

# Appendix E

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# Clause 13.02 Assessment

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## Proposed terminal station for the Delburn Wind Farm

September 2020



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Cover image: terminal station (courtesy of Delburn Wind Farm Pty Ltd)

## ADVERTISED PLAN

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**Version:** V2

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## Introduction

This report has been developed to assess the proposed Delburn Wind Farm terminal station against the requirements of Clause 13.02-1S of the Latrobe Planning Scheme. The objective of clause 13.02 is 'to strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life'. As this property is located in a Bushfire Prone Area and a Bushfire Management Overlay it meets the 'Policy Application' test to be assessed against the Clause 13.02 Policy.

The report has been developed following extensive assessment of the landscape and local bushfire risk along with access, egress and topography.

The proposal is to develop a terminal station that will allow the proposed Delburn Wind Farm to connect to the existing Victorian electricity network. There are two preferred sites located at Varys Track, Driffield. This report addresses the two potential locations for the terminal station however only one site will be selected in the future. As the sites are located on either side of Varys Track, at the landscape level the outcome of the assessment will not alter significantly.

The location of the terminal station is at the northern end of the Delburn Wind Farm development and is adjacent to one of the existing 220 kV transmission lines running between Hazelwood and Rowville. The site is approximately two kilometres west of the Strzelecki Highway and is accessed from either the north or south along Varys Track and Deans Road.

This report has been developed following a site inspection, analysis of various plans and publications that assess bushfire risk within this area and assessment against Clause 13.02 of the Latrobe Planning Scheme.

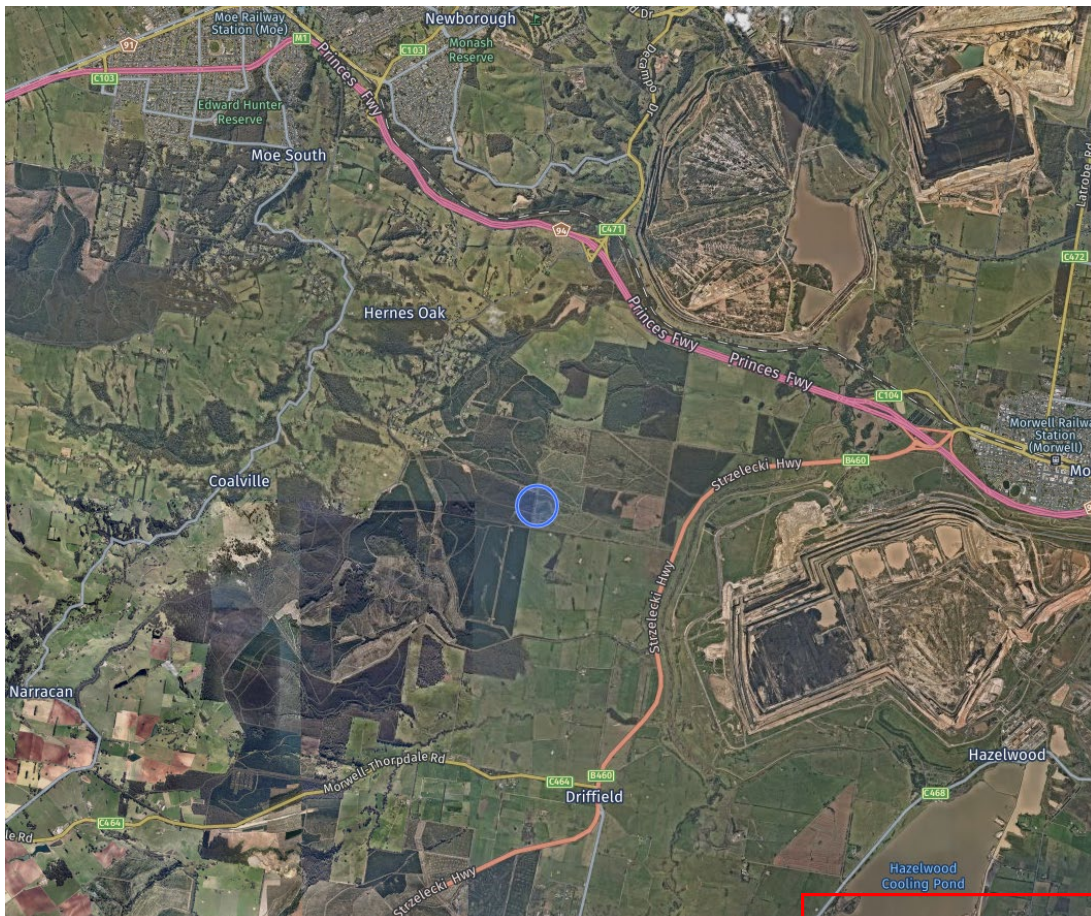


Figure 1 – Subject site with Morwell to the east and Moe to the north west

## Site Details

<b>Municipality</b>	Latrobe
<b>Overlays</b>	Bushfire Management Overlay (BMO)
<b>Zoning</b>	Special Use Zone (SUZ) and Farming Zone (FZ)

## Site Description

<b>Existing use of buildings and works on or near the land</b>	The land is currently used plantations.
<b>Existing vehicle access arrangements</b>	Access to the development will be via Deans Road and Ryans Track
<b>Location of nearest fire hydrant</b>	There are no street fire hydrants within the area. The Planning Permit application for the Delburn Wind Farm proposes to install a 100,000 litre water tank near the terminal station for firefighting purposes.

