



Government of Western Australia
Office of the **Appeals Convenor**
Environmental Protection Act 1986

Appeals Convenor's Report to the Minister for Environment

Appeal objecting to the grant of clearing permit: CPS 9029/1
Lot 164 on DP 202726 (Reserve 25911) Hopeland

May 2021
Appeal 003 of 2021



Appellant	Mr Warwick Boardman
Permit holder	Shire of Serpentine Jarrahdale CPS 9029/1
Authority	Department of Water and Environmental Regulation (DWER)

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Cover image – Banksia Woodlands

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Acknowledgement of Country

The Office of the Appeals Convenor acknowledges the traditional custodians throughout Western Australia and their continuing connection to the land, waters and community.

We pay our respects to all members of the Aboriginal communities and their cultures, and to Elders both past, present and emerging.

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1 Executive summary

1.1 Decision under appeal

This appeal is against the Department of Water and Environmental Regulation's (DWER) decision to grant Clearing Permit CPS 9029/1 to the Shire of Serpentine Jarrahdale under Part V of the *Environmental Protection Act 1986* (EP Act).

The permit is for the clearing of up to 12.39 hectares (ha) of native vegetation within Lot 164 on Deposited Plan 202726 (Crown Reserve R25911; Yangedi Reserve). The purpose of the clearing is to facilitate fire hazard mitigation to reduce the risk of wildfire to infrastructure, as well as to the *Banksia Woodlands of the Swan Coastal Plain* Threatened Ecological Community (TEC) present within the application area.

A map of the application area is provided in Appendix 1. Please see Section 3.1 for a summary of DWER's assessment of the clearing application.

1.2 Grounds of appeal and appellant concerns

The appellant is Mr Warwick Boardman. Mr Boardman has appealed against the grant of the clearing permit as he believes that DWER did not adequately consider the potential for weeds to increase after the prescribed burn, which may increase flammability and threaten biodiversity in the Banksia Woodlands. If the permit is granted, the appellant asked for an amendment to the conditions to require management measures to control weeds to ensure there is no net increase in weeds. The appellant also asked for the clearing around the Bureau of Meteorology (BOM) infrastructure to be offset due to the potential for a significant residual impact.

1.3 Key issues and conclusions

From the appellant's concerns, we have identified the 3 issues at the heart of the appeal. We summarise our conclusions for these issues below. Section 2 of this report details our reasoning and Section 3 provides supporting information.

Was DWER justified in granting the clearing permit?

While the concerns raised by the appellant are acknowledged, based on our consideration of the available information and recent literature we consider that DWER's decision to grant the permit subject to conditions is reasonable.

In its assessment of the clearing application, DWER identified that the proposed burn event has the potential to introduce or exacerbate the distribution and impact of weeds. DWER noted that post-fire weed control will be implemented by the Shire to mitigate potential vegetation degradation. DWER determined the proposed clearing can be managed appropriately and is not likely to lead to an unacceptable risk to environmental values.

DWER also took into consideration the purpose of the clearing, which is to reduce the risk of wildfire to critical infrastructure at the Yangedi Airfield. We note that responsible hazard reduction burning balances the risk to human life and community assets with conservation of biodiversity. It does not eliminate the risk of wildfires but aims to reduce the risk to a level considered acceptable by the community.

From our investigation we note that the Conservation Advice for the Banksia Woodlands of the Swan Coastal Plain recommends, amongst other things, an ideal fire cycle of 24–28

years and a mosaic pattern of burning and fire ages, with retention of some long-unburnt areas (10 to 30 years since the last fire).

We note that it is likely the area has not been burnt for over 25 years and that the Shire is proposing to undertake the burn at a time such that it can control the intensity of the burn event resulting in a cool, slow burn with minimal scorch height. From our review we consider that with a cool mosaic burn, and appropriate weed management after the burn event, the biodiversity values are likely to be maintained in this Banksia woodland remnant.

We note that the permit only authorises the application area to be burnt once.

This ground of appeal should be dismissed.

Is the weed hygiene condition adequate?

DWER granted the clearing permit subject to 4 conditions, including a condition requiring hygiene steps to minimise the risk of introduction and spread of weeds in the application area. DWER advised that the intent of the condition is to ensure that no additional weed species are inadvertently introduced or spread over the application area during the burning activity. DWER considers that the permit conditions adequately address the risk posed by the activity.

Based on our review of the available information, we consider that, in this case, the weed hygiene condition is insufficient to mitigate against weed spread and an increase in weed fuel loads after the burn event. We recommend an additional condition be included on the clearing permit to address this potential risk.

Is an offset required?

DWER considers that the proposed clearing and burn event do not create a significant residual impact, nor will it result in fragmentation, sever any ecological connectivity or impact on the viability of Bush Forever Site 378. DWER also considers the assessment and requirements in the permit are consistent with the WA Environmental Offsets Policy and State Planning Policy 2.8 Bushland Policy for the Perth Metropolitan Region.

Considering the Shire's changes to the proposed clearing to reduce the area for fire mitigation to 4.7 ha, the conditions imposed by DWER and the additional recommended condition, as well as the natural regeneration of the application area that should occur if weed management is appropriate, we consider that it is unlikely the proposed clearing will result in a significant residual impact and that an offset is not required in this case.

This ground of appeal should be dismissed.

1.4 Recommendation to the Minister

Allow the appeal to the extent that an additional condition is included on the clearing permit requiring the permit holder to develop and implement a weed management and monitoring plan to mitigate the potential risk of weed spread and an increase in weed fuel loads after the burn event.

Our full recommendation and explanation is provided in Section 2.2.

Otherwise dismiss the appeal.

2 Reasons for recommendation

2.1 Was DWER justified in granting the clearing permit?

Our conclusion is that DWER had sufficient information to inform its assessment of the application and its decision to grant the permit subject to conditions is reasonable. We explain our reasoning below.

DWER's assessment of the clearing permit application

The appellant submitted that DWER should not have granted the clearing permit to the Shire of Serpentine Jarrahdale for fire hazard reduction burning in Bush Forever Site 378. The appellant referred to experience with fire hazard reduction burns in Kings Park, which have shown that the more frequent the burns, the more burnable the bushland becomes. The appellant identified a concern being the encroachment of highly flammable grass weeds which thrive on disturbance. The appellant submitted that the presence of these weeds could make the area more flammable in the years after the burn than it was prior to the burn, with increased threats to biodiversity.

In its assessment of the clearing application, DWER identified that 19 non-native flora species (weeds) are known from the vicinity and that mechanical clearing, mulching and/or burning have the potential to introduce or exacerbate the distribution and impact of weeds.¹ In its response to the appeal, DWER advised that this typically occurs after frequent burns,² whereby introduced grass species displace a native understorey, or alternatively, after intense fires that open large areas of vegetation and create a rich ash bed that benefits weeds.³ DWER noted that the proposed burn is neither of these.

Taking into consideration the permit holder's minimisation and mitigation measures, DWER determined the proposed clearing can be managed appropriately and is not likely to lead to an unacceptable risk to environmental values.⁴ DWER granted the clearing permit subject to 4 conditions.

In its response to the appeal, DWER advised that the permit holder has responsibility for the ongoing management of Yangedi Reserve, including weed control, and the Shire possesses the knowledge and resources to do this effectively. DWER noted the Shire has prepared the Yangedi Bush Forever and Airfield Reserve Management Plan, which includes strategies for ongoing weed control and commitments for post-fire weed control to mitigate potential vegetation degradation by the invasion of non-native species. DWER advised that it considers the specific strategies, timing and methods for ongoing reserve management is the jurisdiction of the Shire.

