



CERES Wind Farm
Yorke Peninsula



Prepared for

Yorke Peninsula Windfarm Project Pty Ltd

Date

30 July 2013

Planning Report

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1.0 Introduction

This planning report is made in respect of the proposed CERES Wind Farm and associated site works, converter stations and cabling on behalf of the applicant in this matter, Yorke Peninsula Windfarm Project Pty Ltd, a wholly owned company of REpower Pty Ltd. We understand the applicant wishes to incorporate this report in the body of documents comprising the development application and to have the writer's opinions available to the relevant planning authority when considering this matter.

Our instructions are to review and advise on the merits and relevant planning considerations in this matter. In preparing this report we have viewed the subject land and locality and considered all of the relevant application material including documentation prepared on behalf of the applicant as of the January 2013 lodgement and the supplementary report prepared in response to the information request of the Department of Planning Transport and Infrastructure (DPTI) of 22 February 2013.

In particular, the application comprises the 20 December 2012 report of Parsons Brinckerhoff together with Appendices A – W inclusive in respect of specialist technical advices on matters including the cultural and natural values and impacts, noise, shadow flicker, and blade glint impacts, a traffic assessment, ground water and geotechnical considerations, aeronautical matters including associated impacts on aerial spraying and bushfire emergency responses, construction management considerations, and the social and economic effects including the community engagement encompassed by the project investigations and design resolution. The application documents also include a detailed landscape and visual assessment.

Those matters have been supplemented, qualified, and varied by the body of documents submitted on 22 February 2013 and 23 July 2013. We have also cited and contributed comment toward the response to representations and public agency comments (incomplete as of the date of this report), including, in particular, further detail on the proposed temporary concrete batching plant.

Following our appraisal of the application and assessing it against the policies of the pertinent development plan edition we consider the application to be in substantial conformity with those provisions and merits a development plan consent (subject to the conditions set out herein).

2.0 Background

Yorke Peninsula Windfarm Project Pty Ltd is a wholly owned company of REpower Australia Pty Ltd.

REpower Australia Pty Ltd is part of the Suzlon Group, a global energy infrastructure investor being the fifth largest wind power business in the world. REpower Australia Pty Ltd has been operating in this country for over 18 years and provides some 36% of Australia's wind energy market with over 900MW of energy generated by 14 wind farm projects, including at Hallett (4 projects), Clements Gap, and Snowtown in South Australia and elsewhere including at Cullerin Range, Portland, Hepburn and Wonthaggi.

The suitability generally of the subject site for its intended purposes has long been established with the earlier approval gained by Pacific Hydro for a smaller wind farm at Sheoak Flat in the early 2000's. The credentials of the subject site to accommodate a viable wind farm has been further underpinned by some seven years of site investigations and meteorological data.

3.0 Legislation and Policy Framework

The subject application, being a project sponsored by the Office of Major Projects and Infrastructure given its significance to the State's power network, is being processed under Section 49 of the *Development Act, 1993* ie the Minister for Planning and Transport Infrastructure will determine the application. Section 49 requires that the application undergo the same assessment procedures and rigor as would an application processed under Sections 32 – 40 inc, ie whilst the project is considered to make a significant contribution to the State's infrastructure resources, this matter has been given public notice and forwarded to Government agencies to provide expert advice as is expected of all development applications.

Indeed, as supplementary information has been provided by the applicant in response to the information request of the Development Assessment Commission, the application has been renotified, and the further advices of relevant public agencies has also been sought.

As with all development applications the subject proposal must be assessed against the Development Plan provisions in force as of the date of lodgement of the application (refer 6.0 Planning Assessment).

4.0 Development Proposal

We summarise the key features of the proposal as detailed in the application documentation including the supplementary information furnished on 22 February 2013 and 23 July 2013, below.

The application proposes:

- 198 wind turbines. Each turbine consists of a main tower (93m tall); a nacelle which houses the generator, gearbox and other components; the rotor hub which connects each of the blades; and the blades, each with a length of 57 metres to the centre of the hub. The total height of the structure is 150m. The swept area of the blades is approximately 10,200m²;
- the construction of access roads and other associated infrastructure to support the wind farm;
- the undergrounding of all electrical connections within the wind farm;
- HVDC cable connections (two 300 MW capacity cables) to Adelaide across Gulf St Vincent, including approximately 60 kilometres of marine cable and 14 kilometres of terrestrial cable, linking the wind farm to the Adelaide power grid;
- an operations compound and two converter stations - one located to the west of Port Julia and the other located at Parafield Gardens;
- construction of an underground transmission connection (33 kV) from the operations compound to Rex Mineral's Hillside project site;
- temporary concrete batching plant of approximately 9,000 m³ capacity and consisting of a trailer mounted concrete mixer, cement bins, sand and aggregate stockpiles and a storage container for various equipment and tools located in the compound area;
- up to 8 permanent 100m high meteorological towers with instrumentation to make meteorological measurements; and
- associated site and civil works (including the excavation/filling of land, site clearance etc).

On behalf of the applicant, we confirm that the application is amended, clarified/qualified, and further detailed in the following respects:

Approval timeframe

- given the estimated 27 month construction timeframe, together with the documentation requirements associated with this sizeable project, it is considered that the normal statutory timeframes (for the substantial commencement and substantial completion of the project) whilst achievable, are 'tight'. It is intended that the project be carried out in line with the estimated programme as set out in the application for good commercial

reasons. However, in order to allow for the project to be completed without the need to obtain a fresh development approval should delays be encountered the applicant seeks an approval with the following extended timeframes:

- substantial commencement – 18 months; and
- substantial completion – 5 years;

Prohibition of dwelling occupancy for selected sites

- the applicant proposes, as an integral element of the application, to change the use of the said six residences (being second dwellings on stakeholder farms) (5 dwellings), and a recently contracted property where residency of the dwelling is contractually precluded (1 only dwelling). Each of the buildings identified on the proposed plans as 259, 266, 300, 312, 315 and 316 are to be used for the purposes of farm buildings only, ie such that each of the buildings is only put to storage, administration and allied purposes and is not put to any permanent, or temporary, accommodation whether for family members, farm workers, or visitors/tourists. The letters of agreement/contract terms for such dwellings have been issued by the applicant under separate cover;

Number of wind turbines

- whilst application was made for 199 turbines following completion of the project investigations and the inclusion of technical assessments provided with the application, that number has been reduced with the removal of turbine 221, as identified in the supplementary documentation. As confirmed below, the final number of turbines may be further reduced to ensure compliance with the EPA Wind Farms Environmental Guidelines 2009 (in respect of the recently approved Redding residence should it be constructed).

Mitigation Measures for Converter Station

- the applicant agrees to mitigate noise produced from the converter stations to ensure their compliance with the 2009 Guidelines of the Environment Protection Authority (affecting a single residence at Port Julia and a number of residences proximate to the Parafield Gardens station), by measures including those set out in the accompanying supplementary report of Marshall Day Acoustics. As the final building design detail is not settled the most effective mitigation measures also cannot be determined. The applicant agrees therefore to submit those details to the reasonable satisfaction of the Environment Protection Authority to ensure conformity with the 2009 Guidelines prior to the grant of the Building Rules consent.

Road maintenance and reconstruction proposal

- the applicant agrees (as set out in the application documents) to ensure that in the course of construction:
 - articulated semi-trailer and over-dimensioned vehicles will be confined to roads designed for, or suitable for such purposes; and

- vehicle load and dimension limits will be placed on the use of all other roads, such limits to be determined by the applicant in consultation with Council based on the expected duration and frequency of such movements, the agreed maintenance regime for such roads and the expected public use made of those roads;
- the maintenance regime over the course of the project construction and condition of those roads at handover upon completion of the project (to be carried out by the applicant), will be determined by the applicant in consultation with Council;
- all related matters to road and access features and the applicant's responsibility during the course of and completion of the subject project will be detailed in the Traffic Management Plan (TMP) to be prepared to Council's reasonable satisfaction and approval prior to the grant of a Building Rules consent;

Measures to eliminate/lessen electromagnetic interference with radio communication systems

- the wind farm is designed to avoid a line of sight issue for existing radio communication installations and hence minimise impact on the operation of such systems. Nonetheless, the applicant confirms that it will:
 - further investigate the experience with similar wind turbine technology adopted, for example, at the Bluff WF to establish any electromagnetic transmission interference issues from wind farms and evaluate the effectiveness of any remedies adopted including modification of operating procedures or any adjustments required to radio communications systems at such locations;
 - engage the local operators and industry representatives to devise a testing regime and response process to be put in place with the subject project; and
 - document an agreed testing and monitoring regime and an engagement process to identify and resolve issues as they arise;

Temporary workforce accommodation camp

- the applicant wishes to maximise the use of local tradespersons. It also wishes to house workers from outside the Yorke Peninsula district in existing accommodation, and to utilise business infrastructure established in the district as much as is practicable in order to help underpin/build local services benefiting the local residents and the local economy. To this end, it is agreed to seek to place workers into a range of rental and short-term accommodation facilities as are available. However, where the workforce accommodation needs exceed, in the peak summer tourist season, an agreed threshold (which would impinge on the accommodation needs of the districts' visitors and tourists) a temporary accommodation camp will be established. It is accepted that the temporary accommodation camp(s) if required, will need to be the subject of a separate, further, development application;

Management of impact on bats

- the turbine siting has been informed by a flora and fauna management plan prepared by EBS in order to minimise impact on important habitat where, amongst other things, bat species are considered likely to live. The management plan also covers construction management issues. As confirmed by EBS, little is understood about the impacts of turbines on bat behaviour and the incidence of bat strike. As such, a monitoring program is proposed in the post-construction stage to better understand the interaction of bats and turbines. The management plan identifies a number of responses available in the event that bat impact is considered an issue and requires a response, including the use of visual markers and radar technology. The post-operational monitoring and management of this matter is integral to the application and the detail of these services and management measures is to be submitted to the reasonable satisfaction of the EPA prior to the receipt of Building Rules consent.

Temporary concrete batching plant

- a number of options exist for the applicant to meet its concrete batching needs over the course of construction. It may be possible to utilise one, or a number, of existing concrete batching facilities on the Yorke Peninsula for such purposes depending on supply needs and the established capacity of existing plant, and reaching appropriate commercial considerations with the operator(s). The applicant has however also factored in, and made preliminary investigations in respect of, the development of a temporary concrete batching plant on the compound site. The applicant considers that such a plant, should it be required, is within the supply capacity of the district given the overall service demands and supply capacity of the district generally; and
- to this end, the applicant has documented and submitted under separate cover the details of a temporary concrete batching facility and established the plant logistics and its operating conditions. Formal approval is therefore sought for the temporary facility. Depending on its negotiations with local providers, the applicant may seek to vary the current development application to delete the temporary concrete batching plant, a decision it is likely to make in settling the CMP for approval.

Turbine Siting Around Redding Residence – Allotment 157

- on the 25 June 2013, approval was issued for the construction of a dwelling (as a replacement dwelling for a remotely located residence elsewhere on the farming property) over land flanking the northern project area of the proposed wind farm. There are a number of proposed turbines located proximate to the approved dwelling site. In the circumstances surrounding the approval (the lawfulness of which is also uncertain), it is not clear whether that approved dwelling will ever be constructed, or constructed on the approved house site. Under separate cover from the applicant's solicitors, Finlaysons, a condition has been proposed to cover the possible contingencies of the approved dwelling proceeding and influencing the final turbine layout. The effect of the suggested condition is that the final turbine layout must be assessed by a specialist noise

consultant to ensure its conformity with the EPA Guidelines, 2009. The layout will be prepared in respect of existing or under-construction dwellings as of the 3 July 2014 and must be submitted to the reasonable satisfaction of the EPA prior to the construction of any turbines taking place.

