LEVEL CROSSING REMOVAL PROJECT

Cars waiting at the Calder Park Drive level crossing

Calder Park Drive and Holden Road

Publication of Finalised Documentation under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)

July 2024

VICTORIA'S BIG BUILD

AECOM GHD JOINT VENTURE

LEVEL CROSSING REMOVAL PROJECT

000 - Multiple Sites
Offset Management Strategy - Calder Park Drive and Holden Road, Calder Park

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1. Introduction

1.1 Background

The AECOM-GHD Joint Venture (AECOM-GHD JV) is engaged by the Level Crossing Removal Project (LXRP) to provide specialist planning and environmental advice for the Calder Park Drive and Holden Road Level Crossing Removal Project (the Project). An existing conditions assessment was completed (AECOM-GHD JV 2023a) that informed the development of the design for the Project. Subsequently a construction footprint was determined, enabling the specific impacts associated with the Project to be assessed. An impact assessment report was prepared (AECOM-GHD JV 2023b) to identify impacts to ecological values based on the Project's construction footprint and to advise on the implications of any required approvals and/or in relation to referrals and approval requirements likely to be required under relevant State and Commonwealth environmental legislation.

The proposed action was referred to the Australian Government Minister for Environment and determined to be likely to have a significant impact on listed threatened species and communities (sections 18 and 18A) protected under Part 3 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 19 September 2023 (EPBC 2023/09569).

It was determined that the proposed action will be assessed by Preliminary Documentation. A request for additional information (RFI) for assessment by Preliminary Documentation was issued by the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW). The RFI included a requirement to provide an Offset Management Strategy outlining an offset to compensate for a significant residual impact on a Matter of National Environmental Significance (MNES) listed under the EPBC Act: Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* (critically endangered).

The EPBC Act offset for the Project will be achieved via a third party offset on land owned by another party (a native vegetation credit owner). Third party offset sites are established by the landowner via a security agreement registered on the land title that runs in perpetuity.

1.2 Spiny Rice-flower species profile

Spiny Rice-flower (SRF) is a small shrub that grows between 5-30 cm in height (DEWHA 2009). Flowering typically occurs between April and August, producing small white, cream or yellow flowers (Flora of Victoria 2017). It is most commonly found in grasslands and occasionally in grassy woodlands and open shrublands (DEWHA 2009). Habitat suitable for SRF is associated with Kangaroo Grass *Themeda triandra*, Wallaby Grass *Rytidosperma* spp. and Spear Grass *Austrostipa* spp. (DEWHA 2009). The location of SRF is often associated with EVC 132 Plains Grassland and the EPBC Act-listed ecological community Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP). An image of SRF in flower is provided in Figure 1.

Some of the key threating processes for SRF is degradation, modification, and fragmentation of habitat through native vegetation removal, inappropriate fire regimes, weed invasion, agricultural practices and excessive grazing (DEWHA 2009).

Figure 1 Spiny Rice-flower *Pimelea spinescens subsp. spinescens* (critically endangered)

1.3 EPBC Act Offset Requirements

Offsets are measures that compensate for the residual adverse impacts of an action on the environment. Offsets are only required if residual impacts on a protected MNES are significant and assessed under the EPBC Act. It has been determined that offsets are required due to unavoidable removal of eight individuals of SRF to enable the Project to be developed.

Works within the construction footprint will remove a cluster of eight SRF individuals in the Calder Park Drive roadside. The impacts have been assessed against the EPBC Act significant impact criteria and the loss of eight SRF individuals constitutes a significant impact on the species (DEWHA 2009; DCCEEW 2022).

Residual impacts on SRF will therefore need to be compensated for in accordance with the *EPBC Act Environmental Offsets Policy* (DSEWPaC 2012a). It is the expectation of this policy that a minimum of 90% of the offsets proposed for an impact are comprised of direct offsets. Direct offsets are those actions that provide a measurable and immediate conservation gain for impacts on a MNES and most projects can provide a direct offset that will satisfy 100% of the offset requirement (DSEWPaC 2012a).

1.4 Purpose

The purpose of this Offset Management Strategy is to:

- Describe the offset strategy that will compensate for a significant impact on SRF, including proposed offsets, the offset site and offset alignment with EPBC Act *Environmental Offsets Policy* (Section 2)
- Describe offset implementation, management and responsibilities (Section 3)
- Respond to the minimum requirements for a draft Offset Management Strategy outlined in the RFI (Section 4)

2. Offset Strategy

Offsets can be delivered by a range of mechanisms, including market-based mechanisms and contracting third party providers. LXRP proposes to use an existing offset parcel protected under a Section 69 Agreement to conserve and bolster a SRF population by improving management and rehabilitation of SRF individuals and habitat in the offset parcel, thereby gaining conservation benefit.

This Offset Management Strategy (OMS) for the Project has been prepared in accordance with the *EPBC Act Environmental Offsets Policy* (DSEWPAC 2012b). This OMS demonstrates that identified additional management measures will provide additional conservation gain to SRF and compensate for the loss of eight individual SRF due to Project residual impacts. Offset suitability is determined by applying the requirements outlined in *Section 7* of the *Policy* and using the offsets assessment guide to calculate the adequacy of the proposed offsets.

Matters to be considered at the offset site include:

- Extent to which the proposed offset actions correlate to, and adequately compensate for, the impacts on the attributes for the protected matter
- Conservation gain to be achieved by the offset. This may be through positive management activities that improve the viability of the protected matter or averting the future loss, degradation or damage of the protected matter.
- Current land tenure of the offset and the proposed method of securing and managing the offset for the life of the impact
- Time it will take to achieve the proposed conservation gain
- Level of certainty that the proposed offset will be successful. In the case of uncertainty, such as using a previously untested conservation technique, a greater variety and/or quantity of offsets may be required to minimise risk.
- Location suitability of the offset site. In most cases this will be as close to the impact site as possible. However, if it can be shown that a greater conservation benefit for the impacted protected matter can be achieved by providing an offset further away, then this will be considered (pg. 15, DSEWPAC 2012b).

2.1 Offset requirements

EPBC Act offsets for SRF were estimated using the EPBC Act offset assessment guide (offset calculator) with reference to the *How to use the offset assessment guide* (DCCEEW n.d.).

Offset for the loss of eight individuals of SRF from an area in the Calder Park Drive roadside will be achieved based on 'number of individuals' as the protected matter attribute in the calculator. This attribute can be selected for the Project as the number of individuals to be lost is known.

An offset of 64 individuals is required to compensate for the loss of eight individuals and provide >100% impact offset over 10 years (Table 1). Consequently, an offset site has been identified that currently supports a minimum of 40 individual SRF plants. A summary and details of the offset calculator is provided in Appendix A.

