



1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 8842/1
Permit type:	Area permit
Applicant name:	Mr Damien Burton and Sonja Burton
Application received:	13 March 2020
Application area:	3.84 hectares of native vegetation
Purpose of clearing:	Dam
Method of clearing:	Mechanical
Property:	Lot 1762 on Deposited Plan 203415
Location (LGA area/s):	Shire of Denmark
Localities (suburb/s):	Hazelvale

1.2. Description of clearing activities

The application is to clear a patch of remnant vegetation within the south-eastern portion of the property for construction of a dam. The vegetation proposed to be cleared is contained within a single area (see Figure 1, Section 1.5).

The application area is located approximately 9.6 kilometres from the Walpole townsite and is adjacent to other farming properties and patches of native vegetation. North of the application area is the Mount Frankland South National Park and the Frankland State Forest and to the south is the Walpole-Nornalup National Park. The application area occurs within a local area (10-kilometre radius from the application area) that retains more than 60 per cent native vegetation.

1.3. Decision on application

Decision:	Refused
Decision date:	25 March 2022
Decision area:	0.58 hectares of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and two submissions were received. Consideration of matters raised in the public submissions is summarised in Appendix B.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix C), relevant datasets (see Appendix G.1), the findings of a flora, vegetation and fauna survey report (see Appendix F), and advice received internally from DWER's Environmental Water Planning section and externally from the Department of Biodiversity, Conservation and Attractions (DBCA). The determination also had regard to the clearing principles set

out in Schedule 5 of the EP Act (see Appendix D), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3).

The assessment identified that the proposed clearing may result in:

- impacts to the hydrology of the immediate area which may impact suitable habitat for the conservation significant sunset frog (*Spicospina flammocaerulea*) (as considered under the revised application areas)
- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values

After consideration of the available information, including the applicant's minimisation and mitigation measures (see Section 3.1) and the expert advice from DBCA and DWER's Environmental Water Planning section, the Delegated Officer considered that, based on the available information, it remained possible that the proposed clearing would result in unacceptable impacts to the environment. The applicant has not adequately demonstrated impact management measures or provided other sufficient information to give confidence that there is low risk of significant impacts to habitat that is suitable for the Sunset Frog.

In accordance with applying the objects and principles of the EP Act found under section 4A to the decision-making process, the Delegated Officer must take a precautionary approach when assessing an application. The Delegated Officer decided to refuse to grant a clearing permit based on the potential for significant impacts to habitat that is known to be suitable for the sunset frog and in which there is a material possibility that the sunset frog occurs, which if realised would represent unacceptable impacts to the species..

1.5. Site map



Figure 1 Map of the application area (as revised December 2021)

2 Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA, 2020)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

The application form included evidence provided by the applicant, noting that the applicant had considered alternative locations for the dam, but the other locations were not suitable for water catchment sources.

The applicant requested a reduction in size of the application area from 3.84 hectares (Figure 1) to 2.9325 hectares (Figure 2) during the assessment and prior to any biological surveys being undertaken. The reduction was a result of a revised engineering design.

A further reduction in size to 0.58 hectares was proposed by the applicant in December 2021 (Figure 3) to minimise impacts to the habitat values identified from the surveys completed. Specifically, the revised design avoids the area identified as sunset frog habitat and is not within 25 meters of this habitat. However, despite the measures undertaken by the applicant to avoid and minimise potential impacts of the proposed clearing on the environmental values, the Delegated Officer determined that there was remaining uncertainty in relation to the extent these measures would mitigate impacts, particularly hydrological impacts, on the habitat values of the adjacent area.



Figure 1: Initial application area hatched in blue (3.84 hectares)

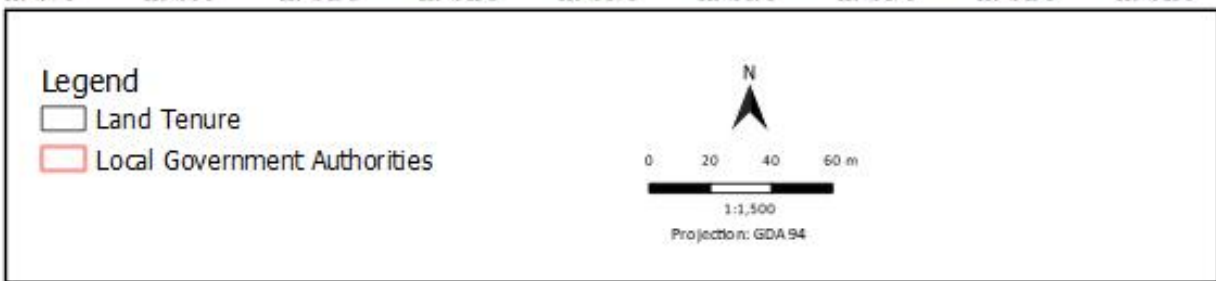


Figure 2: Revised application area hatched in blue (2.93 hectares)



Legend

- new revision
- Land Tenure
- Local Government Authorities

Image

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Projection: GDA 94

GOVERNMENT OF
WESTERN AUSTRALIA

Figure 3: Final application area hatched in blue (0.58 hectares)

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix C) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment below is for the final application area (as shown in Figure 3, above) which is the proposed clearing of 0.58 hectares with comparison made to the original application area.

The assessment against the clearing principles (see **Error! Reference source not found.**) identified that the impacts of the proposed clearing present a risk to suitable habitat for conservation significant flora and fauna and surface and ground water. The consideration of these impacts is set out below.

3.2.1. Biological values - Fauna - Clearing Principles (b)

Assessment:

A review of the available databases indicates a total of fifty-four conservation significant fauna species with records in the local area. These species are listed under the state *Biodiversity Conservation Act 2016* (BC Act) or *Wildlife Conservation (Specially Protected Fauna) Notice 2018*, the commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or listed as Priority species by DBCA,

Of these, thirty are listed as Threatened, one Conservation Dependent, nine under International Agreement, two Other Specially Protected species, two Priority 2, one Priority 3 and nine Priority 4 species. A majority of these species are avifauna considered as wader species, marine shorebirds or as marine fauna species, and therefore have been excluded from this assessment. Given the vegetation types present within the application area and the habitat preferences of the abovementioned species, the following species were considered as possibly occurring within the application area:

- *Calyptorhynchus banksii naso* - Forest red-tailed black cockatoo (VU under BC Act and EPBC Act)
- *Calyptorhynchus baudinii* - Baudin's cockatoo (EN under BC Act and EPBC Act)
- *Calyptorhynchus latirostris* - Carnaby's cockatoo (EN BC Act and EPBC Act)
- *Bertmainius tingle* - Tingle pygmy trapdoor spider (EN under BC Act and EPBC Act)
- *Bertmainius mysticus* - Mystical pygmy trapdoor spider (P2)
- *Cynotelopus notabilis* - Western Australian pill millipede (EN under BC Act)
- *Isoodon fusciventer* - Quenda, southwestern brown bandicoot (P4)
- *Geocrinia lutea* - Nornalup frog (P4)
- *Spicospina flammocaerulea* - Sunset frog (VU under BC Act and EN under EPBC Act)
- *Hydromys chrysogaster* - Water-rat, rakali (P4)
- *Falsistrellus mackenziei* - Western false pipistrelle, western falsistrelle (P4)

The original application area (Figure 1) contained a small stand of unidentified *Eucalyptus* trees which may have provided a foraging resource for some or all of the black cockatoo species, however, this area was omitted from the revised application area. The removal of potential habitat for black cockatoo species within the final application area (Figure 3) indicates these species would not be directly or indirectly impacted by the proposed clearing.