The terminal station is connected to the Delburn Wind Farm development. The terminal station is located to the north of the development. See Figure 2.

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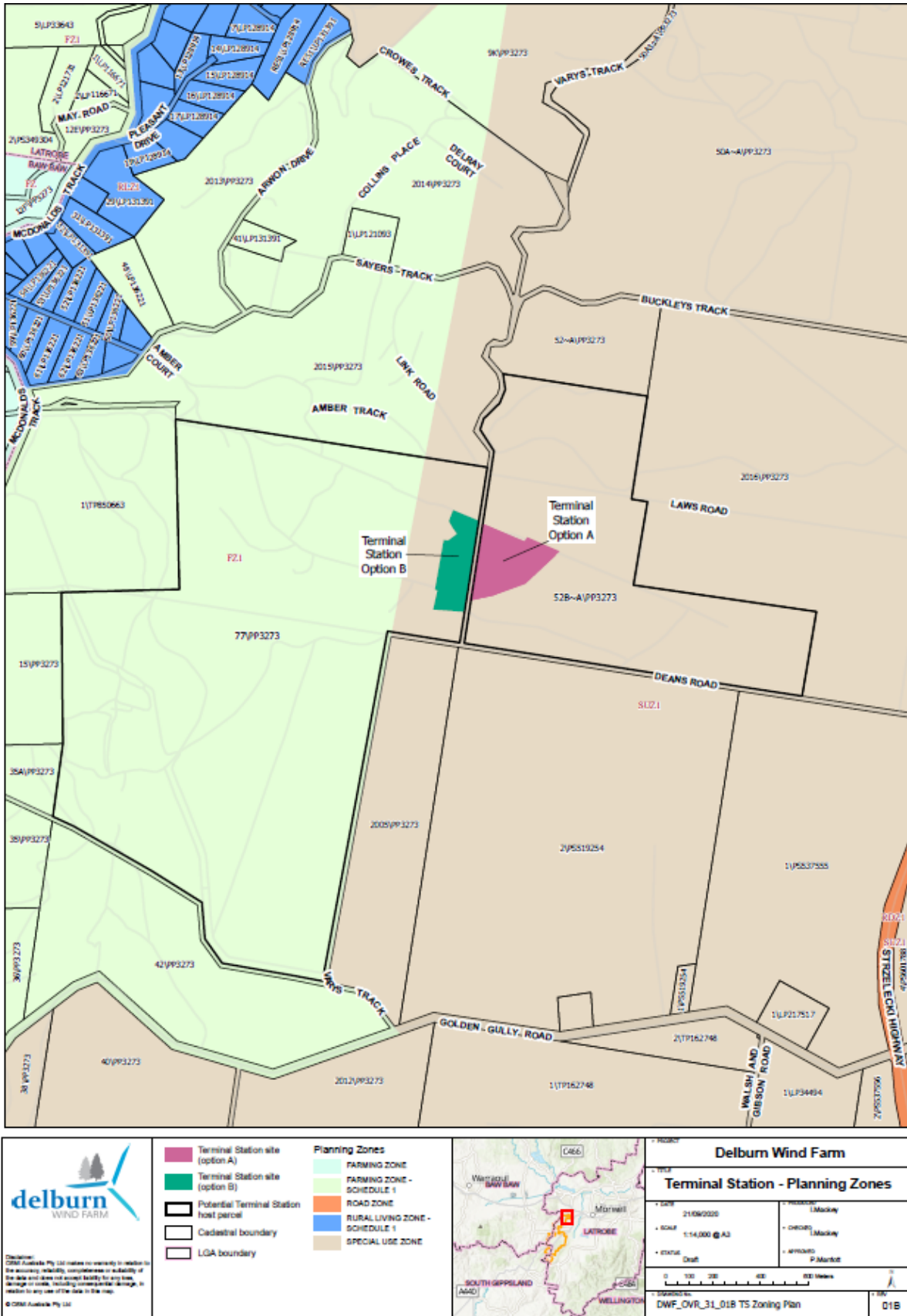


Figure 2 – Location of the terminal station options

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## Bushfire Hazard Assessment

A Bushfire Hazard Assessment is a key component of assessing risk as outlined within Clause 13.02 of the Latrobe Planning Scheme. The requirements outline the need to consider and assess the bushfire hazard on the basis of:

- Landscape conditions (20 kilometres)
- Local conditions (1 kilometre)
- Neighbourhood conditions (400 metres)
- The site for the development

In addition to this assessment, analysis of past bushfire history and the development of likely bushfire scenarios supports the response to the 'settlement planning' requirements of Clause 13.02.

## Fire History

The historical information provided by DEWLP<sup>1</sup> indicates bushfire activity surrounding the location. Most recently bushfires in 2013 and 2014 have burnt within proximity to these locations. The most significant bushfire to burn in this type of landscape was in 2009 when the plantations to the south of this site were impacted by the Delburn bushfire.

Figure 3 outlines the locations of these bushfires that occurred near the site.

