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DEVELOPMENT APPROVAL

Approval no: DEV2018/961

Date: 10 September 2021



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Land and environment consultants

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## Bushfire management plan

Proposed reconfiguration of a lot | 4499-4651 Mount Lindsay Highway | North Maclean | Queensland  
Prepared for Wearco Pty Ltd | 13 July 2018

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## Bushfire management plan

Final V3

Report 16014 | Prepared for Wearco Pty Ltd | 13 July 2018

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Prepared by Robert Janssen

Position Managing principal

Signature



Date 13 July 2018

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### Document control

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**Appendix**

Appendix 1	Reconfiguration of lot plan
Appendix 2	Threshold quantities for hazardous chemicals
Appendix 3	SPP draft model bushfire hazard overlay code assessment

### *Disclaimer*

Notwithstanding the precautions adopted in this report, it should always be remembered that bushfires burn under a range of conditions. An element of risk, no matter how small always remains, and although AS 3959-2009 is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.

It should be noted that upon lodgement of a development application, council and/or the fire service may recommend additional construction requirements.

Although every care has been taken in the preparation of this report, Land and Environment Consultants accept no responsibility resulting from the use of the information in this report.

# 1 Introduction

Land and Environment Consultants (LEC) was engaged to undertake a bushfire hazard assessment and prepare a bushfire management plan for the proposed development (reconfiguration of 1 lot into 4 lots – industrial and business development) at 4499-4561 Mount Lindsay Highway, North Maclean, Queensland (the site), properly described as 39/SP258739.

The site is within the Logan City Council local government area and the *Greater Flagstone Urban Development Area*. The proposed development is consistent with the industrial business precinct designation for the site established by the *Greater Flagstone Development Scheme* (UDLA 2011). Therefore, Economic Development Queensland (EDQ) are the assessment authority for the proposed development rather than the local council.

EDQ have requested the proposed development be assessed against the Queensland State Planning Policy (SPP) *Draft model bushfire hazard overlay code* (SPP draft model bushfire hazard overlay code).

The site is affected by the SPP *Bushfire hazard area overlay* (SPP bushfire hazard overlay) map for high and medium bushfire hazard areas and potential impact buffer area. Therefore, the proposed development is subject to bushfire hazard assessment and compliance with relevant performance outcomes sought under the SPP draft model bushfire hazard overlay code.

This bushfire management plan has been prepared in general accordance with the SPP draft model bushfire hazard overlay code. It documents the bushfire hazard assessment for the site and identifies strategies that the proposed development will implement to mitigate the potential impacts of bushfire on life, property and the environment and includes:

- an introduction (this section) and description of methods and information resources used for the bushfire hazard assessment;
- description of the site and the proposed development;
- bushfire hazard assessment;
- identification of bushfire hazards associated with the site and the proposed development;
- a plan for mitigating bushfire hazards; and
- assessment of the proposed development against the SPP draft model bushfire hazard overlay code.

## 1.1 Method

To meet the requirements of the SPP draft model bushfire hazard overlay code the following steps were undertaken:

- desktop review of the SPP bushfire hazard overlay map;
- desktop review of the Queensland regional ecosystem (RE) map (version 10), vegetation hazard class (VHC) map and severe fire weather map on the Queensland Fire and Emergency Services (QFES) online mapping system (redi-portal);
- assessment of the site and land within 100 m of the site, including:
  - vegetation characteristics and current management practices;
  - slope; and
  - evidence of previous fires;
- bushfire hazard assessment in accordance with Part B of the SPP Natural Hazards, Risk and Resilience Technical Manual – *A ‘fit-for-purpose’ approach in undertaking natural hazard studies and risk assessments* (April 2016) (SPP bushfire hazard assessment manual) and the patch and corridor filters in the State Inter-Departmental Committee on Bushfires guideline, *Commonwealth Scientific and*

*Industrial Research Organisation (CSIRO) Bushfire prone area patch and corridor filter rules (2016)* (CSIRO patch and corridor filter rules);

- consultation with QFES to identify local knowledge about bushfire history and bushfire ignition sources around the site; and
- assessment of the proposed development against the SPP draft model bushfire hazard overlay code.

Aerial imagery of the site was accessed online from Google Earth to assist in validating observations and measurements made during the site assessment.

## 1.2 Suitably qualified person

This bushfire management plan was prepared by Robert Janssen who is a suitably qualified and experienced bushfire management consultant.

Robert is the managing principal at LEC and has over 20 years of experience in bushfire planning and operations. He has prepared bushfire management plans for residential, commercial and industrial property developments, utilities, government facilities and conservation estates.

Robert's formal qualifications as an environmental scientist and consulting experience are coupled with 10 years of experience as a nationally accredited fire-fighter with the national parks and wildlife service in New South Wales and Queensland.

## 2 Description of the site and the proposed development

### 2.1 Site description

The site is 117.9 hectares (ha) and is bordered by Crowson Lane to the north and Mount Lindsay Highway to the east and is designated as an industrial business precinct under the *Greater Flagstone Development Scheme*. The location of the site is shown on Figure 2.1.

The site adjoins naturally vegetated land to the south and naturally vegetated land and rural residential properties to the west. Rural residential properties also occur north of Crowson Lane and east of Mount Lindsay Highway.

Natural vegetation adjacent the south and west boundaries of the site mostly consists of Eucalyptus and Corymbia species in woodland formations. Melaleuca species in forest formation also occur in low lying areas adjoining the south boundary of the site.

The site is currently developed for an agricultural purpose, ie grazing, and has a Powerlink high voltage powerline easement which runs from the east boundary of the site to west.

The site is gently sloping and has an easterly aspect.

### 2.2 Proposed development

The proposed development is a reconfiguration of 1 lot into 4 lots, public road and 6.62 ha open space, as shown on the reconfiguration of a lot plan at Appendix 1.

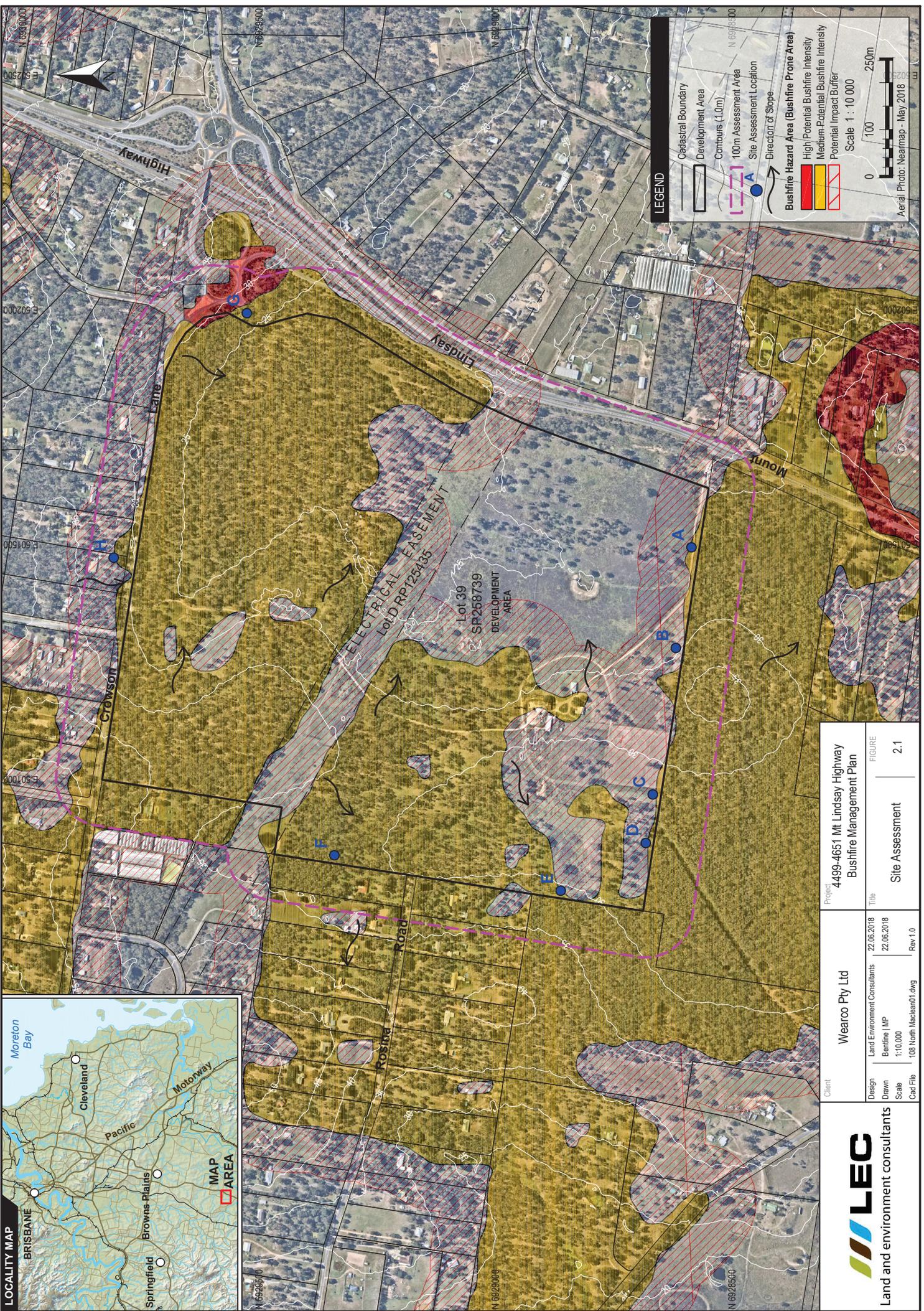
Proposed lots will be used for an industrial and business purpose and range in size from 15.52-35.5 ha.

