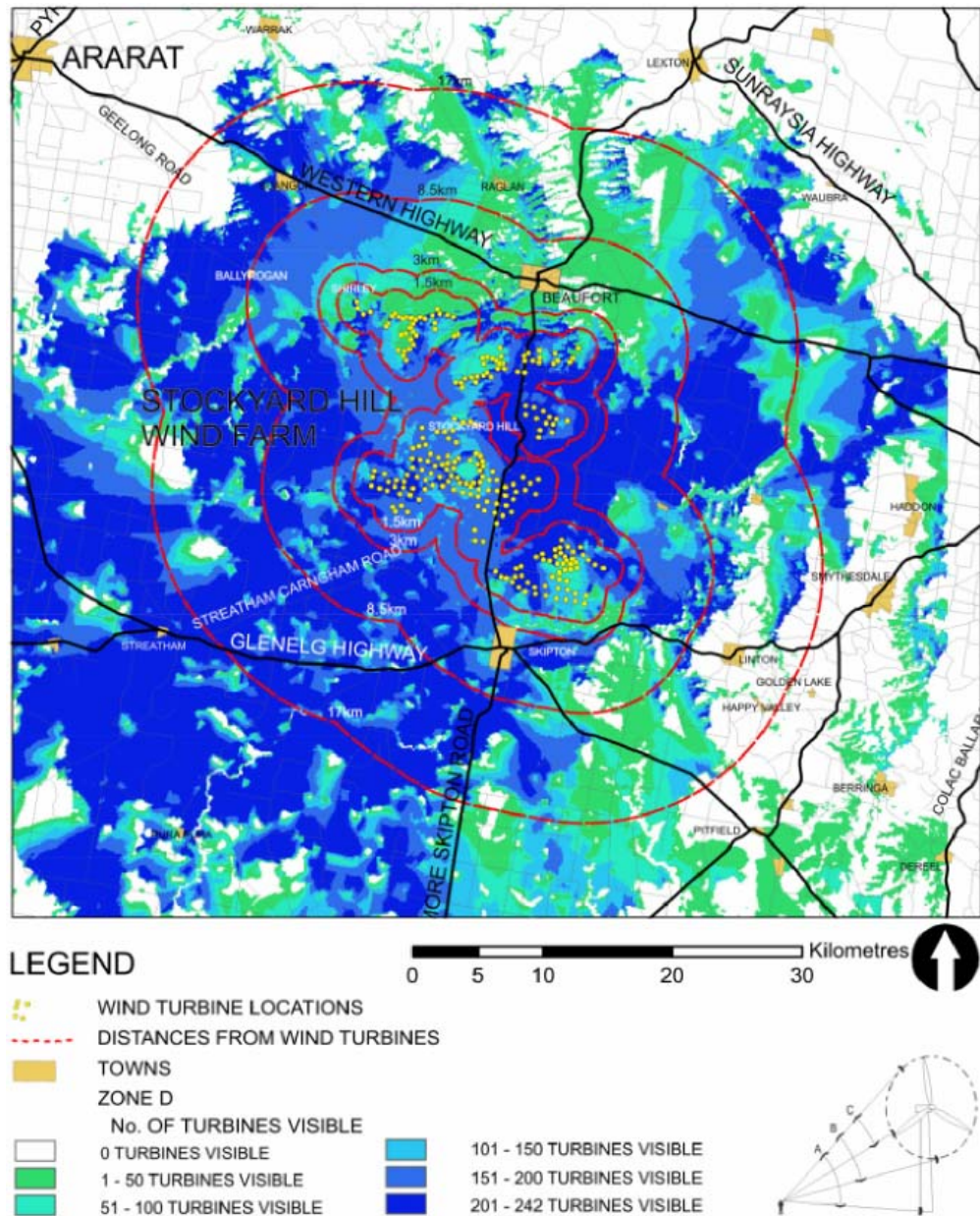


Figure 18.10 Zone D – Areas from where viewers can potentially see any part of one or more wind turbines

Figure 18.10 shows the criteria set at its most conservative, as in this case where even the visibility of a blade tip is included. The results are similar to the previous Figures where the most affected areas, are those in the central area of the wind farm and to the south-west including areas along the Glenelg Highway. The extent of the Glenelg Highway that is most affected is generally beyond 8.5 km and lies to the west of Skipton. This analysis also shows that viewers may have the opportunity to see the tips of wind turbines from Beaufort.

18.5.7 *The Relevance of this Analysis to Viewpoint Location*

The characteristics of the surrounding landscape means that there are few locations within the 17 km viewshed that can potentially see all of the wind turbines in their entirety. This is demonstrated in *Figure 18.7* and is limited to elevated locations such as the very summit of Mount Cole. This location is surrounded by extensive areas of vegetation.

The Seen Area Analysis has also been mapped with the Zones of Visual Influence overlaid on the figures. It is important to note that this Seen Area Analysis only maps potential visibility, based on topography. The screening effects of vegetation, buildings or microtopographical changes such as earthworks, and road side cuttings are not taken into account. Therefore, the actual visibility from many areas may be far less than is mapped.

The mapping of areas of potential wind turbine visibility shows those areas where indicative view points should be selected. These views should be in areas that lie closest to the wind farm, preferably within the 8.5 km viewshed zone, as it is within the 8.5 km zone that the greatest visual impact occurs. The reason for this is discussed in *Table 18.1* Zones of Visual Impact. Areas with potential for views to the proposed wind turbines also include the low-lying areas between the Western Highway to the north and the Glenelg Highway to the south.

18.6 *KEY FINDINGS AND POTENTIAL IMPACTS*

The key findings and potential impacts of the landscape and visual assessment are detailed below.

18.6.1 *Publicly Accessible Viewpoints*

The selection of viewpoints seeks to provide representative views from publicly accessible areas within the viewshed and that may have views to one or more of the proposed wind turbines. These viewing locations have therefore been selected around the wind farm site primarily in areas that were identified in the Seen Area Analysis from where viewers would be able to potentially see wind turbines. The majority of these locations are also within 8.5 km of the wind turbine.

There were 28 viewpoints that were selected as representative viewpoints from publicly accessible locations. Their location and relevance to this assessment is identified in *Table 18.4*.

Table 18.4 Viewpoint from the surrounding landscape

Rural Townships	Roads
VP A1 Beaufort Township #1	VP C1 Western Highway
VP A2 Beaufort Township #1	VP C2 Geelong Road #1
VP A3 Trawalla Township	VP C3 Geelong Road #2
VP A4 Skipton Township **	VP C4 Geelong Road #3
VP A5 Buangor Township	VP C5 Streatham - Carngham Road #1**
VP A6 Pittong Township	VP C6 Beaufort - Carngham Road**
VP A7 Snake Valley Township	Repeat
VP A8 Carngham Township	VP C7 Western Highway – Eurambeen Road
VP A9 Linton Township	VP C8 Eurabmeen – Streatham Road**
Reserves and Parks	VP C9 Mount William Road
VP B1 Lake Goldsmith – Stockyard Hill Road **	VP C10 Glenelg Highway
VP B2 Mount Buangor State Park #1	VP C11 Streatham – Carngham Road #2
VP B3 Skipton Rail Trail**	VP C12 Streatham – Carngham Road #3
VP B4 Mount Emu	
VP B5 Mount Buangor State Park #2	
VP B6 Trawalla State Forest**	
VP B7 Mt Langi Ghiran State Park	

** Photomontage locations

The locations of these viewpoints can be seen in *Figure 18.11*. It is noted that from two of the viewpoint locations, two assessments have been undertaken. Photomontages were prepared from six locations..

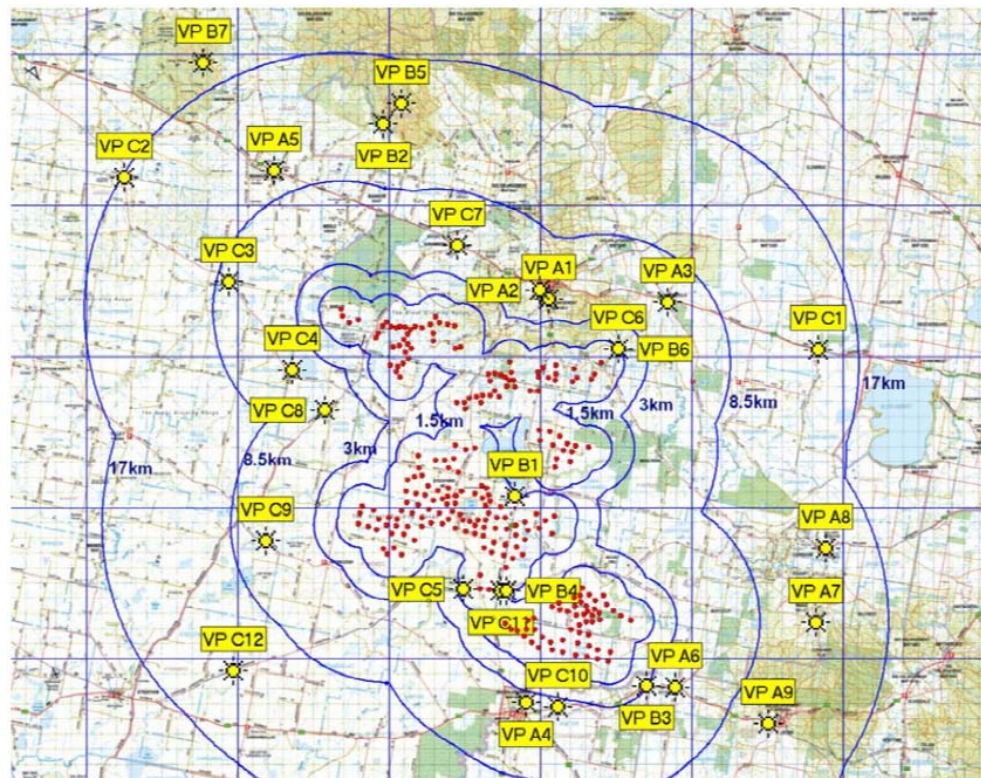


Figure 18.11 Selected viewpoints

These viewpoint locations including their proximity to the proposed wind turbines are shown in *Figure 18.11*.

The following sections summarise the findings of the landscape and visual impact assessment from the publicly accessible viewpoints detailed above.

18.6.2 *The Overall Visual Impact of the Wind Farm on Townships within the Viewshed*

The potential visual impact on the townships of Beaufort, Skipton, Trawalla, Pittong, Snake Valley, Carngham and Linton has been assessed. *Table 18.5* summarises the overall visual impact of each viewpoint within or near these townships.

Table 18.5 *Summary of the assessment of the visual impact on townships*

VP	Distance to nearest site boundary (approx.)	Direction to wind farm	Dominant landscape unit	Landscape sensitivity	Viewer numbers	Overall visual impact
A1	4.5 km	S	Unit 4	Moderate	Moderate	Nil
A2	4.4 km	S	Unit 4	Moderate	Moderate	Nil
A3	6.0 km	SW	Unit 4	Moderate	Moderate	Low
A4	3.7 km	N	Unit 4	Moderate	Moderate	Moderate-Low
A5	10.0 km	SE	Unit 4	Moderate	Moderate	Nil
A6	4.7 km	SE	Unit 4	Moderate	Low	Low
A7	12.1 km	W	Unit 3	Moderate	Moderate	Nil
A8	13.6 km	SW	Unit 4	Moderate	Moderate	Low-Nil
A9	11.2 km	W	Unit 4	Moderate	Moderate	Nil

It is only from selected locations that some views can be found of the proposed wind farm from these townships. All of these townships have well established town planting. Combined with existing buildings and intervening topography the overall visual impact of the proposed Stockyard Hill Wind Farm would be quite low on the townships within the viewshed.

When the screening afforded by this planting is combined with the screening provided by buildings and intervening topography the overall visual impact of the proposed Stockyard Hill Wind Farm is assessed as low at most viewpoints within the townships within the viewshed.

