

**Aircraft hazard assessment of the proposed
Silverton Wind Farm**

April 2008

1.1.1 Aircraft hazard impacts

This section was researched and prepared by Anthony Micallef, EPURON.

The development of the Silverton wind farm would involve the construction of up to 600 wind turbines each with a height of up to 155 metres to the blade tip. Due to the height of the structures, the potential implications for aviation safety have been examined. The potential for aircraft hazard would only occur during the *operational phase* of the wind farm. Air safety issues that have been assessed for the proposed project include:

- Proximity of the proposed wind farm to landing fields,
- Potential intrusion into air traffic zones and regulatory requirements, and
- Potential effects on activities such as aerial spraying of agricultural areas.

Proximity of the proposed wind farm to landing fields

Landing fields may be classified according to whether instrument landings are available. The nearest airfield to the wind farm site providing instrument landings is Broken Hill Certified Aerodrome. CASA advised that the Obstacle Limitation Surfaces¹ reach a distance of 15km from the field. The Broken Hill aerodrome is approximately 6km south of Broken Hill CBD and 22km south east of the wind farm site.

The operator of a certified aerodrome must monitor the airspace around the aerodrome to ensure that buildings and structures do not infringe the OLS. In the case of Broken Hill aerodrome, the wind turbines would be well beyond and below the respective OLS for Broken Hill aerodrome. The proposed structures are not expected to represent hazards or obstructions to this aerodrome.

On the advice of CASA, the proponent notified Broken Hill City Council (the aerodrome operator) on 23rd October 2007. A response from Broken Hill City Council dated 21st January 2008, confirmed the wind farm to be clear of the Obstruction Limitation Surfaces for the Broken Hill Aerodrome.

Airservices Australia was notified on 16th January, 2008 in relation to the proposal. A preliminary high level assessment of the proposal was carried out and at the time, EPURON was advised that there were no radar or satellite links in the vicinity of the wind farm and that there is not expected to be a navigational aid issue as the majority of services are located at Broken Hill which is a sufficient distance from the wind farm.²

A response by email was received from Mr Joe Doherty of Airservices Australia on 4th April 2008 which indicated that:

“The wind farm development will affect several procedures at Broken Hill Airport. The Lower Safe Altitude (LSALT) route W428 west of Broken Hill Airport will need to rise from 2600 to 2900 and the 25MSA must rise from 2700 to 3100 – and consequent changes to all starting altitudes for the instrument procedures to the airport.

¹ The Obstacle Limitation Surfaces (OLS) are conceptual (imaginary) surfaces associated with a runway, which identify the lower limits of the aerodrome airspace above which objects become obstacles to aircraft operations and must be reported to CASA.

² As per discussion with Mr Joe Doherty of Airservices Australia 190108

These changes are within acceptable limits and can be managed safely by Airservices provided we receive prior notification of the commencement of construction for publication by NOTAM (Notice to Airmen).

Parts of the associated transmission lines, in the vicinity of the airport, connecting the wind farm to Broken Hill and on to Red Cliffs (Vic) may also require assessment when details of the location and elevations are available.

The wind farm will not impact on Precision/Non-Precision Nav Aids, HF/VHF Comms, Cables, ASMGCS, Radar or Satellite/Links.”

The Department of Defence was notified in writing on 21st January 2008 in relation to the proposal.³ A response from Mr John Kerwan of the Department of Defence dated 11th March 2008 was sent to Mr Neville Osbourne, Manager, Water and Energy of the Department of Planning with a copy to EPURON.

The letter stated that the Department of Defence had finalised an assessment with regard to the possible impact of the Silverton wind farm on military aircraft operations, radio communications and the operation of navigational aids and radars.

