

4 October 2018

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**MEDOWIE CHRISTIAN SCHOOL - FLORA AND FAUNA ASSESSMENT
ADDENDUM REPORT**

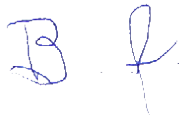
Dear Justin,

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As requested, we have prepared an addendum to the Flora and Fauna Assessment previously prepared for the Medowie Christian School site at 6B Waropara Road, Medowie, NSW, to assess additional biodiversity impacts of a new Development Application for the site. Our addendum report is attached to this letter and consists of the following:

- **Appendix A** – Flora and Fauna Assessment Addendum;
- **Appendix B** – Figures;
- **Appendix C** – Assessments of Significance.

Yours sincerely,



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Appendix A

Medowie Christian School - Flora and Fauna
Assessment - Addendum Report

A.1 Introduction

Cumberland Ecology has been engaged by Medowie Christian School to prepare an addendum Flora and Fauna Assessment (FFA) report for 6B Waropara Road, Medowie, NSW. The property assessed within this Flora and Fauna Assessment consists of Lot 22 in DP1036306, and is hereafter referred to as “the Study Area” (**Figure 1, Appendix B**). The biodiversity values of the Study Area were assessed for a previous Flora and Fauna Assessment (15121RP1) prepared by Cumberland Ecology in February 2016 for a Development Application (DA) for a new administration building within the school grounds. The administration building has now been constructed.

This addendum report has been prepared to assess the impacts on biodiversity of a new secondary classroom to be constructed to the north of the new administration building. The construction of the new classroom will involve removal of existing buildings and vegetation. The impact area required for the new classroom is hereafter referred to as the “development footprint” (**Figure 1, Appendix B**).

This report considers the potential ecological impacts of the construction of an administration building on the development footprint.

The objectives of this report include:

- To present a review of the results of a previous site survey, photographs provided by SHAC architects, and interpretation of NearMap aerial images to map changes in distribution of the vegetation communities occurring within the Study Area;
- To describe fauna habitats within the development footprint;
- To assess the likelihood that threatened species of flora and fauna, or threatened ecological communities could occur within the development footprint;
- To consider the potential impacts of the proposed development on threatened flora, fauna, and vegetation communities; and
- Where relevant to recommend mitigation measures to reduce the impacts of the development on flora and fauna.

The Study Area is located in the Port Stephens Local Government Area (LGA). This LGA is one of the Interim Designated Areas identified in the *Biodiversity Conservation (Savings and Transition) Regulation 2017* and is not subject to the changes in biodiversity assessment requirements due to the enactment of the *NSW Biodiversity Conservation Act 2016* (BC Act) until 24 November 2018. As such this Flora and Fauna Assessment has been prepared under former planning provisions (i.e. Section 5A of the *NSW Environmental Planning and Assessment Act 1979* and the *Threatened Species Conservation Act 1995* (TSC Act)).

A.2 Methods

Surveys for flora and fauna species and vegetation community mapping were undertaken across the entirety of the Study Area on the 5th September 2015 for a Flora and Fauna Assessment that was prepared to support a DA for the construction of an Administration Building. Survey methods are described in the FFA 15121RP1 (Cumberland Ecology 2016).

As the new project assessed in this addendum report includes the demolition and construction of a new building in a part of the Study Area devoid of remnant or regrowth native vegetation, a site inspection was not undertaken. The previous site surveys were comprehensive and were undertaken within the last five years and are therefore considered to be adequate for the purposes of this assessment.

Vegetation mapping of the Study Area has been updated based on recent aerial photography (NearMap images) interpretation aided by recent photographs of the development footprint provided by SHAC. Vegetation communities present in the development footprint were used to determine the likelihood of occurrence of threatened flora and fauna species and impacts to threatened entities.

A.3 Results

A.3.1 Vegetation Communities

The vegetation occurring within the overall Study Area was mapped during field work for the FFA in 2015. Vegetation mapping was updated in 2018 to reflect changes due to removal of vegetation under a previous DA and the planting of additional garden beds in the time since the 2015 survey (**Figure 2, Appendix B**). A total of five vegetation communities were mapped on the site during the 2015 surveys. Of these, two are present in the new development footprint.

The vegetation communities occurring within the new development footprint are described below.

i. Exotic Grassland

BC Act Status: Not listed

EPBC Act Status: Not listed

Exotic grassland within the school grounds was noted in 2015 as predominately comprised of *Stenotaphrum secundatum* (Buffalo Grass), with *Cenchrus clandestinum* (Kikuyu), and *Cynodon dactylon* (Couch) present in some areas. Common exotic weed species were present in these areas including *Trifolium repens* (White Clover), *Veronica arvensis* (Wall Speedwell), *Plantago lanceolata* (Lamb's Tongues), *Richardia stellaris* (Lawn Madder), and *Hypochaeris radicata* (Flatweed).