Table 1 Number of individuals entered in the Offset Assessment Guide Calculations for Spiny Rice-flower (SRF)

Offset assessment guide attribute	Number of individuals	Justification
Impact – total quantum of impact	8	Eight individuals in the construction footprint.
Offset – Time horizon	10 years	Existing number of individuals is expected to be increased over a 10-year active management schedule that would be part of an Offset Area Management Plan (OAMP).
Offset – Start value	40	40 individuals are proposed to be in the initial offset to account for the loss of 8 individuals within the construction footprint.
Offset – Future value without offset	40	Assumed population will remain at approximate current number since Spiny Rice-flowers are estimated to live up to 100 years with a generation time of 50 to 80 years (Mueck 2000; TSSC 2016). Consequently, a population of 40 individuals is highly likely to survive 10 years, without losses due to stochastic events caused by climate change. It is possible that losses due to stochastic events has already occurred. The SRF population appears to have decreased at the offset site from 2016-2022. A count of the numbers quoted for each spatial location in the provided maps (see Appendix B) results in 422 individuals in 2016 and 342 in 2022. The survey methodology, effort and timing are unknown and therefore it is impossible to determine the relative (i.e. to survey effort or true) number of individuals at the site. Consequently, the calculated offsets are based on no loss of adult individuals given their lifespan and legal protection (e.g. fences). Nevertheless, the National Recovery Plan for SRF (DCCEEW 2024) recognises climate change as a primary threat to the long-term viability of SRF populations across its entire range through the increased frequency and duration of reduced rainfall. This has major consequences for SRF and increases the risk of plant mortality through drought stress, reduced reproductive output, and declines to pollinator populations. This has led to climate change being considered likely, to have a catastrophic consequence on local populations through an increased risk of local extinctions. Considering the increasing extinction threat to individual populations, given the high likelihood of more extreme conditions, the survival of local populations is put in doubt without intensive site management to improve mature plant survival and reproductive potential (seed output and recruitment survival) (TSSC 2016; DCCEEW 2024). It is anticipated that Victoria will experience increased frequency and intensity of droughts, fires and species diversity declines generally (IPCC 2023, CSIRO 2024). A site that supports a population of SRF that is simply protected but not improved or managed specifically for SRF and is likely to be subject to the ongoing influence of stochastic pressures is likely to result in a decline in the population. Additionally, populations can experience significant declines over short periods of time, particularly following drought (TSSC 2016).

Offset assessment guide attribute	Number of individuals	Justification
Offset – Future value with offset	64	A net-gain in the number of individuals is assumed as a conservative future value if the offset is managed in accordance with an OAMP tailored to manage specific threats to SRF individuals and the local population. The OMS will provide specific and quantifiable gains to the local population of SRF through supplementary and enhancement planting and additional maintenance of 200 SRF individuals into the local population. Low recruitment rates experienced by SRF is acknowledged in significant impact guidelines and Conservation Advice for SRF (DEWHA 2009; TSSC 2016). Seed germination appears to be limited and most populations consist of relatively old individuals (McCraw 2014). SRF is considered to have episodic germination and extremely low recruitment survival through summer (Reynolds 2013, DELWP 2021). This lack of seed germination and recruitment survival suggests that the number of individuals at most sites is decreasing (DEWHA 2009). Recruitment level measured by number of seedlings surviving the first summer at sites on the Victorian Volcanic Plains was 14% (Reynolds 2013). The provision of supplemental planting, increased management for plantings and recruits and habitat management specific to OMS requirements (e.g. biomass management including fire, hand weeding, supplemental watering) will increase the number of individuals at the site, provide enhanced site conditions for SRF recruitment and increase the survival rates of planted and recruiting individuals
Offset - Confidence in result	80%	Confidence is high given an offset site has been carefully chosen to ensure success of the proposed offset, e.g., there is evidence of the landholder's capability to manage threats to the population and potentially to newly planted seedlings. Confidence has been set at 80% to account for the specific offset site being already covered by a Section 69 Agreement, however, as survivorship of seedlings can vary (30-70%) it is best to allow for a low survivorship scenario and a very large 'margin of error'. Spiny Rice-flowers are estimated to live to up to 100 years with a generation time of 50 to 80 years (Mueck 2000; TSSC 2016). Consequently, a population of 40 individuals is highly likely to survive 10 years, without losses due to stochastic events caused by climate change. However, planting 200 seedlings at a survival rate 30-70% should allow for an additional 24 plants to survive to meet the calculated gains (e.g. 200 seedlings at 30% = 60 at 80% confidence = 48 plants). The gain has been set at 24 to allow for 50% losses due to stochastic events.
Percentage of impact offset	**124.31%**	

2.2 Proposed conservation gain to offsets

LXRP proposes to use an existing offset parcel protected under a Section 69 Agreement (the proposed LXRP offset site). The management actions under the Section 69 Agreement do not explicitly address management of SRF, but it is considered that the broader goal of improving native vegetation would likely have benefited the local SRF population. The existing Section 69 Agreement management actions are:

- Erecting and maintaining fencing to exclude threats around the site boundary
- Eliminating new, emerging woody weeds and ensuring herbaceous weeds do not increase beyond current levels, including control and monitoring where required
- Monitoring and controlling rabbits, foxes and other pest animals
- Supplemental planting with canopy species
- Habitat condition monitoring
- Annual reporting

Additional management measures will be required to achieve conservation gain for the proposed LXRP offset site (Table 2), rather than traditional 'averted loss' benefits. These additional measures are proposed to apply to the SRF population within the proposed offset site boundary only and are outlined in Table 2, with key measures summarised below.

The SRF population would be improved by planting at least 200 seedlings from seed collected in-situ and from other northern populations, which would be at minimum an increase in the offset from 40 individuals to 64 individuals. This is calculated using a very conservative approach, using the lowest survivorship from studies and a high loss due to stochastic events (e.g. drought, fire, grazing). If 200 seedlings are planted, with a survival rate of 30% equates to 60 individuals surviving (Reynolds 2013, PsRT 2013), with a confidence of 80% this results in 48 plants. Without significant management of the offset site generally (i.e., more than existing) and specific management of the planted and recruiting (if identified) populations, it is anticipated that half could be lost to extreme fire, drought, grazing and other stochastic events. Consequently, the very conservative gain would be to increase the population from 40 to 64 individuals. There are still many unknown factors surrounding SRF reproductive biology and survival and this also supports the use of conservative survival percentages and a confidence of 80%.

The existing offset site has significant potential for improvement through additional management measures targeted towards increasing survivorship of the enhancement planting from 30% to 70% and decreasing the loss from 50% due to, for example, climate change and may increase the population to over 120 individuals. Additional management measures outlined in Table 2 and are separated into additional management measures for the supplementary plantings and additional management measures to increase the habitat value for SRF individuals and enhance recruitment potential. Additional measures for the management of enhancement plantings include:

- Planting of tubestock from seed collected from the study site and/or from northern populations and localised site selection for planted SRF individuals.
- Recipient site preparation including weed management and watering.
- Marking of all planted individuals for ongoing monitoring for survival and potential recruitment.
- Supplementary watering following planting until rainfall produces persistent moist soil conditions.