18.6.3 *The Overall Visual Impact of the Wind Farm on Reserves and Parks within the Viewshed*

Table 18.6 summarises the overall visual impact of each viewpoint within the reserves and parks. These included Lake Goldsmith, the entry to the Mount Buangor State Park, the Skipton Rail Trail, Mount Emu, Mount Buangor State Park, Trawalla State Forest and the Mt Langi Ghiran State Park.

Table 18.6 *Summary of the assessment of the visual impact on reserves and parks*

VP	Distance to nearest site boundary (approx.)	Direction to wind farm	Dominant landscape unit	Landscape sensitivity	Viewer numbers	Overall visual impact
B1	1.1 km 3.9 km	SW NE	Unit 1	Low-High	Low	Low - positive
B2	12.6 km	S	Unit 3	Low-Moderate	Low	Low-Nil
B3	2.9 km	NW	Unit 2	Moderate	Low	Low
B4	1.1 km	W	Unit 1	Low	Moderate	Moderate
B5	12.6 km	S	Unit 3	Low-Moderate	Low	Low
B6	1.4 km	SW	Unit 3	Low-Moderate	Low	Low-Nil
B7	18.5 km	SE	Unit 3	Low-Moderate	Low	Low

Generally, these reserves and parks are the most visually appealing areas within the viewshed. The State Parks and forested areas are often on steeper land and appear natural. The State Parks are typically well forested, with forest canopy filtering views to the proposed wind farm and therefore a low level of visual impact.

All but one of the viewpoints was assessed as “low” or “low-to-nil” visual impact. This is due to the forest canopy screening views to the wind farm. In more open areas, where expansive views of the wind turbines will be possible, these same views will be across a highly modified landscape, which is flat and therefore has a lower degree of sensitivity to change.

There are two viewing locations that have been assessed that are not covered in vegetation allowing long views to the surrounding landscapes and whereby no visual impact will occur. The first of these is Mount Emu (Refer Viewpoint B4), where the wind turbines will be a dominant feature in a landscape that has always been dominated by Mount Emu. This impact is assessed as moderate.

The other area that may be impacted is Lake Goldsmith (Refer Viewpoint B1). Although appearing little more than a flat paddock at the moment, when full of water it would be a striking feature of the landscape. The possibility of co-locating a visitor's information stop at a location on the edge of Lake Goldsmith with views towards the wind farm may well be a positive outcome.

18.6.4 *The Overall Visual Impact of the Wind Farm on the Road Network within the Viewshed*

For many viewers using the highways and local roads in the area, the presence of the proposed wind farm may be a positive element. This conclusion is supported by the community perception studies that are described in *Annex Z – Landscape and Visual Assessment*.

Table 18.7 summarises the overall visual impact from each viewpoint on the road network assessed.

Table 18.7 *Summary of the assessment of the visual impact on the road network*

VP	Distance to nearest site boundary (approx.)	Direction to wind farm	Dominant landscape unit	Landscape sensitivity	Viewer numbers	Overall visual impact
C1	14.3 km	W	Unit 1	Low	High	Low
C2	16.5 km	SE	Unit 2	Low-Moderate	Low	Low
C3	7.6 km	SE	Unit 1	Low-Moderate	Low	Low
C4	4.9 km	NE	Unit 1	Low-Moderate	Low	Low
C5	1.1 km	E	Unit 1	Low	Low	Low
C6	1.4 km	SW	Unit 2	Low-Moderate	Low	Low
C7	4.9 km	S	Unit 1	Low-Moderate	High	Low
C8	5.2 km	NE	Unit 1	Low	Low	Low
C9	6.2 km	E	Unit 1	Low	Low	Low
C10	3.6 km	N	Unit 1	Low-Moderate	Low-Moderate	Low
C11	0.7 km	W	Unit 1	Low	Low	Low
C12	12.7 km	NE	Unit 1	Low	Low	Low

The low level of impact on the road network is often the result of the low to moderate landscape sensitivity of the area surrounding the Stockyard Hill Wind Farm.

18.6.5 *Assessment of Visual Impact on Residential Properties*

The major impact of wind turbines on residential properties occurs where wind turbines are within 1.5 km. However, wind turbines can be dominant out to 3 km. This is supported by past panel decisions. For example the Bald Hills Wind Farm Panel report stated:

Whilst the Panel has not found that there are any materially adverse amenity impacts at the 3 km range, its experience with this documentation would suggest that 3 km represents an excellent precautionary threshold within which detailed mapping should be made available to a decision maker (Bald Hills Planning Panel, 2004, P 219).

To the possibility of finding future dwelling sites, the Panel observes:

... The Panel cannot conceive of the proponent needing to engage in discussions with parties who are any more remotely located than approximately 1 km from the nearest proposed turbine (Bald Hills Wind Farm Project: EES, Panel Report: 24 June 2004, Page 278).

The greatest potential impact is on neighbouring non-participatory residential properties. That is residential properties whose owners have not elected to be part of the wind farm, as it can be assumed that those that have elected for their land to form part of the wind farm, the visual impact is acceptable.

The locations of participatory landowners' residences and non-participatory residences have been provided by Stockyard Hill Wind Farm Pty Ltd. *Table 18.8* shows the number of houses that are within 1.5 km and 3 km of the nearest wind turbine. These are those properties which have the greatest potential visual impact.

Table 18.8 *Non-participatory houses within 3 km of the nearest turbine*

Distance from house to its nearest wind turbine	Total number of participatory houses	Total number of non-participatory houses
On site (within site boundaries)	25	0
Within 1.5 km (off site)	17	15
1.5 km to 3.0 km (off site)	14	58
TOTAL within 3 km (off site)	32	73

During community consultation meetings and in private meetings with residents, addresses were sought of people interested in better understanding the visual impact of the wind turbines from their places of residence. 14 landowners sought or allowed Stockyard Hill Wind Farm Pty Ltd to visit their properties and undertake a visual assessment. The addresses of these properties are detailed below with *Table 18.9*.

Table 18.9 *Residential viewpoints*

Ref #	Viewpoint location	Ref #	Viewpoint location
VP R1	233 Dalgleishs Road**	VP R9	Carngham Streatham Road
VP R2	1066 Carngham Road**	VP R10	Beaufort Skipton Road
VP R3	Geelong Road**	VP R11	310 Mt William Road
VP R4	Caramuir Road**	VP R12	1344 Mt William Road
VP R5	14 Dalgleishs Road	VP R13	2990 Geelong Road
VP R6	Dalgleishs Road #2	VP R14	"Mawallok", Geelong Road**
VP R7	Dalgleishs Road #3**		
VP R8	182 Frog Hollow Road		

** *Photomontage locations*

The locations of these viewpoints can be seen in *Figure 18.12*. It is noted that from two of the viewpoint locations, two assessments have been undertaken. Photomontages were prepared from six locations.

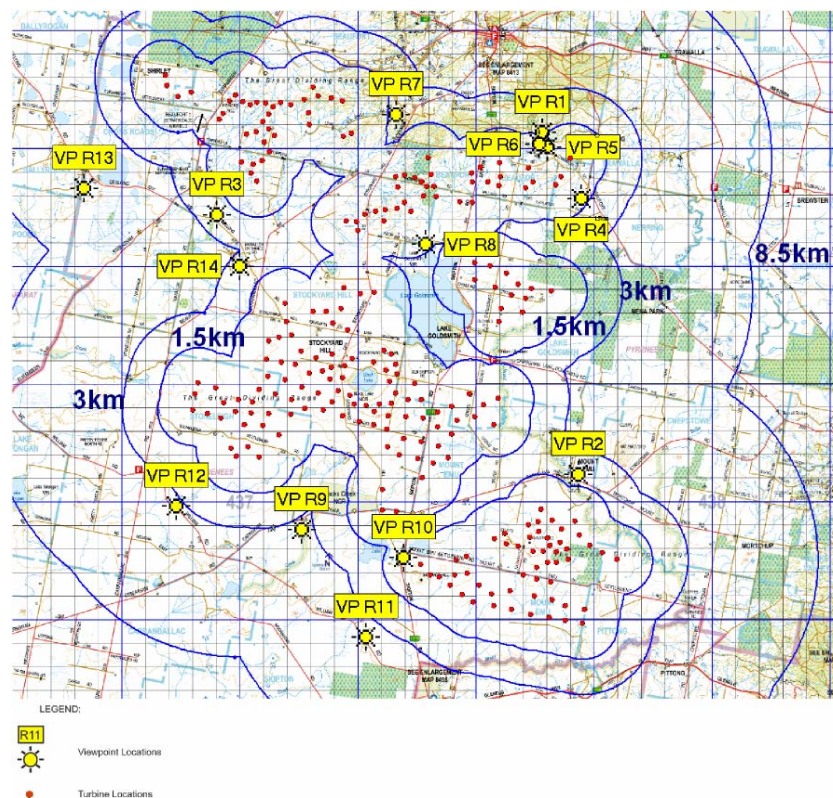


Figure 18.12 *Selected Residential Viewpoints around the Stockyard Hill Wind Farm*

18.6.6 *Summary of the Visual Impact from Residential Properties*

Table 18.10 summarises the overall visual impact of the proposed wind farm on a number of residences within the viewshed, with the majority being within 3 km of the nearest wind farm.

Table 18.10 *Summary of the assessment of the visual impact on residential properties*

VP #	Distance to nearest wind turbine	Direction to nearest wind turbine	Overall visual impact
R1	1.6 km	S	High - Without screening. Screening may not be appropriate.
R2	2.0 km	S	Moderate - Without landscape mitigation Low - with landscape mitigation
R3	2.2 km	NE	Moderate - Without landscape mitigation Low - with landscape mitigation
R4	1.2 km	NW	High - Without landscape mitigation Low - With landscape mitigation
R5	1.2 km	SW	Low - Existing screening
R6	1.1 km	SW	Low - Existing screening
R7	2.6 km	S	Moderate - Without landscape mitigation Low - With landscape mitigation
R8	1.5 km 2.2 km (visible)	NW SE	Low - Existing screening
R9	3.5 km	E	Low - Existing screening
R10	1.3 km	E	Low - Existing screening
R11	3.8 km	NE	Low - without screening Nil - with screening
R12	3.3 km	NE	Low - Existing screening
R13	6.7 km	E	Moderate - where no screening occurs. Low - where existing planting or proposed planting occurs.
R14	2.4 km 3.6 km (visible)	SE N	Moderate - without additional planting Low - with additional planting

In these assessments of residential viewpoints the overall visual impact was often assessed as being moderate to high when the wind turbines were visible and there was no existing screening.

The reason for this higher sensitivity rating for residential properties in comparison to publicly accessible viewpoints is primarily due to the value attributed to occupant's views.

This analysis has also highlighted the number of properties that are within 3 km of the wind farm that have a low level of overall visual impact.

This has been the result of existing gardens or windbreak planting between the residence and the proposed wind farm. In many cases this has been established in response to the windy conditions of the area, which makes the site appealing for the establishment of a wind farm.

18.6.7 *Assessment of the Proposed Powerline from Publicly Accessible Locations*

As identified previously, the Victorian Minister for Planning decided on 29th September 2008 that the Stockyard Hill Wind Farm project does not require an EES, subject to the three conditions. The condition relevant to the landscape and visual assessment of the site is as follows:

A report identifying corridor options for an extension of the national electricity grid to the Stockyard Hill Wind Farm site, and assessing sensitivities with respect to landscape and fauna values, including potential impacts on Brolga, is to be prepared to the satisfaction of the Secretary of the Department of Planning and Community Development, or delegate, and submitted to the Minister for Planning.

In response to the above condition an assessment of the visual impact (landscape values) of the proposed 132kV powerline route and terminal substation was undertaken. Although both these components are subject to separate planning applications, for completeness the results of this assessment have been provided for information only.