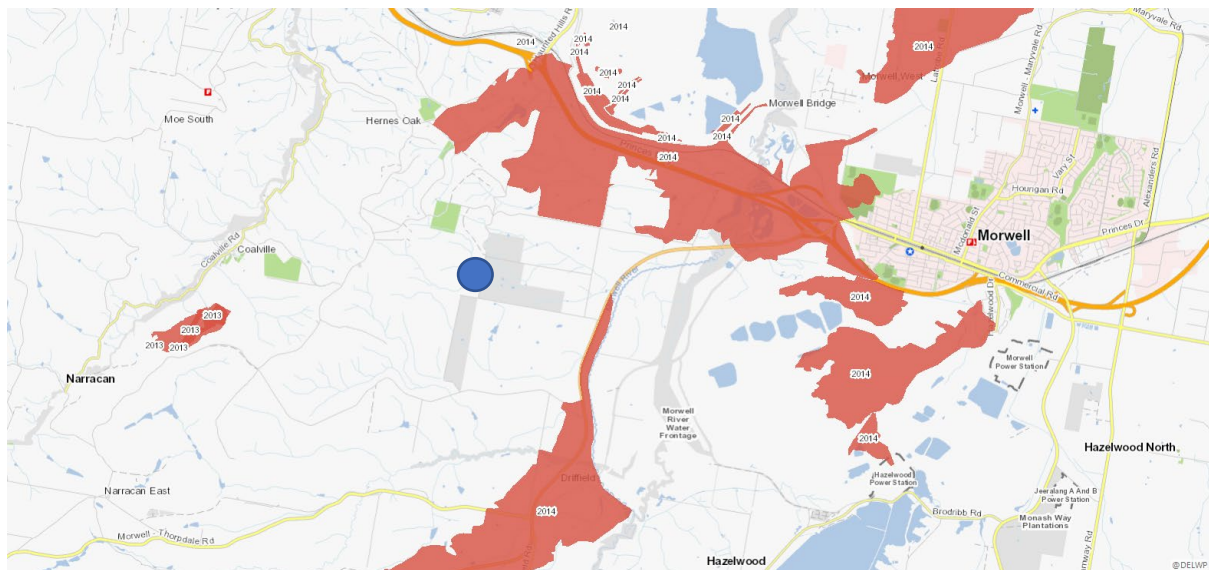


Figure 3 - Bushfire history with the approximate location of the property in blue.

Across the Latrobe footprint, there are certain areas that show more ignitions when compared to other areas. Figure 4 shows the location of ignitions across the municipality. The location surrounding the terminal station shows low numbers of ignitions. This would be consistent with HVPs activities to manage the plantations.

Further to the north west the area of Moe South does show an increased number of ignitions. It is realistic for bushfires starting in this area to reach or at least threaten this location.

The ignition data along with the bushfire history demonstrates that there is an existing extreme bushfire risk across the landscape.

<sup>1</sup> <https://mapshare.vic.gov.au/MapShareVic/index.html?viewer=MapShareVic.PublicSite&locale=en-AU>



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Latrobe City - Risk Map - 2017