Sunset frog

Background information

Spicospina flammocaerulea, or sunset frog, is a black or very dark blue-grey frog growing to 35 mm. It has bright reddish-orange hands, feet, throat and anterior chest, as well as orange patches around the cloaca and margins of the jaws. The belly has small light to bright blue spots (Tyler & Doughty, 2009). The species is found in permanently moist peat-based swamps with organically-rich soils (Roberts et al. 1997), in a high rainfall area of moderate relief with granite outcrops and associated ranges of hills rising to 300 to 400 m (Roberts et al. 1999).

The Sunset Frog Recovery Plan (Burbridge and Roberts, 2002) indicates 'every time that extensive searches for the Sunset Frog have taken place, additional populations have been located'. The area northeast of Walpole includes swamps with poor access (most searching has been along roads and tracks), and it is very likely that the species occurs at additional localities (Burbridge and Roberts, 2002). This suggests the known abundance of the species is likely to be an underrepresentation. According to the Conservation Advice (TSSC, 2019), fourteen of the known location sites occur on land managed by the Department of Parks and Wildlife (National Park), where the main threatening process is inappropriate fire regimes and feral pigs

The breeding period for *S. flammocaerulea* usually starts around November when the pools are shallow and water temperature increases, however, individuals can often be detected sporadically calling in occupied swamps as early as August (Bio Diverse Solutions, 2020a). The Commonwealth conservation advice indicates surveys should be conducted during the species' breeding season when males are calling, between October and December and conducted at night with no artificial light (TSSC, 2019).

Review of surveys conducted in relation to the sunset frog

During the assessment, a 'Reconnaissance flora, vegetation and fauna survey report' (BDS, 2020a) was completed within the revised application area (area within Figure 2 above). The survey identified 21 fauna species within the location, none of which are threatened or priority species. The survey noted the presence of suitable habitat for *Spicospina flammocaerulea* (refer to Appendix F for further detail).

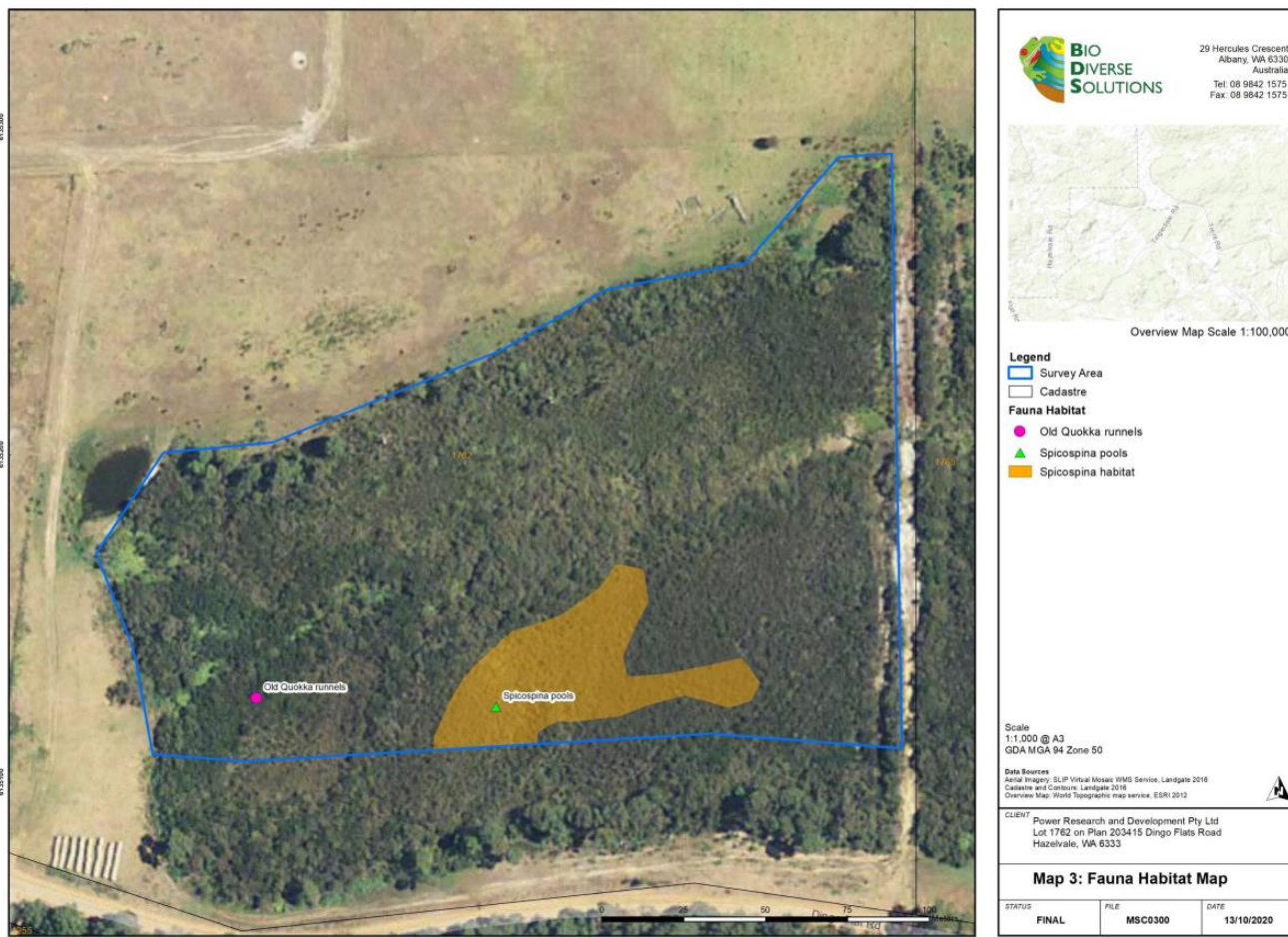


Figure 4: Mapped area of sunset frog habitat (Bio Diverse Solutions, 2020a)

The survey (Bio Diverse Solutions, 2020a) consisted of two dusk / evening call monitoring for the sunset frog attempting to identify calling males, with no individuals detected ((Bio Diverse Solutions, 2020a). The lack of calling individuals does not, however, confirm that the site is unoccupied and may indicate a non-breeding population or a low-density population with infrequently calling males (Bio Diverse Solutions, 2020a). In addition, the survey noted that the survey was conducted outside of the core breeding period for this species and while the field conditions were suitable for breeding, the weather conditions were not (Bio Diverse Solutions, 2020a).