Management of Turbine Impacts on Aerial Spraying Operations

- turbines have been placed so as to minimise the impacts on aerial spraying operations (where carried out) by ensuring generous 600m – 700m spacing between turbines, and offset from adjoining properties. The applicant has additionally agreed to manage the operation of turbines to allow unrestricted fixed wing aircraft access for aerial spraying of surrounding farms (no stakeholder farms contract aerial spraying services). The proposed management of the turbine operations ensure that, apart from the turbine footprint itself, there is no restriction on existing farm management practices as a consequence of the wind farm. The management details are set out in documents submitted by the applicant under separate cover. In brief, the applicant has put in place arrangements with the sole operator of the local aerial spraying business to shut down turbines and rotate the blades parallel with the flight passes when aerial spraying is conducted. The management agreement also requires the shutdown of any additional turbines in the event that turbulence is expected to interfere with the safe and efficient aerial spraying operations. A commercial consideration has been entered into to cover any associated impacts on the administration of this agreement and its obligations so as to provide for a continuity of aerial spraying services (as required) to the surrounding farms.

5.0 Subject Land and Locality

The land the subject of this application is as broadly set out in the application documents. It comprises, in essence, three discrete areas, being:

- the Yorke Peninsula land of some 180 square kilometres of pastoral land, in the main running generally north/south centrally through the peninsula and extending from a latitude north of Port Vincent to a latitude almost as far as Muloowurtie Point. The Yorke Peninsula wind farm also includes the Port Julia converter station and the terrestrial cabling on Yorke Peninsula;
- the route of the connecting HVDC cable crossing of the Gulf St Vincent, ie the gulf crossing portion only, excluding the terrestrial cabling either side of the gulf; and
- the converter station site and terrestrial cabling within metropolitan Adelaide on a route aligned from St Kilda to its Port Wakefield Road converter station site immediately south of the Little Para River at Parafield Gardens.

We describe in more detail below the three discrete areas, or routes, taken up by these three elements of the proposal viz:

Yorke Peninsula Wind Farm and associated converter station site and terrestrial cabling route to Port Julia

The subject land at Yorke Peninsula occupies elevated land running along the eastern flank of Yorke Peninsula, with the converter station and cabling extending to the Gulf St Vincent coast immediately north of Port Julia. The coastal towns and settlements along the eastern coastal areas of this section of Yorke Peninsula include Port Vincent, Black Point, Pine Point, Sheoak Flat, Port Julia and Muloowurtie Point. The latter three settlements in particular are compact coastal settlements occupying a relatively narrow strip along the coast backed by moderate to steeply rising land. As such, those settlements are largely secreted from view from the main Port Wakefield-Yorketown Road.

Set out on projecting land beyond the main alignment of the east coast of the peninsula is the Black Point shack settlement and also Port Vincent. These settlements/townships are flanked by lower lying land and enjoy more extended views to/from the main road network on the peninsula and beyond to the subject proposed wind farm site.

As with much of Yorke Peninsula, the subject land and its locality is extensively cleared and farmed, primarily for a range of cereal crops as well as for irrigated pasture and grazing purposes. Remnant open woodland and limited understorey is confined in the main to many of the corridors along roads in the district as well as to limited fenced holdings scattered haphazardly in the locality.

An elevated plateau runs centrally through Yorke Peninsula. There is however, relief in the topography with variation in the land form. As a consequence there are considerable changes in the vertical alignments of roads crossing through this section of the peninsula. Towards the southern end of the locality closer to

Yorke town, the landscape flattens out. It is marked by low-lying depressions and contains numerous salt lakes. To the north of the subject land there are expansive views across the peninsula from elevated portions of the land which exhibits generally less variation in its elevated topography. The northern portion of the locality on our observation contains greater roadside vegetation along which sections there are fewer panoramic vistas of this extensively farming landscape.

Based on the visual analysis/assessment in these matters, it is expected that the proposed wind farm will represent an appreciable visual element strongly recognisable in the landscape for a distance of at least 20km from the nearest turbine, albeit the wind farm will be able to be viewed from a considerably greater distance from elevated and distant vantages, weather conditions permitting. As such, it is considered the locality of the subject proposal is likely to extend from as far south as Stansbury, and north to Ardrossan, ie representing an area across the central/northern portion of the Yorke Peninsula as broadly identified in the locality plan, attached.

The Gulf St Vincent marine cabling route

Given that the proposed cabling is to be buried into the sea bed across the Gulf St Vincent it will not have any visual impact. Its "locality" in these circumstances is confined to the immediate cabling route of some 60km along the sea bed across the gulf from north of Port Julia to St Kilda. Of particular note is the significance of the mangrove community and the associated sea bed area at the St Kilda end of the cabling route which passes into the sheltered harbour area and the disturbed levee-protected coastal community developed at St Kilda.

Parafield Gardens converter station site and the St Kilda-Parafield Gardens terrestrial cable route

Lastly, the Parafield Gardens converter station site is to occupy a portion of the compact horticultural land immediately west of Port Wakefield Road, 'behind' the existing truck stop lay-off bay south of the Little Para River at Parafield Gardens, a short distance from SA Water's Bolivar sewage treatment plant. The converter station site is flanked to the south by high tension transmission lines (66Kv) and a strip of intensive market gardening production areas lining Port Wakefield Road and Little Para River in an area north of the Globe Derby Park district.

The western side of Port Wakefield Road is dominated by the treatment plant, together with the White Horse Inn Hotel and accommodation facility, and the Bolivar caravan park further to the north. East of Port Wakefield Road is the developed residential communities of Paralowie, Bolivar and Parafield Gardens.

6.0 Planning Assessment

6.1. Zoning

The subject land falls within the following zones:

- (i) *Yorke Peninsula [DC] Development Plan [Not Consolidated 29 November 2012]*
 - Primary Production Zone
 - Coastal Conservation Zone;
- (ii) *Land Not Within a Council Area (Coastal Waters) Development Plan [Not Consolidated 29 November 2012]*
- (iii) *Land Not Within a Council Area (Metropolitan) Development Plan [Consolidated 29 November 2012]*
 - MOSS (Conservation) Zone
- (iv) *Salisbury (City) Development Plan [Not Consolidated 29 November 2012]*
 - Excluded land;
 - Coastal Township Zone;
 - Extractive Industry Zone;
 - Special Uses Zone;
 - Horticulture Zone;
 - Recreation Zone;
 - Deferred Industry Zone;
 - MOSS (Recreation) Zone; and
 - Rural Zone

6.2. Procedures

We have considered the above zone provisions where relevant to the circumstances of the subject proposal. We have also considered the pertinent Council Wide provisions and those applying to the out-of-Council area having regard to the express policy provisions and considerations relevant to the nature of the proposal and the circumstances of the land directly, and indirectly, affected by the subject proposal.

Within the zones in which the subject proposal lies, the kinds of development proposed (a wind farm and cabling together with associated electrical infrastructure) are neither listed as complying nor non-complying and as such requires an assessment on-merit.

We have split the assessment of the proposal into the three discrete geographic areas, and development plans, into which the proposal falls as follows:

- the wind farm and ancillary infrastructure on the Yorke Peninsula;
- the high voltage direct current (HVDC) cable; and
- the wind farm's ancillary infrastructure within the City of Salisbury.

6.3. Assessment

We assess, below, the wind farm and its ancillary infrastructure (within the Primary Production Zone), together with the converter station and the terrestrial cable through to the Coastal Conservation Zone of the Yorke Peninsula (DC) Development Plan.

Within the following assessment, underlining has been added to the quoted Development Plan provisions by the authors to emphasise the primary consideration/interpretation as relevant to the proposed development.

We have categorised the most relevant provisions under the following sub-headings on which we comment as follows:

The wind farm and ancillary infrastructure on the Yorke Peninsula:

- wind farms and renewable energy facilities generally;
- wind farms in the Primary Production Zone;
- visual and landscape;
- noise;
- flora and fauna;
- cultural and heritage;
- interference with television and radio signals and global positioning systems;
- shadowing, flickering, reflection and glint;
- aeronautical (including aerial agricultural and bushfire management);
- traffic and transport;
- geotechnical (including groundwater and erosion); and
- surface and stormwater management.

The high voltage direct current (HVDC) cable:

- land use;
- flora and fauna;
- noise and vibration; and
- geotechnical and coastal processes.

The wind farm's ancillary infrastructure within the City of Salisbury:

- zone and land use (terrestrial cable);
- zone and land use (converter station);
- visual; and
- noise.

6.4. The wind farm and ancillary infrastructure on the Yorke Peninsula:

6.4.1. Wind Farms and Renewable Energy Facilities Generally

The following provisions are considered the most pertinent in the appropriateness of wind farms generally across the Yorke Peninsula:

Development Plan Provisions

Council wide	Renewable Energy Facilities
Objectives	1, 2 and 3
Principle	1

Objective 2 *The development of renewable energy facilities, such as wind farms and ancillary development, in areas that provide opportunity to harvest natural resources for the efficient generation of electricity.*

Objective 3 *Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment and other land uses.*

In general terms the planning provisions throughout the State promote renewable energy solutions together with sustainability and low impact development which minimises power demands or impact on the land's natural resources. To this end, amongst the strategies endorsed under the Development Plan is the reduction in demand for, and economic use of, power as well as the active promotion of renewable energy sources. Wind farms (and associated or ancillary development) are actively promoted where wind resources and infrastructure are available to harness and efficiently utilise power generated through such sources and input into the power grid.

We address the operational and interface issues, and natural environmental impact considerations below under headings in latter sections of this report.

In general terms wind farms are actively promoted throughout the State, and in particular in low density farming communities where the potential to interfere with sensitive land uses and transport systems is minimal. Whilst some farming communities might seek to have wind farms relocate to remote locations, such areas are often in fragile and sensitive natural eco-systems. Further, as such locations are well removed from the State's power grid, the power generated cannot readily be put to economic use. Moreover, much of remote South Australia is also unsuitable in terms of the available wind resource alone, and cannot as a matter of practice accommodate the efficient production of wind power.

The proposal is, in respect of the above matters, confined to the elevated and windy portion of the Yorke Peninsula where the natural wind resources are able to be efficiently harnessed and fed (across the Gulf of St Vincent) direct into metropolitan Adelaide, the largest market for power in this State. Being off-set from the coast and public/private aerodromes, the proposed wind farm is, in general terms, well removed from sensitive transport hubs, housing communities and settlements and

any significant natural environmental resources. It is also in a farming community with relatively low occupancy and hence has limited potential for interference with or impact on sensitive residential occupiers. The proposal is an anticipated and encouraged use which is fundamentally suitable on the subject land.

6.4.2. Wind Farms in the Primary Production Zone

Development Plan Provisions

Primary Production Zone

Objectives	1, 2, 4, 5 and 6
Desired Character Statement	
Principles	1, 3 and 9

Objective 1 The long term continuation of primary production.

Objective 4 Protection of primary production from encroachment by incompatible land uses and protection of scenic qualities of rural landscapes.

Objective 5 Accommodation of wind farms and ancillary development.

Objective 6 Development that contributes to the desired character of the zone.

Desired Character

....

Wind farms and ancillary development such as substations, maintenance sheds, access roads and connecting power-lines (including to the National Electricity Grid) are envisaged within the zone and constitute a component of the zone's desired character.

...

Principle 1 The following forms of development are envisaged in the zone:

- bulk handling and storage facility
- commercial forestry
- dairy farming
- farming
- horticulture
- intensive animal keeping
- tourist accommodation (including through the diversification of existing farming activities and conversion of farm buildings)
- wind farm and ancillary development
- wind monitoring mast and ancillary development.

The proposed wind farm turbines, and its primary infrastructure on Yorke Peninsula is located within the Primary Production Zone except on the very coastal margins where the cable crossing of the Gulf of St Vincent commences. Within the subject Primary Production Zone a wind farm and associated, or ancillary, infrastructure is one of the uses expressly identified as appropriate per Zone PDC 1 and Objective 5, above.

