

Department of Health and
Department of Finance
(Building Management and Works)

Fire Management Plan Busselton Health Campus Conservation Zone

February 2013



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Fire Management Plan

Busselton Health Campus Conservation Zone

February 2013

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Executive Summary

Natural Area Consulting was commissioned by the Department of Finance (Building Management and Works) on behalf of the Department of Health to prepare a fire management plan for the vegetated areas dominated by the open *Agonis flexuosa* (Peppermint) woodland area near the Busselton Health Campus (Conservation Zone). The site is flat land abutting the Indian Ocean to the north, Craig Street to the west, Bussell Highway to the south and Mill Road to the east. Soils are typical of those in coastal locations.

The plan incorporates the following:

- a description of current site conditions,
- an assessment of the bushfire risk at the site based on topography (slope), vegetation type, and projected distance to buildings and infrastructure,
- the management strategies that will assist with reducing the risks to nearby property from flames and embers during a bushfire, and
- roles and responsibilities.

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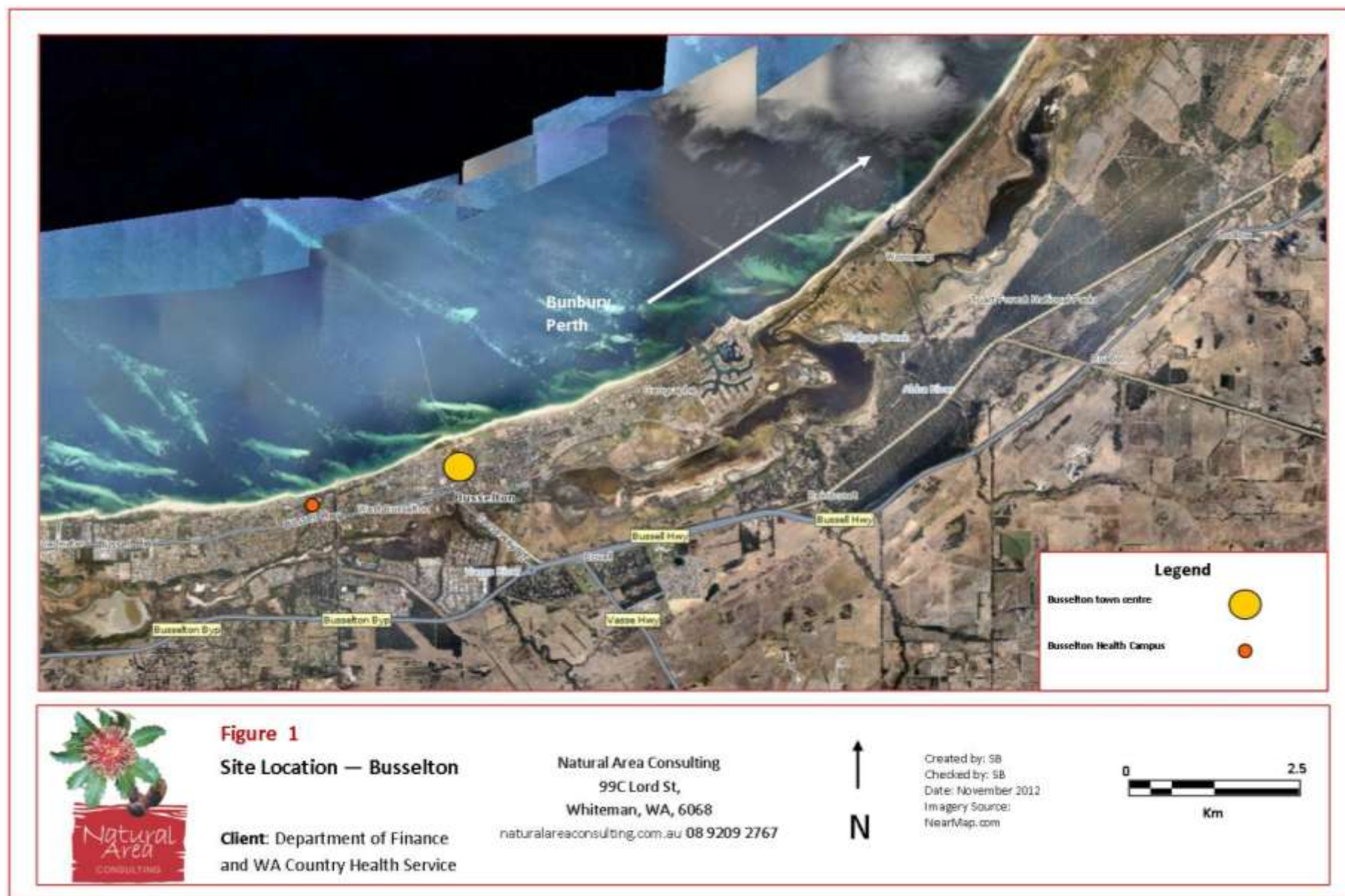
1.0 Introduction