DWER sought advice from DBCA on the likelihood of occurrence and adequacy of the survey effort in relation to the sunset frog. DBCA agreed that sunset frog habitat was identified within the application area and that it was possible that the species occurs, even though no individuals were seen or heard during the reconnaissance survey; DBCA noted that while the survey was adequate to meet the requirements of a reconnaissance survey and no individuals were recorded, it was still possible that the species is located within the peaty habitat within the site. DBCA noted that to provide further certainty for the species presence or absence, additional targeted surveys would be required potentially including installation of an automated acoustic recording device(s) to improve detectability.

No further survey efforts have been undertaken within the original application area, or either of the revised areas, although additional information on the survey conditions was provided (Bio Diverse Solutions, 2020b).

Potential impacts to the sunset frog or its suitable habitat

DBCA advised that if the sunset frog is present within the application area, then it would be significant for the species as it would increase the species known area of occupancy. DBCA's advice indicated that, if the species is present, any impacts that resulted in removal of this suitable habitat would result in local extinction of the species. DBCA's advice also indicated that, if the species is present, excluding this suitable habitat from direct clearing activities may not be enough to ensure the species persistence, due to the potential for indirect impacts as a result of the disturbance caused by the clearing activities, changes in hydrology and potential changes in acidity.

Advice provided by DWERs Environmental Water Planning (EWP) section considered the revised application area (Figure 2) and then the further revised area (Figure 3), having regard to the information subsequently provided by the applicant in relation to the clearing footprint and proposed hydrological impact management measures (BDS 2020a, Bowman and Partners Environmental 2021). Following review of the abovementioned information, EWP noted that the proposed clearing had potential to impact on the suitable habitat for the sunset frog due to the following reasons:

- the information provided (by the applicant) to date is not sufficient to assess the impacts of the proposal on the elements of the hydrological regime;
- the proposed buffer of 50 metres between the revised clearing area (as shown in Figure 3) and the suitable habitat identified (for sunset frog) may not be enough to buffer impacts such as change to water quality, instream and foraging habitat and associated food webs for the sunset frog;
- the proposed clearing and subsequent dam construction will impact lateral groundwater flows. Alteration of groundwater systems will likely disturb surface water;
- the location of the proposed dam will change surface water flow with the extent reliant on the actual configuration of the dam. Details on the methods to maintain environmental water flow have not been provided.

Significant impacts to the Sunset Frog and its habitat are described by the Sunset Frog Recovery Plan as:

- any action, including changes in land use within catchments, that may affect the quantity or quality of water flowing into swamps utilised by the species, including drainage and land-use in the catchments that caused pollution or eutrophication;
- any process that alters the ability of a peatland to accrue organic material has the potential to alter the habitat quality of the Sunset Frog; this would include the deliberate imposition of an inappropriate fire regime, damming of rivers that would cause flooding of habitat or changes to the hydrology of habitat, - any nearby industrial development that may affect air quality to the extent that rainfall quality changed to the extent that water quality in the swamps was lowered; and
- subdivision of the land near swamps inhabited by the Sunset Frog to urban or near urban levels, thus increasing people pressure on the habitat and leading to increased risk of frequent fire, and increased demand that nuisance insects within the swamps be controlled

Having had regard to the survey results and the presence of suitable Sunset Frog habitat, avoidance and minimisation measures proposed by the applicant, including hydrological impact management measures, and the advice received by DBCA and EWP, the Delegated Officer considered that there remained a risk that the proposed clearing may result in an unacceptable environmental impact with respect to the Sunset Frog.

Other Conservation Significant Fauna

Bertmainius tingle and *Bertmainius mysticus* are species of trapdoor spiders, listed as Endangered and Priority 2 respectively. *B. tingle*, also known as the tingle pygmy trapdoor spider, constructs shallow burrows in the tree bark of tingle trees (*Eucalyptus guilfoylei*, *E. jacksonii* and *E. brevistylis*) or in soil on the banks of creek lines and gullies in a small area of the high rainfall, closed-forest ecosystem of the Warren bioregion on the far south coast of WA (TSSC, 2018). The local area indicates 14 historical recordings with the closest located 3.8 km away. *B. mysticus*, also known as the mystical pygmy trapdoor spider, has little known habitat preferences and indicates one recording in the local area, the closest located 7 km away (DBCA, 2007-). Previous *B. mysticus* recordings are all located within Walpole-Nornalup National Park and associated with large trees.. A survey conducted within the application area found no individuals of these species. The revised application area of 0.58 hectares is not likely to contain habitat for the species.

Cynotelopus notabilis, or Western Australian pill millipede is found in deep litter and under logs as well as under rocks. Specimens have been found under rocks associated with granite tors, from under logs and karri bark, and in leaf litter (Main, Harvey & Waldock, 2002). *C. notabilis* appears to possess a very restricted range and the only available specimen, based records are from localities stretching along 115 km of the southern coast of Western Australia ranging from Tinglewood in the west, to Torbay Hill in the east. The local area indicates 2 previous recordings, the closest located 6.1 km away. Given the lack of abundant large trees and subsequent leaf litter and logs, the application area is unlikely to offer significant habitat for this species. The survey conducted did not locate the species within the survey effort (Bio Diverse Solutions, 2020a)

Isodon fusciventer or quenda prefer dense scrub (up to one metre high), with swampy vegetation but are found in a variety of other habitats, The species is widely distributed near the southwest coast from north of Geraldton to east of Esperance. Quendas have a patchy distribution throughout the Jarrah and Karri Forest, the Swan Coastal Plain, and inland as far as Hyden (DEC, 2012a). They will often feed in adjacent forest and woodland that is burnt on a regular basis, and in areas of open grassland, pasture and crop land lying close to dense cover (DEC, 2012a). Given the application area contains riparian vegetation and is within close proximity of large dense woodlands, the vegetation proposed to clear may contain suitable habitat for this species. The survey conducted did not locate the species within the survey effort (Bio Diverse Solutions, 2020a)

Geocrinia lutea, or Nornalup frog/Walpole frog is a small, short-bodied frog with relatively long legs and grows to maximum size of ~2.3 centimetres (WAM, 2020). They are found in very dense swamp vegetation (to 4 m high) on peaty sand, bordering streams and seeps, often on the edge of a forest (WAM, 2020). The local area indicates four previous recordings, the closest located 3.2 km away. Given the application area contains dense riparian vegetation and would become inundated with seasonal rainfall, the vegetation proposed to clear may contain suitable habitat for this species. The survey conducted noted that the survey area contained habitat for this species though no individuals were recorded during the survey.