Moreover, the desired character statement (portion of which only is quoted above) details where such uses and associated infrastructure are expected to locate and the conditions and features associated with wind farms. The policy provisions are unambiguous. The physical form of wind farms are an envisaged and appropriate element, integral to the desired character of the Zone.

Wind farms and ancillary development are one of the primary purposes of the Zone. Such uses are not 'incompatible land uses' that are to be precluded from the Zone (where they impact on the productive and landscape values of the land). Instead, wind farms are uses which sit properly side by side with primary production on the land. Whilst it is relevant to have regard to the consequences of wind farm activities on the productivity of the land and the land's natural biodiversity values (matters dealt with in the discussion in sections below) wind farms and ancillary development are uses which are in their own right fundamentally appropriate to this Zone.

In these circumstances, the siting of the primary wind farm structures, site works, and above-ground ancillary infrastructure within the Primary Production Zone is, in our view, envisaged and appropriate.

6.4.3. Potential Wind Farm Impacts

6.4.3.1. Visual and landscape

Development Plan Provisions

Council Wide	Renewable Energy Facilities
Objective	3
Principle	2
Primary Production Zone	
Objectives	4, 5 and 6
Desired Character Statement	
Principles	1, 3 and 9

Renewable Energy Facilities

Objective 3 Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment and other land uses.

Principle 2 The visual impacts of wind farms and ancillary development (such as substations, maintenance sheds, access roads and wind monitoring masts) should be managed through:

- (a) wind turbine generators being:
 - (i) setback at least 1000 metres from non-associated (non-stakeholder) dwellings and tourist accommodation
 - (ii) setback at least 2000 metres from defined and zoned township, settlement or urban areas (including deferred urban areas)
 - (iii) regularly spaced
 - (iv) uniform in colour, size and shape and blade rotation direction
 - (v) mounted on tubular towers (as opposed to lattice towers)
- (b) provision of vegetated buffers around substations, maintenance sheds and other ancillary structures.

Primary Production Zone

Desired Character

Wind farms and ancillary development such as substations, maintenance sheds, access roads and connecting power-lines (including to the National Electricity Grid) are envisaged within the zone. Indeed such uses make up a component of the zone's desired character. These facilities will need to be located in areas where they can take advantage of the natural wind resource and, as a consequence, components (particularly turbines) may need to be:

- located in visually prominent locations such as ridgelines
- visible from scenic routes and valuable scenic and environmental areas
- located closer to roads than envisaged by generic setback policy.

This, coupled with the large scale of these facilities (in terms of both height and spread of components), renders it difficult to mitigate the visual impacts of wind farms to the degree expected of other types of development. Subject to implementation of management techniques set out by general / council wide policy regarding renewable energy facilities, these visual impacts are to be accepted in pursuit of benefits derived from increased generation of renewable energy.

Principle 1 The following forms of development are envisaged in the zone:

- ...
- wind farm and ancillary development
- wind monitoring mast and ancillary development.

The policy settings above place wind farms and allied infrastructure as an envisaged and appropriate use, and indeed an integral component of the desired character of the zone in which the subject proposal is located. This speaks directly to the key considerations in respect of the anticipated visual impacts of the proposal.

Where the physical form of the wind farm including its turbines is considered to make up one of the key elements and envisaged features of the zone it is reasonably concluded that the development of the subject wind farm will indeed enhance the characteristic or iconic features envisaged and appropriate in the locality provided the setbacks and siting features listed under Renewable Energy Facilities PDC 2 (above) are met. In our view, these matters are the only clear and measurable tests under the Development Plan pertinent in assessing the appropriateness of the visual amenity of the proposal.

In respect of these considerations we comment as follows:

- turbines are to be sited no less than 1.3km from the nearest occupied dwelling of a non-participating land owner viz-a-viz 1km per PDC 2(a)(i);
- there is no designated township, settlement or urban area within 2km of the proposed turbines [in accord with PDC 2(a)(ii)]. The closest settlements at Sheoak Flat and Port Julia are sited on the lower coastal shelf visually removed from the location of the nearest turbines which sit on elevated land vertically displaced from the setting of, and largely screened from, the immediate surrounds of these settlements;
- in general terms, as is available with the configuration of the land holdings of participating land owners, the turbine locations have been modified as appropriate to achieve adequate separation from all dwellings (in order to conform with EPA guidelines on acoustic impacts):
- the turbines are regularly spaced (and indeed exhibit a greater separation between individual turbines than is the industry standard) having a regular 600m – 700m siting of turbines as the 'default' design parameter pending any required modifications. The regular spacing of turbines is considered a desirable design technique and integral to managing visual impact [per PDC 2(a)(iii)];
- as desired, all turbines are of a uniform colour (off white/light grey), height (93 metres to the nacelle) and have the same slender conical, or tubular, shape and blade rotation direction [per PDC 2(a)(iv) and (v)]. We expect that in this manner the Plan authors envisage the turbines will 'read' consistently and legibly as do iconic rural structures such as silos where the uniformity and predictable features created by those structures contributes to the appealing modified landscape features and the envisaged built form integral to the Zone's desired character; and
- ancillary structures are kept to a minimum, there being no fencing or allied buildings/structures associated with wind turbines themselves. It is also notable that there are no overhead power lines linking turbines, or connected with the converter station and hence an absence of other visual elements that compete for attention and create visual clutter. Further, whilst provision is made to add a temporary concrete batching facility, this is of a temporary nature only and will not be undertaken unless demanded. The converter station, the only material additional building element of note, is to be extensively landscaped and screened from view [per PDC 2(b)].

Given the clear policy position and desired features and building forms in the subject Primary Production Zone, including in the circumstances of this matter, the proposal represents in our view a desirable feature of the zone and its locality. The turbines are suitably sited, being set back from townships and any urban areas where dwellings or potentially sensitive land uses are expected. The turbines are also sited relative to all non-stakeholder dwellings in accord with the express directions in these matters so as to suitably “manage” its visual impacts.

In these circumstances the proposal is a suitably managed feature envisaged in, and appropriate to, the subject land and its Primary Production Zone.

6.4.3.2. Noise (including operational, construction and converter station)

Development Plan Provisions

Council Wide	Renewable Energy Facilities
Objective	3
Principle	3
Council Wide	Interface between Land Uses
Objectives	1, 2 and 3
Principles	1, 7, 8

Renewable Energy Facilities

Objective 3 *Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment and other land uses.*

Principle 3 *Wind farms and ancillary development should avoid or minimise the following impacts on nearby property owners / occupiers, road users and wildlife:*

(b) excessive noise

Interface between Land Uses

Principle 1 *Development should not detrimentally affect the amenity of the locality or cause unreasonable interference through any of the following:*

(b) noise

Principle 7 *Development that emits noise (other than music noise) should include noise attenuation measures that achieve the relevant Environment Protection (Noise) Policy criteria when assessed at the nearest existing noise sensitive premises.*

Operational Noise of the Wind Farm

Marshall Day Acoustics has prepared a Noise Impact Assessment for the proposed wind farm. The assessment was undertaken in accordance with the Environment Protection Authority's document *Wind farms environmental noise guidelines (2009)* ("the Guidelines"). The turbine model on which the assessment was based is the REpower 3.2M114 turbine, ie the larger of the two models that may be used in the proposal.

The Guidelines form the basis for determining appropriate noise limits at relevant receivers in accordance with the following:

The predicted equivalent noise level ($L_{Aeq,10}$), adjusted for tonality in accordance with these guidelines, should not exceed:

- *35dB(A) at relevant receivers in localities which are primarily intended for rural living, or*
- *40dB(A) at relevant receivers in localities in other zones, or*
- *the background noise ($LA_{90,10}$) by more than 5dB(A),*

whichever is the greater, at all relevant receivers for wind speed from cut-in to rated power of the WTG and each integer wind speed in between.

On this basis, the appropriate noise limits were considered to be 40dB L_{Aeq} for properties in the (then) General Farming Zone (now the Primary Production Zone) and 35dB L_{Aeq} for properties along the coast in the (then) Rural Living, Holiday Settlement, Coastal and Urban Coastal Zones.

I note that these zones were amended between the time the report was completed and the lodgement of the application by Council's Better Development Plan and General Development Plan Amendment. Accordingly, the appropriate noise limits are considered to be 40dB L_{Aeq} for properties in the Primary Production Zone and 35dB L_{Aeq} for properties along the coast in the Rural Living, Settlement, Coastal Open Space, Coastal Conservation and Community Zones.

The Guidelines stipulate that a 5dB penalty is applied where the characteristics of the selected turbine would be annoying, such as tonality. It was considered by Marshall Day Acoustics that the turbine model was free from tonality and other annoying characteristics such as aerodynamic noise and infrasound.

In accordance with the Guidelines, relevant receivers (potentially affected dwellings) and noise monitoring locations were identified and the existing ambient noise levels were quantified at assessable residences. The assessment classified 14 dwellings as relevant receivers. Marshall Day Acoustics undertook further background noise readings of 29 sites (including six receivers being on stakeholder properties) at various locations around and within the proposed wind farm.

The noise assessment identified that noise levels at all dwellings on all non-stakeholder owned properties would fall below (or conform with) the applicable criterion (40 dB L_{Aeq} for the Primary Production Zone, and 35 dB L_{Aeq} for other 'living' zones). Noise limits at stakeholder properties, however, under the Guidelines should not exceed 45 dB L_{Aeq} providing a formal agreement is in place with the affected landowners. The maximum predicted noise level is up to 43 dB L_{Aeq} for one

stakeholder dwelling and 42 dB L_{Aeq} for the other stakeholder dwellings. Given that the affected landholders are stakeholders the noise values at these dwellings are considered reasonable provided:

- *a formal agreement is documented between the parties,*
- *the agreement clearly outlines to the landowner the expected impact of the noise from the wind farm and its effect upon the landowner's amenity, and*
- *the likely impact of exposure will not result in adverse health impacts (eg the level does not result in sleep disturbance).*

The affected stakeholders have advised that none of the six dwellings are either used, or required, for residential purposes, there being other dwellings on all affected land holdings used for such purposes. The affected stakeholders have signed agreements in place with the applicant in respect of these dwellings. Those agreements require that the affected dwellings shall not be put to use as residences for the life of the project and indeed, five of those buildings (also affected by shadow flicker) are to be formally put to use as farm buildings only under this application.

Operational Noise from the Converter Station (Port Julia)

Parsons Brinckerhoff provided an assessment of the predicted noise levels during the operation of the converter station at Port Julia. The nearest residential receiver was approximately 1,000m from the site. Noise limits applicable for the receiver from the converter station were considered to be 42 dB L_{Aeq} for the day time and 35 dB L_{Aeq} for the night time. The predicted operational noise levels of 36 dB L_{Aeq} during neutral conditions complies with the day time goal, but exceeds the night time goal by 1 dB L_{Aeq} . During the worst predicted meteorological conditions, noise levels of 42 dB L_{Aeq} were predicted. This complies with the day time goal, but exceeds the night time goal by 7 dB L_{Aeq} . It is predicted that the operational noise of the converter station, with no mitigation or noise attenuation measures will meet the day and night time goals at a distance of approximately 1.4 km from the site.

A number of mitigation measures to achieve compliance for the operation of the converter facility have been identified in the application. Such measures would ensure that the stations conform with both day time and night time goals set in these matters for all of the potentially affected residential receivers, and therefore comply with the EPA Guidelines.