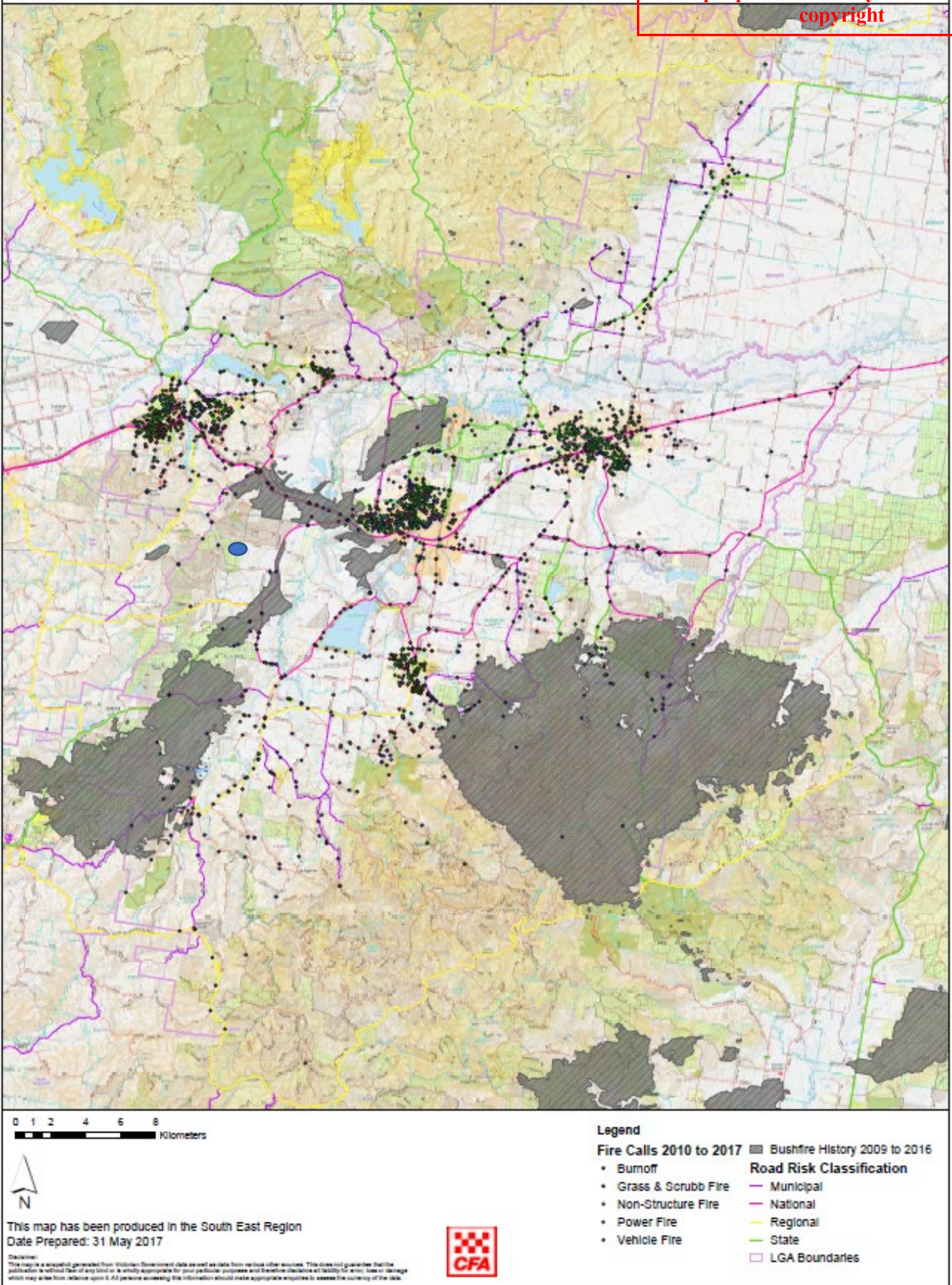


Figure 4 - Fire ignitions within Latrobe City footprint between 2010 – 2017 – sourced from <https://www.communitybushfireconnection.com.au/>. Approximate location of terminal station shown in blue.

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## Vegetation

The vegetation on the sites has recently been removed as part of normal plantation harvesting operations. Plantations when assessed against AS 3959:2018 – *Construction of buildings in bushfire prone areas* results in a Class A - Forest classification. Figure 5 shows the current type of vegetation adjacent to the site.



Figure 5 - Looking westerly from the western edge of one of the proposed sites

The surrounding landscape is largely dominated by plantations. As with all plantations, the risk varies year to year as operations including harvesting and thinning alter the risk profile. This is also the case with the different types of trees that are planted being either eucalypts or pines. Immediately surrounding the two siting options, the plantations have been cleared which provides an opportunity to introduce defensible space to ensure the protection of the terminal station from a bushfire.

## Bushfire risk assessment

An analysis of available bushfire risk information has identified the following sources:

- Latrobe Municipal Fire Management Plan
- Safer Together – Gippsland Priority Fuel Management Areas (PFMA's)
- HVP and Delburn Wind Farm Operational Protocols

The Latrobe Municipal Fire Management Plan (MFMP) outlines the risk across the municipality. In relation to Plantations, it indicates a range of areas where Plantations are present and can be either at risk or can create a risk for adjoining landowners. The MFMP outlines the existence of various plans implemented by HVP including Fire Protection Plan, Fire Operations Folders and Fire Strategy and Management Plan. The MFMP also outlines the role that HVP plays in maintaining strategic fire breaks across their plantations and how these supports the management of landscape bushfire risk.

The East Central Strategic Bushfire Management Plan identifies the Latrobe Valley as a bushfire catchment and states:

*The worst bushfires in this catchment start in the grasslands in and north of Mount Worth Park, and north of Yallourn North in the Tanjil State Forest, with bad bushfires starting many kilometres into the forest. Major areas of convection are the Mount Worth State Park and everything in the large forested area north of Yallourn North in the Tanjil State Forest,*

This effectively states that major bushfires that have time to establish in the forested areas to the north of Yallourn North can effectively impact on wide areas south of the Yallourn North and into the Latrobe Valley. The outcome of the bushfire burning through areas of convection will mean rapid bushfire growth and long-distance spotting will be possible.

The HVP and Delburn Wind Farm Operational protocols have been established in recognition of the risk that is present within the Plantations. These protocols largely provide treatments that both organisations have committed to for the management of bushfire risk.

The outcome of the bushfire risk assessment indicates that there is a history of bushfires in the area surrounding the proposed site, the potential for this area to support major bushfires is present and there are a range of plans in place to manage this risk.

### Likely Bushfire Scenarios

Due to the nature of the landscape surrounding the proposed development, forest fires are the likely scenario with depending on the level of setbacks, bushfires could impact on the development through radiant heat and ember attack. Direct flame contact is a potential due to the presence of Plantations around the site.