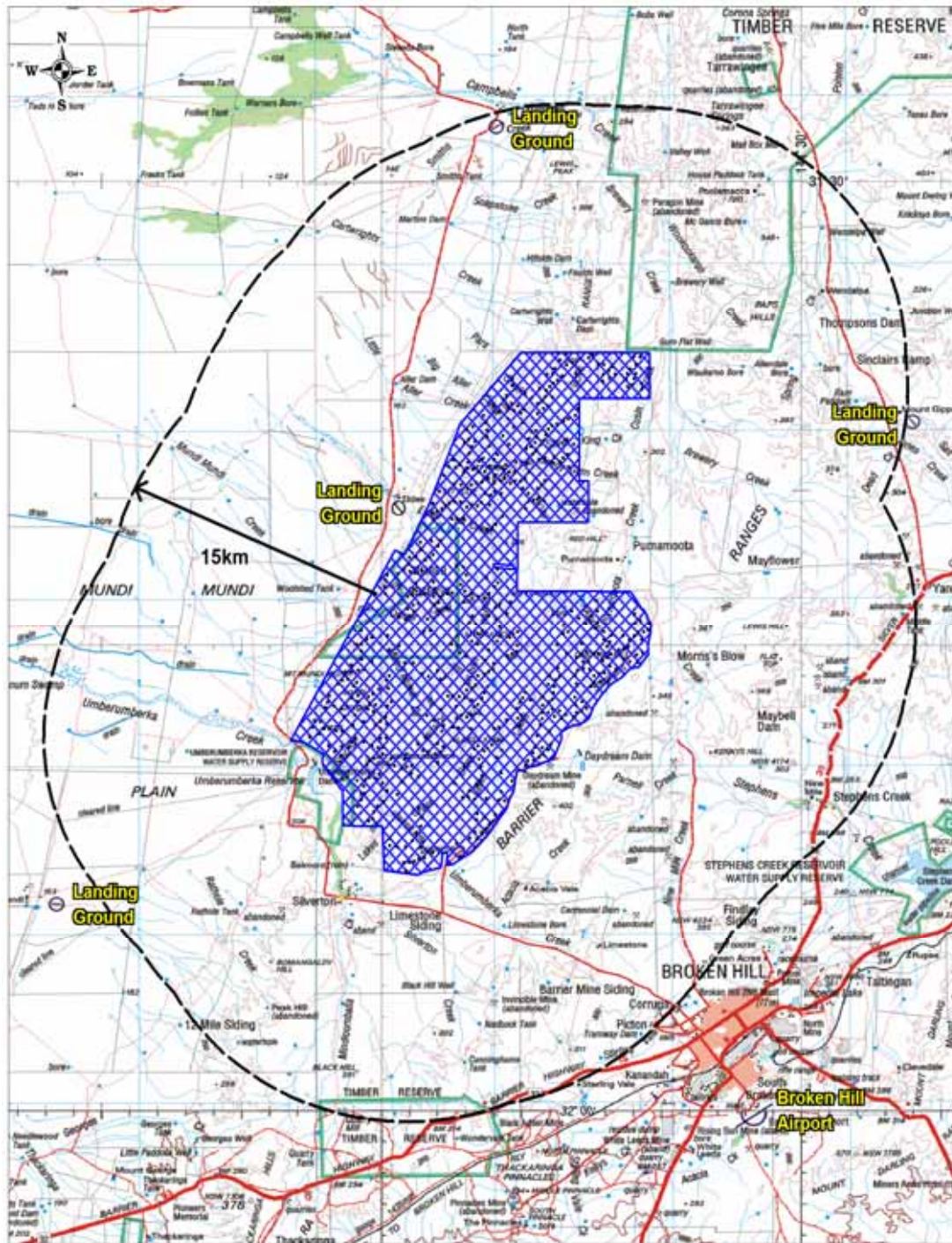
The Department of Defence advised that the proposed development will be outside any areas affected by the Defence (Areas Control) Regulations (DACR). The DACR control the height of objects (both man-made structures and vegetation) and the purpose for which they may be used within approximately 15km radius of Defence airfields. In addition, the proposal has been assessed as unlikely to affect existing Defence communications within the region.

The RAAF AIS has requested that the proponent supply location and height details once the final position of the wind turbines have been determined and before construction commences. After construction is complete, the Department of Defence requests that the proponent provide RAAF AIS with “as constructed” details for the wind turbines, wind monitoring masts and electricity transmission lines if applicable.

Subject to the conditions stated in the letter (Consultation with CASA in relation to Obstacle Marking and provision of location and height details to RAAF AIS) the Department of Defence has no objection to the proposed wind farm.

The minor, private airstrips in the local area rely on visual rather than instrument based landings and as the turbines are clearly visible structures it is unlikely that the development would pose any additional hazard to the users of these airstrips.

³ Email sent to Mr Gary Lees, Department of Defence, Canberra



Location of airstrips in relation to the proposal

- EPURON will provide the “as constructed” location and height of each tower to the Australian Aerial Agriculture Association.