- Supplementary watering through the first and potentially second summers following planting. It is anticipated that Victoria will experience increased frequency and intensity of droughts (IPCC 2023, CSIRO 2024). Drought and climate change are threats to the survival of the species (DCCEEW 2022). *In situ* germinants require soil moisture. Cropper (2009) found above average rainfall in winter, spring and summer key to germinant survival in the Victorian Volcanic Plains.
- Ongoing monthly monitoring of planted individuals for the first six months and every two months for the subsequent 12 months.

Additional habitat management measures for SRF include:

- Biomass reduction and/or management. Biomass management is a key threat minimisation technique suggested for SRF by Reynolds (2013), Foreman (2005, 2011) and DCCEEW (2024), with all recommending the use of low intensity, frequent fires to reduce biomass, increase germination, increase indigenous species diversity and increase soil nutrients. Productivity sites City of Melton (2019) have successfully used burns every two to three years to manage a SRF population on their land. Infrequent, cool burns may also benefit Swift Parrot habitat by preventing larger, uncontrolled fires (Stojanovic et al. 2016), and would not negatively impact (in the long-term) on other threatened species on site. Fire regimes will be tailored to the site conditions and are likely to be less frequently required for this lower productivity site (every 4-5 years).
- Additional weed management. Currently weeds are managed by spot spraying, however this can accidentally kill/harm non-target species, particularly small recruits including SRF. Hand weeding will be undertaken around SRF individuals within the offset site boundary.
- Supplemental monitoring and watering of all individuals during dry periods and prolonged drought conditions.
- Select areas of rabbit-proof fencing could prevent access to SRF and important habitat by rabbits and other feral animals (e.g., hares, feral goats; Table 2). Baiting is outlined as a control method for rabbits and hares and although it does state that carcasses will be removed to prevent predator poisoning, there is still a possibility of predators feeding upon poisoned carcasses. Poisoned carcasses and chemicals can be transferred to other trophic levels, enter waterways and contaminate soil, thereby decreasing ecological functions needed to support SRF.
- Supplemental planting of non-canopy flora species would benefit the SRF population. SRF is an inter-tussock species and may benefit from the planting of complimentary understorey species. Reynolds (2013) determined that SRF germinants are positively associated with habitat species diversity. The existing offset parcel is Grey Box (*Eucalyptus microcarpa*) Grassy Woodland that can have an understorey of grasses, forbs and herbs.

Table 2 Potential additional measures to increase conservation benefit of the offset site and Spiny Rice-flower regional population

Measure	Description	Rationale	Anticipated Benefit
Direct benefit			
Planting and additional management of at least 200 seedlings	Use of nursery stock to enhance the existing population including additional management of the planted SRF	Reynolds (2013) and PsRT (2013) highlight that seedlings produced from seeds can have a survival of 30-70% 3-4 years later and translocated plants can successfully produce seed given habitat is managed to reduce threats. Planting of tubestock from seed collected from the study site and/or from northern populations and localised site selection for planted SRF individuals. Recipient site preparation including weed management and watering. Marking of all planted individuals for ongoing monitoring for survival and potential recruitment. Supplementary watering following planting until rainfall produces persistent moist soil conditions. Supplementary watering through the first and potentially second summers following planting. Ongoing monthly monitoring of planted individuals for the first six months and every two months for the subsequent 12 months.	200 seedlings at a survival rate 30% = 60 at 80% confidence = 48 plants, allowing for 50% loss = 24. The gain has been set at 24 to allow for losses due to stochastic events.
Habitat management to increase survivorship of population (and new seedlings) at offset site			
Biomass management	SRF requires a certain level of biomass Reduce/manage biomass, fire preferred largely through use of a 'cool burn' (Indigenous management technique)	Inappropriate fire regime is a threat to the survival of the species (DCCEEW 2022). Reynolds (2013) found mortality of plants highest in areas of low bare soil coverage and negatively associated with amount of organic litter. Reynolds (2013) and Foreman (2005, 2011) found many mature non-flowering individuals at sites with no biomass reduction. Reynolds (2013) suggests that fire might be a superior method to reduce biomass. Low frequency of fires allows biomass growth and inhibits SRF growth. Foreman (2011) found that increased fire frequency was positively associated with increased number of indigenous species in SRF habitat. Fire as biomass control can also lead to an increase in weed cover, additional weed management around SRF post burns should also be conducted.	Managing biomass will increase survivorship of existing and new plants. Biomass is not actively managed at the site. This may reduce the loss from 50% (which in this context is 48 plants to 24) and increase the overall gain of SRF. Introducing an appropriate fire regime to the offset site will increase the recruitment potential for SRF.

Measure	Description	Rationale	Anticipated Benefit
		Frequent low intensity burning can also reduce the likelihood of larger uncontrolled fires. It may be that late summer burns are most effective prior to and during the flowering and seed-set period (March-November) to avoid 'wiping out' the reproductive potential of that year (Regan et al. 2021). Biomass accumulation rates are likely to be lower than in grasslands further south so fire frequency is likely to be less compared with Grasslands and is more likely to be required every 4-5 years (Foreman 2005, DCCEEW 2024).	
Soil moisture monitoring and supplemental watering	Increased monitoring during dry periods for soil moisture	Drought and climate change are threats to the survival of the species (DCCEEW 2022). *In situ* germinants require soil moisture particularly through summer months. Cropper (2009) found above average rainfall in winter, spring and summer key to germinant survival in the Victorian Volcanic Plains. Foreman (2006) suggests that SRF recruitment success in northern populations (including the proposed offset site) is more closely linked to local rainfall events. Increased and prolonged drought conditions is linked to a reduction in recruitment potential for SRF (including a reduction in viable seed production) for mature individuals and increased risk of individual plant mortality (DCCEEW 2024). Watering also promotes weed growth, so watering should occur in conjunction with additional weed control measures (hand pulling around the SRF).	Planted individuals will need supplemental watering, however, this is usually limited to months/year post planting. Therefore, continued monitoring and supplementary watering should minimise the effects of drought given the high likelihood of increased severity and frequency of dry conditions. Thereby, increasing long-term survivorship of newly planted and recruited SRF. This may reduce the loss from 50% (which in this context is 48 plants to 24 plants) and increase the overall gain of SRF. Supplementary watering for mature individuals through prolonged drought conditions will reduce the risk of plant mortality and increase recruitment potential at the offset site.
Additional surveys for *in-situ* SRF recruitment	Annual surveys in mid-winter	Annual recruitment survival is low for SRF (14% Reynolds 2013), early identification and marking of recruits can allow for additional management measures to be targeted to any identified recruits.	Increasing long-term survivorship of newly recruited SRF, such as additional watering and biomass reduction.
Rabbit-proof fencing	Fence SRF plants, especially newly planted seedlings and translocated adults	A key threat to SRF are rabbits and other introduced herbivores (DCCEEW 2022). Rabbit-proof fencing could reduce grazing in conjunction with pest species management already at site. For example, Moseby and Read (2006) found that 115-180 cm high wire netting fence with foot apron and curved 'floppy' overhang was effective in containing most rabbits, feral cats and foxes and 30 mm hexagonal netting to reduce access by young, small rabbits.	Grazing is a threat to SRF, minimising grazing will increase survivorship (>30%).