Proposed access/egress will be from the existing road stub on the new Mount Lindsay Highway interchange. There will also be a temporary access easement to Crowson Lane opposite Greenhill Road.

Proposed open space will occur in a narrow corridor along the full length of the west boundary of the site and along part of the south boundary of the site. It will be subject to vegetation restoration plantings consistent with RE 12.3.3 *Eucalyptus tereticornis* woodland on Quaternary alluvium (RE 12.3.3) and RE 12.9-10.12 *E. seeana*, *Corymbia intermedia*, *Angophora leiocarpa* woodland on sedimentary rocks (RE 12.9-10.12).

### 2.3 Bushfire hazard overlay

The SPP bushfire hazard overlay map is shown on Figure 2.1 and indicates the site is affected by high and medium bushfire hazard areas and potential impact buffer area.



<b>LEC</b> Land and environment consultants	Client	Wearco Pty Ltd	Project	4499-4651 Mt Lindsay Highway Bushfire Management Plan
	Design	Land Environment Consultants	Title	Site Assessment
Drawn	Bentline   JMP	Figure	2.1	
Scale	1:10,000			
Cad File	108 North Maclean01.dwg			
		Rev 1.0		
		22.06.2018		
		22.06.2018		

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## 3 Bushfire assessment

### 3.1 Site assessment

VHC mapping was reviewed on the redi-portal so that it could be compared with observations from the site assessment.

The site assessment was performed on 10 May 2016 and focused on land within 100 m of the site. The location of site assessment points is shown on Figure 2.1 and Table 3.1 provides a summary of VHC mapping from the redi-portal, ground truthed VHCs and other observations from the site assessment. The characteristics of the assessment points are shown in Photograph 3.1 - Photograph 3.7.

**Table 3.1 Site observations**

Assessment Point	Redi-portal VHC	Ground-truthed VHC	Notes
A	VHC 13.1 <i>Dry to moist eucalypt open forests on undulating metamorphics and granite</i>	VHC 13.2 <i>Dry to moist eucalypt woodland on undulating metamorphics and granite</i>	There was no evidence of recent fires.  The slope of land under vegetation is flat when measured perpendicular to the boundary of the site.
B	VHC 10.1 <i>Spotted gum dominated open forests</i>	VHC 10.2 <i>Spotted gum dominated woodlands</i>	There was no evidence of recent fires.  The slope of land under vegetation is 2° upslope when measured perpendicular to the boundary of the site.
C	VHC 10.1 <i>Spotted gum dominated open forests</i>	VHC 10.2 <i>Spotted gum dominated woodlands</i>	There was no evidence of recent fires.  The slope of land under vegetation is flat when measured perpendicular to the boundary of the site.
D	VHC 13.1 <i>Dry to moist eucalypt open forests on undulating metamorphics and granite</i>	VHC 22.1 <i>Melaleuca dry open forest on sand plains or depositional plains</i>	There was no evidence of recent fires.  Vegetation is associated with a drainage line.  The slope of land under vegetation is flat when measured perpendicular to the boundary of the site.
E	VHC 22.1 <i>Melaleuca dry open forest on sand plains or depositional plains</i>	VHC 13.2 <i>Dry to moist eucalypt woodland on undulating metamorphics and granite</i>	Evidence of fire – charring on trees up to 4 m high.  The slope of land under vegetation is 2° upslope when measured perpendicular to the boundary of the site.
F	VHC 10.1 <i>Spotted gum dominated open forests</i>	VHC 40.4 <i>Continuous low grass or tree cover</i>	Mostly rural residential properties with small areas of natural vegetation, buildings, driveways and managed land, ie trees with cut grass.  The slope of land under vegetation is flat when measured perpendicular to the boundary of the site.  VHC 40.4 is a non-bushfire prone hazard class.

**Table 3.1 Site observations**

Assessment Point	Redi-portal VHC	Ground-truthed VHC	Notes
G	VHC 16.2 Eucalyptus dominated woodland on drainage lines and alluvial plains	VHC 16.2 Eucalyptus dominated woodland on drainage lines and alluvial plains	<p>Evidence of fire – charring on trees up to 8 m high.</p> <p>1.5 ha patch of vegetation which will be reduced in area with construction of the connection road to the Mount Lindsay Highway interchange access road.</p> <p>The slope of land under vegetation is 2° downslope when measured perpendicular to the boundary of the site.</p>
H	VHC 10.1 <i>Spotted gum dominated open forests</i>	VHC 40.4 <i>Continuous low grass or tree cover</i>	<p>Mostly rural residential properties with small areas of natural vegetation, buildings, driveways and managed land, ie trees with cut grass.</p> <p>VHC 40.4 is a non-bushfire prone hazard class.</p>



**Photograph 3.1 Assessment location A**



**Photograph 3.2 Assessment location B**



**Photograph 3.3 Assessment location C**



**Photograph 3.4 Assessment location D**



Photograph 3.5 Assessment location E



Photograph 3.6 Assessment location F



Photograph 3.7 Assessment location G

### 3.2 Bushfire hazard assessment

The bushfire hazard assessment for the site is based on Part B of the SPP bushfire hazard assessment manual and the patch and corridor filters in the CSIRO patch and corridor filter rules.

### 3.3 Bushfire hazard area patch and corridor filters

Assessment of vegetation against the CSIRO patch and corridor filter rules is a process used in the development of the SPP bushfire hazard overlay map.

Vegetation at assessment points F and H is consistent with VHC 40.4 *Continuous low grass or tree cover* which has a potential fuel load of 5 t/ha and is a non-bushfire prone hazard class. These areas have varying levels of vegetation management and are associated with rural residential lots.

Vegetation at assessment point G meets the rule for *one to two continuous fuel patch downgrade* in the CSIRO patch and corridor filter rules because it is 1.5 ha and is > 100 m from any other continuous fuel > 2 ha.

The *one to two hectare continuous fuel patch downgrade* rule reduces the potential fuel load of vegetation which meets the rule by a factor of 3. Therefore, the potential fuel load which is to be used for the potential fire-line intensity calculation for assessment point G is 4 t/ha, ie the potential fuel load of VHC 16.2 *Eucalyptus dominated woodland on drainage lines and alluvial plains* (11.8 t/ha) divided by 3.