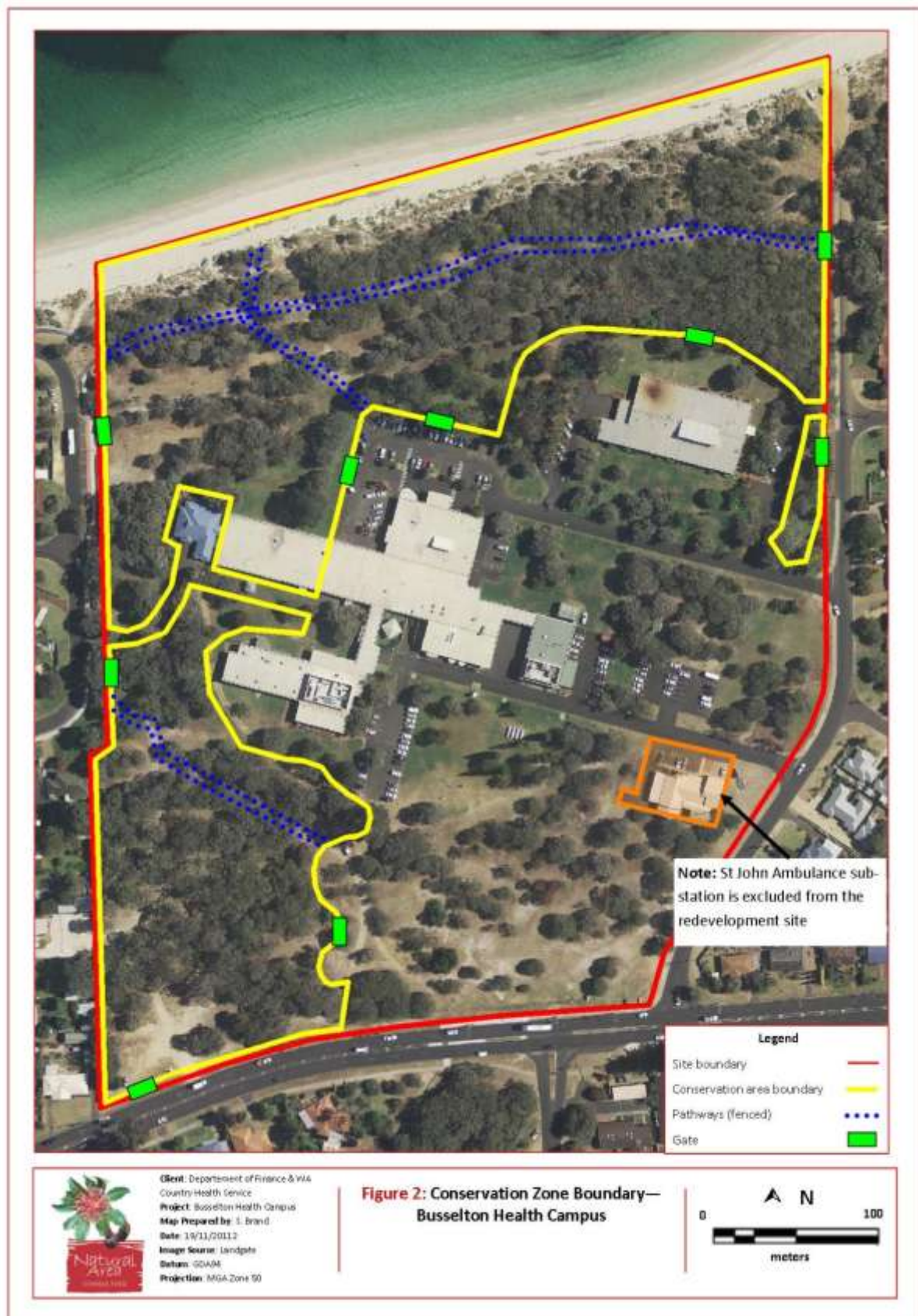
Natural Area Consulting (NAC), a division of Natural Area Holdings Pty Ltd, was contracted to prepare a fire management plan (FMP) for the areas vegetated with native species, known as the 'conservation zone', at the Busselton Health Campus, 189 (Lot 406) Bussell Highway, Busselton (Figure 1). The fire management plan is required as a component of the approvals process associated with the redevelopment of the site.

The site is approximately 2.5 kms west of the Busselton town centre, and is bounded to the east by Mill Road, the south by Bussell Highway, private property and Craig Street to the west and the coast to the north (Figure 2). The total area of the site is 12.303 ha, of which the redevelopment footprint is 6.026 ha and the conservation zone is 6.277 ha.

This plan will describe the following:

- The aims of the fire management plan;
- The location and zoning of the subject site;
- Current site characteristics, including climate, topography, soils, vegetation, water supply and access;
- The fire problem at the site;
- Fire protection elements and performance criteria; and
- A summary outlining roles and responsibilities.





2.0 Management Plan Purpose

The purpose of the fire management plan (FMP) is to outline fire management methods and requirements that will be implemented within the vegetated portion of Busselton Health Campus. The aims of the fire management plan are to:

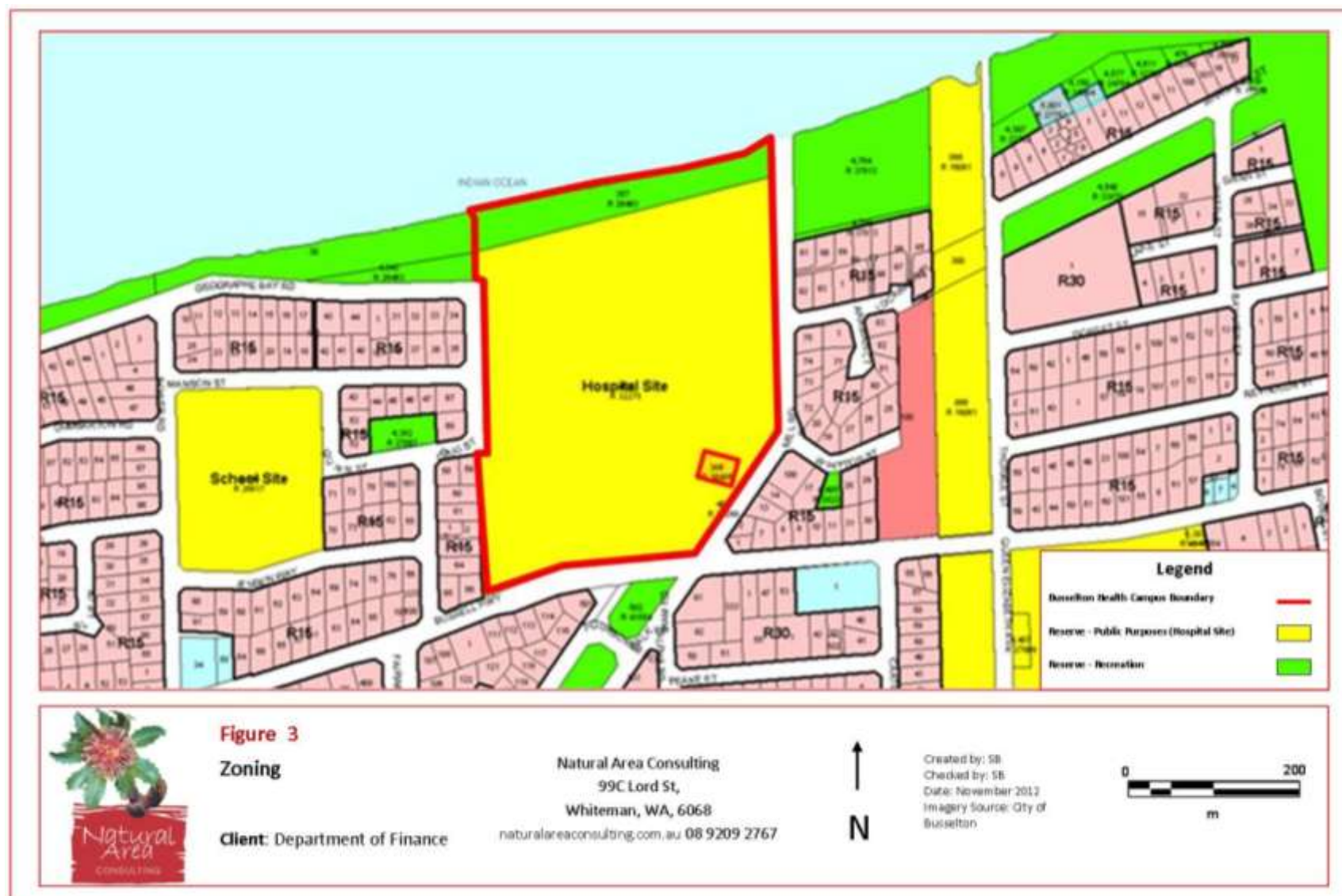
- retain the conservation area and its values as far as is possible through appropriate fire management,
- reduce the threat of fire to patients, staff, and nearby residents, and
- allowing easy access of fire-fighters if a fire does occur within the conservation area as far as is possible.

