

Clarence City Council

Bushfire Management Plan

Lauderdale Wetlands Reserve
Lauderdale

Revised
January 2017
Clarence City Council

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1. Introduction

This bushfire management plan (BMP) is a revision and expansion of the first BMP review for the Lauderdale Wetlands Reserve prepared by AVK Environmental Management and Renaissance Forestry in 2005, and will operate for a period of 5 years after which another review is recommended.

It should be noted that this BMP is not an operations plan and does not deal directly with response to bushfires. Operational procedures are dealt with in various documents prepared by the Tasmania Fire Service (TFS) and other emergency services.

1.1 Aim

The aim of this BMP is to provide a framework for bushfire management that meets Clarence City Council's land management objectives for the site, as set out in Council's *Bushfire Management Strategy for Council Owned and Controlled Land*, *Bushfire Management Strategy - Best Management Practice Guidelines* and Strategic Plan.

It must be noted that it will not be possible to prevent bushfires occurring in the reserve. Unless these fires are suppressed quickly, there is a risk that large destructive fires may develop. Depending on weather conditions, such fires may burn a substantial portion of the bushland in and adjoining the reserve causing damage to assets and environmental values, and even loss of life. This BMP aims to lessen these risks by minimising the risk of fires starting in the reserve, and minimising the risk of injury or damage to assets in and surrounding the reserve.

This plan also provides for the use of fire as a management tool to:

- Target area for maximum risk reduction
- reduce bushfire hazard to protect assets from bushfires
- maintain the long-term viability of the native vegetation in the reserve
- Assist in the removal of weeds and the regeneration of degraded bushland.

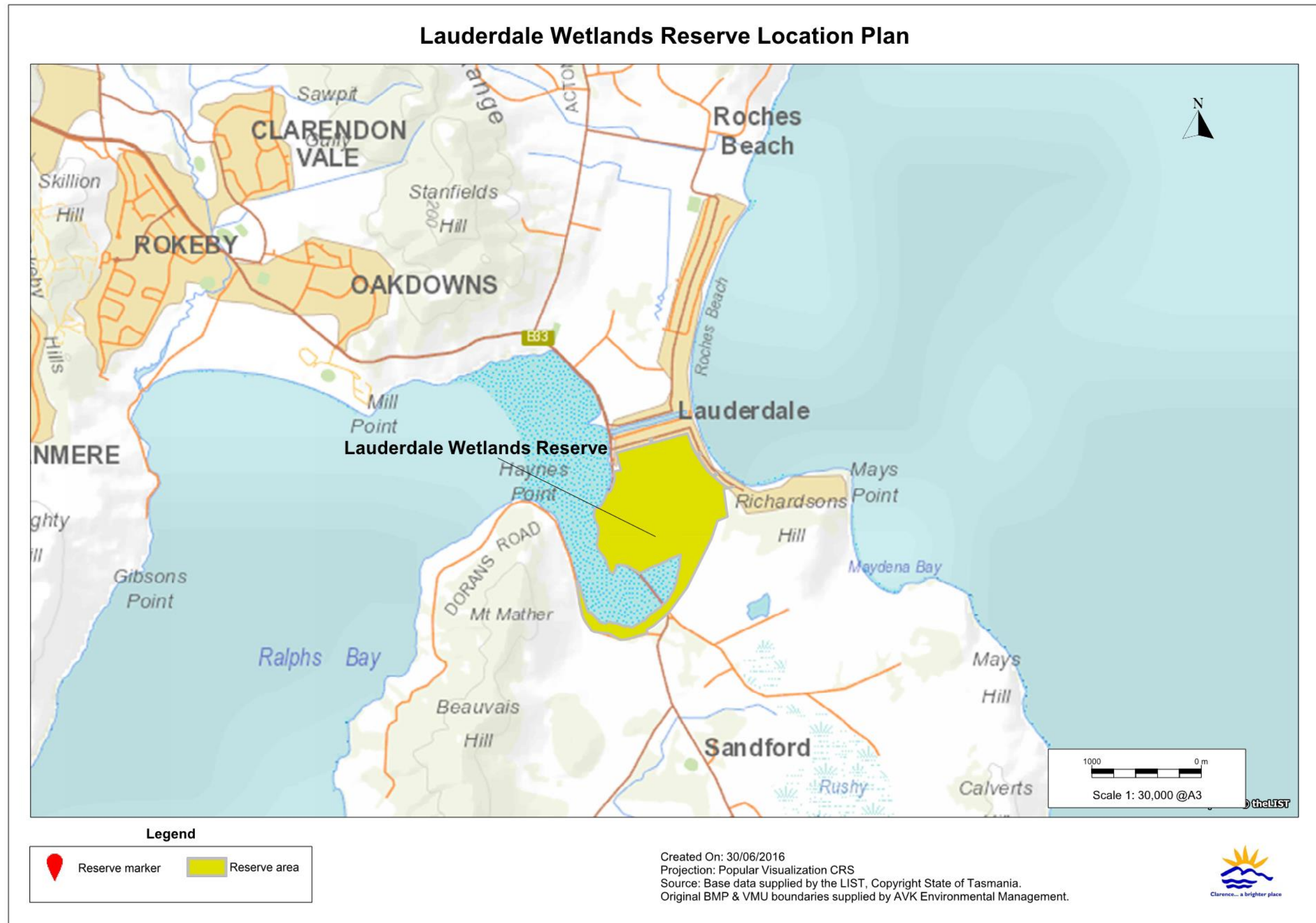
1.2 Location and Description

The Lauderdale Wetland Reserve is located to the south of Lauderdale (see figure 1). The reserve is 122^{ha} in size and is bounded to the west by Ralphs Bay, to the east by residential development along Bayview Road and to the south by farmland and an area of Commonwealth land containing major telecommunications infrastructure.

South Arm Road runs through the reserve and a large landfill (former Lauderdale tip operating 1970's to early 2000's) now capped and revegetated, is located roughly in the middle of the reserve.

Sections of the reserve have been mapped as a bushfire-prone area under the *Clarence Interim Planning Scheme 2015*. Any future developments within or adjacent may require a Bushfire Risk Assessment and a Bushfire Hazard Management Plan.

Figure 1 – Location of the reserve



1.2.1 Geology and Soils

The wetlands occupy a narrow sandy neck between Ralphs Bay to the west and Fredrick Henry Bay to the east. The substrate is a mixture of recent sandy silty and clayey deposits with some patches of gravel and shingle.

Soils over most of the reserve are undefined, waterlogged and have a peaty surface layer where there is a vegetation cover. The lower parts of the reserve around Ralphs Bay are frequently inundated and are highly saline.

1.2.2 Vegetation

The major vegetation communities in the reserve are shown in figure 2.

Vegetation types and community boundaries within the reserve are based on TASVEG 3.0 mapping, checked and modified where required following a survey of the reserve. Vegetation community boundaries outside the reserve have not been checked for accuracy but are shown to give an indication of the surrounding vegetation.

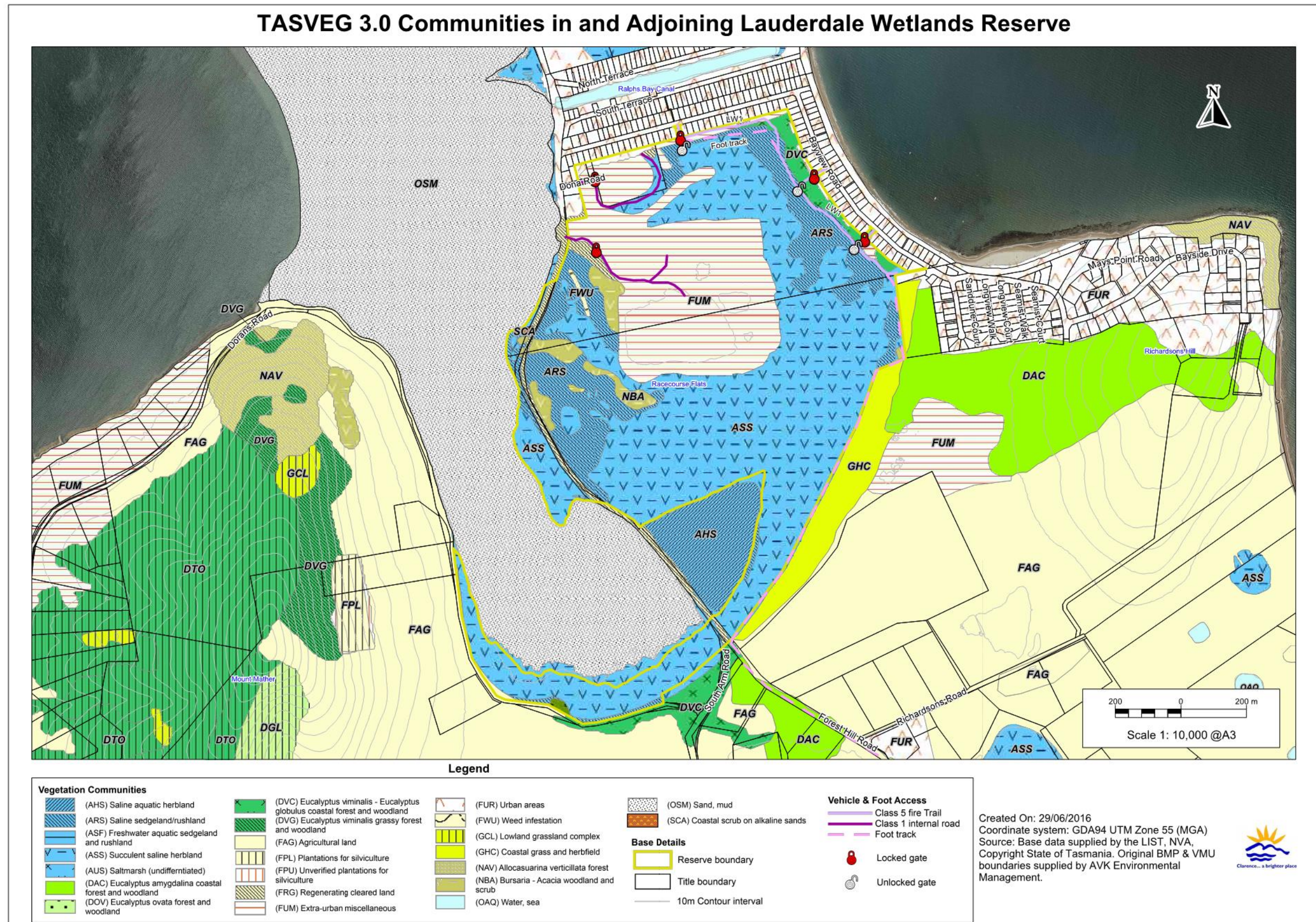
The reserve is dominated by a variety of saline wetland plant communities, mainly succulent saline herbfield (ASS) and saline grassland (ARS). The wetland vegetation is interspersed with patches of *Bursaria-Acacia* woodland and scrub (NBA). *Eucalytus viminalis* – *Eucalyptus globulus* coastal forest and woodland (DVC) and *Eucalyptus ovata* forest and woodland (DOV) occurs on the higher ground fringing the reserve. The former Lauderdale tip has been vegetated with a variety of native shrubs and trees and currently has a grassy woodland structure.