Assessing the effect of fire on the environment

As part of our investigation we reviewed recent information on fire and weed management in Banksia Woodlands. We provide a summary in Section 3.2.

¹ CPS 9029/1 Clearing Permit Decision Report (DWER, 2021), Section 3.2.1.

² English, V. and Blyth, J. (2000). Shrubland and woodlands of Muchea limestone: Interim recovery plan No. 57 2000–2003. Department of Conservation and Land Management.

³ Wilson, B.A., Kuehs, J. and Valentine, L.E. (2010). Guidelines for Developing Ecological Burning Regimes for the Gngangara Groundwater System, Gngangara Sustainability Strategy, Department of Environment and Conservation.

⁴ CPS 9029/1 Clearing Permit Decision Report (DWER, 2021), Section 1.4.

DWER's guideline *A guide to burning under the native vegetation clearing provisions* aims to ensure that hazard reduction burns do not result in significant adverse impacts on biodiversity, land degradation or water quality. The guideline identifies several key factors that should be considered in assessing the effect of fire on the environment. The factors include fire frequency, fire season, fire intensity and habitat heterogeneity. We used these key factors as a framework against which to investigate the matters raised in the appeal. The findings from our investigation are provided in Section 3.3.

We have also considered the purpose of the clearing, which is to reduce the risk of wildfire to the infrastructure of the Yangedi Airfield, as well as the Banksia Woodlands of the Swan Coastal Plain TEC present in the application area. We note that responsible hazard reduction burning balances the risk to human life and community assets with conservation of biodiversity.⁵ It does not eliminate the risk of wildfires but aims to reduce the risk to a level considered acceptable by the community.

During the appeal investigation the Shire advised that the prescribed burn will be undertaken over 2 areas totalling approximately 4.7 ha within the application area (areas shown in red in Figure 2, Appendix 1). The remainder of the application area will be left unburnt creating a mosaic of burnt and unburnt areas. The Shire advised that the 2 areas have been selected to provide protection for the adjacent assets:

- BOM infrastructure: the area has been selected to follow the vegetation type and changes, noting that if the area to be burnt is too small then the protection (or buffer) gained would be reduced.
- Hangars on the southern edge: the area has been selected based on consideration of wind direction and the change in vegetation composition, to protect the infrastructure from fires on the southern edge of the application area.

We acknowledge the concerns raised by the appellant and that the effects of fire on the environment are complex and will be a result of many factors interacting together (Section 3.2). However, based on our consideration of the available information we consider that DWER's decision to grant the permit subject to conditions is reasonable.

In particular, we note the Conservation Advice for the Banksia Woodlands of the Swan Coastal Plain recommends, among other things, an ideal fire cycle of 24–28 years and a mosaic pattern of burning and fire ages, with retention of some long-unburnt areas (10 to 30 years since the last fire). From our review we consider that a cool mosaic burn with appropriate weed management after the burn event, the biodiversity values are likely to be maintained in this Banksia woodland remnant.

We note that the permit only authorises the application area to be burnt once. It will be the Shire's responsibility to ensure any follow up prescribed burns are compliant with the conditions of any exemption or otherwise in accordance with a clearing permit.

Alternative option for fire hazard mitigation not appropriate

The appellant submitted that ensuring there is adequate fire-fighting equipment available at the airfield facility to help suppress a fire quickly and before it becomes uncontrollable, would be an appropriate alternative option to clearing of the vegetation.

We note that the Shire has prepared the Yangedi Bush Forever and Airfield Reserve Management Plan. The plan includes a Fire and Emergency Management Plan for the Yangedi Airfield that details the management methods and requirements that will be

⁵ Department of Environment Regulation (2015).

implemented within the airfield and Bush Forever Site to reduce the threat to residents and firefighters in the event of bushfire within or near the site. We note the Yangedi Bush Forever and Airfield Reserve Management Plan identifies that reducing the risk of catastrophic wildfire involves the maintenance of fire breaks and/or controlled burning to reduce fuel loads.⁶

In its response to the appeal, the Shire advised that there are currently good response arrangements in place for fire detection and suppression within the airfield area. The airfield has a fire mitigation and management plan and has put in place measures to protect the airfield infrastructure. The airfield has a fire suppression unit on site for rapid fire suppression. The Shire advised that with high fuel loads in the bushland surrounding the airport infrastructure and under summer conditions, bushfires have the potential to escalate rapidly.

DWER advised that a fire emergency response for the application area would involve integrated action from several organisations with expertise in fire management and that the coordination of firefighting resources is outside the scope of the clearing permit assessment.

Based on the advice of the Shire and DWER, we consider that it is a relevant consideration and reasonable conclusion for fire hazard reduction burning of the application area to be permitted in the interest of protecting human life and community assets.

Deferral of the permit start date is not supported

The appellant proposed that to reduce the threat of a post-fire weed increase, it may be better to implement weed control before the burn. In the event that there was no weed control in 2020, the appellant suggested that the start date of the permit should be deferred to 2022 (rather than 2021), to enable the permit holder to undertake weed control effort in 2021 prior to the proposed prescribed burn.

We understand that the Shire is proposing to undertake the prescribed burn in autumn prior to the 2021 fire season. Consistent with the provisions of the EP Act, the area permit has been granted for a period of 2 years from the date on which it was granted (6 February 2021 to 6 February 2023). We consider that the 2-year duration of the permit provides the Shire with the flexibility to determine the most appropriate time and conditions to undertake the prescribed burn to meet the Shire's fire mitigation requirements.

We also consider that the need for, and benefits of, pre-fire weed control will be a matter for the Shire to consider during the development of the proposed weed management and monitoring plan (refer to Section 2.2).

2.2 Is the weed hygiene condition adequate?

Our conclusion is that an additional condition is required to complement the existing weed hygiene condition. The additional condition would require the permit holder to develop and implement a weed management and monitoring plan. We explain our reasoning below.

Permit condition relating to weed hygiene is inadequate

The appellant considers that the condition relating to weed management is inadequate and will not mitigate the potential risk of weed spread and an increase in weed fuel loads after the prescribed burn. The appellant requested that the condition be amended to require weed

⁷ Keighery, B.J. (1994). Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc.), Nedlands, Western Australia.

management measures to control weeds to the extent required to ensure there is no net increase in weeds. The appellant also submitted that there should be a requirement for tall weeds to be cut by an experienced person to minimise impacts on fire intensity; that monitoring of flora diversity and weed impacts and weed management should be undertaken for at least 10 years (the minimum time to the next burn) or until weed impacts fall from a properly determined pre-fire level; and that rubbish should be removed from the site.

DWER imposed a condition on the permit to minimise the risk of the introduction and spread of weeds and dieback and mitigate impacts to native vegetation. Condition 2 requires:

- cleaning of earth-moving machinery of soil and vegetation prior to entering and leaving the clearing area
- ensuring that no dieback or weed-affected material (soil, mulch, fill or other material) is brought into the clearing area
- restricting the movement of machines and other vehicles to the areas to be cleared
- restricting the movement of soils to dry conditions
- ensuring that dieback or weed-affected material that is to be removed from the clearing area is transferred to areas of comparable soil disease status.

In its response to the appeal, DWER advised that the intent of these requirements is to ensure that no additional weed species are inadvertently introduced or spread within the application area during the prescribed burning activity. The relevant actions taken to minimise the risk of introduction and spread of weeds must be recorded by the permit holder (condition 3) and provided to DWER on request (condition 4). DWER advised that it considers the requirements of condition 2 are appropriate to adequately mitigate the risk of additional weed species inadvertently being introduced to the application area.