The fire management plan does not address fire management issues associated with the landscaped areas of the Busselton Health Campus site, nor those relating to the buildings and other infrastructure.

3.0 Location and Zoning

The subject Land is located within the Busselton Health Campus, some 2.5 kms west of the Busselton town centre on Bussell Highway. The site is Lot 406 on Deposited Plan 216401, Volume 3004 Folio 734. It is designated as a reserve for Public Purposes 'hospital site' (Figure 3).

Reserve 26463 at Lot 357 Geographe Bay Road West is the foreshore reserve at the front of the hospital. It is Deposited Plan 29251, Volume 3013 Folio 832, which is reserved for Recreation. Reserve 38006 on Deposited Plan 185317 Volume 3148 Folio 188 is the St John's Ambulance sub centre, and is reserved for Public Purposes 'hospital site'.



4.0 Site Details

The site has an area of approximately 12.3 ha, which includes approximately 10 ha of open Peppermint (*Agonis flexuosa*) woodland, and 2.3 ha of existing buildings, car parks, vehicle access points, and similar associated with the current hospital and St John Ambulance operations (Figure 2). The area associated with the Peppermint woodland includes areas of mature trees with little understory to the east, west and south. Areas to the north include mature Peppermints with an understory of coastal sedges and shrubs.

4.1 Climate

According to the Bureau of Meteorology (2011), the climate of the Busselton region is typical of the Swan Coastal Plain. It can be described as Mediterranean, characterised by cool, wet winters and hot, dry summers. Statistics available from the Bureau of Meteorology (2011) indicate the following:

- Average maximum temperatures range from 16.3 °C in winter to 28.5 °C in summer,
- Average minimum temperatures range from 7.5 °C to 14.0 °C,
- Average rainfall is 810 mm per year, with approximately half of that falling during winter months, and
- Average humidity ranges from 50% in summer to 81% in winter.

Potential climate change impacts in the vicinity of the site include:

- A drying climate with the potential to result in further decline in groundwater levels and associated groundwater dependent ecosystems,
- Sea level rise, and
- Increased frequency of storm events.

4.2 Topography

The site is relatively flat, rising from the north towards the south in a series of low, undulating dunal formations, rising from 0 m AHD along the coast to some 2 – 3 m AHD inland towards Bussell Highway. Soils range from those typical of the white, beach sands of the Quindalup Dune System along the foreshore area, to those that have been coloured over time due to the presence of vegetation and other organic matter.

4.3 Vegetation and Flora

The vegetation and flora at the site and at other nearby locations has the potential to contribute to the spread of fire, and needs to be considered from a fire management perspective.

4.3.1 Onsite Vegetation

The vegetation and flora at the Busselton Health Campus is dominated by the Peppermint (*Agonis flexuosa*). The site contains areas of open peppermint woodland with a grassy understorey, Peppermint woodland with a middle storey of *Rhagodia baccata* and *Acacia* species and an understory of coastal sedges and herbs (Figures 4 and 6). There are also areas of weed infestation and locations where lawn clippings and other garden wastes have accumulated, contributing to the fire risk at the site (Figure 4).



Figure 4: Vegetation at Varying Locations

4.3.2 Offsite Vegetation

Vegetation occurs at a number of locations nearby the Busselton Health Campus site, and the conservation zone (Figure 6). Vegetation types within 100 m of the site (Figures 5 and 6) are predominantly mature Peppermints with a grassy understorey; however there are areas of denser vegetation along the foreshore reserve to the east and within the old railway reserve to the south. These are sufficiently distant that they do not significantly increase the fire risk within the site.