Hydromys chrysogaster or water rat/rakali inhabits a great variety of aquatic environments including subalpine streams, low inland rivers, lakes, farm dams, and sheltered marine waters. The species can also occur in streams and estuaries in located in urban cities (DEC, 2012b). The local area contains one historical recording located 2.5 km away. The survey conducted noted that remains of a feed containing cherax (yabby) shell which could be attributed to a feeding activity by this species. In addition, the survey concluded that the survey area may contain this species. Given the reduction in the application area, the amount of suitable habitat remaining and the conservation significance of this species, the proposed clearing is not likely to impact on the conservation status of the species or be significant on a local or regional scale.

Falsistrellus mackenziei is a species of bat found in wet sclerophyll forest dominated by karri and in high rainfall zones of the jarrah and marri forest (Woinarski *et al.*, 2014). It prefers tall mature forest but has also been recorded from Banksia woodland on the Swan Coastal Plain (Armstrong *et al.* 2017). This species forages under the tree canopy and along forest tracks, and roosts within tree hollows and fallen hollow logs. No information on the breeding biology of this species is available (Armstrong *et al.* 2017). The western false pipistrelle faces multiple threats, including habitat loss as a result of logging, burning and clearing, as well as competition for resources from introduced species such as the European Honey Bee and Rainbow Lorikeet (Armstrong *et al.* 2017). The local area indicates 3 previous recordings, the closest located 6.7 km away. The survey conducted noted no suitable habitat for this species was located within the survey area.

Ecological Linkage

According to the aerial imagery and available databases, the vegetation within the applied clearing area is not within a mapped ecological linkage (Molloy *et al.*, 2009). The applied clearing area is within 3 km of the Southwest Regional Ecological Linkage line which runs through the Walpole-Nornalup National Park. Given the abundant remnant vegetation within this National Park, it is reasonable to assume fauna would be using this as a transportation corridor. The vegetation within the applied clearing within close proximity to a watercourse and some fauna may be using this for transport; however, the majority of the watercourse has been historically altered and is unlikely to be offering a significant ecological linkage.

Conclusion

Given inconclusive survey results to the absence/presence of the sunset frog and the information gaps related to the design and hydrology impacts of the proposed clearing and subsequent construction of a dam, a risk-based approach has been applied to assess the impacts of the clearing in relation to potential impacts on suitable habitat for the sunset frog.

In accordance with applying the objects and principles of the EP Act found under section 4A to the decision-making process, the Delegated Officer must take a precautionary approach when assessing an application. Based on the available information, it is possible that the proposed clearing would result in a significant impact on the Sunset Frog (if present) and its habitat.

3.2.2. Environmental value: Biodiversity values (flora) – Clearing Principles (a) and (c)

Assessment: A review of the available databases indicates the local area contains records of forty-two conservation significant flora, as listed under the state *Biodiversity Conservation Act 2016* or *Wildlife Conservation (Specially Protected Flora) Notice 2018*, the commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, or listed as Priority species by DBCA.

Of those, five are listed as Threatened, eleven as Priority 2 (P2), thirteen as Priority 3 (P3) and thirteen as Priority 4 (P4). Considering the mapped vegetation within the original application area and the habitat preferences of the flora species recorded within the local area, the following species were considered likely to be found within the application area:

- *Corybas abditus* (P3)
- *Juncus meianthus* (P3)
- *Hemigenia microphylla* (P3)
- *Pleurophascum occidentale* (P4)
- *Leucopogon alternifolius* (P4)
- *Andersonia* sp. *Amabile* (N. Gibson & M. Lyons 355) (P3)
- *Gonocarpus simplex* (P4)
- *Microtis pulchella* (P4)
- *Corybas autumnalis* (P2)
- *Microtis globula* (T - VU)
- *Drosera binate* (P2)
- *Leptinella drummondii* (P3)
- *Lepyrodia extensa* (P2)
- *Chordifex jacksonii* (P3)
- *Lysinema lasianthum* (P4)
- *Stylidium leeuwinense* (P4)
- *Gahnia sclerioides* (P4)
- *Schizaea rupestris* (P2)
- *Actinotus repens* (P3)
- *Sphagnum novozelandicum* (P2)
- *Boronia virgate* (P4)
- *Alexgeorgea ganopoda* (P3)
- *Ornduffia submerse* (P4)
- *Sphaerolobium benetectum* (P2)

Given the likelihood of the species above occurring within the application area, DWER requested a flora survey be completed.

The applicant commissioned a consultant to undertake a Reconnaissance flora, vegetation and fauna (including targeted) assessment which was undertaken on 5 and 6 October 2020 within the 2.93 hectare revised application area (as mapped within Figure 2 and detailed in Appendix F).

The survey found 42 flora species within the survey area, 15 of which were introduced species. The survey effort found one suspected priority listed species, *Corybas abditus* (P3). The species was not flowering at the time of the survey and identification was based on the presence of its distinctive basal leaf. No other conservation listed flora or Threatened/Priority Ecological Communities were present. The final revised area of 0.58 hectares avoids impacts to the P3 species identified within the survey.

On review of the survey findings, DWER sought further information on why the following species were not targeted, or did not appear to be searched for intensely within the survey:

- *Microtis globula* (T-VU)
- *Reedia spathacea*
- *Microtis pulchella* (P4) and
- *Stylidium leeuwinense* (P4)

Information provided by the consultants who undertook the survey noted that the survey was undertaken outside of the flowering period for *Stylidium leeuwinense* (P4) and *Microtis* species which would have affected their ability to be

detected. The response from the consultants also noted that the application area provided suitable habitat *Reedia spathacea* and that the species is easily detectable and was not found in the survey effort.

DWER sought advice from DBCA who noted that *Microtis globula* (VU) is a perennial herb which flowers in December or January after hot summer fires. DBCA also advised that the search effort within the peat soil areas with a drone is unlikely to have identified cryptic species (*Microtis globula*, *Microtus pulchella* (P4) and *Styliidium leeuwinense* (P4).

Furthermore, DBCA noted that flora authorisations under Section 40 of the *Biodiversity Conservation Act 2016* would normally not be progressed until the presence/absence of threatened species can be confirmed and the impacts quantified to allow for assessment of significance to be undertaken, however, given the species only flowers after summer fires, additional surveys may not detect the species. DBCA commented that since the peat habitat is preferred by both the flora species *Microtis globula* and the sunset frog, efforts to avoid impacts to the sunset frog habitat were likely to help conserve habitat for *Microtis globula*.

The final application area (Figure 3) avoids peat habitat which is likely to mitigate impacts to *Microtis globula*.

No further flora surveys were completed within the application area.

Conclusion

Based on the above assessment, the proposed clearing will result in the loss of native vegetation within 15 metres of a mapped watercourse. Noting the findings of the survey conducted, the proposed clearing is not likely to impact on the conservation status of any priority or threatened flora species, or impact on individuals of conservation significant species.

Additionally, the final application area of 0.58 hectares avoids direct impact to the wetter areas that may provide suitable habitat for *Microtis globula*. The construction of the dam as proposed may impact surface/subsurface water flows to the peaty habitat, but this is considered as less of an impact to flora species than the more sensitive receptors (the sunset frog).