Potential intrusion into air traffic zones and regulatory requirements

Under Civil Air Safety Regulations any person who proposes to construct a structure 110m or more above ground level must inform CASA of that intention and the proposed height and location of the structure. EPURON has advised CASA of the proposal and is currently in consultation regarding their requirements for the lighting of turbines at the site.

The turbines may have aircraft warning lighting which would comprise red flashing beacons on the top of the nacelle to meet the requirements of the Civil Aviation Safety Authority (CASA). CASA draft guidelines for aviation warning lighting for a group of wind turbines require that sufficient wind turbines should have red obstacle beacons to indicate the extent of the group. The interval between beacons should not exceed 900m. Accordingly, we expect that some turbines would require aircraft warning beacons.

To address the potential intrusion into air traffic zones:

- EPURON will provide the location and height of each tower to CASA and the RAAF AIS / Department of Defence once constructed for inclusion in relevant databases, maps and charts.

Potential effects on activities such as aerial spraying of agricultural areas

The wind turbine structures are not considered to be safety hazards to aerial agriculture operations as the structures are clearly visible and pilots can easily avoid them. However, the turbines may limit the areas that can be treated using aerial methods.

The ridge top and immediate slopes of the site would not be able to be treated using aerial based methods after the installation of the turbines. The land is not currently used for agricultural purposes and aerial spraying is unlikely to be required in the foreseeable future.

To address the effect of the development on agricultural spraying:

- EPURON will provide the location and height of each tower to the Australian Aerial Agriculture Association.
- EPURON will liaise with landowners if properties are used for agricultural purposes and would not be able to be treated using aerial based methods to determine an alternative method of treatment.

Correspondence



Australian Government
Civil Aviation Safety Authority

Our file ref :- 07/5882

Mr Anthony Micallef
Project Manager
EPURON Pty Ltd
Suite 104, 349 Pacific Hwy
NORTH SYDNEY
NSW 2060

Dear Anthony

RE: Mundi Mundi Range (Silverton NSW) - Wind Farm Proposal

I refer to your correspondence dated 10 /10/07 in which you advised of a development proposal for establishing a wind turbine farm on the Mundi Mundi Range in the vicinity of Silverton NSW.

In my email response of 11/10/07, I referred you to a Civil Aviation Safety Authority Advisory Publication AC-139-18(0) – Obstacle Marking and Lighting of Wind Farms.

That publication is comprehensive in providing the CASA requirements in respect to wind farm developments, and it is recommended they be considered from the outset when determining sighting.

Broken Hill Certified Aerodrome is the nearest Aerodrome and the Obstacle Limitation Surfaces (OLS's) reach to a horizontal distance of 15000 metres from the edge of the field. The Silverton proposal appears to be well beyond that distance; however it would be prudent to clear this with Broken Hill City Council, the aerodrome operator.

If this is the case and given your advice during our initial discussion that the proposal calls for structures greater than 110m in height Above Ground Level, it will then be necessary to provide sufficient details to this office for a CASA determination.

A plan showing contours and providing turbine locations with geographic coordinates and ground level spot heights will be required. Generally the scale of plan is from 1:15,000 to 1: 30,000.

I also note within the development brief, Buronga and Red Cliffs are strategic sites in respect to the grid connection. Mildura and Wentworth aerodromes are in the vicinity of these areas and consequently it will be necessary to observe the OLS clearance requirements for both these aerodromes.

4 KEL BARCLAY AVENUE ADELAIDE AIRPORT PO BOX 126 PBC EXPORT PARK SOUTH AUSTRALIA 5950
TELEPHONE: (08) 84222930 FACSIMILE: (08) 84222915
Email: vas.saris@casa.gov.au

Aerodrome contacts are;

Mildura

Mr Bill Chapman
Aerodrome Manager
Mildura Rural City Council
PO Box 105
MILDURA
VIC 3502
Tel: 03 50215745

Wentworth

Bill Turner
Aerodrome Manager
Shire of Wentworth
PO Box 81
WENTWORTH
NSW 2648
Tel: 03 50275041

A proponent establishing structures to a permissible height does imply that CASA approves structures, and it does not preclude any proponent from complying with any State or Local Government Development Plans in the sighting or erection of structures.

Aerodromes that are neither Certified or Registered Aerodromes under the jurisdiction of the Civil Aviation Safety Regulations are known as Aeroplane Landing Areas (ALA's); for additional information and details, please refer to;
http://www.casa.gov.au/download/CAAPs/ops/92_1.pdf

For structures in the vicinity of Aircraft Landing Areas, proponents will need to negotiate with the landowners to determine the impact that wind turbines may have on private operations, including medical evacuations. Councils, community groups or individual owners normally administer ALA's; they determine the controls and operational restrictions to accommodate proposals.