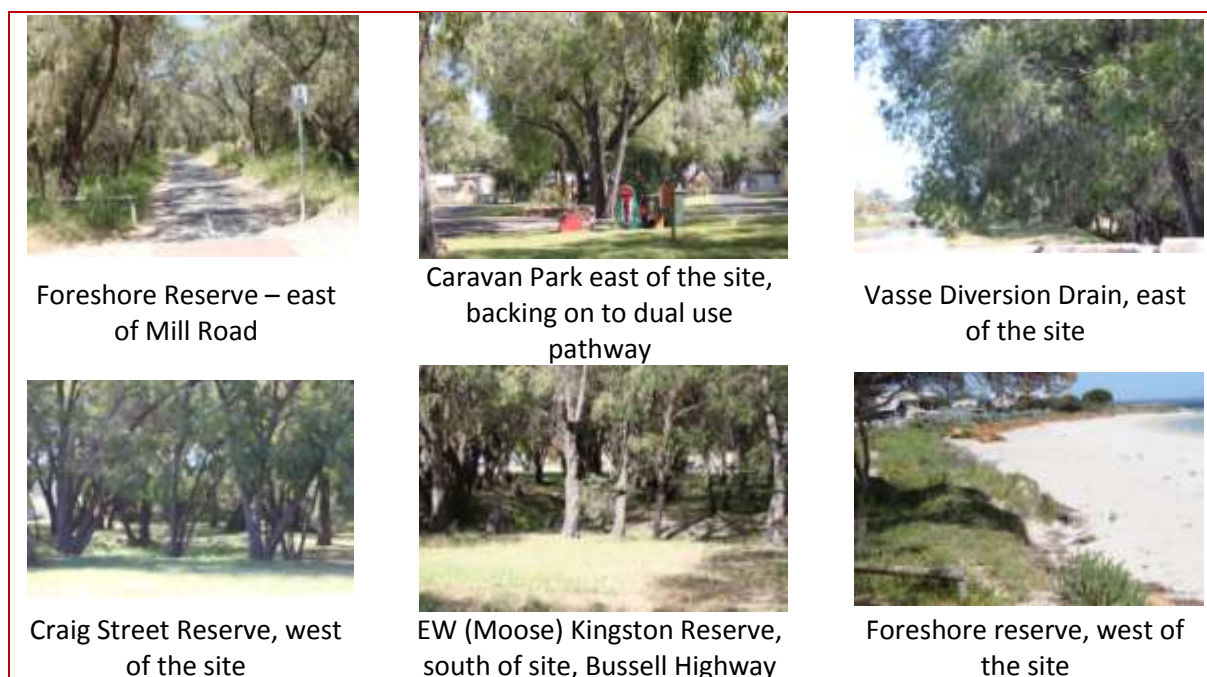
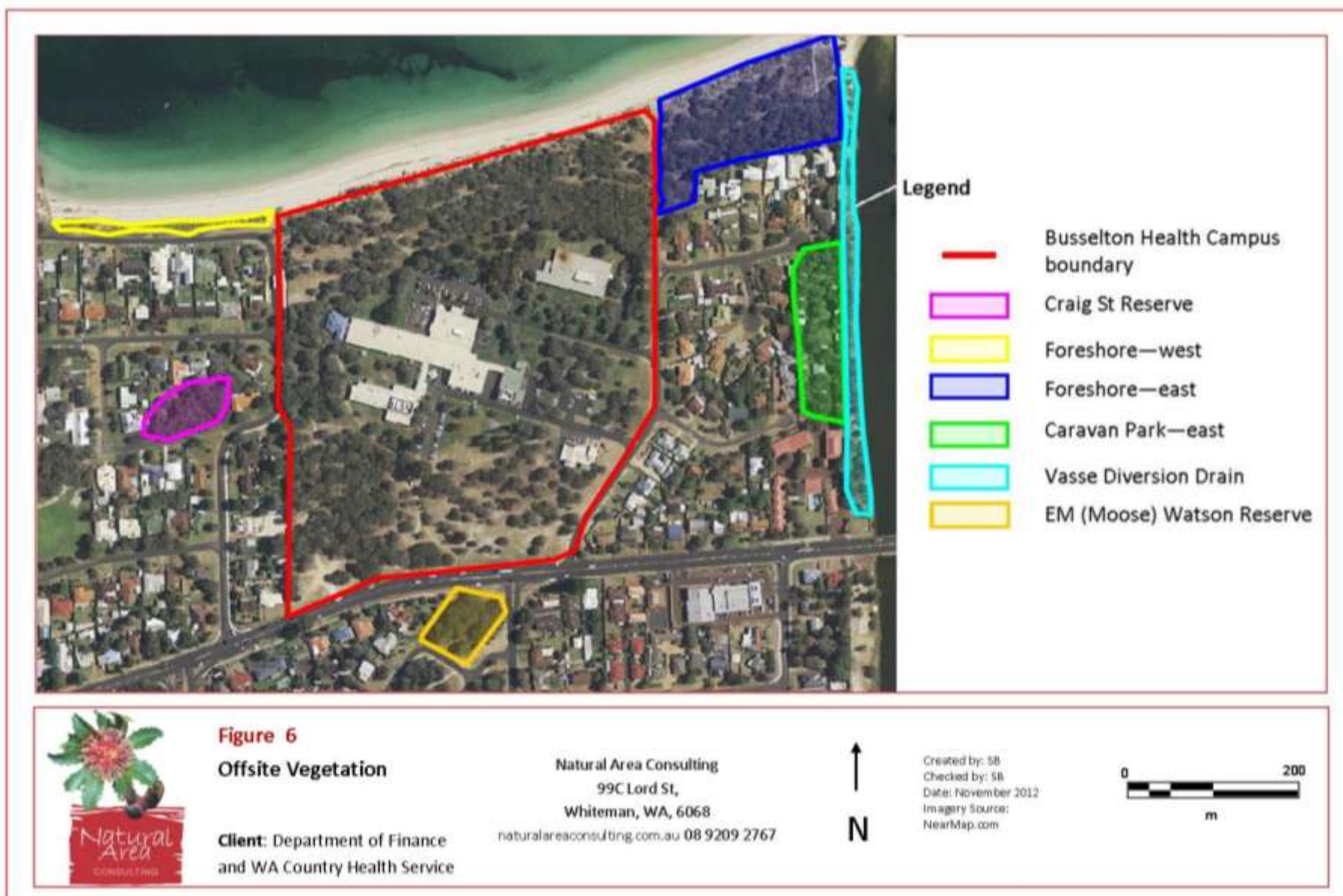


Figure 5: Offsite Vegetation in the Vicinity of the Project Site



4.3.3 Landscaping and Revegetation

It is understood that landscaping and revegetation activities will occur at varying locations during and/or after the development process, in accordance with the Revegetation Management Plan, also prepared by Natural Area Consulting (2011). Any revegetation activities have the potential to result in vegetated stands of 0.25 ha or greater, and thus being considered 'classified vegetation' from a fire management perspective. Accordingly, revegetation activities will need to consider:

- competing aims for revegetation, if any,
- the area to be revegetated, and
- the species to be used – for example, it may be more appropriate in some areas to plant non-native species that do not burn as readily as local native species.

Based on projected planting locations and densities, the fire hazard at the site is expected to be similar to current levels after revegetation activities. This assessment is based on the following:

- further distance from vegetated areas to buildings (excluding the hospice),
- planned planting density in the vicinity of buildings is low – i.e.: 1 Peppermint per 20 m²,
- planting density of 1 Peppermint per 5 m² is planned for clearer areas further away from buildings,
- no planting of understorey plants is planned in areas where greatest numbers of Peppermints will be planted, and
- parkland cleared areas beneath the majority of the Peppermints will be retained.

4.4 Existing Land Use and Assets

The Busselton Health Campus currently houses the local Busselton Hospital, a St John Ambulance substation, the community Hospice, and associated infrastructure. Accordingly, the site is considered to be a 'sensitive premises', and will warrant rapid fire response in the event a fire occurs anywhere on or in close proximity to the site. It should be noted that all onsite buildings and infrastructure except for the hospice are more than 20 m from the conservation zone and areas containing higher numbers of Peppermints or denser stands of vegetation.

Projected concept design plans for the site indicate that the major buildings will occur some 50 - 75 m from the nearest perimeter of the conservation zone. While further away from the vegetated areas than existing buildings, this distance is still within what would be a BAL 12.5 construction level.

4.5 Access

Site access needs to be considered from the perspective of both the current situation and what will occur after the development commences in 2012 until its conclusion in approximately mid-2014.

4.5.1 Current Site Access

Access to the site occurs through two formal entries from Mill Road, along with an entrance from Craig Street to the current hospice. The site is not fenced, and informal access to the

site is also possible from various tracks along the foreshore area, Craig Street and from Bussell Highway (Figure 2).

At present, there is sufficient access for pedestrian and vehicle access to and from the site in the event of a fire. At the conclusion of the development process, access locations will differ from those currently, however they are still expected to provide sufficient alternatives for pedestrians and vehicles in the event of a fire.

4.5.2 Access Considerations During Development

As the development proceeds, it is intended that the conservation area will be fenced to prevent access and provide a clear delineation between the development area and the conservation area as well as provide a measure of protection for planned revegetation activities. The proposed fence will make access to the site more difficult, and will need to be taken into consideration when determining appropriate fire management solutions for the conservation area, such as ensuring sufficient gates to allow access for emergency vehicles at strategic locations.

