CHAPTER 16

Fire and Bushfire Assessment

16. FIRE AND BUSHFIRE ASSESSMENT

Fire and bushfire impacts of the Project on human life and property have been assessed in accordance with the Director-General's Requirements (DGR's) and the *Rural Fires Act 1997*.

By basing the risk management process on the AS/NZS 4360-2004 *Risk Management* (Standards Australia 2004) and the National Inquiry on Bushfire Mitigation and Management (Council of Australian Governments (COAG) 2004), an analysis and evaluation of bushfire risk and acceptable risk treatments have been undertaken. The complete report on Bushfire Risk Assessment and Risk Treatment Options conducted by Eco Logical Australia (ELA) can be found in **Appendix 19**.

16.1 Methods

The study was conducted using:

- Desktop study;
- Field survey; and
- Analysis of results.

Information was processed according to a methodology adapted from Dovey (2004) based on vegetation type (structure and available fuel loads) and condition (level of disturbance and regeneration), which allows the vegetation on-site to be classified into different fuel types. By comparing fuel types with the slope on which vegetation grows, a bushfire hazard class can be calculated resulting in a ranking of higher or lower potential fire behaviours compared to other sites in the area.

The risk classification scheme is developed through qualitative scales of likelihood and of consequences in methodology adopted from AS/NZ 4360-2004 *Risk Management* (Standards Australia 2004). The terminology for describing risk factors is also consistent with the bushfire risk management planning process adopted by the NSW Rural Fire Service for 'rural fire districts' of NSW. Review **Appendix 19** for an example of the qualitative scales of likelihood and consequences.

16.2 Existing Situation

The majority of the area, including the Project site, consists of cleared pasture with large areas of Natural Temperate Grassland, featuring Snow Gum Woodland in small and scattered remnants, such as within steep gullies (predominantly on the south facing slopes) and along watercourses. For more information on vegetation communities and distribution refer to **Chapter 10** Flora and Fauna.

The Project site has not been affected by a bushfire for more than 25 years, while the Cooma-Monaro and Bombala districts generally experience on average two 'major' fires per year. The times of year that bring the most adverse fire weather conditions are spring and summer, due to strong westerly winds accompanied by high daytime temperatures and low humidity. Although extreme fire weather days can occur at any time from September through to March. Southerly winds may also adversely affect fire behaviour and hamper control efforts during this time.

Generally, the primary cause of bushfires are from camp fires, however accidental fires can also be started from rural and farming activities, lightning strikes and arson.

The existing level of bushfire protection for life and property in the surrounding Project area is relatively good. This is due to the extensive areas of cleared grazing land combined with the compartmentalisation of the landscape by roads which act as fire breaks.

16.3 Potential Impacts

16.3.1 *Bushfire Impacts*

Using methodology adapted from Dovey (2004), it can be seen that the fuel types in the Study area varied from minimal to medium. These results, in conjunction with the analysis of slope, produced **Figure 16.1**, a bushfire hazard map. The steeper slopes with good condition Snow Gum Woodland have a medium bushfire hazard, whereas the rest of the Project site, dominated by grasslands, is a low bushfire hazard.