Recommend development and implementation of a weed management plan .

Based on consideration of the matters raised by the appellant and our review of the available information, we consider that in this case the weed hygiene condition (condition 2) is insufficient and that an additional condition should be applied to the permit to mitigate against weed spread and an increase in weed fuel loads after the burn event.

In making this recommendation, we acknowledge that the Shire has:

- advised that it is “acutely aware” of the impacts of fire and the increased risks of weed invasion after fire and that the aim of the burn is not to have the fuel loading increase through weed invasion.
- committed to implement long-term post-fire weed control to reduce grassy fuel loads that follow a burn. In its response to the appeal, the Shire advised that regular weed control is considered an integral part of the burning program and is scheduled for many years after the burn has taken place until the vegetation has recovered from the disturbance.
- consulted widely with staff from the Department of Fire and Emergency Services (DFES) and the Department of Biodiversity, Conservation and Attractions (DBCA) about Banksia Woodlands and fire management in Yangedi Reserve. The proposed burn event is based on the current knowledge with the aim of protecting life and property, and maximising biodiversity outcomes.
- sought to minimise the area to be mechanically cleared and burnt to achieve the objective of minimising the size and intensity of wildfire on life, property and critical infrastructure.

Our conclusion that an additional condition is required is based on the following:

- Banksia Woodlands are complex systems and the interactions between native species, weeds and fire add to the challenge of managing fire risk to protect human life and community assets, as well as the environmental values of the bushland.
- This bushland remnant exists in a highly fragmented landscape and is therefore particularly susceptible to weed invasion as well as the introduction of dieback.
- The findings from current research that ongoing weed management will likely be required to prevent the increase and spread of weeds as a result of the burn event.
- The application area is a Bush Forever site and the majority of the application area is in 'Excellent' (Keighery, 1994)⁷ condition, with the area surrounding the BOM infrastructure in 'Very Good' (Keighery, 1994) condition.

Noting the above we consider that the addition of a condition to develop and implement a weed management and monitoring plan would formalise the controls that the Shire has already developed and is justified given the high biodiversity value of the application area as an example of Banksia Woodlands of the Swan Coastal Plain TEC.

The objective of the weed monitoring and management plan should be that there is no net increase in weed fuel load within the application area (including weed biomass, number of weed species and weed spread into the application area). The weed management and monitoring plan should include, but not be limited to, methods for identifying priorities for weed control as well as management and monitoring techniques both before and after the burn event to enable the success of the weed control to be measured.

We recommend that the management and monitoring plan should be prepared by, or in consultation with, an environmental specialist with expertise in control of weeds in remnant bushland areas. The plan should be prepared to the satisfaction of the Chief Executive Officer (CEO) of DWER.

We note that if the objective of the weed management and monitoring plan has not been met towards the end of the permit, the permit holder or DWER may seek an extension to the permit.

Burn event could be part of an experimental study

The appellant requested that if the burn is permitted, a condition should be included on the permit requiring that it form part of an experiment to determine the extent of weed intrusion after fire and whether the bushland attains the increase in biodiversity as expected to occur. The appellant suggested that a public evaluation is required and that the study should be published.

The EP Act enables the CEO of DWER (or their delegate) to attach conditions to a clearing permit that are considered necessary or convenient to prevent, control, abate, or mitigate environmental harm. However, we do not consider it appropriate that a condition requiring the burn event to be part of a scientific study should be included on the permit.

In its response to the appeal, the Shire advised that it is open to having research conducted on the site. We understand that the Shire has actively been engaging with the fire ecologist at DFES to identify potential opportunities for the burn event to be a best practice case study.

As part of our investigation into the appeal, we met with scientific staff at the Botanic Gardens and Parks Authority involved in a research project to assess impacts of different fire and weed management approaches on native species diversity, weed cover and fuel loads in

⁷ Keighery, B.J. (1994). Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc.), Nedlands, Western Australia.

urban Banksia Woodlands. We understand that staff from the Botanic Gardens and Parks Authority have discussed with the Shire opportunities for including Yangedi Reserve in this research project.

2.3 Is an offset required?

Our conclusion is that it is unlikely the proposed clearing will result in a significant residual impact and that an offset is not required. We explain our reasoning below.

Proposed clearing unlikely to result in a significant residual impact

In considering whether to grant a clearing permit in respect of a Bush Forever site, DWER is to have due regard to the advice of planning authorities on planning issues. As part of its assessment of the clearing application DWER considered advice provided by the Department of Planning, Lands and Heritage (DPLH). DPLH recommended that an offset package be prepared and approved in accordance with the WA Environmental Offsets Policy and Appendix 4 of State Planning Policy 2.8 Bushland Policy for the Perth Metropolitan Region.

The appellant agreed with DPLH that an offset is appropriate. The appellant is of the view that the BOM infrastructure should not have been located on the Bush Forever Site and that it is inappropriate to clear more vegetation to protect the facility. The appellant suggested that the offset could include a requirement to fence off the perimeter; help pay for monitoring of biodiversity; provide maintenance of fire control equipment; or, given the appellant's concerns about the adequacy of flora surveys undertaken by the permit holder, to hire the Wildflower Society of WA to formulate a robust strategy for flora surveys in the application area.

We provide additional information on environmental offsets in Section 3.4.

Considering the extent of the proposed clearing and the composition and condition of the vegetation to be cleared, DWER concluded the proposed clearing will not result in fragmentation, sever any ecological connectivity, or significantly impact upon the viability of Bush Forever Site 378.⁹ DWER considered that the proposed clearing does not constitute a significant residual impact and that an offset under the WA Environmental Offsets Policy or Appendix 4 'Offsets Criteria' of State Planning Policy 2.8 Bushland Policy for the Perth Metropolitan Region is not required.

We note that the application area provides foraging habitat for Carnaby's cockatoo. DWER determined that impacts to Carnaby's cockatoo due to a reduction in foraging habitat are unlikely.¹⁰ This is based on:

- Over 6,700 ha of native vegetation occurs within the local area, the majority of which is likely to provide foraging habitat for Carnaby's cockatoo.
- Mechanical clearing or slashing of 0.11 ha of Banksia Woodlands in 'Good' (Keighery, 1994)¹¹ or better condition (less than 1% of the application area) is unlikely to significantly impact on the foraging resource the Banksia Woodlands provides for Carnaby's cockatoo.
- The proposed low intensity autumn burn in a mosaic application is unlikely to result in a reduced resource for Carnaby's cockatoo in the medium to long term.

⁹ CPS 9029/1 Clearing Permit Decision Report (DWER, January 2021), Section 3.3.

¹⁰ CPS 9029/1 Clearing Permit Decision Report (DWER, January 2021), Section 3.2.2.

¹¹ Keighery, B.J. (1994). Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc.), Nedlands, Western Australia.

In its response to the appeal, DWER advised that it considers clearing under CPS 9029/1 is consistent with the overall purpose and intent of the Yangedi Reserve and that the permit holder has demonstrated appropriate consideration of avoidance and minimisation measures. DWER noted that long unburnt native vegetation occurs within the Asset Protection Zone (APZ) of the BOM infrastructure, which is therefore at risk from wildfire. DWER advised that several options were available to the permit holder to reduce the risk to the BOM infrastructure, including clearing to mineral earth, incorporating the APZ within the burn area, or slashing and mulching (which is not equivalent to clearing to mineral earth). To reduce impacts to native vegetation, the permit holder proposed slashing and mulching within the 20 m of the infrastructure. DWER advised that on review, it considers the assessment and requirements in the permit are consistent with both the WA Environmental Offsets Policy and State Planning Policy 2.8.