Species identifiable from photos provided by SHAC architects comprising grasslands in the development footprint include *Cenchrus clandestinus*, *Cynodon dactylon* and *Paspalum dilatatum*.



Photograph 1 **Exotic grassland within the development footprint (east)**



Photograph 2 **Exotic grassland within the development footprint (west)**

ii. *Garden Vegetation*

BC Act Status: Not listed

EPBC Act Status: Not listed

This community is present in the south-west of the development and consists of a mulched, planted garden bed. Species include native cultivars and exotic species. Species identifiable in photos provided by SHAC architects include native plantings of *Lomandra longifolia* “Tanika”, *Cupaniopsis anacardioides* (Tuckeroo), and a cultivar of *Westringia fruticosa* (Coastal Rosemary). Exotic species present include a *Gazania* species.



Photograph 3 **Garden Vegetation in development footprint (south)**

A.3.2 *Threatened Ecological Communities*

No threatened ecological communities occur within the development footprint. The Endangered Ecological Community (EEC) Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions listed under the BC Act occurs in the north-east of the Study Area. This is mapped as Forest Red Gum/ Red Mahogany Swamp Sclerophyll Forest in **Figure 2, Appendix B**.

A.3.3 *Threatened Flora Species*

No threatened flora species were recorded within the Study Area in 2015 during the site survey. No habitat is present within the current development footprint for threatened flora species as the entire area consists of planted vegetation within a landscaped garden bed and mown exotic lawns. Accordingly it is considered that no threatened flora species are likely to occur in the development footprint.

A.3.4 Threatened Fauna Species

The FFA (15121RP1) described twenty-eight threatened species as previously having been recorded as occurring within the locality. Of these, nine species (**Table 1**) are considered to have some likelihood of utilising the current development footprint.

Two threatened fauna species considered within the 2015 FFA as having potential habitat within the footprint of the previous development, the Koala (*Phascolarctos cinereus*) and the Little Lorikeet (*Glossopsitta pusilla*) are not considered to have habitat within the current development footprint due to the lack of any eucalypt trees.

Table 1 Threatened fauna species potentially occurring within the development footprint

Scientific Name	Common Name	BC Act Status	EPBC Act Status
<i>Lophoictinia isura</i>	Square-tailed Kite	V	-
<i>Ninox strenua</i>	Powerful Owl	V	-
<i>Tyto novaehollandiae</i>	Masked Owl	V	-
<i>Petaurus norfolcensis</i>	Squirrel Glider	V	-
<i>Pteropus poliocephalus</i>	Grey-headed Flying Fox	V	V
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	V	-
<i>Miniopterus australis</i>	Little Bentwing-bat	V	-
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V	-
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	V	-

iii. Threatened Birds

The following threatened bird species have some potential forage across garden vegetation, and open grassland areas, within the development footprint:

- *Lophoictinia isura* - Square-tailed Kite (Vulnerable - TSC Act);
- *Ninox strenua* - Powerful Owl (Vulnerable - TSC Act); and
- *Tyto novaehollandiae* - Masked Owl (Vulnerable - TSC Act).

All of these species have some potential to forage in the Study Area, although no nesting/breeding habitat is present for the Masked Owl or Powerful Owl due to the lack of suitably large hollows, and the lack of watercourses, which the Square-tailed Kite nests adjacent to. The Square-tailed Kite and the two owls if present may forage across the school grounds on occasion, and potentially the development footprint. These species would only utilise the

development footprint as part of a much larger foraging range. The core foraging habitat for these species within the Study Area is located within the bushland in the east.

iv. *Grey-headed Flying Fox*

The Grey-headed Flying Fox (*Pteropus poliocephalus*) is listed as Vulnerable under both the TSC Act and the EPBC Act. It commonly forages in degraded areas, including urban gardens, feeding on the nectar of flowering plants and therefore has potential to utilise garden plants within the development footprint for foraging. However most of the habitat within the Study Area for this species is located within the bushland in the east. No roosting/breeding camps are present within the Study Area, and no suitable trees for roosting are present in the development footprint. Individuals in the locality would only utilise the development footprint as part of a much larger foraging range.

v. *Microchiropteran Bat Species*

Four threatened microchiropteran bat species known to occur in the locality have potential to utilise the development footprint, though only as part of a larger foraging range. No roosting or breeding habitat is present within the development footprint due to the lack of trees, the lack of entry points to existing building roof spaces, and the lack of tree hollows. Threatened microchiropteran bat species that may utilise the development footprint for foraging purposes include the following:

- *Mormopterus norfolkensis* (Eastern Freetail-bat) (Vulnerable - TSC Act);
- *Miniopterus australis* (Little Bentwing-bat) (Vulnerable - TSC Act);
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) (Vulnerable - TSC Act); and
- *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat) (Vulnerable - TSC Act).