Should you have any queries in relation to the above, please do not hesitate to contact me on 08 84222930 or email to vas.saris@casa.gov.au.

Yours faithfully



Vas Saris
District Aerodrome Inspector
Adelaide
22/10/2007



Australian Government
Department of Defence
Defence Support Group

2004/1044160/2
LPSI/OUT/22/2008

Mr Neville Osborne
Manager, Water and Energy
Department of Planning
GPO Box 39
SYDNEY NSW 2001

Dear Mr Osborne

PROPOSED SILVERTON WIND FARM NSW

1. The Department of Defence lodged an interim response to your request for comments in a letter dated 11 January 2008 (LPSI/OUT/2/2008). A copy of the letter is attached at Annex A. In addition to the proposed development outlined in Paragraph 1 of Annex A, it is noted that a 65m high wind monitoring mast has been established on the site with three additional wind monitoring masts to be installed in the future. Also, Epuron Pty Ltd has subsequently advised that the total number of wind turbines may now be up to 600 in number.

2. Defence has finalised the assessment with regard to the possible impact of the wind farm on military aircraft operations, radio communications and the operation of navigation aids and radars. The Department advises the proposed development will be outside any areas affected by the Defence (Areas Control) Regulations (DACR). The DACR control the height of objects (both man-made structures and vegetation) and the purpose for which they may be used within approximately 15km radius of Defence airfields. In addition, the proposal has been assessed as unlikely to affect existing Defence communications within the region.

3. CASA has produced an Advisory Circular, AC 139-18(0) *Obstacle Marking and Lighting of Wind Farms* dated July 2007, which provides amongst other things, guidance to proponents of wind farms. Wind Turbines are tall structures which can be hazardous objects to aviation and the AC outlines measures on how to reduce the hazard including the use of obstacle marking and lighting. In accordance with the AC, CASA will need to assess the proposal and provide determination.

4. It should be noted that tall structures present a hazard to flight safety for low level flying operations. Consequently, there is an ongoing need to obtain and maintain accurate information about tall structures so that risks associated with inadvertent collision by low flying aircraft can be reduced. RAAF AIS in Melbourne is responsible for recording the location and height of tall structures. The information is held in a central database managed by RAAF AIS and relates to the erection, extension or dismantling of tall structures the top measurement of which is:

- a. 30 metres or more above ground level - within 30 kilometres of an aerodrome, or
- b. 45 metres or more above ground level elsewhere.

5. The proposed wind turbines, wind monitoring masts and possibly the electricity transmission lines will meet the above definition of tall structure. RAAF AIS has requested that the proponent supply them with location and height details once the final position of the wind turbines have been determined and before construction commences. After construction is complete, the Department of Defence requests that the proponent provide RAAF AIS with "as constructed" details for the wind turbines, wind monitoring masts and electricity transmission lines if applicable. RAAF AIS has a web site with a Vertical Obstruction Report Form at www.raafais.gov.au/obstr_form.htm which can be used to enter the location and height details of tall structures.

6. Information on tall structures and any queries in regard to the database should be directed to:

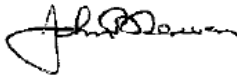
Acronautical Data Officer
RAAF AIS (VBM-M2)
Victoria Barracks
St Kilda Road
Southbank Vic 3006

Tel: (03) 9282 6400 Fax: (03) 9282 6695

Email: ais.charting@defence.gov.au

7. The Department of Defence has no objection to the proposed wind farm subject to the conditions stated at paragraphs 3 and 5. Please direct any questions to Mr Gary Lee on telephone (02) 6266 8187.