From our discussions with the Shire, we understand that the proposed clearing around the BOM infrastructure has been reduced to the extent that a minimum number of trees (3) will be removed and the burning of the understorey will provide adequate fire protection.

Taking into account the Shire's changes to the proposed clearing, the conditions imposed by DWER and the additional recommended condition for the development and implementation of a weed management and monitoring plan (Section 2.2), as well as that natural regeneration of the application area should occur if weed management is appropriate, we consider that the proposed clearing is unlikely to result in a significant residual impact. Therefore, consistent with DWER's determination, we agree that an offset is not required in this instance.

In discussions with the appellant about the revised scope of the proposed clearing, noting in particular that the clearing around the BOM infrastructure was now restricted to the clearing of 3 trees, the appellant advised that he no longer has concerns about an offset.

3 Supporting information

3.1 DWER's assessment of the clearing permit application

On 31 August 2020, the Shire of Serpentine Jarrahdale applied for an area permit to clear 12.39 ha¹² of native vegetation to facilitate fire hazard mitigation at Yangedi Reserve. The Yangedi Reserve is managed by the Shire for the purpose of recreation. The reserve includes Yangedi Airfield (Serpentine Airfield) and a lease in the north-west corner of the reserve where a BOM facility has been established. The application area is located within Bush Forever Site 378 (the Henderson Road Bushland, Peel Estate).¹³ Bush Forever sites are Environmentally Sensitive Areas (ESA) under the EP Act.

DWER advised that the application area is located within Crown Reserve R 25911, reserved for the Purpose of 'recreation'. Land has been leased to the Sport Aircraft Builders Club of Western Australia Inc (registered 23/09/2002; I243533) to support the Yangedi Road Airfield. A change of reserve Purpose has also been applied to incorporate 'recreation and weather radar activities' (registered 27/02/2019; O099238). This was to support the BOM facility located in the north-west corner of the reserve.

DWER assessed the clearing application against the 10 clearing principles set out in Schedule 5 of the EP Act.¹⁴ DWER's assessment found the proposed clearing:

- May be at variance to clearing principle (a), as most of the application area consists of Banksia Woodlands, a Threatened Ecological Community (TEC) listed as 'Endangered' under the Commonwealth *Environment Biodiversity and Conservation Act 1999* (EPBC Act) and listed by DBCA as a Priority 3 Priority Ecological Community (PEC). Banksia Woodlands are characterised by high species richness and high species geographic turnover, particularly in the shrub and herbaceous layers.
- May be at variance to clearing principle (b), as the application area is predominantly Banksia Woodlands, which provide foraging habitat for the 'Endangered' Carnaby's Cockatoo (*Calyptorhynchus latirostris*). The Priority 4 listed quenda (*Isoodon fusciventer*) is also known from the vicinity of the application area.
- May be at variance to clearing principle (e), as the application area occurs over the Bassendean Complex–Central and South, which has approximately 26.9% of its pre-European vegetation extent remaining. This is below the national target for biodiversity conservation to prevent clearance of ecological communities with an extent below 30% of that present pre-1750.
- May be at variance to clearing principle (h), as the application area is located within the Bush Forever Site 378.
- Is not likely to be at variance to principles (c), (f) and (i).
- Is not at variance to principles (d), (g) and (j).

The application was advertised for a 21-day public comment period on 16 September 2020. One submission was received from the appellant. DWER's response to the submission is documented in Appendix B of the Clearing Permit Decision Report.

In determining to grant the permit, DWER also considered:

- the site characteristics (Appendix A of the Decision Report)

¹² The initial application proposed an application area of 12.59 ha (Clearing Permit Decision Report, DWER 2021). The application area was reduced during the assessment to exclude from the prescribed burn a mapped Conservation Category Wetland.

¹³ Government of Western Australia (2000).

¹⁴ CPS 9029/1 Clearing Permit Decision Report (DWER, 2021), Appendix C.

- relevant reference information and GIS datasets (Appendix G of the Decision Report)
- supporting biological survey information and representative photographs of the application area provided by the applicant (Appendix E of the Decision Report)
- relevant planning instruments, including the *Yangedi Bush Forever and Airfield Reserve Management Plan*
- any other matters considered relevant to the assessment.

DWER's assessment identified the proposed clearing will result in:

- potential introduction and/or spread of weeds
- potential introduction and/or spread of dieback disease (*Phytophthora* species)
- short-term loss of 11.95 ha of foraging habitat for the Endangered Carnaby's Cockatoo (*Calyptorhynchus latirostris*)
- permanent loss of 0.44 ha of vegetation for fire protection purposes within Bush Forever Site 378, the majority of which (75%) is in either 'Completely Degraded' (Keighery, 1994)¹⁵ or 'Degraded' (Keighery, 1994) condition, with the remainder in 'Good' (Keighery, 1994) or 'Very Good' (Keighery, 1994) condition.

DWER also took into consideration the purpose of the clearing to reduce the risk of wildfire to the infrastructure of the Yangedi Airfield, as well as the conservation significant Banksia Woodland present over the application area.¹⁶ DWER noted that the protection of assets within the Yangedi Reserve is a component of the Shire's bushfire mitigation strategy.¹⁷

Based on its assessment, including the applicant's minimisation and mitigation measures, DWER determined the proposed clearing can be managed appropriately and is not likely to lead to an unacceptable risk to environmental values. The permit was granted subject to conditions relating to:

- avoiding, minimising and reducing impacts and extent of clearing (Condition 1)
- implementing hygiene measures to minimise the risk of the introduction and spread of weeds and dieback (Condition 2)
- records that must be kept (Condition 3) and reporting (Condition 4).

The clearing permit was granted on 14 January 2021. The permit authorises the applicant to:

- mechanically clear up to 0.44 hectares of native vegetation within the application area (cross-hatched yellow in Figure 1, Appendix 1)
- implement a prescribed burn to reduce fuel loads to less than 2 tonnes per hectare over 80% of the 11.95 ha within the application area (cross-hatched red in Figure 1, Appendix 1).

The Department recommended that the appeal should be dismissed.

3.2 Fire and weed management in Banksia Woodlands

The majority of the application area consists of Banksia Woodlands of the Swan Coastal Plain ecological community, which is listed as a Priority 3 PEC by DBCA, and is a TEC listed as 'Endangered' under the EPBC Act. Banksia Woodlands are found in the south-west of Western Australia, from around Jurien Bay in the north to Dunsborough in the south, and were formerly the dominant vegetation type of the Swan Coastal Plain bioregion, particularly of the Perth sub-region.¹⁸

¹⁵ Keighery, B.J. (1994). Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc.), Nedlands, Western Australia.

¹⁶ CPS 9029/1 Clearing Permit Decision Report (DWER, 2021), Section 1.4.

¹⁷ CPS 9029/1 Clearing Permit Decision Report (DWER, 2021), Section 1.2.

¹⁸ Commonwealth of Australia (2016); Threatened Species Scientific Committee (2016), Section 1.2.