The selected viewpoints seek to provide representative views from publicly accessible areas within the viewshed. These have been selected along the length of the proposed 132 kV powerline and terminal station. This viewpoint assessment looks at the potential visual impact from publicly accessible locations as well as major roads including the Western Highway to the north, Glenelg Highway to the south as well as from minor roads. Potential viewing locations are also examined from the towns identified within the viewshed.

There were 17 viewpoints that were selected as representative of publicly accessible locations which are set out in *Table 18.11*.

Table 18.11 *Power line Viewpoints*

VP#	Address	VP#	Address
VP T1	Corner Skipton and Carngham	VP T10	Crawford's Road from the Rowland's Road intersection
VP T2	- Streatham Road	VP T11	Frosts Road
VP T3	Corner Skipton and Carngham	VP T12	Calvert's Road
VP T4	- Streatham Road	VP T13	Intersection of Calvert's road and
VP T5	Murray Road	VP T14	Hamilton Highway
VP T6	Park Road	VP T15	Intersection of the Hamilton Highway and McLean's Road
VP T7	Skipton Geelong Road	VP T16	McLean's Road
VP T8	Mount Bute Road from Crawfords Road intersection	VP T17	Intersection of McLean's Road and Four Tree Road
VP T9	Crawfords Road from the Mount Bute Road intersection Rowland's Road		Near proposed Transmission Terminal Site

Figure 18.13 shows the locations of each of these viewpoint's location in proximity to the proposed 132kV powerline and terminal station.

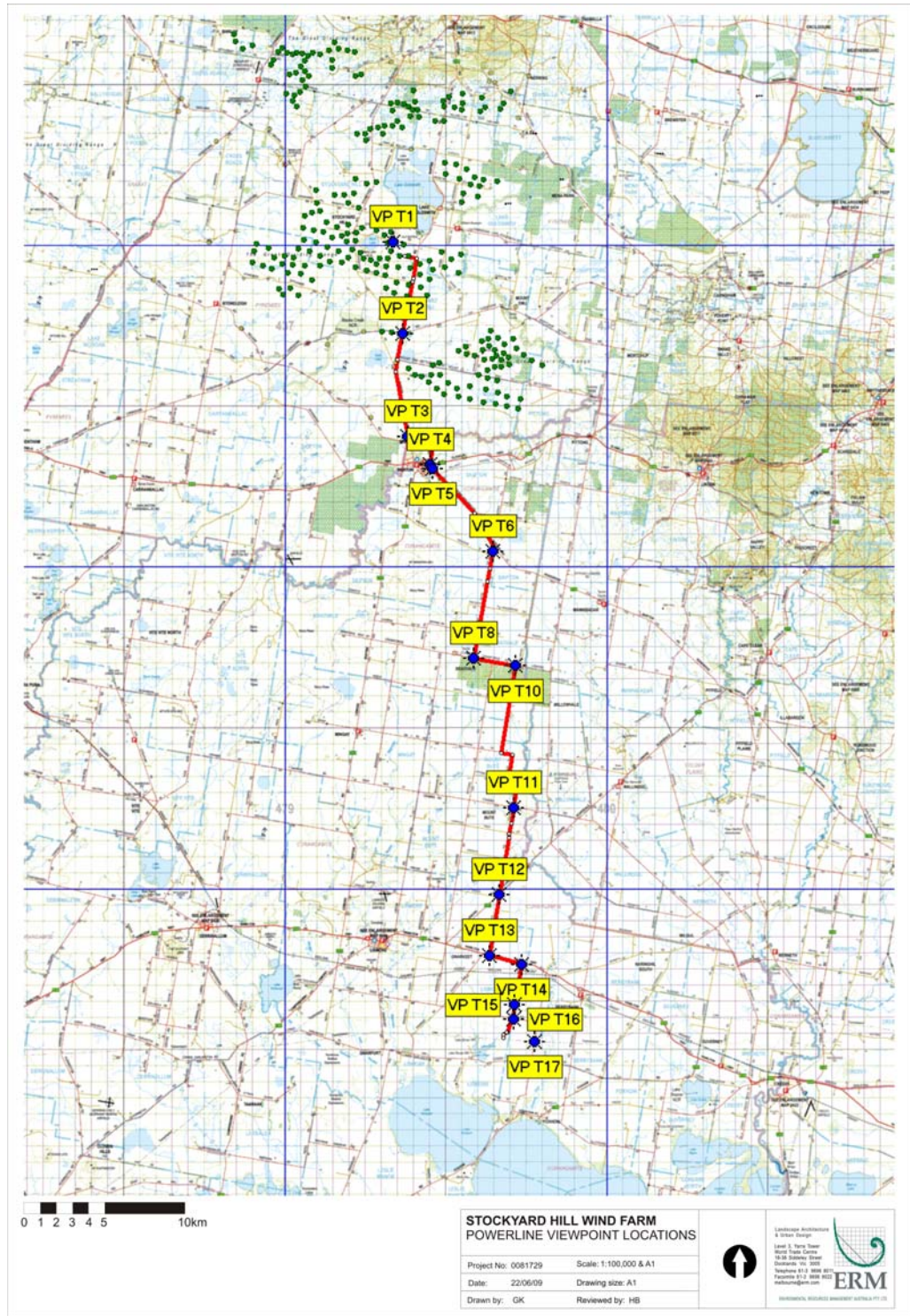


Figure 18.13 Viewpoint Locations

18.6.8 *Summary of Visual Impact of the Transmission Line from Publicly Accessible Viewpoints*

Table 18.12 summarises the assessment rating of all publicly accessible viewpoints analysed.

Table 18.12 *Summary assessment of publicly accessible viewpoints*

VP	Dominant landscape units	Viewer numbers	Landscape sensitivity	Overall visual impact
TOWNSHIPS				
T1	Unit 1	Low	Low	Low
T2	Unit 1	Low	Low	Low
T3	Unit 1	Low	Low	Low
T4	Unit 1	Low	Low	Low
T5	Unit 1	Low	Low	Low
T6	Unit 1	Low	Low	Low
T7	Unit 1	Low	Low	Low
T8	Unit 1	Low	Low	Low
T9	Unit 1	Low	Low	Low
T10	Unit 1	Low	Low	Low
T11	Unit 1	Low	Low	Low
T12	Unit 1	Low	Low	Moderate (east) High (west)
T13	Unit 1	Low	Low	Low - Hamilton Highway Moderate - Calverts Road
T14	Unit 1	Low	Low	Low - Hamilton Highway Low - McLeans Rd, east side
T15	Unit 1	Low	Low	Low
T16	Unit 1	Low	Low	Low
T17	Unit 1	Low	Low	Low

All but two of the viewpoints are assessed as “low”. The higher sensitivity ratings of moderate and high are in areas where existing native trees will require removal. The rating in these areas is due to the noticeable and discernable changes in the landscape associated with the removal of these trees.

The proposed powerline infrastructure associated with the construction of the wind farm is not dissimilar to many instances of powerlines already found in the surrounding landscape. They are therefore not a new element in the landscape.

18.6.9***Assessment of Visual Impact of the Proposed Night Lighting***

Hazard identification lighting is not required for the proposed Stockyard Hill Wind Farm according to the *Review of Obstacle Lighting Requirements – A Risk Assessment, September 2009* prepared by The Ambidji Group Pty Ltd (refer to Section 14 of this report for a summary of this assessment). However, in the event that such lighting is a future requirement an assessment of the likely visual impact has been undertaken and is summarised below (refer to *Annex Z* for the full assessment).

Wind farms are generally located away from major population centres and in areas where there are few roads. The assessment of the viewshed of the Stockyard Hill Wind Farm has identified there is a low density of occupants within the surrounding area as well as the relatively low usage of the local road network. In essence this has highlighted the fact that the wind farm is located in an area with little night time lighting with few night time viewers.

However should the wind farm require lighting there would be a relatively small visual impact due to limited viewing opportunities. For example when people are at home at night and when inside lights are on, windows become mirrors, reflecting the interior of the house and not allowing views to the low level lights in the distance. Obviously when curtains or blinds are closed, there is also no visibility to the proposed lights in the surrounding area. Therefore, at night in most situations, a viewer needs to be outside to see the proposed hazard identification lights.

18.6.10***Cumulative Impact of Hazard Identification Lighting***

A cumulative impact can potentially occur for travellers on the Western Highway where views of the proposed Stockyard Hill Wind Farm and the existing Waubra Wind Farm may be possible.

There will be no cumulative impact for travellers along the Glenelg Highway where they may also be able to view both the proposed Stockyard Hill Wind Farm and the existing Challicum Hills Wind Farm as the wind turbines within the Challicum Hills Wind Farm are not lit.

However, even where the hazard identification lighting may be visible, it will only be one further element in a traveller's experience which obviously includes the frequent presence of rear tail lights, headlights and lights from nearby houses and farms. As such the cumulative visual impact for these road users will be minimal.

For these reasons there would be negligible cumulative impact from the proposed hazard identification lighting if they were installed both at the Stockyard Hill Wind Farm and other wind farms that may be approved in the vicinity, either around Ararat or around Ballarat.

18.7

MITIGATION AND MONITORING

Landscaping is a mitigation option for residential properties. From the immediate house surrounds planting may be designed to either screen the wind turbines from view, filter the views to the wind turbines through open canopy evergreen or deciduous planting.

Landscape mitigation is possible and desirable for houses located to the north of the wind farm. Vegetation on the southern boundaries of the northern houses will protect these properties from southern winds and will not affect solar access. Many properties already have substantial wind break planting along their southern boundaries.

However, it is recognised that the landholder may not wish to establish boundary planting, due to the decrease in viable farmland, or for aesthetic reasons.

The desirability of landscape mitigation measures for houses to the south is lower than for properties to the north. This is due to the potential for landscape mitigation to affect solar access to living areas or courtyards. Landscape mitigation measures should be determined on a case by case basis in consultation with landholders who seek to minimise adverse visual impacts.

Such a process has occurred in previous projects, where after approval of the wind farm, funding has been supplied by the proponent to support landscape mitigation treatments. For example, the Portland Wind Energy Project (Pacific Hydro) involved negotiation with affected landowners to mitigate the visual impacts of the proposed wind farm by landscaping on or adjacent to residences within 2 km of the proposed wind farm. This involved a site visit to affected residences and creation of a landscape concept to be implemented by the proponent.

Similarly, the Panel decision for the Bald Hills Wind Farm in Victoria also required the proponent (Wind Power Pty Ltd) to undertake "*specific off-site landscape program works to address residential amenity impacts...subject to agreement with the landowners*". A similar process could occur on affected residences within 3 km of the Stockyard Hill Wind Farm.

Figure 18.14 shows an example of landscape remediation for a dwelling. This example is based on the owner's desire that the views to the wind turbines should be screened or filtered.