Yours sincerely



John Kerwan
Director Land Planning & Spatial Information
BP3-1-A052
Department of Defence
CANBERRA ACT 2600

// March 2008

Annex:

A. Defence Letter LPSI/OUT/2/2008 dated 11 January 2008

cc. Regional Manager DS-SA
Mr Anthony Micallef, Epuron Pty Ltd
Mr Tim Browne, NGH Environmental



Australian Government
Department of Defence
Defence Support Group

*Annex A to
LPSI/OUT/22/2008
dated 11/3/08.*

2004/1044160/2
LPSI/OUT/2/2008

Mr Neville Osborne
Manager, Water and Energy
Department of Planning
GPO Box 39
SYDNEY NSW 2001

Dear Mr Osborne

PROPOSED SILVERTON WIND FARM NSW

1. I refer to your email dated 4 January 2008 advising of a proposal to construct and operate a wind farm and associated infrastructure on a site approximately 25km north-west of Broken Hill. The wind farm will consist of up to 500 wind turbines with an above ground level (AGL) height of up to 158m. The project also requires the construction of transmission lines connecting the wind farm to Broken Hill and connecting Broken Hill to Red Cliffs in Victoria.
2. As advised, Defence cannot finalise a detailed assessment by 25 January 2008. Therefore, as agreed, Defence herewith provides an outline of the assessment which will be undertaken by the Department. Once this assessment has been completed, the results will be forwarded to the Department of Planning for consideration.
3. Wind farms have the potential to affect the safety and operation of Department of Defence activities including military aircraft operations, radio communications and the operation of navigation aids and radars.
4. Being tall structures, wind turbines can be hazardous objects to aviation, especially for low level flying operations. Defence will assess the impact of the wind farm on military aircraft operations.
5. The operation of Line-of-sight Communications, such as VHF and UHF communications and Microwave Links can be affected by the location of a wind farm. Defence will determine if any Defence communications will be affected.
6. A wind farm located in proximity to a radar has the potential to affect its operation, thereby having an impact on the safety of flying operations. Defence will determine if there is a radar within proximity to the wind farm site.

7. Please direct any further questions to Mr Gary Lee on telephone (02) 6266 8187.

Yours sincerely



Natasha Davies
A/Director Land Planning & Spatial Information
BP3-1-A046
Department of Defence
CANBERRA ACT 2600

11 January 2008

cc. Regional Manager SA



Broken Hill City Council

... a safe, vibrant, prosperous and culturally rich City achieved through community leadership and sustainable management.

Quote No 44840 - I3/1
PD:KOB
Telephone / Personal Enquiries
Ask For Mr. Paul Delisio

Please address all communications to:
The General Manager,
240 Bendle Street,
P.O. Box 448,
BROKEN HILL N.S.W. 2880
Telephone: (08) 8080 2222
Fax: (08) 8088 1702
ABN: 84 873 116 132
Email: council@brokenhill.nsw.gov.au
Website: www.brokenhill.nsw.gov.au

January 21, 2008

Mr. Anthony Micallef
Project Manager
Level 11, 75 Miller Street
NORTH SYDNEY NSW 2060

Dear Mr. Micallef,

PROPOSED WIND FARM

Further to your letter of October 2007, please be advised that the Obstacle Limitation Surfaces (OLS's) for the Broken Hill Airport extends out for a distance of 15km from the Broken Hill Airport.

Our understanding is that the proposed wind farm will be located outside of this distance and hence would be clear of the OLS for the Broken Hill Airport. Please advise Council should our understanding that the wind farm will be located further than 15 kilometres from the Broken Hill Airport be incorrect.

Yours faithfully,

PAUL DELISIO
GROUP MANAGER-INFRASTRUCTURE

From: Doherty, Joe [mailto:Joseph.Doherty@AirservicesAustralia.com]
Sent: Friday, 4 April 2008 3:39 PM
To: Anthony Micallef
Cc: Quigley, Kent; Rogers, Carly; Neville.Osborne@planning.nsw.gov.au
Subject: Silverton Wind Farm and Transmission Lines

Anthony

I refer to your request for Airservices assessment of the proposed Wind Farm about 25km north-west of Broken Hill at Silverton.

The wind farm development will affect several procedures at Broken Hill Airport. The Lower Safe Altitude (LSALT) route W428 west of Broken Hill Airport will need to rise from 2600 to 2900 and the 25MSA must rise from 2700 to 3100 – and consequent changes to All starting altitudes for the instrument procedures to the airport.

These changes are within acceptable limits and can be managed safely by Airservices provided we receive prior notification of the commencement of construction for publication by NOTAM (Notice to Airmen).

Parts of the associated transmission lines, in the vicinity of the airport, connecting the wind farm to Broken Hill and on to Red Cliffs (Vic) may also require assessment when details of the location and elevations are available.

The wind farm will not impact on Precision/Non-Precision Nav Aids, HF/VHF Comms, Cables, ASMGCS, Radar or Satellite/Links.

Regards

Joe

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Senior Advisor

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