4.6 Water Supply

The site is connected to town water supply and includes a number of hydrants within the hospital site boundary. The site also contains a bore that can be accessed for water in the event of a fire, along with a hydrant booster at the front of the property along Bussell Highway.

Hydrants on surrounding roads are usually identifiable via any or all of the following:

- A blue 'cats eye' reflective indicator to the left of the centre line of the road,
- A white pointer in association with a large 'H' painted on the road and pointing to the location of the hydrant,
- A small blue 'H' painted on the curbing, and
- A white and red stripe around the power pole nearest to the hydrant.

5.0 Fire Problem

In order to identify the potential fire risks and mitigation strategies, it is necessary to describe the fire problem associated with the site. All areas of vegetation greater than 0.25 ha occurring within 100 m of the project site are reviewed when considering the fire problem. Thus, the assessment takes into consideration the:

- type and classification of vegetation present at the site,
- distance between the dominant vegetation classification and the walls of existing or proposed buildings,
- the topography and slope of the land between the buildings and the classified vegetation, and
- land use.

The slope of the land across the site is considered to be flat. Vegetation at the site has been classified according to descriptions provided in AS 3959 – 2009 (Figures 7 and 8), and include areas of the following:

- Low woodland – vegetation type B-07,
- Open shrubland – vegetation type B-09, and
- Tall shrubland – vegetation type E-15.

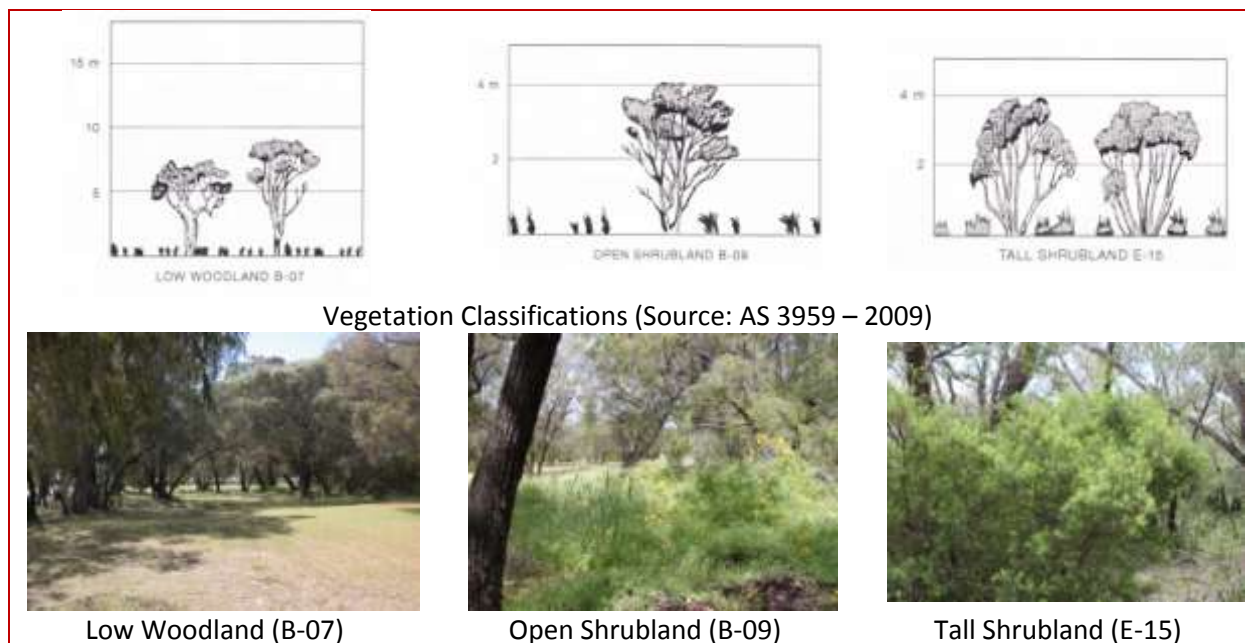


Figure 7: Classified Vegetation within the Conservation Zone as per AS 3959 - 2009

The overall threat is primarily associated with the presence of the mature Peppermints with close or connected canopies, potentially allowing fire to spread at height through the sections of the conservation zone and contribute to the risk of smoke, flames and embers to buildings and other infrastructure. Areas in the vicinity of the foreshore with a denser understorey also have the potential to contribute to the spread of fire and damage from smoke and ember attack. Summer weather conditions also contribute to the fire threat through mid-level disturbances bringing unstable atmospheric conditions from the north or north-west that result in thunder storms and lightning strike.



Figure 8

Vegetation Classification and Risk

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5.1 Fire History

An assessment of the site by NAC indicates that fire has occurred at some time in the past, with burn and scorch marks around the base of a number of trees and some up to two metres (Figure 9); however it is not known when the fire(s) occurred. McNamara (2011) and Thompson (2011) indicates that the fire brigade has been called out to fires within the foreshore reserve within Busselton, but not that portion of the reserve within the conservation zone at the Busselton Health Campus site.