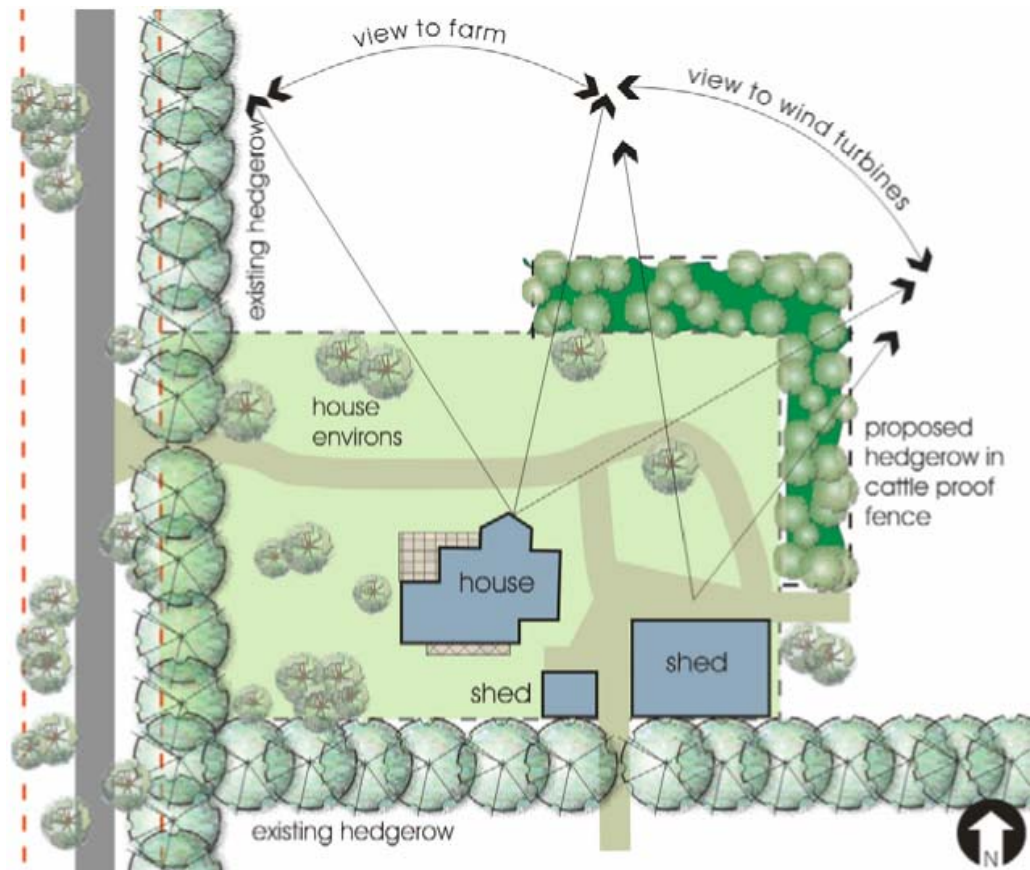


Figure 18.14 An example of landscape mitigation for a residential property

A site visit would determine the extent of planting between the proponent and the resident. Species selection would be determined in consultation with landholders using advice from the local Landcare group. The Bald Hills example used a mixture of Eucalyptus and Acacia species which was designed to filter the views to the north and to the wind farm.

It is recommended that a permit condition should ensure that landscape mitigation could be offered for residences within 3 km of the nearest wind turbine for a period of one year after construction, the implementation of such residential landscape treatments that was agreed between the land owner and the proponent, should be carried out by the land owner and then reimbursed. The reasons for such an approach is that it avoids the risk of the proponent's contractor bringing weed seeds or pathogens onto a working farm. Farmers also often have relationships with contractors and land care groups who have previously undertaken work on their property and the ongoing involvement of these groups would offer a better chance of success.

It should also be expected that the ongoing maintenance of the agreed landscape works would be undertaken by the landowner not the proponent.

Within *Annex Z - Landscape and Visual Assessment Report* further mitigation measures are also discussed for particular residential viewpoints, where such measures are applicable and appropriate.

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19 HEALTH AND SAFETY ISSUES

This Section describes health and safety issues attributed to wind farms; namely, fire, lightning, blade glint and public safety.

19.1.1 Fire

The potential for fire damage to wind turbines or fire caused by the operation of a wind farm is very low. The following factors reduce the potential for fire attributed to wind farm operations:

- The flammable components are located high above the ground;
- There is no vegetation around the base of the turbine;
- High-voltage connections are underground;
- Access tracks act as firebreaks and provide fire fighting access;
- Lightning protection factors are installed on every wind turbine; and
- Dedicated monitoring and control systems shut down the wind turbines when the threshold temperatures of critical components are reached.

In addition, the EMP will include provisions aimed at avoiding certain operations (such as the external use of welders, angle grinders) during high fire-risk periods.

The development of the wind farm will not significantly increase the potential for fire.

19.1.2 Lightning Strike

The turbines are installed with lightning transfer devices which transfer the high voltages and currents to the ground. Turbines are often struck by lightning; however, devices such as lightning rods installed in the blades ensure that the voltage and current is controlled safely. The transmission of lightning to the ground does not significantly increase the potential for fire.

19.1.3 Blade Glint

Blade glint occurs when sunrays are reflected from the turbine blades. The blades used on this project will be finished in a non-reflective material ensuring that any potential impact from blade glint will be minimised or avoided completely.

19.1.4 Public Safety

The wind farm will be located on private properties and the public has no right of access. Site security during construction will be managed by the clerk of works and signs at locked gates will direct visitors to the site office. Signage will advise that public access is prohibited.

Upon completion of construction, access gates will be controlled by the landowners and signage will advise that public access is prohibited and provide directions (in the form of a road map) to the interpretative facility.

The operation of the wind farm entails no significant risks to people visiting the site.

19.2

CONCLUSION

This Section demonstrates that the Stockyard Hill Wind Farm is not expected to adversely affect residents or the community in terms of safety issues. SHWF will utilise mitigation measures (where applicable) in consultation with landholders to minimise any adverse impacts, should they occur. The EMP will include provisions aimed at avoiding certain operations that may cause additional risk to the health and safety during construction and operation of the proposed wind farm.

20***CUMULATIVE IMPACTS***

This Section describes the potential cumulative impacts associated with the proposed Stockyard Hill Wind Farm and other proposed or approved wind farms within proximity and any mitigation measures required as a result of potential cumulative impacts.

20.1***METHODOLOGY***

An assessment of cumulative impact required a review of all known and seriously entertained proposals for wind energy facilities in proximity to the site and an assessment of the impacts of the presence of multiple wind farms in terms of:

- Visual impact;
- Traffic;
- Noise; and
- Aircraft Safety.

20.2***KEY FINDINGS AND POTENTIAL IMPACTS***

Table 20.1 summarises the location and viewshed of each of the existing and proposed wind farms within 70 km of the proposed Stockyard Hill Wind Farm. The distances given are from the centre of each wind farm. In reality wind turbines may be closer than the given distances.

Table 20.1 Existing and proposed wind farms

Wind Farm	Approximate distance to the boundary of the Stockyard Hill Wind Farm	Turbine Height	Viewshed	Status	Viewshed Overlap
Crowlands	~48 km NW	~125 m	15km	Application lodged	No
Ararat	~25 km NW	~135 m	17km	No Application lodged	No
Lexton	~29 km N	~125 m	15km	Approved	Yes
Waubra	~32 km NE	~121.5 m	15 km	Operating	No
Tuki	~63 km SW	~144m	17 km	No Application lodged	No
Lal Lal	~58 km NW	~125 m	15km	Approved	No
Mt Mercer	~54 km SE	~140 m	15km	Approved	No
Darlington	~52km SW	~130 m	15 km	Application lodged	No
Berrybank	~45 km S	~130 m	17 km	Application Lodged	No
Mortlake	~66km SW	~125 m	17 km	Application Lodged	No
Challicum Hills	~25 km NW	105 m	10km	Operating	Yes

The nearest existing and proposed wind farms to the proposed Stockyard Hill Wind Farm are the Challicum Hills, Waubra and Lexton wind farms. Ararat and Crowlands are the next closest and lie close together, although not close enough that they would read as a single wind farm in the landscape. Berrybank, Darlington and the Mortlake Wind Farms also lie to the south and south-west of the Stockyard Hill Wind Farm.

Other known wind farms around Ballarat are much further to the north-west and south-east of the Stockyard Hill Wind Farm and would not be part of the experience of a visitor to or a resident of Beaufort and the surrounding areas.

The greatest possibility of cumulative visual impact lies with visitors travelling through the road network to the north of the proposed Stockyard Hill Wind Farm on the Western Highway.

20.2.1 Cumulative Visual Impacts

Cumulative visual impact can occur either by:

- Sequential and simultaneous views to wind turbines from publicly accessible viewpoints or from private viewing locations; or
- Changes to a community's or visitor's perception of a region due to the presence of multiple wind farms in an area.

Sequential and simultaneous visual impact is greatest from the main roads and highways. The main highways within the viewshed of the Stockyard Hill Wind Farm are the Western Highway to the north and the Glenelg Highway to the south. Therefore, the cumulative impact both sequentially and simultaneously on highway users would be on users of these roads.

The preceding analysis of viewpoints along the Western Highway has shown that there are limited viewing locations from which the proposed Stockyard Hill Wind Farm will be visible. For viewers travelling west along the Western Highway, the Stockyard Hill Wind Farm is screened by an intervening forested ridge around the Trawalla State Forest. The first wind farm that would be visible for western bound travellers would be the Waubra Wind Farm and then after Stockyard Hill Wind Farm. Challicum Hills Wind Farm would be visible several kilometres further west. The Challicum Hills Wind Farm, which is located on an elevated ridge to the west of the Stockyard Hill Wind Farm is visible from the Western Highway near the locality of Buangor.

The viewsheds of the Challicum Hills Wind Farm and the Stockyard Hill Wind Farm do not overlap along the Western Highway and there are also limited locations when travelling west along the Western Highway that the Stockyard Hill Wind Farm will be visible. This is due to the intervening forested ridges located within the Trawalla State Forest south of Beaufort. Therefore, there will be no simultaneous cumulative visual impact and any cumulative visual impact would be minimal.

Travellers along the Glenelg Highway will be able to see the Stockyard Hill Wind Farm just after leaving Pittong and before Skipton when travelling west.

There are limited locations from which multiple wind farms could be visible on the local road network, which have relatively few users. The visual impact of sequential or simultaneous views from the local road network would be low to negligible as a result of the low user numbers and the infrequency of either simultaneous or sequential views.

Some individual dwellings or farms may be able to see more than one wind farm both sequentially or simultaneously. The cumulative impact on these residences may be higher, although this would obviously depend upon the extent to which vegetation could screen or filter views.

20.2.2

Change in Perception

The development of wind farms may lead to a change in people's perception of a region and will be evident as they travel through the road network. Alteration to the perception of a landscape will occur when a visitor is able to view two or more wind farms.

The question that must be answered when assessing cumulative visual impact and the effect this may have on their perception of an area is whether prior views of another wind farm would make these viewers more sensitive. To some extent that must be answered in the positive.

The Western Highway: The main east-west route through western Victoria is the Western Highway. The Western Highway is within the viewshed of the proposed Stockyard Hill Wind Farm, however, views are limited and there will be a limited change to the region's perceived character for users of this highway.

The Glenelg Highway: The Glenelg Highway lies to the south of the Stockyard Hill Wind Farm. The Glenelg Highway is also within the viewshed of the proposed wind farm and there are a greater number of viewing locations from which the Stockyard Hill Wind Farm will be visible. Oaklands Hill Wind Farm, which is approximately 70km to the west of Skipton is the only other known wind farm along on the Glenelg Highway, and to the west of Ballarat.

The nearest wind farm is the Challicum Hills Wind Farm that is a distant view from some locations within the viewshed of the Stockyard Hill Wind Farm. Therefore there will be little change in viewer's perception of the region as a result of cumulative impact.

The local road network: In some instances multiple wind farms will be visible from the local road network as it winds between Challicum Hills and the Stockyard Hill Wind Farms. For the users of these local roads there may be a degree of perception change. For those who find wind farms unattractive, this will be a negative change to their cognitive landscape. For those who find wind farms attractive, this will be a positive change to their cognitive landscape.

The *Table 20.2* below summarises the previous discussion and highlights the low level of cumulative visual impact that is expected as a result of the Stockyard Hill Wind Farm.

Table 20.2 *Summary of cumulative visual impact*

Impact	Location	Cumulative visual impact
Simultaneous views	<ul style="list-style-type: none"> • From Highways • From local roads • From residences 	<ul style="list-style-type: none"> • Low • Negligible • Moderate to low, depending upon screening
Sequential views	<ul style="list-style-type: none"> • From Highways • From local roads • From residence 	<ul style="list-style-type: none"> • Low • Negligible • Moderate to low, depending upon screening
Character change - regional	<ul style="list-style-type: none"> • From Highways • From local roads 	<ul style="list-style-type: none"> • Low • Negligible

20.2.3 *Cumulative Traffic Impacts*

The proposed wind farm is not expected to result in any significant cumulative impacts in terms of traffic during the operational phase.