3.2.3. Environmental value: land and water resources – Clearing Principles (f), (g), (i) and (j)

Assessment:

According to the aerial imagery and the available databases, the application area is approximately 15 metres from a mapped watercourse. The watercourse, flows from south-east to north-west where it meets the Kent River. The vegetation types within the application area were described as follows (Bio Diverse Solutions, 2020a):

- Taxandria shrubland, which is described as a closed canopy of tall *Taxandria linearifolia* and *Homalospermum firmum* with dense *Empodisma gracillimum* dominating the understorey and a diverse understorey in areas where the canopy is more open. In instances where understorey is absent, a sparse weed-dominated ground cover is present.
- Pteridium Thicket vegetation is dominated by a midstory of dense *Pteridium esculentum* and *Histiopteris incisa* with *Rubus laudatus* and *Cenchrus clandestinus* throughout.
- Peatland - open *Homalospermum firmum* over closed *Empodisma/Cyathochaeta* on shallow peaty podzols

Given the vegetation types within the application area contain species which rely on moist conditions provided by the nearby watercourse, it is considered that the application area contains vegetation which grows in association within a watercourse.

The land degradation risks are outlined in Appendix C and indicate the mapped soil type has a low risk of wind erosion, salinity and flood risk, a moderate risk of water logging and a medium to high risk of water erosion, subsurface acidification and phosphorus export risk. (DPIRD, 2017).

The removal of 0.58 hectares of vegetation and construction of farm dam is unlikely to increase the risk of flooding as the purpose of the dam is to capture water. The proposed clearing is unlikely to increase the risk of phosphorus export as much vegetation is being retained along the watercourse and the reduced application area of 0.58 hectares is not considered significant. The risk of waterlogging within the mapped soil type is moderate but considering the application area is 0.58 hectares and much vegetation within the remnant would be retained, it is not considered the proposed clearing would contribute to waterlogging.

The removal of the vegetation proposed to clear may impact on the groundwater in the area due to the lack of abundant deep-rooted vegetation within the riparian zone of the watercourse. The subsequent construction of a dam will have unknown impacts on surface and groundwater flows (as detailed within Principle b).

The proposed clearing is likely to alter surface water quality particularly if cleared during periods of rain and surface water flow, however, given the end purpose is for the construction of a dam, these impacts are likely to be temporary.

Conclusion:

Based on the above assessment, the proposed clearing will likely result in impacts to surface water quality, the loss of vegetation growing in association with a wetland/watercourse and the subsequent construction is likely to have impacts on surface/subsurface and groundwater flow, although these impacts have not been fully assessed due to lack of available information.

For the reasons set out above, it is considered that the impacts of the proposed clearing cannot be managed to be environmentally acceptable and are assessed as potentially constituting a significant residual impact in the absence of more detailed information.

3.3. Relevant planning instruments and other matters

Other relevant authorisations required for the proposed land use include:

- Development approval under the *Planning and Development Act 2005* (issued by the Shire of Denmark).

The Shire of Denmark advised DWER that local government approvals are required. No Development Approval for construction of a dam has been provided to date.

Advice from DWER's region noted that although the application area is within a non-proclaimed surface water area under the *Rights in Water and Irrigation Act 1914*, the landowner may have the right to take water from a watercourse for any other purpose so long as the taking of water under this right does not sensibly diminish the flow in the watercourse.

There are no mapped Aboriginal Heritage sites within the applied clearing area, or in the immediate vicinity. The nearest site is mapped as the Frankland River, located 1 km to the west.

End

Appendix A. Additional information provided by applicant

The address below summarises the additional information provided by the applicant and changes made to the application from the date of receipt (13 March 2020). It only includes significant information, or events that have led to the decision to refuse, or when changes were made to the application area.

Summary of information	Consideration
<p>October 2020 – Response to first Request for Information (RFI)</p> <ul style="list-style-type: none"> Reduction of application area from 3.84 ha to 2.93 hectares Biological survey conducted and provided (Bio Diverse Solutions 2020a) Avoidance of Eucalypt tree cluster Notification that a Development Application has been made with the Shire 	<ul style="list-style-type: none"> Reduction of the application area is observed in Figure 2 above. The findings of the biological survey have been considered in this assessment Avoidance of the cluster of Eucalypt trees negated the need to survey for hollows (suitable for black cockatoo species) The Development Application was not approved by the Shire and remains outstanding <p>DWER requested Department of Biodiversity, Conservation and Attractions (DBCA) advice based on the survey findings.</p>
<p>November 2020 – Response to second RFI</p> <ul style="list-style-type: none"> Clarification of survey findings, effort and detail on flora surveys provided (Bio Diverse Solutions 2020b) 	<ul style="list-style-type: none"> Information considered and advice sought from DBCA
<p>March 2021- Response to third RFI</p> <ul style="list-style-type: none"> An alternate design was proposed by the applicant for discussion which was a more linear design with a 25 metre buffer from the mapped sunset frog habitat (Applicant, 2021a) 	<ul style="list-style-type: none"> This design was forwarded to DBCA in relation to impacts to the sunset frog.
<p>May 2021- Water management plan provided</p> <ul style="list-style-type: none"> To address concerns of sunset frog habitat (Applicant, 2021b) 	<ul style="list-style-type: none"> Water management plan was sent to DBCA and DWER's Environmental Water Planning section for review
<p>September 2021 – Response to intent to refuse</p> <ul style="list-style-type: none"> Applicant submitted a memorandum and a topographic assessment (Bowman and Partners, 2021) to address the intent to refuse. 	<ul style="list-style-type: none"> Information was provided to DWER's Environmental Water Planning section for review. The advice received was provided to the applicant
<p>December 2021 – Applicant reduces application area to 0.58 hectares (Applicant, 2021c)</p>	<ul style="list-style-type: none"> The final revised area was submitted to DBCA and to DWER's Environmental Water Planning section for review. The responses received acknowledge that while the application area is reduced, there are still residual risks in relation to impacts on the sunset frog habitat.

Appendix B. Details of public submissions

The public submissions received during the advertising period raised the following points in relation to the original application area (the revised application area was not re-advertised):

Summary of comments	Consideration of comment
The proposal is within riparian area. The clearing could influence further riparian areas downstream	Comments are addressed within principle (f)
Riparian vegetation has value in reducing erosion and turbidity and the main stream is 1.5 kilometres away.	Comments are addressed within principle (g) and (i)
The application area may provide foraging habitat for black cockatoos	Addressed within principle (b)
There has been no survey to identify if the area provides night roosting habitat	Addressed within principle (b) and through avoidance and minimisation measures
Impacts should be considered cumulatively	Considered under principle (e) for remnant vegetation.