Eucalyptus ovata forest and woodland (DOV) and *Eucalytus viminalis* – *Eucalyptus globulus* coastal forest and woodland (DVC) are listed as threatened native vegetation communities under the *Nature Conservation Act 2002*.

1.2.3 Reserve Usage

Most of the reserve is conserved primarily for its wetland vegetation rather than for recreation. Community usage is minor and generally limited to the Tangara Trail that runs around the southern and eastern sides of the reserve. Previous land uses included grazing, refuse disposal late 1970's until early 2000's, and a horse-racing track. A security fence surrounds the site of the former Lauderdale tip. The Lauderdale Football Club grounds are also within the reserve.

Figure 2 – Vegetation types in the reserve



1.3 Bushfire Management Objectives

Bushfire management within the Lauderdale Wetland Reserve will meet the following broad management objectives:

1. Protection of life, assets and adjoining property from bushfire.
2. Minimise the risk of fires starting and spreading in the reserve.
3. Protection and enhancement of the ecological and visual values provided by the reserve.
4. Protection of infrastructure and cultural heritage values within the reserve.
5. Recovery, maintenance and enhancement of vegetation communities and fauna habitat within the reserve.
6. Minimisation of soil loss resulting from bushfire, or bushfire management activities.

The actions recommended to attain each of these objectives are listed in section 5.1.

1.4 Reserve Management Responsibilities

Management of the reserve is the responsibility of Clarence City Council. Clarence City Council has a responsibility under the *Fire Service Act (1979)* to take all reasonable precautions to prevent any fire lit on their property from spreading onto neighbouring property. This BMP will help to fulfil that “duty of care”. The TFS is responsible for suppressing bushfires within the reserve.

2. Bushfire Risks

Extreme bushfire conditions can occur in southern Tasmania when dry winters and springs are followed by summers where fuels are very dry. Under these conditions, fires can be expected to move quickly under the influence of strong, dry, north-westerly winds, and then move more or less at right angles on a broad front when the subsequent south-westerly wind change arrives. Fires that start under these conditions can reach a very high intensity, even in areas with relatively low fuel loads, and are very difficult to control until the weather conditions abate.

2.1 Fire History and Causes

The bushfire history of the Lauderdale Wetlands Reserve is shown on figure 3.

2.1.1 Bushfires

The only documented bushfire to impact the reserve was the 1967 Black Tuesday bushfires which burnt approximately 28ha of the reserve.

Data supplied by the TFS and Clarence City Council Fire and Bushland Management showed that within the duration of the previous BMP (2011-2015) the TFS attended two incidents within the reserve, the first in January 2013 which was documented as a grassfire burning approximately 2^{ha}, the ignition cause was fireworks. The second incident also being a grassfire occurring in April 2014 and documented to have burnt approximately 4^{ha}, the ignition cause is unknown. Polygons for burnt areas from these two incidents are not shown on figure 3, merely incident point locations.

2.1.2 Planned Fires

The planned burning history of the reserve is shown on figure 4.

During 2007 Clarence City Councils Fire and Bushland Management conducted a planned fuel reduction burn within the grassy woodland components of vegetation management unit (VMU) 3 and VMU 4. The objective was to reduce fuel loads. This burn was completed successfully in addition to post burn weed management.

Figure 3 – Bushfire history within reserve (1967-2015)

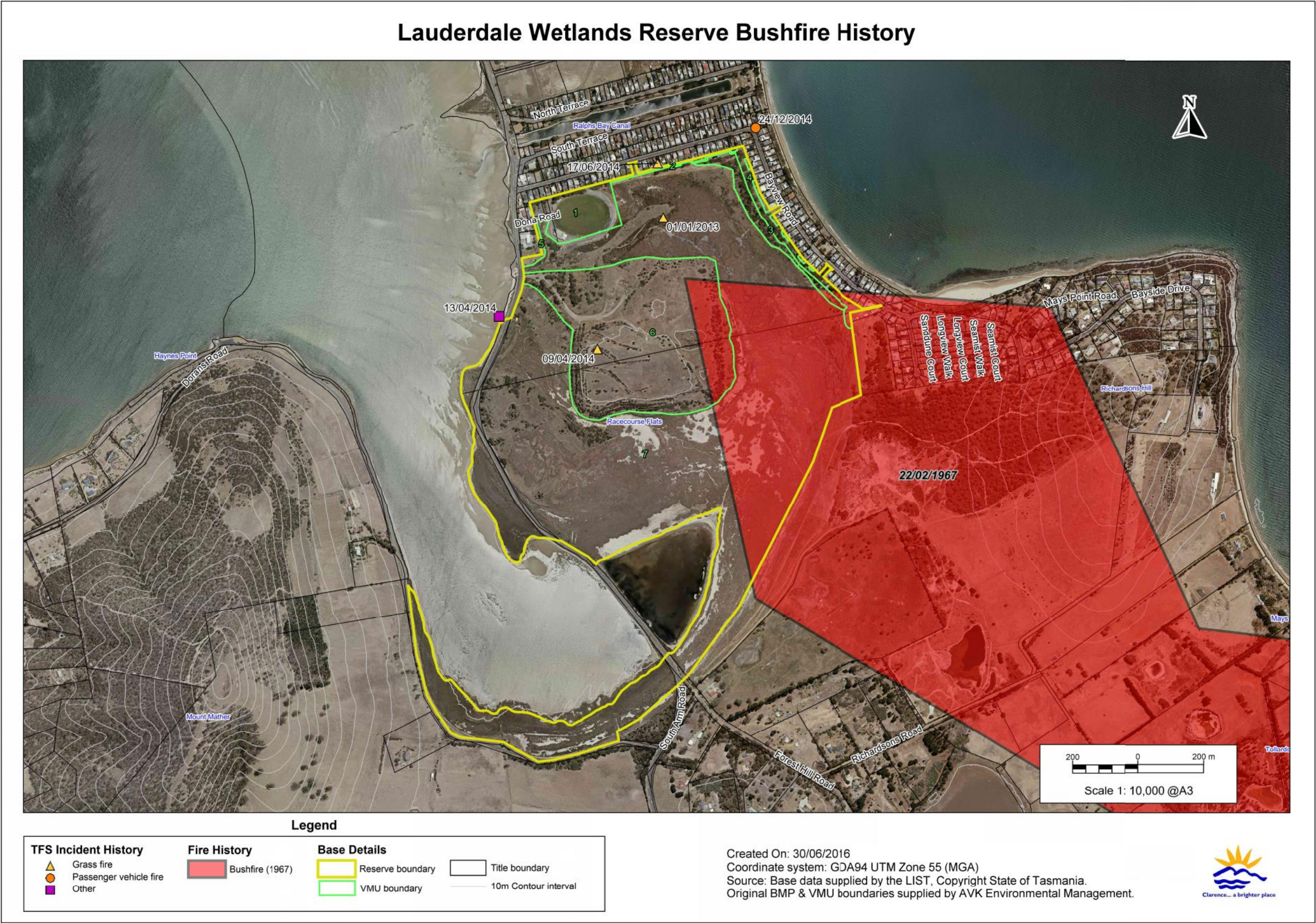


Figure 4 – Planned burning within reserve (2007-2015)



2.2 Fuel Types and Hazard Levels

The higher the intensity of a bushfire the greater its destructiveness and the more difficult it is to control. As the intensity of a bushfire increases it becomes progressively more difficult to contain and suppress the bushfire. Very high intensity ($> 4000 \text{ kW/m}$ heat output at the fire front) fires with flame heights greater than 10m are generally uncontrollable (NSW Rural Fire Service, 1997). Although grass fires rarely attain a very high intensity, they can move much faster than forest fires, thereby making them difficult to contain.

Bushfire intensity is a function of the heat content of the fuel, the quantity (load) of fuel, and the rate of spread of the bushfire. The heat content of vegetation fuels is roughly constant, and rate of spread is largely a function of slope and weather conditions (wind speed and relative humidity). It has been found that the quantity and distribution of fine fuels are the main factor influencing bushfire behaviour. Larger fuels burn during a bushfire but do not contribute significantly to the spread of a bushfire (NSW Rural Fire Service, 1997).

Fine fuels consist of dead plant matter less than 6mm in diameter and live plant matter less than 2mm in diameter (including grasses, bracken, leaves, bark, and twigs and branches) (Marsden-Smedley, 2009). Fine fuel load (measured in tonnes per hectare) has therefore been used as a convenient measure of the underlying bushfire hazard in areas dominated by woody vegetation. The fine fuel load at any given time is a balance between the rate of fuel build-up, and factors that remove fuel, such as litter decomposition and fire. In the absence of bushfire, fuel loads in forests and woodlands with a shrubby or heathy understorey build up to a quasi-equilibrium state where the rate of fuel production equals the rate of decomposition. The maximum levels vary for different vegetation types and also for the same vegetation types in different locations (Conroy, 1988). The time taken to reach equilibrium fuel loads also varies, ranging from about 2 years in some native grasslands to about 20 to 40 years in dry eucalypt forests (Marsden-Smedley, 2009).

However, it has been found that the fuel structure is possibly more important than the total fine fuel load in determining bushfire behaviour (Marsden-Smedley, 2009). Fuel in forests, woodlands and shrublands can be categorised into four layers with differing effects on bushfire behaviour (Hines et al., 2010). These layers are:

- **Surface fine fuel;** leaves, bark, small twigs and other fine fuel lying on the ground. These fuels provide the horizontal continuity that allows a bushfire to spread.
- **Near surface fine fuel;** grasses, low shrubs, bracken etc. up to about 0.5m above the ground surface. Fuels in this layer will burn when the surface fuel layer burns and will increase bushfire intensity.
- **Elevated fuels;** larger shrubs and small saplings with most of the fuel closer to the top of this layer and a clear gap between them and the surface fuels. These interact with the two lower fuel layers to further increase bushfire intensity. They also contribute to the vertical continuity of fuel that allows fire to 'climb' into the tree canopy.

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

Canopy fuels are not usually included in fuel hazard assessments in forests and woodlands, but are included in shrubland and heath fuel types where they are equivalent to elevated fuels. If there is sufficient fuel in the lower fuel layers to start the canopy fuel burning (called a crown fire) bushfire intensity can increase considerably. Crown fires in forests are generally considered uncontrollable (Luke and McArthur, 1986).

The main fuel factor that influences the rate of spread of a bushfire is the quantity of near surface fuel whereas total fine fuel load is the main factor influencing bushfire intensity (Gould et al 2007).