Construction Noise

Technical Appendices Volume 2 prepared by Parsons Brinckerhoff, lodged with the subject application confirms, amongst other things, the detail of the scope of the Construction Environmental Management Plan ("CEMP"). That plan includes the management of construction noise. The CEMP and the TMP are, in our view, well scoped and adequately detailed for preliminary consideration in the subject application. However, as these matters are quite separate from the issues surrounding the operation of the wind farm and as further investigations are needed, it is proposed that the further detailing of these matters should be prepared and negotiated with the relevant planning authority once a decision is made on the

substantive merits of the proposal. As such, it is proposed to have these construction issues conditioned under any development approval issued in this matter, subject to the reasonable satisfaction of the relevant planning authority.

In summary, Renewable Energy Facilities PDC 3 states that wind farms and ancillary development should avoid or minimise "excessive noise" impacts on nearby property owners, occupiers, road users and wildlife. Further, PDC 7 of the Interface between Land Uses section seeks development that achieves the relevant Environment Protection (Noise) Policy criteria when assessed at the nearest sensitive premises. Marshall Day Acoustics has predicted that the noise limits at all non-stakeholder dwellings will conform with the allowable limits. The only instances where the limits are exceeded are six stakeholder dwellings (to be converted to farm buildings under the amendments to this application or alternatively not put to residential use for the life of the project under contractual agreement with the applicant). Notwithstanding that the predicted noise limits are considered to be reasonable for stakeholder dwellings, under changes to this application they will no longer be dwellings or sensitive receivers.

Measures proposed with respect to the converter station suitably attenuate noise to ensure compliance with the pertinent Guidelines. Further, the applicant will ensure that the project is constructed in accord with good environmental practice to be detailed in accord with the matters suitably scoped in the application. The construction management details, including associated noise impacts, are matters subject to further detail and scrutiny from the planning authority to ensure compliance with the relevant guidelines.

Accordingly, we consider the operation of the wind farm will not cause or create 'excessive noise' conditions that may interfere with residents in proximity to the wind farm.

6.4.3.3. Flora and fauna

Development Plan Provisions

Council wide	Renewable Energy Facilities
Objective	3
Principle	3
Council Wide	Infrastructure
Objective	1
Principles	10 and 12
Council Wide	Natural Resources
Objectives	1, 8 and 9
Principles	1, 2, 3, 26, 27, 28, 29, 30, 31, 32, 33.

Renewable Energy Facilities

Objective 3 *Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment and other land uses.*

Principle 3 *Wind farms and ancillary development should avoid or minimise the following impacts on nearby property owners / occupiers, road users and wildlife:*

(e) modification of vegetation, soils and habitats

Infrastructure

Principle 10 *Electricity infrastructure should be designed and located to minimise its visual and environmental impacts.*

Principle 12 *Utilities and services, including access roads and tracks, should be sited on areas already cleared of native vegetation. If this is not possible, their siting should cause minimal interference or disturbance to existing native vegetation and biodiversity.*

Natural Resources

Objective 8 *Native flora, fauna and ecosystems protected, retained, conserved and restored.*

Principle 1 *Development should be undertaken with minimum impact on the natural environment, including air and water quality, land, soil, biodiversity, and scenically attractive areas.*

Principle 27 *Development should be designed and sited to minimise the loss and disturbance of native flora and fauna, including marine animals and plants, and their breeding grounds and habitats.
 (my underlining)*

6.4.3.4. Flora and Fauna

EBS Ecology assessed the potential impacts the wind farm may have on terrestrial flora and fauna on and adjoining the subject land. The assessment involved both desktop and field surveys investigating vegetation types and condition; present flora and fauna species; value of habitats present; and threatened species occurring or expected to occur at the site. Two protected areas, one covered by a heritage agreement, the other a Significant Environment Benefit offset area, fall within the site's boundary.

Flora

EBS Ecology identified three species of national conservation significance during the survey. Three nationally threatened orchid species, although not recorded in the survey, were considered nonetheless to present in the area.

The level of remnancy of native vegetation in the project area is considered low. Of the vegetation assessed 698 hectares was considered in poor condition, 113 hectares was considered to be in moderate condition, 141 hectare in good condition and 100 hectares in excellent condition. Approximately 30% of the remnant native vegetation occurred in roadsides.

The siting of turbines occurred after the broad assessment of flora and fauna constraints. As a result, the avoidance of impact on native vegetation is a parameter adopted in the turbine layout.

To manage the impacts on flora the project site was classified by the applicant's consultant into three 'zones' – viz 'conservation', 'high recovery potential' and 'highly modified'. No infrastructure is proposed within the 'conservation' and 'high recovery potential' zones. In addition, a number of management measures are identified to further enhance the potential bio-diversity value of these zones.

The wind farm layout includes four different buffers to protect biodiversity assets from direct and indirect impacts. The buffers are as follows:

Buffers proposed for the project

Buffer	Description
Buffers around high quality vegetation and threatened flora	A minimum buffer of 100m around intact/high quality vegetation has been adopted for turbines where possible. Where this buffer cannot be achieved micro-siting of infrastructure has been undertaken.
Buffers around key bird and bat habitat	A minimum buffer of 100m has been adopted for areas of high habitat value for birds and bats. In the project area this comprises areas of mallee and woodland associations.
Buffers along the coastline	The coastline adjacent to the project area is considered to contain important habitat areas for shorebirds. EBS recommended a minimum buffer of 500m along the coast based on ecological characteristics. REpower adopted a buffer of 1,000m between turbines placement and the coastline as a precautionary approach to minimise disturbance and direct collision for migratory shorebirds.
Buffers around raptor nests	A buffer of 500m between turbines and nests has been adopted for mainland wedge-tailed eagles. Each identified nest has had a 500m buffer placed around it to reduce the risk of bird collision and nest disturbance.

Of the 199 turbines identified in the proposal as lodged (now 198 turbines) 57 turbines do not meet the 'ideal' 100m buffer distance recommended by EBS Ecology. Of these turbines:

- 3 are within 100m of a 'conservation zone';
- 8 are within 100m of a 'high recovery potential' zone;
- 42 are within 100m of a 'highly modified' zone; and
- 4 are not categorised.

The three turbines proposed within 100m of a conservation zone are to be set back no less than 50 metres from native vegetation. To achieve the recommended 100m setback would entail resiting turbines further into farming properties. Given the particular circumstances of those three turbines and the features of the area in the zone proximate to the turbines (and the consequent additional intrusion on the efficiency of farm management arising from a resiting of those turbines) it was determined that the turbine siting should remain as originally proposed.

For all of the above reasons, it is considered that the turbine siting avoids direct impact on any valued flora and maintains desirable, or adequate, separation from habitat considered of high value, including coastal locations and habitat recognised for its fauna.

Further, whilst there will be minor losses of modified native vegetation associated with the converter station, extensive revegetation using provenance planting is planned so as to create a significant landscape buffer and to enhance the biodiversity values of this portion of the site.

In these circumstances it is considered that the natural flora resources are suitably protected and that there is minimal to no disturbance of such habitat.

Fauna

EBS Ecology identified 100 fauna species, including 95 species of bird, nine species of mammal (including four species of bat), and six species of reptile. Of particular note, one bird species (Fairy Tern – recorded outside the project area) has a national conservation rating, seven bird species are listed as migratory under the Environment Protection Biodiversity Conservation Act (EPBC Act) and 10 species have a State conservation rating. Several of these species were recorded off-site. Wedge-tailed eagles are recognised as an at-risk species in relation to wind farm developments. Five Wedge-tailed eagles nests were recorded and 11 sightings were made.

The swept area of the turbines is at elevation levels of between 36m and 150m above ground level (hub height 93m and blade length 57m). There were 15 species recorded flying above 36m, including five raptor species, two species of raven, two species of wood swallow, two species of waterbird and one migratory species.

Remnant vegetation is the primary habitat, providing roosting, nesting, protective shelter and food resources. These areas should be avoided and where possible buffered.

The coastline adjacent the proposed wind farm provides varied habitats utilised by migratory shorebirds. The only direct impact to coastal habitat will occur with the construction and maintenance of the HVDC cable.

A range of direct and indirect impacts of wind farms on birds is recognised. These include direct strike, displacement due to habitat loss and other disturbance effects.

Collision risk can be defined as the likelihood of individual species colliding with wind turbines and other infrastructure. Birds such as raptors and waterbirds are at a greater risk of collision based on their flight heights, size and behaviour.

Each bird species and/or individuals' response to turbines is likely to differ based on their own sensitivities or tolerance. EBS states that as there are no published studies on the effects of wind farms on Australian birds it is difficult to evaluate the extent they will be affected.

The most obvious approach to mitigate the risks posed by a wind farm is to space turbines at a distance that allows birds to fly between them. The turbine spacing of 600m – 700m is greater than many wind farms in Australia. While there is no evidence to suggest that the spacing is sufficient to manage risk of potential bird strike, it is generally considered the greater the distance, the better.

No specific bird movement hot spots were identified during the survey, however, it is considered best to avoid placing turbines between core areas of habitat. Additionally, the placement of turbines along roadsides may not be ideal as it may inhibit movement corridors between areas of native vegetation.

Bats

The general siting criteria adopted with the placement of turbines and their setback from natural features within and beyond the subject land have been overseen by EBS Ecology. In these respects, we understand the proposed wind farm is considered to suitably protect fauna in accord with the pertinent Development Plan provisions, albeit additional consideration (refer below) needs to be given to the impact on the bat population.

For reasons summarised above and detailed in the EBS report it is proposed to carry out additional bat surveys to assist in informing the applicant on the final micro-siting of approved turbines and to inform the management practices in the wind farm operations. It is proposed that this element of the application be the subject of a condition of consent to ensure that the applicant is able to devise a fully reconciled management plan to the reasonable satisfaction of the Environment Protection Authority.

The management plan will entail post-operational monitoring (as has already been foreshadowed in the technical documents of the application) in order to further understand bat interaction with the turbines (their flight patterns and behaviour) and to assist in the management of the wind farm, including, potentially, the placement of visual markers and incorporation of radar technology. In this way it is understood that the proposal will suitably minimise impact on the bat population.

6.4.3.5. Cultural and heritage

Development Plan Provisions

Council wide	Heritage Places
Objectives	1 and 4
Principles	1

Australian Cultural Heritage Management (ACHM) was engaged to undertake Aboriginal cultural heritage surveys. The surveys comprised an ethnographic survey targeting cultural sites and areas of cultural sensitivity, and an archaeological survey searching for archaeological sites or objects. Representatives of the Adjahdura Narungga Heritage Group (ANHG) attended each of the surveys with ACHM Archaeologists.

The surveys identified areas considered low risk, medium risk and high risk. The risk generally related to the disturbance of land, ie land that has been ploughed and farmed is generally lower risk than areas of undisturbed land, which may have located in areas of high topographical relief or nearer the coast. The surveys were targeted based on the anticipated risk level, with results giving an indication as to whether works can proceed without further impact or whether further investigations were required.

During the surveys, no new ethnographic sites were identified. However, ANHG representatives explained several Creation Ancestor tracks/stories intersect with the survey area. Three land forms were identified that were preferred to be avoided by the proposed works. During the archaeological survey, two new sites were recorded, both being located within the Central Western Area.

Northern Area

During the surveys, 25 of the proposed turbine and crane pads locations were surveyed. Of these, 21 were given a 'cleared' status. The remaining four locations were determined as 'ANGH not cleared'. These sites, together with a proposed laydown area, require future survey. The associated access tracks through the area have been given a 'cleared' status.

The underground cable line was not archaeologically surveyed and has been assigned a low risk area.

Central Western Area

A total of 53 proposed turbine and crane pad locations were surveyed. Of these, 39 proposed turbine and crane pad locations have been given a 'cleared' status. The access tracks surveyed have also been given a cleared status. Two new archaeological sites were recorded in locations proximate to proposed turbines and crane pads 39 and 42. These have been given a 'not cleared' status.

The remaining locations were determined to be given an 'ANHG not cleared' status on the understanding that further surveys may need to be undertaken. Of these

locations, five were determined a 'medium risk' status, and seven were determined to be 'low risk'.