Appendix C. Site characteristics

C.1. Site characteristics

Characteristic	Details
Local context	The area proposed to be cleared is part of a patch of remnant native vegetation. It is surrounded by farmland. The application area is less than three kilometres from the Frankland River and less than one kilometre from the Walpole-Nornalup National Park. The proposed clearing area follows a water course which meets the Frankland River approx. 2.5 km to the west. Spatial data indicates the local area (10 km radius of the proposed clearing area) retains more than 60 per cent of the original native vegetation cover.
Ecological linkage	The application area is not within any mapped ecological linkages but may contribute to a local linkage given its proximity to a watercourse.
Conservation areas	The application area is directly south (approximately 550 metres) of a Timber Reserve vested by the Conservation Commission of WA under the CALM Act 1984 5(1)(a) with pasture and remnant vegetation present in between. Walpole-Nornalup National Park is located approximately one kilometre to the south of the application area. The Frankland State Forest and Mount Frankland South National Park are also located within several kilometres to the north of the application area.
Vegetation description	<p>Vegetation survey (Bio Diverse Solutions, 2020) indicates the vegetation within the proposed clearing area consists of:</p> <ul style="list-style-type: none"> • Taxandria shrubland, which is described as a closed canopy of tall <i>Taxandria linearifolia</i> and <i>Homalospermum firmum</i> with dense <i>Empodisma gracillimum</i> dominating the understorey and a diverse understorey in areas where the canopy is more open. In instances where understorey is absent, a sparse weed-dominated ground cover is present. • Pteridium Thicket vegetation dominated by a midstory of dense <i>Pteridium esculentum</i> and <i>Histiopteris incisa</i> with <i>Rubus laudatus</i> and <i>Cenchrus clandestinus</i> throughout. • Peatland - open <i>Homalospermum firmum</i> over closed <i>Empodisma/Cyathochaeta</i> on shallow peaty podzols <p>The full survey descriptions, photographs and maps are available in Appendix F.</p> <p>This is inconsistent with the mapped vegetation type(s): Hazelvale complex, which is described as Mosaic of a low woodland to woodland of <i>Eucalyptus marginata subsp. marginata-Eucalyptus patens</i>, low forest of <i>Agonis juniperina-</i></p>

Characteristic	Details
	<p><i>Callistachys lanceolata</i> with closed heath of Myrtaceae spp. on sandy plains in the hyperhumid zone.</p> <p>The mapped vegetation type retains approximately 41 per cent of the original extent (Government of Western Australia, 2019).</p>
Vegetation condition	<p>Vegetation survey (Bio Diverse Solutions, 2020) indicate the vegetation within the proposed clearing area is in degraded to excellent (Keighery, 1994) condition, described as:</p> <ul style="list-style-type: none"> • Excellent described as: vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species. • Very good described as: Vegetation structure altered, with obvious signs of disturbance • Degraded described as: Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management <p>The full Keighery (1994) condition rating scale is provided in Appendix E. The full survey descriptions and mapping are available in Appendix F.</p>
Climate and landform	<p>The application area is mapped within the Walpole Hills System, which is described as Granitic hills and low hills, in the south of the Warren-Denmark Southland. Loamy gravel, loamy earth, sandy gravel and loamy duplex. Jarrah-marri-karri forest and woodland (DPIRD, 2017).</p> <p>The Walpole area indicates a mean maximum and minimum annual temperature of 20.9 and 9.6 degrees Celsius respectively and a mean annual rainfall of 710.2 mm (over a 24-year period).</p>
Soil description	<p>The soil is mapped as the following soil type (Schoknecht et al., 2004):</p> <ul style="list-style-type: none"> • Hazelvale Subsystem (254WhHA) which is described as: Narrow sandy plains; slight stream incision. Humus podzols on crests of spurs; Teatree scrub. Yellow duplex soils on valley flanks; Jarrah-Marri low forest. Peaty podzols on minor valley floors; sedges and reeds.
Land degradation risk	<p>The mapped soil type has a low risk of wind erosion, salinity and flood risk, a moderate risk of water logging and a medium to high risk of water erosion, subsurface acidification and phosphorus export risk.</p>
Waterbodies	<p>The desktop assessment and aerial imagery indicate that the application area is within approximately 15 metres of a non-perennial watercourse (mapped as a minor river) and identified as part of the Kent River.</p>
Hydrogeography	<p>The application area is not within any proclaimed areas under the <i>RIWI Act 1914</i> or the <i>CAWS Act 1947</i>. The mapped groundwater salinity is 500-1000 milligrams total dissolved solids per litre.</p>
Flora	<p>According to available databases, 42 conservation significant flora species have been recorded within the local area. The closest record is <i>Pleurophascum occidentale</i> (P4). A number of the species located within the local area have similar habitat preferences to those present within the application area.</p>
Ecological communities	<p>The closest conservation significant ecological community is located approximately 6.8 kilometres south-west of the application area and is the <i>Reedia spathacea - Empodisma gracillimum - Schoenus multiglumis</i> dominated peat paluslopes and sandy mud floodplains of the Warren Biogeographical Region. This community is listed as Priority 1 by DBCA.</p>
Fauna	<p>According to available databases, 54 conservation significant fauna species have been recorded within the local area. The closest recording is of <i>Calyptrorhynchus</i> sp. 'white-tailed black cockatoo' (either a Baudin's Cockatoo or a Carnaby's cockatoo), White-tailed black cockatoos are the most frequently occurring species within the local area.</p>

C.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Warren	833,985.56	659,432.21	79.07	558,485.38	68.36
Vegetation complex					
Hazelvale **	7,276.42	2,982.39	40.99	1,089.06	14.97

**Government of Western Australia (2019b)

C.3. Flora and fauna analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix G.1), and biological survey information, impacts to the following conservation significant flora and fauna required further consideration.

Species name	Conservation status	Suitable habitat features? [Y/N/NA] FAUNA ONLY	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Microtis globula</i>	T	N/A	Y	Y	7.7	3	N
<i>Corybas abditus</i>	P3	N/A	Y	Y	10.2	5	Y
<i>Juncus meianthus</i>	P3	N/A	Y	Y	7.3	24	Y
<i>Hemigenia microphylla</i>	P3	N/A	Y	Y	9.7	25	Y
<i>Pleurophascum occidentale</i>	P4	N/A	Y	Y	2.6	59	Y
<i>Leucopogon alternifolius</i>	P4	N/A	Y	Y	7.4	16	Y
<i>Andersonia</i> sp. Amabile (N. Gibson & M. Lyons 355)	P3	N/A	Y	Y	6.4	22	Y
<i>Gonocarpus simplex</i>	P4	N/A	Y	Y	6.4	26	Y
<i>Microtis pulchella</i>	P4	N/A	Y	Y	7.7	19	Y
<i>Corybas autumnalis</i>	P2	N/A	Y	Y	5.9	2	Y
<i>Leptinella drummondii</i>	P3	N/A	Y	Y	9.4	14	Y
<i>Lepyrodia extensa</i>	P2	N/A	Y	Y	5.2	12	Y
<i>Chordifex jacksonii</i>	P3	N/A	Y	Y	10.3	31	Y
<i>Lysinema lasianthum</i>	P4	N/A	Y	Y	7.4	30	Y
<i>Stylidium leeuwinense</i>	P4	N/A	Y	Y	8.3	60	Y
<i>Gahnia sclerioides</i>	P4	N/A	Y	Y	3.8	29	Y
<i>Schizaea rupestris</i>	P2	N/A	Y	Y	9.9	13	Y
<i>Actinotus repens</i>	P3	N/A	Y	Y	9.6	33	Y
<i>Sphagnum novozelandicum</i>	P2	N/A	Y	Y	7.3	3	Y
<i>Chamaexeros longicaulis</i>	P2	N/A	Y	Y	4.4	20	Y
<i>Andersonia auriculata</i>	P3	N/A	Y	Y	5.7	108	N
<i>Boronia virgata</i>	P4	N/A	Y	Y	7.9	54	Y
<i>Alexgeorgea ganopoda</i>	P3	N/A	Y	Y	6.1	32	Y
<i>Ornduffia submersa</i>	P4	N/A	Y	Y	6.8	61	Y
<i>Sphaerolobium benetectum</i>	P2	N/A	Y	Y	6.5	9	Y
<i>Drosera binata</i>	P2	N/A	Y	Y	9.4	11	Y