The presence of Plantations and native forest to the north west and south west of the proposed site will raise the potential for uncontrollable bushfires to burn in the surrounding area. The likely scenarios for this location include:

- A bushfire starting in the Hernes Oak and Moe South areas to the north west and under elevated fire danger conditions travelling towards the site. Once the bushfire enters the plantations it can burn uninterrupted for approximately two kilometres. Beyond this, the landscape is fragmented and will provide opportunities to suppress the bushfire or slow its spread. It can be assumed that once the bushfire enters the plantation to the north west of the site in and around Hernes Oak, it will travel unimpeded to the site.
- A bushfire burning towards the south west and under a south westerly wind change following a period of elevated fire danger conditions can travel approximately eight kilometres uninterrupted towards the site. The risk of a bushfire starting in the private land to the south west of the site is low due to the nature of the farming areas including large areas that are irrigated.

Figures 6 and 7 provides an outline of the types of bushfires that could impact on the site.

Table 1 outlines the hazard assessment relating to the proposed development.

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Bushfire hazard type	Description	Likely scenario/s	Considerations
Landscape conditions (20 kilometres)	The landscape hazard up to 20 kilometres from the site identifies the large areas of Plantations to the north west and south west mixed with native forest on both private and public land. Refer to Figure 7 for further detail.	<p>The likely scenario includes a bushfire burning in the areas in and around Moe South and Hernes Oak. The ignition data provided in Figure 4 shows the low number of ignitions that occur within the immediate area surrounding the site but this increases when population density increases.</p> <p>A bushfire within the Plantation and forested areas would under a north westerly wind influence, generate embers that would start multiple fires in the grassland areas to the north of the Plantation.</p> <p>It is unlikely for bushfires to impact on this site from north of the Princes Highway as the residential areas of the Moe and Newborough townships provides a buffer between the bushfires north of the Princes Highway impacting on this location.</p> <p>Bushfires traveling towards the site under a south westerly wind influence have the potential to travel for a long distance. The most likely scenario would be a bushfire travelling through Coalville under a north westerly influence and entering the Plantation to the south of the site. Under a south westerly wind change the bushfire is then pushed towards the site.</p> <p>In its current form, the bushfire attack mechanism could include flame contact, radiant heat and ember attack.</p> <p>It is unlikely that firefighting resources would attend the site until after the bushfire front has passed. It may take some time to access the site as the number of trees that have fallen over the access roads would be expected to be high.</p> <p>A bushfire approaching from the south west is also possible however it would be travelling through grassland. There are no large areas of forest to the south west that would generate ember attack to support increased fire spread.</p>	<p>The Operational Protocols between HVP and Delburn Wind Farm are to continue to focus on maintaining the areas surrounding the new infrastructure. This also extends to maintaining the ability to undertake suppression activities at the earliest possible time.</p> <p>The Transmission Line provides a level of protection to the immediate north of the site under lower fire danger conditions.</p> <p>The site can be operated remotely and on elevated fire danger days, will not have people present.</p> <p>There is an extensive road network surrounding the area that provides multiple options to access and egress if required.</p>

Bushfire hazard type	Description	Likely scenario/s	Considerations
<b>Local conditions (1 kilometre)</b>	Within one kilometre of the site the dominant vegetation is Plantations and native forest. The Sayers Trig Bushland Reserve is approximately 800 metres to the north west of the site.	<p>As outlined previously, the risk of a fire starting within the Plantation is low based on the ignition data supplied in Figure 4. However, if a bushfire started within one kilometre of the site, under the right wind conditions would travel towards the site and impact would be through flame contact, radiant heat and embers.</p> <p>At the local level, the variable fuel loads will likely influence bushfire behaviour. As with any Plantation the management arrangements through harvesting and thinning mixed with the various growth stages will usually always ensure that the landscape is a mix of mature stands through to bare earth. In addition to this is the extensive track network that provides opportunities under lower fire danger conditions to undertake suppression activities.</p> <p>To the immediate north of the site is the main Transmission Line between the Latrobe Valley and Melbourne. This area is a minimum of 40 metres wide and will also provide opportunities to suppress a bushfire or slow its spread.</p>	<p>The Operational Protocols between HVP and Delburn Wind Farm are to continue to focus on maintaining the areas surrounding the new infrastructure. This also extends to maintaining the ability to undertake suppression activities at the earliest possible time.</p> <p>The Transmission Line provides a level of protection to the immediate north of the site under lower fire danger conditions.</p>
<b>Neighbourhood conditions (400 metres)</b>	Within close proximity to the site are Plantations.	The likely scenarios are very similar to previous descriptions however the closer a bushfire starts to the site, the increased likelihood that it will not have developed to a point where it can impact on the site.	As above.
<b>The site for the development</b>	The site will be completely clear of all vegetation as per normal terminal station designs.	In the event of a failure associated with the terminal station, the site will be cleared of all vegetation and the ground surface will be maintained with a non-combustible material.	As above.