Measure	Description	Rationale	Anticipated Benefit
		Monitoring and maintenance of the rabbit-proof fence will need to occur regularly. Noting potential impacts to native fauna, rabbit-proof fencing could be used in specific areas around SRF. A temporary fence could be investigated for broader areas if rabbits and predators are a major problem limiting SRF.	
Planting of other indigenous species	Increase flora species diversity surrounding SRF plants	Reynolds (2013) determined that SRF germinants positively associated with habitat species diversity. Increased diversity would also increase diversity of pollinators that are essential for SRF. Existing management measures do not focus on increasing ground-cover flora species diversity.	Low flora species diversity (especially ground and shrub cover) is a threat to SRF survivorship. Increasing species diversity will increase SRF recruitment potential at the offset site
Additional conservation measures			
Fire ecology	Investigate efficacy of fire	A research project based on different fire frequencies and germination rates aligns with action 1.6 of the recovery plan (DCCEEW 2024). There are some unknowns around appropriate fire frequency for northern SRF populations.	Increase efficacy of fire regime at offset site and habitat quality, thereby increasing survivorship of SRF population.
Seed collection	Seed collection to add to nursery stock genetic diversity	Increasing diversity in a captive population would increase protections against stochastic events (e.g. disease, drought). The captive population may then be used for reintroduction to the wild if necessary. Thomas (2008) outlines the protocol for collecting seed. Seed collection would add to the genetic diversity of nursery stock.	Use nursery stock to supplement offset site and regional population.
Population surveys	Investigate landscape SRF population dynamics	SRF population dynamics is still little understood. For example, the sex or age ratio that is required for a viable population.	Increasing knowledge of population dynamics will improve the efficacy of measures on the offset site. For example, how many males : females should be planted to increase recruitment potential.
New population establishment	Investigate surrounding areas in landscape for new SRF population establishment	Species need to be conserved over a landscape to enable appropriate genetic diversity and protections against stochastic events. Populations can no longer be managed in isolation. Investigate additional plantings of SRF on surrounding properties that would bolster protections for offset site population.	Ensuring a healthy landscape population would further enhance the survival of the offset site population.

2.3 Alignment with EPBC Act Environmental Offsets Policy

The proposed offsets will be delivered through a third-party provider and will align with the requirements of the EPBC Act Environmental Offset Policy (Table 3).

Table 3 EPBC Act Environmental Offset Policy requirements in Section 7 of Policy

Section No.	Offset Requirement	Justification
7.1	Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter	It is calculated that the planting of 200 seedlings could, at a minimum, provide a gain from 40 to 64 individuals, or a 124.31% impact of offset. If additional measures successfully increase survivorship this could be as much as an increase to 120 individuals, which would equate to 414.36% impact of offset.
7.2	Suitable offsets must be built around direct offsets but may include other compensatory measures	100% direct offset is achieved by this offset strategy (Table 1).
7.2.1	Tenure for direct offsets	The offset will involve improving the population size, management and conservation gain of existing protected habitat. Although the habitat is protected under a Section 69 Agreement, it could be managed/rehabilitated to provide a much greater conservation benefit than is currently projected. The existing Section 69 Agreement was executed on [redacted] and has been under continual management since then with the goal of improving native vegetation. Although the existing Section 69 Agreement does not explicitly address management of SRF, the broader goal of improving native vegetation would have benefited the local SRF population.
7.2.1	Impacting on existing EPBC Act offsets	An offset has been identified that does not affect an existing EPBC Act offset but plans to improve other offsets at the site (i.e. SRF, Swift Parrot).
7.3	Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter	Offset calculator factors in the conservation value (critically endangered) of the protected matter.
	Suitable offset must be of a size and scale proportionate to the residual impacts on the protected matter	The proposed offset meets the requirements for residual impact of direct loss of eight SRF individuals. It is calculated that the planting of 200 seedlings could, at a minimum, provide a gain from 40 to 64 individuals, or a 124.31% impact of offset.

Section No.	Offset Requirement	Justification
	Suitable offsets must effectively account for and manage the risks of the offset not succeeding	The offset will be achieved through direct offsets acquitted through an on-title conservation agreement and implementation of an OAMP. This arrangement presents a low risk that the offset will not succeed and is more likely to result in a conservation gain. However, gains via individual seedling survivorship has been calculated using a very conservative approach, with a very large error margin. If additional measures successfully increase survivorship there could be as much as an increase to 120 individuals, which would equate to 414.36% impact of offset.
7.6	Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs	It is calculated that the planting and additional management of 200 seedlings could, at a minimum, provide a gain from 40 to 64 individuals, or a 124.31% impact of offset. If additional measures successfully increase survivorship this could be as much as an increase to 120 individuals, which would equate to 414.36% impact of offset.
7.6.1	Links with state and territory approval processes	State offsets are not required for the removal of SRF in this instance as the plants do not occur in an area of native vegetation. Native vegetation requires offset in accordance with the Victorian Native Vegetation Removal Regulations and will be achieved for removal of native vegetation associated with the Project as required.
7.7	Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable	Additional management measures (Table 2) consider significantly increasing the local population and reducing threats to the SRF outlined in its Recovery Plan (DCCEEW 2022). Not all threats present at the offset site outlined in the existing Section 69 Agreement have been adequately addressed and relevant scientific literature by experts in SRF have been referenced in detail (e.g. Reynolds 2013)
7.8	Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced	The OAMP will include the requirement for the land manager to submit a report annually to DEECA and DCCEEW on the success of the offset implementation.

2.4 Proposed LXRP offset site and broader offset parcel

This section describes the vegetation present within the proposed LXRP offset site and broader offset parcel. Details provided are based on data provided by [redacted].

2.4.1 Site location and context

The proposed LXRP offset site for SRF for the Project is approximately [redacted]. The proposed LXRP offset site is located within a larger offset parcel that is protected under agreement with the Secretary to the Department of Environment, Land, Water and Planning (DELWP) under section 69 of the *Conservation, Forests and Lands Act 1987*.