Higher quality foraging habitat for all of these species is present within the bushland in the east of the Study Area, outside of the development footprint, and roosting habitat is present in the form of small and medium sized tree hollows in this area. Existing buildings within the development footprint do not contain access points for entry by microchiropteran bats to provide roosting habitat.

vi. *Squirrel Glider*

The Squirrel Glider (*Petaurus norfolcensis*) is listed as Vulnerable under the TSC Act. It has the potential to utilise trees within the Study Area for foraging, though only as part of a larger foraging range. The species requires areas with large trees with abundant hollows, within vegetation patches with abundant hollows for nesting. There are no suitable large trees with abundant hollows in the Study Area for nesting, and hollows are scarce. No trees are present in the development footprint which means it is highly unlikely this species would make significant use of this area for foraging. This species is likely to use the Study Area and possibly the development footprint only as foraging habitat as part of a much larger foraging range. It is a mobile species that accesses resources from across areas of 3 – 9 ha in size and would not

depend upon resources (shrubs of poorly suited native species only) contained in the development footprint for survival.

Foraging habitat for this species is in much better condition within the bushland in the east of the Study Area, outside of the development footprint.

A.4 Impact Assessment

A.4.1 Vegetation Communities

The vegetation within the development footprint is comprised of a total of 0.017 ha of non-native vegetation, comprised of a garden and lawns (**Figure 3, Appendix B**). The total impacts of the construction of the new building on vegetation communities are detailed below in **Table 2**.

Table 2 Areas of vegetation communities within the Study Area and development footprint

Vegetation Community	Study Area (ha)	Development Footprint(ha)
Forest Red Gum/ Red Mahogany Swamp Sclerophyll Forest	0.58	-
Blackbutt/ Red Bloodwood/ Scribbly Gum/ Smooth-barked Apple Open Forest	1.03	-
Blackbutt/ Red Bloodwood/ Scribbly Gum/ Smooth-barked Apple Open Forest - Canopy Only	0.10	-
Garden Vegetation	0.17	0.005
Exotic Grassland	0.89	0.012
Total	2.77	0.017

The proposed additional clearing for the new classroom is considered to be minor, and will not result in impacts any native vegetation communities or remnant or regrowth natives plants. The construction of an additional school building mostly positioned primarily in the location of an existing building does not result in any additional impacts to flora and fauna species than that noted within the FFA for a previous DA within the Study Area. It exacerbates the impact of vegetation clearance assessed previously, though not to native vegetation communities. No threatened flora species are likely to be impacted by proposed building construction as none were recorded as present within the Study Area or development footprint, and the development footprint does not provide suitable habitat.

A.4.2 Fauna Species

No threatened fauna species were recorded within the development footprint in 2015, and no habitat features for threatened fauna species were recorded in this area (**Figure 3, Appendix B**). As a result of the proposed 0.017 ha of vegetation clearance on the site, particularly removal

of planted native shrubs, a very minor area of potential foraging habitat will be removed for common, native fauna species, such as birds like the Noisy Minor (*Manorina melanocephala*), and potentially for some threatened fauna species which may utilise the site as part of a larger foraging range.

Nine threatened fauna species that have been recorded from the locality have potential to occur in the development footprint and Study Area; the Powerful owl, the Square-tailed Kite, the Masked Owl, the Grey-headed Flying Fox, and four microchiropteran bat species.

The development footprint contains planted garden and lawn vegetation only, which provides minimal habitat for these species. No roosting, or nesting habitat for any of these species is present within the development footprint, due to a lack of trees and if they occur, they are only likely to use the development footprint as foraging habitat as part of a larger foraging range. Large areas of bushland will remain in the locality that provide more suitable habitat for threatened fauna species. Within the Study Area alone, intact native vegetation to remain following the proposed development, providing far greater habitat values than the development footprint, consists of 0.58 ha of Forest Red Gum/ Red Mahogany Forest, an EEC, and 1.03 ha of Blackbutt/ Red Bloodwood/ Scribbly Gum/ Smooth-barked Apple Open Forest.

An Assessment of Significance has been prepared for each threatened fauna species (**Appendix C**) that has potential to utilise the development footprint. These indicate a significant impact is not expected to occur to any of the threatened species with potential habitat within the development footprint. The area of clearing is minor, no areas of native vegetation communities are to be cleared, and the area of habitat that will be removed is not expected to impact on these species.