In grasslands and grassy woodlands the degree of curing (dryness) of the fuel is considered at least as important as the actual fuel load (Cheney and Sullivan, 2008). Grass goes through an annual cycle with new growth in spring drying out over summer. The bushfire hazard in grassland areas is greatest when the grass is fully cured which usually occurs during the period from December to April depending on seasonal breaks and significant summer rainfall events. However, grasslands that are not grazed or slashed over winter can burn in spring if cured grass from the previous growing season is still present.

Unlike bushland dominated by woody plants, grasslands can accumulate fuel very rapidly, and therefore burning is not a very effective method of hazard reduction. As grass fuel decomposes faster than eucalypt leaves and twigs, and is more likely to be eaten by herbivores, fuel loads in grasslands and grassy woodlands can fluctuate from year to year (Cheney and Sullivan, 2008).

Fuel loads can be roughly categorised in terms of the potential threat they pose as follows:

Low - < 5 tonnes per hectare

Moderate - 5 to 15 tonnes per hectare

High - >15 tonnes per hectare.

The characteristics of each fuel type in the Lauderdale Wetlands Reserve are given in table 1. The TASVEG 3.0 codes of the vegetation types in figure 2 corresponding to each fuel type are listed under the fuel type.

Table 1 – Characteristics of the different fuel types in the reserve

FUEL TYPE	FUEL HAZARD CHARACTERISTICS	BUSHFIRE BEHAVIOUR AND CONTROL
Shrubby forest / woodland DVC	Canopy, bark, elevated, near surface and surface fuels all present. Shrub layer to about 2m in height but some areas have shrubs up to 3m high. Near surface fuels a mixture of grasses and heathy shrubs. Leaf and bark fall around trees contributes to a gradual build up of fuel, particularly around the base of trees. Generally moderate overall fuel loads, but high where there is dense shrub growth. Grass component of the fuel load can build up fuel rapidly after a bushfire.	Can burn with moderate to high intensity depending on the degree of fuel accumulation. Significant ember attack on structures downwind of the bushfire and spotting across containment lines can be expected. Capable of carrying a bushfire at any time of year if there is a sufficient amount of litter on the ground. Tree cover can sustain a crown fire and the eucalypts, particularly old hollow trees and those with rough bark, will be a source of burning embers which can carry a bushfire over nearby fire control lines (roads, fuel breaks) and threaten nearby buildings. Hazard reduction burning is effective in removing accumulated litter, elevated fuels and the bark fuels largely responsible for spotting, but grass and bracken fuels can be replenished within a year or two after a burn.
Grassy forest / woodland DOV FUM	Canopy, near surface and surface fuel all present, bark fuels only present on roughed barked trees and shrubs. Moderate fuel loads, grass cover generally sparser and lower in height than in open grassland. Leaf and bark fall around trees contributes to a gradual build up of fuel, particularly around the base of trees. Grass component of the fuel load can build up fuel rapidly after a bushfire.	Can burn with moderate to high intensity depending on the degree of fuel build-up. Significant ember attack on structures and spotting across containment lines can be expected. Capable of carrying a bushfire at any time of year if there is a sufficient amount of litter on the ground, and/or cured grass. Tree cover is generally too sparse to sustain a crown fire, however, the eucalypts, particularly old hollow trees and those with rough bark, will be a source of burning embers which can carry a bushfire over nearby fire control lines (roads, fuel breaks) and threaten nearby buildings. Hazard reduction burning is effective in removing accumulated litter and the bark fuels largely responsible for spotting, but grass fuels can be replenished within a year after a burn.
Shrubland NBA SCA	Moderate overall fuel loads, predominantly elevated and bark fuels. High proportion of the fuel finely divided and elevated up to 4m. Relatively low surface and near surface fuel loads except where the shrub cover is sparse.	Where shrub canopies touch it can sustain a running crown fire of high intensity on days of extreme bushfire weather that would be difficult to control. Dense thickets are difficult to access. Significant ember attack on nearby structures and spotting across containment lines can be expected. Difficult to prescribe burn in cool weather due to low surface and near surface fuel loads.
Saltmarsh ASS	Near surface and surface fuels present. Dominated by succulents and with low fuel loads. Surface fuels damp except during prolonged drought.	Only likely to burn under extreme conditions. Low spotting risk so fuel breaks are likely to stop fires. Vehicle access restricted to landward edge and access on foot may be difficult due to wet ground. Difficult to carry out hazard reduction as surface fuels will usually only burn during droughts.

FUEL TYPE	FUEL HAZARD CHARACTERISTICS	BUSHFIRE BEHAVIOUR AND CONTROL
Unmanaged grassland ARS ASF	Native and introduced grasses, near surface and surface fuels present. Potential for dense elevated fuels to about 1m high following wet winters and springs. Flammability dependant on degree of curing of the grass. Grass fuels can be replenished within a year after a burn.	Can generate rapidly moving, moderate intensity fires in late summer and early autumn. Fires can occur at other times of the year if the cured standing crop from the previous year's growth persists. Likely to be relatively little spotting so fires can usually be stopped at roads and firebreaks, however, fires may be uncontrollable in extreme conditions.
Managed grassland Lauderdale football ground	Surface and near surface fuel present. Very low overall fuel loads. Grass generally less than 100 mm in height due to regular mowing and well watered.	Will not burn except under very extreme bushfire conditions and then only at low intensity.

Due to the predominance of saltmarsh in the reserve, fuel loads are generally low. However, the substantial grassy component on slightly higher ground are estimated to be averaging 5^t/ha. These fuels could generate fast moving fires that could threaten adjoining properties. The grassy component means that in relatively wet years fuel loads can build up rapidly. It also means that fuel loads will build up quickly following a bushfire, limiting the effectiveness of any hazard reduction burning.

2.3 Bushfire Threat and Risk to Persons

Most of the saltmarsh vegetation in the reserve would only burn under severe/extreme bushfire conditions. The main bushfire threat would come from fires in the grassland, shrubland and grassy woodland areas in the northern part of the reserve being blown towards adjoining houses by strong westerly or south-westerly winds. These fires could be difficult to control if the ground in the reserve is wet, thereby restricting vehicle access.

As most of the usage of the reserve is around the perimeter and there are large areas of vegetation in the reserve with low flammability that could be used as refuge areas, bushfires in the reserve are unlikely to be a danger to reserve users.

2.4 Assets at Risk from Bushfire

Assets potentially at risk from bushfire include; dwellings, infrastructure, and other items (such as ornamental and regeneration plantings) which would cost money to replace; as well as items of scenic, cultural and natural heritage value which could be damaged or destroyed by fire, or bushfire suppression activities. Each landowner has an obligation to reduce a bushfire hazard where it is a threat to neighbouring properties. However, even with extensive fuel reduction burning, the risk of high intensity bushfires occurring in the reserve cannot be eliminated.

Therefore consideration must be given to protection measures that will reduce the risk of bushfire damage to assets in and surrounding the reserve. Assets within and surrounding the reserve that are considered at risk from bushfires are shown in figure 5 and discussed in table 7.

2.4.1 Bushfire Risk to Natural Heritage Assets

The conservation value of the plant communities in the Lauderdale Wetlands Reserve is given in table 2. Six flora species of conservation value occur within the reserve (see figure 5). These are listed in table 3 along with their response to bushfire if known.

In addition, five fauna species of conservation value have been observed within the reserve (see figure 5). The habitat requirements and preferred bushfire management of these species are given in table 4.

Table 2 – Conservation values of plant communities

TASVEG CODE	EQUIVALENT FLORISTIC COMMUNITY ¹	Conservation Status ²
ARS	<i>Juncus kraussii</i> rushland <i>Gahnia filum</i> tussock sedgeland	Not threatened
ASF	<i>Eleocharis acuta</i> sedgeland	Not threatened
ASS	<i>Suaeda australis</i> heath <i>Sarcocornia quinqueflora</i> low open heath <i>Hemichroa pentandra</i> low open heath <i>Wilsonia backhousei</i> herbfield <i>Sclerostegia arbuscula</i> heath <i>Samolus repens</i> herbfield	Not threatened
DOV	DRY-hOV Heathy <i>E. ovata</i> forest	THREATENED NATIVE COMMUNITY
DVC	DRY-hVIM-co Heathy/Shrubby <i>E. viminalis</i> coastal forest	THREATENED NATIVE COMMUNITY
FUM	None described	Not threatened
NBA	None described	Not threatened
SCA	<i>Atriplex cinerea</i> shrubland	Not threatened

1. Forest Practices Authority (2005)

2. Nature Conservation Act 2002

Figure 5 - Assets at risk from bushfire



Table 3 - Plant species of conservation value and preferred bushfire management

SPECIES	CONSERVATION STATUS¹	OCCURRENCE	RESPONSE TO BUSHFIRE AND MANAGEMENT	ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (EPBC Act) STATUS
<i>Cuscuta tasmanica</i> golden dodder	RARE	Most recently recorded from similar habitat beneath radio masts just outside study area. This plant is parasitic on <i>Wilsonia</i> sp. - small saltmarsh undershrubs.	Unknown, bushfire is unlikely to play a significant role in the ecology of the species.	Not threatened
<i>Cynoglossum australe</i> coast houndstongue	RARE	Localised to remnants of <i>E. viminalis</i> woodland.	Regenerates from seed following bushfire - sometimes prolifically.	Not threatened
<i>Lachnagrostis punicea</i> subsp. <i>Filifolia</i> narrowleaf blownglass	RARE	Widespread across saltmarsh.	Unknown response to bushfire. Likely to regenerate from rootstock.	Not threatened
<i>Lachnagrostis robusta</i> tall blownglass	RARE	Patchily distributed in saline grassland.	Unknown response to bushfire. Likely to regenerate from rootstock.	Not threatened
<i>Lawrencina spicata</i> salt lawrencina	Locally significant	Several thousand plants; locally abundant on boundary between succulent saltmarsh and graminoid saltmarsh vegetation.	Unknown, bushfire is unlikely to play a significant role in the ecology of the species.	Not threatened

1. Tasmanian Threatened Species Protection Act 1995

Table 4 - Fauna of conservation value and preferred bushfire management

SPECIES	CONSERVATION STATUS ¹	HABITAT AND PREFERRED BUSHFIRE MANAGEMENT	ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (EPBC Act) STATUS
<i>Amelora acontistica</i> Chevron looper moth <i>Dasybela achroa</i> Saltmarsh looper moth	VULNERABLE	Both rarely recorded in Tasmania, although have been confirmed from this site in 1994. Little is known of their biology or ecological requirements. A major stochastic event such as an extensive bushfire would have unknown but possibly devastating impact upon their populations. Exclude bushfire from the wetland area.	Not threatened
<i>Lathamus discolor</i> Swift parrot	ENDANGERED	Known to breed in the Meehan Range and likely to nest elsewhere. Nests in hollows in old growth eucalypts (Brereton 1997). Blue gums (<i>Eucalyptus globulus</i>) provide a preferred foraging habitat although swamp gums (<i>E. ovata</i>) are recognised as being particularly important as an alternative nectar source. The swift parrot feeds in the tree canopy and therefore an extensive, high-intensity bushfire that scorched the canopy could reduce the potential food resources for this species within a reserve. However, a temporary loss of food resources in a reserve due to a localised bushfire is unlikely to have a significant impact on regional food sources for this species. Management should aim to avoid crown damage to larger trees by keeping planned burns at a low intensity and reducing the bushfire hazard to reduce the intensity of bushfires.	ENDANGERED
<i>Perameles gunnii</i> Eastern barred bandicoot	Tasmanian Status Not Threatened	Grasslands (both native and introduced) and grassy woodlands. Dense cover of regrowth is likely to be unsuitable habitat. Mosaic burning will ensure open habitats are maintained and help mitigate devastating bushfires.	VULNERABLE

SPECIES	CONSERVATION STATUS ¹	HABITAT AND PREFERRED BUSHFIRE MANAGEMENT	ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (EPBC Act) STATUS
<i>Theclinesthes serpentata</i> subsp. <i>Lavara</i> Checquered blue	RARE	A complete species management profile is not currently available for this species. Recommend contact DPIPWE Threatened Species Section prior to broadscale planned burning within reserve.	Not threatened

1 - Tasmanian Threatened Species Protection Act 1995

The fire sensitivity and flammability ratings of the vegetation types in the reserve according to Pyrke and Marsden-Smedley (2005), is given in table 5.

