South Coast Ecology
Ecological consulting and research
Kiah, NSW

30 September 2022

OUR REF: SCE0012

Client name: **87 Oakdale Road, Gateshead**

ATTENTION: Jason Wasiak

RE: **Ecological Assessment Report for Proposed Rezoning of Land and adjacent Public Road at 87 Oakdale Road, Gateshead.**

Dear Jason,

1.0 Introduction

South Coast Ecology was commissioned by JW Planning to undertake field surveys and present a biodiversity assessment report for a proposed rezoning of the above address. This advice is to guide the design and implementation of a planned rezoning, so that appropriate biodiversity and planning outcomes can be established, and the project can avoid, minimize, or mitigate impacts on biodiversity where possible.

Statutes addressed in this report include:

- Biodiversity Conservation Act 2016;
- State Environmental Planning Policy (Koala Habitat); and,
- Environment Protection and Biodiversity Conservation Act 1999.

1.1 The Site

The location of the site and its context is depicted in Figure 1.

The site comprises two (2) areas of land:

a) Lot 87 being land that is heavily disturbed and predominately clear of native vegetation given a history of informal land use ranging from grazing, a dirt bike track, and to the storage of large industrial equipment; and

LEGEND:

- Lot 87 - part of the study area
- Road Verge - part of the study area

(LPI NSW Imagery 2020; NSW Spatial Services 2020)

Prepared by John Paul King
john.paul.king@hotmail.com

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FIGURE 1.0

Description of the Study Area

JOB ADDRESS:	Gateshead, NSW	A3 SCALE:	1:14000
CLIENT:	Oakdale Group	PLAN DATE:	29/01/2022
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b) Oakdale Road to the extent it forms a frontage to Lot 87. Access to the site involves the informal verge of Oakdale Road which, while disturbed, contains native vegetation that is likely to be impacted by future development of the site.

The purpose of this report is to enable an assessment of a proposal to rezone the land to enable future industrial land uses consistent with the adjoining industrial zoned land.

1.2 Methods

Field surveys were undertaken in accordance with guidelines over three seasons during 2021 and early 2022 (See Table 1 for details). Surveys included a series of parallel walking transects (2 meters apart), floristic plots (400m^2), stag watching, diurnal fauna surveys and nocturnal surveys. Data collected included, plant species, fauna species/habitat, nesting and roosting habitats, hollow bearing trees, significant flora species presence/habitat, and community data to determine vegetation types, refer to Figure 1.1.

Table 1. Field Surveys

Date	Flora	Fauna	Plant communities	Habitat	Tree Hollows	Targeted
27/07/2021	2 Hours -Plant survey meanders (2m apart). Habitat descriptions for	2 Hours- Habitat searches, and identification of fauna species, i.e. birds, reptiles and mammals	1 hour- Survey of draft community descriptions.	1 hour- searches for evidence of fauna, scats and scratches	30 Min- Recording of tree hollows onsite	*Diuris praecox* and other rare species surveys.
18/09/2021	3 Hours – BAM Plots	2 hours-Nocturnal surveys of tree hollows usage and marsupial activity.			2 hours-Nocturnal surveys of tree hollows usage and marsupial activity.	*Tetratheca juncea, Diuris praecox* and other rare species surveys
05/10/2021		2 Hours- Habitat searches, and identification of fauna species, i.e. birds, reptiles and mammals				*Tetratheca juncea* and other rare species surveys
12/11/2021		2 Hours- Habitat searches, and identification of fauna species, i.e. birds, reptiles and mammals.			2 hours-Nocturnal surveys of tree hollows usage and marsupial activity and bat activity.	*Tetratheca juncea* and other rare species surveys
31/01/2022	1 hr- Survey of area proposed for clearing in traffic report	2 Hours- Habitat searches, and identification of fauna species, i.e. birds, reptiles and mammals.	1 hour- Completion of final community descriptions.			

LEGEND:

- Walking targeted flora transects
- BAM Plots
- Stag watching transects and nocturnal surveys
- Lot 87 Site Boundary
- Road Verge Site Boundary

(LPI NSW Imagery 2020; NSW Spatial Services 2020)

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FIGURE 1.1

Subject Site Surveys

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2.0 Results

2.1 Background-Identified key habitats in the Local area and relevance to the subject site

The site in on the lower reaches of the conglomerate Adamstown formation that runs up to Dudley Bluff. The local area is well vegetated and includes remnants of high conservation value in Lake Macquarie. These remnants provide significant local population habitats for Squirrel glider, *Tethratheca juncea*, and *Diuris praecox*. The site is highly modified, having been cleared and managed as pasture for a extended period. Notwithstanding, there are small areas of native habitats present onsite and areas of good quality native vegetation in road reserves. Whilst there are only minor habitat opportunities onsite, it's condition and relationship with local biodiversity must be considered in any future development application documents.

Our review of biodiversity data for the local area shows that in addition to habitats for threatened species, populations, communities and their habitats, there are also local ecological issues (often these overlap) requiring special consideration, Refer to Table 2.

Table 2. LGA relevant biological considerations.

Local Area ecological management considerations	Relevance to habitats on the subject site
Squirrel glider local population is known to all remnants in the local matrix and forms part of the Northeast section of the LGA wide glider management strategy. As such, any clearing of native habitat or interruptions to connections could impact on individuals and populations.	A total of 11 trees were record onsite. Of these, 7 have hollows suitable for glider use. On site, these trees occur in two groups; those along the northern boundary of the site, and a clump of 4 near the southern boundary. The gap between these groups makes movement for gliders unlikely (<30m, trees less than 6m tall, ground flat). However, individuals could move from surrounding habitats to and from these trees, and as such all trees onsite are considered part of the local habitat for Squirrel gliders.
LMCC Tetratheca juncea population. (Lake Macquarie T. juncea Planning and Management Guidelines 2014)	*Tetratheca juncea* is known to occur in the local area with a high number of clumps recorded adjacent to the site and surrounding remnants, which form part of sector 1 population as described in the guidelines. Given the controlled and cleared nature of the site, the site is unlikely to provide habitat, however, targeted surveys are required to confirm. The planning goal for this sector is to maintain connectivity between this sector and Central North-east sector and securing long term conservation reserve boundaries is important to facilitate management Development proposals will require a Development Application to be accompanied by a BDAR assessment to understand the potential impact of any development onsite to the local surrounding population.

2.2 Habitat types identified on and surrounding the Subject Site

2.2.2 Listed Flora

Listed flora species known to the local area as shown in Table 3. Where suitable habitat for a species (highlighted in the table below) is identified onsite, appropriate seasonal surveys are conducted which is discussed further in this report.

Table 3. Listed flora in the local area

Species name	Common name	NSW	EPBC	*Species name*	Common name	NSW	EPBC
Rutidosis heterogama	Heath Wrinklewort	V	V	*Eucalyptus camfieldii*	Camfield's Stringybark	V	V
Senecio spathulatus	Coast Groundsel	E1		*Melaleuca biconvexa*	Biconvex Paperbark	V	V
Tetratheca juncea	Black-eyed Susan	V	V	*Rhodamnia rubescens*	Scrub Turpentine	E4A	CE
Epacris purpurascens var. purpurascens		V		*Syzygium paniculatum*	Magenta Lilly Pilly	E1	V
Pultenaea maritima	Coast Headland Pea	V		*Diuris praecox*	Rough Doubletail	V,P,2	V
Callistemon linearifolius	Netted Bottle Brush	V,3		*Muehlenbeckia sp. Mt Norman*	Scrambling Lignum	V	
Grevillea shiressii		V	V	*Grevillea parviflora subsp. parviflora*	Small-flower Grevillea	V	V
Zannichellia palustris		E1					

2.2.3 Listed Fauna

Listed terrestrial fauna species known to the local area are shown in Table 4. There is habitat available on the site for the species highlighted which is discussed further in this report.