A.5 Recommended Mitigation Measures

The impacts to flora and fauna values within the Study Area are considered minimal given the degraded and completely modified nature of the vegetation within the development footprint. The development footprint does not encroach on the remnant vegetation in the north east of the Study Area, which provides better quality resources for threatened and non-threatened species, nor on remnant trees on the fringes of the school grounds.

Despite this, it is recommended that a number of measures are implemented to minimise impacts to flora and fauna values, including:

- Use of suitable runoff, sedimentation, erosion and pollution controls during construction;
- Clear demarcation of vegetation to be removed to avoid any unnecessary vegetation removal; and
- Use of locally occurring native species within landscape design, which may provide potential habitat for native fauna species such as birds and reptiles;

It is recommended that flora species to be planted in landscaped areas of the site, should be those that offer some foraging resources for local fauna species, such as nectivorous birds.

A.6 Conclusion

The Study Area was surveyed by Cumberland Ecology in detail in 2015, and the results of that survey are documented in the FFA for the site (Cumberland Ecology 2016). The development footprint for the construction of a new classroom occurs mostly in the location of an existing building with no ecological values, and adjacent areas within the footprint have very little ecological value as they are comprised of artificial vegetation communities consisting of lawns and garden plantings. A small area of potential, sub-optimal foraging habitat will be removed for some native fauna species, potentially including threatened fauna species, however areas of habitat to be removed are very minor in the context of the locality including habitats elsewhere within the Study Area which will be retained.

No significant impact is expected to occur to any threatened flora or fauna species or ecological communities. A Species Impact Statement or referral to the Commonwealth Department of the Environment and Energy is not required.

A.7 References

Cumberland Ecology (2016). Flora and Fauna Assessment - Medowie Christian School. Prepared for Medowie Christian School. Epping, NSW.

DEC (NSW) (2006). Recovery Plan for the Large Forest Owls: Powerful Owl *Ninox strenua*; Sooty Owl *Tyto tenebricosa*; Masked Owl *Tyto novaehollandiae*. Hurstville, Department of Environment and Conservation (NSW).

DECCW (2009). Draft National Recovery Plan for the Grey-headed Flying-fox *Pteropus poliocephalus*. Sydney, NSW, Department of Environment, Climate Change and Water.

OEH (2018). Eastern Bentwing-bat - profile. Hurstville, Office of Environment and Heritage.

OEH (2018). Eastern False Pipistrelle – Profile, Hurtsville, NSW Office of Environment and Heritage.

OEH (2018). Eastern Freetail-bat - Profile. Hurstville, NSW Office of the Environment and Heritage.

OEH (2018). Little Bentwing-bat - Profile. Hurtsville, NSW Office of the Environment and Heritage.

OEH (2018). Masked Owl - profile, NSW Office of the Environment and Heritage, Hurtsville.

OEH (2018). Powerful Owl - profile. Hurstville, Office of Environment and Heritage.

OEH (2018). Square-tailed Kite - Profile. Hurstville, Office of Environment and Heritage.

OEH (2018). Squirrel Glider - profile. Hurstville, Office of Environment and Heritage.

Appendix B

Figures



Legend

-  Development Footprint
-  Study Area

Image Source:
Image © NearMap2018
Dated: 9/9/2018

Coordinate System: MGA Zone 56 (GDA 94)