The potential for cumulative traffic impacts results when one or more wind farm in the area are under construction at the same time (although it is noted that the major roads within the area, being the Western Highway to the north and the Glenelg Highway to the south, would have sufficient capacity to cater for one or more wind farms being constructed at the same time).

It is anticipated, that the Lexton Wind Farm will be operational by the commencement of the construction phase of the Stockyard Hill Wind Farm, which is planned to commence construction in late 2012.

The proposed Stockyard Hill Wind Farm will not use the same minor road network as the existing Waubra Wind Farm and the approved Lexton Wind Farm, hence it is not anticipated that the operational phases of these wind farms would generate enough traffic to cause an impact to the local road network.

20.2.4 *Cumulative Noise Impacts*

The location of the Stockyard Hill Wind Farm in relation to other wind farm facilities ensures the cumulative impacts associated with noise are not relevant. It is also expected that cumulative noise impacts associated with other uses (e.g. traffic) will have negligible impacts.

20.2.5 *Cumulative Aircraft Safety Impacts*

The construction and operation of the Stockyard Hill Wind Farm will not have any cumulative impacts in relation to aircraft safety as it is not intended that the proposed wind farm will require obstacle lighting. Aircraft Safety is addressed at *Section 14* of this report.

20.2.6 *Cumulative Landuse Impacts*

The construction and operation of the Stockyard Hill Wind Farm, in addition to other proposed wind farms in the region, will not have any cumulative impacts in relation to landuse on site or in the surrounding region as the predominant use of the wider region is agriculture which can still continue during the wind farm's operation.

20.3 *MITIGATION AND MONITORING*

In order to minimise any potential cumulative impacts to a level considered appropriate, SHWF will implement the following mitigation and monitoring measures.

20.3.1 *Cumulative Visual Impacts*

SHWF will continue to liaise with the owners of directly affected houses and discuss additional landscaping that may be required to reduce both the direct and potential cumulative impacts. Providing vegetative screening to relevant private properties forms an integral part of the overall wind farm works. Such landscaping will form part of a Landscape and Visual Screening Plan.

20.3.2 *Cumulative Traffic Impacts*

SHWF will develop a traffic management plan for the construction phase in conjunction with Pyrenees Shire Council and VicRoads having regard to the potential for other major development in the area, including if there is an overlap with other wind farm proposals.

20.3.3 *Cumulative Aircraft Safety Impacts*

SHWF will continue to liaise with CASA regarding whether there is a requirement to provide obstacle lighting at the Stockyard Hill Wind Farm.

21 **PLANNING ASSESSMENT**

This Section provides a policy assessment of the Stockyard Hill Wind Farm against the key issues identified in the legislative, policy and strategic context.

21.1 **METHODOLOGY**

This assessment utilises the findings of the previous sections of this report in relation to land capability, heritage, infrastructure, transport, aircraft safety, noise, landuse, socio economic, and landscape and visual impacts, to undertake an assessment of the Stockyard Hill Wind Farm against key Commonwealth, State and local policy directions.

21.2 **PLANNING ASSESSMENT**

A comprehensive summary of the planning assessment undertaken is provided within *Table 21.1*. A more detailed policy assessment is provided within *Annex G - Planning Assessment Report* prepared by ERM.

Table 21.1 Planning Policy Assessment

Topic/ Chapter	Legislation/ Policy	Summary of Legislation/Policy (Objectives)	Summary of Policy Assessment
FEDERAL AND STATE LEGISLATION			
Approvals	<i>Planning and Environment Act 1987</i>	Establishes a framework for planning the use, development and protection of land in Victoria.	The Proposal is consistent with the key objectives of the PE Act and will result in the orderly and sustainable development and use of land that will have minimal impact on natural resources and ecological processes. Given the location of the Site in the Pyrenees Shire, the Proposal has also been assessed against the requirements of the Pyrenees Planning Scheme.
	<i>Environment Effects Act 1978</i>	Provides for the assessment of projects that are capable of having a significant effect on the environment.	The Minister for Planning determined on the 29 th September 2008 that an EES is not required for the Proposal, providing particular environmental considerations are addressed. The Minister determined, on the 16 th September 2009, that these considerations have been 'satisfactorily met' (refer <i>Annex D- Ministers EES Decision</i>).
	<i>Environment Protection Act 1970 and Environment Protection Act (Amendment) 2006</i>	Details the responsibilities and function of the Environment Protection Authority (EPA). The Act requires that a Works Approval be obtained from the EPA to establish a scheduled premise.	A wind farm does not constitute a scheduled premise under the Environment Protection (Scheduled Premises and Exemptions) Regulations 2007. Accordingly, a Works Approval will not be required for the Proposal, however the relevant State Environmental Protection Policies will need to be addressed in the EMP and complied with during the construction phase of the project. The EPA will be consulted in the development of the EMP.
Flora and Fauna	<i>Flora and Fauna Guarantee Act 1988</i>	Ensures the protection of flora and fauna on crown land. A permit is required from DSE for activities on public land which might kill, injure or disturb protected native plants and animals.	The proposed wind farm will require the removal of native vegetation within road reserves, therefore a permit/licence will be required under the FFG Act. This will be applied for as part of a separate application.
	<i>Environment Protection and Biodiversity Act 1999</i>	Under the Act, actions that are likely to have a significant impact upon matters of national environmental significance require approval from the Environment Minister to undertake those actions.	An EPBC Referral was submitted to DEWHA on the 28th January 2009. On the 15 th July 2009 DEWHA determined that the proposed Stockyard Hill Wind Farm is a 'controlled action'. The proposed project will be assessed, for the purposes of the EPBC Act, under the processes accredited by the new bilateral agreement, under Section 45 of the Act, between the Commonwealth and State Governments whereby assessment powers are handed to the State Government.
Heritage	<i>Aboriginal Heritage Act 2006</i>	Provides for the protection of Aboriginal cultural heritage in Victoria.	The preliminary desk top cultural heritage assessment shows that there are two previously recorded areas of sensitivity within the activity area. A wind energy facility is a high impact activity (<i>Aboriginal Heritage Regulations 2007</i>) and given that areas of sensitivity have been identified within the site boundary, a mandatory Cultural Heritage Management Plan (CHMP) is required. The CHMP for the proposed Stockyard Hill Wind Farm was submitted to AAV on the 23 rd September 2009.

Topic/ Chapter	Legislation/ Policy	Summary of Legislation/Policy (Objectives)	Summary of Policy Assessment
	<i>Heritage Act 1995</i>	Establishes a legislative framework for the protection and conservation of places and objects of cultural heritage significance in Victoria. It also establishes the Heritage Council and the Victorian Heritage Register.	It is anticipated that the proposed wind farm will have no impact on areas of non-Aboriginal historical significance.
Catchment Protection	<i>Catchment and Land Protection Act 1994</i>	Gives effect to the Victorian Catchment Management Council and the regional Catchment Management Authorities and their policies and strategies.	The development and use of the Stockyard Hill Wind Farm is not expected to impact on the current land and water management regime. The construction and operation of the proposed wind farm will be completed in accordance with an EMP which will address management of land, water, weeds and pest animals. The Catchment Management Authority will be consulted as part of the development of the EMP. In addition, Works on Waterways Permits will be required for the construction of waterways crossings.
Renewable Energy	<i>Victorian Renewable Energy Act 2006</i>	Promotes the development of renewable energy generation.	Whilst the Act does not regulate the development of renewable energy projects; it has provided the stimulus for developments, such as the proposed Stockyard Hill Wind Farm.
PYRENEES PLANNING SCHEME			
STATE PLANNING POLICY FRAMEWORK			
Clause 11 – Introduction, Goals and Principles	<i>Clause 11.01 – Introduction</i>	Outlines the State Government’s objectives for planning for communities and promoting sustainable development.	This planning permit application is in accordance with the direction provided in this Clause in that an assessment which encompasses and integrates relevant environmental, social and economic factors has been undertaken.
	<i>Clause 11.02 – Goal</i>	Identifies the goals of the SPPF.	The proposal will result in an appropriate use and development that is consistent with the objectives of planning in Victoria.
Clause 11.03 – Principles of Land Use and Development	<i>Clause 11.03-2 Environment</i>	Identifies the importance of ecologically sustainable development and the role of international and national agreements in providing a broad framework for the development of strategies and policies at State level.	The ecological investigation undertaken by Brett Lane & Associates Pty Ltd has assessed the development of the Stockyard Hill Wind Farm in accordance with the FFG Act 1988 and EPBC Act 1999. Based on the findings of this investigation, the Proposal is not expected to have any significant impact on the ecological conditions of the Site.

Topic/ Chapter	Legislation/ Policy	Summary of Legislation/Policy (Objectives)	Summary of Policy Assessment
	<i>Clause 11.03-3 Management of Resources</i>	Identifies the need for planning to conserve and use wisely natural resources.	The Stockyard Hill Wind Farm will contribute to reducing Australia's reliance on fossil fuels and increase the production of renewable energy. Similarly, the design (e.g. height) and the micro-siting have responded to the findings of the various technical studies which have been undertaken to ensure the protection of the environmental quality of the area.
	<i>Clause 11.03-4 Infrastructure</i>	Identifies the need for planning to conserve and use wisely natural resources including energy, water, land, flora, fauna and minerals to ensure environmental quality is maintained and that development is sustainable in the long term.	Prior to the preparation of this planning permit application, SHWF completed a feasibility study to ensure that the proposed wind farm will be able to be connected to the National Electricity Grid and thus respond to the growing demand for renewable energy sources. This planning permit application has been completed in accordance with the Guidelines, ensuring relevant planning policies and strategic issues have been addressed.
	<i>Clause 11.03-5 Economic Well-Being</i>	Identifies the importance of economic well-being of communities and the State as a whole through encouraging and assisting economic growth and development.	The Stockyard Hill Wind Farm will contribute to the economic well being of the local community and the State throughout the construction and operation phase of the project.
Clause 15 - Environment	<i>Clause 15.01- Protection of Catchments, Waterways and Groundwater</i>	Seeks to ensure the protection and, where possible, restoration of catchments, waterways, water bodies, groundwater and the marine environment.	The potential impacts associated with the construction and operation of the wind farm on the water conditions of the proposed wind farm will be minimal. Construction and operational Environmental Management Plans will be developed to ensure that principles of this Clause are upheld.
	<i>15.04- Air Quality</i>	Assist the protection and improvement of air quality	Any air quality impacts associated with the construction phase of the proposed wind farm are expected to be minimal. Air quality considerations relating to the construction phase will be undertaken in accordance with an EMP.
	<i>Clause 15.05 - Noise Abatement</i>	Identifies the need for planning and responsible authorities to ensure that development is not prejudiced and community amenity is not reduced by noise emissions.	The objectives of this Clause are able to be met and the proposal is not expected to result in any significant loss of amenity to adjoining residences as a result of noise. The noise limits were exceeded at 25 of the 52 host landholder's residential properties under (NZS6808:1998). However 23 of these comply with the ETSU-R-97 recommended noise limit of 45dBA. The remaining three properties will be rented by SHWF for the life of the wind farm. These two properties (together with two properties with options to be purchased by SHWF) will be utilised for wind farm operational purposes.
	<i>Clause 15.07- Protection from wildfire</i>	Seeks to ensure that risk to life, property, the natural environment and community infrastructure from wildfire is minimised.	Consultation with the Country Fire Authority has been undertaken. Existing CFA point to point services will not be affected by the wind turbine locations. Existing CFA mobile radio services are adequate to provide its services to the SHWF and future CFA radio service installations are unlikely to be affected. These outcomes and further precautions will be included in the EMP for the proposed wind farm development.