Table 4. Listed flora in the local area

Species name	Common name	NSW	EPBC	*Species name*	Common name	NSW	EPBC
Crinia tinnula	Wallum Froglet	V,P		*Phascolarctos cinereus*	Koala	V,P	V
Hirundapus caudacutus	White-throated Needletail	P	V,C,J,K	*Petaurus norfolcensis*	Squirrel Glider	V,P	
Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P		*Petauroides volans*	Greater Glider	P	V
Lophoictinia isura	Square-tailed Kite	V,P,3		*Potorous tridactylus*	Long-nosed Potoroo	V,P	V
Callocephalon fimbriatum	Gang-gang Cockatoo	V,P,3		*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V
Calyptorhynchus lathami	Glossy Black-Cockatoo	V,P,2		*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P	
Glossopsitta pusilla	Little Lorikeet	V,P		*Micronomus norfolkensis*	Eastern Coastal Free-tailed Bat	V,P	
Lathamus discolor	Swift Parrot	E1,P,3	CE	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P	
Ninox connivens	Barking Owl	V,P,3		*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P	
Ninox strenua	Powerful Owl	V,P,3		*Vespadelus troughtoni*	Eastern Cave Bat	V,P	
Tyto novaehollandiae	Masked Owl	V,P,3		*Miniopterus australis*	Little Bent-winged Bat	V,P	
Tyto tenebricosa	Sooty Owl	V,P,3		*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P	
Daphoenositta chrysoptera	Varied Sittella	V,P		*Pseudomys novaehollandiae*	New Holland Mouse	P	V
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P					
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E				

2.3 Survey Results

2.3.1 Flora

In total 97 flora species were recorded across both Lot 87 and the road verge. Flora within Lot 87 was dominated by exotic flora species which accounted for 75% of total flora and 89% of the land surface. Overstorey native tree species are present on the northern boundary and a smaller clump on the southern boundary. By comparison the road verge had three distinctive areas of vegetation providing a range of habitat for flora species. The top of the verge at the most eastern extent is dominated by native flora and likely provides important habitat for native flora. The central portion has a broad cleared area that is dominated by exotic flora and is unlikely to provide any important habitat for flora and the south-eastern extent, whilst also

being modified does include areas of native flora and habitats. Notwithstanding the potential for habitats, surveys did not record any listed flora species on Lot 87 or the road verge.

2.3.1 Fauna

In total 29 fauna species were recorded on Lot 87. By comparison 54 species were recorded in the road verge. Common forest and forest edge (open area specialists) bird species represented 54% of the fauna diversity in Lot 87. Five pest species were identified (Rabbit, Fox) in Lot 87 but generally all in low numbers. Two listed micro-bats species (Little Bent-winged Bat, Large Bent-winged Bat) were recorded in on Lot 87, both species are cave dwelling bats and are known to inhabit the local area. Flying Fox and Squirrel glider were heard during nocturnal surveys in the local remnant outside of site.

2.3.2 Vegetation

There are small remnants of one native plant community on Lot 87. This community is also adjacent to the Subject Site in road verge. Most of the site is dominated by exotic plant communities, refer to Table 5 and Figure 2.

Table 5. Plant communities recorded in the Study Area

PCT	Typical plants onsite	Area	Condition	Lot 87	Road Verge
1638 - Smooth-barked Apple - Red Bloodwood - Scribbly Gum grass - shrub woodland on lowlands of the Central Coast	*E. racemose* *A. costata* *Acacia longifollia var. sophorae* *Acacia longifollia var. sophorae* *Hardenbergia violiaceae*	0.27ha	Poor condition community providing moderate quality habitat for a small number of threatened species	Found on northern and small clump on southern boundary	Found in eastern and western extent of verge.
Managed exotic and native grasslands	*Stenotaphrum secundatum- Axonopus affinis- Cynodon dactylon, Pennisetum clandestinum*	0.9ha	Poor condition man made environment	Most of the Lot 87	Found in central portion of verge.

2.3.4 Tree Hollows

Surveys recorded 15 trees in Lot 87, of which 10 trees have one or more hollows. In total, 28 hollows were identified of varying sizes and quality (Refer to Table 6 and Figure 3). No large tree hollows (Owl hollows) were identified. To confirm usage and value in the local context tree hollows were stage watched over 2 nights. One Brush-tailed possum was recorded leaving a hollow on the northern boundary (See Table 6 and Figure 1).

Table 6. Trees and tree hollows recorded onsite.

Individual	Tree species	DBH (mm)	Hollow Number	Hollow Type/Data	GPS	Understory Notes:
Tree 1	*Eucalyptus racemosa*	700	5	1 med spout 4 small lateral branches	-32.99223, 151.70426	*Exocarpos cupressiformis, Imperata cylindrica* Buffalo, Kikuyu
Tree 2	*Eucalyptus racemosa*	650	5	1 med vertical spout 4 small lateral branches 1 kingfisher/kooka nest in termite	-32.992119, 151.704300	Acacia falcata juvs, P.undulatum juv Exocarpos cupressiformis juv Buffalo
Tree 3	*Eucalyptus racemosa*	750	5	2 med spouts 3 small lateral branch	-32.992072, 151.704209	Bidens pilosa, Buffalo
Tree 4	*Angophora costata*	490	0		-32.991883, 151.704957	Native peas, Lomandra, Native violet, P. undulatum, Bracken
Tree 5	*Angophora costata*	540	1		-32.991863, 151.704862	Eucalyptus juvs, Native violet, P.undulatum Buffalo
Tree 6	*Angophora costata*	430	1	Small Lateral branch forming	-32.991889, 151.704830	Persoonia linearis, Native violet

Tree 7	*Angophora costata*	510	0		-32.991850, 151.704601	*Dipodium variegatum* at base Hardenbergia violeacea, Native couch, Guinea grass, Kikuyu, Buffalo
Tree 8	*Eucalyptus racemosa*	825	0		-32.991793, 151.704708	Kikuyu, Ambrosia, Bidens pilosa, Hovea sp & native twiners
Tree 9	*Angophora costata*	710	2	1 vertical spout forming 3 branch forming	-32.991743, 151.704415	Juv Cheese tree & Eucalypts, Cynodon, Imperata *Tricoryne elatior* at base
Tree 10	*Eucalyptus racemosa*	850	3	3 lateral branch	-32.991727, 151.703816	Cryptostylis erecta small colony at base Themeda triandra, Cynodon, Imperata Acacia falcata juvs Bracken Juv Stringy Gums
Tree 11	*Eucalyptus racemosa*	375	0		-32.991940, 151.703958	Bitou Bush, Lantana Imperata, Morning Glory
Tree 12	*Eucalyptus pilularis*	450	1	ground hollow	-32.992395, 151.703579	Bitou Bush, some juv acacia, Lantana
Tree 13	*Eucalyptus racemosa*	800	4	1 vertical spout 3 lateral branch	-32.992391, 151.703527	Bitou Bush, Lantana Imperata, Morning Glory
Tree 14	*Eucalyptus pilularis*	500	0	3 lateral branch	-32.992441, 151.703341	Bitou Bush, Lantana Imperata, Morning Glory
Stag 15	Stag		0		-32.992424, 151.703357	Bitou Bush, Lantana Imperata, Morning Glory

2.4 Habitat Zones

Three habitat zones were identified onsite, and one class- poor condition. Refer to Table 6 and Figure 4 for details of habitat zones onsite.