Table 5 – Fire attributes of the native vegetation

TASVEG 3.0 CODE	FIRE SENSITIVITY	FLAMMABILITY
ARS	Low	Low
ASF	Low	High
ASS	Low	Low
DOV	Low	High
DVC	Low	High
NBA	Low	High
SCA	Moderate	High

Flammability classification of Tasmanian vegetation (Pyrke & Marsden-Smedley, 2005)

FLAMMABILITY	CRITERIA FOR FLAMMABILITY
Very high	Will burn readily throughout the year even under mild weather conditions, except after recent rain (i.e. less than 2-7 days ago).
High	Will burn readily when fuels are dry enough but will be too moist to burn for lengthy periods, particularly in winter. Fuels will be dry enough to burn on most days from late spring to early autumn.
Moderate	Extended periods without rain (i.e. two weeks at least) and/or moderate or stronger winds are required for these communities to burn.
Low	These communities will burn only after extended drought (i.e. four weeks without rain) and/or under severe bushfire weather conditions (i.e. forest fire danger index > 40).

Note: recently burnt stands of low or moderate flammability classes may have a higher flammability rating.

Fire sensitivity classification of Tasmanian vegetation (Pyrke & Marsden-Smedley, 2005)

FIRE SENSITIVITY	ECOLOGICAL IMPACT OF BUSHFIRE	MANAGEMENT RECOMMENDATIONS
Extreme	Any bushfire will cause either irreversible or very long-term (> 500 years) damage.	Suppress all bushfire. Highest priority for bushfire suppression.
Very high	A single bushfire will cause significant change to the community for 50–100 years and will increase the probability of subsequent fires changing the community permanently.	Suppress all bushfire. High priority for bushfire suppression.
High	A bushfire-adapted community requiring at least 30 years between fires to maintain the defining species. Bushfire intervals greater than 80 years are required to reach mature stand structure.	Suppress all bushfire, but give higher priority to stands burnt less than 80 years ago.
Moderate	A bushfire-adapted community requiring at least 15 years between fires to maintain the defining species.	Suppress fires in stands burnt less than 20 years ago.
Low	Highly bushfire-adapted or non-native vegetation. A single bushfire will generally not affect biodiversity, although repeated short intervals (i.e. < 10 years) may cause long-term changes.	Suppression usually not an ecological priority except in specific situations (e.g. a recently burnt stand of a threatened species).

The low bushfire sensitivity of most of the native vegetation in the reserve indicates that it is highly bushfire adapted and a single bushfire will generally not adversely affect biodiversity, though repeated fires at intervals of less than 10 years may cause long-term changes in floristics and vegetation structure (Pyrke & Marsden-Smedley 2005). The high flammability rating of some of the native bushland in the reserve in Pyrke & Marsden-Smedley (2005) indicates that parts of the reserve will burn readily when fuels are dry but may be too moist to burn for long periods during winter. Fuels will generally be dry enough to burn on most days from late spring to early autumn.

2.4.2 Bushfire and Habitat Management

The main bushfire risk to natural heritage assets in the reserve is from bushfires that burn the whole of the reserve as well as fire regimes (planned or unplanned) that are outside the thresholds within which a particular plant community, or habitat for flora and fauna species, has viability in the long-term. Fire regimes within the thresholds of a particular plant community will help maintain its long-term viability, whereas fire regimes outside the thresholds are likely to lead to progressive changes in the structure and floristics of the plant community, and loss of habitat for the fauna favouring that plant community.

High intensity bushfires that burn the whole of the reserve can damage or destroy valuable fauna habitat including:

- Tree hollows used as nests and dens by many birds and arboreal mammals.
- Mature, senescing or dead trees that can be important invertebrate, bird and reptile habitat, and take a long time to replace.
- Understorey species that provide nest and shelter sites as well as a food source for many bird and mammal species.
- Fallen logs, bark and leaf litter that provide shelter and a food source for invertebrates, frogs, reptiles, birds and mammals.

Species may be lost from the reserve if they cannot recolonise from nearby areas, or survive in unburnt patches. Bushfires often stimulate the spread of environmental and other weeds. However, some weed species provide significant protection and food sources for fauna (for example, gorse and blackberry) and removal of these species should be carefully managed to ensure they are progressively replaced by equivalent native species habitat.

Planned burning of the native vegetation in the reserve at the optimum frequency for its long-term viability is considered the best way to conserve important habitat for both flora and fauna in the reserve (excluding the former Lauderdale tip site (VMU 6) due to unknown sub-surface contaminants). Planned burning in a mosaic pattern along with maintenance of fire trails is the best way to minimise the risk of a bushfire burning the whole of the reserve. The bushfire management requirements of the different plant communities/habitats in the reserve are given in table 6. These plant communities have been grouped together according to their bushfire management requirements.

Table 6 - Bushfire management requirements of the plant communities in the reserve

TASVEG MAPPING UNITS	BUSHFIRE IMPACTS AND BUSHFIRE MANAGEMENT AIMS
Heathy dry sclerophyll forests and woodlands	
DVC- <i>Eucalyptus viminalis</i> and / <i>E. globulus</i> coastal forest and woodland	<p>Bushfire controls the establishment of a dense shrubby understorey which would reduce light penetration to the ground layer. This can help maintain a diversity of heathy shrubs and herbs.</p> <p>Frequent fires can encourage a dense bracken layer that can suppress other ground layer species.</p> <p>Bushfire provides an opportunity for bushfire dependent species to germinate.</p> <p>Optimal bushfire interval for maintaining these communities is 15-25 years.</p> <p>Exclude bushfire from representative areas to provide controls for monitoring the effects of bushfire.</p>
Grassy dry sclerophyll forests and woodlands	
DOV – <i>Eucalyptus ovata</i> forest and woodland	<p>Infrequently burnt sites develop a dense shrubby understorey. Kangaroo grass (<i>Themeda triandra</i>) can die out after an extended absence of bushfire, or other method of biomass reduction (Lunt & Morgan, 1998).</p> <p>Frequent fires (< 5 years) can inhibit tree regeneration and eliminate the shrubby component</p> <p>Sites overlying dolerite and other more fertile soils have markedly more rapid rates of regeneration than low fertility soils derived from mudstone and sandstone.</p> <p>Overfrequent burning regimes in the past within much of forest overlying mudstones has contributed to loss of topsoil and erosion.</p> <p>Extended absence from bushfire can result in build up of fuel causing hot and damaging burns.</p> <p>A temporal and spatial mosaic burning pattern would assist with tempering the effects of a devastating bushfire.</p> <p>Optimal bushfire frequency is 5-20 years on fertile sites.</p> <p>Exclude bushfire from most areas on mudstone, which due to low fertility have low biomass growth rates and are drought stressed.</p>

TASVEG MAPPING UNITS	BUSHFIRE IMPACTS AND BUSHFIRE MANAGEMENT AIMS
Non eucalypt forests and woodlands	
NBA – <i>Bursaria</i> / <i>Acacia</i> woodland and shrub	<p>This community is typically derived from eucalypt woodland.</p> <p>Bushfire regimes will influence the nature of regeneration. Important to allow for a period of absence from bushfire where eucalypts can re-establish if desired.</p> <p>Optimal bushfire frequency is 5-20 years.</p> <p>Exclude bushfire from representative areas to provide controls for monitoring the effects of bushfire.</p>
Coastal vegetation	
SCA – Coastal scrub on alkaline sands ARS – Graminoid saltmarsh ASS – Succulent saltmarsh	<p>Variation in bushfire frequency and intensity within coastal vegetation can lead to the evolution of different communities (Harris, 1991).</p> <p>Successional processes in coastal grassland are inhibited by bushfire.</p> <p>Further colonisation of wattle and blackwood at Racecourse Flats will occur in the absence of bushfire.</p> <p>Exclude fires from all coastal vegetation for the duration of the plan.</p> <p>Review successional processes at Lauderdale wetland at the end of the plan.</p>
Wetlands	
ASF – Freshwater Aquatic sedgeland	<p>Bushfire is not typically an important management factor in wetland vegetation, although ephemeral wetlands can be highly flammable if they dry out.</p> <p>Exclude fires from all wetland vegetation for the duration of the plan.</p>

2.4.3 Bushfire Risk to Built and Cultural Assets

During the BMP review process Aboriginal Heritage Tasmania (AHT) completed a requested search of the Aboriginal Heritage Register (AHR) regarding the area inside the BMP boundary.

This search identified two known locations of shell middens or isolated artefacts within Lauderdale Wetlands Reserve. Proposed management strategies to preserve these sites are mentioned in Table 7 under “Other Bushfire Risks”.

Infrastructure in the reserve includes a power line, metal gates, security fence around the former Lauderdale tip, various types of perimeter fencing and a water filling point. Of these only the Broadcast Australia site (18 Forest Hill Road, Sandford delivering the ABC network to the greater Hobart region), power line poles, and some signage are likely to be damaged by fire. The main built assets at risk from bushfire are the buildings and infrastructure in the residential areas on the northern and eastern sides of the reserve. Fire on top or directly adjacent to the former Lauderdale tip site should be avoided.

The degree of bushfire danger at any particular time is a combination of fine fuel quantity, slope, and the prevailing weather conditions. The actual risk of a bushfire causing damage to an asset is a function the degree of danger, the probability of a bushfire igniting, and any measures taken to prevent the bushfire causing damage.