[redacted]

Figure 2 shows the proposed LXRP offset site including:

- Land subject to existing Section 69 Agreement (blue boundary)
- Ecological vegetation class mapping
- Land that has provided offsets for Swift Parrot (purple boundary)
- [redacted]
- Existing SRF plant locations (white hatching)
- Land proposed to provide SRF offsets for the Project (light green hatching)

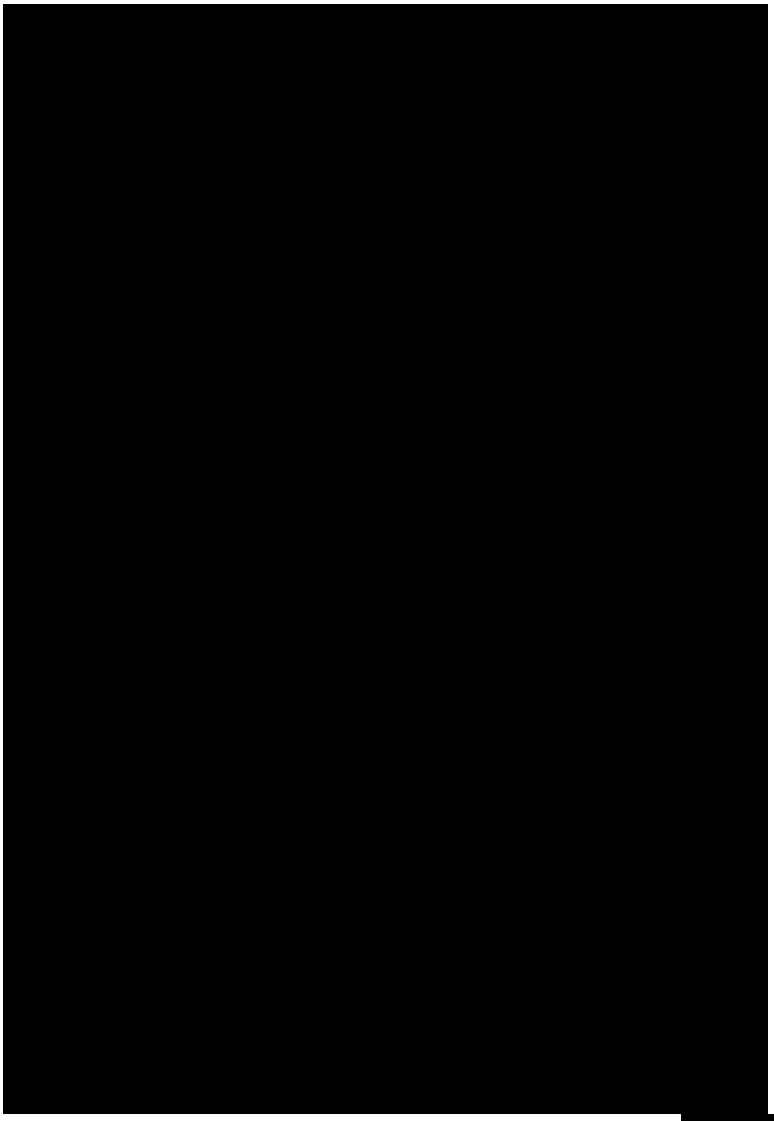

Figure 2 Proposed Offset Site (Source: based on data provided by)

2.4.2 Vegetation

The broader offset site (blue boundary line Figure 2) has been assessed as containing a mosaic of EVC 882_61 Shallow Sandy Woodlands and EVC 283 Plains Sedgy Woodland. The area is dominated by Yellow Box *Eucalyptus melliodora* and Grey Box *Eucalyptus microcarpa*, with a canopy contiguous with adjoining habitats. Understory species cover is sparse, but there is a high leaf litter biomass.

Understory species that are present include Cranberry Heath *Styphelia humifusa*, Common Eutaxia *Eutaxia microphylla var. microphylla*, Golden Wattle *Acacia pycnantha* and Fuzzy New Holland Daisy *Vittadinia cuneata.* Weed cover is variable, but most recently estimated to be high at 39% cover in the , with Spear Thistle *Cirsium vulgare* recorded as a high threat weed (AJM Joint Venture 2022).

2.5 Spiny Rice-flower surveys

No surveys for SRF have been undertaken at the proposed LXRP offset site by LXRP. However, surveys in 2016 and 2022 successfully located SRF, and it is therefore assumed that SRF will also be present throughout the remainder of the proposed LXRP offset site given the environment is homogenous.

Surveys will be conducted before offsets are secured.

2.6 Offset site quality

The portion of the proposed LXRP offset site assessed for the [redacted] has been described as containing an overstory of Yellow Gum *Eucalyptus leucoxlyon* and Grey Box *Eucalyptus microcarpa*. The understory and ground layer are relatively sparse, providing suitable habitat structure for the natural recruitment and germination of SRF. These habitat conditions are expected to similarly extend throughout the entire offset parcel. LXRP will ground-truth the suitability of the entire site for SRF prior to finalising an Offset Area Management Plan (OAMP).

2.7 Ongoing threats to Spiny Rice-flower

[redacted] Key threats specific to this site are:

- Grazing: There is evidence of European Rabbits grazing the SRF and they cause significant soil degradation due to their extensive warrens
- Weed Invasion: Weed cover across the [redacted] site is variable and may outcompete or smother SRF
- Biomass: High leaf litter biomass in the [redacted] site may reduce available recruitment space for SRF

It is expected that these threats will be similar across the entire offset parcel, given the immediate proximity. Therefore, grazing, weed invasion and biomass threats will require additional management to ensure the survival success of the offset SRF.

3. Implementation

3.1 Responsibility

LXRP will be responsible for preparing an Offset Area Management Plan (OAMP) based on this Offset Strategy and development of measurable criteria as agreed with DCCEEW and the manager of the proposed offset site.

The broader offset parcel ([redacted]) existing landowner agreement was established on [redacted]. The on-title Section 69 Agreement ([redacted]) will be amended to ensure that the landowner can successfully comply with measures outlined in this strategy. The landowner has shown successful delivery of MNES conservation and management from site establishment in [redacted]. Annual reports have documented the compliance and successful deliverance of management actions from Year 1 to Year 4 under the existing landowner agreement.

3.2 Funding

LXRP is responsible for providing funding to the manager of the proposed LXRP offset site for the management and monitoring of the offset site for the agreed period.

3.3 Offset Area Management Plan

Once this OMS is accepted, an OAMP will be prepared according to DCCEEW's *Environmental Management Plan Guidelines* (2004) and in consultation with the manager of the proposed offset site. The OAMP will outline specific, measurable environmental outcomes that detail the nature of the conservation gain to be achieved for SRF. The OAMP will be prepared to the satisfaction of DCCEEW. The OAMP will detail implementation including timeframes, monitoring, reporting and other relevant actions.

4. Response to Requirements for a Draft Offset Management Strategy

This Offset Management Strategy responds to the minimum requirements for a draft Offset Management Strategy outlined in the RFI, as described in Table 4.