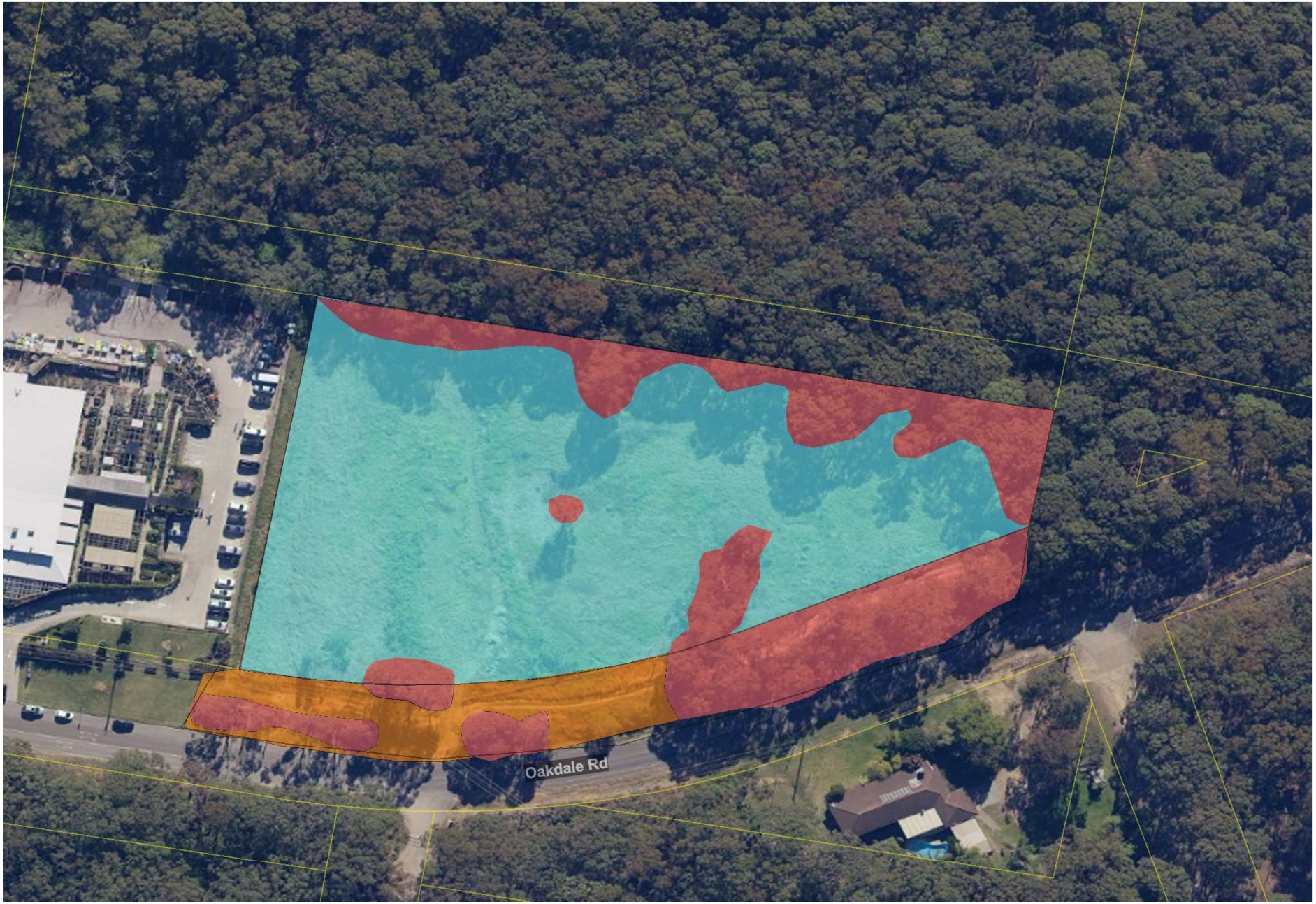
Table 6. Habitat for native species in the Study Area

Zone	Description	Location	Area	Important habitat	Comments for consideration
1	Remnant trees on southern boundary	Adjacent to preferred entrance point		Hollows provide habitat and tree cover is used by native species. These areas are however largely devoid of native understory flora species and habitat. Unlikely to be important habitat, however tree hollow loss for management of local squirrel glider population is an important consideration.	These trees provide supplementary habitat value to the surrounding vegetation. Hollows are present and use of these trees by native species was observed during survey. It is likely that these trees are used by listed species from time to time.
2	Remnant trees on northern boundary and eastern portion of site	At rear of subject site adjacent to good condition healthy vegetation		Hollows provide habitat and tree cover is used by native species. These areas are however largely devoid of native understory flora species and habitat. Unlikely to be important habitat, however tree hollow loss for management of local squirrel glider population is an important consideration.	These trees provide supplementary habitat value to the surrounding vegetation. Hollows are present and use of these trees by native species was observed during survey. It is likely that these trees are used by listed species from time to time.
3	Poor condition pasture and exotic grasslands	Majority of the site		No habitat for native species.	This area of the subject site is of little ecological value.
4	Poor condition exotic	Existing access point an alternative		Marginal habitat for native species.	This area of the road verge is of little

Zone	Description	Location	Area	Important habitat	Comments for consideration
	vegetation and cleared area	on road verge			ecological value. And in comparison, to other parts of the verge the most suitable for access. (in ecological terms)
5	Good condition native vegetation	Road verge		Good quality native habitat connected to large patches, provides important habitats for a few listed species	This area of the road verge is important habitat. A small area of this vegetation is required to be trimmed or an individual tree removed to improve sight at the driveway. Refer to trim line on Figure 4.

Habitat for native fauna also differs from surrounding vegetation. The remnant area outside of Lot 87 and the road verge site provides a wide range of habitat for native species, including, nesting and foraging habitats for marsupials, micro-bats, birds, and foraging habitat for flying foxes. By comparison, Lot 87 is lacking in foraging, nesting habitats and refuge areas for most native species known to the local area.

Photographs highlight the vegetation, conditions classes and habitat zones discussed above. The photographs also describe the non-native vegetation in the sites and Figure 2 and 3 shows the respective distribution of these communities and habitats.



LEGEND:

- 1638 - Smooth-barked Apple - Red Bloodwood - Scribbly Gum grass - shrub woodland on lowlands of the Central Coas
- Managed exotic and native grasslands
- Managed exotic and native grasslands Road Verge
- Site Boundary

FIGURE 2.0

Vegetation communities

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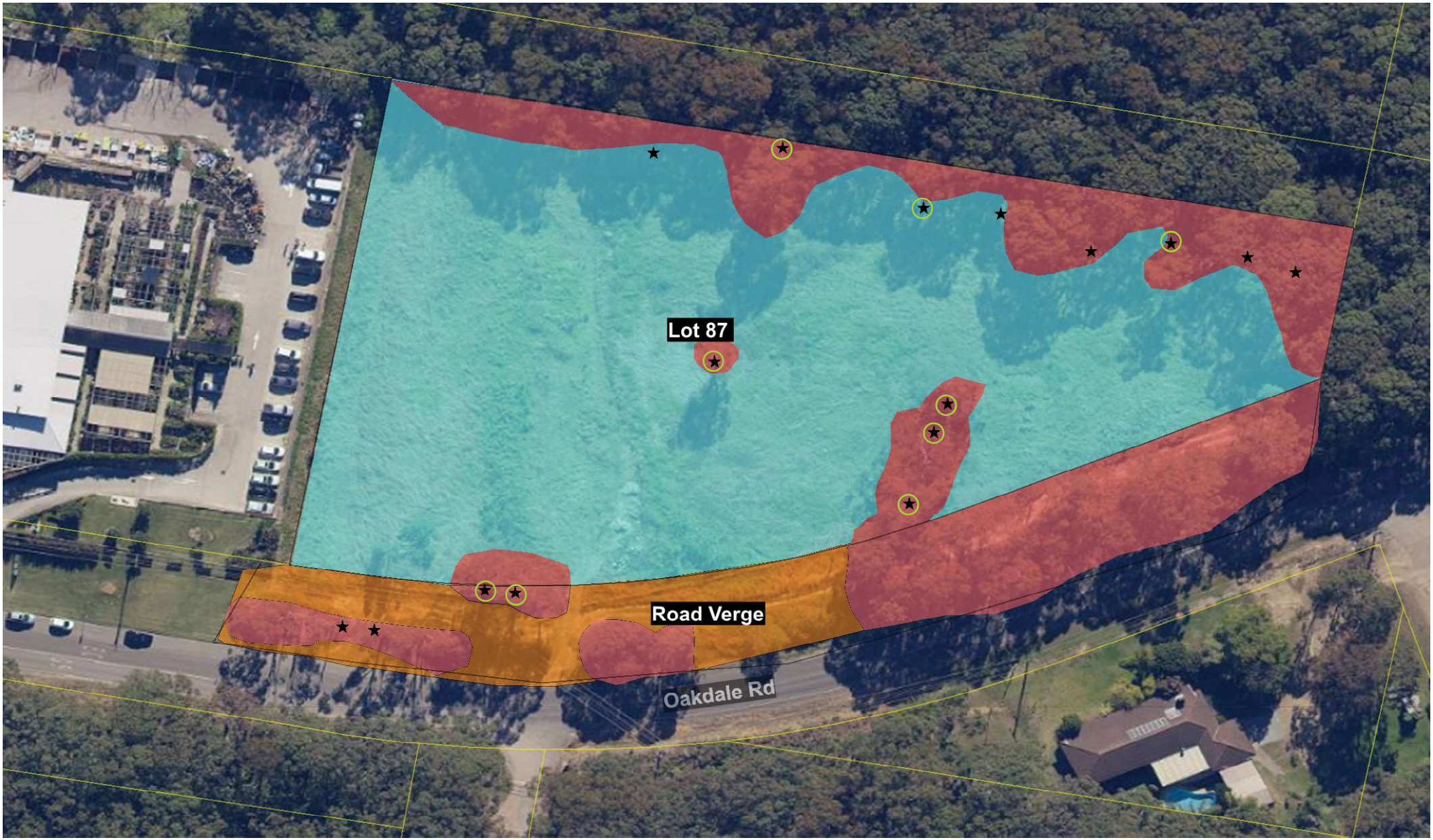

LEGEND:

- Trees
- Trees with hollows, cracks or fissures present
- 1638 - Smooth-barked Apple - Red Bloodwood - Scribbly Gum grass - shrub woodland on lowlands of the Central Coas
- Managed exotic and native grasslands
- Managed exotic and native grasslands Road Verge
- Site Boundary

(LPI NSW Imagery 2020; NSW Spatial Services 2020)

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FIGURE 3
Tree Hollows

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Photograph 1. *This is typical of the plant cover in Zone 1. Dominated by Scribbly, with managed Bladdy grass as the understory. This tree is closet to the southern boundary.*

Photograph 2. *Zone 1 adjacent tree to photograph 1 has suitable hollows for gliders but the area lacks understory and native species.*

Photograph 3. *Zone 1- Scribbly gum adjacent to the southern boundary, the high level of management is evident in the photograph*

Photograph 4. *Zone 1- Scribbly gum adjacent to the southern boundary, further west than the other clump. Suitable hollows for native species, mixture of exotic and native flora in the understory.*

Photograph 5. *Zone 1- Scribbly gum adjacent to tree above. No hollows for native species, mixture of exotic and native flora in the understory.*

Photograph 6. *Zone 2- At the north/eastern boundary of the Subject Site there is a clump of trees, species in this clump include Smooth-barked Apple and Scribbly gum. There are a higher number of native flora species in this area, however, their cover and condition are controlled by maintenance.*

Photograph 7. *Zone 2- Evidence of suitable trees hollows for native species and native flora species present in understory*

Photograph 8. *Zone 2 – Evidence of suitable trees hollows for native species and native flora species present in understory*

Photograph 9. *Zone 2- further west along the southern boundary there are two scattered trees.*

Photograph 10. *Zone 2- further west along the southern boundary there are scattered trees.*

Photograph 11. *Zone 2- further west along the southern boundary there are scattered trees.*

Photograph 12. *Zone 2- further west along the southern boundary there are scattered trees.*

Photograph 13. *Zone 4- alternate access point typical of non-native areas of road verge. Exotic and native species, no trees or native shrubs present. This is looking west.*

Photograph 14. *Zone 4- Preferred access point on road verge. Exotic and native species, no trees but one native shrub present. This is looking east.*

Photograph 15. *Zone 5- road verge. Exotic and native species, no trees or native shrubs present. Healthy example of PCT* ***1638 - Smooth-barked Apple - Red Bloodwood - Scribbly Gum grass - shrub woodland on lowlands of the Central Coast.***

2.5 Potentially affected threatened species, risks, and mitigation options

Table 7. Species that may be found on site or in the local area, and potential mitigation and management measures

Species name	Common name	Location of habitat	Risks	Mitigation and Management	Can these potential risks be managed?	Future works needed?
Rutidosis heterogama	Heath Wrinklewort	Road Reserve Zones- 5 87 Oakdale Rd Zones- None	Low. Not recorded during flowering season, unlikely to be onsite.	There is habitat for this species in Zone 5- road verge, however this habitat area is only on the ridge top and upper slopes of the cut.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Tetratheca juncea	Black-eyed Susan	Road Reserve Zones- 5 87 Oakdale Rd Zones- None	Low. Not recorded during flowering season, unlikely to be onsite.	There is habitat for this species in Zone 5- road verge, however this habitat area is on the ridge top and upper slopes of the cut. On the lower slopes and within 2 metres of the road verge the vegetation is exotic and managed.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Diuris praecox	Rough Doubletail	Road Reserve Zones- 5 87 Oakdale Rd Zones- None	Low. Not recorded during flowering season, unlikely to be onsite.	There is habitat for this species in Zone 5- road verge, however this habitat area is on the ridge top and upper slopes of the cut. On the lower slopes and within 2 metres of the road verge the vegetation is exotic and managed.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Haliaeetus leucogaster	White-bellied Sea-Eagle	Road Reserve Zones- 4 & 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during flowering season, unlikely to be onsite.	White-bellied Sea-Eagle can be found using isolated trees for roosting and thus could be found in Zone 1,2, 4 or 5.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Callocephalon fimbriatum	Gang-gang Cockatoo	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during flowering season, unlikely to be onsite.	Gang-gang Cockatoo is a forest bird so Zones 1,2 and 5 are potential habitat.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.

Species name	Common name	Location of habitat	Risks	Mitigation and Management	Can these potential risks be managed?	Future works needed?
Calyptorhynchus lathami	Glossy Black-Cockatoo	Road Reserve Zones- 5 87 Oakdale Rd Zones- None	Low. No Allocasuarina recorded in Lot 87 and no suitable sized hollows for this species. Recorded outside of the site in local area vegetation habitat during surveys.	Where possible plantings of Allocasuarina spp. within landscape designs.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Tyto novaehollandiae	Masked Owl	Road Reserve Zones- 4 & 5 87 Oakdale Rd Zones- 1,2, and 3	Not recorded during surveys, however the open edge nature of the site and the local area is ideal foraging habitat for this species.	The inclusion of specific Masked Owl Nest box to retained trees would be beneficial.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Daphoenositta chrysoptera	Varied Sittella	Road Reserve Zones- 5 87 Oakdale Rd Zones- None	Low. Not recorded during surveys and tends to prefer more dense habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during surveys but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Petaurus norfolcensis	Squirrel Glider	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Moderate. Squirrel Glider population in the local area is important for conservation of the species at the wider scale. Recent research by the author in the local patches shows not all patches are occupied and not many of the occupied patches are fully used, so a basic patch size, connectiveness approach may overestimate population size.	The retention of zone 1 trees will retain tree hollows and habitat adjacent to potential corridor; however, the development will still result in the loss of 6 trees with hollows. This can be mitigated by replacement; however, this may be inconsistent with the Squirrel glider management strategy.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.

Species name	Common name	Location of habitat	Risks	Mitigation and Management	Can these potential risks be managed?	Future works needed?
Pteropus poliocephalus	Grey-headed Flying-fox	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during surveys but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during surveys but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during surveys, but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Scoteanax rueppellii	Greater Broad-nosed Bat	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during surveys, but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Vespadelus troughtoni	Eastern Cave Bat	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during surveys, but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Miniopterus australis	Little Bent-winged Bat	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Recorded during surveys, but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.

Species name	Common name	Location of habitat	Risks	Mitigation and Management	Can these potential risks be managed?	Future works needed?
Miniopterus orianae oceanensis	Large Bent-winged Bat	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Recorded during surveys, but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.

2.6 General species conditions and recommendations

2.6.1 flora

There is no habitat on Lot 87 for listed flora species. By contrast there is suitable habitat within the road reserve for several species, however the proposed access point and tree line trimming will not remove or modify any areas of suitable native habitat for these species. The historical clearing and ongoing maintenance have removed and controlled habitats for these species. The road verge does however provide habitat for several of the listed species. Surveys undertaken in this zone targeting these species did not locate any individuals. Notwithstanding, we recommend that the access point for the development be in the already cleared and weedy zone 4. Zone 5- road verge will be impacted by trimming of branches and possible loss of an individual tree. Whilst this scale of impact is small, further surveys will be required to inform access and egress design at DA stage.

2.6.2 Mammals (Koala, Squirrel Glider, micro-bats and Grey-headed Flying Fox)

Whilst there is habitat for threatened non-flying mammals on Lot 87 this proposed rezoning is unlikely to cause significant impacts on these species. There may be downstream impacts on habitat, but these risks can be managed by the design of suitable sensitive development on the land. Micro-bats will lose foraging habitats but again this will be minimal and can be offset. Grey-headed flying fox could use the local area extensively and will only be impacted if changes in hydrological are extensive enough to impact on food resource downstream. The implementation of a well-designed storm water management system that controls hydrological regimes and qualities to the highest standard will mitigate impacts on these species.

Squirrel glider habitat could potentially be impacted by future development. We recommend the integration of zone 1 vegetation into landscape design of any future DA for development (See Figure 3). This will retain 3 of the 10 hollows onsite and improve the corridor connection along Oakdale Road. Even the loss of a small number of hollows from the local area can be deleterious, however without an understanding of patch occupancy, percentage of patch utilised, quantification of resources in the patch i.e. number of hollows and winter flowering shrubs it is impossible to determine the level of impact on the local population. Whilst the LMMC management strategy has modelled occupancy, critically our data suggests that this may be an overestimation of the local population. Nonetheless, further assessment specific to the design of a proposed land use will serve to clarify this issue.