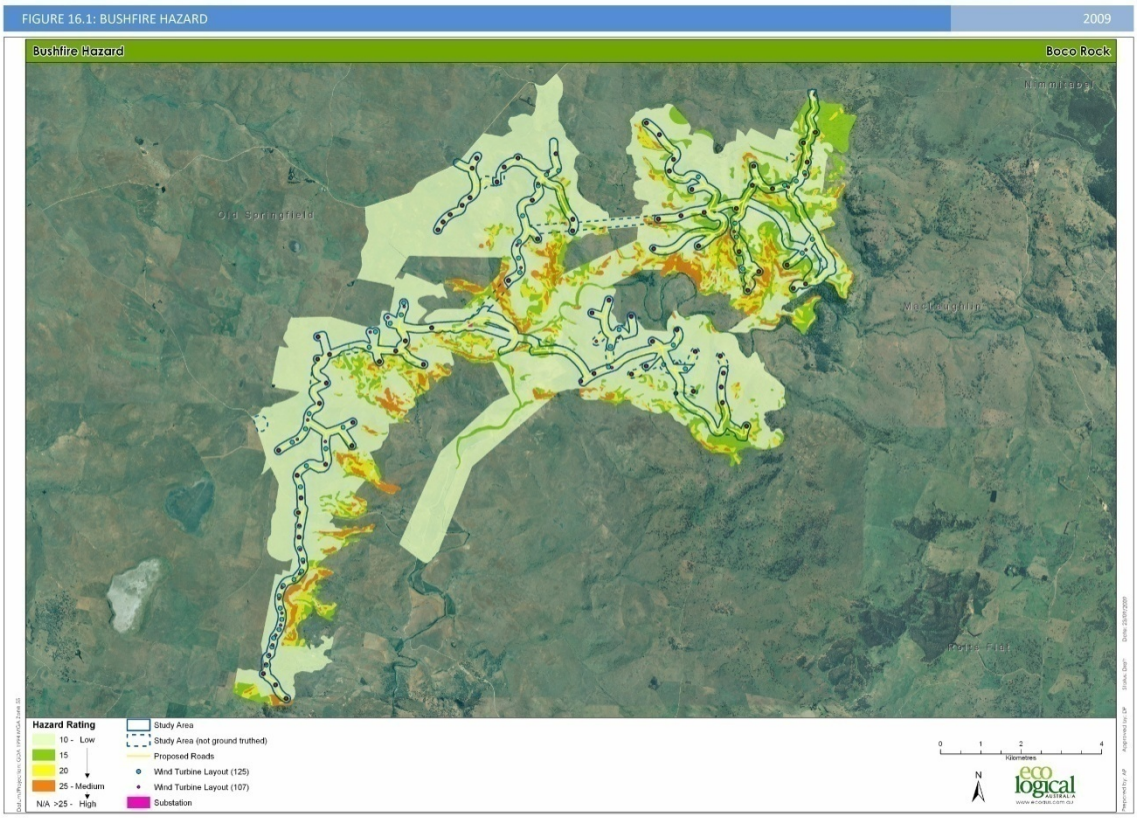

Figure 16.1 Bushfire hazard
(An A3 size version of this Figure is displayed in Volume 2)

Applying the AS/NZS 4360-2004 *Risk Management* (Standards Australia 2004) to life (human), property (built assets) and property (stock and crops), the only category to have a rating above minor was 'localised damage to property with short-term external assistance required to recover', at a rating of moderate. For full results view **Appendix 19**.

16.3.2 *Construction and Decommissioning*

During construction and decommissioning, the use of flammable materials and ignition sources on-site increases the risk of fire.

16.3.3 *Operation*

Substations, ancillary infrastructure, wind turbines and transmission lines all have the potential to start or influence the spread of fire on-site due to the presence of electrical equipment and associated petrochemicals. Wind turbines in particular can start/influence fires from malfunctioning turbine bearings, inadequate crankcase lubrication, cable damage during rotation and electrical shorting or arching which occurs in transmission or distribution facilities (AusWEA 2001).

Fire in modern wind turbines is rare and dedicated monitoring systems (e.g. SCADA) enable turbines to be automatically shut down if ambient temperatures exceed the safe operating range, or if components overheat. Other remote alarming and maintenance procedures are required for electrical faults, which can still occur within the tower or nacelle creating a fire.

A wind turbine can influence its surrounding wind and temperature, which can ultimately impact on bushfires. However the amount of increase is approximately 0.7 °C in temperature and 0.6 m/s in wind speed at ground level (Baidya *et al*. 2004) which is negligible, considering existing vegetation is predominantly cleared pasture and grassland with low and minimal fuel loads.

Lightening strikes have the potential to occur at all wind farm locations with the frequency dependent on the location. Each wind turbine is built with lightening arresters to protect the turbine blades, nacelle and tower assembly. If the lightening is not grounded correctly, then minor damage can occur to the turbine and potentially the surrounding area potentially starting a fire.

Most of the Project will have underground transmission lines as discussed in **Chapter 3** Project Description, which reduces the risk of electrical fires. The remainder, which are overhead transmission lines, will have an increased risk of an electrical fire. However the lines will be built to appropriate specifications and routed to avoid trees and forest fragments where feasible. This will reduce the maintenance required for Asset Protection Zones (APZs), which in turn will minimise the start/spread of a fire.

The transformers are located in the substation facility which will contain oil for the purpose of cooling and insulation. The substation will be built with sufficient bunding to ensure all oil is contained during a leak, reducing the risk of oil spreading and potentially catching fire. The substation itself will be surrounded by gravel and concrete to minimise the spread of fire and improve the APZ.

The Project can also provide benefit for any fire fighting operations due to the installation and maintenance of new or existing tracks. This will allow fire fighters to reduce fire response times and provide an opportunity to more easily access fires on properties neighbouring the Project.

16.3.4 *Cumulative Impacts*

An assessment of cumulative environmental impacts considers the potential impact of a proposal in the context of existing developments and future developments to ensure that any potential environmental impacts are not considered in isolation. It is anticipated that there will be no cumulative effect to fire and bushfire from the introduction of the proposed development into the area.