Table 4 Response to minimum requirements for a draft Offset Management Strategy

Requirement	Description	Response
B1.1	Specific details of the nature of the conservation gain to be achieved for relevant MNES, including the creation, restoration and revegetation of habitat in the proposed offset area/s.	Included at Section 2. It is calculated that the planting of 200 seedlings could, at a minimum, provide a gain from 40 to 64 individuals, or a 124.31% impact of offset. Given the success of additional measures, an increase in survivorship could be as much as 120 individuals, which would equate to 414.36% impact of offset.
B1.2	Details of the environmental offset/s (in hectares) to compensate for the residual significant impacts of the proposed action on relevant MNES.	As per Section 2, the environmental offset for residual significant impacts has been calculated based on the number of individuals. It is calculated that the planting of 200 seedlings could, at a minimum, provide a gain from 40 to 64 individuals, or a 124.31% impact of offset. Given the success of additional measures, an increase in survivorship could be as much as 120 individuals, which would equate to 414.36% impact of offset.
B1.3	Details of the potential offset area/s (including a map) to compensate for the residual significant impacts of the proposed action on relevant MNES.	As per Section 2, the Project has identified a suitable offset site in consultation with a native vegetation offset broker and will secure the offset site prior to commencement of works.
B1.4	The methodology, with justification and supporting evidence, used to inform the inputs of the Offsets Assessment Guide in relation to the Project site for each relevant MNES, including: • total area of habitat (in hectares); and • habitat quality	See Section 2, more specifically 2.1. An offset of 64 individuals is required to compensate for the loss of eight individuals and provide >100% impact offset over 10 years is required to compensate for the loss of eight individuals.
B1.5	Details, with supporting evidence, of how the environmental offset/s meets the requirements of the department's EPBC Act Environmental Offsets Policy (2012) (Offsets Policy), available at: www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy.	See Section 2.3. Table 3 outlines how the strategy aligns with section 7 of EPBC Act *Environmental Offset Policy* requirements.

Requirement	Description	Response
B1.6	The methodology, with justification and supporting evidence, used to inform the inputs of the Offsets Assessment Guide in relation to each potential offset area/s for each relevant MNES, including: • time over which loss is averted (max. 20 years); • time until ecological benefit; and • confidence in result (%).	See Section 2. It is calculated that the planting of 200 seedlings could, at a minimum, provide a gain from 40 to 64 individuals, or a 124.31% impact of offset. Given the success of additional measures, an increase in survivorship could be as much as 120 individuals, which would equate to 414.36% impact of offset.
B1.7	Evidence that the relevant MNES, and/or their habitat, can be present in the potential offset area/s.	As per Section 2, the proposed LXRP offset site has been surveyed by the landowner and SRF individuals identified in Figure 2.
B1.8	Information about how the potential offset area/s provides connectivity with other relevant habitats and biodiversity corridors.	As per Section 2, the proposed LXRP offset site has been surveyed by the landowner and SRF individuals identified in Figure 2. The broader offset parcel is within a landscape that is a mosaic of nature reserves and agriculture. [redacted]
B1.9	Details and execution timing of the mechanism to legally secure the environmental offset/s (under Tasmanian legislation or equivalent) to provide enduring protection for the potential offset area/s against development incompatible with conservation.	As per Section 2, the offset will be secured via an amendment of the existing Section 69 Agreement ([redacted]).

5. Summary

Construction of the Calder Park Drive and Holden Road Level Crossing Removal Project (the Project) will remove a cluster of eight Spiny Rice-flower individuals from the Calder Park Drive roadside that are located in the construction footprint for the Project. Loss of eight Spiny Rice-flower individuals constitutes a significant impact on the species under the EPBC Act (DEWHA 2009; DCCEEW 2022).

An offset of a conservative 64 Spiny Rice-flower individuals will be provided by the Project to compensate for the loss of the eight individuals and provide a conservation gain for the species. The Project has identified an offset site that will provide this required conservation gain by adding to the population, extending management of the offsets, biomass management, pest control and habitat rehabilitation. An Offset Area Management Plan will be prepared in consultation with the manager of the proposed offset site and to the satisfaction of DCCEEW.

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Appendices

Appendix A – Offset Assessment Guide (Offset Calculator)

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	6.8%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	No		Area			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	Yes		8		Count	