Therefore, we recommend further assessment is undertaken as part of any DA design preparations to include adjoining habitats to obtain this data and better inform the likelihood of impacts. Notwithstanding, the complications in estimating impacts on the local population, there is scope onsite and in the local area to compensate for this small degree of potential loss of habitat or avoid the potential for adverse impact by the retention of hollow bearing trees as part of the landscaping within future development proposals.

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2.6.3 Birds

Glossy Black Cockatoo was recorded adjoining the site on several occasions. Following the 2019-2020 fires that devastated habits for this species, coastal habitats that have local populations, such as this local area, are likely critical to the long-term survival of the species (others are currently doing work on this). Whilst this loss of these small number of non-breeding trees is not a direct impact on the species, we recommend that a suitable nest box be installed in Zone 1 trees.

2.6.4 Endangered Ecological Communities

No endangered ecological communities were identified onsite.

2.6.5 Limitations

No limitations of this study were identified.

3.0 Outcomes of Surveys, Conclusions and Recommendations

The focus of assessing biodiversity impacts in NSW has shifted so that greater efforts are made to protect biodiversity at the earliest stages of project design. Specifically, to submit documentation for approval, the proponent must demonstrate that they have undergone four major steps, these are:

1. Project design, as much as possible, shall avoid areas of native vegetation and other habitats for native species (i.e., caves); then,

2. Minimise biodiversity impacts further by smart sustainable design and integration of biodiversity conservation objectives; then,

3. Only after all attempts are made in step 1 and 2 to avoid and minimise impacts on biodiversity, one can then begin to assess the final design against biodiversity: and finally,

4. The proponent must then commit to proposed offsets for all residual impacts.

This report has been prepared to assist and guide the sustainable design in line with step 1 and 2 above. The design and site selection for this project has avoided areas of native remnant biodiversity, and whilst the project does include the removal of a very small area of potential poor condition habitat for Squirrel glider, with the implementation of proposed measures, none of these impacts are likely to be significant in nature.

The Office of Environment and Heritage (OEH) Biodiversity Values Map (BV Map) showed that the Subject Site is not mapped as Biodiversity Value (BV) land, But the Study Area is (as defined by the *Biodiversity Conservation Regulation 2017)*. The Biodiversity Offset Scheme (BOS) threshold of native vegetation clearing associated with the study area is >0.5ha (See supplementary material). If the planned clearing of native vegetation were to exceed 0.5ha then this would trigger the Biodiversity Assessment Method (BAM) and BOS. Additional ecological assessment works would be required to determine the suitable offsets for the proposed activity. Mapping shows that the direct impacts on the Subject Site are unlikely to result in a Serious and Irreversible Impact.

Assessment of the proposal under other relevant environmental policy instruments including Koala Habitat Protection SEPP confirms that the proposal will not impact on koala habitat.

3.1 Biodiversity Offsets Scheme

The BOS threshold is a test used to determine when to undertake a BAM to assess the impacts of a proposal, thus triggering the BOS or the Significant impact tests.

The Biodiversity Conservation Regulation 2017 sets out threshold levels for when the BOS will be triggered. The threshold has two elements:

1. Whether the amount of native vegetation being cleared exceeds a threshold area, or

2. Whether the impacts occur on an area mapped on the Biodiversity Values map published by the Chief Executive of the NSW Office of Environment and Heritage.

If clearing and other impacts exceeds either trigger, the BOS applies to the proposed development including biodiversity impacts prescribed by Section 6.1 of the Biodiversity Regulation 2017.

The BOSET report (See Appendix A) reports that the planned area crosses into the BV Map area and therefore triggers the BOS and a Development Application will require that a Biodiversity Development Assessment Report (BDAR) be prepared consistent with the BAM.

3.2 Conclusion and Recommendations

In conclusion, this assessment has identified some issues that will require further ecological works to be undertaken during the preparation of a Development Application. Largely, these additional works are triggered due to Squirrel glider habitat. Nonetheless, because this project will only result in clearing of a very small area of habitat, this should be a streamlined assessment. In short, the conclusions that can be drawn thus far, and the issues requiring further investigations as part of a DA process are:

- The use of the land for industrial Land use purposes is unlikely to impact on the life cycle of any species, populations, or communities so that they are put at further risk pursuant to the BC Act;
- The use of the land for industrial Land use purposes is unlikely to trigger the need to prepare a BDAR;
- Future development is likely to require a VMP and the integration of vegetation into a landscape scheme;
- It is unlikely to result in offsets as the process should result in no net change in the vegetation integrity, thus no credits will be generated;
- There appears to be scope for any design for future land use to clear less than 0.5ha of vegetation, thereby an Offset liability is not necessarily likely; and,
- The use of the land for industrial Land use purposes is unlikely to trigger for Koala Habitat Protection SEPP.

Yours Sincerely,

John Paul King
Principal Ecologist

Supplementary material

- **Appendix A - Flora recorded**
- **Appendix B –Fauna recorded**
- **Appendix C – BOSET report**

Appendix A

Job No/name: Oakvale Rd, Gateshead	Date: 31/01/22	Plot ID: 1A	Bearing: NNW GPS: (-32.992059, 151.703610)	Staff:GS
-				
Tree: 0%	Shrub: 3%	Vine: 15%	Litter: 0.5%	
Mid: 0%	Grass: 95%	Weeds: 99%	Forbs:	

Upper	C	Ab	Mid	C	Ab	shrub Lower	C	Ab	ground Lower (Con.)	C	Ab
			Acacia longifollia var. sophorae	###	1	*Hardenbergia violiaceae*	###				
			Westringia fruiticosa	###	5	*Kennedia rubicundra*	<1		*Lomandra lonfifolia var. longifolia*	0.2	5
			Chrysanthemoides monilifera subsp. rotundata *	2%	20				*Juncus ucitatus*	<1	10
			Sida rhombifolia *	0.5	10				*Commelina cyanea*	<1	
			Crotaliaria lanceolata *	<1	10	*Ipompea indica* *	15	50	*Cynodon dactylon*	3	
			Verbena bonariensis *	1	15	*Vicia sativa* *	<1	20	*Cyperus eragrostis* *		
			Bidens pilosa *	1	10	*Plantago sp.* *	1	30	*Andropogon virginicus* *	10	
			Lactuca serriola *	<1	10	*Hypocharis radiata* *	###	20	*Pennisetum clandestinum* *	2	
			Euryops chrysanthemoides *	0.5	4	*Neomarica caerulea* *	<1		*Setaria sphacelata* *		
			*Rumex crispus**	2	10	*Trifolium repens* *	<1	20	*Megathyrsus maximus var. maximus* *	5	
			Cirsium vulgare *	0.1		*Medicago sp.* *	<1	15	*Cortaderia sp.* *	1%	2
			Oenothera lindheimeri *	0.1					*Stenotaphrum secundatum* *	85%	
			Senecio madagascariensis *	0.1	5				*Paspalum dialatum* *	1.5	20
			Conyza sumatrensis *	1	10				*Sporobolus africanus* *	<1%	

C(%cover)= 0.1, 0.20.3, …1,2,3…10,15,20,25…(nearest 5%)

Ab (abundance)= 1-20,50,100,500,1000 (greater than twenty estimate only. Overhanging count as 1.

Job No/name: Oakvale Rd, Gateshead	Details: bam 1b	Date: 31/01/22	Plot ID: 1B	Bearing: NNW GPS: (-32.9920362, 151.7036119

Temp(_27__), Rain(_no__),clouds(___no_____),wind_speed(_12km/hr__),wind_direc(__SE_), water_cond(____),(start_T(_____),Finish_T(_____),Photo (_yes__)

Stem Size class (DBH 1.3 High)	**Presence and Absence (>50cm)**	**Hollow Bearing Trees**			**Leaf_Lit (5 x1m2 plots) (5,15,25,35,45 along transect)offset first 5 metres___Includes all debris <10cm. Attached or onground**				Notes:
<5CM	P_n_/A_1_		A. longifolia var. sophorae	0	**I**	**Leaf Litter (gm)/cover%**	**Bare gr(%)**	**Rocks(%)**	Rocks' in plot are foreign concrete - dumped
5-9cm	P_n_/A__	No&Spec_T			1(0ffset)	0 (NB: 100% live veg cover)	0	0	
10-19cm	P_n_/A__				2	0 (NB: 100% live veg cover)	0	0	Fauna observations: frog possibly Crinia signifera,
20-29cm	P_n_/A__	No_Holl			3	0 (NB: 100% live veg cover)	0	0	channel billed cuckoo, fairy wrens
30-49cm	P_n_/A__				4	0 (NB: 100% live veg cover)	0	0	2 mini ridge lines from ground works? Compacted ground
50-79cm	P_n_/A__	No_G_Holl			5	5%	0	5	Adjacent troughs supporting a few natives
>80cm	P_n_/A__	Total= 0							
		Metres of debris on ground(>10cm_W&>50cm_L							
		Total= 0							

Weeds (%),clearing_Erosion_EdgeEffects_Grazing_Fire_other.