cumberland
ecology

0 50 100 m

Figure 1. Location of the Development Footprint and Study Area

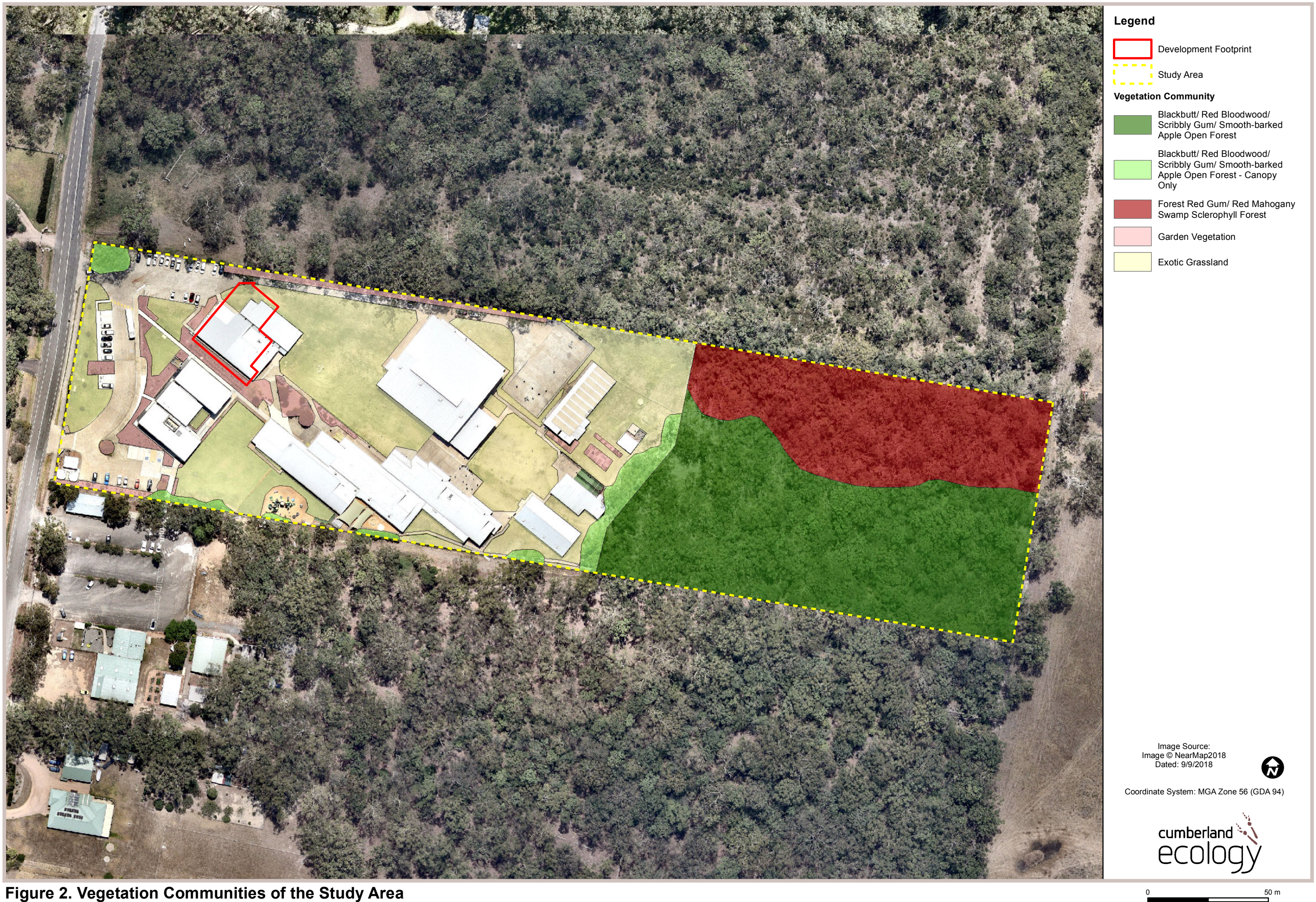


Figure 2. Vegetation Communities of the Study Area



Figure 3. Impact Area of the Proposed Development

Appendix C

Assessments of Significance

C.1 Large Forest Owls

The following species have been determined as having some likelihood of utilising the development footprint as a small part of a larger foraging range and have been assessed together.

- Masked Owl (*Tyto novaehollandiae*); and
- Powerful Owl (*Ninox strenua*).

The Masked Owl is distributed across much of Victoria and New South Wales and occurs with Queensland and South Australia. The species occupies dry sclerophyll forests and woodlands from sea level to an elevation of 1100 m. The species resides within forests but often hunts along the edges of forests, including along roadsides. It roosts and breeds in moist eucalypt forests using large tree hollows, and on occasion, caves. The species is listed as Vulnerable under the TSC Act (OEH 2018).

The Powerful Owl is distributed from Mackay to south western Victoria, mainly on the coastal side of the Great Dividing Range. This species occurs in many vegetation types from woodland and open sclerophyll to tall open wet forest and rainforest. It requires large tracts of native vegetation but can survive in fragmented landscapes. It roosts in dense vegetation and nests in large tree hollows. The Powerful Owl is listed as Vulnerable under the TSC Act (OEH 2018).

- (a) *In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*

These species are large owls, generally requiring a dense canopy and shrub layer for foraging and roosting, and large tree hollows for nesting. There are no suitable hollow-bearing trees within the development footprint. These species are likely to use the Study Area and possibly the development footprint only as foraging habitat as part of a much larger foraging range. They are highly mobile species that accesses resources from across a wide area and would not depend upon resources contained on the Study Area for survival. Therefore the proposed development is not likely to place a viable local population of the species at risk of extinction because there is limited foraging and no breeding or roosting habitat present.

- (b) *In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.*

Not applicable.

- (c) *In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*

- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

Not applicable.

(d) *In relation to the habitat of a threatened species, population or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the action proposed, and*
- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.*

Approximately 0.017 ha of potential foraging habitat consisting of exotic grassland and garden vegetation within the Study Area is proposed to be removed with the development footprint. Approximately 2.75 ha of potential habitat will remain within the Study Area, including intact remnant bushland in the east.