Banksia Woodlands typically have a prominent tree layer of *Banksia*, sometimes with scattered eucalypts and other tree species within or above the *Banksia* canopy, and a species rich understory with many wildflowers, including sclerophyllous shrubs, sedges and herbs.¹⁹ Banksia Woodlands provide important habitat for over 20 nationally threatened animal and plant species, including Carnaby's cockatoo, forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*), the chuditch or western quoll (*Dasyurus geoffroii*), and western ringtail possum (*Pseudocheirus occidentalis*); as well as many flora endemic to the south-west and other animals that depend on them, such as the honey possum (*Tarsipes rostratus*).²⁰ Banksia Woodlands also provide ecosystem services and contribute to the health and wellbeing of local communities (e.g. store carbon, filter and maintain aquifers, mitigate local flooding, soil loss and pollution, and provide amenity and recreation).²¹

Altered fire regimes present a major threat to the diversity, viability and long-term conservation of Banksia Woodlands and their component species.²² Many Banksia Woodland species have particular responses to fire and specific fire regime requirements, with optimal time since last fire and fire intensity dependent on life-history traits. Due to the diversity of species and responses to fire, it is unlikely that any single fire prescription will be optimal for all species. For example, if the fire interval is too short, then obligate seeders do not have the opportunity to mature and set seed, which can threaten species persistence. Alternatively, some species are dependent on fire for seed to be released from the canopy (e.g. *Banksia grandis*).

Based on the life history traits of key Banksia Woodlands flora and fauna species, derived from studies in the Gngangara Groundwater System region, the Conservation Advice for the Banksia Woodlands of the Swan Coastal Plain recommends for Banksia Woodlands overall, a minimum fire interval of 8–16 years, a maximum of 40 years and an ideal fire cycle of 24–28 years.²³ The current fuel loads in the majority of the application area indicate the area has not been burnt for over 25 years.²⁴

Fire history and fire management are also important determinants of the habitat suitability of Banksia Woodlands for fauna communities, including reptiles, mammals and birds. The richness and diversity of fauna is generally maximised by avoiding widespread intense bushfires and by maintaining a diversity of post-fire vegetation successional stages to provide habitat diversity.²⁵

Weeds are a key threatening process in Banksia Woodlands, particularly in urban areas with significant weed seed banks and the urban interface representing an ongoing source of weed invasion.²⁶ Many weeds that occur in Banksia Woodlands can alter community composition through competitive effects that reduce the persistence and diversity of native shrubs and herbs in the understory. Some weeds (e.g. perennial veldt grass [*Ehrharta calycina*]²⁷) are highly flammable and infestations can produce a substantial annual biomass that increases fuel loads, promoting higher frequencies of fire and fire spread.²⁸

¹⁹ Commonwealth of Australia (2016); Threatened Species Scientific Committee (2016), Section 1.3.

²⁰ Commonwealth of Australia (2016); Threatened Species Scientific Committee (2016), Section 1.4.

²¹ Commonwealth of Australia (2016).

²² Threatened Species Scientific Committee (2016), Appendix D4.

²³ Threatened Species Scientific Committee (2016), Appendix E.

²⁴ CPS 9029/1 Clearing Permit Decision Report (DWER, 2021), Section 3.1.

²⁵ Threatened Species Scientific Committee (2016), Appendix D4.

²⁶ Threatened Species Scientific Committee (2016), Appendix E.

²⁷ An invasive perennial grass originating from southern Africa and the most serious and best understood of the invasive plants in Banksia Woodlands (Ritchie et al. 2021).

²⁸ Threatened Species Scientific Committee (2016), Appendix E; Miller and Miller (2020).

The Botanic Gardens and Parks Authority, in collaboration with the Parks and Wildlife Service of DBCA, local government, Murdoch and Curtin Universities, is undertaking long-term (decadal) research to assess the impacts of varying fire and weed management approaches on native species diversity, weed cover and fuel loads in urban Banksia Woodlands.²⁹ The key objectives of the study are to:

1. Assess the impacts of managed fire at short and medium intervals on native species richness and composition in urban Banksia Woodlands.
2. Assess the development of fuel loads and fire hazard following managed fire.
3. Assess the role of grassy weeds in the development of fuel loads and fire hazard.
4. Assess the role of fire in enhancing or suppressing grass (and other) weed species.
5. Assess the effectiveness of the combination of fire and weed management of weed cover.
6. Identify management combinations that optimise native species persistence with minimising fire hazard and weed spread in Banksia Woodlands in the presence of grassy weed species.

The preliminary findings from this long-term study include:³⁰

- Fire is a key ecological process in Banksia Woodlands and has an important role in maintaining species diversity when the fire regime remains within the systems range of tolerance. Specifically,
 - Many seedlings of native perennial species established post-fire and several species that were not observed in pre-fire surveys emerged from seedbanks.
 - At the study site in Kings Park (relatively low pre-fire weed cover), native species recovery after burning was greatest in areas receiving weed control.
 - At the study site in Bold Park (high pre-fire weed cover), native species abundance declined after fire in the absence of weed control, but more than doubled when weeds were managed.
 - Fire seasonality can affect seed survival through fire and post-fire seedling recruitment, but further research is required to understand interactions with fire patchiness, severity and intensity.
- Fire enhances the abundance of introduced grasses and weed management treatments are effective in reducing weed cover.
 - At the study site in Kings Park, fire alone resulted in three times the abundance of introduced grass, increased grass fuel connectivity and possibly an increase in the fire hazard. Fire and weed management kept grasses at or below previous levels.
 - At the study site in Bold Park, fuel continuity attributed to grass cover decreased in the year after fire, but if unmanaged, returned to the same high levels in the following years. When weed management was applied, fuel continuity decreased to very low levels.
- Burning without weed management may lead to an increased fire hazard and degradation of ecological values. Weed management can help to reduce one element of the fire hazard in grass invaded bushlands, but an appropriate fire regime combined with weed management can further reduce the fire hazard and enhance regeneration of degraded systems, leading to optimal outcomes for biodiversity.

The Conservation Advice for the Banksia Woodlands of the Swan Coastal Plain identifies the following priority actions to protect Banksia Woodlands from the effects of fire:

²⁹ Botanic Gardens and Parks Authority (2021).

³⁰ Miller (2017); Miller (2020); Miller and Miller (2020).

- Adopt a landscape-scale approach, available knowledge of fire histories and age of stands to identify appropriate fire regimes.
- Manage fires to ensure that, where possible, prevailing fire regimes do not disrupt the life-cycles of the component species and support rather than degrade the habitat, and they do not promote the invasion of exotic species or increase the impacts of other disturbances (e.g. grazing or predation by feral predators).
- Given the cycle of fires promoting grassy weed establishment and higher fuel loads, manage the fire–weed cycle by controlling invasive weed species before and after fire events.
- Implement a mosaic pattern of burning and fire ages, with retention of some long-unburnt areas (10 to 30 years since the last fire) that provide habitat for a variety of fauna and flora.
- Avoid physical damage to the habitat and individuals of threatened species during and after fire operations.
- Implement appropriate fire management regimes, taking into account results from research. This may include:
 - not burning during the reproductive seasons of threatened or functionally important or characteristic flora and fauna species
 - not burning if soil moisture is very low or relatively dry conditions are predicted for the coming season
 - where controlled burns are necessary, use small scale (<1 ha) mosaic burning patterns to reduce impacts of too frequent fires
 - within large patches, burn different parts in rotation, rather than the whole area in any one season
 - avoid slashing or tree removal as part of fire management
 - consider fire regimes appropriate for nearby ecological communities when planning burning (e.g. adjacent wetlands)
 - monitor outcomes of fire and manage consequences (e.g. weeds) and take results into account when managing future fire regimes.³¹

3.3 Assessment against DWER’s guideline

As part of our investigation into the appeal, we considered available information against the key factors identified in DWER’s guideline *A guide to burning under the native vegetation clearing provisions*. Our consideration is summarised in Table 1.