There were 17 remaining locations that were not surveyed, six of these were considered 'medium risk' and 11 were considered 'low risk'. The underground cable line was not archaeologically surveyed and has been assigned a low risk area.

Central East Area

This area contains 47 turbine and crane pad locations, sections of the underground 33Kv cable, the converter station and the HVDC cable route. All of these areas (except the HVDC cable route), were considered to be of 'low risk'. The HVDC cable route, however, due to its crossing of the coast, is considered to be a 'medium risk'.

Southern Area

The area contains 45 turbine and crane pad locations, two lay down areas and part of the proposed 33Kv cable route. Of these locations, 35 were determined to be 'low risk', and the remaining ten locations were determined to be 'medium risk'. Portions of the 33Kv cable route were considered to be 'low risk' and 'medium risk'.

It is understood that ACHM is satisfied that micro-siting of the 'uncleared', or 'ANHG not cleared' status turbines can be undertaken to suitably protect archeologically sensitive sites. In these circumstances the final turbine sites selection and cabling route, where clearance has not been provided by ACHM, will need to be the subject of a final clearance approval based on the further survey and negotiations between ACHM and the indigenous representatives with the documentation of those negotiations and micro-siting/cabling route to be the subject of the planning authority's reasonably approval.

The applicant proposes, in accord with the recommendations of ACHM, that all earthworks will be overseen by an accredited cultural advisor (together with indigenous representation) with any artefacts or archaeological source material uncovered in the course of those works will need to be recorded and further surveyed, with modified micro-siting agreed and approved.

The assessment of ACHM of the design and siting of individual turbines has demonstrated there will be no impact on any sites of European heritage significance. Although we understand that the proposed turbines will not affect sites of Aboriginal significance, further assessment will be undertaken at the final detailed design stage. We are satisfied that the principles applied to the survey and design and siting has, and will further ensure that there is no impact on sites of Aboriginal significance. Accordingly, the proposal is considered to satisfy the 'Heritage Places' Objectives 1 and 4, and Principle 1.

6.4.3.6. Interference with television and radio signals and global positioning systems

Development Plan Provisions

Council wide	Renewable Energy Facilities
Objectives	3
Principles	3
Council Wide	Interface between Land Uses
Objectives	1 and 2
Principles	1

Parsons Brinckerhoff investigated the potential impact of the wind farm on radio communication services. The impact includes services which are provided on a point to point basis, point to multipoint (ie television, radio, mobile telecommunication) basis and also radar systems (aircraft detector weather services), and can be divided into four categories:

- near field impacts;
- destruction impact;
- reflector and scattering impacts; and
- electromagnetic emissions/radio frequency (RF) interference.

The wind farm has been designed to minimise its impact on radio communication facilities by implementing exclusion zones and avoiding direct line of sight impacts. Other mitigation methods may be feasible in the event that design considerations are not satisfactory, these include:

- relocation/removal of turbines;
- replace services with less affected types;
- relocation of radio communication services;
- substitution of radio communication services for underground or overhead optical fibre; and
- enhance radar filters.

The investigations identified all radio communication services within 20km of the site, an assessment of exclusion zones and an assessment of shadowing at point-to-multipoint services.

With respect to point-to-point services, 11 links were identified that were within 1km of individual turbines. It is not certain that the proposed turbines will affect these services, as a result, some of these turbines may need to be micro-sited so as to not impact the exclusion zones. If this is not possible, further mitigation may be required.

For point-to-multipoint systems, the potential impact is considered to be low. The impacts to AM and FM radio are considered negligible. Mobile radio (mobile telecommunications may be affected by shadow but can be generally rectified by moving the position of the receiver).

It is expected that analogue television signals would have been impacted by the wind farm, but as such television signals are no longer transmitted on Yorke Peninsula this is no longer of concern. Digital signals are considered to be largely immune to interference from wind turbines and it is expected that any interference of these signals will be negligible.

Following construction of the wind farm mitigation measures may be required to improve receival signals. This may include upgrading or relocating antennae at the receiver.

Based on the adopted turbine layout and micro-siting criteria, interference with television and radio signals is considered to be suitably minimised. Ongoing monitoring and investigations will however be required to ensure that prior to construction point-to-point systems will be unaffected by the required micro-siting of individual turbines.

It is agreed that conditions of approval should reaffirm the undertaking of the applicant with respect to the ongoing monitoring to ensure that any interference with radio and other telecommunications frequencies, and GPS operations, is at a satisfactory level and that any required modifications including the methodologies identified above are to be negotiated with the affected operators and the solutions adopted agreed, to the reasonable satisfaction of the planning authority. Mitigation measures to be undertaken by the applicant at no cost to the affected parties.

6.4.3.7. Shadowing, flickering, reflection and glint

Development Plan Provisions

Council wide	Renewable Energy Facilities
Objectives	3
Principles	3
Council wide	Interface between Land Uses
Objectives	1, 2, 3
Principles	1

Parsons Brinckerhoff undertook an analysis of shadow flicker to determine potential flickering and blade glint impacts. Whilst there is no applicable limit for allowable shadow flicker, two guidelines that are considered best practice with respect to shadow flicker have been assessed, being the *Environment Protection and Heritage Council's Draft National Windfarm Guidelines* which reference the *Sustainable Energy Authority Victoria's Policy and planning guidelines for development of wind energy facilities* and the *Draft Planning Bulletin – Wind Farms* by Planning SA.

The limits imposed by Draft National Wind Farm Development Guidelines were adopted in the proposed wind farm layout and in evaluating impacts on dwellings. This guideline covers distances greater than 500m and provides a methodology in making a realistic evaluation of shadow flicker hours received at nearby dwellings.

This guideline prescribes a maximum 30 hours per year of shadow flicker experienced at any dwelling in the area surrounding a wind energy facility.

The analysis undertaken identifies that no occupied dwellings of either stakeholder or non-stakeholder involvement exceed 30 hours of shadow flicker in the worst case scenario. There are five dwellings that are identified as exceeding the 30 hour threshold of blade flicker, however, these dwellings are owned by project stakeholders and are presently not put to any residential use. Further, under this application, as amended, these dwellings are to be put to use as a farm building only. As a result no further mitigation measures are proposed, or required, to reduce shadow flicker at these locations.

Blade glint refers to the periodic reflection of the sun from the wind turbine blades. Blade glint can be received at various locations depending on the position of the sun, cloud cover, turbine yaw position and the pitch of the blades. The wind turbines proposed are to be painted in off-white/light grey colour and have a low reflectivity surface finish. This approach minimises potential impacts of reflection and glint. Additionally, the turbine towers are also finished in the same manner so as to reduce reflections from the towers. This approach, including the unified colour scheme is consistent with other wind farms operating in South Australia, and in time with the relevant planning policies in these matters.

The impacts of shadowing, blade flicker, and glint are considered to be minimised by the design of the wind farm site and the finishes of the turbine structures. Accordingly, the proposal is considered to satisfy Renewable Energy Facilities PDC 3 (a).

6.4.3.8. Agricultural Impacts – Aerial Spraying

Development Plan Provisions

Council wide	Renewable Energy Facilities
Objectives	1, 3
Principles	1, 3, 4
Council Wide	Hazards
Objectives	1, 2, 6
Principles	6, 8, 14

The Ambidji Group Pty Ltd undertook separate investigations into the potential impacts of the proposal on the aeronautical activities proximate to the proposed wind farm. The two investigations are titled *Proposed CERES Wind Farm Aeronautical Impact Assessment, Qualitative Risk Assessment and Obstacle Lighting Review* and *The CERES Wind Farm Project Assessment of Agricultural Applications for Fixed Wing Aircraft*. These reports provide an expert specialist advice, firstly, in relation to the general operation of the wind farm and its potential impacts on air transport and on the operation of airfields and designated landing strips [PDC 1(b)], and secondly the potential impacts on aerial agricultural spraying [PDC 3(d)].

The analysis identifies that the proposed wind farm does not infringe on any aircraft operations' surfaces obstacle limitation or clearance planes for Air Traffic Control Radars and Radio Navigation Aids. Whilst the proposal would infringe upon the lowest safe altitude (LSALT) of the air route N640 to the north-west of Adelaide VOR (very high frequency omni directional range) navigational aid system, Airservices Australia is satisfied that by raising the LSALT by 100ft provides a satisfactory resolution.

The analysis identified that some of the turbines are within the line of sight of the Adelaide Airport Primary Service Radar. Airservices Australia however concurs that the impact of this infringement will have neither significant adverse impacts to the performance of the radar nor any significant adverse operational impacts on the serviceability of the radar, aircraft operations or the air traffic services provider. The proposed wind farm will not adversely affect the performance of Airservices Australia Primary Surveillance Radar or Monopulse Secondary Surveillance Radar or other Communications, Navigation and Surveillance equipment.

There are five operating aircraft landing areas proximate to the wind farm, being Ardrossan (14km from the wind farm), Yorketown (29km), Minlaton (14km), Maitland (16km) and Arthurton (25km). The Parafield and Adelaide Airports are 68km and 64km respectively from the wind farm. The aircraft landing areas in close proximity to the wind farm are used for various private, commercial, medical and aerial agricultural flights. Consultation was undertaken with a number of authorities and operators of aerodromes and service providers in determining the risk level. Subsequently, the report summarises the risk as follows:

- *except for authorised low flying operations all aircraft operating in the area are required by aviation regulations to operate at a height that exceeds the maximum height of the wind turbines proposed for CERES;*
- *pilots conducting authorised low flying Emergency Services and aerial agricultural operations generally utilise organisational operations manuals and safety management systems that provide clear guidance for the planning and conduct of flight in the vicinity of obstacles. It is considered that the risk is mitigated;*
- *to improve conspicuity of the meteorological masts and associated guy wires, it is recommended that the developer mark them in a manner consistent with the NASAG Guideline D section 39 "Marking and lighting of wind monitoring towers." It is further recommended that these markings be adequately maintained to ensure their conspicuity;*
- *the developer should formally advise all relevant stakeholders of the wind farm proposal, including details of the marking of the turbines, wind monitoring masts and above ground power lines; and*
- *with regard to all categories assessed, it is considered that the proposed development poses an overall low level of risk and is considered to be of no operational significance and not a hazard to aircraft safety.*

Further, lighting of the proposed wind farm is not considered to be required as the proposal is not in the vicinity of an aerodrome and has been assessed as not

operationally significant. The proposal thereby is considered to satisfy Renewable Energy Facilities PDC 1(b).

With respect to the impacts on aerial agricultural operations, The Ambidji Group undertook detailed baseline information gathering on existing aerial operations of landowners within the vicinity of the proposed wind farm, determined baseline craft types and the nature of operations to inform scenarios and the analysis of efficiency impacts. Following the analysis, potential mitigation strategies were identified.

Potential safety impacts of the wind farm on aerial operations include the presence of turbines as a physical obstruction, the potential pilot workload increase, the wake turbulence of turbine blades and the mechanical turbulence generated by the turbine structures. The report identifies that the Aerial Agricultural Association of Australia has specific approaches to aerial application planning guidelines to mitigate the risk of wind turbine structures as additional obstacles.

The analysis of the impact on aerial operations considered that impact on efficiency to be relatively small even before considering mitigation strategies. The report indicates that for 80% of the sites adjoining the proposed wind farm aerial spraying is not employed (as is becoming the wider practice generally). As such, only 20% of farms enlist aerial spraying and may be affected in some way by the turbines. Of those farms the area considered to be impacted represents less than 15%, ie aerial spraying impacts involve less than 3% of the immediately surrounding farming areas.

Those impacts are further reduced if smaller aircraft are factored in.