As the habitat within the development footprint consists of exotic grassland and planted shrubs and groundcovers only within the grounds of a school, it is therefore fragmented and somewhat isolated from other habitat, and it is not anticipated that further fragmentation or isolation will occur as a result of the proposed development.

Habitat in the development footprint is not important for either owl in the locality as it a small area of suboptimal habitat within a disturbed context. Much larger areas of potential habitat occur within the Study Area and within the locality.

(e) *Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).*

No critical habitat for this species has currently been identified by the Director-General of the OEH.

(f) *Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

A recovery plan has been prepared for large forest owls, including the Powerful Owl and Masked Owl. The ultimate aim of the recovery plan is to ensure that the species it covers persist in the wild in NSW in each region where they presently occur (DEC (NSW) 2006). The

proposed development is not considered to threaten the objectives of that Recovery Plan. No Threat Abatement Plan is relevant for these species.

- (g) *Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process*

The proposed development may potentially impact the Powerful Owl and Masked Owl through the following processes:

- **Clearing of native vegetation** as this directly reduces the abundance of foraging and possible future nesting habitat.

Clearing of native (planted) vegetation will result in removal of a very small area of potential foraging habitat for the species. This is considered insignificant in relation to the amount of potential habitat provided in the wider locality.

Conclusion

Approximately 0.017 ha of potential foraging habitat within the development footprint is proposed to be removed under the proposed development. Approximately 2.75 ha of potential habitat will remain around the boundary of the proposed development. The proposed development is not likely to place a viable local population of either species at risk of extinction because there is limited foraging and no breeding habitat within the development footprint. While the proposed development may potentially impact these species through clearing of vegetation, this will not have a significant impact on the viability of either species or a population of either in the locality.

C.2 Square-tailed Kite

The Square-tailed Kite is listed as Vulnerable under the TSC Act. The Square-tailed Kite is distributed from south-western to northern Australia. The species occupies a wide range of timbered habitats including dry forests and open woodlands. The species shows a strong preference for timbered watercourses. It occupies large hunting ranges of more than 100 km² (OEH 2018).

- (a) *In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*

This species is raptor that specialises in hunting smaller birds, particularly nestlings, from the outer foliage of the tree canopy. It generally requires large trees close to water courses for nesting. There are no suitable large trees within the Study Area for nesting. This species is likely to use the Study Area and possibly the development footprint only as foraging habitat as part of a much larger foraging range. It is a highly mobile species that accesses resources from across a wide area and would not depend upon resources contained on the Study Area or development footprint for survival. Therefore the proposed development is not likely to place a

viable local population of the species at risk of extinction because there is limited foraging and no breeding habitat present.

- (b) *In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.*

Not applicable.

- (c) *In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*

- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

Not applicable.

- (d) *In relation to the habitat of a threatened species, population or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the action proposed, and*
- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.*

Approximately 0.017 ha of potential foraging habitat within the development footprint is proposed to be removed with the development footprint. Approximately 2.75 ha of potential habitat will remain within the Study Area, including intact remnant bushland in the east.

As the habitat within the development footprint consists of exotic grassland and planted vegetation only within the grounds of a school, it is therefore fragmented and somewhat isolated from other habitat, and it is not anticipated that further fragmentation or isolation will occur as a result of the proposed development.

Habitat within the development footprint is not important the species in the locality as it a small area of suboptimal habitat within a disturbed context. Much larger areas of potential habitat occur within the Study Area and within the locality.

- (e) *Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).*

No critical habitat for this species has currently been identified by the Director-General of the OEH.

- (f) *Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

A recovery plan has not been prepared for this species

- (g) *Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process*

The proposed development may potentially impact the Square-tailed Kite through the following processes:

- **Clearing of native vegetation** as this directly reduces the abundance of foraging habitat.

Clearing of native (planted) vegetation will result in removal of a very small area of potential sub-optimum foraging habitat for the species. This is considered insignificant in relation to the amount of potential habitat provided in the wider locality.

Conclusion

Approximately 0.0.17 ha of potential foraging habitat within the development footprint is proposed to be removed. Approximately 2.75 ha of potential habitat will remain within the Study Area. The proposed development is not likely to place a viable local population of the species at risk of extinction because there is limited foraging and no breeding habitat within the development footprint. While the proposed development may potentially impact the species through clearing of native vegetation, this will not have a significant impact on the viability of the species or population in the locality.

C.3 Grey-headed Flying-fox

The Grey-headed Flying-fox is listed as Vulnerable under the TSC Act (NSW Scientific Committee, 2004c) and the EPBC Act. The Grey-headed Flying-fox is distributed along the east coast from Bundaberg in Queensland to Melbourne, Victoria. It occurs as far west as the western slopes of the Great Dividing Range in northern NSW. It occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Grey-headed Flying-foxes migrate according to the availability of native fruits, nectar and pollen. They roost in large “camps” which are generally within 20km of a food source (NSW NPWS, 2001b).