Table 1 - Overview of bushfire hazard and likely scenarios

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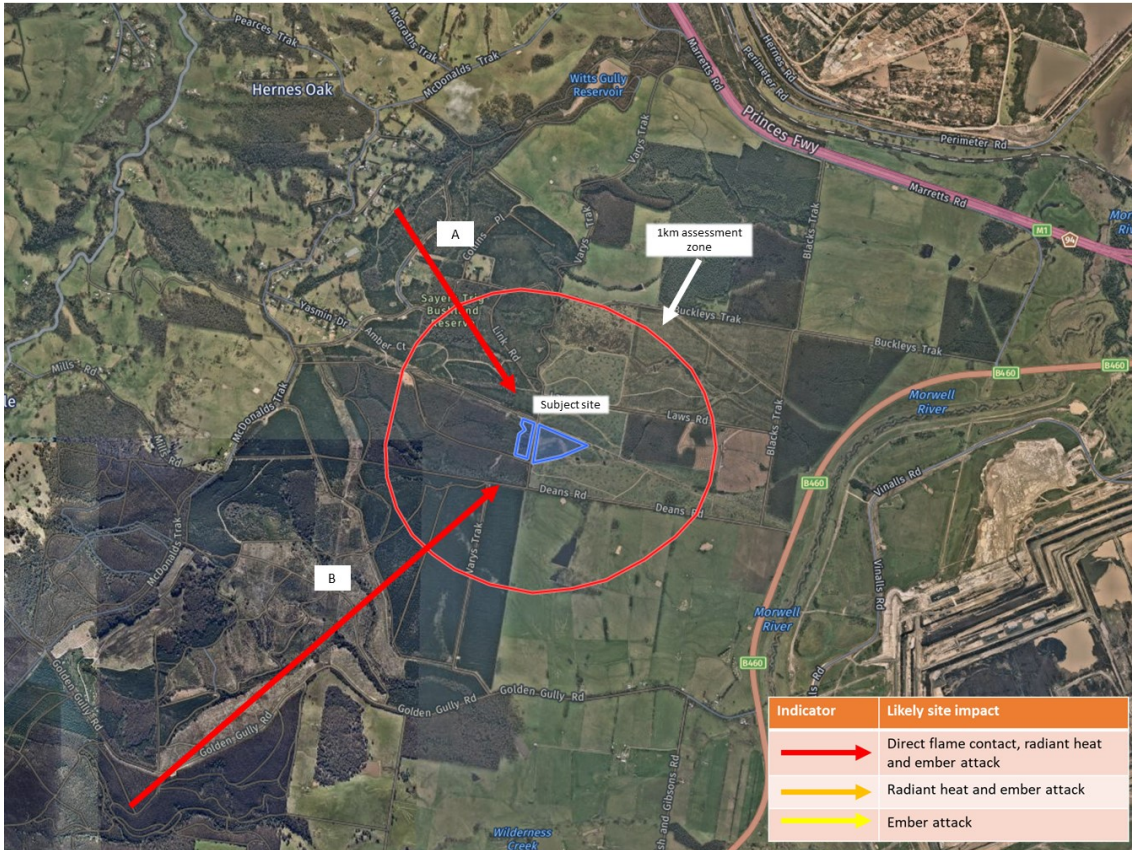