The CSIRO patch and corridor filter rules justify the *one to two hectare continuous fuel patch downgrade* as follows:

These areas are less likely to ignite due to their disconnection with fuels that can carry running fire fronts. If ignited they are most likely to be ignited by point ignitions which require both distance and area to develop into a fire front of considerable hazard. If a fire front emerges from a 1 to 2 ha patch it is likely to

be narrow in width and significantly less in intensity than a fire front which has had sufficient time and area to develop. The combination of both likelihood and intensity estimates deem it to exhibit an intensity significantly less than (by a factor of 3 time less) much larger areas of continuous fuel where fire fronts would have sufficient area to develop.

Vegetation at assessment points A-E correlate with bushfire prone VHCs. The assessment points do not meet exclusion criteria for low threat vegetation in the CSIRO patch and corridor filter rules and requires further assessment to quantify the level of bushfire hazard, ie potential bushfire intensity calculation.

### 3.4 Potential bushfire intensity calculations

The potential bushfire intensity of land associated with assessment point A-H was determined using the QFES *Potential Bushfire Intensity Calculator* (version November 2014) which applies the method outlined in the SPP bushfire hazard assessment manual.

The severe fire weather map on the redi-portal indicates the 5 % annual exceedance probability forest fire danger index (FDI) for the site is 55. Therefore, FDI 55 was used in the potential bushfire intensity calculations.

The results are presented in Table 3.2 and are based on the site observations summarised in Table 3.1.

**Table 3.2 Potential bushfire intensity**

Assessment point	Ground-truthed VHC	Potential fuel load (t/ha)	Slope (°)	Potential bushfire intensity (kW/m)	Bushfire hazard class
A	VHC 13.2 <i>Dry to moist eucalypt woodland on undulating metamorphics and granite</i>	14.4	0	7,071	Medium
B	VHC 10.2 <i>Spotted gum dominated woodlands</i>	18	2	12,683	Medium
C	VHC 10.2 <i>Spotted gum dominated woodlands</i>	18	0	11,048	Medium
D	VHC 22.1 <i>Melaleuca dry open forest on sand plains or depositional plains</i>	28.4	0	27,504	High
E	VHC 13.2 <i>Dry to moist eucalypt woodland on undulating metamorphics and granite</i>	14.4	2	8,117	Medium
F	VHC 40.4 <i>Continuous low grass or tree cover</i>	5	0	853	Not a bushfire hazard area
G	VHC 16.2 <i>Eucalyptus dominated woodland on drainage lines and alluvial plains</i>	4 <sup>1</sup>	2	626	Not a bushfire hazard area

**Table 3.2 Potential bushfire intensity**

Assessment point	Ground-truthed VHC	Potential fuel load (t/ha)	Slope (°)	Potential bushfire intensity (kW/m)	Bushfire hazard class
H	VHC 40.4 <i>Continuous low grass or tree cover</i>	5	0	853	Not a bushfire hazard area

**Notes** 1 potential fuel load is reduced by a factor of 3, ie 11.5 t/ha divided by 3, under the CSIRO patch and corridor filter rules

### 3.5 Bushfire hazard areas

The results of the potential fire intensity calculations indicate that high and medium bushfire hazard areas occur adjacent the south and part of the west boundaries of the site.

Land adjacent high and medium bushfire hazard areas is vulnerable to exposure to radiant heat, ember attack and burning debris from the bushfire hazard area. To mitigate these potential impacts, the SPP bushfire hazard assessment manual identifies land within 100 m of high and medium bushfire hazard areas as a potential impact buffer. Land affected by a potential impact buffer is defined as a bushfire hazard area for planning purposes.

Although the site will be mostly cleared of vegetation under the proposed development, parts of the site within 100 m of the bushfire hazard areas adjoining the south and part of the west boundaries of the site will remain vulnerable to bushfire attack. Therefore, it is concluded from the bushfire hazard assessment that the site is affected by a bushfire hazard area and the proposed development is subject to demonstrating compliance with relevant performance outcomes sought under the SPP draft model bushfire hazard overlay code.

## 4 Bushfire hazards associated with the site

This chapter identifies potential bushfire hazards associated with the site.

### 4.1 Fire danger season

The fire danger season in South-east Queensland starts in August, peaks in September and begins to fall in November, but will remain elevated until consistent summer rainfall occurs. Typically, the worst fire weather conditions will be experienced during the fire danger season when the wind direction is from the north.

Fire Danger Index (FDI) values represent the chance of a fire starting, its rate of spread, its intensity and the difficulty of its suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long and short-term drought effects. The severe fire weather map accessed on the redi-portal indicates the 5% annual exceedance probability FDI for the site is 55.

Fire danger ratings (FDR) are based on the forecast weather conditions, ie FDI, and give advice about the level of bushfire threat on a day. An FDI of 55 is commensurate with a very high to severe FDR and will be associated with hot, dry and windy conditions. If a fire starts and takes hold under these conditions, it may be difficult to control in natural areas.

### 4.2 Consultation with Queensland fire authorities

The Chambers Flat Rural Fire Brigade (RFB) and Jimboomba RFB were consulted to identify bushfire history, fire ignition sources and operational fire-fighting concerns around the site.

Neither the Chambers Flat RFB or the Jimboomba RFB raised operational concerns about containing fires around the site explaining that it is relatively flat and open country.

### 4.3 Fire history

Charring was observed in the bushfire hazard area at assessment points E and the patch of vegetation at assessment point G. The Chambers Flat RFB confirmed that no large-scale fires have occurred around the site in recent history. This observation does not mean the bushfire hazard area will not be subject to a fire in the future but suggests a broad-scale wildfire event is unlikely.

### 4.4 Exposure to bushfire attack

The proposed development's likely exposure to bushfire attack is on the south boundary and a small part of the west boundary where it is adjacent medium and high bushfire hazard areas.

### 4.5 Potential bushfire hazard from adjacent land use

The site is surrounded by rural residential development. Rural residential land uses are not considered a bushfire hazard to the proposed development as evidenced by consultation with the Chambers Flat RFB in Section 4.3.

The Powerlink high voltage transmission easement which runs through the site is susceptible to 'flashover' which can cause a fire. However, weather conditions during which this type of event would occur are rare and Powerlink maintains land within their transmission easements to reduce the risk of fires and to maintain vehicle access.

## 5 Bushfire hazards associated with the proposed development

This chapter identifies potential bushfire hazards associated with the proposed development.

### 5.1 Site activities and usage patterns

The primary use of the proposed development is an industrial use. Industrial activities will be confined within buildings and hardstand areas and are unlikely to cause an ignition in natural vegetation adjoining the site. Therefore, the risk of bushfire to adjacent properties is unlikely to change because of the proposed development.

The proposed development will include continued access to the Powerlink high voltage transmission easement which is required for maintenance and management of vegetation in the easement.

### 5.2 Population

The potential impact buffer resulting from medium and high bushfire hazard areas affects a small part of the proposed development adjacent the south and part of the west boundaries of the site. Therefore, the proposed development will not materially increase the number of people exposed to medium and high bushfire hazard areas.

### 5.3 Bulk storage and handling of hazardous chemicals

Future development on proposed lots could involve the bulk storage and handling of hazardous chemicals. This type of land use requires careful consideration when planning bushfire mitigation measures because it may present an unacceptable risk to people, property and the environment if a bushfire impacts the hazardous materials. It may also present difficulty to emergency services for emergency response or evacuation.

Bulk storage and handling of hazardous chemicals will not occur within 100 m of the medium and high bushfire hazard areas adjoining the south and part of the west boundaries of the site.

### 5.4 Vulnerable use and essential community infrastructure

Future development on proposed lots could involve vulnerable uses, eg training facilities, childcare centre, medical facility, etc, and government facilities, eg QFES station, police station, etc.