The four major modes of attack by bushfires that can cause damage to assets are:

1. wind-blown burning debris
2. radiant heat which can ignite flammable materials ahead of the fire front and shatter glass
3. flame contact
4. Strong winds generated or intensified by the bushfire.

The potential for damage to buildings in the path of large fires burning out of the reserve will depend largely on:

- whether the bushfire will approach upslope or downslope
- the quantity and distribution of fuel surrounding the building
- whether they are defended during the bushfire
- their design
- if the building was constructed to Australian Standard 3959-2009, *Construction of Buildings in Bushfire-prone Areas*
- How well they have been maintained.

The Australian Standard for Construction of buildings in bushfire-prone areas (AS:3959 – 2009) uses a Fire Danger Index (FDI) of 50 to determine the Bushfire Attack Level (BAL) for buildings that need to comply with the standard. An FDI of 50 is the boundary between Very High and Severe Fire Danger Rating.

There is insufficient data available to assess the likelihood of a high intensity bushfire starting in the reserve, however there is sufficient fine fuel within the reserve to sustain a high intensity bushfire on days of extreme fire danger. The bushfire risk to the built and cultural heritage assets within and surrounding the reserve has been assessed using a procedure adapted from the National Emergency Risk Assessment Guidelines (NEMC, 2010). The assessment process is explained in section 5.4 of *Clarence City Council Bushfire Management Strategy for Council Owned and Controlled Land*, and the results and proposed management strategies are shown in table 7. This assessment process has been analysed and meets compliance with AS/NZS IOS:31000-2009. Note that the assessment in table 7 only considers the risk from fires starting in, or passing through the park. Some assets may face a greater bushfire risk from nearby bushfire hazards that are not under the control of Clarence City Council.

Some assets, such as Aboriginal heritage sites, may not be directly damaged by bushfire but may be damaged by bushfire management and bushfire suppression activities, such as constructing fire control lines. These risks are noted under “other risks” in table 7.

NOTE: It was not possible to inspect assets on properties adjoining the reserve. The risk assessment therefore makes the following assumptions about these assets:

- Landowners/residents have established and are maintaining a defensible space to Tasmania Fire Service specifications around vulnerable assets, either wholly within the lot, or up to the boundary with the reserve where there is insufficient space within the lot. Where this is not the case the asset may face a much higher bushfire risk than indicated in the risk assessment.
- All dwellings adjoining the reserve are well maintained to resist attack by wind-blown burning embers. Where this is not the case the asset may face a much higher bushfire risk than indicated in the risk assessment.

The management strategies recommended in table 7 will reduce the existing bushfire risk to built and cultural assets but in most cases will not eliminate it. Active protection of an asset during a bushfire can greatly reduce the bushfire risk. Assets at medium and high risk of damage from bushfire will need to be protected during planned burns in the reserve.

Table 7 - Bushfire risk assessment for built and cultural assets

RISK CATEGORIES										
LOW – asset of low value or considered to have a low risk of damage from bushfires in the reserve due to its construction, location, or protection measures already in place.										
MODERATE – asset is vulnerable to damage by bushfires and could face attack by a moderate to high intensity bushfire, but has features that will reduce the intensity of the fire attack, or provide some protection from fires. Further bushfire protection measures are required.										
HIGH – asset is of high value, is vulnerable to damage by bushfires and could face attack by a high intensity bushfire with few, if any, features that would reduce the intensity of fire attack. Further bushfire protection measures are required.										

ASSET AT RISK	RISK ANALYSIS (See section 5.4 of the Bushfire Management Strategy)								OTHER BUSHFIRE RISKS	PROPOSED MANAGEMENT STRATEGIES
	A	B	C	D	E ¹	F	G	Level of Risk		
Dwellings bordering the eastern side of the reserve along Bayview Road	5	2	3	2	2	1	6	720 Moderate		Advise residents of the need to maintain an adequate defendable space around their dwellings. Establish and maintain a minimum 20m wide outer zone incorporating the fire trail along the reserve boundary. See MP 6 in the Best Management Practice Guidelines.
Lauderdale Football Club buildings	4	2	3	2	2	1	4	384 Moderate		Maintain existing 15m wide outer zone on the southern side of the building.
Dwellings bordering the northern side of the reserve along Bayview Road	2	2	3	2	2	1	6	288 Moderate		Advise residents of the need to maintain an adequate defendable space around their dwellings. Establish and maintain a minimum 5m wide outer zone incorporating the fire trail along the reserve boundary. See MP 6 in the Best Management Practice Guidelines.
Power line along South Arm Road	2	2	1	3	2	1	4	96 Low		Maintain existing easement. Clear at least 1m around the base of each pole.
Electricity transformer on the side of South Arm Road	2	2	1	1	2	1	4	32 Low		Regularly remove all vegetation and other flammable material from within the transformer compound.

ASSET AT RISK	RISK ANALYSIS (See section 5.4 of the Bushfire Management Strategy)								OTHER BUSHFIRE RISKS	PROPOSED MANAGEMENT STRATEGIES
	A	B	C	D	E ¹	F	G	Level of Risk		
Broadcast Australia radio masts and facilities	2	2	3	2	0.2	1	6	29 Low		Maintain existing mown areas around buildings and radio towers. No bushfire protection measures required within the reserve.
BP service station	4	2	1	2	0.2	1	6	19 Low		Maintain the existing 35m wide defensible space on the eastern and southern sides of the service station. Part of this is in the reserve.
Building bordering the reserve at 2 Dona Road	4	2	1	2	0.2	1	4	19 Low		Separated from bushland by roads and car parking areas. No bushfire protection measures required within the reserve.
Restaurant bordering the reserve at 534 South Arm Road	4	2	1	2	0.2	1	4	19 Low		Maintain the existing 30m wide defensible space on the eastern side of the building. Part of this is in the reserve.
Aboriginal heritage sites									May be damaged by vehicle movements during bushfire management or suppression, and establishment of fire control lines.	Ensure that the TFS is aware that the reserve has known sites and their importance. Only use existing trails and tracks for fire control lines, or use wet lines.
Old Lauderdale Tip (land fill site)									Sub-surface waste from historical tip site may ignite and smoulder for extended period, requiring large machinery to dig up and extinguish.	Ensure that the TFS is aware of previous tip site. Extinguish fires within VMU 6 as soon as possible. No planned burning within VMU 6.

1 - Note that the risk analysis score in column E only indicates that there is enough space to provide a defensible space between bushland in the reserve and an adjoining asset. It does not indicate that a defensible space has been established on the adjoining property, or if established is being adequately managed.

3. Bushfire Management Issues

3.1 Existing Bushfire Management

3.1.1 Implementation of the Previous BMP

As part of this revision of the BMP for Lauderdale Wetlands Reserve, a review of the success of the implementation of the recommendations of the previous BMP was carried out. The review found that of fifteen recommendations five have been fully implemented, five have been partly implemented, four have not been implemented because they have not been required (ie they are actions in response to other incidents) and one has not been implemented.

The recommendation that was not implemented was recommendation 11) "Carry out vegetation monitoring as detailed in section 5.10 of the Bushfire Management Strategy including the recovery of any populations of threatened or rare flora and fauna burnt by bushfires or planned burns." Clarence City Councils Fire and Bushland Management established a vegetation/soil monitoring program in 2012 for Council managed bushland. The aim is to monitor long term impacts/effectiveness of adopted fire regimes outlined in relevant BMPs. This program is yet to include Lauderdale Wetlands Reserve.

The reserve would benefit from a Vegetation Condition Assessment (VCA) in the DVC woodland to assist in a long term approach to monitoring the reserves native vegetation.

The full findings of the review are in Appendix A.

3.1.2 Planned Burning

The previous BMP scheduled no broadscale planned burning within the reserve for the period 2011-2016, with patch or pile burning scheduled as required in VMUs 2, 4, 6 and 7.

The amended burning schedule for 2016-2021 has been included in this plan (see table 9) with patch and pile burning only prescribed as required for outer zone maintenance in VMUs 2, 3 and 4.

A single planned burn was undertaken in the strip of woodland vegetation along the eastern boundary of the reserve (VMU 3 and 4) in 2007. The remainder of the reserve is either wetland vegetation which is not considered to require burning for habitat management, or vegetation planted to stabilise the former Lauderdale tip which is still too young to survive a low intensity bushfire.

No planned burning is to occur within VMU 6 (former tip site) to avoid historical sub-surface waste igniting and smouldering for extended periods, most likely requiring large machinery to dig up and extinguish.

3.1.3 Vehicle Access Routes and Foot Tracks

The reserve is accessible from three points along Bayview Road, from a track running round the Lauderdale Football Ground and the old access road to the former Lauderdale tip. An unformed vehicle track runs around the northern and eastern perimeter of the reserve but has sections which can be boggy after rain. Other sections of the reserve are accessible from South Arm Road and Dorans Road. Access points are shown on figure 6.

There are no formal walking tracks in the reserve but the Tangara Trail runs throughout.

Locked gates prevent unauthorised vehicle access to the fire trail. The location of the trails within the reserve considered necessary for bushfire management are shown in figure 6 and described in table 8. The only fire trail LW1 has been assigned a usage class and its current condition assessed against the standard for their assigned usage class in MP 1 in the *Clarence City Council Bushfire Management Strategy – Best Management Practice Guidelines*.

As noted in previous BMPs for the reserve, the existing trails and foot tracks provide adequate access to all areas of the reserve for bushfire management, and have been used as fire control lines for the planned burning recommended in this plan. It must be noted that the track network identified within Lauderdale Wetlands Reserve BMP is a shared network in conjunction with the Tangara Trail network, and any future works are to meet requirements of both users.

Figure 6 – Vehicle and Foot Access



Table 8 - Condition and maintenance of fire trails

Assigned usage class (see MP 1):	Maintenance priority:
Class 1 - all 2WD and 4WD vehicles	High priority - major through routes and fire control lines
Class 3 - all weather 4WD, light and heavy 4WD vehicles (category 3, 4 & 5 tankers)	Medium priority - important access and escape routes and minor fire control lines
Class 5 - dry weather and/or high clearance 4WD, light 4WD (category 5 tankers), also includes trails with sharp bends and dead end trails with small turning areas.	Low priority - minor access routes and boundaries of vegetation management units.

The trail usage class describes the suitability of the fire trail if properly maintained, not necessarily its condition at the time of inspection.