Figure 9: Evidence of previous fire within the Conservation Zone

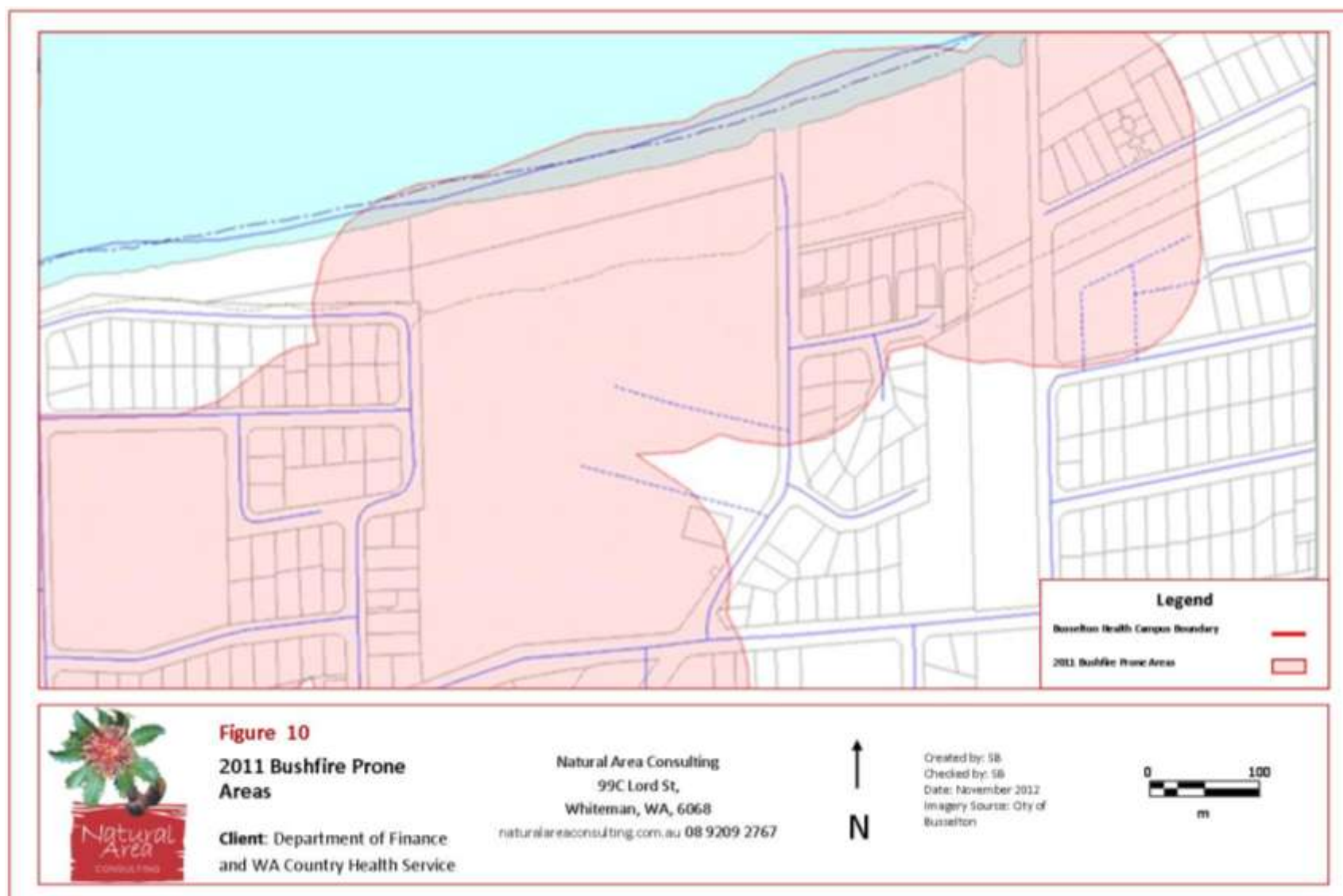
5.2 Bush Fire Risk

Risk relates to the likelihood of a negative or detrimental consequence arising out the interaction between hazards, community and the environment. An assessment by the City of Busselton regarding fire risk rates the majority of the site, including the entire conservation zone, as being prone to bushfires (Figure 10).

Given the distance between the Peppermints and the current and proposed buildings and infrastructure, the potential for damage to property from embers, the fire risk associated with the conservation zone has been rated as **moderate**, according to the type and density of vegetation at various locations within the conservation zone (Figure 8).

Risk also needs to be considered in relation to the proximity of buildings and infrastructure. As buildings within the vicinity currently existing or are planned for construction from 2012 to 2014, a minimum 20 m building protection zone will be required between vegetated areas and buildings. Design projections indicate that the distance of future buildings at the site will be some 50 – 75 m or more from the conservation zone, suggesting the fire risk will be similar to current levels after rehabilitation works.

It is also recommended that an assessment of the fire fuel load occur regularly by FESA or the City of Busselton as appropriate, that fire response is rapid, and that appropriate access be maintained for fire suppression activities in order to minimise the risk of damage to buildings and infrastructure or injury to people and wildlife.



5.3 Bush Fire Hazard

Bushfire hazard assessments provide an indication of potential fire intensity and the likely threat of fire to the site and surrounding areas. Thus the assessment of fire risk takes into account existing site conditions including:

- topography,
- vegetation cover and associated fuel loads, and
- relationship to surrounding development.

Using assessment criteria published in the 2nd edition of Planning for Bush Fire Protection Guidelines (Western Australian Planning Commission (WAPC), Department of Planning (DoP) and Fire and Emergency Services Authority (FESA), 2010), the hazard is considered to be ***moderate*** across most of the vegetated area because of the presence of the Peppermint woodland, some with close or connected canopies.

6.0 Fire Management Plan

The aim of the fire management plan is to reduce incidences of fire, minimise the area affected by fire, allow easy fire fighter access and protect property and conservation values. The following strategies are suggested to assist with fire protection and management at the site, based on current conditions:

- a system of strategic firebreak systems,
- construction and maintenance of personnel and vehicle access points at strategic locations within the conservation zone, along with a series of vehicle passing/turning locations, and
- fire fuel load reduction, particularly weed control activities.

It is recognised that conditions will change over time, particularly as revegetation activities result in changes to vegetation densities within the conservation zone. Accordingly, the provisions of the fire management plan will need to be reviewed at an appropriate frequency to ensure their continued suitability, as highlighted in Section 6.9.

6.1 Firebreaks

At present, there is no formal firebreak within the conservation zone boundary, with informal access tracks serving that function. It is proposed that a formal firebreak be created within the vicinity of the western boundary of the property. However, the following constraints associated with the locating and maintenance of a firebreak should be noted (Figure 11):

- the presence of a number of mature Peppermint trees that provide habitat for the endangered Western Ringtail Possum (*Pseudocheirus occidentalis*) occur along the western boundary of the site, thus mitigating against their clearing for the installation of the firebreak;
- the access road to the hospice from Craig Street is raised approximately 0.5 m higher than the surrounding area; and
- the presence of the lamp pole/street sign with associated support wires at the corner of Craig Street and Geographe Bay Road at the north western corner of the site (note: this pole is showing signs of termite infestation).



Stand of mature Peppermints along western boundary



Street sign and associated support wires

Figure 11: Constraints Associated with Firebreak Construction along the Western Boundary

Given these constraints, it is proposed that an alternative firebreak be constructed that results in minimal impact on the Peppermint trees particularly (Figure 12). At present, it is suggested that the firebreak be constructed in two sections, the first making use of an existing track that commences at Bussell Highway and extends to the approximate location of the Hospice entry, in the vicinity of the existing gate. The second section would commence just north of the Hospice entry and meet up with the existing dual use path in the vicinity of the foreshore reserve, noting that the exit onto the path will be near the street sign and its associated support cables.

6.2 Strategic Fire Access

It is important that responders have a safe way to access and exit the area in the event of a fire, and to assist with fire fighting activities. The following will provide access during fire response activities:

- the dual use pathway within the foreshore area of the site; and
- the proposed firebreaks along the western boundary of the site (Figure 12).

Overhanging tree branches and similar in the vicinity of firebreaks and other strategic access ways will need to be pruned to provide a vertical height clearance of 4 m to enable the ready passage of emergency response vehicles. When the conservation zone is fenced off, gates will need to be constructed to a standard specified by the City of Busselton and keyed with a key common to the City.

In addition to the above, the following are recommended:

- that the proposed bollarded walkways are constructed to provide a 3 m wide trafficable surface that would allow the passage of a fire response vehicle such as a Toyota Landcruiser, with movement allowable in one direction only, and
- that a 3 m wide access way be provided inside the perimeter of the fence to allow the movement of emergency response vehicles, noting that the parkland cleared understorey suggests this would be feasible.