A small area of suitable foraging habitat is present within the development footprint which would be utilised as part of a much larger foraging range. The development footprint does not comprise a breeding camp or contain trees which could support one.

- (a) *In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*

The development footprint does not contain a Grey-headed Flying-fox camp and so only consists of foraging habitat for the species. The species may use garden vegetation within the development footprint as part as foraging habitat as part of a much larger foraging range. Therefore the proposed development is not likely to place a viable local population of the species at risk of extinction because there is very limited foraging and no breeding habitat present.

- (b) *In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.*

Not applicable.

- (c) *In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*

- (iii) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (iv) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

Not applicable.

- (d) *In relation to the habitat of a threatened species, population or ecological community:*

- (iv) *the extent to which habitat is likely to be removed or modified as a result of the action proposed, and*
- (v) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*
- (vi) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.*

Approximately 0.005 ha of potential foraging habitat within the development footprint is proposed to be removed. Approximately 1.87 ha of potential habitat will remain within the Study Area, comprised of forested areas and gardens.

As the habitat within the development footprint consists of planted garden vegetation only within the grounds of a school, it is therefore fragmented and somewhat isolated from other habitat,

and it is not anticipated that further fragmentation or isolation will occur as a result of the proposed development.

Habitat within the development footprint is not important for the Grey-headed Flying-fox in the locality as it a small area of habitat and much larger areas will remain in the Study Area and within the locality.

(e) *Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).*

No critical habitat for this species has currently been identified by the Director-General of the OEH.

(f) *Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

No state recovery plan or threat abatement plan has been prepared for this species.

The National Draft Recovery Plan for the Grey-headed Flying-fox (DECCW 2009) is applicable. The proposed development is not considered to threaten the objectives of that Recovery Plan. No Threat Abatement Plan exists for this species.

(g) *Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process*

The proposed development may potentially impact the Grey-headed Flying-fox through the following processes:

- **Clearing of native vegetation** as this reduces the abundance of foraging habitat.

Clearing of native (planted) vegetation will result in removal of a very small area of potential foraging habitat for the species. This is considered insignificant in relation to the amount of potential habitat provided in the wider locality.

Conclusion

Approximately 0.005 ha of potential foraging habitat within the Study Area is proposed to be removed with the proposed development. Approximately 1.87 ha of potential habitat will remain within the Study Area as gardens and forested areas in the east. The proposed development is not likely to place a viable local population of these species at risk of extinction because there is limited foraging and no breeding camp within the development footprint. While the proposed development may potentially impact this species through clearing of native vegetation, this will not have a significant impact on the viability of this species or the population in the locality.

C.4 Microchiropteran Bats

The following microchiropteran bat species have been identified as having the potential to occur within the Study Area, though due to the lack of trees and may only very occasionally forage

across the development footprint for insects and will be addressed collectively in this assessment of significance:

- Eastern Freetail-bat (*Mormopterus norfolkensis*);
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*);
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*); and
- Little Bentwing-bat (*Miniopterus australis*)

The Eastern Freetail-bat (*Mormopterus norfolkensis*) occurs from southern Queensland to southern NSW, in dry sclerophyll forest and woodland. It roosts in tree hollows and sometimes under bark or in man-made structures. It is listed as Vulnerable under the TSC Act (OEH 2018).

The Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) occurs on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. The species prefers moist habitats with tall trees and roosts in tree hollows, loose bark on trees or in buildings. It is listed as Vulnerable under the TSC Act (OEH 2018).

The Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) occurs along the east and north-west coast of Australia. It roosts in caves, derelict mines, stormwater tunnels, buildings and other man-made structures. It forages above the canopy in forested areas. It is listed as Vulnerable under the TSC Act (OEH 2018).

The Little Bentwing-bat (*Miniopterus australis*) occurs the east coast and ranges of Australia. The species roosts in caves, tunnels, and sometimes tree hollows during the day. It forages for insects, beneath the canopy of densely vegetated habitats. There is 36 records within a 10km radius of the Study Area. It is listed as Vulnerable under the TSC Act (OEH 2018).

- (a) *In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*

The action proposed is not likely to have an adverse effect on the life cycle of these species such that a viable local population is likely to be placed at risk of extinction. The above listed species all have known occurrences within the locality and have the potential to utilise the site for foraging purposes, but only as part of a larger foraging range.

- (b) *In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.*

There are no endangered populations of these microchiropteran bat species listed under the TSC Act.

- (c) *In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*
- (v) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
 - (vi) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

Not applicable.