***MP refers to Management Procedures in Clarence City Council Bushfire Management Strategy – Best Management Practice Guidelines**

FIRE TRAIL ID	USAGE CLASS	STRATEGIC FIRE TRAIL UNDER HOBART FIRE PROTECTION PLAN ¹	MAINTENANCE PRIORITY	LOCATION AND CONDITION AT MARCH 2016	ACTION REQUIRED	MANAGEMENT CONSTRAINT
LW1	5 (with class 3 vegetation clearing)	Low-Moderate	High	Starts between 39 and 41 Bayview Road running east then south finishing behind 139 Bayview Road (dead end). Two exit points linking back to Bayview Road along fire trail. Trail currently meets class 5 standards and follows Tangara Trail. Trail can become impeded after heavy rainfalls.	Maintain to class 5 standards with class 3 vegetation clearing standards as specified in MP1. Fire trail traverses Tangara Trail. Manage for dual purposes.	Rare flora <i>Cynoglossum australe</i> ¹ within proximity. Preferably undertake maintenance in Autumn when not in seed setting period. May require permit from DPIPWE Threatened Species Section.

1. Tasmanian Threatened Species Protection Act 1995

3.1.4 Water Supply

There is multiple water filling points at the entrance to the former Lauderdale tip and near the entrance to the Lauderdale Football Ground. Water for fire fighting and bushfire management is also available from fire hydrants along Bayview Road. As the reticulated water supply does not extend across the South Arm Road causeway, there are no fire hydrants on the southern side of the reserve.

Water sources available for fire management operations are shown in figure 6.

3.1.5 Fuel Breaks and Defendable Spaces

A fuel break (sometimes called a “firebreak”) is a strip of cleared, or partly cleared, bushland constructed and maintained to slow, or stop, the progress of a bushfire to assist in its control. They are not the same as defendable spaces which are maintained around vulnerable assets to protect them from bushfires. Fuel breaks in grassland can be effective in stopping fires if cleared down to mineral earth, but where trees and shrubs are present wind-blown burning embers will usually carry a bushfire across a fuel break. Therefore, in bushland with shrubs and trees the only benefit of a fuel break is to provide access for firefighters and a boundary for backburning operations. Currently there are no standards or guidelines for fuel breaks in Tasmania. There is no fuel breaks maintained in the reserve, nor are any considered necessary.

A defendable space is an area of managed vegetation around an asset likely to be at risk from bushfire that protects it from direct flame contact and intense radiant heat, as well providing an area where fire fighters can defend the asset. The Tasmania Fire Service document *Bushfire Survival Plan 2015-2016* recommends that a defendable space includes two 'zones':

- An inner zone (formerly Bushfire Protection Zone or BPZ) where flammable materials are minimised.
- An outer zone (formerly Fuel Modified Buffer Zone or FMZ) where a low level of flammable material is permitted.

In the inner zone, flammable materials on, under and around your home should be moved away from the house.

In the inner zone:

- Include non-flammable areas such as paths, driveways, and mowed lawns.
- Use non-flammable mulch; do not use woodchips or bark.
- Locate any dams, orchards, vegetable gardens and any effluent disposal areas on the fire-prone side of the home.
- Use radiation shields and windbreaks such as stone or metal fences and hedges using low-flammability plants.

- Remove fire hazards such as wood piles, rubbish heaps and stored fuels.
- Replace all highly-flammable plants with low-flammability plants.
- Prune lower branches on trees and remove flammable shrubs from under and between trees.
- Rake up bark and leaves and keep roofs and gutters clear of flammable debris.

The TFS notes that it is not necessary to remove all vegetation from the inner zone. Individual trees rarely cause houses to burn in bushfires.

Trees can screen a building from windblown embers while protecting it from radiant heat. Smooth barked trees are less likely to catch fire than those with rough bark. No tree should be able to fall on the building.

In the outer zone, small-sized natural fuels (such as leaf litter, bark, sticks, tussocks and some shrubs) should be removed and larger fuels (trees and shrubs) should be cut back to reduce the intensity of an approaching bushfire.

Natural fuels, both on the ground and between the ground and any larger trees, should be reduced by selective removal of vegetation, both horizontally and vertically, followed by ongoing maintenance.

In the outer zone:

- Retain established trees to trap embers and reduce wind speeds.
- Selectively remove small trees and shrubs to create clumps (rather than a continuous wall of trees) separated by open areas.
- Remove the vegetation between the ground and the bottom of the tree canopy, to a height of at least two metres.
- Minimise fine fuels at ground level, such as grasses and leaf litter.

The existence and adequacy of defensible spaces on individual lots adjoining the reserve was not surveyed as part of this BMP. Nevertheless, it must be stressed that establishment and maintenance of defensible spaces around residences bordering the reserve is essential for bushfire protection. Clarence City Council and individual landowners need to co-operate to provide and maintain adequate bushfire protection.

The existing outer zones along the reserve boundary are wide enough to meet TFS requirements for an outer zone, and should provide adequate protection for adjoining properties, provided that the portion of these properties between the dwelling and the reserve is maintained as an inner zone.

During 2014 Councils Fire and Bushland Management re-established the outer zone in VMU 2.

Planting of trees and shrubs as well as dumping of garden rubbish as noted in the previous BMP is an ongoing issue within outer zones.

3.1.6 Bushfire Detection and Suppression

As the Lauderdale Wetland Reserve is highly visible from surrounding suburbs and roads, it is likely that any fires would be promptly reported. Bushfire suppression in the wetland sections of the reserve could be difficult as there is no fire trail access and vehicles risk getting bogged if they venture off road. This means it may only be possible to control bushfires from the perimeter of the reserve. This would result in most of the more flammable vegetation in the reserve being burnt should a bushfire occur.

3.2 Weeds

A detailed weed survey was not undertaken as part of this review, merely observations from field work.

Environmental weeds occur within the reserve (figure 7) and are at a level that can be managed with ongoing maintenance, eradication however is not viable without long term management programs.

Several weed species found in the reserve are classified as declared weeds under the Tasmanian *Weed Management Act 1999* and/or Weeds of National Significance (WONS). Where possible these weeds will be targeted as a priority to prevent their further spread.

Blackberry (*Rubus fruticosus*), boneseed (*Chrysanthemoides monilifera*), boxthorn (*Lycium ferocissimum*), canary broom (*Genista monspessulana*) and gorse (*Ulex europaeus*) are present declared weeds and WONS.

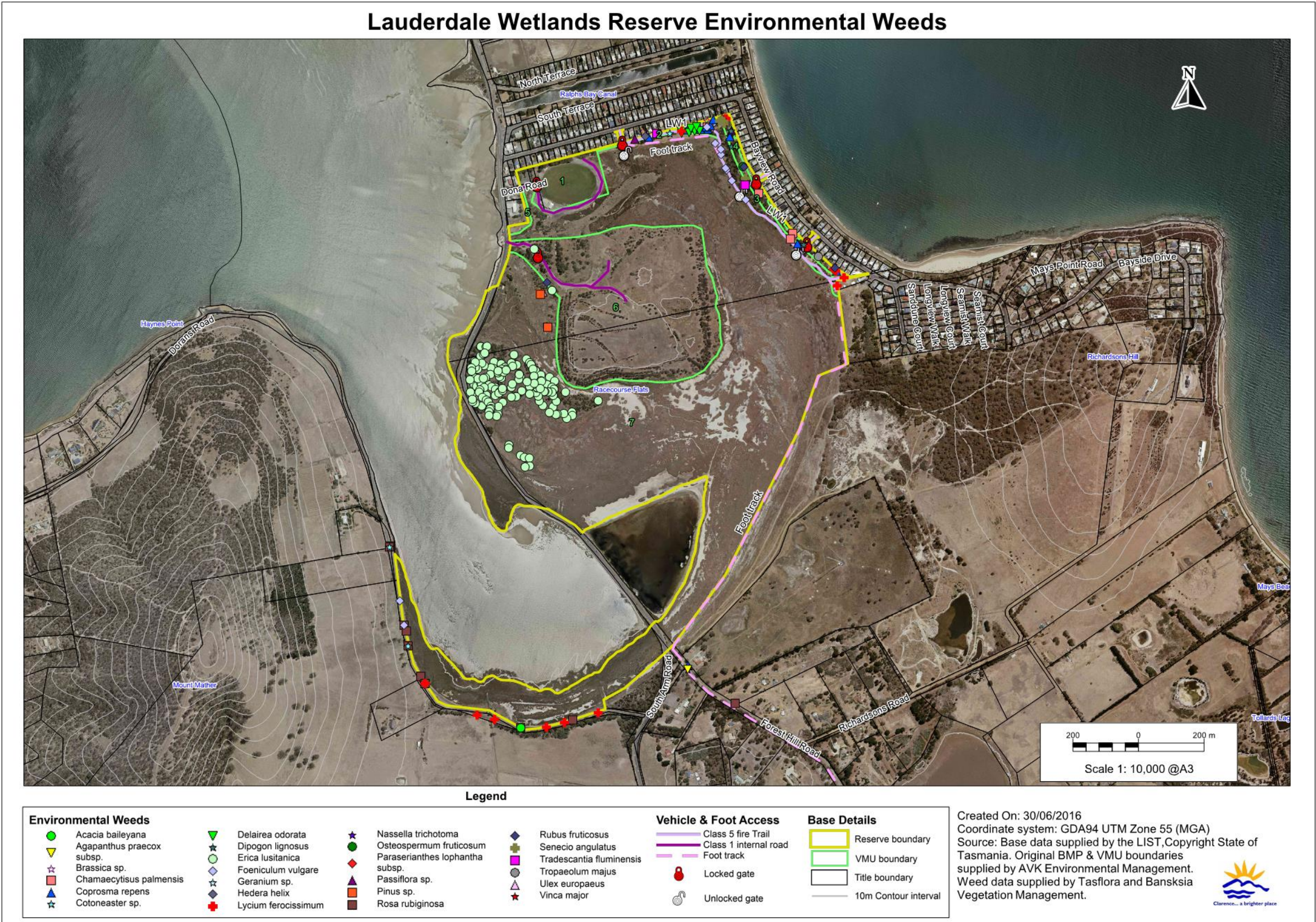
Declared weeds in the reserve that are not listed as WONS include fennel (*Foeniculum vulgare*) and Spanish heath (*Erica lusitanica*).

Other environmental weeds present within the reserve are: Mirror bush (*Coprosma repens*) and numerous household escapees.

During 2015 Councils Fire and Bushland Management commenced a management program for the control of boxthorn (*Lycium ferocissimum*) with extensive removal throughout outer zones within the reserve. A follow up program has been designed and implemented with annual inspection/maintenance at targeted locations.

There was evidence that garden rubbish and prunings are being dumped in the reserve along the rear of Bayview Road. This increases fuel loads close to dwellings as well as introducing weeds into the reserve. Recommendations are in section 5.1 to mitigate future occurrences.

Figure 7 – Environmental weeds in reserve



3.3 Stakeholder and Community Concerns

At the commencement of the project Clarence City Council sent a letter to all landowners adjoining the reserve and to other stakeholder groups informing them that the BMP was being revised and inviting them to have input into the revision process by sending in a written submission, attending a community “walk and talk” in the reserve, or by contacting the reviewer. The community “walk and talk” was held on 7th November 2015 but no community members attended. No written comments were received.