Vulnerable use and essential community infrastructure will avoid being located within 100 m of the medium and high bushfire hazard areas adjoining the south and part of the west boundaries of the site.

### 5.5 Landscaping

Proposed open space will occur in a narrow corridor along the full length of the west boundary of the site and along part of the south boundary of the site. It will be subject to vegetation restoration plantings with a suite of species from RE 12.3.3 and RE 12.9-10.12 and is likely to be consistent with VHC 13.2 *Dry to moist eucalypt woodland on undulating metamorphics and granite* when it reaches a mature state. Therefore, where open space adjoins medium and high bushfire hazard areas, the potential impact buffer will be measured from the east/north edge of the open space.

The site will be cleared in preparation for civil earthworks. Landscaping associated with future development on proposed lots will be consistent with industrial and business uses and consist of hard and soft areas including driveways, footpaths, grass and landscaped gardens.

## 5.6 Access and egress

Efficient access for fire-fighters and the orderly evacuation of occupants will be provided via the existing road stub on the new Mount Lindsay Highway interchange. There will also be a temporary access easement to Crowson Lane opposite Greenhill Road.

## 5.7 Fire-fighter water supply

Hydrants will be in positions that enable fire services to access water safely, effectively and efficiently. They will also be identified so that fire services can locate them at all hours.

The proposed development will be connected to mains water. During the detailed design phase, water supply and pressure will be tested (and if required augmented) to ensure that it has sufficient flow and pressure characteristics for fire-fighting purposes always.

## 5.8 Warning and evacuation

Queensland emergency services use a range of methods to warn the community about bushfire, severe weather and other emergencies that require preparation and action at the property level. Future occupants of the proposed development will be subject to advice and warnings by Queensland emergency services via radio, online media, and local community safety announcements.

## 5.9 Buildings

In Queensland, construction requirements in the *Australian Standard for the Construction of Buildings in Bushfire Prone Areas* (AS 3959-2009) are applicable to *National Construction Code* (NCC) class 1-3 buildings, ie residential buildings, and associated class 10 buildings, ie non-habitable buildings and structures.

Vegetation setbacks and construction requirements in AS 3959-2009 are not applicable to the proposed development because buildings will be associated with an industrial or commercial use, ie NCC class 4-9 buildings, eg office buildings, warehouses, shops, etc. Nevertheless, NCC class 4-9 buildings will comply with fire resistance and safe access/egress requirements in Sections C and D of the NCC (volume 1).

## 6 Bushfire mitigation plan

This chapter identifies measures that will be implemented for the proposed development to reduce the risk of bushfire hazards to a tolerable level.

It is the total of the actions in this report that will reduce the risk of bushfire hazards to a tolerable level. Failure to implement all actions in their entirety could result in an increased level of exposure to bushfire hazards.

### 6.1 Bushfire protection zone on lot 4

A bushfire protection zone/covenant area will be established on lot 4 as shown on Figure 6.1.

The effects of the bushfire protection zone on the developer include:

- establish this area as a covenant over the lot;
- a registered surveyor must survey and peg the bushfire protection zone on the lot;
- the bushfire protection zone must be shown on the disclosure plan for this lot;
- fencing and retaining walls within and adjoining the bushfire protection zone will be constructed with non-combustible materials; and
- prospective purchasers of this lot are to be notified of the effects of the bushfire protection zone on the lot.

The effects of the bushfire protection zone on prospective purchasers include:

- bulk storage and handling of hazardous chemicals is not permitted in the bushfire protection zone;
- site specific planning will be required for vulnerable use and essential community infrastructure in the bushfire protection zone and must demonstrate:
  - access for emergency services and fire-fighting water supply will comply with design criteria in the QFES guideline *Fire Hydrant and Vehicle Access Guidelines 2015*; and
  - buildings will be sufficiently setback from bushfire hazard to make certain building exits and escape routes are serviceable when subject to bushfire attack, ie radiant heat exposure level < 10 kW/m<sup>2</sup>.
- landscaping in the bushfire protection zone will consist of hardened pathways, lawn and cultivated gardens with lower flammability species with high moisture content, high salt content, and low levels of fine fuel and/or oil content;
- a 1 m wide pedestrian access path must be provided for fire-fighter to access the area between buildings and adjacent bushfire hazard vegetation always.

Bulk storage and handling of hazardous chemicals is defined by the quantity thresholds specified at Appendix 2.

### 6.2 Emergency services access

Emergency services access/egress to the site will be via the road stub on the new Mount Lindsay Highway interchange roundabout as shown on Figure 6.1. The direction of escape from the site is away from the bushfire hazard area adjacent the south boundary and part of the west boundary.

Additional access/egress routes may be available in the future as further development occurs in the Greater Flagstone Urban Development Area.

The design and construction of roads and driveways will comply with QFES design criteria specified in the QFES guideline *Fire Hydrant and Vehicle Access Guidelines 2015*.

### 6.3 Hydrants

Fire-fighter water supply and hydrants will be supplied in accordance with Queensland Urban Utility standards or the QFES guideline *Fire Hydrant and Vehicle Access Guidelines 2015*. Where there are differences the higher design criteria or performance outcome will prevail.

Hydrants will be in positions that enable fire services to access water safely, effectively and efficiently. No point of a proposed building will be > 90 m from a hydrant.

Hydrants will be identified with marker posts or blue cats eye markers on the road so that they can be located at all hours.

### 6.4 Building design and construction

Buildings will comply with fire resistance and safe access/egress requirements in Sections C and D of the NCC (volume 1).



**LEGEND**

- Cadastral Boundary
- Development Area
- Contours (1.0m)
- Escape Route
- Bushfire Protection Zone / Covenant Area
- Bushfire Hazard Area
- Open Space Boundary

Scale 1 : 7500

0 100 250m

Aerial Photo: Nearmap - May 2018

Client	Wearco Pty Ltd	Project	4499-4651 Mt Lindsay Highway Bushfire Management Plan
	Land Environment Consultants	Title	Bushfire Mitigation Plan
Design	22.06.2018	FIGURE	6.1
Drawn	22.06.2018		
Scale	1:7500		
Cad File	108 North Macleod1.dwg		
		Rev	1.0



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## 7 Conclusion

This bushfire management plan has been prepared in general accordance with the SPP draft model bushfire hazard overlay code.

A bushfire hazard assessment confirmed the proposed development is affected by a bushfire hazard area and is subject to compliance with relevant performance outcomes sought under SPP draft model bushfire hazard overlay code.

Mitigation measures for the proposed development include a bushfire protection zone/covenant area on lot 4, design criteria for emergency services access and hydrants and building design and construction requirements.

With the implementation of the mitigation measures in this report, the proposed development complies with the outcomes sought under the SPP draft model bushfire hazard overlay code as demonstrated at Appendix 3.