Typical construction standards for access ways are summarised in Table 1.

Given the area and layout of the site, the following are unlikely to be required:

- personnel access points, and
- vehicle turn-around areas.

Table 1: Vehicle Access Standards to Assist with Bushfire Protection

Standard	Emergency Access Way
Minimum trafficable surface	3 metres
Horizontal clearance	5 metres (1 m clear either side of 3 m wide track)
Vertical clearance	3 metres
Maximum grade	1 in 8
Maximum grade over <50 metres	1 in 5
Maximum average grade	1 in 7
Minimum weight capacity	15 tonnes
Maximum crossfall	1 in 33
Curves minimum inner radius	12 metres

Standard	Emergency Access Way
Signage	Required
Gates (vehicle access gates)	Min width 3.6 metres, approx. every 500 m
Personnel entry gates	Approved by City of Busselton
Design and construction	Approved by City of Busselton
Management measures	Erosion control measures in place

6.3 Signage

Where vehicle access locations adjoin public roads they need to be signposted appropriately, with FESA recommending the following:

- 'Fire Service Access – No Public Access' for strategic fire access points, and
- 'Emergency Access Only' for emergency access locations.

6.4 Vehicle Gates

The use of gates to restrict public access to strategic fire and emergency access ways may be required, but must adhere to the following:

- have a minimum width of 3.6 metres,
- be of a design and construction approved by the City of Busselton,
- gates for emergency access ways will be padlocked with the key being common to the City of Busselton,
- gates for strategic access ways may be locked but keyed with a common key, and
- may include the installation of bollards to restrict vehicle movement around gates where appropriate.

6.5 Fencing

It is understood that fencing at the back of existing housing to the west of the site is to be replaced. Given the vegetated nature of the conservation zone and the plan for infill planting with Peppermints, it is recommended that fences be constructed from non-combustible materials such as colourbond, brick or limestone.

6.6 Fuel Reduction

The presence of potential fuel, particularly dry vegetation, weeds and rubbish, contributes to the frequency and intensity of fires that might occur on site. The fuel loading within the conservation zone varies, with the parkland-cleared areas having a low load. However, in areas where garden waste has accumulated and weeds are present, the load is higher. FESA recommends that the fuel loads be maintained below 4 tonnes/hectare (McNamara, 2011; Thompson, 2011). Accordingly, the removal of garden waste and the implementation of regular weed control activities in areas of infestation to assist with fuel load reduction are recommended.

6.7 Education

It is recommended that the Western Australian Country Health Service includes information about the provisions of this fire management plan in its staff induction process and regular fire training activities.



Figure 12
Fire Management

Client: Department of Finance
and WA Country Health Service

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Date: November 2012
Imagery Source: Landgate,
2011, GDA 94 MGA 58



6.8 Assessment of Fire Management Strategies

The risk assessment process is composed of three key stages that are used as the basis of determining the level of risk associated with various activities, in this case, the potential of damage to property and people in the event of fire within the Busselton Health Campus. The stages involved with the risk assessment process include:

- Risk identification - Identify and document the potential risks and impacts associated with the occurrence of fire at the site;
- Qualitatively ranking potential environmental impacts to establish relative significance; and
- Establishing and documenting control measures to mitigate against potentially significant impacts.

Risk ranking is generally undertaken by assigning numeric likelihood and consequence levels to each identified risk issue. A risk matrix (Table 4) is presented based on the likelihood and consequence criteria outlined in Tables 2 and 3. Once the level of risk has been determined, risks can be prioritised. For all significant risks, control strategies should be established to ensure that the adequate controls are implemented.

Table 2: Risk Assessment Likelihood Descriptor

Level	Likelihood	Description
1	Rare	Very unlikely / may occur only in exceptional circumstances
2	Unlikely	Known to have occurred at some time
3	Probable	The event will probably occur, or has occurred under some conditions
4	Likely	The event is expected to occur under some conditions or has occurred more than once in recent years
5	Almost certain	The event is a common or frequent occurrence

Table 3: Risk Assessment Consequence Classification

Level	Consequence	Description
1	Insignificant	Confined to immediate area, rapid clean-up, no damage to housing, or people
2	Minimal	Confined to isolated area, rapid clean-up using internal resources, minimal damage, minor injuries
3	Moderate	Impact confined to the boundaries of the wetland area, clean-up may require external assistance, moderate damage and/or injury
4	Major	Major damage, significant but non-life-threatening injury, impacts within 1 km of wetland boundary, considerable clean-up using range of internal and external resources.
5	Catastrophic	Severe damage, loss of life, extensive clean-up and recovery period, requires ongoing operators and external resources

Table 4: Risk Assessment Matrix

		Consequence				
		1	2	3	4	5
Likelihood		Insignificant	Minor	Moderate	Major	Catastrophic
5	Almost certain	5	10	15	20	25
4	Likely	4	8	12	16	20
3	Moderate	3	6	9	12	15
2	Unlikely	2	4	6	8	10
1	Rare	1	2	3	4	5

- Extreme risk; immediate action required
- High risk; senior management attention needed
- Moderate risk; management responsibility must be specified
- Low risk; manage by routine procedures

The nature of the site, the proximity of existing buildings, infrastructure, neighbouring houses, and the conservation values associated with the presence of the Western Ringtail Possum means that the strategies described in this Plan represent the best available options that are likely to be achieved without significant clearing of Peppermint trees. Given that the overall hospital site is considered to be a 'sensitive premise', rapid response by emergency personnel and accessibility are essential for fire management. Outcomes of the risk assessment process and potential management strategies are shown in Table 5.

Table 5: Risks and Management Strategies

Issue	Potential Impact	Raw Risk			Management Strategies	Residual Risk		
		Likelihood	Consequence	Risk Level		Likelihood	Consequence	Risk Level
Fauna – Western Ringtail Possum	<ul style="list-style-type: none"> Death of population on site 	2	3	M	<ul style="list-style-type: none"> Parkland cleared areas reduce potential for wildfire Revegetation to occur in designated zones 	2	2	L
Proximity of buildings to Peppermint trees	<ul style="list-style-type: none"> Damage from fire, smoke, embers 	2	3	M	<ul style="list-style-type: none"> Except for the hospice, current layout means little vegetation except for the occasional tree within 20 m of building walls Revegetation activities will not occur with 20 m of building walls Proposed revegetation within the vicinity of the hospice will not occur within 20 m of building walls, and will not significantly change current density around the building Landscaping activities will consider fire management Buildings to be constructed in accordance with BCA requirements in relation to fire resistance periods for structure, floor construction, lift shafts (120 minutes) and structure enclosing combustible materials (240 minutes) (Hassell, 2011) 	2	2	L
Fire fuel load	<ul style="list-style-type: none"> Fire spread Damage from fire, smoke, embers 	2	2	L	<ul style="list-style-type: none"> Fire fuel loading to be kept within 4 tonnes per hectare or less around buildings and infrastructure Assessed regularly by City of Busselton/FESA 	2	1	L