4. Plan Implementation

To ensure that the recommendations in this plan are fully implemented, Clarence City Council will ensure that TFS brigades likely to attend bushfires within the reserve are familiar with the plan, and its contents are issued to the TFS.

4.1 Bushfire Risk Reduction Strategy

The overall bushfire risk reduction strategy recommended for the Lauderdale Wetlands Reserve can be summarised as follows:

- Reduce ignitions through prosecution of arsonists, and prompt reporting of fires.
- Maintain access points and fire trails to enable the TFS to rapidly contain fires that start in the reserve.
- Maintain defensible spaces in the reserve to protect assets within and adjoining the reserve.
- Carry out strategic planned burning to reduce bushfire hazards in the reserve.
- Encourage neighbouring residents to maintain defensible spaces around their homes.

4.2 Community Education, Awareness and Involvement

To ensure successful implementation of this BMP it will be necessary to inform key sectors of the community about bushfire management issues in the reserve. This should include surrounding residents and those with special interests in the reserve, or whose activities can affect assets within the reserve. The community education process is detailed in section 5.7 of *Clarence City Council Bushfire Management Strategy for Council Owned and Controlled Land*. This was not implemented during the previous BMP, and has a heavy influence in the effectiveness of this BMP.

In particular, adjoining residents should be advised that dumping garden waste and other rubbish in the reserve increases the bushfire hazard and makes fire fighting along the bushland/urban interface more difficult and dangerous for fire fighters. It also contributes to the spread of weeds. Residents should also be advised that they are not authorised to remove vegetation in a Council reserve, even if it is recommended in the BMP. If residents have any concerns about the bushfire hazard in the reserve near their home, they are encouraged to contact Council's Fire and Bushland Vegetation Management Co-ordinator.

4.3 Planned Burning

The native forest and woodland communities in the reserve are considered dependent on bushfire to maintain their structure and floristics in the long term. Periodic burning will help to maintain diversity in the understorey, and allow bushfire dependent species to germinate and establish. However, there is a need to minimise damage to important habitat elements (such as dead trees, old logs and stumps) during these burns, and to ensure adequate retention of unburnt patches of each forest type to act as refugia for recolonisation of burnt areas.

No planned burning is to occur within VMU 6 (former tip site) to avoid historical sub-surface waste igniting and smouldering for extended periods, most likely requiring large machinery to dig up and extinguish.

4.3.1 Vegetation Management Units (VMU)

The planned burning program in this plan is based on the division of the reserve into a mosaic of vegetation management units (VMUs) (see figure 8). VMUs can be burnt at a frequency, season and intensity that is optimal for the plant communities within each unit or excluded from fire if the vegetation does not require burning or the VMU is being managed by other means. The bushfire management requirements of the vegetation communities within the reserve are given in table 6.

The previous BMP divided the reserve into seven VMUs based on the vegetation types in the reserve. This regime has been continued for the 2016-2021 revision to allow for the implementation of the most appropriate methods for managing bushfire hazard whilst promoting biodiversity.

4.3.2 Planned Fire Regimes

The approach adopted in this plan is to use planned burning for a combination of asset protection in areas targeted for maximum risk reduction and for habitat management. Burning for habitat management will have the additional benefit of reduced bushfire hazard for a period following each bushfire.

Planned burning operations should be carried out following the seed-setting period of native species and after the nesting period of the understorey bird species in the reserve. Where possible hollow logs and dead trees should be protected from bushfire due to their fauna habitat value. This can be achieved by using wet lines around the tree or log, or raking fine fuels away from logs or the base of hollow trees, and rapidly extinguishing fires at these points should they occur.

This BMP covers a 5-year period, after which another review is required. Pile and patch burning within the reserve has been scheduled in table 9. In order to create a mosaic of native bushland with different bushfire histories, VMUs should generally not be burnt within 2 years of adjoining VMUs.

Figure 8 – Vegetation management units in the reserve



Table 9 – Bushfire management in the reserve

VMU ¹	AREA (ha)	BUSHFIRE MANAGEMENT OBJECTIVES and PRESCRIPTIONS	NOTES and PRECAUTIONS ^{2,3}	LAST BURNT	NEXT BURN
1	2.7	OBJECTIVES: Maintain as managed vegetation/car park. Reduce the extent and density of weeds. PRESCRIPTION: Maintain a 15m wide outer zone around the clubhouse.	None.	N/A	No burning
2 FUM	0.3	OBJECTIVES: Maintain as outer zone to protect adjoining dwellings. Reduce the extent and density of weeds. PRESCRIPTION: See table 7 for widths and MP 5 in the Best Management Practices Guidelines for Outer Zone specifications.	Contains the threatened plant species <i>Cynoglossum australe</i> ³ . Obtain a permit from DPIPWE Threatened Species Section before operations. Pile burns only if required.	Pile burnt 2014	Pile burns only
3 DVC	1.7	OBJECTIVES: Maintain the structure and floristics of the vegetation communities. Maintain groundcover to minimise erosion. Allow recruitment of canopy species. Reduce the extent and density of weeds. PRESCRIPTION: Autumn burn every 15 to 20 years.	Contains the threatened plant species <i>Cynoglossum australe</i> ³ . Obtain a permit from DPIPWE Threatened Species Section before operations. Consult DPIPWE Threatened Species Section before burning. Contains DVC ² . Do not burn during the nesting/seed setting period Keep burns at low intensity to minimise canopy scorch. Protect adjoining property during burns.	2007	Assess next plan
4 DVC	1.6	OBJECTIVES: Maintain as an outer zone to protect adjoining dwellings. Reduce the extent and density of weeds. PRESCRIPTION: See table 7 for widths and MP 5 in the Best Management Practices Guidelines for Outer Zone specifications.	Contains the threatened plant species <i>Cynoglossum australe</i> ³ . Obtain a permit from DPIPWE Threatened Species Section before operations. Consult DPIPWE Threatened Species Section before burning. Contains DVC ² . Patch and pile burns only if required.	2007	Assess next plan

VMU ¹	AREA (ha)	BUSHFIRE MANAGEMENT OBJECTIVES and PRESCRIPTIONS	NOTES and PRECAUTIONS ^{2,3}	LAST BURNT	NEXT BURN
5 FUM	0.26	<p>OBJECTIVES:</p> <p>Maintain as an outer zone to protect adjoining buildings.</p> <p>Reduce the extent and density of weeds.</p> <p>PRESCRIPTION:</p> <p>See table 7 for widths and MP 5 in the Best Management Practices Guidelines for Outer Zone specifications.</p>		Not known	No burning
6 FUM	23.1	<p>OBJECTIVES:</p> <p>Maintain planted vegetation.</p> <p>Reduce the extent and density of weeds.</p> <p>PRESCRIPTION:</p> <p>Continue current management regime including slashing of grass on the former Lauderdale tip.</p>	<p>No planned burning; historical tip site unknown contaminants sub-surface.</p> <p>Use mechanical means to reduce fuel loads.</p> <p>Suppress any fire within VMU at as early as possible.</p> <p>Site has been planted with native species.</p> <p>Vulnerable fauna sp. <i>Amelora acontistica</i> ³ sighting within VMU. Operations may require permit from DPIPWE Threatened Species Section.</p>	N/A	No burning
7 NBA SCA ASS ARS ASF	91.6	<p>OBJECTIVES:</p> <p>Maintain the structure and floristics of the vegetation communities.</p> <p>Reduce the extent and density of weeds.</p> <p>PRESCRIPTION:</p> <p>Patch or pile burn only to assist with weed control.</p>	<p>Contains the rare plant species <i>Cuscuta tasmanica</i> ³, <i>Cynoglossum australe</i> ³, <i>Lachnogrostis robusta</i> ³ and <i>Lachnogrostis punicea</i> ssp. <i>filifolia</i> ³.</p> <p>Contains rare and vulnerable fauna sp. <i>Amelora acontistica</i> ³, <i>Theclinessthes serpentata</i> ssp. <i>Lavara</i> ³ and <i>Dasybela achroa</i> ³</p> <p>Obtain a permit from DPIPWE Threatened Species Section before any management activities likely to affect these species.</p>	Partially burnt 1967	Patch and Pile burns only

¹ TASVEG 3.0 codes of vegetation types in the unit.² Nature Conservation Act 2002³ Tasmanian Threatened Species Protection Act 1995

4.3.3 Preparation and Supervision

Any areas of weeds to be patch burnt should be treated with the appropriate herbicide at least three months before a burn to ensure that the chemical has penetrated into the root system, achieved a kill of all tissue, and the plant has had time to desiccate before burning. This will maximise removal of weed biomass during the burn. Disturbance of the treated infestations (by mechanical means, slashing or burning) within this period may reduce the herbicide's effectiveness, and regeneration from rootstock is likely to occur.

Successful implementation of the planned burning in this BMP requires trained personnel and special equipment. Any broadscale planned burning recommended in future BMPs must have a burn plan prepared by someone who has completed the Forestry Tasmania "Develop Prescribed Burning Plans" course or equivalent. All persons engaged in planned burning or firefighting in the reserve must have completed the Forestry Tasmania "Forest Fire Fighting" course or equivalent.

If the planned burning is contracted out, the contractor must be able to meet the required training accreditation in the previous paragraph, as well as provide evidence of experience in carrying out broadscale low intensity fuel reduction burns.

4.4 Bushland Management

Bushfire can provide the disturbance that many introduced species need to spread to new areas, as well as to expand existing populations. Other bushfire management activities, such as construction and maintenance of fire trails, and bulldozing of fuel breaks during bushfire suppression, can also provide opportunities for weeds to colonise native bushland. Fire can also be used as a tool to manage weed infestations. Some species are best controlled by herbicide application to regrowth following a bushfire. Other species can sometimes be controlled by the application of a fire regime that stimulates germination of seed but kills the regrowth before it has been able to flower. MP 8 in *Clarence City Council Bushfire Management Strategy - Best Management Practice Guidelines* includes guidelines for integrating weed management with planned burning, and for minimising the risk of weed invasion following bushfires. These guidelines should ensure that bushfires in the reserve do not worsen existing weed problems, or cause weeds to spread.

It should be noted that bush regeneration plantings in previously cleared areas can increase the bushfire hazard. Any proposals for bush regeneration in the reserve should be considered in the context of this BMP to ensure that they do not compromise bushfire protection measures proposed in this plan. In general, plantings should not be allowed:

- on inner zones and outer zones established around assets at risk
- on fuel breaks
- Within 2m of the edge of fire trails.

5. Bushfire Management Recommendations

The management actions recommended to meet the objectives of the plan in section 1.3 have been summarised and classified using the following criteria:

- URGENT** - Actions required to reduce a very high risk to life or property.
- ESSENTIAL** - Actions required to improve safety, or inadequate bushfire protection measures in high risk areas.
- Actions that are essential for control & suppression of bushfires, and/or conservation of threatened species.
- RECOMMENDED** - Actions required to improve inadequate bushfire protection measures in moderate risk areas.
- Actions required to ensure on-going effective bushfire management, or conservation of biodiversity.
- ROUTINE** - Maintenance of bushfire control resources and protection measures.