Species name	Conservation status	Suitable habitat features? [Y/N/NA] FAUNA ONLY	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
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T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

C.4. Fauna analysis table

Species name	Conservation status (WA)	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Bertmainius tingle</i> - Tingle pygmy trapdoor spider	EN	Y	N/A	3.79	47	Y
<i>Cynotelopus notabilis</i> - Western Australian pill millipede	EN	Y	N/A	6.14	169	Y
<i>Isoodon fusciventer</i> - Quenda, southwestern brown bandicoot	P4	Y	N/A	4.35	9503	Y
<i>Geocrinia lutea</i> – Nornalup Frog	P4	Y	N/A	3.19	21	Y
<i>Calyptorhynchus banksii naso</i> - Forest red-tailed black cockatoo	VU	Y	N/A	7.94	3360	Y
<i>Calyptorhynchus baudinii</i> - Baudin's cockatoo	EN	Y	N/A	1.43	4076	Y
<i>Calyptorhynchus latirostris</i> - Carnaby's cockatoo	EN	Y	N/A	6.14	20924	Y
<i>Bertmainius mysticus</i> - Mystical pygmy trapdoor spider	P2	Y	N/A	0.99	34	Y
<i>Spicospina flammocaerulea</i> - Sunset frog	VU	Y	N/A	7.01	269	N
<i>Hydromys chrysogaster</i> - Water-rat, rakali	P4	Y	N/A	2.64	813	Y
<i>Falsistrellus mackenziei</i> - Western false pipistrelle, western falsistrelle	P4	Y	N/A	2.20	530	N

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

C.5. Land degradation risk table

Risk categories	Hazelvale Subsystem (254WhHA)
Wind erosion	10-30% of map unit has a high to extreme water erosion risk
Water erosion	50-70% of map unit has a high to extreme wind erosion risk
Salinity	<3% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	<70% of map unit has a high risk of subsurface acidification
Flood risk	10-30% of the map unit has a moderate to high flood risk
Water logging	30-50% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	50-70% of map unit has a high to extreme phosphorus export risk

Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
<p><u>Principle (a):</u> "Native vegetation should not be cleared if it comprises a high level of biodiversity."</p> <p><u>Assessment:</u> The area proposed to be cleared contains habitat for locally significant flora, and fauna.</p>	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<p><u>Principle (b):</u> "Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."</p> <p><u>Assessment:</u> The area proposed to be cleared contains suitable habitat for conservation significant fauna species.</p>	May be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (c):</u> "Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."</p> <p><u>Assessment:</u> The area proposed to be cleared may contain habitat for flora species listed as threatened under the BC Act.</p>	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<p><u>Principle (d):</u> "Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community."</p> <p><u>Assessment:</u> The area proposed to be cleared does not contain species that can indicate a threatened ecological community listed under the Biodiversity Conservation Act 2016 or <i>Environment Protection and Biodiversity Conservation Act 1999</i></p>	Not likely to be at variance	No
Environmental value: significant remnant vegetation and conservation areas		
<p><u>Principle (e):</u> "Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."</p> <p><u>Assessment:</u> The extent of the mapped vegetation type and the native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia (Commonwealth of Australia, 2001; Government of Western Australia, 2019). The local area contains over 60 per cent of its pre-</p>	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
European extent of native vegetation. Vegetation in the proposed clearing area is not considered to be part of a significant ecological linkage in the local area.		
<p><u>Principle (h):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.”</i></p> <p><u>Assessment:</u> Given the distance to the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of any nearby conservation areas</p>	Not likely to be at variance	No
Environmental value: land and water resources		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u> Given the presence of a watercourse within approximately 15 metres of the application area, and noting the surveyed vegetation types and species, the vegetation is considered to be growing in association with a watercourse.</p>	At variance	Yes <i>Refer to Section 3.2.3, above.</i>
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u> Given a watercourse is recorded within close proximity to the application area and noting the mapped waterlogging risk of the soil type, the proposed clearing may contribute to waterlogging. However, considering the amount of vegetation proposed to be cleared versus what would remain, the proposed clearing is not like to significantly increase waterlogging risk.</p> <p>The mapped soils moderately to highly susceptible to water and wind erosion, nutrient export, and flooding; and a low risk of salinity. Given the end land use, the proposed clearing is not likely to have an appreciable impact on land degradation.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.3, above.</i>
<p><u>Principle (i):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.”</i></p> <p><u>Assessment:</u> Given presence of a watercourse within close proximity to the application area and considering surface water flows and elevations, the proposed clearing may impact surface or ground water quality.</p>	May be at variance	Yes <i>Refer to Section 3.2.3, above.</i>
<p><u>Principle (j):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment:</u> The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.3, above.</i>

Appendix E. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present

in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely degraded	The structure of the vegetation is no longer intact, and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Appendix F. Biological survey information excerpts