Weeds 100%	Minimal shrubs, no trees

Habitat description:

Resilience improved at Northen end of transect - juv Eucs, Acacias, Native grasses & groundcover appearing

	Job No/name: 87 Oakdale Rd, Gateshead			Date: 31/01/22			Plot ID: 2A			Bearing: E GPS: (-32.992401, 151.703915)		Staff: GS	
	Overall cover												
	Tree: 0			Shrub: 23%			Vine: 17%			Litter: 2%			
	Mid: 3%			Grass: 25%			Weeds: 80%			Forbs: 14%			
	Upper	**C**	**Ab**	**Mid**	**C**	**Ab**	**Lower**	**C**	**Ab**	**Lower (Con.)**	**C**	**Ab**
1	*Glochidion ferdinandi*	3%	5	*Acacia falcata*	1%	5	*Ipomoea indica* *	15%		*Andropogon virginicus* *	40	500
2	*Allocasuarina littoralis*	0.5	1	*Breynia oblongafolia*	1%	10	*Ipomoea cairica* *	1%		*Megathyrsus maximus var. maximus* *	2	
3	*Banksia integrifolia juv.*	0.1	1	*Lantana camara* *	20%	50	*Araujia sericifera* *	1%		*Paspalum dialatum* *	2	
4	*Acacia juv*	<1	10	*Sida rhombifolia* *	1%	15				*Bromus catharticus*	1	
5				*Kennedia rubicundra*	0.1	5				*Setaria sphacelata* *	1	
6				*Rubus fruiticosus sp. agg.* *	0.1	5				*Stenotaphrum secundatum**	15	
				Hydrocotyle bonariensis *	####	20				*Cynodon dactylon*	3	
7				*Conyza sumatrensis* *	1	20				*Briza subaristata* *	1	
8				*Foenecium vulgare* *	10%	200				*Pennisetum clandestinum* *	15	
9				*Verbena bonariensis* *	1%	30				*Eragrostis sp.* *	0.5	
10				*Bidens pilosa* *	2%	50				*Sporobolus africanus* *	0.5	
11				*Ambrosia sp.* *	2%	100				*Agave attenuata* *	1	
12				*Plantago sp.* *	1							
13				*Rumex crispus* *	5%	75						
14				*Senecio madagascariensis* *	0.1	5						
15												
16												
17												
Note:	C(%cover)= 0.1, 0.20.3, …1,2,3…10,15,20,25…(nearest 5%)						Ab (abundance)= 1-20,50,100,500,1000 (greater than twenty estimate only. Overhanging count as						

Job No/name: Oakvale Rd, Gateshead	Details:BAM 1B			Date: 31/01/21 & 2/2/22		Plot ID: 2B	Bearing: E GPS: (-32.992401, 151.703915)				
Temp(_30/21__), Rain(__no/yes_),clouds(___no/yes_____),wind_speed(_37km/hr__),wind_direc(__S_), water_cond(____),(start_T(_____),Finish_T(_____),Photo_yes(_x_)											
Stem Size class (DBH 1.3 High)	**Presence and Absence (>50cm)**	**Hollow Bearing Trees**			**Leaf_Lit (5 x1m2 plots) (5,15,25,35,45 along transect)offset first 5 metres___Includes all debris <10cm. Attached or onground**				Notes :		
<5CM	P_y_/A__19	No&Spec_T	A. costata	0	**No**	**Leaf Litter (gm)/cover%**	**Bare gr(%)**	**Rocks(%)**	includes access road in plot = approx 75m2 bare track		
5-9cm	P_y_/A__2		E. pilularis	0	1(0ffset)	0 (NB: 100% live veg cover)	0	0%	evidence of suburban dumping - garden waste -->		
10-19cm	P_y_/A__10		E. racemosa	14	2	0 (NB: 100% live veg cover)	0	0%			
20-29cm	P_y_/A__4		A. littoralis	0	3	10	0	0			
30-49cm	P__y/A__8		E. piperita	0	4	85%	5%	10%			
50-79cm	P__y/A__2		G. ferdinandi	0	5	100%	0	0			
>80cm	P_n_/A__0	No_Holl	14								
		No_G_Holl	0								
		Total= 14									
		Metres of debris on ground(>10cm_W&>50cm_L									
		Total= 3 m									
Weeds (%),clearing_Erosion_EdgeEffects_Grazing_Fire_other.											
Access rd used for 4x4 and dirt bikes --> erosion & compaction in future											
Habitat description:											
0-20m of plot- weed infested with minimal native recruitment											
1 x Cheese Tree - height 5m, understory of Lantana											
impenetrable weeds at W end of plot, increased resilience at E. intact leaf & bark mulch layer support native grasses & groundcovers											
Some native recruitment on edge of access rd ie. where exotic competition thins											

Habitat recorded onsite and species recorded during all surveys.

Job No/name: Oakvale Rd, Gateshead			Date: 31/01/22			Staff:GS	
Plot ID: Habitat 2 (bam 2)			Bearing: E	GPS: -32.992255, 151.704498			
Native							
CANOPY		**SHRUB**		**VINES**		**GROUND**	
Eucalyptus racemosa	Snappy Gum	*Allocasuarina littoralis*		*Desmodium varians*		*Pteridum esculentum*	Bracken Fern
Eucalyptus pillularis	Blackbutt	*Banksia integrifolia*	Coastal Banksia	*Desmodium rhytidophyllum*		*Centella asiatica*	Gotu Kola
Eucalyptus piperita	Sydney Peppermint	*Bossiea obcordata*		*Hardenbergia violacea*	False Sarsparilla	*Lomandra obliqua*	Fishbone Lomandra
Angophora costata	Snmooth-bark Apple	*Hibbertia diffusa*	Wedge Guinea Flower	*Cassytha glabella f. glabella*		*Lomandra multiflorum*	
		Pittosporum undulatum		*Kennedia rubicundra*	Running Postman	*Lomandra longifolia*	Basket Grass
		Exocarpos cupressiformis	Cherry Ballart	*Eustrephus latifolius*	Wombat Berrt	*Lomandra filiformis*	
		Acacia falcata		*Hibbertia dentata*		*Lepidosperma laterale*	
		Acacia longifolia ssp. sophorae		*Cissus antarctica*	Kangaroo Vine	*Dianella caerulea var. assera*	Blue-flax Lily
		Polyscias sambuccifolia		*Hovea linearis*		*Lobelia purpurea*	White root
		Glochidion ferdinandi	Cheese Tree			*Pseuderanthemum variable*	Pastel Flower
		Breynia oblongifolia	Coffee Bush			*Viola hederacea*	Native Violet
		Acacia ulicifolia	Prickly Moses			*Cryptostylis erecta*	Common Bonnet Orchid
		Dodonea triquetra				*Xanthorrhoea latifolia subsp. latifolia*	Grass Tree
						Thelymitra sp.	Sun Orchid
						Imperata cylindrica	Blady Grass
						Rytiodsperma pallidum	Wallaby Grass
						Cynodon dactylon	Couch
						Themeda triandra	Kangaroo Grass
						Entolasia stricta	Right angled Grass
						Poa affinis	
						Ghania sp.	Saw sedge
						Echinopogon sp.	Echidna Grass

Exotic						
CANOPY	**SHRUB**		**VINES**		**GROUND**	
	Senna pendula var. glabrata		Ipomoea indica	Blue Morning Glory	*Andropogon virginicus* *	Whiskey Grass
	Chrysanthemum monifera ssp. rotunda	Bitou Bush	*Ipomoea cairica* *	Purple Morning Glory	*Cortaderia sp.* *	Pampas
	Lantana camara	Lantana	*Araujia sericifera* *	Moth Vine	*Megathyrsus maximus var. maximus* *	Guinea Grass
	Conyza sumatrensis *	Tall Fleabane			*Paspalum dialatum* *	
	Sida rhombifolia *	Paddy's Lucerne			*Bidens pilosa* *	Farmers Friend
	Rubus fruiticosus sp. agg. *	Blackberry			*Setaria sphacelata* *	Foxtail Grass
	Verbena bonariensis *	Purple Top			*Stenotaphrum secundatum**	Buffalo
					Briza subaristata *	
					Pennisetum clandestinum *	Kikuyu
					Senecio madagascariensis *	Fireweed
					Hypochaeris radicata	Cat's Ear