Figure 6 - Landscape risk analysis - 1 km

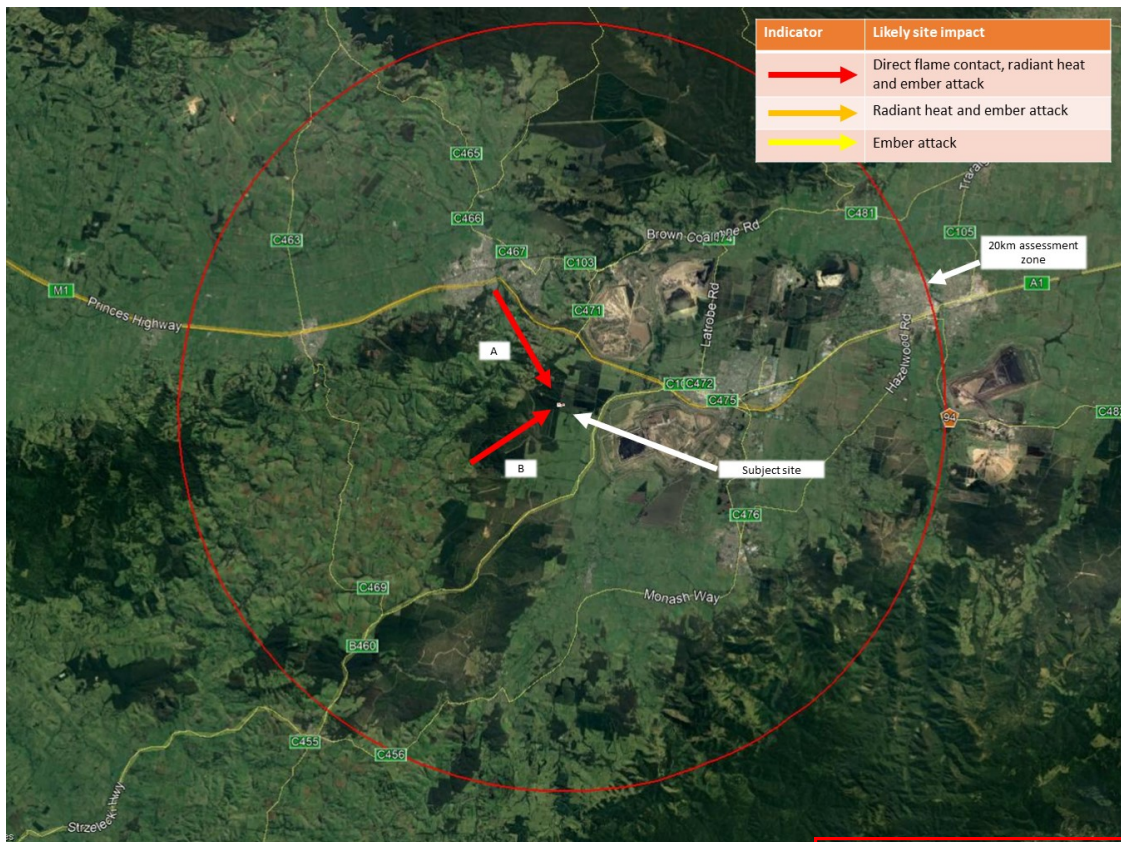


Figure 7 - Landscape risk analysis - 20 km

In summary, the landscape analysis has identified the potential for flame contact, radiant heat and embers to impact on the site unless vegetation management arrangements are introduced. However, due to the nature of terminal stations they are often remotely monitored, and people usually only visit the site when needing to undertake preventative maintenance or fault rectification.

It is acknowledged in nearly any type of landscape, the elimination of ember attack is not possible and as such the terminal station will be required to ensure that areas where embers can impact on the site are suitably protected. The key requirement is the need to manage the impact of radiant heat and flame contact onto the site.

## Settlement Planning – Clause 13.02

Clause 13.02 of the Latrobe Planning Scheme identifies the objectives that are required to be achieved to strengthen the resilience of settlements and communities and prioritise protection of human life.

Table 2 outlines how this development meets the objectives of Clause 13.02 based on the bushfire hazard assessment and the adoption of the proposed treatments.

### Proposed treatments

To offset the identified bushfire risk following the completion of the bushfire hazard assessment and the site analysis, the following treatments are proposed:

1. The development of an Emergency Management Plan that implements a policy that only permits access to the site on Total Fire Ban days to critical works only. The policy also outlines that no person is to be at the site on Code Red days.
2. Following the design of the terminal Station, a detailed analysis is undertaken to identify potential ember ignition points and a design solution is implemented to reduce the potential for embers to start fires.
3. The design of the terminal Station includes the installation of radiant heat barriers that eliminates the potential for flame contact and radiant heat onto the infrastructure.
4. The entire site is surfaced to eliminate all vegetation including grasses.
5. A 100,000 litre firefighting water supply be provided within the Varys Track area.

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Settlement Planning objective	Discussion	Achieved
Directing population growth and development to low risk locations, being those locations assessed as having a radiant heat flux of less than 12.5 kilowatts/square metre under AS 3959-2009 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009)	<p>The terminal station through a mix of vegetation management and radiant heat barriers will ensure that the facility is not exposed to more than 12.5 kW/m<sup>2</sup>.</p> <p>As the terminal station needs to be located within close proximity to the Transmission Line along with providing road access, this location is deemed the most suitable.</p>	✓
Ensuring the availability of, and safe access to, areas assessed as a BAL-LOW rating under AS 3959-2009 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009) where human life can be better protected from the effects of bushfire.	<p>Through the development of an Emergency Management Plan that will ensure limited access on Total Fire Ban days and eliminate people attending the site on Code Red days will ensure human life is protected.</p> <p>BAL LOW areas are available along the Strzelecki Highway and in the town of Morwell. Google maps indicates that the travel time from the terminal station to the Morwell CBD is approximately 10 minutes.</p>	✓
Ensuring the bushfire risk to existing and future residents, property and community infrastructure will not increase as a result of future land use and development.	It is acknowledged that there is an existing extreme bushfire risk at this location. The design of the terminal station will not allow an increase in this risk. Appropriate protection systems will be installed as required by legislation to reduce the potential for fires to start at the terminal station so far as is practicable.	✓
Achieving no net increase in risk to existing and future residents, property and community infrastructure, through the implementation of bushfire protection measures and where possible reducing bushfire risk overall.	The provision of protection systems at the terminal station along with static water supply, radiant heat barriers and reducing the impact of embers will ensure no net increase is achieved.	✓
Assessing and addressing the bushfire hazard posed to the settlement and the likely bushfire behaviour it will produce at a landscape, settlement, local,	The bushfire hazard has been assessed and has identified the bushfire risk. The outcome of this assessment had been incorporated into the proposed treatments for the site.	✓

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Settlement Planning objective	Discussion	Achieved
neighbourhood and site scale, including the potential for neighbourhood-scale destruction.		
Assessing alternative low risk locations for settlement growth on a regional, municipal, settlement, local and neighbourhood basis.	As previously explained, this site is the most suitable due to the need to provide road access and direct access to the Transmission Line.	✓
Not approving any strategic planning document, local planning policy, or planning scheme amendment that will result in the introduction or intensification of development in an area that has, or will on completion have, more than a BAL-12.5 rating under AS 3959-2009 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009).	This development along with the proposed treatments will see the terminal station being able to achieve less than BAL 12.5.	✓

## Conclusion

This area of the proposed terminal station is widely known as being at extreme risk from bushfires. History demonstrates that bushfires within this landscape can be destructive. The available risk information indicates the need to ensure ongoing attempts are made to reduce the risk from bushfires in the areas surrounding Plantations.