## References

Australian Building Codes Board (ABCB) 2016, *National Construction Code Series, Building Code of Australia Class 2 to Class 9 Buildings, Volume 1*, Australian Government and States and Territories of Australia, May 2016

Australian Building Codes Board (ABCB) 2016, *National Construction Code Series, Building Code of Australia Class 1 and Class 10 Buildings, Volume 2*, Australian Government and States and Territories of Australia, May 2016

Bowden, John (Bowden) 1999, *Living with the Environment in the Pine Rivers Shire*, Pine Rivers Shire Council

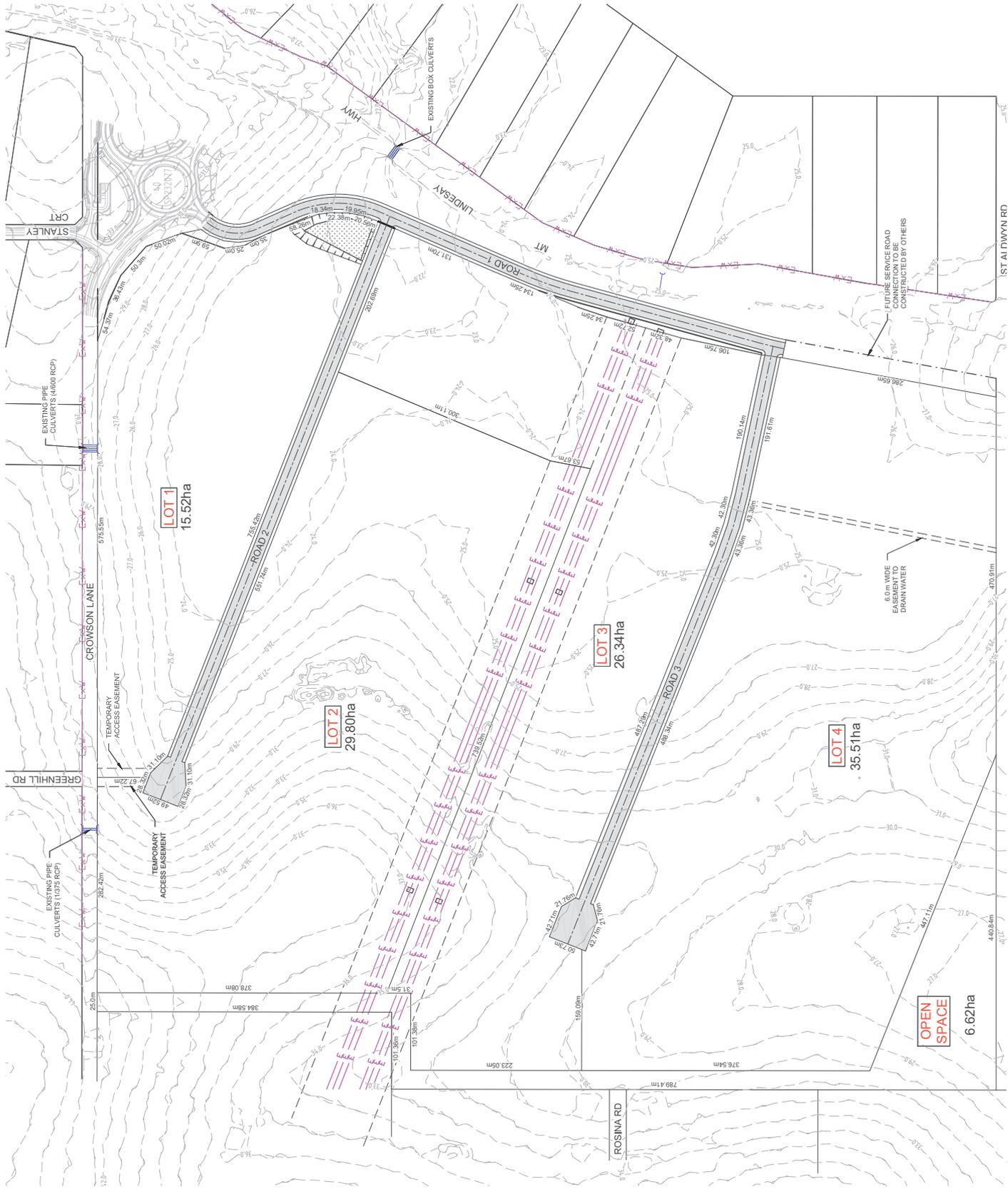
Commonwealth Scientific and Industrial Research Organisation (CSIRO) 2014, *A new methodology for State-wide mapping of bushfire prone areas in Queensland*, CSIRO and State of Queensland 2014

Queensland Department of Infrastructure, Local Government and Planning (DILGP) 2016, *State Planning Policy Natural Hazards, Risk and Resilience Technical Manual – A 'fit-for-purpose' approach in undertaking natural hazard studies and risk assessments*, April 2016

Queensland Fire and Emergency Service (QFES) 2015, *Fire Hydrant and Vehicle Access Guidelines for Residential, Commercial and Industrial Lots*, November 2015

Standards Australia Limited (Standards Australia) 2009, *Australian Standard 3959-2009 Construction of buildings in bushfire prone areas*, Incorporating amendments 1, 2 and 3, 10 March 2009

## Appendix 1 Reconfiguration of lot plan



**LEGEND**

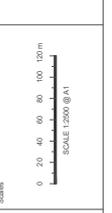
— E —	OVERHEAD TRANSMISSION POWER LINES
- - -	EXISTING CONTOURS
▬	ROAD RESERVE

NOT FOR CONSTRUCTION

Drawing Title  
**PROPOSED DEVELOPMENT LAYOUT PLAN**  
 Scale  
 1:2500  
 Project No.  
 ACE180514.CIV.DA  
 Issue  
 010  
 Date  
 D

Project  
**PROPOSED BUSINESS PARK  
 4499-4651 MT LINDESEY HIGHWAY,  
 NORTH MACLEAN QLD**

**AUSTRALIAN  
 CONSULTING  
 ENGINEERS.**  
 PT. N. T. O. A. C. N. O. A. L. O. S. O. A. J.  
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 ENGINEERING PROJECT MANAGEMENT & DEVELOPMENT CONSULTANTS



Surveyor  
 Wearco Pty Ltd  
 42 South Street, Jimboomba QLD 4280

Issue	Description	Date	Design	Check
D	ISSUE FOR DEVELOPMENT APPLICATION	11/07/2018	M.M.	J.B.
C	ISSUE FOR DEVELOPMENT APPLICATION	12/06/2018	M.M.	J.B.
B	ISSUE FOR INFORMATION	13/12/2016	H.A.	A.A.
A	ISSUE FOR INFORMATION	18/07/2016	AUB	A.A.S.

## Appendix 2 Threshold quantities for hazardous chemicals

## Threshold quantities for hazardous chemicals

Item	Description of hazardous chemical		Threshold quantity
1	Flammable gases	Category 1	5,000L
2	Gases under pressure	With acute toxicity, categories 1, 2, 3 or 4	500L
3		With skin corrosion categories 1A, 1B or 1C	500L
4		Aerosols	10,000L
5		Not stated elsewhere in this table	10,000L
6	Flammable liquids	Category 1	500L
7		Category 2	2,500L
8		Category 3	10,000L
9		Any combination of chemicals from items 6 to 8 where none of the items exceeds the threshold quantities on their own	10,000L
10		Category 4	100,000L
11	Self-reactive substances	Type A	50kg or 50L
12		Type B	500kg or 500L
13		Type C to F	2,500kg or 2,500L
14	Flammable solids	Category 1	2,500kg
15		Category 2	10,000kg
16		Any combination of chemicals from items 12 to 15 where none of the items exceeds the threshold quantities on their own	10,000kg or 10,000L
17	Pyrophoric liquids and pyrophoric solids	Category 1	500kg or 500L
18	Self-heating substances and mixtures	Category 1	2,500kg or 2,500L
19		Category 2	10,000kg or 10,000L
20		Any combination of chemicals from items 17 to 19 where none of the items exceeds the threshold quantities on their own	10,000kg or 10,000L
21	Substances which in contact with water emit flammable gas	Category 1	500kg or 500L
22		Category 2	2,500kg or 2,500L
23		Category 3	10,000kg or 10,000L
24		Any combination of chemicals from items 21 to 23 where none of the items exceeds the threshold quantities on their own	10,000kg or 10,000L
25	Oxidising liquids and oxidising solids	Category 1	500kg or 500L
26		Category 2	2,500kg or 2,500L
27		Category 3	10,000kg or 10,000L