Issue	Potential Impact	Raw Risk			Management Strategies	Residual Risk		
		Likelihood	Consequence	Risk Level		Likelihood	Consequence	Risk Level
					<ul style="list-style-type: none"> Appropriate removal of garden and building waste 			
Fire response	<ul style="list-style-type: none"> Fire spread, damage due to lack of or inability to respond 	2	3	M	<ul style="list-style-type: none"> Hospital site is a 'sensitive premises', so rapid response essential Fire management considered during staff and contractor induction process 	2	2	L
Revegetation activities	<ul style="list-style-type: none"> Increase areas of vegetation, and thus risk of fire 	3	3	M	<ul style="list-style-type: none"> Revegetation to occur in designated areas, away from buildings and infrastructure Distance to new buildings (excluding the hospice) will be > 50 m Parkland cleared areas to be maintained in proximity to buildings and infrastructure 	3	2	M

6.9 Implementation

Implementation of this Plan will commence immediately and will be the responsibility of the landowner, the Department of Health. Similarly, maintenance of fencing, gates and access points will be the responsibility of the landowner.

Likely tasks that will be involved with the implementation of this plan are described in Table 6.

Table 6: Implementation Schedule

Activity	Responsibility	Maintenance
Installation of vehicle and personnel access points, along with associated fill where required	Landowner	Will include checking of general condition, organising repairs as required, maintaining desired aesthetics, such as painting and similar; checking access is not blocked
Installation of firebreaks in appropriate locations, along with material such as limestone or road-base to provide a base for vehicle access during emergency situations	Landowner	Checking of firebreaks and base on regular basis, in accordance with City requirements
Signage identifying emergency access ways and similar	Landowner	Will include checking of condition, legibility, visibility
Fuel load reduction	City of Busselton/FESA	At a frequency that will maintain recommended fuel load rating
Education	Landowner & City of Busselton	Department of Health – staff and visitor induction process City – during normal administrative activities to residents and rate payers

6.9 Plan Review

This fire management plan has been developed based on current conditions at the site, but recognises that changes can occur over time. Accordingly, it is recommended that this plan be reviewed twelve months after initial endorsement and implementation to ensure its continued suitability, and in the event any of the following occur:

- A fire occurs within the site boundary or a neighbouring property that spreads to the site; and
- As plantings associated with revegetation activities become established and mature, increasing the density of vegetation with the conservation zone.

7.0 Summary and Recommendations

The Busselton Health Campus site is located on an area of relatively flat land with a number of mature Peppermint trees and the associated presence of the Western Ringtail Possum (*Pseudocheirus occidentalis*). The presence of the Peppermint trees and other vegetation mean there is a potential risk for fire within the site, and which needs to be managed appropriately. Given the 'sensitive premises' consideration, early response to ensure the protection of property, people, pets and the environment. This section summarises the fire management recommendations for the site, as well as outlining the responsibilities of various stakeholders.

7.1 Recommendations

The key fire management considerations at the Busselton Health Campus site are:

1. the nature of the land use, being a hospital site and thus a 'sensitive premises', with the various buildings and other infrastructure to support that use; and
2. the presence of the endangered Western Ringtail possum and associated habitat, particularly in the form of Peppermint trees (*Agonis flexuosa*).

In order to provide maximum protection from fire within the conservation zone, the following management strategies are recommended:

- an alternative fire break be installed along the western boundary of the site in areas that minimise impacts to the presence of the mature Peppermint trees,
- that proposed bollarded walkways be constructed in a manner that also allows their use by emergency response vehicles, such as the use of bollards that can lowered or removed in the vicinity of fire breaks and access ways,
- that the fence to be installed during development activities includes gates constructed to the nominated City of Busselton requirements and keyed with a common City key,
- that consideration be given to the presence of the support wires associated with the street sign at the north western site boundary in terms of vehicle movement, such as looking at the feasibility of adjusting its location, and
- ensuring revegetation activities occur in a manner that does not significantly increase the risk of fire spread, smoke and/or damage by embers.

7.2 Responsibilities

Responsibilities associated with bushfire preparedness and response within the conservation zone of the Busselton Health Campus are shared by the landowner, contractors associated with the development activities, and the City of Busselton.

7.2.1 Landowner Responsibilities

The landowner is responsible for implementing key portions of this Fire Management Plan, including:

- implementing requirements associated with installation and maintenance of appropriate firebreaks and vehicle access ways, and complying with relevant WAPC, DoP and FESA guidelines,
- installation and maintenance of appropriate gates and signage,

- maintaining any firebreak areas or similar in accordance with City of Busselton requirements and guidelines,
- maintaining hydrants, fire extinguishers and other fire equipment used on site,
- respond to fire management advice issued by the City of Busselton and/or FESA,
- maintain buildings and infrastructure on site in a manner that reduces the potential for damage from fire, smoke and/or ember attack,
- undertaking weed control activities at appropriate times to maintain required fire fuel loadings within the conservation zone, and
- providing appropriate information to staff and contractors about the need to minimise the risk of fire within the conservation zone, such as the requirement to ensure all wastes are appropriately disposed of.

7.2.2 Staff and Contractor Responsibilities

Staff and contractors working at the Busselton Health Campus have the following responsibilities:

- ensuring rubbish is kept to a minimum and disposed of appropriately at nominated locations outside the conservation zone,
- that adequate signage and provision for cigarette disposal is made for those locations where smoking is allowed within the conservation zone, particularly in the vicinity of the Gazebo and seating adjacent to the dual use pathway, and
- report fires or suspected fires in accordance with Busselton Health Campus procedures, to reception or FESA as soon as they are noticed.

7.2.3 City of Busselton Responsibilities

The City of Busselton will be responsible for:

- Providing appropriate advice in relation to City requirements for firebreaks, hazard reduction, and similar to the property owners and occupiers as required.

7.2.4 FESA Responsibilities

FESA will be responsible for:

- Maintaining organisational fire fighting equipment in good condition and repair, and
- Responding to fires within the Busselton Health Campus in a timely manner in an effort to minimise the spread of fire and damage to nearby housing from ember attack.

8.0 References

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Wildlife Conservation Act 1950 (WA)

Appendix 1 Glossary

AE	Aurora Environmental
BAL	Bushfire Attack Level
DEC	Department of Environment and Conservation
DoP	Department of Planning
FESA	Fire and Emergency Services Authority
FMP	Fire Management Plan
NAC	Natural Area Consulting
WACHS	WA Country Health Service
WAPC	Western Australian Planning Commission