- (d) *In relation to the habitat of a threatened species, population or ecological community:*
- (vii) *the extent to which habitat is likely to be removed or modified as a result of the action proposed, and*
 - (viii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*
 - (ix) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.*

It is assumed that all vegetation will be removed within the development footprint and this includes 0.017 ha of exotic grassland and garden vegetation, which could provide some foraging habitat.

The habitat within the development footprint is highly modified and does not consist of any remnants or regrowth of a naturally occurring vegetation community. The vegetation within the development footprint is currently isolated generally from native vegetation within the locality as it is located within the grounds of a school, thus, the proposed action will not further fragment or isolate the vegetation of the Study Area

As aforementioned, the habitat in the development footprint has been highly modified and is suboptimal foraging habitat for these species. 2.75 ha of vegetation will remain in the Study Area, including more suitable habitat in the east of the Study Area within the remnant bushland area. The removal of the vegetation within the development footprint is not likely to have an adverse effect on the long-term survival of these species.

- (e) *Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).*

No critical habitat for these species has currently been identified by the Director-General of OEH.

- (f) *Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

No recovery plan has been prepared for these species.

No threat abatement plans are relevant to these species.

- (h) *Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process*

The proposed development may potentially impact these species through the following process:

- **Clearing of native vegetation** as this reduces the abundance of foraging habitat.

Clearing of native (planted) vegetation will result in removal of a very small area of potential foraging habitat for these species. This is considered insignificant in relation to the amount of potential habitat provided in the wider locality.

Conclusion

The development footprint provides a small area of potential foraging habitat for these microchiropteran bat species with no roosting or breeding habitat. Areas within the locality, including within vegetation to be retained within the Study Area containing more suitable foraging and roosting habitat will remain intact. Therefore, the development footprint is unlikely to be important site for their persistence in the local area. No significant impact is expected to occur from the proposed development on these species.

C.5 Squirrel Glider

The Squirrel Glider is listed as Vulnerable under the TSC Act. The Squirrel Glider is distributed from north Queensland to western Victoria. The species occupies a *Eucalyptus* open forests and woodlands with a *Banksia* or *Acacia* shrub layer and requires large trees with abundant hollows (OEH 2018).

- (a) *In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*

This species feeds on nectar, pollen, plant exudates, honeydew, and on occasion small vertebrates such as nestling birds. It requires areas with large trees with abundant hollows for nesting. There are no suitable large trees in the Study Area for nesting. This species is likely to use the Study Area and possibly the development footprint only as foraging habitat as part of a much larger foraging range. It is a mobile species that accesses resources from across areas of 3 – 9 ha in size would not depend upon resources contained in the Study Area for survival. Therefore the proposed development is not likely to place a viable local population of the species at risk of extinction because there is limited foraging and no breeding habitat present. Planted natives within the development footprint do not include *Banksia* or *Acacia* species so the likelihood of the species foraging in garden vegetation is small.

- (b) *In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.*

Not applicable.

- (c) *In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*

- (vii) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (viii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

Not applicable.

- (d) *In relation to the habitat of a threatened species, population or ecological community:*

- (x) *the extent to which habitat is likely to be removed or modified as a result of the action proposed, and*
- (xi) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*
- (xii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.*

Approximately 0.005 ha of potential foraging habitat within the Study Area is proposed to be removed within the development footprint. Approximately 1.87 ha of potential habitat will remain within the Study Area, including intact remnant bushland in the east.

As the habitat within the development footprint consists of a small area of planted shrub sized vegetation only within a garden bed within the grounds of a school, it is therefore fragmented and somewhat isolated from other habitat, and it is not anticipated that further fragmentation or isolation will occur as a result of the proposed development.

Habitat in the development footprint is not important the species in the locality as it a small area of suboptimal habitat within a disturbed context. Much larger areas of potential habitat occur within the Study Area and within the locality.

- (e) *Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).*

No critical habitat for this species has currently been identified by the Director-General of the OEH.

- (f) *Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

A recovery plan has not been prepared for this species.

- (h) *Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process*

The proposed development may potentially impact the Squirrel Glider through the following processes:

- **Clearing of native vegetation** as this directly reduces the abundance of foraging and possible future nesting habitat.

Clearing of native (planted) vegetation will result in removal of a very small area of potential foraging habitat for the species with species not likely to be very suitable for utilisation by the species. This is considered insignificant in relation to the amount of potential habitat provided in the wider locality and remaining within the Study Area.

Conclusion

Approximately 0.005 ha of potential foraging habitat within the Study Area is proposed to be removed within the development footprint. Approximately 1.87 ha of potential habitat will remain within the Study Area. The proposed development is not likely to place a viable local population of the species at risk of extinction because there is limited foraging and no breeding habitat within the development footprint. While the proposed development may potentially impact the species through clearing of native vegetation, this will not have a significant impact on the viability of species or population in the locality.