Topic/ Chapter	Legislation/ Policy	Summary of Legislation/Policy (Objectives)	Summary of Policy Assessment
	<i>Clause 15.09- Conservation of Flora and Fauna</i>	To ensure the protection and conservation of biodiversity, including native vegetation retention and the provision of habitats for native plants and animals and the control of pest plants and animals.	The ecological investigations undertaken by Brett Lane & Associates Pty Ltd demonstrate that the proposal is able to assist in the achievement of this Clause.
	<i>Clause 15.11- Heritage</i>	The objective of this Clause is to assist the conservation of places that have natural, environmental, aesthetic, historic, cultural, scientific or social significance or other special value important for scientific and research purposes.	The preliminary desktop cultural heritage studies undertaken thus far have identified that a CHMP will be required for the proposed development site. A CHMP has been prepared in accordance with the provisions of the <i>Aboriginal Heritage Act 2006</i> , the recommendations of which will mitigate any impacts to significant cultural heritage identified. The CHMP for the proposed Stockyard Hill Wind Farm was submitted to AAV on the 23 rd September 2009.
	<i>Clause 15.12- Energy Efficiency</i>	The objective of this Clause is to encourage development that uses energy efficiently and minimises greenhouse gas emissions.	The proposed wind farm will offset the use of other, more intensive greenhouse producing, electricity generators. The proposed wind farm will generate approximately 1819 Gwh of electricity per year and offset approximately 1,890,969 tonnes per year of CO ₂ (based on a long term average forecast).
	<i>Clause 15.14- Renewable Energy</i>	To promote the provision of renewable energy, including wind energy facilities. Consideration must be given to the 'Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria, 2009' (the Guidelines).	The proposal is consistent with this Clause. It is predicted that this project will generate approximately 1819 Gwh of electricity per year (based on a long term average forecast) of renewable energy for use by Australian consumers. The proposal will result in a carefully sited wind farm, in an appropriate location, that is expected to have significant environmental and economic benefits both at a local level and to the broader community through the provision of additional renewable energy.
Clause 17- Economic Development	<i>Clause 17.04 - Tourism</i>	This Clause identifies the importance of tourism and the need for responsible authorities to encourage the development of well designed and sited tourist facilities.	The proposed wind farm is not anticipated to have a negative impact on tourism within the surrounding area. On the contrary, it is anticipated that it will encourage visitors to the area.
	<i>Clause 17.05 - Agriculture</i>	This Clause seeks to ensure that the State's agricultural base is protected.	The development of the proposal will provide host landholders with an additional income source whilst allowing agriculture on both the site and surrounding properties to continue with minimal impact. There is also the potential for income generated from the wind farm to be reinvested by landholders into their agricultural enterprises. Accordingly the proposal is considered to be entirely consistent with the policy direction of this Clause.

Topic/ Chapter	Legislation/ Policy	Summary of Legislation/Policy (Objectives)	Summary of Policy Assessment
Clause 18 – Infrastructure	<i>Clause 18.01 Declared Highways, Railways and Tramways</i>	The objective of this Clause is to integrate land use and transport planning around existing and planned declared highways, railways, principal bus routes and tram lines.	The proposed wind farm is not expected to create any adverse traffic impacts in the locality either during construction or operation and thus is considered to be consistent with the key objective of this Clause.
	<i>Clause 18.04 – Airfields</i>	Seeks to restrict incompatible land use and development in the vicinity of airfields.	The proposed wind farm, which does not propose obstacle lighting, is not anticipated to have an impact on aircraft safety, including protected airspace, for several reasons: <ul style="list-style-type: none"> • The proposed site is located 30km from any designated aerodromes; • The height of the turbines are well under the minimum height of Visual Flight Rules; • The site is of all obstacle limitation surfaces; and • The site is located outside navigation air and air traffic control clearance zones. Several lighting options are available should obstacle lighting be deemed necessary for Stockyard Hill Wind Farm.
	<i>Clause 18.13 – Telecommunications</i>	To recognise the importance of telecommunications to all aspects of modern life and the essential and beneficial contribution of modern telecommunications facilities to local communities and the State and national economy.	In general, VHF and UHF band radio signals and digital voice based technologies will be unaffected by the Proposal. There are four point to point links registered within 50 km of the Stockyard Hill Wind Farm, however interference of these radio systems can be avoided through the use of adequate clearances. Methods of mitigation and monitoring of clearances, to assure interference is avoided, is detailed in the <i>Investigation of Possible Impacts (Broadcasting & radio communications)</i> (Annex T). Accordingly it is considered that the proposed wind farm is consistent with the key directions of this Clause.
Clause 19 – Particular Uses and Development	<i>Clause 19.03 – Design and Built Form</i>	This Clause identifies the need for an appropriate site analysis and design response to be undertaken for development proposals and for proposals to take into consideration matters such as landmarks, views and vistas to be protected.	The Landscape and Visual Impact Assessment prepared by <i>ERM</i> identifies that the landscape surrounding the site is considered to have a low sensitivity and is capable of visually absorbing the wind turbines and limiting their impacts. Therefore, the site is considered a suitable landscape for the construction of a wind farm.

Topic/ Chapter	Legislation/ Policy	Summary of Legislation/Policy (Objectives)	Summary of Policy Assessment
LOCAL PLANNING POLICY FRAMEWORK			
Clause 21 Municipal Strategic Statement	<i>Clause 21.03- Key Issues</i>	This Clause identifies factors which are of importance to the Shire's future land use and development.	The Proposal responds to the MSS's Vision by facilitating the continuation of agricultural activity, whilst protecting the qualities of rural areas by preserving the ecological and historical environment.
	<i>Clause 21.04- The Shire's Vision</i>	This Clause identifies the overall strategic planning directions which the Strategic Framework Plan adopted for the Shire sets out.	The proposed wind farm will provide an additional renewable energy source for the State, with minimal environmental impacts, ensuring that the balance between development and protection of the natural environment is maintained. It therefore will not compromise the agricultural integrity of the surrounding area.
	<i>Clause 21.05 Objectives and Strategies</i>	This Clause sets out the planning objectives, strategies and the means of implementing these strategies in response to the key issues identified in Clause 21.03. The Clause contains several sub-Clauses of relevance including the following: <i>21.05-1.1 General Farming areas;</i> <i>21.05-1.2 Environmentally Sensitive Rural Areas;</i> <i>21.05-1.6 Waterways and Water Resources;</i> <i>21.05-1.7 Areas Potentially Subject to Flood Inundation; and</i> <i>21.05-2 Townships and Small Settlements- Beaufort.</i>	The relevant sections of these Clauses are discussed in greater detail within this table.
	<i>21.05-1.1 General Farming Areas</i>	This Clause aims to promote the effective management of rural land by encouraging sustainable farm management practices and land use activities, encouraging measures to reduce salinity and land degradation, to protect significant habitats and remnant vegetation and to restrict subdivision of high quality agricultural land.	The proposed wind farm will support continued agricultural use, promote the management of rural land through retaining block sizes and current land uses and support agricultural diversity. This will be achieved through the micro-siting of turbines.

Topic/ Chapter	Legislation/ Policy	Summary of Legislation/Policy (Objectives)	Summary of Policy Assessment
	<i>21.05-1.2 Environmentally Sensitive Rural Areas</i>	This Clause identifies the need to protect geologically unstable land or land subject to severe land management constraints.	Impacts associated with the construction and operation of the proposed wind farm on surface and ground water, water bodies and water ways, native vegetation and geologically unstable areas are expected to be minimal due to the small development footprint of the proposed wind turbines and access tracks, and the relatively shallow depth of the foundations. The development of a site EMP that will be implemented for management of construction activities will ensure that the environment is protected during this phase.
	<i>21.05-1.6 Waterways and Water Resources</i>	This Clause seeks to protect the rivers and streams and designated water supply areas in the Shire that are relied upon for urban water supply and/or agriculture.	The potential impacts associated with the construction and operation of the proposed wind farm on the water conditions of the proposed site will be minimal. This is due to the avoidance of waterways in the layout design, the small development footprint of the proposed wind turbines and access tracks, the relatively shallow depth of the foundations and the continuation of current land practises.
	<i>21.05-1.7 Areas Potentially Subject to Flood Inundation</i>	This Clause endeavours to help control potentially flood-prone areas.	Due to the type of development a wind farm consists of and the small development footprint of the proposed wind turbines and access tracks flooding and inundation is not anticipated to be an issue. The development of a site EMP that will be implemented for management of construction activities will ensure and protect the environment and development in relation to the objectives of this Clause.
	<i>21.05-2 Townships and Small Settlements- Beaufort</i>	This Clause seeks to maintain the town of Beaufort's existing function as the Shire's principal town and to develop the town's role as a highway service centre	The proposed Stockyard Wind Farm upholds the objectives of this Clause as regional, state and national economic benefits are expected during the construction and operational phases.
Clause 22 Local Planning Policies	<i>Clause 22.02- Agricultural Policies</i>	This Clause seeks to encourage land use and development which is environmentally and ecologically sustainable, diversification of the agricultural base, sustainable resource management and the protection of agricultural land within the Shire; reduce problems or risks of salinity and land degradation, protect significant flora and fauna habitats and remnant native vegetation, discourage rural subdivision where this is prejudicial to effective and sustainable agricultural use and restrict the subdivision of high quality agricultural land.	The proposed wind farm is a complementary landuse to the current agricultural use occurring on the majority of host landholders. It will provide host landholders with an additional income source whilst allowing agricultural production to continue with minimal impact. There is also the potential for income generated from the wind farm to be reinvested by landholders into the agricultural enterprises. The proposed wind farm will also have no impact on the continued use of neighbouring properties for agricultural use. Additionally the construction of improved access tracks may improve the agricultural efficiency of the sites.

Topic/ Chapter	Legislation/ Policy	Summary of Legislation/Policy (Objectives)	Summary of Policy Assessment
	<i>Clause 22.03- Environmental Policies</i>	This Clause seeks to minimise adverse environmental impacts to the Shire.	<p>The Landscape and Visual Assessment (ERM, 2009) concludes that scenic landscapes within the vicinity of the site will be retained with minimal adverse impacts.</p> <p>Investigations and targeted surveys undertaken to assess the impact on the flora and fauna, within the site, and in particular the Brolga population within the sites surrounds, identified that the development of the proposed wind farm will have minimal impacts and will be mitigated within the EMP, Native Vegetation Management Plan and Fauna Management Plan to be prepared for the proposed development.</p> <p>The proposed wind farm is not anticipated to affect the water catchment area due to the small development footprint of the proposed wind turbines and access tracks, and the shallow depth of the foundations.</p> <p>Construction and Operational Environmental Management Plans will be developed to ensure that the proposed wind farm development proceeds, as expected, in an environmentally acceptable manner.</p>
	<i>Clause 22.05- Employment Policies</i>	This Clause seeks to facilitate employment opportunities within the Shire, to encourage diversification of the agricultural base, to encourage tourism opportunities and to encourage the development of new industry.	<p>It is considered that the proposed wind farm will contribute to the economic well being of the local community and the State during the construction and operation phase of the project through creating temporary and permanent employment opportunities both directly and indirectly.</p> <p>Further, the development of the proposed wind farm will result in an additional income source for host landholders whilst allowing agricultural production to continue with minimal impact. This is clearly consistent with the Shire's direction of value adding to local operations and encouraging innovative farming practices, whilst maintaining the agriculture as the key component of the local economy. Farming will be able to continue around the wind farm infrastructure.</p>
Clause 22.06- Specific Purpose Policies	<i>22.06-01 Native Vegetation Protection</i>	This Clause seeks to conserve and enhance existing vegetation throughout the Shire wherever practicable; and to protect significant and sensitive areas including wetlands from the negative effects of vegetation clearance and modification.	<p>The proposed wind farm is appropriate in the context of this Policy as it will not have any significant impacts on native flora and fauna. The loss of native vegetation has been minimised where possible.</p> <p>Investigations and targeted surveys undertaken to assess the impact on the flora and fauna, within the site, and in particular the Brolga population within the sites surrounds, identified that the development of the proposed wind farm will have minimal impacts and will be mitigated within the EMP, Native Vegetation Management Plan and Fauna Management Plan to be prepared for the proposed development.</p>