28		Any combination of chemicals from items 25 to 27 where none of the items exceeds the threshold quantities on their own	10,000kg or 10,000L
29	Organic peroxides	Type A	50kg or 50L
30		Type B	500kg or 500L
31		Type C to F	2,500kg or 2,500L
32		Any combination of chemicals from items 30 and 31 where none of the items exceeds the threshold quantities on their own	10,000kg or 10,000L
33	Acute toxicity	Category 1	500kg or 500L
34		Category 2	2,500kg or 2,500L
35		Category 3	10,000kg or 10,000L
36		Any combination of chemicals from items 33 to 35 where none of the items exceeds the threshold quantities on their own	10,000kg or 10,000L
37	Skin corrosion	Category 1A	500kg or 500L
38		Category 1B	2,500kg or 2,500L
39		Category 1C	10,000kg or 10,000L
40	Corrosive to metals	Category 1	10,000kg or 10,000L
41		Any combination of chemicals from items 37 to 40 where none of the items exceeds the threshold quantities on their own	10,000kg or 10,000L

**Reference** Brisbane City Plan 2014 *Bushfire overlay code*

## Appendix 3 SPP draft model bushfire hazard overlay code assessment

Performance outcomes	Acceptable outcomes	Compliance assessment
<b>For assessable development</b>		
<b>Compatible development</b>		
<p><b>PO1</b></p> <p>Vulnerable essential service and major hazard facility uses are not established or intensified within a bushfire prone area.</p>	<p><b>AO1</b></p> <p>Vulnerable essential service and major hazard facility uses are not established or intensified in the bushfire prone area.</p>	<p>✓</p> <p>Potential impact buffer area on lot 4 is identified as a bushfire protection zone.</p> <p>A covenant will be established over the bushfire protection zone to convey its effects in perpetuity.</p> <p>Future development involving the bulk storage and handling of hazardous chemicals is not permitted in the bushfire protection zone.</p> <p>Site specific planning will be required for vulnerable use and essential community infrastructure in the bushfire protection zone on lot 4. Such uses in the bushfire protection zone must be able to demonstrate appropriate access for emergency services, appropriate fire-fighter water supply and the buildings will be sufficiently setback from bushfire hazard to make certain building exits and escape routes are serviceable when subject to bushfire attack.</p>
<p><b>PO2</b></p> <p>Emergency services and uses providing community support services are able to function effectively during and immediately after a bushfire event.</p>	<p><b>AO2</b></p> <p>Emergency services and uses providing community support services have direct access to safe access and egress routes.</p>	<p>✓</p> <p>Refer to response to PO1</p>
<b>All development</b>		
<p><b>PO3</b></p> <p>All premises are provided with vehicular access that enables safe</p>	<p><b>AO3</b></p> <p>Private driveways within individual lots:</p>	<p>✓</p> <p>The design and construction of roads and driveways will comply with QFES design criteria specified in the QFES guideline <i>Fire Hydrant</i></p>

Performance outcomes	Acceptable outcomes	Compliance assessment
<p>evacuation for occupants and easy access by fire-fighting appliances.</p>	<ol style="list-style-type: none"> <li>1) do not exceed a length of 60 m from the street to the building;</li> <li>2) do not exceed a gradient of 12.5%;</li> <li>3) have a minimum width of 3.5 m;</li> <li>4) accommodate turning areas and vertical clearances for fire-fighting appliances in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines; and</li> <li>5) serve no more than 3 dwellings or buildings.</li> </ol>	<p><i>and Vehicle Access Guidelines 2015.</i></p>
<p><b>PO4</b></p> <p>Development outside reticulated water supply areas include a dedicated static supply that is available solely for fire-fighting purposes and can be accessed by fire-fighting appliances.</p>	<p><b>AO4</b></p> <p>A water tank is provided within 10 m of each building (other than a class 10 building) which:</p> <ol style="list-style-type: none"> <li>1) is either below ground level or of non-flammable construction;</li> <li>2) has a take-off connection at a level that allows the following dedicated, static water supply to be left available for access by fire fighters: <ol style="list-style-type: none"> <li>a) 10,000 litres for residential buildings;</li> <li>b) for industrial, commercial and other buildings, a volume specified in AS 2304–2011;</li> </ol> </li> <li>3) includes shielding of tanks and pumps in accordance with AS2304–2011;</li> <li>4) includes a hardstand area allowing medium rigid vehicle (15 tonne fire appliance) access within 6 m of the tank;</li> <li>5) is provided with rural fire brigade tank fittings if serviced by a rural fire brigade (i.e. 50 mm ball valve and male camlock coupling and, if underground, an access hole of 200 mm (minimum) to accommodate suction lines); and</li> </ol>	<p><b>Not applicable</b></p> <p>The proposed development will be connected to the reticulated water supply.</p>

Performance outcomes	Acceptable outcomes	Compliance assessment
	6) is clearly identified by directional signage at the street frontage.	
<p><b>PO5</b></p> <p>Development is not within the bushfire prone area where upslope from retained hazardous vegetation.</p>	<p><b>AO5</b></p> <p>Development is not within the bushfire prone area where upslope from retained hazardous vegetation.</p>	<p>✓</p> <p>A small area of the site on lot 4 is affected by a potential impact buffer area and will be identified as a bushfire protection zone/covenant area.</p> <p>Land under bushfire hazard adjacent the site is relatively flat with slopes &lt; 2° when measured perpendicular to the boundary of the site.</p> <p>Neither the Chambers Flat RFB or the Jimboomba RFB raised operational concerns about containing fires around the site explaining that it is relatively flat and open country.</p>
<p><b>PO6</b></p> <p>Bushfire risk mitigation measures maintain or enhance significant existing environmental or other protective land form functions.</p>	<p><b>AO6</b></p> <p>Measures to reduce the risk of bushfire do not adversely affect significant existing environmental or other protective land form functions (such as, but not limited to, areas reflecting matters of state or national environmental significance, vegetation management, biodiversity, heritage, or scenic amenity).</p>	<p>✓</p> <p>Refer to ecology report.</p>
<p><b>PO7</b></p> <p>To ensure the protection of peoples' lives and property is the pre-eminent planning and development outcome, an area designated for revegetation or rehabilitation will not create an additional bushfire prone area.</p>	<p><b>AO7.1</b></p> <p>The dimensions and configuration of an area designated for revegetation or rehabilitation ensure the area does not have the ability to become a medium, high or very high bushfire prone area in the future.</p> <p><b>And</b></p> <p><b>AO7.2</b></p> <p>The landscaping treatments or proposed plantings in an area designated for revegetation or</p>	<p>✓</p> <p>Proposed open space will be subject to vegetation restoration and has been considered as though it is unmanaged vegetation which has reached a mature state consistent with VHC 13.2.</p> <p>In recognition of this situation, the bushfire protection zone/covenant area on lot 4 has been measured from the edge of the open space (as opposed to the boundary of the site).</p>

Performance outcomes	Acceptable outcomes	Compliance assessment
	<p>rehabilitation establish practically and sustainably managed and maintained vegetation or surfaces with a low overall available fuel load or a fuel structure that is insufficient to create a medium, high or very high bushfire prone area in the future.</p> <p><b>And</b></p> <p><b>AO7.3</b></p> <p>A landscape maintenance plan for an area designated for revegetation or rehabilitation specifies the long-term strategies and treatments needed to ensure the fuel load or fuel structure of vegetation that has the capacity to create a medium, high or very high bushfire prone area is maintained at a level that is insufficient for that hazard to emerge.</p>	
<p><b>PO8</b></p> <p>Where an area designated for revegetation or rehabilitation required to satisfy another state interest cannot avoid creating an additional bushfire prone area;</p> <p>a) the value of that state interest must outweigh the risk to people and property from the impacts of bushfire; and</p> <p>b) the created bushfire prone area does not contain additional building envelopes.</p>	<p><b>AO8.1</b></p> <p>An additional building envelope is not located in a created bushfire prone area described in PO15.</p> <p><b>And</b></p> <p><b>AO8.2</b></p> <p>The measures described in (AO7.1, AO7.2, and AO7.3) are used to ensure the lowest possible hazard is created.</p>	<p>✓</p> <p>Refer to response to PO7</p>
<p><b>PO9</b></p> <p>Landscaping and fuel sources within the bushfire prone area between hazardous vegetation and building envelopes does not increase the potential for bushfire hazard.</p>	<p><b>AO9.1</b></p> <p>Landscaping treatments between hazardous vegetation and buildings or building envelopes establishes readily maintained vegetation cover or surfaces with overall available fuel loads at an acceptable level.</p> <p><b>AO9.2</b></p> <p>A landscape maintenance plan describes long-term strategies and treatments needed to maintain</p>	<p>✓</p> <p>Potential impact buffer area on lot 4 is identified as a bushfire protection zone.</p> <p>A covenant will be established over the bushfire protection zone to convey its effects in perpetuity.</p> <p>A landscaping prescription is provided for the bushfire protection zone which states:</p>