Table 1 Assessment of the effects of the proposed burn event

Key factor (summary)	Consideration
<p>Fire frequency</p> <ul style="list-style-type: none"> • To maintain the conservation values of a piece of bushland, fire should not occur more frequently than the time needed for all plants to reach adequate reproductive capacity. This is particularly important for obligate re-seeders, which are usually killed by fire and depend on 	<ul style="list-style-type: none"> • Assessment of current fuel loads in the application area, combined with local knowledge, indicates that the area has probably not been burnt for over 25 years.³² • This is supported by our examination of publicly available aerial imagery that suggests the area has not been burnt since at least 2003. The application area has not therefore been burnt frequently in the past.

³¹ Threatened Species Scientific Committee (2016), Section 5.

³² Information provided by the Shire as part of its clearing permit application.

Key factor (summary)	Consideration
<p>soil or canopy stored seed for replacement.</p> <ul style="list-style-type: none"> While there is some information available regarding time between germination and reproductive maturity, there is the need for local knowledge of particular areas and vegetation communities. Too frequent fire has several deleterious effects, including favouring the growth of grassy weeds, resulting in a higher fuel load in a shorter time period and diminishing biodiversity values in the bushland. 	<ul style="list-style-type: none"> Based on the life history traits of key Banksia Woodlands flora and fauna species, the Conservation Advice for the Banksia Woodlands of the Swan Coastal Plain recommends for Banksia Woodlands overall, a minimum fire interval of 8–16 years, a maximum of 40 years and an ideal fire cycle of 24–28 years.³³ In its response to the appeal, the Shire advised that after this proposed burn, there are no plans for any other prescribed burns at the location for a minimum of 15 years. Noting the research that is currently being undertaken (Section 3.2), we agree with the Shire’s view that by this time there should be more definitive research to guide managers as to the best approach for future burning. Prescribed burning was selected as the wildfire mitigation strategy as it will require less clearing than alternative mitigation measures such as mechanical removal or the establishment of strategic firebreaks to create separation within the Banksia Woodland.³⁴
<p>Fire season</p> <ul style="list-style-type: none"> There are generally two options for when burns should take place: cool or hot burns. The impact of fire should also consider what environmental conditions have occurred prior to any planned burn. Cool burns are usually undertaken for hazard reduction purposes and are of low-to-moderate intensity; hot fires are usually of high intensity and are most commonly used for regeneration for ecological purposes. The main characteristics of cool burns include: <ul style="list-style-type: none"> low-to-moderate intensity do not consume all organic matter — some patches may be left and little or no canopy is burnt will destroy that year’s seed crop favour resprouting plants over re-seeders 	<ul style="list-style-type: none"> The burn event is proposed to be undertaken in autumn prior to the 2021 fire season. Results from the work being undertaken by the Botanic Gardens and Parks Authority indicate that fire seasonality affects native species seed survival and seedling recruitment:³⁵ <ul style="list-style-type: none"> Seeds sown in late autumn to early winter (May to July) had the highest seedling emergence in the first year. Low emergence was recorded for seeds sown in late winter and spring (August to October). Seedling emergence of seeds sown in the latter period was also minimal in the second year. Timing of seed sowing was also important for seedling survival and establishment. Seedlings from early sowing in May and June had best survival. Further work is required to understand how these effects may interact with other aspects of fire, such as fire patchiness and severity in different seasons.

³³ Threatened Species Scientific Committee (2016), Appendix E.

³⁴ CPS 9029/1 Clearing Permit Decision Report (DWER, 2021), Section 3.1.

³⁵ Miller (2020).

Key factor (summary)	Consideration
<ul style="list-style-type: none"> o encourages growth of already established perennial weed grasses. 	
<p>Fire intensity</p> <ul style="list-style-type: none"> • Intensity at which a fire burns will depend on a number of things, including season, air temperature and humidity, amount and moisture content of the fuel and soil, topography, wind strength and time of day. • Fires of different intensities favour the regeneration of different species. • Low intensity fires are more readily managed to leave areas of vegetation unburnt to promote habitat diversity and sustain fauna populations. • A ground layer of weedy grasses increases the fire intensity regardless of burning season. 	<ul style="list-style-type: none"> • The burn event is proposed to be conducted as a cool, slow burn with minimal scorch height. • In its response to the appeal, the Shire has advised that there are only weeds located in the disturbed areas around the edges of the application area.
<p>Habitat heterogeneity</p> <ul style="list-style-type: none"> • Biodiversity is greatest where habitat heterogeneity (represented by a wide range of post-fire successional stages in the vegetation) is maximised. This highlights the need to have a variety of fire ages within areas of remnant vegetation, ranging from recently burnt to long unburnt. • Unburnt patches of bush are important refuges for fauna during a fire and provide food and shelter afterwards. • Unburnt patches provide a source of seed for recolonisation of burnt areas. • Isolated remnants are more vulnerable in the event of a burn and retaining some unburnt vegetation is an important consideration within these areas. • Fire management plans should be designed to leave substantial areas unburnt following any controlled fire. • The impact of unpredictable events following a fire (e.g. heavy rain, 	<ul style="list-style-type: none"> • The clearing permit authorises the implementation of a burn to reduce fuel loads to less than 2 tonnes per hectare over 80% of the 11.95 ha area. The objective is to create a mosaic of burnt and unburnt areas within the application area.³⁶ Adjacent native vegetation will also contribute a mosaic of fire ages. • From discussions with the Shire, we understand it is proposed the prescribed burn will be implemented over two areas totalling approximately 4.7 ha within the application area (areas shown in red in Figure 2, Appendix 1). The remainder of the application area will be left unburnt. • We also understand from discussions with the Shire that the proposed clearing around the BOM infrastructure has been reduced to the extent that a minimum number of trees (3) will be removed and the burning of the understory will provide adequate fire protection.

³⁶ CPS 9029/1 Clearing Permit Decision Report (DWER, 2021), Sections 3.1 and 3.2.2.

Key factor (summary)	Consideration
drought, heavy grazing) can be deleterious to regenerating vegetation and underline the importance of not burning all of an isolated remnant at one time.	

3.4 Environmental offsets

The WA Environmental Offsets Policy and Guidelines provide that offsets may be applied to address significant residual environmental impacts of a development or activity that remain after on-site avoidance and mitigation measures have been undertaken. Environmental offsets are not appropriate in all circumstances and while environmental offsets may be appropriate for significant residual environmental impacts, they will not be applied to minor environmental impacts. The applicability of off-sets will be determined on a project-by-project basis.

For Bush Forever sites, State Planning Policy 2.8 Bushland Policy for the Perth Metropolitan Region requires that proposals or decision-making should ensure all reasonable steps have been taken to avoid, minimise or offset (mitigate) any likely adverse impacts on regionally significant bushland consistent with the requirements of the policy. The policy supports a general presumption against the clearing of regionally significant bushland, or other degrading activities, except where a decision is:

- consistent with existing approved uses or existing planning/environmental commitments or approvals, or
- in accordance with a management plan approved under, or is a compatible or necessary operation carried out under, the *Conservation and Land Management Act 1984*, or
- in accordance with a management plan (or similar) endorsed by the Western Australian Planning Commission and which has appropriately considered bushland protection requirements, or
- consistent with the overall purpose and intent of an existing Crown reserve can be reasonably justified regarding wider environmental, social, economic or recreational needs, and all reasonable alternatives have been considered in order to avoid or minimise any direct loss of regionally significant bushland and reasonable offset strategies are secured to offset any loss of regionally significant bushland, where appropriate and practical.

The impact assessment criteria identified in the policy include other planning and environmental considerations, including fire protection and control measures.