Topic/ Chapter	Legislation/ Policy	Summary of Legislation/Policy (Objectives)	Summary of Policy Assessment
	<i>22.06-03 Wildfire Land Use Safety Policies</i>	The objective of this Clause is to reduce or minimise the fire risk in the Shire by appropriate design and development standards on use and development of land including subdivision.	The potential fire risk to turbines or to the local area is considered very low. Consultation with the Country Fire Authority has been undertaken. Existing CFA point to point services will not be affected by the wind turbine locations, existing CFA mobile radio services are adequate to provide its services to the SHWF and future CFA radio service installations are unlikely to be affected. These outcomes and further precautions will be included in the EMP for the proposed wind farm development (<i>CFA, 2008</i>).
	<i>22.06-05 Heritage</i>	There are a substantial number of heritage places both in urban and rural areas of the Shire that have been identified in Pyrenees Shire Heritage Precinct Study as being of either proven or potential local heritage significance, this Clause seeks to protect these areas.	The preliminary desktop cultural heritage studies undertaken thus far have identified that a CHMP will be required for the proposed development site. A CHMP has been prepared in accordance with the provisions of the <i>Aboriginal Heritage Act 2006</i> , the recommendations of which will mitigate any impacts to significant cultural heritage identified. The CHMP for the proposed Stockyard Hill Wind Farm was submitted to AAV on the 23 rd September 2009.
ZONE AND OVERLAY CONTROLS			
	<i>Zoning</i>	The Stockyard Hill Wind Farm is predominately located within the Farming Zone (FZ). Some roads traversing the site are located in a Road Zone Category 1 (RDZ1)	A permit is required for the use of the land for a Wind Energy Facility (refer Clause 35.07-1 of the Planning Scheme) and its ancillary infrastructure (refer Clause 35.07-4). In accordance with the RDZ1, a permit is required to alter access to various roads. This will be required in some instances to provide access to the site, including access to Skipton and Geelong Roads.
	<i>Overlays</i>	The proposed site is located within an Environmental Significance Overlay – Schedule 1 (ESO1), Wildfire Management Overlay (WMO) and a Heritage Overlays (HO32, HO33 and HO37).	The Proposal will comply with the key directions of the overlays affecting the Site as the Proposal seeks to protect and enhance the rural quality of the environment, minimise any impacts on water quality and ensure the protection of heritage features. A planning permit will be required for this proposal under the ESO1 however it is not anticipated that a permit will be required pursuant to the WMO or the HO's as the wind farm is not anticipated to significantly impact these places of heritage significance and wildfire management is addressed in the EMP for the wind farm proposal.
PARTICULAR PROVISIONS			
	<i>Clause 52.05 – Advertising Signs</i>	The FZ is a Category 4 area which has the maximum limitations in relation to advertising signs. In this category a business identification sign is a permissible use however it must not exceed 3m ² in size.	Business identification signs will be designed to be in compliance with the provisions of this Clause.

Topic/ Chapter	Legislation/ Policy	Summary of Legislation/Policy (Objectives)	Summary of Policy Assessment
	<i>Clause 52.06 – Car Parking</i>	The purpose of this Clause is to ensure that development proposals provide adequate car parking facilities for different uses.	Within this Clause there is no specific car parking requirements relating to wind energy facilities. There will be designated car parking spaces proposed as part of the proposed wind farm maintenance area.
	<i>Clause 52.17 – Native Vegetation</i>	This Clause seeks to protect and conserve native vegetation to reduce the impact of land and water degradation and provide habitat for plants and animals. Under this Clause a permit is required to remove, destroy or lop native vegetation under this Clause (exemptions are listed under Clause 52.17-6).	The proposed wind farm is appropriate in the context of this Policy and will not have any significant impacts on native flora and fauna as discussed previously. A permit will be sought in accordance with the objectives of this Clause. The proposal has also been designed to meet the requirements of <i>Victoria's Native Vegetation Management- A Framework for Action</i> , particularly in terms of addressing the removal of vegetation criteria of 'avoid, minimise and offset'.
	<i>Clause 52.32 – Wind Energy Facility</i>	This Clause facilitates the establishment and expansion of wind energy facilities, in appropriate locations, with minimal impact on the amenity of the area. This Clause outlines the information requirements for any application for a wind energy facility.	For reasons investigated throughout the report, the proposed wind farm will have minimal impact on the amenity of the area. It is considered that this assessment, along with the technical studies undertaken as part of the permit application, fulfil the requirements for information stipulated in this Clause.
	<i>Clause 52.34 – Bicycle Facilities</i>	The purpose of this Clause is to encourage cycling as a mode of transport and provide secure, accessible and convenient bicycle parking spaces and associated shower and change facilities.	There will be designated bicycle parking spaces provided in the maintenance facility design for the wind farm. Within this Clause there are no specific bicycle space requirements relating to wind farms.
OTHER RELEVANT DOCUMENTS			
	<i>Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (2009)</i>	These Guidelines were released by the Victorian Government in 2009 to assist in the development and assessment of applications for wind energy facilities. They are an Incorporated document in the Scheme.	This development application has been prepared in accordance with the Guidelines, ensuring planning policies and strategic issues have been identified and addressed appropriately. Figure 5.1 of this report demonstrates how the proposal responds to the application requirements set out in the Guidelines.

Topic/ Chapter	Legislation/ Policy	Summary of Legislation/Policy (Objectives)	Summary of Policy Assessment
	<i>Victoria's Native Vegetation Management – A Framework For Action (2002)</i>	<p>As part of any proposed development, the proponent is required to take into account the principles of <i>Victoria's Native Vegetation Management – A Framework for Action (the Framework)</i>. The Framework is an Incorporated document in the Scheme.</p> <p>The aim of the Framework is to achieve a Net Gain in the quality and quantity of indigenous vegetation across the Victorian landscape (DNRE 2002).</p>	<p>A flora and fauna assessment has been undertaken as part of the assessment process for this proposed wind farm.</p> <p>The design of the proposed layout has minimised native vegetation removal where possible with micro-siting of turbines within the proposed site. Vegetation to be removed will be appropriately offset, consistent with the requirements of the Framework. Therefore, the proposed wind farm is fully in compliance with the relevant steps of the Framework (i.e. “minimise”).</p>
	<i>Glenelg-Hopkins Regional Catchment Strategy 2003-2007</i>	<p>The Glenelg-Hopkins Regional Catchment Strategy for 2003-2007 provides long-term directions such as goals, targets etc. for managing the future of land, water resources, biodiversity and seascape of the catchment. It also provides a framework for investment decisions to ensure improved natural resource outcomes are achieved.</p>	<p>It is considered that the proposed wind farm is in compliance with the long term directions of the Glenelg-Hopkins Catchment Strategy for 2003-2007, as its potential impact on water catchment areas will be minimal.</p>
	<i>Victorian Renewable Energy Strategy</i>	<p>The Victorian Renewable Energy Strategy will build upon existing measures, including the wind energy support package, to achieve Victoria's renewable energy targets (i.e. 10% of Victoria's electricity consumption by 2016).</p>	<p>The <i>Victorian Renewable Energy Strategy 2002</i> is upheld by the Stockyard Hill Wind Farm proposal as the development contributes to achieving Victoria's targets for the production of renewable energy towards 2016.</p>

Topic/ Chapter	Legislation/ Policy	Summary of Legislation/Policy (Objectives)	Summary of Policy Assessment
	<i>Victorian Greenhouse Strategy Action Plan</i>	<p>The Victorian Greenhouse Strategy recognises the importance of 'Positioning Victoria's economy for a low carbon future'. Accordingly, a number of actions have been established, including those intended for supporting renewable energy and supporting cleaner energy technologies.</p> <p>While the focus of the Victorian Greenhouse Strategy is on government investment into projects and policies, it demonstrates the State's commitment to the establishment and use of renewable energy resources and its support for the development of renewable energy.</p>	This strategy supports the proposed wind farm intentions as the plan gives confirmation of the importance of developing renewable energy sources, such as wind farms.

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22 ENVIRONMENTAL MANAGEMENT PLAN

22.1 BACKGROUND

This Section describes the framework for the preparation of an Environmental Management Plan (EMP) for Stockyard Hill Wind Farm, including management tools, protection measures and monitoring regime for the design, construction and operation phases.

22.1.1 *Policy and Planning Guidelines for the Development of Wind Energy Facilities in Victoria*

The *Wind Energy Guidelines (Annex B)* indicate that an EMP may be required. An EMP details how the site will be managed through construction and sets out future operational and maintenance requirements:

- *Principles of environmental management;*
- *Environmental mitigation measures;*
- *Standards to be met;*
- *Monitoring requirements;*
- *Decommissioning and rehabilitation requirements; and*
- *Post construction adaptive management measures where monitoring shows significant impacts of FFG and EPBC Act listed species.*

An EMP for the construction and operation of the Stockyard Hill Wind Farm will be developed. The following outlines the framework of the EMP.

22.1.2

Environmental Management Framework

SHWF maintains a strong policy on the environment. SHWF's environmental policy is stated below.

SHWF aims to provide leadership in managing the impacts of our activities and will continually strive to set an example of best practice environmental management. SHWF recognises the value of the environment to the community and future generations.

SHWF is continually committed to:-

- *Identifying all environmental aspects and impacts of our operations through regular reviewing and internal auditing;*
- *Continual improvement in environmental management practices and performance;*
- *Communicating openly and transparently with appropriate parties on environmental matters;*
- *Managing land under our care with sensitivity, having due regard for local environment and cultural sensitivities;*
- *The use of the latest or most appropriate technology in order to maximise power output whilst having due consideration for the environmental impact of our activities, products and services;*
- *Complying with all environmental legislation and other requirements which relate to its environmental aspects, including the Clean Energy Council Best Practice Guidelines;*
- *Educating employees and contractors (any persons performing a task for the organisation or on it's behalf) to conduct their activities in an environmentally responsible manner;*
- *Ensuring this policy is readily available to the public, maintained and communicated to all persons working for or on behalf of this organisation, and is periodically reviewed;*
- *Continuing to refine and continually improve our Environmental Policy and environmental objectives and targets.*

The SHWF Environmental Management System provides the framework for developing, implementing, monitoring and reviewing environmental objectives, actions and targets as set out in our environmental plans and programs. These objectives and targets drive our management programs and focus our commitment to continual improvement in environmental performance, as measured by our internal audits along with our environmental objectives and targets.

Source: www.wind-power.com.au/AboutUs/EnvironmentPolicy%20.asp

To give effect to the above stated environmental policy and to ensure that the Stockyard Hill Wind Farm accords with regulatory requirements, the following objectives have been established:

- To contribute to State and Federal government policy objectives to maintain a secure, efficient and affordable supply of energy in Victoria while reducing the intensity of greenhouse gas emissions from the energy sector;
- To minimise the adverse impacts of the facility on visual landscape values;

- To ensure that the construction and operation of the facility does not unduly affect the amenity of nearby dwellings, or existing land uses on and around the site;
- To avoid or minimise impacts on species and communities listed under the Flora and Fauna Guarantee Act 1988, to avoid or minimise impacts on other indigenous species and communities, and to comply with net gain requirements for biodiversity outcomes;
- To avoid or minimise impacts on places with Aboriginal and non-Aboriginal cultural heritage values; and
- To minimise any physical impacts from the construction and operation of the facility, such as erosion, sedimentation, road damage and traffic hazards.

It is recognised that without environmental management measures being incorporated into the design, development and operation of Stockyard Hill Wind Farm, the potential exists for adverse environmental impacts to occur. Accordingly and in addition to its corporate EMS and the conditions of regulatory approvals, SHWF will develop an EMP for the project.