Performance outcomes	Acceptable outcomes	Compliance assessment
	fuel loads between hazardous vegetation and buildings or building envelopes at an acceptable level.	'Landscaping in the bushfire protection zone will consist of hardened pathways, lawn and cultivated gardens with lower flammability species with high moisture content, high salt content, and low levels of fine fuel and/or oil content.'
<p><b>PO10</b></p> <p>Maintained recreational park and open space is located between buildings, building envelopes or lot boundaries and hazardous vegetation.</p>	<p><b>AO10.1</b></p> <p>Recreational parks or open space are between buildings, building envelopes or lot boundaries and hazardous vegetation designed and planned to maintain or reduce fuel loads.</p>	<p><b>Not applicable</b></p> <p>The proposed development does not include maintained parklands.</p>
<b>All uses</b>		
<p><b>PO11</b></p> <p>Development is located and designed to achieve a separation distance which reduces risk to an acceptable or tolerable level which is provided:</p> <p>a) between adjacent buildings or building envelopes; and</p> <p>b) between hazardous vegetation and buildings or building envelopes which achieves a radiant heat flux level at any point on the building or envelope respectively of:</p> <p>i) 10 kW/m<sup>2</sup> where involving a vulnerable use; or</p> <p>ii) 29 kW/m<sup>2</sup> otherwise.</p> <p><b>Note:</b> The radiant heat levels and separation distances are to be established in accordance with method 2 of AS3959–2009.</p>	<p><b>AO11.1</b></p> <p>No new development is located within the bushfire prone area.</p> <p><b>Or</b></p> <p><b>AO11.2</b></p> <p>Buildings or building envelopes are separated from hazardous vegetation defined as medium, high and very high potential bushfire intensity categories, and from adjacent buildings or building envelopes by a distance that:</p> <p>1) is defined in table 1; and</p> <p>2) is contained wholly within the development.</p> <p><b>Notes:</b></p> <p>a) Where a separation distance is proposed to be achieved by utilising existing cleared developed areas external to the site, certainty must be established (through tenure or other means) that the land will remain cleared of hazardous vegetation. For staged developments, temporary separation distances, perimeter roads or fire trails may be absorbed as part of subsequent stages.</p> <p>b) The achievement of separation distance may not be achievable where other provisions within the</p>	<p>✓</p> <p>The proposed development is for an industrial and business purpose.</p> <p>Buildings which have an industrial and/or business purpose, ie NCC class 4-9 buildings, are not subject to vegetation setbacks or construction requirements in AS 3959-2009.</p> <p>Nevertheless, they must comply with fire resistance and safe access/egress requirements in Sections B and C of the NCC (volume 1).</p> <p>Where a vulnerable use and/or essential community infrastructure is proposed in the bushfire protection zone/covenant area on lot 4, the effects of the bushfire protection zone require such buildings to be sufficiently setback from bushfire hazard to make certain building exits and escape routes are serviceable when subject to bushfire attack, ie radiant heat exposure level &lt; 10 kW/m<sup>2</sup>.</p>

Performance outcomes	Acceptable outcomes	Compliance assessment
	<p>planning scheme require protection of certain ecological, slope, visual or character features of functions.</p> <p>c) Separation from adjacent buildings or building envelopes may not be required where not considered practicable due to lot size and location of existing adjacent buildings or building envelopes.</p>	
<p><b>PO12</b></p> <p>Where development is undertaken in an urban area or is for urban purposes, a constructed perimeter road with reticulated water supply is established between the site boundary or building envelope, and the hazardous vegetation and is readily accessible at all times for urban fire-fighting vehicles.</p> <p>The access to the perimeter road is available for both fire-fighting and maintenance purposes.</p> <p><b>Notes:</b></p> <p>a) Local governments should be aware of fire brigade classifications that service development areas.</p> <p>b) Perimeter roads are unlikely to be required where a development site involves less than 2.5 ha.</p>	<p><b>AO12.1</b></p> <p>Development sites are separated from hazardous vegetation by a public road which:</p> <ol style="list-style-type: none"> <li>1) has a two-lane sealed carriageway clear of hazardous vegetation;</li> <li>2) contains a reticulated water supply;</li> <li>3) is connected to public roads at both ends and at intervals of no more than 500 m;</li> <li>4) accommodates geometry, turning radii and vertical clearance in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines and the Department of Transport and Main Roads' Planning and Design Manual; and</li> <li>5) allows and does not impede access for fire-fighting and maintenance for fire-fighting purposes.</li> </ol> <p><b>AO12.2</b></p> <p>Fire hydrants are designed and installed in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines, unless otherwise specified by the relevant water entity.</p> <p><b>Note:</b> Applicants should have regard to the relevant standards set out in the reconfiguration of a lot code and works code in this planning scheme.</p>	<p><b>Not applicable</b></p> <p>The proposed development is not for an urban purpose.</p> <p>Nevertheless, roads and fire-fighter water supply will meet the design criteria in the QFES guideline <i>Fire Hydrant and Vehicle Access Guidelines</i>.</p>

Performance outcomes	Acceptable outcomes	Compliance assessment
<p><b>PO13</b></p> <p>Where a development is undertaken for non-urban purposes, either a constructed perimeter road or a formed, all weather fire trail is established between the site boundary or building envelope and the hazardous vegetation and is readily accessible at all times for the type of fire-fighting vehicles servicing the area.</p> <p>The access to the perimeter road or fire trail is available for both fire-fighting and maintenance works or hazard reduction activities.</p> <p><b>Note:</b> Fire trails are unlikely to be required where a development site involves less than 2.5 ha.</p>	<p><b>AO13.1</b></p> <p>Development sites are separated from hazardous vegetation by a public road (as per AO12.1) or a fire trail, which includes:</p> <ol style="list-style-type: none"> <li>1) a reserve or easement width of at least 20 metres</li> <li>2) no cut or fill embankments or retaining walls adjacent to the 4 metres wide trafficable path</li> <li>3) a minimum trafficable (cleared and formed) width of 4 metres and no less than 4.8 metres vertical clearance, with 3 metres each side cleared of all flammable vegetation greater than 10 centimetres in height</li> <li>4) The trail must be capable of accommodating a 10 tonne vehicle</li> <li>5) The balance 10 metre width of the easement has managed vegetation to remove major surface hazards</li> <li>6) turning areas and vertical clearances for firefighting appliances in accordance with Queensland Fire and Emergency Services' Fire hydrant and vehicle access guidelines</li> <li>7) a maximum gradient of 12.5 per cent</li> <li>8) a cross-fall of no greater than 10 degrees</li> <li>9) drainage and erosion control devices in accordance with the standards prescribed in a planning scheme policy</li> <li>10) vehicular access at each end, which is connected to the public road network at intervals of no more than 500 metres</li> <li>11) designated fire-trail signage</li> <li>12) if used, has gates locked with a system authorised by Queensland Fire and Emergency Services; and</li> <li>13) if a fire trail, has an access easement that is granted in favour of council and</li> </ol>	<p>✓</p> <p>Potential impact buffer area on lot 4 is identified as a bushfire protection zone.</p> <p>A covenant will be established over the bushfire protection zone to convey its effects in perpetuity.</p> <p>The effect of the bushfire protection zone on prospective purchasers is that they are to maintain a 1 wide pedestrian access path for fire-fighters to access the area between buildings and adjacent bushfire hazard vegetation always.</p>