In its response to the appeal, DWER advised that an assessment of residual impacts was undertaken during the permit application assessment. DWER noted:

- Loss of native vegetation includes the mechanical clearing of up to 0.39 ha immediately adjacent to the aircraft hangars. This area consists of previously cleared vegetation that has not been mapped as regional remnant vegetation, 84% (0.33 ha) of which is either 'Completely Degraded' (Keighery, 1994)³⁷ or 'Degraded' (Keighery, 1994).
- Slashing around the BOM infrastructure will result in the loss of an additional 0.05 ha of native vegetation, noting that slashing is not equivalent to clearing to mineral earth.

³⁷ Keighery, B.J. (1994). Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc.), Nedlands, Western Australia.

DWER advised that the key considerations in the determination that no significant residual impacts remain after the implementation of avoidance and mitigation measures were:

- The total vegetation loss of 0.44 ha includes a limited extent of 0.11 ha of native vegetation in 'Good' (Keighery, 1994) or better condition.
- Banksia Woodlands are fire-maintained ecosystems, and the proposed fire regime for the planned prescribed burn of the remainder of the application area is considered appropriate.

3.5 Summary of recent similar appeal

There has been one recent appeal in objection to the decision of DWER to grant Clearing Permit CPS 8460/1 for the purpose of fire mitigation and forest management.³⁸ We noted in our investigation of this appeal that it is reasonable for fire mitigation burning to be allowed in the interests of protecting human life and assets.

See www.appealsconvenor.wa.gov.au for the appeal report and the Minister's appeal determination.

³⁸ Appeals Convenor (2020).

Appendix 1 Site map

This appendix shows the following maps:

Fig	Details	Source
1	Map of the application area	Schedule 1, Clearing Permit CPS 9029/1
2	Revised areas to be burnt in the application area	Shire of Serpentine Jarrahdale

Figure 1 Map of the application area (provided by DWER)

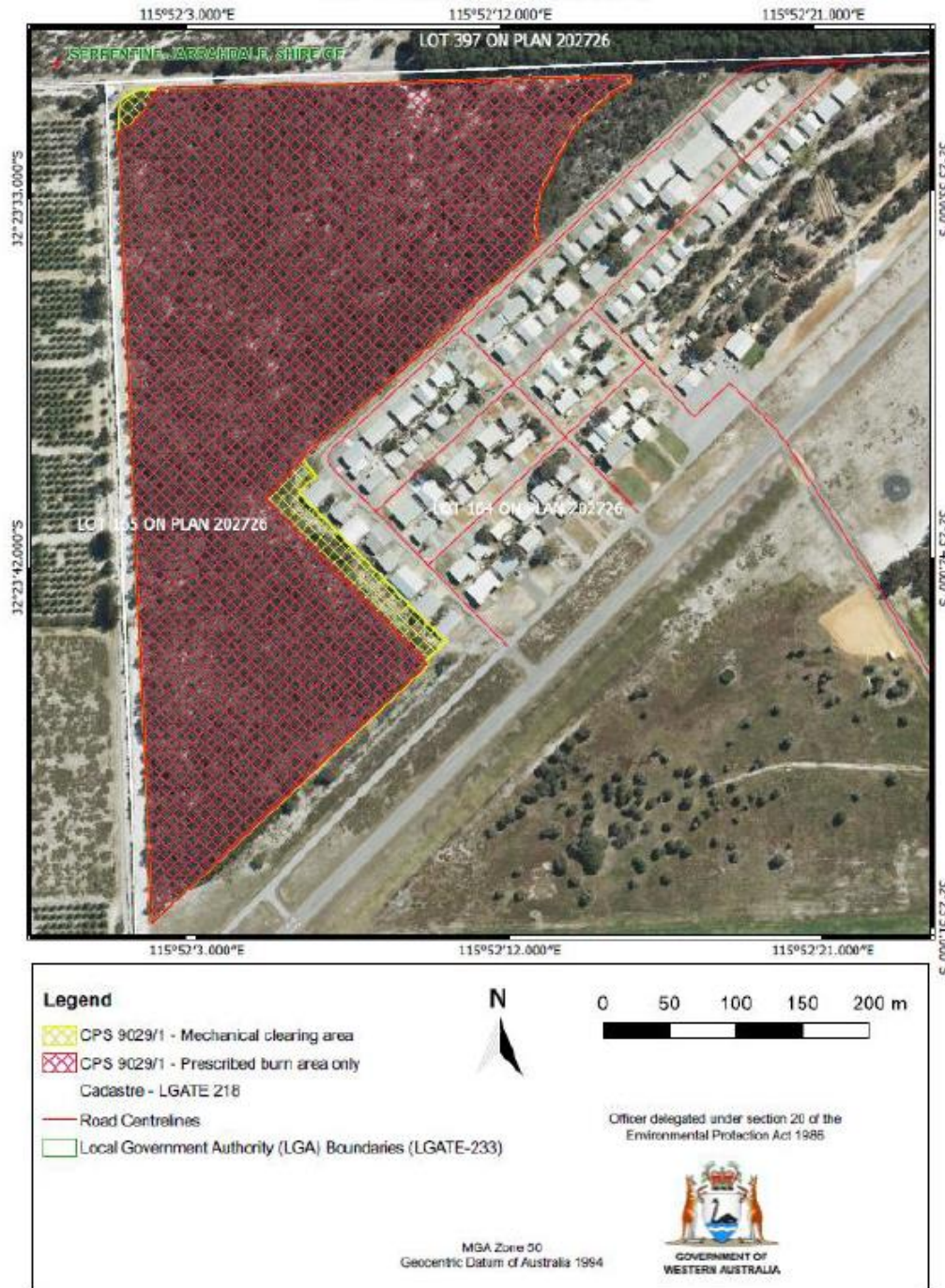
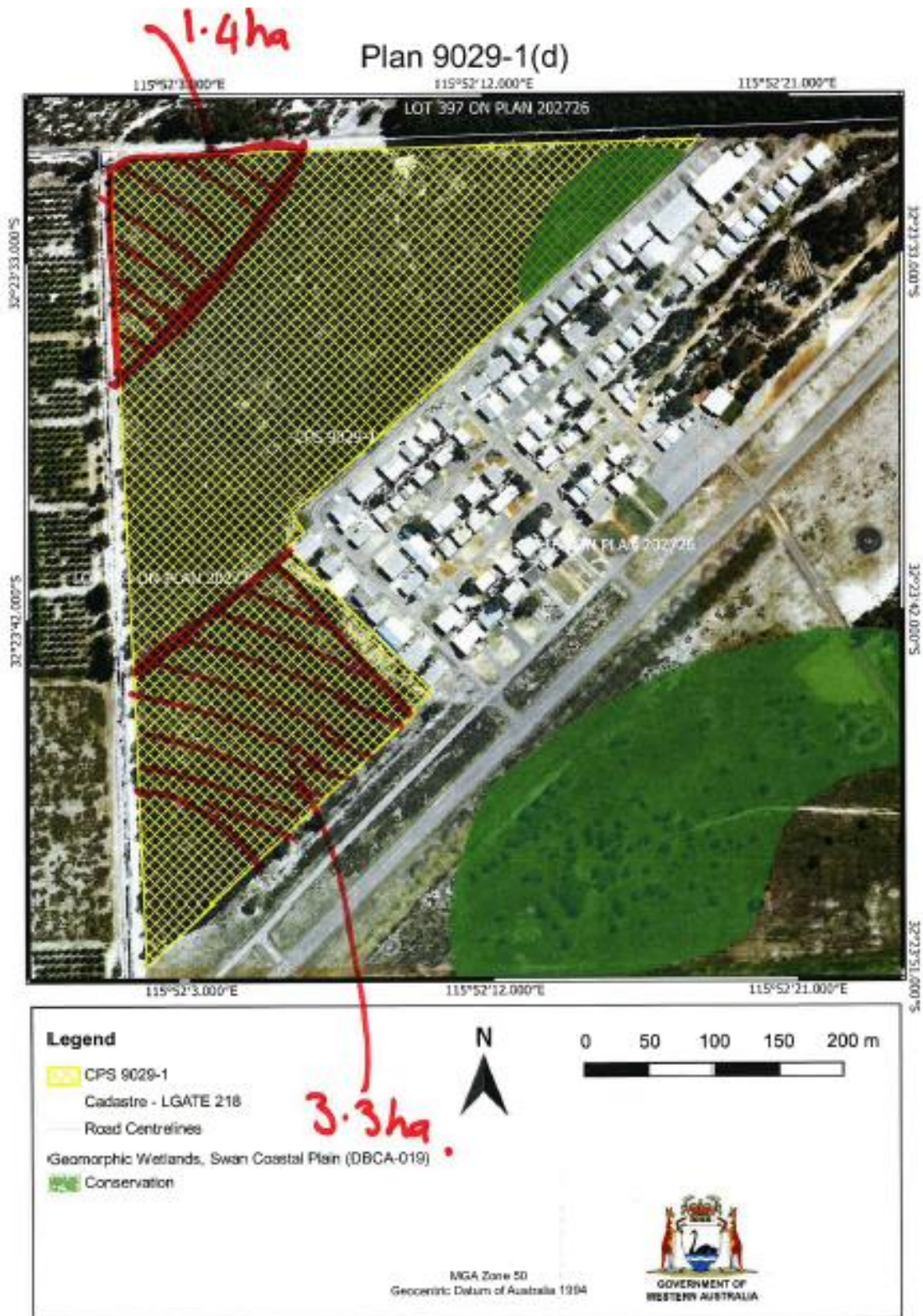