The report recommends that whilst the affected area is minimal, additional mitigation techniques may be considered. As there is limited scope or benefit in relocating turbines with respect to the 3% impacted farm area, the applicant has considered other mitigation measures. In this respect the applicant has explored with the sole aerial spraying contractor management measures which would allow the unfettered continuation of existing aerial spraying practices. Consideration has been given to how the parties may work together and how the turbine operation can be modified so that existing aerial spraying practices by fixed wing aircraft (where currently adopted) may continue.

In this respect the applicant agrees, with appropriate notice, and on days where aerial spraying can be successfully carried out, to shut down affected turbines and rotate the head and angle of blades to a direction parallel with aerial passes, and also to shut down additional turbines, as appropriate in the event that wind turbulence from those turbines is considered to pose a safety threat.

Given that the turbines will be at little or no productivity when conditions are appropriate for aerial spraying, such measures are considered practicable and effective. In conjunction with a range of obligations on both parties, and a commercial consideration to deal with the added complexities and administrative requirements to bring about such changes, the parties have signed a heads-of-agreement on these matters to ensure that, over the long-term, measures are in place to provide for the continuation of existing aerial spraying practices, by fixed wing aircraft, for those relatively few properties where such methods are still employed.

Whilst alternative (ground application or the use of helicopter for aerial spraying services) remain available to all farmers on stakeholder and non-stakeholder holdings, the above agreements put in place operational changes which allow unfettered the continuation of existing farming operations and productivity.

With reference to Renewable Energy Facilities PDC 3(d), the impacts on low altitude aircraft movements for agricultural purposes have, under the agreed operational measures adopted by the applicant, been all but eliminated. There will be some additional administration associated with such practices, but not to the detriment of the aerial spraying contractor nor the relatively limited farming community reliant on such practices.

6.4.3.9. Management of Bushfire Hazard

Development Plan Provisions

Council Wide	Hazards
Objectives	1, 2, 5
Principles	6, 8, 14

The Hazards Section Objective 5 and Principle 8 state:

Objective 5 Development located to minimise the threat and impact of bushfires on life and property.

Principle 8 Buildings and structures should be located away from areas that pose an unacceptable bushfire risk as a result of one or more of the following:

- (a) vegetation cover comprising trees and/or shrubs
- (b) poor access
- (c) rugged terrain
- (d) inability to provide an adequate building protection zone
- (e) inability to provide an adequate supply of water for fire-fighting purposes.

Parsons Brinckerhoff has prepared a fire risk assessment with the application. In addition, the Assessment of Agricultural Applications for Fixed Wing Aircraft also canvasses the potential impacts on aerial fire fighting capabilities.

The subject site is located in an area considered to be of General Bushfire Risk. This level of risk is considered the lowest level of bushfire hazard.

In this respect a significant proportion of the district has been cleared for cereal growing purposes and, with the exception of vegetated corridors along property lines and road verges, and remnant retained natural vegetated areas, a significant proportion of the subject land and its surrounds is cleared and cropped.

Irrespective, productive pastoral districts of the State are subject to bushfire hazard and the extent to which the proposal worsens risks to life and property, and the logistics of defending property and managing the fire hazard is an important consideration. The Parsons Brinkerhoff analysis of the risks identifies that mitigating factors reducing the associated fire hazard include:

- the spacious siting of turbines (placed generally in excess of 600m apart);
- the absence of any overhead transmission lines and other vertical obstacles for combating bushfire by means of aerial attack;
- the absence of fencing of turbines or the restriction to movement of vehicles as will be required to traverse properties in a fire emergency.

The expert views of the CFS on the fire fighting logistics as contained in the agency report is the most pertinent reference in this matter:

“Response of any aircraft to any location is made after a request from the local fire fighting resources. Dynamic risk assessments are a continuous part of fire fighting. Air Operations and wind turbines potentially present no more a problem for aviation than radio masts, power lines and similar obstacles. There is some discussion in relation to downwind turbulence, but in real terms this entire area (downwind) is likely to be subject to heavy smoke ahead of the fire and may not be able to be dealt with by aircraft regardless of obstacles. Each location has unique local conditions, and once again I stress that I continually use dynamic risk assessment process during all of our operations”.

For all of the above reasons and as detailed in the application documents, the presence of towers placed within the district air space is able to be managed as indeed the CFS must already negotiate a number of obstacles. For practical purposes the use of aircraft in fighting a fire emergency is limited by a number of factors including smoke which masks the navigable air space.

Based on the circumstances of the wind farm development and the advice of the CFS, we consider the proposed wind farm does not pose a threat to the incidence of bushfires nor does it place vulnerable structures in areas of unacceptable bushfire hazard. The impact of bushfires on life and property is not materially affected by the proposal. In these circumstances we consider the relevant Development Plan provisions in this respect are satisfied.

6.4.3.10. Traffic and transport

Development Plan Provisions

Council wide	Transportation and Access
Objectives	1, 2 and 5
Principles	1, 2, 13, 22, 23, 24, 25, 27 and 28

Parsons Brinckerhoff provided an analysis of anticipated vehicle movements associated with the proposed wind farm.

The proposed development differs from many types of development in that the majority of traffic movements will occur during construction, with limited vehicle movements associated with its ongoing operation and maintenance.

Traffic associated with the construction at the wind farm can generally be broken into two separate streams, light vehicle movement and heavy vehicle movement. Light vehicle movements are connected with construction personnel, while heavy vehicle movements comprise the delivery of the wind farm components.

The construction work force is anticipated to be temporarily accommodated at sites throughout the Yorke Peninsula, and in the main at either Ardrossan or Maitland, or at a temporary on-site camp. Workers are anticipated to be transported to sites by light vehicles with an average of two persons per vehicle. On this basis, it is estimated that at the peak daily traffic movements will be up to 500 trips, with an average daily trip during construction at 100 vehicles per day.

Equipment and materials are expected to be delivered by ship to Outer Harbor, where they will then be transported on-road to the site. Heavy vehicle requirements include the transportation of the turbines (in components), steel reinforcing, cables and controllers, converter station equipment, cranes, earthmoving equipment and construction materials (quarry materials, cement and water). The average daily movements of heavy vehicles is expected to be 90 trips (two way) per day. The majority of these movements are made up by quarry materials supplies.

The vast majority of vehicle movements are within the general mass limits for heavy vehicles, with the transportation of the tower components, nacelles, blades, converter station and earthmoving equipment comprising over-dimensional vehicles equating to 26% of the total heavy vehicle movement (or 6,360 trips).

Construction traffic will generally come from Adelaide, with the majority of the wind turbine generator components being transported from Outer Harbor. Over-dimensional vehicles will travel the following route:

- Victoria Road
- Port River Expressway
- Salisbury Highway
- Port Wakefield Road
- Copper Coast Highway
- Port Wakefield – Yorketown Road, and
- Ardrossan – Minlaton Road.

Access to the various sections of the wind farm site from Ardrossan-Minlaton Road will be via the local road network. There are to be approximately 70 site access points with each of these providing access for up to 10 wind turbine generators.

Increases in peak daily and hourly traffic are expected to generally affect the Port Wakefield – Ardrossan Road and the Ardrossan – Minlaton Road. This is due to the existing low traffic movements on these roads. Predicted peak daily traffic movements on these roads provide for an increase up to 48.5% and 68.3%, respectively, whilst peak hour movements are predicted to increase 235.1% and 347.1%, respectively. The assessment indicates that each of these roads will maintain an “A” level of service in which the free flow of traffic is retained with a high degree of freedom for drivers to select desired speeds and to manoeuvre within the traffic stream.

The number of additional vehicle movements expected through the key intersections is as follows:

- additional 190 vehicles daily and 42 vehicles in the peak hour through the Copper Coast Highway/Port Wakefield-Yorketown Road junction; and
- additional 503 vehicles daily and 168 vehicles in the peak hour through the Port Wakefield-Yorketown Road/Ardrossan-Minlaton Road junction.

The assessment indicates that sight distances to and from intersections are generally considered to be good, however, where sight distances may not be sufficient or where significant project-generated turning traffic movements will occur, ‘trucks entering’ warning road signs (Australian Standard 1742.1 sign code W5-22) should be installed on the main road approaches to the subject intersections.

A Traffic Management Plan (TMP) will be prepared during the detailed design stage prior to construction and will address a series of considerations and proposed mitigation measures to ensure the general safety and operation of road network during and after construction.

Forecast changes to temporary traffic movement conditions including the loading of key roads and intersections confirms that the proposal over the course of construction will not give rise to unsafe traffic conditions or interfere with the safety at intersections or the function of main roads. Construction management issues including the regime of repair of shoulders/verges of local roads may be required for heavy vehicle access purposes as will be stipulated in the TMP, a matter requiring the further approval of the relevant planning authority.

Post-construction traffic impacts are expected to be minimal. As such, the proposal satisfies, or is able to satisfy, the pertinent Development Plan provisions in this matter.

The proposal will result in increased traffic on arterial and non-arterial roads, however this is largely limited to the construction period. Post-construction, there will generally be only light vehicles accessing the sites.

Further, given that the proposal will maintain an ‘A’ level of service (the highest level), the proposal will not cause unreasonable impacts to the local arterial road network. We consider the traffic associated with the proposed development will suitably maintain a safe and efficient transport network. As such, the proposal is considered to satisfy ‘Transportation and Access’ Objectives 1, 2 and 5 and Principles 1, 2, 13, 22, 23, 24, 25, 27 and 28.

6.4.3.11. Geotechnical (including groundwater and erosion)

Development Plan Provisions

Council wide	Natural Resources
Objectives	1, 2, 6, 10, 11, and 12
Principles	1, 2, 36, 37, and 38

Parsons Brinckerhoff prepared a 'Phase 2 Environmental Impact Assessment Geotechnical' desktop study. This study investigates erosion, groundwater and the re-use of excavated soil and rock.

With respect to the pertinent Development Plan provisions in this matter:

- the subject land is fundamentally capable of supporting the loading generated by the proposed towers and stresses associated with wind turbines;
- the foundation design will be settled on a site-by-site case with the micro-siting of turbines. Earthworks associated with the foundations are expected to fall within the draft construction standards with excess spoil used in association with the turbines, for the remaking/repair of local and access roads and property access points, ie surplus spoil will be used on the site and will not require off-site transport; and
- micro-siting of turbines will ensure the towers are founded on an appropriate and stable, and largely levelled platform which will be engineered to support loads associated with the performance of a wind turbine.

The management of groundwater and erosion is further discussed in Appendix A of the Development Application. This forms the basis of the Sediment, Erosion Drainage Management Plan. This plan is based on the EPA's Stormwater Pollution Prevention Code of Practice. Provided that groundwater and erosion are managed in the manner proposed we consider the proposal will have minimal impact on the natural environment and therefore satisfies Natural Resources Objectives 2, 6, 10, 11 and 12 and Principles 1, 2, 36, 37 and 38.

6.4.3.12. Surface and storm water management

Development Plan Provisions

Council wide	Natural Resources
Objectives	1, 2, 4, 5, and 6,
Principles	1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 20, 22, and 25

Stormwater catchments, overland flow paths and receiving waters were mapped by Parsons Brinckerhoff to inform its high level analysis in respect of surface stormwater. A series of risks and mitigation measures were identified which will form the basis of a

more detailed assessment of existing surface water features as required for new drainage infrastructure during the design phase.

Broadly, the identified risks during construction and operations, include:

- stormwater pollution (sediment and other);
- damage to surface water features;
- damage to receiving waterways or environments;
- damage to existing stormwater infrastructure;
- erosion; and
- blocking overland flow paths.

The Volume 2, technical appendices submitted with the application identifies the scope of surface water and ground water assessment and engineering required to accommodate the wind farm proposal. The scope of a detailed stormwater (and erosion) management plan is broadly identified in the appendices. This document is based on the EPA's stormwater Pollution Prevention Code of Practice and will be the subject of further detailed investigations and the approval of the relevant planning authority and will need to detail, amongst other things:

- requisite stormwater treatment measures;
- ensuring the quality of stormwater is maintained or improved;
- maintaining peak stormwater outflows;
- detail the salt hydrology catchment plans to include sub-catchments and detailed flow paths; and
- determine design infrastructure that ensures the free flow of stormwater.