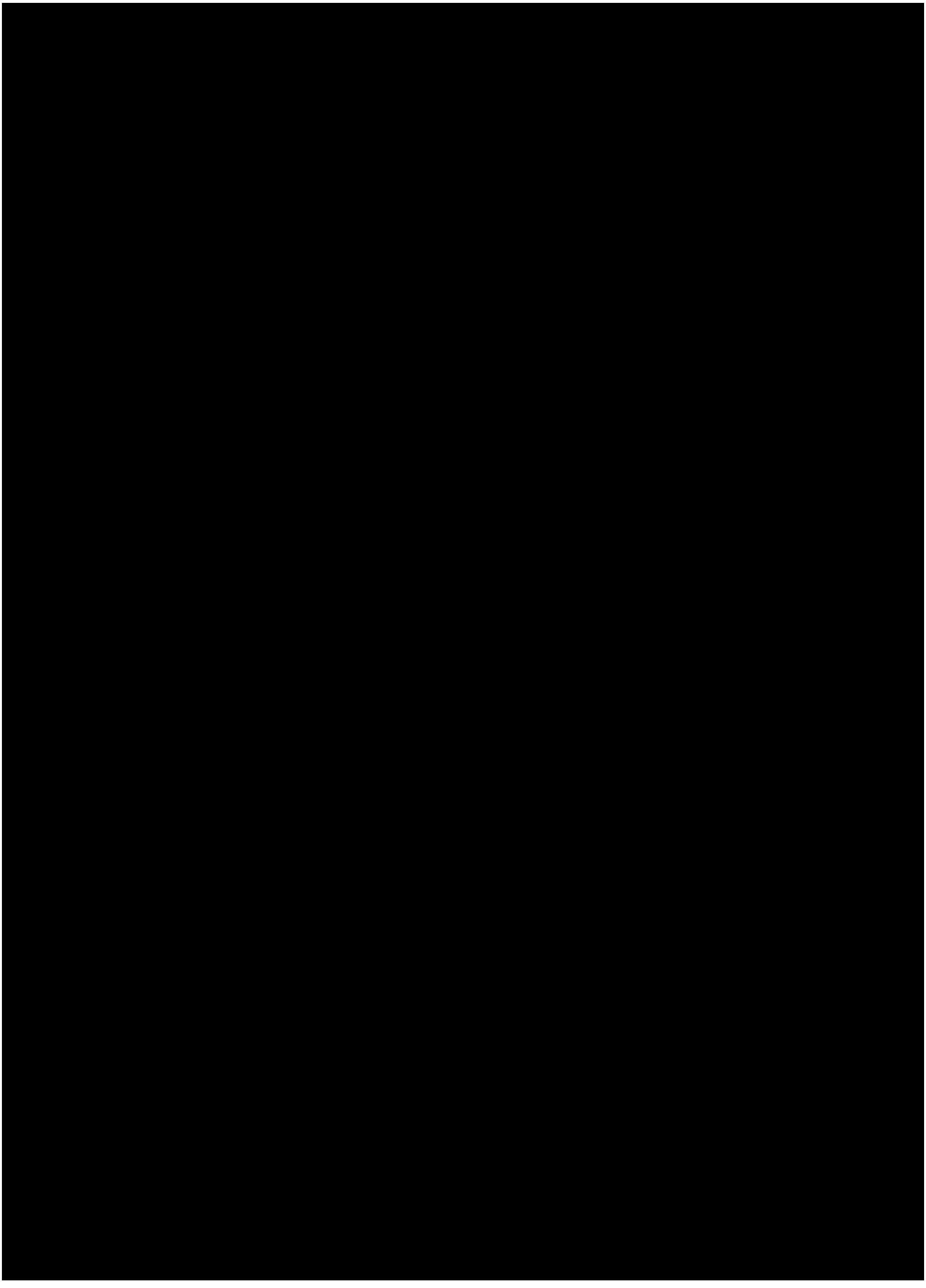
Offset calculator

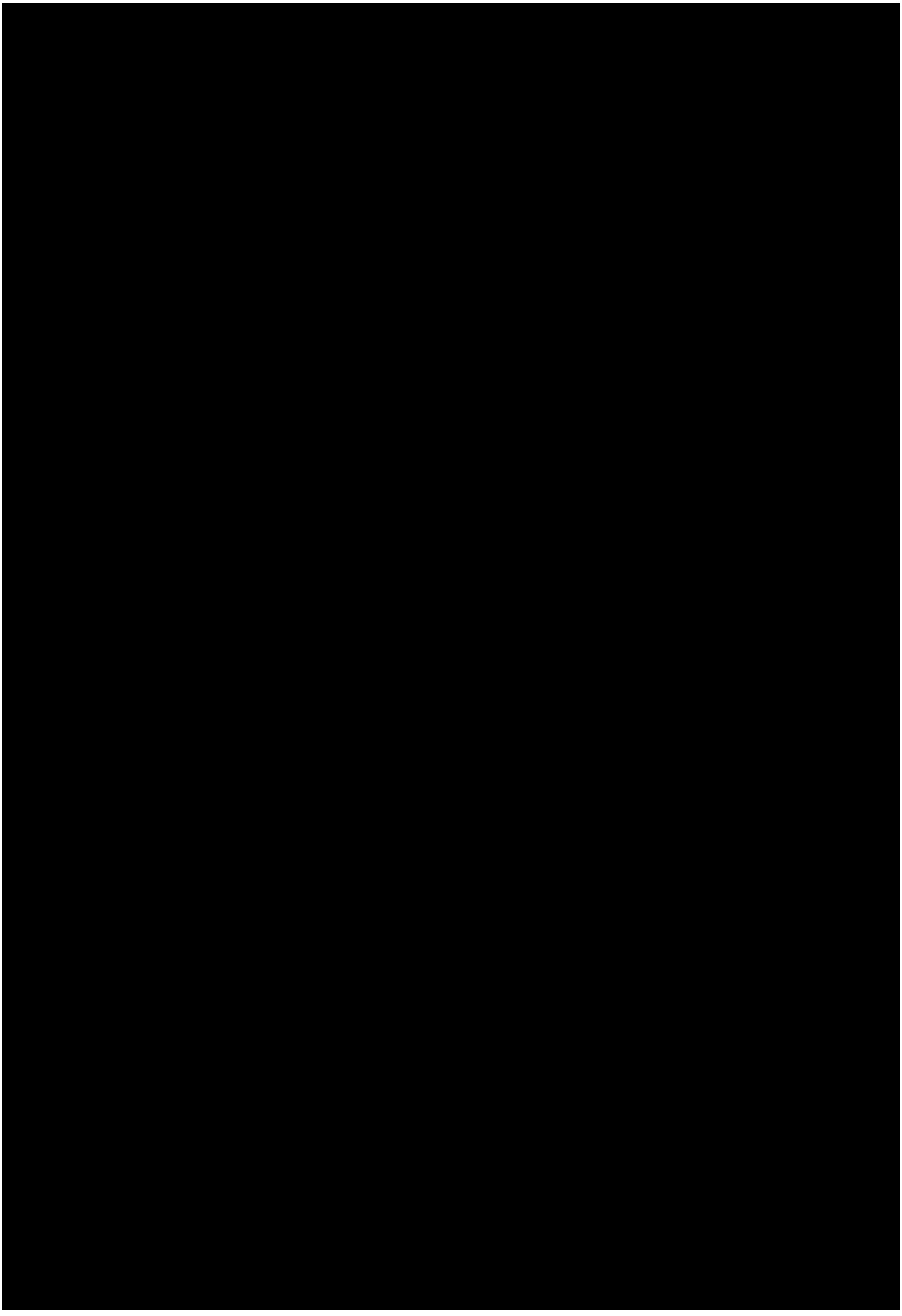
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality	Future area and quality without offset	Future area and quality with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																
Area of community	No				Risk-related time horizon (max. 20 years)	Start area (hectares)	Risk of loss (%) without offset	Risk of loss (%) with offset								
							Future area without offset (adjusted hectares) 0.0	Future area with offset (adjusted hectares) 0.0								
					Time until ecological benefit	Start quality (scale of 0-10)	Future quality without offset (scale of 0-10)	Future quality with offset (scale of 0-10)								
Threatened species habitat																
Area of habitat	No				Time over which loss is averted (max. 20 years)	Start area (hectares)	Risk of loss (%) without offset	Risk of loss (%) with offset								
							Future area without offset (adjusted hectares) 0.0	Future area with offset (adjusted hectares) 0.0								
					Time until ecological benefit	Start quality (scale of 0-10)	Future quality without offset (scale of 0-10)	Future quality with offset (scale of 0-10)								
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**	**Start value**	**Future value without offset**	**Future value with offset**	**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No															
Condition of habitat Change in habitat condition, but no change in extent	No															
Threatened species																
Birth rate e.g. Change in nest success	No															
Mortality rate e.g Change in number of road kills per year	No															
Number of individuals e.g. Individual plants/animals	Yes	8	Count	40	10	40	40	64	24	80%	19.20	9.94	124.31%	Yes		