Urgent actions need to be undertaken as soon as possible.

Where applicable the desirable timing of other actions has been coded as follows:

- A** - Inspect and maintain annually, or as specified in the relevant MP
- A/S** - Timing as specified in the bushfire management plan
- 1, 2, etc** - Carry out action within the time period specified (years)
- 1A, 2A etc** - Construct within the next 1, 2 etc years and then inspect and maintain annually, or as specified in the relevant MP.

Management actions have been linked to generic MP's in *Clarence City Council Bushfire Management Strategy – Best Management Practice Guidelines*. Performance indicators have also been provided for each management action. These should be used to determine if the specific objectives of this BMP have been achieved. They should be monitored when the plan is revised every 5 years. Where performance targets are not being achieved, a review of the relevant portion of the plan should be undertaken.

5.1 Management Action Summary

RECOMMENDED ACTION	OBJECTIVE (section 1.3)	PRIORITY	RESPONSIBILITY	PERFORMANCE INDICATORS
1) Develop a community education program, including an information sheet, as outlined in section 5.7 of the Bushfire Management Strategy, to inform the community of bushfire management issues in the reserve and to ask them to report any smoke, or suspicious activity, on days of total fire bans to the police.	1, 2	REC - 1	Clarence City Council Fire and Bushland Management Tasmania Fire Service	Educational material distributed to adjoining residents, reserve users and other interest groups. Reduction in rubbish dumping within the reserve and residents planting in Council managed outer zones. Reduction in the incidence of illegal fires on and around the reserve.
2) Implement the bushfire protection measures in section 2.4 for protection of built assets in and around the reserve.	1, 4	E	Clarence City Council Fire and Bushland Management Private landowners	Bushfire protection measures in the reserve implemented and maintained. No assets lost to fires originating in, or moving through, the reserve.
3) Erect appropriate signs on tracks and roads to warn reserve users of planned burns.	1	E	Clarence City Council Fire and Bushland Management	No users of the reserve injured by planned burns.
4) Implement the recovery procedures in MP 12 following planned burns and bushfires.	1, 5, 6	E	Clarence City Council Fire and Bushland Management Tasmania Fire Service	Post-fire recovery carried out after planned burns and bushfires. No users of the reserve injured by fires or the effects of fires.
5) Carry out fire trail repairs listed in table 8.	2, 6	E - 2	Clarence City Council Fire and Bushland Management	Fire trail repair works listed in table 8 completed.

RECOMMENDED ACTION	OBJECTIVE (section 1.3)	PRIORITY	RESPONSIBILITY	PERFORMANCE INDICATORS
6) Ensure all fire trails shown on figure 6 are inspected and maintained in a trafficable condition at all times according to MP 2.	2, 4	ROU - A	Clarence City Council Fire and Bushland Management	Vehicle access routes inspected as required in MP 2, and maintained in a trafficable condition for fire service vehicles.
7) Inspect gates regularly to ensure that locks are in place and functioning. Ensure that the local TFS brigade and other emergency services have keys to the gates on trails giving access to the reserve.	2	ROU - A	Clarence City Council Fire and Bushland Management	No unauthorised use of fire trails in the reserve. Security lock system implemented, keys distributed to TFS brigades and other emergency services.
8) Carry out bushfire management according to the schedule in table 9.	2, 3, 4, 5	E - A/S	Clarence City Council Fire and Bushland Management Tasmania Fire Service	No decline in the populations or distribution of threatened species. Structure and floristics of native plant communities maintained.
9) Integrate planned burning into the weed management program for the reserve according to MP 8. Ensure follow-up weeding is carried out after planned burning and bushfires.	3, 5	REC - A/S	Clarence City Council Fire and Bushland Management Lauderdale Coastcare Group	Reduction in extent of WONS, declared weeds and environmental weeds.
10) Consult with DPIPWE Threatened Species Section when carrying out bushfire management activities that may affect populations of threatened flora and fauna.	3	E	Clarence City Council Fire and Bushland Management DPIPWE Threatened Species Section	All required permits obtained before burns or other management activities likely to affect threatened species.
11) Carry out vegetation monitoring as detailed in section 5.10 of the Bushfire Management Strategy including the recovery of any populations of threatened or rare flora and fauna burnt by bushfires or planned burns.	3, 5	E	Clarence City Council Fire and Bushland Management DPIPWE Threatened Species Section	Vegetation monitoring plot set up and surveyed and data on the population size and extent of threatened species recorded before planned burns. Regular follow-up surveys undertaken.

RECOMMENDED ACTION	OBJECTIVE (section 1.3)	PRIORITY	RESPONSIBILITY	PERFORMANCE INDICATORS
12) Regularly revise burning schedules and prescriptions to ensure they incorporate the most recent information on the fire ecology of flora, fauna and plant communities of conservation value in the reserve.	3, 5	REC - A/S	Clarence City Council Fire and Bushland Management	Bushfire management plan revised every 5 years.
13) Coordinate bushfire management, weed management and other management activities using the procedure in MP 9.	3, 5	REC - A	Clarence City Council Fire and Bushland Management Lauderdale Coastcare Group	Meetings held as recommended in MP9 and the outcomes recorded.
14) Ensure all personnel engaged in planned burning activities in the reserve have the appropriate level of training and equipment as outlined in the bushfire management strategy, and the minimum equipment listed in MP 7.	1, 2	E	Clarence City Council Fire and Bushland Management	All personnel are able to demonstrate the required level of training and minimum levels of equipment.
15) Record bushfire management activities and bushfires using the procedures in MPs 10 and 11.	3, 4, 5	REC - A/S	Clarence City Council Fire and Bushland Management	Records maintained of all bushfire management activities.
16) Develop/distribute flyer warning residents of the increased bushfire risk and environmental risks associated with the dumping of rubbish/green waste, and tree planting within outer zones.	1, 2, 3	REC - A	Clarence City Council Fire and Bushland Management	Reduction in dumping of rubbish/green waste, and tree planting within outer zones.

RECOMMENDED ACTION	OBJECTIVE (section 1.3)	PRIORITY	RESPONSIBILITY	PERFORMANCE INDICATORS
17) Any proposals for bush regeneration in the reserve should be considered in the context of this BMP to ensure that they do not compromise bushfire protection measures. Plantings should not be in defensible spaces or within two metre of fire trails.	1, 4, 5,	REC - A	Clarence City Council Lauderdale Coastcare Group	No plantings within two metres of fire trail LW1, no planting within defensible spaces.

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Appendix A

Implementation of the previous BMP

The following codes have been used in assessing implementation of the previous Bushfire Management Plan for Lauderdale Wetlands Reserve:

IS – Implemented successfully

PI – Partly implemented

NI – Not implemented

NA – Not applicable (to be implemented at a later time, or dependent on another incident or action).

RECOMMENDED ACTION	CODE	COMMENT
1) Develop a community education program, including an information sheet, as outlined in section 5.7 of the Bushfire Management Strategy, to inform the community of bushfire management issues in the reserve and to ask them to report any smoke, or suspicious activity, on days of total fire bans to the police.	PI	A formalised community education program has not been designed. Public exhibition of Councils <i>Bushfire Management Strategy for Council Owned and Controlled Land, Bushfire Management Strategy Best Management Practice Guidelines</i> and the previous BMP for the reserve has taken place. Various TFS community bushfire preparation events have been attended and represented by Council Fire and Bushland Management throughout municipality.
2) Implement the bushfire protection measures in section 2.4 for protection of built assets in and around the reserve.	PI	The bushfire protection measures in section 2.4 of the previous plan have been largely implemented. Some outer zones require maintenance to bring up to recommendations.
3) Erect appropriate signs on tracks and roads to warn reserve users of planned burns.	NA	No planned burning occurred within the reserve during the previous BMP.
4) Implement the recovery procedures in MP 12 following planned burns and bushfires.	NA	No planned burning or bushfires occurred within the reserve during the previous BMP.
5) Carry out fire trail repairs listed in table 8.	PI	Fire trail repair works listed in table 8 revaluated from operational basis throughout previous BMP. In particular, recommendation to upgrade LW1 fire trail to class 3 standards revised to: class 5 with class 3 vegetation clearing specifications.
6) Ensure all fire trails shown on figure 5 are inspected and maintained in a trafficable condition at all times according to MP 2 and fire trail signs are in place and legible.	PI	Fire trails in good condition and meet current usage standards for class 5. Regular monitoring occurring. No fire trail signage installed. This will not be recommended in reviewed BMP.

RECOMMENDED ACTION	CODE	COMMENT
7) Inspect gates regularly to ensure that locks are in place and functioning. Ensure that the local TFS brigade and other emergency services have keys to the gates on trails giving access to the reserve.	IS	Gates/locks regularly inspected and actioned as required. Local TFS brigade has key to gates.
8) Carry out bushfire management according to the schedule in table 9.	IS	All scheduled operations/ maintenance actioned.
9) Integrate planned burning into the weed management program for the reserve according to MP 8. Ensure follow-up weeding is carried out after planned burns and bushfires.	NA	Planned burning not required as part of the weed management program during the previous BMP. No broadscale planned burns or bushfires impacted reserve throughout previous BMP.
10) Consult with the DPIPWE Threatened Species Section when carrying out bushfire management activities that may affect populations of threatened flora and fauna.	NA	No bushfire management activities occurred that required DPIPWE consultation during previous BMP.
11) Carry out vegetation monitoring as detailed in section 5.10 of the Bushfire Management Strategy including the recovery of any populations of threatened or rare flora and fauna burnt by bushfires or planned burns.	NI	No vegetation monitoring established within reserve as at March 2016.
12) Regularly revise burning schedules and prescriptions to ensure they incorporate the most recent information on the fire ecology of flora, fauna and plant communities of conservation value in the reserve.	IS	Regimes and prescriptions have been analysed throughout life of previous BMP. During 2016 review process all VMUs regimes and prescriptions have been evaluated to suit best outcomes for asset protection and ecological burning.
13) Coordinate bushfire management, weed management and other management activities using the procedure in MP 9.	PI	Major weed management activities have occurred within reserve during previous BMP. Coordination of activities has been undertaken. Some meetings as recommended in MP9 not carried out.
14) Ensure all personnel engaged in planned burning activities in the reserve have the appropriate level of training and equipment as outlined in the bushfire management strategy, and the minimum equipment listed in MP 7.	IS	Extensive training has been delivered to Council Fire and Bushland Crew during term of previous BMP. Ongoing training will be recommended on a needs basis.

RECOMMENDED ACTION	CODE	COMMENT
15) Record bushfire management activities and wildfires using the procedures in MPs 10 and 11.	IS	Since 2013 Council has developed extensive GIS Fire Management context. All available historic fire management information has been input and updated annually.