The proposed terminal station will introduce infrastructure that allows the Delburn Wind Farm to connect to the electricity grid. The chosen site is influenced by the need to identify a site that provides road access along with direct access to the Transmission Line.

The design of the terminal station will be able to achieve the reduction of radiant heat onto the infrastructure to less than 12.5 kW/m<sup>2</sup>. This will be a mix of vegetation management on the site and the provision of radiant heat barriers surrounding the site. In addition, the implementation of Emergency Management Plan that will restrict access to the site at various levels including reducing preventative maintenance and fault rectification on Total Fire Ban days to critical works only.

Providing the treatments are implemented, the proposed terminal station meets the requirements of Clause 13.02-1S of the Latrobe Planning Scheme.

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## Appendix 1 – Provided plans

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<p><b>delburn</b> WIND FARM</p> <p><small>Disclaimer: CGM Australia Pty Ltd makes no warranty or liability in relation to the accuracy, reliability, completeness or availability of the information shown and does not accept liability for any loss, damage or costs, including consequential damage, in relation to any use of the data in this map. © CGM Australia Pty Ltd</small></p>	<ul style="list-style-type: none"> <li> Terminal Station Works Area</li> <li> Construction Compound</li> <li> Terminal Station Layout B(2)</li> <li> Transmission Access Track Upgrade</li> <li> Existing 220KV Powerline</li> <li> Existing Easement</li> <li> Watercourse</li> </ul>		<p><b>Delburn Wind Farm</b></p> <p><b>Terminal Station Option B(2)</b></p> <p>DATE: 20/09/2020 SCALE: 1:2,000 (B.A.) DRAFT</p> <p>REVISIONS: 1. MUCKEY 2. CHECK BY I. MUCKEY 3. APPROVED P. BARRIST</p> <p>0 20 40 60 80 Meters</p> <p>DWF_OVR_027A_02B TSB2</p>
	<p>CGM Australia Pty Ltd</p>		<p>02B</p>

## Appendix 2 – Site photos

Looking across  
the Option B site.



Looking south  
towards Varys  
Track



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Looking south west from the location of Option B



Looking north west from Option B location.



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## Appendix 3 - Bushfire risk in south east Australia

The south east of Australia is one of the most fire prone areas in the world.

The rate a bushfire can spread is a direct result of the weather, fuel hazard (including dryness, quantity and arrangement) and the topography in which the fire is burning. Bushfire fuel is the only one of these three factors that it is possible to modify.

Extreme fire conditions can occur in south eastern Australia when dry winters and springs are followed by summers where bushfire fuels become very dry.

When these conditions combine, fires can be expected to move quickly under the influence of strong, gusty north westerly winds. These fires can then move rapidly in a different direction when the subsequent south–westerly wind change arrives. Fires that start under these conditions can reach a very high intensity, even in areas of relatively low fuel loads and can be difficult to control until the weather conditions abate.

The height of a bushfire’s intensity is directly linked to its destructiveness and the more difficult it is to control. As the intensity increases so does the difficulty of containment and effective suppression. Very high intensity fires with flame heights greater than 10 metres are generally uncontrollable.

Bushfire intensity is a function of the heat content of the fuel, the quantity of fuel and the rate of spread of the bushfire. The heat content of vegetation fuels is roughly constant. It has been found that the quantity and distribution of fine fuels are the main factor influencing bushfire behaviour. Larger fuels burning during a bushfire do not contribute significantly to the spread of a bushfire.

Fine fuels available to a bushfire are fuels such as grass, leaves, dead pine needles and twigs that ignite readily and are consumed rapidly when dry. They are often defined as those dead fuels less than 6mm in thickness. Fine fuel load (measured in tonnes per hectare) has therefore been used as a convenient measure of the underlying bushfire hazard in areas dominated by woody vegetation. The fine fuel load at any given time is a balance between the rate of fuel build up, and factors that remove fuel such as litter decomposition and fire. In the absence of fire, fuel loads in forests and woodlands with a shrubby or heathy understorey build up to a quasi-equilibrium state where the rate of fuel production equals the rate of decomposition. The maximum levels vary for different vegetation types and for the same vegetation types in different locations.

It has been found that fuel structure is possibly more important than the total fine fuel load in determining bushfire behaviour. Fuels in forests, woodlands and shrublands can be categorised into four layers with differing effects on fire behaviour (Hines, et al., 2010). These layers are:

Surface fine fuels: leaves, bark, small twigs and other fine fuel lying on the ground. These fuels provide the horizontal continuity that allows a bushfire to spread

Near surface fine fuels: grasses, low shrubs, bracken etc. up to about .5 m above the ground surface. Fuels in this layer will burn when the surface fuel layer burns and will increase bushfire intensity

Elevated fuels: larger shrubs and small saplings with most of the fuel closer to the top of this layer and a clear gap between them and the surface fuels. These interact with the two-layer fuel layers to further increase bushfire intensity. They also contribute to the vertical continuity of fire that allows fire to ‘climb’ into the tree canopy

Bark fuels: flammable bark on trees, saplings and large bushes from ground level to the canopy. Loose fibrous bark on string-bark eucalypts, and candle bark on some gums can generate large amounts of burning embers which can start spot fires ahead of the main fire front.

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