Subject to the satisfactory completion, and approval, of the stormwater and erosion management plan, the proposal will satisfy the pertinent Development Plan provisions listed above in respect of this matter.

6.5. The high voltage direct current (HVDC) cable

The HVDC cable connection comprises 75.5 kilometres of cables - 61.6 kilometres of marine cable and 13.9 kilometres of land cable. This will include:

- Yorke Peninsula – approximately 2.5 kilometres from operations compound to Port Julia (refer Figure 1.2). The majority of this route runs across private land owned by landowners involved in the project.
- Marine route – approximately 61.6 kilometres across the Gulf St Vincent from Port Julia to St Kilda, to a nominal depth of 1 m.

- St Kilda to Parafield Gardens West route – approximately 11.4 kilometres from landfall to another proposed converter station at Parafield Gardens and then to a grid connection point (refer Figure 1.3). The trench will be approximately 1 m in width, with a construction corridor of approximately 6–8 m. The majority of route will be in road reserve, either around or through the Bolivar sewage works (depending on the final alignment). Two route options are submitted for approval for the terrestrial HVDC cable, however only one will be required.

This section assesses the planning considerations of the cable as it passes through the Coastal Conservation Zone at Port Julia, across the Gulf St Vincent and its route through the Coastal Township Zone in the City of Salisbury.

6.5.1. Land Use

Terrestrial Cable within the Coastal Conservation Zone (Yorke Peninsula)

Coastal Conservation Zone

Objectives	1 and 2
Principles	1

Marine Cable through the Gulf St Vincent (Land Not Within a Council Area [Coastal Waters])

Council Wide

Objectives	1, 3, 8, 22,
Principles	6, 55, 56, 57

Marine Cable through the Gulf St Vincent (Land Not Within a Council Area [Metropolitan])

Council Wide

Objectives	5, 24, 25, 26
Principles	1, 111

Marine and Terrestrial Cable within the Coastal Township Zone (City of Salisbury)

Council Wide

Objectives	Coastal Development
Objectives	1, 2, 3, 4, 5, 6,7, 8, 10, 11
Principles	1, 2, 3, 4, 14, 15

Coastal Conservation Zone

Objectives	1, 3
Principles	1, 2

Wind farms and ancillary development are envisaged development within certain zones and areas in the Yorke Peninsula, Land Not within a Council Area (Coastal Waters), Land Not within a Council Area (Metropolitan) and within the City of Salisbury.

The Coastal Conservation Zone of the Yorke Peninsula seeks low intensity development that protects and conserves the natural coastal environment.

In this instance land within the Coastal Conservation Zone is required to accommodate the below ground cabling, ie essential infrastructure linking the wind farm to the National Electricity Grid. This connection can be achieved in a number of ways and be either above ground or below ground. The proposed method of connection to the grid, by HVDC Cable, is considered to be the most practical method for this proposal and one in which the potential impacts can be managed.

Provided that the proposed cable can be placed with minimal impact on the natural coastal environment, the proposed cable is appropriately located within the Coastal Conservation Zone.

The Land Not within a Council Area (Coastal Waters) covers the majority of the Gulf St Vincent from the Low Water Mark of the Yorke Peninsula to the area covered by the Land Not Within a Council Area (Metropolitan) Development Plan.

The Coastal Waters Development Plan broadly seeks orderly and economic development and the management of development in coastal areas that sustains or enhances the natural coastal environment. The Development Plan does not 'envisage' any types of development. Further, only two types of development are not desired (ie non-complying), that being advertisements and land fill activities. Rather than list envisaged (or unsuitable) development, the Development Plan seeks to ensure that where development is undertaken it does not adversely affect the natural environment.

In our view, and considering the general desirability of wind farms and ancillary infrastructure within the area covered by the Coastal Waters Development Plan, the construction and operation of the HVDC cable is appropriate provided it does not adversely affect the natural environment.

The Land Not within a Council Area (Metropolitan) Development Plan approaches development in a similar manner. The proposed HVDC Cable does not cross any specific zones and is therefore assessed against the 'Council Wide' provisions of the Development Plan. Renewable energy facilities such as wind farms and ancillary development are appropriate where they can efficiently harness the natural wind resource and provided their impacts on the natural environment can be minimised. Accordingly, if the placement and operation of the HVDC Cable does not unreasonably impact the environment, it is appropriate.

The purpose of the cabling is to support essential public infrastructure services and provide a connection into the power grid. Whilst the proposal involves a 600MW connection, we note that a 33Kv (which would entail the some trenching and easement requirements) is exempted from the ambit of 'development', ie no development approval would be required for such purposes. This underlines the importance of public infrastructure under the policy regime of the Development Plan, and also its general community acceptance.

The HVDC Cable enters into the Salisbury Council at St Kilda. The Cable crosses an area that is 'excluded' from Council's Development Plan and then passes into the Coastal Township Zone. This Zone covers the town of St Kilda, a small coastal settlement. Dwellings and small scale tourist and recreational type development are envisaged in the Zone. In the St Kilda township the cable is to be routed through an undeveloped portion of the shack settlement. The Cable then runs to the rear of the dwellings along Whiting Street and Beach Road connecting with St Kilda Road.

In the City of Salisbury renewable energy facilities, including wind farms and ancillary development, are considered appropriate in certain locations. While not specifically 'envisaged' development in the Coastal Settlement Zone, the Council Wide provisions suggest that wind farms and their ancillary development are appropriate where the impacts are managed. The location of the HVDC Cable in the Coastal Township Zone is therefore considered fundamentally appropriate.

6.5.2. Potential Impacts

For the purpose of this assessment we have grouped our discussion of the potential impacts of the siting and laying of the HVDC Cable within and across the Gulf St Vincent under the following headings:

- Flora and Fauna;
- Noise; and
- Geotechnical and coastal processes.

6.5.2.1. Flora and Fauna

Yorke Peninsula

Council Wide	Coastal Areas
Objectives	1, 2, 3, 4, 5, 6, 7, 8
Principles	1, 2, 3, 8, 9, 19, 23
Council Wide	Natural Resources
Objectives	1, 2, 6, 8, 10, 13
Principles	1, 2, 3, 26, 27, 28

Coastal Conservation Zone

Objectives	1, 4
Principles	1, 7, 9, 10

Land Not Within a Council Area (Coastal Waters)

Council Wide

Objectives	9, 12, 14, 16, 17, 18
Principles	2, 3, 4, 5, 16

Land Not Within a Council Area (Metropolitan)

Council Wide

Objectives	5, 7, 8, 9
Principles	41, 42, 44, 47, 48, 49, 113

Salisbury

Council Wide Coastal Development

Objectives	1, 2, 3, 4, 5
Principles	1, 2, 3, 14

Council Wide Conservation

Objectives	1, 3
Principles	2, 3, 4

Coastal Township Zone

Objectives	3
Principles	2

Geo Oceans was engaged to survey the marine habitat of the Gulf St Vincent. Further, EBS Ecology prepared separate flora and fauna assessments of the potential impact associated with the proposal for the Yorke Peninsula and the St Kilda areas affected by the scope of this project.

On the Yorke Peninsula, the HVDC Cable is proposed to be located underground within a trench. Where the cable intersects with the Gulf St Vincent it is proposed to be laid within a trench created by a jet pressure system.

The cable location through the Coastal Conservation Zone has been selected as it provides the least possible impact on native vegetation. The cable crosses through

four road reserves and will require the removal of a minimal amount of native vegetation. EBS Ecology has advised that these sections of native vegetation are in any event of a lesser quality than surrounding vegetation.

EBS Ecology has also considered whether the proposed construction and siting of the HVDC Cable may impact migratory shorebirds. These impacts may be due to localised habitat degradation or the increased disturbance during the construction of the HVDC Cable. In order to minimise this disturbance, EBS Ecology recommend that the HVDC Cable construction be undertaken in June-July during the non-resident period for migratory shorebirds.

The trenching of the cable on the Yorke Peninsula will typically involve a trench of 1 metre in width through a corridor of some 6 to 8 metres wide. At the land/marine interface horizontal directional drilling will be used to minimise the need for excavation in such sensitive areas. The proposed methods of construction, including the trenching and directional drilling, will minimise impacts on native vegetation, soils and habitats. As such, the proposed cable construction and siting satisfies, in my view, Renewable Energy Objective 3 and PDC 3(e).

The Land Not Within a Council Area (Coastal Waters) and Land Not Within a Council Area (Metropolitan) Development Plans contain substantially the same policies that seek to ensure development does not adversely affect the natural environment. Relevant under this sub-heading is PDC 2 of the LNWCA (CA) Development Plan (which is the same as PDC 47 of the LNWCA (M) Development Plan) and PDC 3 (which is substantially the same as PDC 48 of the LNWCA (M) Development Plan):

Principle 2 Development, including flood, erosion and wave protection measures, should not adversely affect the ecology of coastal areas, the seabed or coastal waters by pollution, significant loss of habitat, interference with coastal processes or any other means.

Principle 3 Development should not be located in delicate or environmentally sensitive coastal features such as sand dunes, wetlands or important remnants of native vegetation.
(my underlining)

The survey from Geo Oceans provides an analysis of the types of vegetation habitats across the Gulf. In summary, the marine habitats are dominated by seagrass communities. On the Port Julia side, the seagrass communities are healthy and relatively continuous, however at St Kilda, they are less continuous with significant die back occurring, most likely due to poorer water quality.

It is possible (and preferable) that the siting of the HVDC cable avoid the seagrass communities on the St Kilda side of the Gulf. The health of the seagrass on the Port Julia side suggests that the shortest route through the communities will provide the least impact. Monitoring of the route following the construction to determine any damage to the seagrasses is recommended, and where necessary further planting of these areas could be undertaken.

Geo Oceans state that the ploughing of the HVDC cable into the sea floor would inevitably result in the loss (within the relatively narrow confines of the trenching) of benthic filter feeders such as razorfish, ascidians, sponges and many other species.

However, in the context of the great abundance of benthic filter feeders within Gulf St Vincent, Geo Oceans consider the effect on the local marine ecosystem would be minor.

Accordingly, as the marine environment is unlikely to suffer any significant loss of habitat and as the proposal does not interfere with environmentally sensitive coastal features, the proposal is considered to satisfy PDC's 2 and 3 of the LNWCA (CW) Development Plan and PDC's 47 and 48 of the LNWCA (M) Development Plan.

EBS Ecology's investigations reviewed the potential impacts of the cable location on terrestrial flora and fauna at St Kilda. The investigations identify the habitat associations and potential mitigation measures to avoid detrimental impact to these associations. EBS Ecology advise that the mangrove area ought to be avoided as is proposed with the selected cable route which passes through an exotic grassland area to the rear of dwellings. As proposed, the HVDC cable does not pass through the mangrove area.

The proposed siting and construction of the HVDC Cable is therefore not considered to adversely affect the flora and fauna habitats within the Coastal Township Zone and therefore Zone PDC 2(b) and Renewable Energy Facilities PDC 3(e) are, in our view, satisfied.

6.5.2.2.Noise and Vibration

Yorke Peninsula

Council Wide	Interface Between Land Uses
Objectives	1
Principles	1

Council Wide	Renewable Energy Facilities
Objective	3
Principle	3

Land Not Within a Council Area (Coastal Waters)

Council Wide	
Objectives	41
Principles	56

Land Not Within a Council Area (Metropolitan)

Council Wide	
Objectives	26

Principles 113

Salisbury

Council Wide Form of Development

Objectives 1

Principles 10, 12, 13

Council Wide Renewable Energy

Objectives 2

Principles 3

Parsons Brinckerhoff undertook an assessment of the potential noise and vibration impacts of the construction and operation of the HVDC Cable.