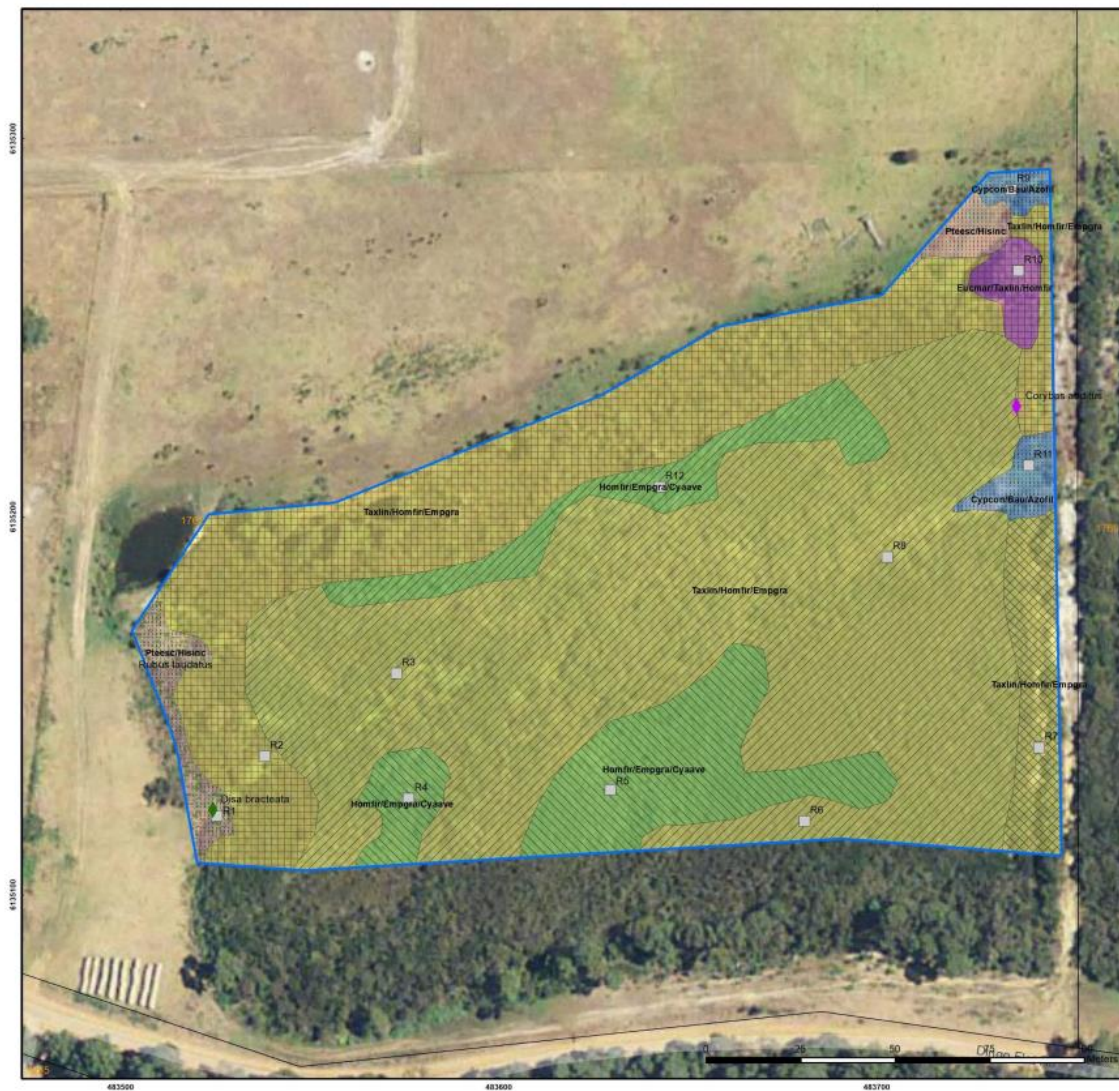
Figure 5: Pteridium Thicket (Bio Diverse Solutions, 2020a)



Figure 6: Tall Taxandria Shrubland (Bio Diverse Solutions, 2020a)



Figure 7: Peatland (Bio Diverse Solutions, 2020a)



29 Hercules Crescent
Albany, WA 6330
Australia
Tel: 08 9842 1575
Fax: 08 9842 1575

Overview Map Scale 1:100,000

Legend

- Survey Area
- Cadastral
- Relieve
- Rubus laudatus* (Declared Pest)

Flora Point

- ◆ *Corybas abdatus* (P3)
- ◆ *Disa bracteata* (Declared Pest)

Vegetation Condition

- Degraded
- Excellent
- Good
- Pristine
- Very Good

Vegetation Mapping

- Eucmar/Taxlin/Homfir
- Homfir/Empgra/Cyaave
- Pterosc/Hisinc
- Cypcon/Bau/Azofil
- Taxlin/Homfir/Empgra

Scale
1:1,000 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: SLP Virtual Mosaic, WMS Service, Landgate 2016
Cadastral and Contours: Landgate 2016
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Power Research and Development Pty Ltd
Lot 1762 on Plan 203415 Dingo Flats Road
Hazelvale, WA 6333

Map 2: Flora and Vegetation Map

STATUS	FILE	DATE
FINAL	MSC0300	13/10/2020

Figure 8: Map of vegetation type and condition (Bio Diverse Solutions, 2020)



BIO DIVERSE SOLUTIONS
 29 Hercules Crescent
 Albany, WA 6330
 Australia
 Tel: 08 9842 1575
 Fax: 08 9842 1575

Overview Map Scale 1:100,000

Legend

- Survey Area
- Cadastre

Fauna Habitat

- Old Quokka runnels
- Spicospina pools
- Spicospina habitat

Scale
 1:1,000 @ A3
 GDA MGA 94 Zone 50

Data Sources
 Aerial Imagery: SLIP Virtual Mosaic WMS Service, Landgate 2018
 Cadastre and Contours: Landgate 2016
 Overview Map: World Topographic map service, ESRI 2012

CLIENT: Power Research and Development Pty Ltd
 Lot 1762 on Plan 203415 Dingo Flats Road
 Hazlebrae, WA 6333

Map 3: Fauna Habitat Map

STATUS	FILE	DATE
FINAL	MSC0300	13/10/2020

Figure x: Map of fauna habitat (Bio Diverse Solutions, 2020)



Appendix G. Sources of information

G.1. GIS databases

Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

G.2. References

- Applicant (2020a) *Clearing permit application CPS 8842/1*, received 13 March 2020 (DWER Ref: A1876471).
- Applicant (2021a) Proposed area of 25m buffer, received 10 March 2021 (DWER Ref: DWERDT577151)
- Applicant (2021b) *Management plan and memo for CPS 8842/1*, received 28 May 2021 (DWER Ref: A2013689).
- Applicant (2021c) Revised application area of 0.58 hectares, received 8 December 2021 (DWER Ref: A2073403)
- Armstrong, K., J. Woinarksi, and A. A. Burbidge (2017). *Falsistrellus mackenziei* The IUCN Red List of Threatened Species [WWW Document]. Retrieved from <http://www.iucnredlist.org/details/17348/0>
- Bio Diverse Solutions (2020a) *Reconnaissance flora, vegetation and fauna survey report*. Received 27 October DWER ref: DWERDT576709
- Bio Diverse Solutions (2020b) *Response to: DWER Request for further information*. Received 11 December 2020 (DWER ref: DWERDT389930)
- Bowman and Partners Environmental. *Memorandum and topo/hydro analysis*. Received 3 September 2021. DWER ref: A2041401
- Burbidge, A.A and Roberts, J.D (2002) *Sunset Frog Recover Plan July 2001- June 2006*. Available at: https://www.dpaw.wa.gov.au/images/documents/plants-animals/threatened-species/recovery_plans/sunsetfrog_recovery_plan_35.pdf#:~:text=The%20Objective%20of%20the%20Sunset%20Frog%20Recovery%20Plan,IUCN%20%281994%2C%202000%29%20Red%20List%20criteria%20for%20Vulnerable.
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