16.4 Management and Mitigation

For appropriate mitigation and management strategies to be adapted to the Project, the risk analysis provided in **Appendix 19,** should be applied when assembling a management plan. This will then create a Bushfire Emergency and Evacuation Plan as shown in **Appendix 20**. The Bushfire Emergency and Evacuation Plan will become a sub-plan under the Emergency Evacuation Plan which aims to increase the awareness of the procedures during bushfire emergencies, increase the preparedness of construction and maintenance staff, and facilitate orderly and safe evacuation and refuge during times of bushfire impact.

Appropriate fire and bushfire management actions for all stages of the wind farm development (i.e. pre-construction, construction, operation and decommissioning) may include the following (a detailed list is provided in **Appendix 19**):

- Adherence to all regulations under the NSW *Rural Fires Act 1997* and the Snowy Monaro and Bombala Bushfire Risk Management Plans;
- The Rural Fire Service (RFS) and NSW Fire Brigade will be consulted in regard to the adequacy of bushfire prevention measures to be implemented on-site during construction, operation and decommissioning. These measures would potentially cover hot-work procedures, APZ's, safety, communication, site access and response protocols in the event of a fire originating in the Project infrastructure, or in the event of an external wildfire threatening the Project or nearby properties;
- Provide RFS with the locations of wind turbine generator (WTG) locations, ancillary infrastructure, construction work schedule, location of additional water supplies for construction, potential landing pads for fire fighting aircrafts and helicopters and access gates for fire fighting services;
- Installation of access tracks at appropriate width and vertical clearances with access suitable for all weather conditions;
- Education to construction crews and maintenance staff on the topic of bushfire risk management and risks that could be present at the Project;
- Provision of basic fire fighting equipment at each active site, including fire extinguishers, knapsacks and other equipment suitable for initial response actions with a minimum of one trained person on-site;
- Maintain provision for mobile telephone and Ultra High Frequency (UHF) radio communications;
- The collector substation will be surrounded by a gravel and concrete area, free of vegetation, to provide an APZ;
- The collector substation facility will be bunded with a capacity exceeding the volume of the transformer oil. The facility will be regularly inspected and maintained to ensure leaks do not present a fire hazard, and to ensure the bunded area is clear (including removing any rainwater);
- Placement and maintenance of APZ will occur around WTG's, transmission line easements and ancillary structures to minimise the spread of fire. Workplace health and safety protocols will be developed to minimise the risk of fire for workers in the control room and amenities;
- WTG's will be shut down if monitored components reach critical temperatures or if directed to by the RFS in the case of a nearby wildfire being declared (an all-hours contact number would be available to the RFS during the bushfire period);

- Flammable materials and ignition sources brought onto the Project site will be handled and stored as per manufacturer's instructions; and
- Lightening protection will be installed correctly to minimise risk of malfunction.

16.5 Summary

The Project occurs in an area of low bushfire risk due to the vegetation and agricultural practices in the area. By reviewing the possible ignition sources from the wind farm and analysing bushfire risk assessments on life and property it is possible to create mitigation and management strategies to minimise the Projects impact on fire and bushfire risk. Through implementing these strategies in a Bushfire Emergency and Evacuation Plan it is possible to increase the awareness of the procedures of bushfire emergencies, increase the preparedness of construction and maintenance staff, and facilitate orderly and safe evacuation and refuge during times of bushfire. The consideration of these mitigation and management strategies will allow the Project to decrease its impact on fire and bushfire hazards.

16.6 Proposed Transmission Line

The proposed transmission line will be assessed apart from this EA under Part 5 of the *EP&A Act*. Possible impacts and mitigation strategies of the transmission line on fire and bushfire include:

- Overhead transmission lines have a greater risk of an electrical fire than buried lines. With a suitable sized and maintained easement the spread of fire will be minimised. (This will be undertaken with respect to Country Energy guidelines for easement establishment and maintenance);
- Consideration of total fire ban days in regard to hours within which construction takes place can minimise the risk of fire and bushfire ignition;
- Provision of basic fire fighting equipment during construction, including fire extinguishers, knapsacks and other equipment suitable for initial response actions with a minimum of one trained person on-site will reduce the risk of spread of fire; and
- Adherence to all regulations under the NSW *Rural Fires Act 1997* and the Snowy Monaro and Bombala Bushfire Risk Management Plans to reduce the risk of fire and bushfire hazards.

16.6.1 *Cumulative Impacts*

The proposed transmission line development will occur in parallel with the planned upgrade to the existing 66 kV network as described in **Chapter 3** Project Description and the Boco Rock Wind Farm. It is anticipated that there will be no cumulative effect to fire and bushfire from the introduction of the proposed transmission line into the area. However, if necessary, an assessment will be included in the Review of Environmental Factors for the transmission line.