Construction noise associated with the HVDC cabling will typically include road surface cutting, trench excavating, cable laying, directional drilling and trench reinstatement. Within the HVDC Cable corridor between the Coastal Conservation Zone on the Yorke Peninsula and the Coastal Township Zone at St Kilda, the sensitive noise receivers are limited to the dwellings at St Kilda. Potential (worst case) construction noise levels associated with the HVDC Cable laying are predicted between 50 dB(A) L_{Aeq} to 76 dB(A) L_{Aeq} and will exceed the 45 dB(A) L_{Aeq} noise goal.

These predicted noise levels are representative of worst case levels with all construction equipment in simultaneous operation. The works that may exceed the noise goals at the sensitive receivers at St Kilda are expected to last for approximately two weeks. To further lessen the impact on sensitive receivers construction activities will be restricted to the hours of 7:00am to 7:00pm Monday to Saturday.

In our view, given that the impact is confined to a short construction period, and as the construction hours involve daytime activities only, the proposal is considered to minimise the impact on nearby property owners, and therefore satisfies Salisbury Council Renewable Energy PDC 3(e)(ii) and the Yorke Peninsula Renewable Energy Facilities PDC 3(b) with respect to construction noise.

Further, Parsons Brinckerhoff considered the potential impacts on flora and fauna. The noise generating activity for cabling works is expected to influence the ambient noise environment close to the cabling alignment for up to 2 weeks at each work location. The ecological surveys identified that shorebirds were not located within the project sites and as such any disturbance to shorebirds is considered to be of low risk and temporary. Further, whilst the Australian Sea Lion and Leatherly Turtle may inhabit the coastline region, the short term and temporary nature of construction works will limit any disturbance impacts.

The proposed construction technique using a shallow trench and jetting does not require activity such as dredging or impact piling which are high noise generating events known to potentially affect behavioural response of fauna. Any disturbance

is likely to be localised within tens of metres of the cabling and be temporary as the cable ship passes along the cable route.

The installation of the cabling is considered a low risk activity for aquatic fauna. Appropriate scheduling of cabling laying works will minimise potential for impacts on sensitive species particularly during the sensitive breeding, nesting and migration seasons. Accordingly, the proposal is considered to satisfy PDC 56 (3)(C)(iii) of the LNWCA (CW) Development Plan and PDC 113(c) of the LNWCA (M) Development Plan.

6.5.2.3. Geotechnical and Coastal Processes

Yorke Peninsula

Council Wide	Coastal Resources
Objectives	1, 2, 5, 8
Principles	2, 3, 4

Coastal Conservation Zone

Objectives	1
Principles	10

Land Not Within a Council Area (Coastal Waters)

Coastal Township Zone

Objectives	23, 28
Principles	2, 3, 4, 5

Land Not Within a Council Area (Metropolitan)

Council Wide

Objectives	5, 6, 7
Principles	47, 48, 49, 50

Salisbury

Council Wide

Objectives	1, 2, 3
Principles	1, 2, 3, 4

Coastal Township Zone

Objectives	1, 3
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Water Technology undertook a coastal process and hydrodynamic assessment of the proposed HVDC Cable crossing of the Gulf St Vincent.

The assessment considered the HVDC Cable in the context of coastal water levels, tidal and wave driven currents, wave climate, seabed substrate and turbidity generation during jet trenching.

For reasons detailed in this technical advice, it is considered that the proposal will not give rise to unreasonable or long-term impacts on the marine environment and will not render the affected coastlines more vulnerable, or exposed to, coastal processes. The trenching methodology and relatively confined impact associated with such trenching is unlikely to give rise to appreciable or long-term impacts.

For all the reasons set out in the technical advice, we consider that the Development Plan provisions set out above with respect to this matter are satisfied.

6.6. The wind farm's ancillary infrastructure within the City of Salisbury

This section considers the siting of the HVDC Cable route beyond the Coastal Township Zone through to its termination at the Converter Station situated at Bolivar.

For the purpose of this assessment, Route Option A, being the preferred route option has been assessed. Route A predominantly locates the HVDC cable within the road reserves of St Kilda, Robinson, Summer and Jobson Roads as well as an unnamed road connecting Summer Road and Jobson Road. Jobson Road directs the route to the south west towards the Bolivar Waste Treatment Works where the route follows the eastern boundary through a vegetated Rural Zone, and behind the Highway 1 Caravan and Tourist Park. The route briefly returns to an easterly direction running between Hodgson Rd and the Whitehorse Inn before traversing Hodgson Road and resuming the southerly route through the Little Para Linear Park behind a rose farm and connecting into the western side of the Bolivar converter station.

Converter Station

The converter station performance, and considerations, is the same as that for the Port Julia converter station canvassed above. The Parafield Gardens Converter Station will deliver power to the National Electricity grid by connection to the Electranet substation on Shepherdson Road Parafield Gardens.

6.6.1. Zone and Land Use (Terrestrial Cable)

Development Plan Provisions

Excluded

Objectives

Principles

Coastal Township Zone

Objectives 1, 2, and 3
 Principles 1, 2

Extractive Industry Zone

Objectives 1
 Principles 1

Special Uses Zone

Objectives 1
 Principles 1

Rural Zone

Objectives 1 and 2
 Principles 1

MOSS (Recreation) Zone

Objectives 1, 2 and 4
 Principles 1, 2, and 9

For all the reasons set out above, the trenched and directional drilled cable route adopts, in the main, an alignment within road reserves, and passing through an open section of the St Kilda township. In this manner the cabling is secreted from view. Moreover it will not diminish the functional use to which the cable route can be put. Indeed, the trenching and deposition of a cable in these locations is consistent with the utility service function to which the road reserves are, in large part, put.

Through the township the cabling will represent a development constraint but will not jeopardise the primarily intended function or materially diminish the development potential envisaged for this zone. Similarly, following the construction impact and site restoration, the boring/trenching of the cable through the MOSS (Recreation) Zone will similarly not diminish its passive and active open space, and institutional use nor diminish its prevailing open character.

For reasons set out above, construction impacts are to be suitably managed to protect the natural values represented by the near coastal areas and riverine habitat of the Little Para River through which the cable passes.

6.6.2. Zone and Land Use (Converter Station)

Development Plan Provisions

Rural Zone

Objectives	1 and 2
Principles	1, 3, 4, 5 and 6.

Objective 1: A zone comprising land primarily for agricultural purposes by preventing the further division of land.

Principle 3: Development should:

- (a) enhance the appearance of localities, particularly where the existing amenity is low;*
- (b) achieve a higher visual amenity along transport corridors; and*
- (c) through urban design and landscaping, contribute to the creation of visually attractive entrances to Adelaide and Salisbury.*

Principle 4: Sufficient landscaping should be established along the boundary of land adjoining public roads, in particular Port Wakefield and Waterloo Corner Roads, to reduce the visibility of any buildings.

Principle 5: Development should be designed and located to avoid effects on other uses within the zone or locality through noise, traffic, fumes, dust, odour, vibration or any other harmful or nuisance creating impact.

Principle 6: Buildings should be set-back at least 30 metres from the top of the banks of the Little Para River west of Port Wakefield Road.

In essence, the Development Plan considerations in respect of this matter are identical to those for the Port Julia converter station, being essential infrastructure required for the State's power network. Whilst the use is not an anticipated, or primarily intended, activity within the subject Rural Zone the establishment of infrastructure of this nature is appropriate in our view, in the circumstances of the proposal, viz:

- it is a largely stand-alone and compact area of the Rural Zone where the fundamental zone objectives are compromised;
- similar public and private infrastructure is strongly represented in this locality (including the Bolivar treatment works, numerous overhead high voltage transmission lines, the immediately adjoining truck inspection/lay-off bay, and also flood detention/mitigation works associated with the Little Para River);
- the limitations of land size, location, and competing/conflicting land uses surrounding the subject land compromise its long-term viability for productive rural purposes; and
- there is underlying support in the Development Plan for well-located infrastructure required to serve the State's power needs, particular from renewable energy sources.

6.6.3. Visual Impact

Council Wide

Infrastructure

Principle 1: Buildings and structures associated with the supply and maintenance of public utilities should, where practicable, be sited unobtrusively and landscaped.

Council Wide Form of Development Principle 10 is also relevant under this heading.

In respect of the siting of the proposed converter station and its visual impact in the context of the desired landscaped main road corridor, we comment as follows.

The proposed station is well removed from the top bank of the Little Para River. It is also well set back and landscaped along its Port Wakefield Road frontage, behind a widened road verge, occupied in part by the truck inspection/lay-off bay.

Given the physical setting and the strong presence of utilitarian structures and the reasonably achievable visual amenity associated with the nature of this proposal, the converter station is, in our view, appropriately located in this part of the zone and suitably set back and landscaped to maintain its existing landscape character, if not open rural setting along this main road corridor.

6.6.4. Noise Impact

Council Wide

Form of Development

Principle 10: Development should not detrimentally affect the amenity and character of the locality or cause nuisance by:

- (d) excessive noise

The Parafield Gardens converter station is located within, essentially, a fringe horticultural district bounded by major public institutions and utility services. It is flanked by Port Wakefield Road, National Highway Route 1, and a major road corridor carrying in excess of some 41,700 vpd (AADT, July 2013 DPTI) separating the station from the residential community of Parafield Gardens to the east.

Based on the analysis undertaken by Marshall Day Acoustics on behalf of the applicant, the proposed converter station shares a similar noise values to the Port Julia station and will need to be modified in the manner described in the application in order to bring it into conformity with the noise goals of the Environment Protection Authority. The applicant is committed to that course of action and to explore at the final design stage which of the suite of measures best achieves the required attenuation to meet the relevant environmental goals.

As such, we consider the approval can be appropriately conditioned subject to the submission of a final building, and noise attenuation design, which meets the

Environment Protection (Noise) Policy 2007, to the reasonable satisfaction of the Environment Protection Authority.

In this manner, the proposal should not give rise to unreasonable impact or noise nuisance.

7.0 Conclusions

For all the above reasons we conclude:

- the proposed wind farm and its associated infrastructure elements, site works and converter stations are an integral part of the proposed renewable energy outcome, a desired use/activity;
- the physical elements of the proposed wind farm are considered to form an essential part of the landscape of the Primary Production Zone (as expressed in the Zone Desired Character) in which the primary above-ground infrastructure, and all wind turbines, are located;
- the visual amenity of the wind farm is suitably managed through the buffer separation and the physical/visual separation achieved from townships and settlements and non-stakeholder dwellings;
- the proposed wind farm conforms with relevant EPA Guidelines and peak industry standards with respect to relevant impact considerations (noise, shadow flicker, blade glint, and the like);
- critical to the turbine locations is the maintenance of productivity from this cereal belt farming community. Under further amendments made by the applicant the wind farm is to be managed to allow unfettered continuation of fixed wing aerial spraying of its surrounds. As such, it is the footprint of the turbines and proposed buildings alone which limit primary production from the land;
- the impact on the natural and cultural values of the locality are also appropriate, or able to be appropriately managed, as scoped by the application documents (to be further detailed under the CMP);
- amendments to the application and conditions attached to the final design of converter stations ensure that all dwellings (whether stakeholder or otherwise) and sensitive land uses are suitably protected in accordance with the relevant noise goals; and
- marine and terrestrial cabling is to be carried out to minimise construction impacts by employing directional boring through sensitive coastal/near coastal environments. Impacts are confined and short-lived, there being no long-term impacts and few practical impediments to the use of land through which the cabling is to be carried out.

As such, the proposal conforms with the pertinent zones goals and is in substantial accord with the Development Plan, on which basis I consider a Development Plan Consent is merited.



Alan Rumsby **MPIA CPP**



Simon Channon **MPIA**