Figure 2 Revised areas to be burnt in the application area (revised map provided by permit holder)



Appendix 2 Appeal process

The Minister assesses the merits of a decision

Environmental appeals follow a merits-based process. This means the Minister can consider all the relevant facts, legislation and policy aspects of the decision and decide whether it was correct and preferable.

For appeals relating to a decision to grant a clearing permit, including the conditions of that permit, the Minister can consider the environmental merits of the assessment by DWER based on the clearing principles set out in Schedule 5 of the EP Act, as well as planning and other relevant matters. Questions of additional information not considered by DWER, technical errors and attainment of relevant policy objectives are normally central to appeals.

We report to the Minister, as does the decision-making authority

To decide an appeal's outcome, the Minister for Environment must have a report from both:

- the Appeals Convenor [see section 109(3) of the EP Act], and
- the authority that originally made the decision under appeal [see section 107(1)].

To properly advise the Minister, our investigation included:

- reviewing DWER's report and responses from the licence holder
- a site visit with a representative from the Shire of Serpentine Jarrahdale on 24 March 2021
- a meeting with Mr Boardman and Ms Gray on 24 March 2021
- a meeting with scientific staff from the Botanic Gardens and Parks Authority and discussions with Mr Mark Webb, Director General of the Department of Biodiversity, Conservation and Attractions,
- reviewing other information, policy and guidance as needed.

See Table 2 for the documents we considered.

Table 2 Documents we reviewed in the appeal investigation

Document	Date
Department of Environment Regulation. Risk-based assessment of clearing permit applications <i>Environmental Protection Act 1986</i> . Clearing Regulation Factsheet 16	No date
Government of Western Australia. Bush Forever. Volume 2: Directory of Bush Forever Sites	2000
Western Australian Government. Environmental Protection (Environmentally Sensitive Areas) Notice 2005 (Government Gazette, No. 55)	April 2005
Western Australian Planning Commission. State Planning Policy 2.8. Bushland Policy for the Perth Metropolitan Region. Prepared under section 26 of the <i>Planning and Development Act 2005</i> (Government Gazette)	June 2010
Serpentine Jarrahdale Shire. Yangedi Bush Forever and Airfield Reserve Management Plan	April 2011
Government of Western Australia. WA Environmental Offsets Policy	September 2011

Document	Date
Department of Environment Regulation. Environmental offsets for native vegetation clearing permits <i>Environmental Protection Act 1986</i> . Clearing Regulation Fact Sheet	June 2014
Government of Western Australia. WA Environmental Offsets Guidelines	August 2014
Department of Environmental Regulation. Guideline: Clearing of native vegetation Offsets procedure under the <i>Environmental Protection Act 1986</i>	August 2014
Department of Environment Regulation. A guide to the assessment of applications to clear native vegetation under Part V Division 2 of the <i>Environmental Protection Act 1986</i>	December 2014
Department of Environment Regulation. Guideline: A guide to burning under the native vegetation clearing provisions <i>Environmental Protection Act 1986</i>	August 2015
Commonwealth of Australia. Banksia Woodlands of the Swan Coastal Plain: a nationally protected ecological community	2016
Brown, K. et al. Mitigating impacts of weeds and kangaroo grazing following prescribed fire in a Banksia Woodland. <i>Ecological Management and Restoration</i> , Vol. 17, p. 133–139	2016
Threatened Species Scientific Committee. <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) (s 266B). Approved Conservation Advice (incorporating listed advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community	August 2016
Miller, B. Interactions between fire regimes and weed management in Banksia Woodlands. Banksia Woodland Management Workshop https://www.youtube.com/watch?v=t-lz--VcHPU [accessed 12 April 2021]	June 2017
DWER. A Guide to Preparing Revegetation Plans for Clearing Permits under Part V of the <i>Environmental Protection Act 1986</i>	March 2018
DWER. A guide to the exemptions and regulations for clearing native vegetation Under Part V of the <i>Environmental Protection Act 1986</i>	August 2019
DWER. Procedure: Native vegetation clearing permits	October 2019
Miller, B. and Miller, R. Adding fuel to the fire invasive grass management and fire in urban fragments. <i>Landscape</i> , p. 45–49	Spring 2020
DWER. Environmentally sensitive areas Environmental Protection Act 1986. Native Vegetation Regulation Factsheet 24	September 2020

Document	Date
Miller, R. Fire regime effects on Banksia Woodland plant populations. Kings Park and Botanic Gardens Science Webinar https://www.youtube.com/watch?v=h3-varlw-jo [accessed 12 April 2021]	October 2020
Appeals Convenor. Report to the Minister for Environment. Appeal in Objection to the Decision of the Department of Water and Environmental Regulation to Grant a Clearing Permit. Clearing Permit CPS 8460/1 Fire Mitigation and Forest Management (Thinning), Eastbrook, Shire of Manjimup. Appeal Number 015 of 2020	November 2020
DWER. Clearing Permit CPS 9029/1	January 2021
DWER. Clearing Permit CPS 9029/1 Decision Report	January 2021
DWER. Grant of Clearing Permit CPS 9029/1 Clearing Permit Appeal Report. Appeal No. 003/21.	March 2021
Shire of Serpentine Jarrahdale. Appeal Response CPS 9029/1	March 2021
Botanic Gardens and Parks Authority. Fire risk management https://www.bgpa.wa.gov.au/about-us/conservation/research/ecosystem-ecology/361-about-us/science/ecosystem-ecology/1960-fire-risk-management [accessed 7 April 2021]	2021
Ritchie, A.L. et al. A threatened ecological community: research advances and priorities for Banksia woodlands. <i>Australian Journal of Biology</i> , 31 pp	2021