22.2 ENVIRONMENTAL MANAGEMENT PLAN

The EMP will be a procedural document which outlines the environmental goals of the project, the safeguard measures to be implemented, the timing of the implementation in relation to the progress of the project, responsibilities for implementation and management, and a review process.

The EMP will be prepared to address the four key stages of the project:

- Wind farm design;
- Site preparation and construction;
- Operation; and
- Decommissioning.

Further, a standalone Construction Environmental Management Plan (CEMP) will be developed for the second stage and form an integral part of the EMP. The preparation of a stand alone CEMP is proposed to allow the construction contractor to tailor construction procedures and environmental management. The preparation of the CEMP will be a condition of a contractual agreement between the proponent and the nominated contractor.

The EMP will be prepared following assessment and approval of the proposed Stockyard Hill Wind Farm, and will serve as working documents to be used throughout the detailed design, construction and operation phases.

General details regarding EMP objectives, contents, structure, reporting, monitoring and review are provided in the following sections.

22.2.1

EMP Objectives

The key objectives of the EMP will include:

- Ensure that works are carried out in accordance with appropriate environmental statutory requirements and relevant non-statutory policy as detailed throughout this report;
- Ensure that works are carried out in accordance with the goals and requirements presented in this report;
- Ensure that works are carried out in such a way as to minimise the likelihood of environmental degradation occurring;
- Ensure that works are carried out in such a way as to manage the impact of the works on neighbouring properties (e.g. noise, traffic);
- Ensure that all employees engaged in the works comply with the terms and conditions of the EMP;
- Provide clear procedures for management of environmental impact including corrective actions; and
- Identify management responsibilities and reporting requirements to demonstrate compliance with the EMP.

22.2.2

EMP Contents and Structure

The SHWF EMP will comprise both generic components and issue-specific management components.

The generic procedural components will comprise:

- Overall policy and management approach;
- Environmental objectives and strategies;
- Responsible personnel and defined responsibilities;
- Environmental training;
- Monitoring and auditing requirements; and
- Reporting procedures.

The issue-specific management components will relate to:

- Protect water quality, particularly near creek crossings;
- Protect flora and fauna;
- Protect cultural heritage;
- Manage traffic and transport;

- Protect infrastructure;
- Minimise electromagnetic interference;
- Control air emissions, including greenhouse emission and dust;
- Control noise;
- Minimise the potential for shadow flicker;
- Minimise impacts to nearby dwellings and existing landuses;
- Manage any risks to the safety of the local community;
- Manage any risks to aircraft safety;
- Minimise socio-economic impacts;
- Minimise impacts on visual amenity and landscape;
- Minimise impacts on agricultural production; and
- Rehabilitate disturbed land.

The EMP will include:

- Establishment of environmental goals and objectives;
- Conditions of project approval;
- List of actions, timing and responsibilities;
- Supervision protocols fully identifying areas of responsibility for environmental management of the project;
- Statutory requirements;
- A structured reporting system detailing all relevant matters on a regular basis;
- Procedures and forms for documentation and reporting of issues;
- Standard specifications incorporating environmental safeguards;
- Training of personnel in environmental awareness and Best Practice Environmental Management Systems;
- Guidelines for emergencies, contact names and corrective actions for non-conformance and notifications to appropriate authorities and affected parties;
- Calibration and measuring of testing equipment;
- Process surveillance and auditing procedures;
- Review procedures and protocols for modification of the EMP;
- Complaint handling procedure;

- Site management and control procedures;
- Monitoring procedures; and
- Quality assurance procedures.

As a guide, the EMP will be structured as detailed in *Table 22.1*

Table 22.1 *EMP Structure*

Item	Description
Introduction and purpose	Details the objectives of the Plan. Chain of Command structure (including relevant environmental delegate). Responsibility and authority for implementation.
Statutory requirements and integration with other plans	Details the statutory requirements, if any, and other obligations required to be met as part of the licensing approval.
Environmental management procedures	Describes the operational procedures for preventing environmental impacts, nominates responsibility to individuals, establishes reporting protocols and procedures, nominates corrective and preventative action procedures.
Monitoring requirements	Details the monitoring program for checking environmental performance of the project, nominates responsibilities to individuals, establishes reporting protocols and procedures, nominates corrective and preventative action procedures.
Emergency response	Contains emergency response plans.

22.2.3 *EMP Reporting and Review*

Environmental performance reporting is an integral part of ISO 14001 and further provides management with the information to make meaningful and positive changes. It is also to ensure that relevant authorities are appropriately informed of how the proponent is managing its environmental performance, periodic reports will be prepared by the contractor during the construction phase and the proponent during the operations phase, in accordance with each party's Quality System.

If the reports identify any shortcomings in the way the construction activities or the operations are being conducted or in the performance of environmental control structures, the necessary changes would be made and the CEMP and the Operational Environmental Management Plan (OEMP), which will be prepared, would be updated to reflect these changes.

EMPs are not static documents. They must be responsive to change, such as changes in legislation, changes in environmental conditions and changes in project detail. Accordingly, the EMP will be reviewed by the proponent every year.

22.2.4 *EMP Responsibilities*

The EMP will be developed by SHWF with the SHWF manager having the ultimate responsibility for the implementation of the EMP with the construction Project Manager responsible for the development and implementation of the CEMP. Notwithstanding this all personnel involved in the design, construction, operation and decommissioning of the Stockyard Hill Wind Farm will be required to comply with the EMP.

22.2.5 *Environmental Safeguards*

A number of safeguards will be incorporated into the EMP to prevent or minimise potential environmental impacts that may be caused by the Stockyard Hill Wind Farm development. These have been detailed in the previous sections of the report and would be implemented throughout the duration of the different stages of the lifecycle of the project.

Table 22.2 summarises the main safeguarding measures. It is a summary of the scope of the EMP.

Table 22.2 *Proposed Wind Farm Development: - Summary of Mitigation and Measurement Methods*

<i>Element</i>	<i>Objective</i>	<i>Scope</i>
Land Capability	To minimise soil erosion and any changes in water quality or hydrology, particularly near wetlands.	The EMP will incorporate best practice measures to minimise soil disturbance, compaction, soil erosion, and the potential for contamination. It shall also incorporate drainage controls, access controls, rehabilitation strategies, monitoring programs and environmental training programs designed to protect soil and water. In doing so it will have regard to applicable EPA documents.
Ecology	To minimise the clearance of native vegetation and impacts on native flora and fauna including avifauna.	The EMP will incorporate a Conservation Management Plan. This will include criteria that identifies the need to fence off areas along with the required revegetation works, weed management works and any offset works. In doing so it will reflect the three step approach to Net Gain (DNRE 2002) for the proposed removal of native vegetation: <ul style="list-style-type: none"> • Avoid adverse impacts, particularly associated with vegetation clearance. This has been achieved by carrying out an investigation of the biological features of the site and relocating infrastructure away from known biological features/values (as far as practical). • Minimise impacts through appropriate consideration in planning processes and expert input into project design or management. The impacts of the development have been minimised as far as practical through the considerate design of the Wind Farm. • Identify appropriate offset options.

<i>Element</i>	<i>Objective</i>	<i>Scope</i>
Heritage	To minimise impacts on Aboriginal archaeology sites, heritage sites and cultural values.	The EMP will incorporate: <ul style="list-style-type: none"> the outcomes of the CHMP. This will feature the protocols for parties to follow during the archaeological testing and subsequent construction phases of the development; and the need for archaeological monitoring in the vicinity of the substation prior to the construction phase.
Transport	To minimise inconvenience to existing road users and any damage to public roads.	The EMP will incorporate a Traffic Management Plan that details access routes to the sites, intersection upgrades, transport controls and public notification requirements when large numbers of heavy vehicles will be accessing the site.
Infrastructure	To minimise any disturbance to public infrastructure, including electricity, gas, water, sewer and telecommunication services.	The EMP will require SHWF to maintain ongoing liaison with key service providers (electricity, gas, water and telecommunications) to ensure that its construction activities do not impact on existing infrastructure service in the region.
EMI	To minimise electrical interference to television and communication services, including emergency services.	The EMP will require the proponent to: <ul style="list-style-type: none"> adhere to clearance requirements for point to point links; and consult with the CFA. Further any interference of television can be avoided with improvements to the receiving antenna system or alternatively through the use of a set top box.
Air and Greenhouse	To minimise greenhouse emission and the discharge of air borne pollutants, including dust, from the site.	The EMP will incorporate measure to control greenhouse emissions, dust and wastes.
Noise	To minimise noise and vibration impacts to nearby residents.	The EMP will include restrictions on blasting, the use of heavy equipment and other noisy activities.
Amenity	To minimise off-site amenity impacts that could be caused by blade glint and shadow flicker.	The EMP will require SHWF to consult with landholders post-commissioning to assess possible concerns about actual shadow flicker effects.
Land use	To minimise both on-site and off-site land use impacts particularly the ongoing use of the site and its environs for grazing purposes.	The EMP will require SHWF to consult with landholders to ensure that the construction and operation of the wind farm is undertaken in a manner which causes minimal disturbance to the ongoing use of the area for grazing purposes, subject to the terms of the licence agreements.
Safety	To ensure that the SHWF is developed and operates in a manner that is safe to persons on-site and off-site.	The EMP will require the ongoing monitoring of the wind farm's operations to detect any abnormal operations that may present a hazard.
Aircraft	To ensure that the SHWF does not prejudice aircraft safety.	The EMP will require details of the project to be provided to CASA, prior to completion of construction, for inclusion on navigation charts.

<i>Element</i>	<i>Objective</i>	<i>Scope</i>
Socio-economic	To minimise the social, economic and tourism impacts of the SHWF and where possible enhance the local economy.	The EMP will require the implementation of a stakeholder communication plan during the construction and early operation of the SHWF. Further the EMP will encourage the purchase of local goods and services where practicable.
Landscape and visual	To minimise the visual impacts of the SHWF through the careful siting and design of the project supported by appropriate mitigation measures and management measures.	The EMP will require SHWF to liaise with adjacent land owners to discuss the need or otherwise for screen planting along with the arrangement for the planting and maintenance of the trees.
Waste management	To develop and use the SHWF in an environmental responsible manner which avoids the generation of waste.	The EMP will require the development and implementation of a Waste Management Plan and ensure all personnel are advised of the waste management and disposal procedures outlined, prior to commencement of works.

22.2.6 *Environmental Monitoring*

Environmental monitoring will be a fundamental component of both the construction and operational EMPs for the proposed wind farm. Detailed monitoring programs would be developed during the preparation of the EMP. An outline of the proposed monitoring methods, locations, frequency, criteria and responsibilities will be detailed in the relevant EMP.

During site operation, site staff will conduct regular visual inspections of the site and its infrastructure to confirm status and operation. Where issues or problems are identified, they would be addressed as part of the inspection.

22.3 *CONCLUSION*

A number of environmental issues have been identified throughout this report. The development and implementation of a comprehensive EMP, supported by a CEMP will help to avoid and or minimise such impacts.

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CONCLUSION

The proposed Stockyard Hill Wind Farm is considered entirely consistent with Commonwealth and State objectives for increasing renewable energy resources, and represents a substantial positive contribution to Victoria's aim of reducing greenhouse gas emissions.

The project is appropriate from a planning perspective, on the basis of a balanced assessment of the relevant state and local planning policies.

The potential environmental and heritage issues associated with the proposed wind farm have been summarised in this report, and demonstrate that potential impacts associated with cultural heritage, flora and fauna, traffic and land capability are relatively low, and can be appropriately managed through the preparation of EMP s.

It is also considered that amenity impacts relating to shadow flicker, blade glint and noise have been appropriately investigated. In this regard it has been demonstrated that the Stockyard Hill Wind Farm will not result in any unreasonable impacts on adjoining landowners.

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