Appendix B

Scientific Name	Exotic	Common Name	NSW status	Comm. status	Lot 87	Road verge
Crinia signifera		Common Eastern Froglet	P			Y
Litoria fallax		Eastern Dwarf Tree Frog	P		Y	Y
Limnodynastes peronii		Brown-striped Frog	P		Y	
Ctenotus robustus		Robust Ctenotus	P			Y
Eulamprus quoyii		Eastern Water-skink	P			Y
Saproscincus mustelinus		Weasel Skink	P			Y
Pogona barbata		Bearded Dragon	P		Y	
Varanus varius		Lace Monitor	P		Y	Y
Cacophis squamulosus		Golden-crowned Snake	P			Y
Coturnix sp.		Unidentified Quail	P			Y
Macropygia phasianella		Brown Cuckoo-Dove	P			Y
Spilopelia chinensis	*	Spotted Turtle-Dove			Y	
Podargus strigoides		Tawny Frogmouth	P		Y	Y
Apus pacificus		Fork-tailed Swift	P	C,J,K	Y	Y
Hirundapus caudacutus		White-throated Needletail	P	V,C,J,K		Y
Cacatua galerita		Sulphur-crested Cockatoo	P		Y	Y
Eolophus roseicapilla		Galah	P		Y	Y
Zanda funereus		Yellow-tailed Black-Cockatoo	P			Y
Platycercus elegans		Crimson Rosella	P			Y
Platycercus eximius		Eastern Rosella	P		Y	Y
Trichoglossus chlorolepidotus		Scaly-breasted Lorikeet	P		Y	Y
Trichoglossus haematodus		Rainbow Lorikeet	P			Y
Eudynamys orientalis		Eastern Koel	P		Y	Y
Scythrops novaehollandiae		Channel-billed Cuckoo	P		Y	Y
Dacelo novaeguineae		Laughing Kookaburra	P		Y	Y
Todiramphus sanctus		Sacred Kingfisher	P			Y

Appendix B

Scientific Name	Exotic	Common Name	NSW status	Comm. status	Lot 87	Road verge
Eurystomus orientalis		Dollarbird	P		Y	Y
Malurus cyaneus		Superb Fairy-wren	P			Y
Acanthiza nana		Yellow Thornbill	P			Y
Acanthiza pusilla		Brown Thornbill	P		Y	Y
Sericornis frontalis		White-browed Scrubwren	P			Y
Pardalotus punctatus		Spotted Pardalote	P		Y	Y
Acanthorhynchus tenuirostris		Eastern Spinebill	P			Y
Anthochaera carunculata		Red Wattlebird	P			Y
Caligavis chrysops		Yellow-faced Honeyeater	P		Y	Y
Manorina melanocephala		Noisy Miner	P		Y	Y
Philemon corniculatus		Noisy Friarbird	P			Y
Phylidonyris niger		White-cheeked Honeyeater	P			Y
Coracina novaehollandiae		Black-faced Cuckoo-shrike	P		Y	
Colluricincla harmonica		Grey Shrike-thrush	P			Y
Pachycephala pectoralis		Golden Whistler	P			Y
Cracticus nigrogularis		Pied Butcherbird	P		Y	
Gymnorhina tibicen		Australian Magpie	P		Y	Y
Rhipidura leucophrys		Willie Wagtail	P		Y	
Corvus coronoides		Australian Raven	P		Y	
Grallina cyanoleuca		Magpie-lark	P		Y	
Hirundo neoxena		Welcome Swallow	P		Y	
Acridotheres tristis	*	Common Myna			Y	
Zosterops lateralis		Silvereye	P			Y
Neochmia temporalis		Red-browed Finch	P			Y
Antechinus stuartii		Brown Antechinus	P			Y
Isoodon macrourus		Northern Brown Bandicoot	P			Y

Appendix B

Scientific Name	Exotic	Common Name	NSW status	Comm. status	Lot 87	Road verge
Petaurus norfolcensis		Squirrel Glider	V,P			Heard nearby
Pseudocheirus peregrinus		Common Ringtail Possum	P			Y
Trichosurus vulpecula		Common Brushtail Possum	P			Y
Pteropus poliocephalus		Grey-headed Flying-fox	V,P	V		Heard nearby
Austronomus australis		White-striped Freetail-bat	P			Y
Chalinolobus gouldii		Gould's Wattled Bat	P			Y
Vespadelus vulturnus		Little Forest Bat	P			Y
Miniopterus australis		Little Bent-winged Bat	V,P			Y
Miniopterus orianae oceanensis		Large Bent-winged Bat	V,P			Y
Rattus fuscipes		Bush Rat	P			Y
Rattus rattus	*	Black Rat				Y
Vulpes vulpes	*	Fox			Y	
Oryctolagus cuniculus	*	Rabbit			Y	Y
				Total	29	54

APPENDIX C. BOSET REPORT

South Coast Ecology
Ecological consulting and research
Kiah, NSW

30 September 2022

OUR REF: SCE0012

Client name: **87 Oakdale Road, Gateshead**

ATTENTION: Jason Wasiak

RE: **Ecological Assessment Report for Proposed Rezoning of Land and adjacent Public Road at 87 Oakdale Road, Gateshead.**

Dear Jason,

1.0 Introduction

South Coast Ecology was commissioned by JW Planning to undertake field surveys and present a biodiversity assessment report for a proposed rezoning of the above address. This advice is to guide the design and implementation of a planned rezoning, so that appropriate biodiversity and planning outcomes can be established, and the project can avoid, minimize, or mitigate impacts on biodiversity where possible.

Statutes addressed in this report include:

- Biodiversity Conservation Act 2016;
- State Environmental Planning Policy (Koala Habitat); and,
- Environment Protection and Biodiversity Conservation Act 1999.

1.1 The Site

The location of the site and its context is depicted in Figure 1.

The site comprises two (2) areas of land:

a) Lot 87 being land that is heavily disturbed and predominately clear of native vegetation given a history of informal land use ranging from grazing, a dirt bike track, and to the storage of large industrial equipment; and

LEGEND:

- Lot 87 - part of the study area
- Road Verge - part of the study area

(LPI NSW Imagery 2020; NSW Spatial Services 2020)

Prepared by John Paul King
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FIGURE 1.0

Description of the Study Area

JOB ADDRESS:	Gateshead, NSW	A3 SCALE:	1:14000
CLIENT:	Oakdale Group	PLAN DATE:	29/01/2022
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b) Oakdale Road to the extent it forms a frontage to Lot 87. Access to the site involves the informal verge of Oakdale Road which, while disturbed, contains native vegetation that is likely to be impacted by future development of the site.

The purpose of this report is to enable an assessment of a proposal to rezone the land to enable future industrial land uses consistent with the adjoining industrial zoned land.

1.2 Methods

Field surveys were undertaken in accordance with guidelines over three seasons during 2021 and early 2022 (See Table 1 for details). Surveys included a series of parallel walking transects (2 meters apart), floristic plots (400m^2), stag watching, diurnal fauna surveys and nocturnal surveys. Data collected included, plant species, fauna species/habitat, nesting and roosting habitats, hollow bearing trees, significant flora species presence/habitat, and community data to determine vegetation types, refer to Figure 1.1.

Table 1. Field Surveys

Date	Flora	Fauna	Plant communities	Habitat	Tree Hollows	Targeted
27/07/2021	2 Hours -Plant survey meanders (2m apart). Habitat descriptions for	2 Hours- Habitat searches, and identification of fauna species, i.e. birds, reptiles and mammals	1 hour- Survey of draft community descriptions.	1 hour- searches for evidence of fauna, scats and scratches	30 Min- Recording of tree hollows onsite	*Diuris praecox* and other rare species surveys.
18/09/2021	3 Hours – BAM Plots	2 hours-Nocturnal surveys of tree hollows usage and marsupial activity.			2 hours-Nocturnal surveys of tree hollows usage and marsupial activity.	*Tetratheca juncea, Diuris praecox* and other rare species surveys
05/10/2021		2 Hours- Habitat searches, and identification of fauna species, i.e. birds, reptiles and mammals				*Tetratheca juncea* and other rare species surveys
12/11/2021		2 Hours- Habitat searches, and identification of fauna species, i.e. birds, reptiles and mammals.			2 hours-Nocturnal surveys of tree hollows usage and marsupial activity and bat activity.	*Tetratheca juncea* and other rare species surveys
31/01/2022	1 hr- Survey of area proposed for clearing in traffic report	2 Hours- Habitat searches, and identification of fauna species, i.e. birds, reptiles and mammals.	1 hour- Completion of final community descriptions.			

