Attachment J: Aeronautical Assessment by Concept Aero March 2018

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BayWa r.e. Wind Pty Ltd
Suite 5, 73A Rupert Street
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Attn: Peter Lausberg

Subject: Ferguson Wind Farm – Corangamite, Victoria.

BayWa r.e. Pty Ltd received planning approval (PA100139) from the Minister for Planning in April of 2017 for the development of a three (3) turbine wind farm to be located on Princetown Road, Corangamite, Victoria. The physical address of the development site as defined by the planning permit is;

- Lot 1 on Plan of Subdivision 097062 Volume 08876 Folio 795; and
- Lot 2 on Plan of Subdivision 98607 Volume 08870 Folio 539.

The planning permit has approved the development of a three-turbine wind farm and allows for a maximum blade tip height of 150m Above Ground Level (AGL). An increase in blade tip height to 200m AGL is now being sort and this desktop assessment addresses potential implications the proposed height increase may have on aviation activities. Specifically, this assessment has reviewed the proposed height increase against:

- The Obstacle Limitation Surfaces (OLS) and Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) surfaces of licenced aerodromes within the vicinity of the development;
- The impacts the proposed height increase may have on published air routes, Lower Safe Altitudes (LSALT) and Minimum Safe Altitudes (MSA);
- The impacts the proposed height increase may have on the performance of ground-based radio navigation aids and other communications, navigation and surveillance (CNS) facilities; and
- Assess the impacts on other aviation activities such as;
    - Unregistered aerodromes;
    - Recreational flying;
    - Aerial Agriculture;
    - Aerial Fire Fighting; and
    - Aeromedical and air ambulance operations.

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DESKTOP ASSESSMENT:

OBSTACLE LIMITATION SURFACES (OLS)

Registered and Certified aerodromes are required under the aviation regulations to establish Obstacle Limitation Surfaces (OLS) applicable to the code of operation for the specific aerodrome as outlined in Civil Aviation Safety Regulations, Manual of Standards Part 139 (MOS 139). The OLS is a set of imaginary surfaces centred on an aerodrome above which any intrusion is identified as an obstacle. Essentially, the OLS function is to protect visual aircraft from obstacles during take-off, approach and landing. This assessment has reviewed the OLS of all certified, registered and military aerodromes within the vicinity of the proposed development site and has concluded that the site is remote and beyond the lateral extent of any aerodrome that is required to establish and maintain an OLS. Therefore; the proposed height increase of turbines to 200m AGL will have no additional impact on any existing OLS.

PANS-OPS SURFACES

Airspace associated with aircraft instrument approach and departure procedures are defined by the PANS-OPS surfaces. These surfaces are ascertained in accordance with the procedures in the International Civil Aviation Organisation (ICAO) Procedures for Air Navigation Services - Aircraft Operations (Doc 8168, PANS-OPS).

The PANS-OPS surfaces are intended to safeguard an aircraft from collision with obstacles when the pilot is flying by reference to instruments. The designer of an instrument procedure determines the lateral extent of areas needed for an aircraft to execute a particular manoeuvre. The designer then applies minimum obstacle clearance (MOC) to structures, terrain and vegetation within that area to determine the lowest altitude at which the manoeuvre can be safely executed. As a result, PANS-OPS surfaces cannot be infringed in any circumstances.

A review of aerodromes within the vicinity of the proposed wind farm and serviced by an instrument approach procedure was undertaken and identified that the lateral extent of any approach procedure did not encompass the site. Therefore, no approach procedure will be impacted as a result of the proposed turbine height increase.

AIR ROUTES / LOWER SAFE ALTITUDES (LSALT)

Air routes are defined and published for flights between common navigation points and / or destinations. The routes facilitate flight planning and assist with the management of air traffic whilst providing protection from underlying obstacles. Each defined route provides information on direction, distance and lower safe altitude for the extent of the route. The altitude protection requirements for published air routes require that all obstacle be at least 300m below the published route lower safe altitude. A review of the published air route structure within the vicinity of the proposed wind farm indicated that no published route would be impacted by either the approved wind farm tip height of 150m AGL or the proposed increase in tip height to 200m AGL.

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MINIMUM SAFE ALTITUDES (MSA)

Minimum safe altitudes (MSA) are published for all instrument approach procedures associated with an aerodrome. Each published instrument approach procedure has a published safe altitude, protected by at least 300m obstacle clearance, for aircraft operating with twenty-five (25) and ten (10) nautical miles (Nm). Since there are no aerodromes with published instrument approach procedures within 30Nm of the proposed wind farm site there will be no impact on published minimum safe altitudes.