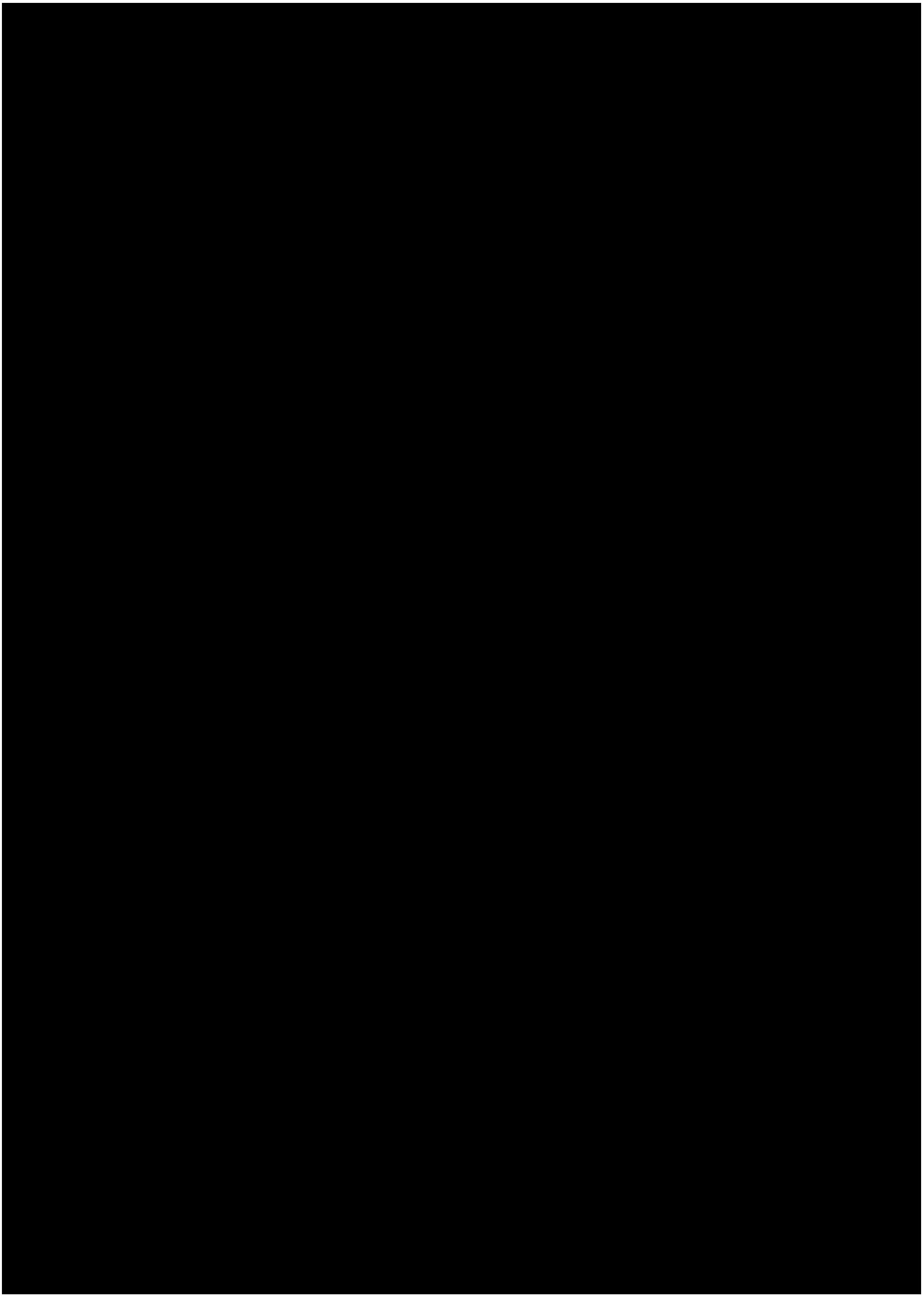
Summary

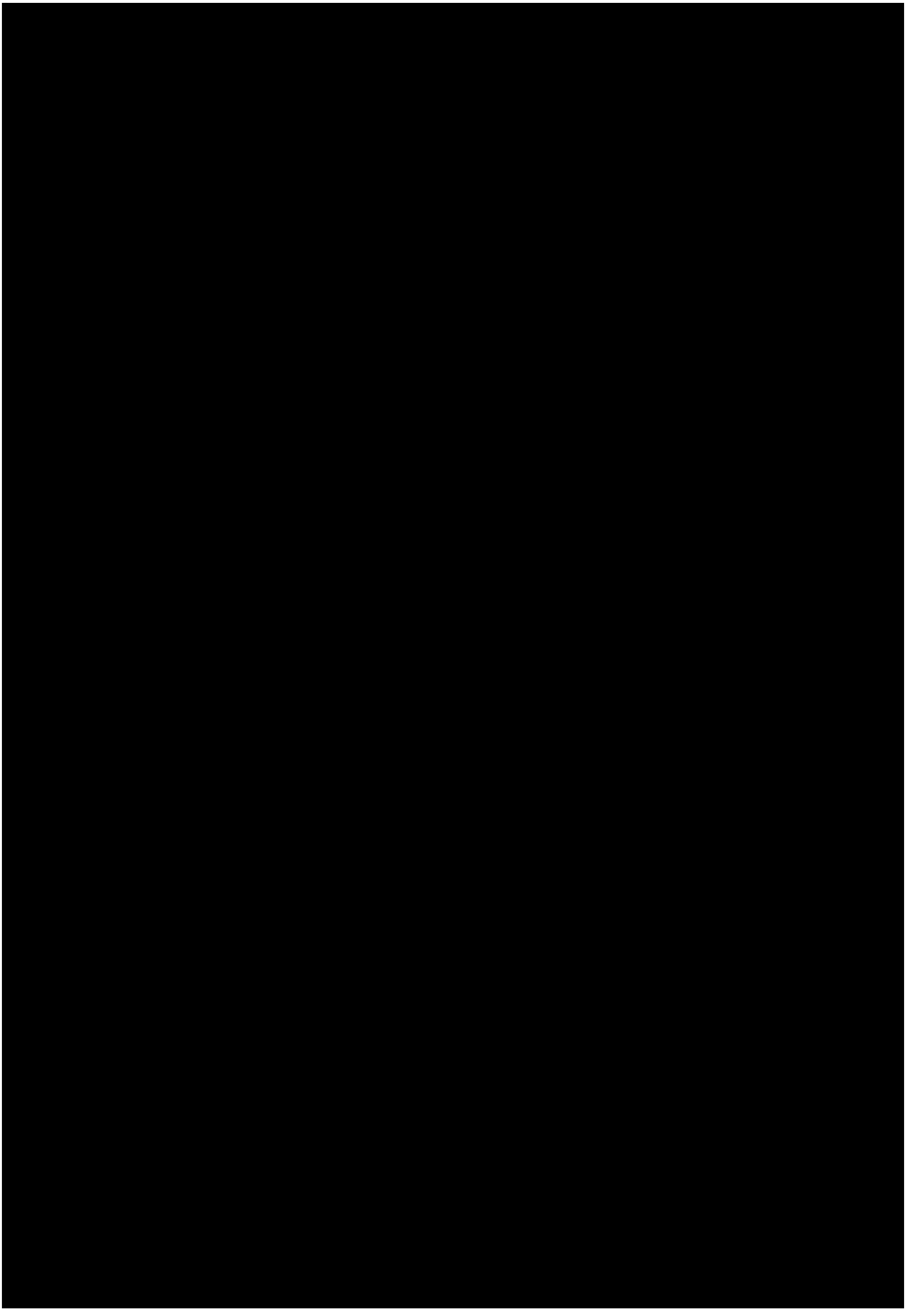
Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	8	9.94	124.31%	Yes	$0.00	N/A	$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	0				$0.00		$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Appendix B – Spiny Rice-flower Survey Results









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