Performance outcomes	Acceptable outcomes	Compliance assessment
	Queensland Fire and Emergency Services; and 14) allows and does not impede access for firefighting and maintenance for firefighting purposes.	
<b>Infrastructure and services</b>		
<b>PO14</b>  Essential infrastructure is designed or located to minimise the creation of ignition sources that would increase the potential risk of bushfires to people and property.	<b>AO14.1</b>  Essential infrastructure, such as electricity distribution and transmission networks within the bushfire prone area, are managed in accordance with relevant standards (e.g. electrical safety regulations).	<b>Not applicable</b>  The proposed development does not include essential infrastructure.  Nevertheless, flashover in the Powerlink high voltage transmission easement is managed via existing vegetation management practices which will not be affected under the proposed development.
<b>For reconfiguring a lot</b>		
<b>PO15</b>  Development is located and designed to achieve a separation distance which reduces risk to an acceptable or tolerable level which is provided:  a) between adjacent building envelopes; and b) between hazardous vegetation and building envelopes which achieves a radiant heat flux level at any point on the building envelope respectively of: i) 10 kW/m <sup>2</sup> where involving a vulnerable use; or ii) 29 kW/m <sup>2</sup> otherwise.  <b>Note:</b> The radiant heat levels and separation distances are to be established in accordance with method 2 of AS3959–2009.	<b>AO15.1</b>  No new lots are created within the bushfire prone area:  <b>Or</b>  Building envelopes are separated from hazardous vegetation and from adjacent building envelopes by a distance that:  1) is defined in table 1; and 2) is contained wholly within the development.  <b>Notes:</b> a) Where separation distance is proposed to be achieved by utilising existing cleared developed areas external to the site, certainty must be established (through tenure or other means) that the land will remain cleared of hazardous vegetation. b) For staged developments, temporary separation distances, perimeter roads or fire trails may be absorbed as part of subsequent stages.	✓  Refer to response to PO11

Performance outcomes	Acceptable outcomes	Compliance assessment
	<p>c) The achievement of a cleared separation distance may not be achievable where other provisions within the planning scheme require protection of certain ecological, slope, visual or character features or functions.</p>	
<p><b>PO16</b></p> <p>Development is designed to minimise dwelling density within or adjacent to the bushfire prone area.</p>	<p><b>AO16.1</b></p> <p>Dwelling density does not exceed the levels exceeded by table 1.</p>	<p><b>Not applicable</b></p> <p>The proposed development is for an industrial and business purpose.</p>
<p><b>PO17</b></p> <p>Where development is undertaken in an urban area or is for urban purposes and is serviced primarily by an urban fire brigade, a constructed perimeter road with reticulated water supply is established between the lots and the hazardous vegetation and is readily accessible at all times for urban fire fighting vehicles.</p> <p>The access to the perimeter road is available for both fire-fighting and maintenance purposes.</p> <p><b>Note:</b> Local governments should be aware of fire brigade classifications that service development areas.</p>	<p><b>AO17.1</b></p> <p>Lot boundaries or building envelopes are separated from hazardous vegetation by a public road which:</p> <ol style="list-style-type: none"> <li>1) has a two-lane sealed carriageway clear of hazardous vegetation;</li> <li>2) contains a reticulated water supply;</li> <li>3) is connected to public roads at both ends and at intervals of no more than 500 m;</li> <li>4) accommodates geometry, turning radii and vertical clearance in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines and the Department of Transport and Main Roads' Planning and Design Manual; and</li> <li>5) allows and does not impede access for fire-fighting and maintenance for fire-fighting purposes.</li> </ol> <p><b>AO17.2</b></p> <p>Fire hydrants are designed and installed in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines, unless otherwise specified by the relevant water entity.</p>	<p>✓</p> <p>Refer to response to PO12</p>

Performance outcomes	Acceptable outcomes	Compliance assessment
	<p><b>Note:</b> Applicants should have regard to the relevant standards set out in the reconfiguration of a lot code and works code in the planning scheme.</p>	
<p><b>PO18</b></p> <p>Where development is undertaken for non-urban purposes and is serviced primarily by a rural fire brigade, either a constructed perimeter road or a formed, all weather fire trail is established between the lots and the hazardous vegetation and is readily accessible at all times for the type of fire-fighting vehicles servicing the area.</p> <p>The access to the perimeter road or fire trail is available for both fire-fighting and maintenance works or hazard reduction activities.</p>	<p><b>AO18.1</b></p> <p>Lot boundaries or building envelopes are separated from hazardous vegetation by a public road (as per AO17.1), or a fire trail which has:</p> <ol style="list-style-type: none"> <li>1) a reserve or easement width of at least 20 metres</li> <li>2) no cut or fill embankments or retaining walls adjacent to the 4 metres wide trafficable path</li> <li>3) a minimum trafficable (cleared and formed) width of 4 metres and no less than 4.8 metres vertical clearance, with 3 metres each side cleared of all flammable vegetation greater than 10 centimetres in height</li> <li>4) The trail must be capable of accommodating a 10 tonne vehicle</li> <li>5) The balance 10 metre width of the easement has managed vegetation to remove major surface hazards</li> <li>6) turning areas and vertical clearances for firefighting appliances in accordance with Queensland Fire and Emergency Services' Fire hydrant and vehicle access guidelines</li> <li>7) a maximum gradient of 12.5 per cent</li> <li>8) a cross-fall of no greater than 10 degrees</li> <li>9) drainage and erosion control devices in accordance with the standards prescribed in a planning scheme policy</li> <li>10) vehicular access at each end, which is connected to the public road network at intervals of no more than 500 metres</li> <li>11) designated fire-trail signage</li> <li>12) if used, has gates locked with a system authorised by</li> </ol>	<p>✓</p> <p>Refer to response to PO13</p>

Performance outcomes	Acceptable outcomes	Compliance assessment
	<p>Queensland Fire and Emergency Services; and</p> <p>13) if a fire trail, has an access easement that is granted in favour of council and Queensland Fire and Emergency Services; and</p> <p>14) allows and does not impede access for firefighting and maintenance for firefighting purposes.</p>	
<p><b>PO19</b></p> <p>The development design establishes safe evacuation routes to achieve an acceptable or tolerable risk to people.</p>	<p><b>AO19.1</b></p> <p>The development:</p> <ol style="list-style-type: none"> <li>1) minimises the length of the development perimeter exposed to, or adjoining hazardous vegetation;</li> <li>2) avoids the creation of bottle-neck points in the movement network within the development;</li> <li>3) establishes direct access to a safe assembly/evacuation area in the event of an approaching bushfire; and</li> <li>4) ensures roads internal and external to the development likely to be used in the event of a fire are designed to have sufficient capacity for evacuating the population and to minimise traffic congestion.</li> </ol> <p><b>Note:</b> For example, developments should avoid finger-like or hour-glass subdivision patterns or substantive vegetated corridors between lots. In order to demonstrate compliance with the performance outcome, a bushfire management plan prepared by a suitably qualified person may be required. The bushfire management plan should be developed in accordance with 'planning for bushfire resilient communities'.</p> <p>Advice from Queensland Fire and Emergency Services should be sought as appropriate.</p>	<p>✓</p> <p>The direction of escape from the site is away from the bushfire hazard area which is adjacent the south boundary and part of the west boundary.</p> <p>Additional access/egress routes may be available in the future as further development occurs in the Greater Flagstone Urban Development Area.</p> <p>The design and construction of roads and driveways will comply with QFES design criteria specified in the QFES guideline <i>Fire Hydrant and Vehicle Access Guidelines 2015</i>.</p>