GRID LOWER SAFE ALTITUDES

Grid lower safe altitudes are calculated for each degree of latitude and longitude and published on the applicable aviation charts. Grid lower safes allow the pilot to quickly determine the safe altitude for manoeuvring within each grid square without compromising the enroute obstacle clearance requirements. The obstacle clearance requirements for the calculation of grid lower safe altitudes is 300m. This desktop assessment determined that the currently published grid LSALT overlaying the Ferguson wind farm site is 3700ft (1127m) Above Mean Sea Level (AMSL). Therefore, the maximum height of any obstacle within the applicable grid square without impacting the currently published altitude is 2700ft AGL (823m). Although specific ground height data at the proposed wind farm site is not available, the ground level has been estimated based on GIS data, to be approximately 210m AMSL. Considering a tip height of 200m AGL the total height of the turbine structure is therefore estimated to be approximately 410m (1345ft) AMSL and considerably below the current maximum obstacle height for this grid square altitude.

COMMUNICATION NAVIGATION AND SURVIELLANCE (CNS)

Infrastructure and facilities that assist with the communication, navigation or surveillance (CNS) of an aircraft can be susceptible to interference by obstacles. Radar, ground base navigation aids, radio communication installations and lighting systems are examples of CNS facilities that require protection from the encroachment of obstacles. This desktop assessment has reviewed the CNS facilities within the vicinity of the proposed wind farm and has determined that the increased blade tip height is unlikely to impact on any CNS facility.

OPERATOR CONSULTATION

The *National Airports Safeguarding Framework (NASF); Guideline D* encourages developers of wind farms to undertake consultation with known aircraft operators and aerodrome owners during the early planning stages. In support of the original planning application consultation was undertaken with a number of stakeholders (Attached) resulting in no objection being raised. It is therefore envisaged that the proposed increase in tip height (200m AGL) is unlikely to change this position however the proposed amendment should be circulated for further comment.

AERIAL AGRICULTURE AND FIREFIGHTING

Low level flying operations such as aerial spraying and firefighting are susceptible to the both physical obstacle of a turbine and the turbulent airflow generated downwind of wind turbine

generators (WTG). Avoidance of the physical obstacle can be achieved visually however, the extent that a disturbed airflow would preclude low level flying operations is difficult to quantify. Discussion with aerial agricultural operators indicated that generally, an exclusion zone of up to one (1) kilometre may be applied to the boundary of the wind farm to protect low level flight operations from exposure to both the physical obstacle and any turbulent airflow. Alternatively, the Country Fire Authority (CFA) has identified that a 300m[1] avoidance area from the base of the turbine is sufficient The acceptance of any risk with conducting low level flight operations in the vicinity of a wind farm would ultimately rest with the aircraft operator and pilot.

RECREATIONAL FLYING AND SIGHTSEEING

The proposed Ferguson Wind Farm is located approximately 10km's north of the 12 Apostles which is a major Victorian tourist attraction and often viewed from the air utilising both helicopter and fixed wing aircraft. A fly neighbourly procedure is published in the Enroute Supplement Australia (ERSA) and advises pilots to concentrate operations off shore and to avoid flight landward of the coast. Therefore, it is unlikely that the establishment of the Ferguson wind farm will substantially impact operations in the area. However, it is recommended that the wind farm be published on appropriate aviation charting to alert itinerate pilots to the potential obstacle hazard.

AEROMEDICAL AND AIR AMBULANCE OPERATIONS

Fixed wing air ambulance functions are unlikely to be impacted by the proposed height increase as they generally operate only to approved aerodromes and under the instrument flight rules. Therefore; these operations will continue to be protected by the safeguards afforded by the rule set. Emergency helicopter medical services, which at times may operate to unprepared landing areas, would need to consider the existence of obstacles and flight hazards in the flight planning stages. In the event that such a service may be required in the area flight crews would be alerted to the potential hazard through the publication of information on appropriate charting and thus providing a level of risk mitigation.

FINDINGS

This assessment makes the following findings should turbine blade tip height be increased to 200m AGL;

- No OLS or PANS-OPS protection surface will be impacted by the proposed height increase;
- No lower or minimum safe altitude will be impacted by the proposed height increase;
- Subject to technical assessment no communication, navigation or surveillance facility will be impacted;
- Additional notification and consultation with known stakeholders should be undertaken;
- Low level flying activities such as aerial agriculture and firefighting are unlikely to be further impacted by the proposed height increase;

[1] Country Fire Authority (CFA) – Emergency Management Guidelines for Wind Energy Facilities – August 2017

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- Aeromedical services are unlikely to be impacted by the proposed height increase; and
- Information on the wind farm should be included on applicable aviation charting.