LEGEND:

- Walking targeted flora transects
- BAM Plots
- Stag watching transects and nocturnal surveys
- Lot 87 Site Boundary
- Road Verge Site Boundary

(LPI NSW Imagery 2020; NSW Spatial Services 2020)

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FIGURE 1.1

Subject Site Surveys

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2.0 Results

2.1 Background-Identified key habitats in the Local area and relevance to the subject site

The site in on the lower reaches of the conglomerate Adamstown formation that runs up to Dudley Bluff. The local area is well vegetated and includes remnants of high conservation value in Lake Macquarie. These remnants provide significant local population habitats for Squirrel glider, *Tethratheca juncea*, and *Diuris praecox*. The site is highly modified, having been cleared and managed as pasture for a extended period. Notwithstanding, there are small areas of native habitats present onsite and areas of good quality native vegetation in road reserves. Whilst there are only minor habitat opportunities onsite, it's condition and relationship with local biodiversity must be considered in any future development application documents.

Our review of biodiversity data for the local area shows that in addition to habitats for threatened species, populations, communities and their habitats, there are also local ecological issues (often these overlap) requiring special consideration, Refer to Table 2.

Table 2. LGA relevant biological considerations.

Local Area ecological management considerations	Relevance to habitats on the subject site
Squirrel glider local population is known to all remnants in the local matrix and forms part of the Northeast section of the LGA wide glider management strategy. As such, any clearing of native habitat or interruptions to connections could impact on individuals and populations.	A total of 11 trees were record onsite. Of these, 7 have hollows suitable for glider use. On site, these trees occur in two groups; those along the northern boundary of the site, and a clump of 4 near the southern boundary. The gap between these groups makes movement for gliders unlikely (<30m, trees less than 6m tall, ground flat). However, individuals could move from surrounding habitats to and from these trees, and as such all trees onsite are considered part of the local habitat for Squirrel gliders.
LMCC Tetratheca juncea population. (Lake Macquarie T. juncea Planning and Management Guidelines 2014)	*Tetratheca juncea* is known to occur in the local area with a high number of clumps recorded adjacent to the site and surrounding remnants, which form part of sector 1 population as described in the guidelines. Given the controlled and cleared nature of the site, the site is unlikely to provide habitat, however, targeted surveys are required to confirm. The planning goal for this sector is to maintain connectivity between this sector and Central North-east sector and securing long term conservation reserve boundaries is important to facilitate management Development proposals will require a Development Application to be accompanied by a BDAR assessment to understand the potential impact of any development onsite to the local surrounding population.

2.2 Habitat types identified on and surrounding the Subject Site

2.2.2 Listed Flora

Listed flora species known to the local area as shown in Table 3. Where suitable habitat for a species (highlighted in the table below) is identified onsite, appropriate seasonal surveys are conducted which is discussed further in this report.

Table 3. Listed flora in the local area

Species name	Common name	NSW	EPBC	*Species name*	Common name	NSW	EPBC
Rutidosis heterogama	Heath Wrinklewort	V	V	*Eucalyptus camfieldii*	Camfield's Stringybark	V	V
Senecio spathulatus	Coast Groundsel	E1		*Melaleuca biconvexa*	Biconvex Paperbark	V	V
Tetratheca juncea	Black-eyed Susan	V	V	*Rhodamnia rubescens*	Scrub Turpentine	E4A	CE
Epacris purpurascens var. purpurascens		V		*Syzygium paniculatum*	Magenta Lilly Pilly	E1	V
Pultenaea maritima	Coast Headland Pea	V		*Diuris praecox*	Rough Doubletail	V,P,2	V
Callistemon linearifolius	Netted Bottle Brush	V,3		*Muehlenbeckia sp. Mt Norman*	Scrambling Lignum	V	
Grevillea shiressii		V	V	*Grevillea parviflora subsp. parviflora*	Small-flower Grevillea	V	V
Zannichellia palustris		E1					

2.2.3 Listed Fauna

Listed terrestrial fauna species known to the local area are shown in Table 4. There is habitat available on the site for the species highlighted which is discussed further in this report.

Table 4. Listed flora in the local area

Species name	Common name	NSW	EPBC	*Species name*	Common name	NSW	EPBC
Crinia tinnula	Wallum Froglet	V,P		*Phascolarctos cinereus*	Koala	V,P	V
Hirundapus caudacutus	White-throated Needletail	P	V,C,J,K	*Petaurus norfolcensis*	Squirrel Glider	V,P	
Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P		*Petauroides volans*	Greater Glider	P	V
Lophoictinia isura	Square-tailed Kite	V,P,3		*Potorous tridactylus*	Long-nosed Potoroo	V,P	V
Callocephalon fimbriatum	Gang-gang Cockatoo	V,P,3		*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V
Calyptorhynchus lathami	Glossy Black-Cockatoo	V,P,2		*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P	
Glossopsitta pusilla	Little Lorikeet	V,P		*Micronomus norfolkensis*	Eastern Coastal Free-tailed Bat	V,P	
Lathamus discolor	Swift Parrot	E1,P,3	CE	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P	
Ninox connivens	Barking Owl	V,P,3		*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P	
Ninox strenua	Powerful Owl	V,P,3		*Vespadelus troughtoni*	Eastern Cave Bat	V,P	
Tyto novaehollandiae	Masked Owl	V,P,3		*Miniopterus australis*	Little Bent-winged Bat	V,P	
Tyto tenebricosa	Sooty Owl	V,P,3		*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P	
Daphoenositta chrysoptera	Varied Sittella	V,P		*Pseudomys novaehollandiae*	New Holland Mouse	P	V
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P					
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E				

2.3 Survey Results

2.3.1 Flora

In total 97 flora species were recorded across both Lot 87 and the road verge. Flora within Lot 87 was dominated by exotic flora species which accounted for 75% of total flora and 89% of the land surface. Overstorey native tree species are present on the northern boundary and a smaller clump on the southern boundary. By comparison the road verge had three distinctive areas of vegetation providing a range of habitat for flora species. The top of the verge at the most eastern extent is dominated by native flora and likely provides important habitat for native flora. The central portion has a broad cleared area that is dominated by exotic flora and is unlikely to provide any important habitat for flora and the south-eastern extent, whilst also

being modified does include areas of native flora and habitats. Notwithstanding the potential for habitats, surveys did not record any listed flora species on Lot 87 or the road verge.

2.3.1 Fauna

In total 29 fauna species were recorded on Lot 87. By comparison 54 species were recorded in the road verge. Common forest and forest edge (open area specialists) bird species represented 54% of the fauna diversity in Lot 87. Five pest species were identified (Rabbit, Fox) in Lot 87 but generally all in low numbers. Two listed micro-bats species (Little Bent-winged Bat, Large Bent-winged Bat) were recorded in on Lot 87, both species are cave dwelling bats and are known to inhabit the local area. Flying Fox and Squirrel glider were heard during nocturnal surveys in the local remnant outside of site.

2.3.2 Vegetation

There are small remnants of one native plant community on Lot 87. This community is also adjacent to the Subject Site in road verge. Most of the site is dominated by exotic plant communities, refer to Table 5 and Figure 2.

Table 5. Plant communities recorded in the Study Area

PCT	Typical plants onsite	Area	Condition	Lot 87	Road Verge
1638 - Smooth-barked Apple - Red Bloodwood - Scribbly Gum grass - shrub woodland on lowlands of the Central Coast	*E. racemose* *A. costata* *Acacia longifollia var. sophorae* *Acacia longifollia var. sophorae* *Hardenbergia violiaceae*	0.27ha	Poor condition community providing moderate quality habitat for a small number of threatened species	Found on northern and small clump on southern boundary	Found in eastern and western extent of verge.
Managed exotic and native grasslands	*Stenotaphrum secundatum- Axonopus affinis- Cynodon dactylon, Pennisetum clandestinum*	0.9ha	Poor condition man made environment	Most of the Lot 87	Found in central portion of verge.

2.3.4 Tree Hollows

Surveys recorded 15 trees in Lot 87, of which 10 trees have one or more hollows. In total, 28 hollows were identified of varying sizes and quality (Refer to Table 6 and Figure 3). No large tree hollows (Owl hollows) were identified. To confirm usage and value in the local context tree hollows were stage watched over 2 nights. One Brush-tailed possum was recorded leaving a hollow on the northern boundary (See Table 6 and Figure 1).

Table 6. Trees and tree hollows recorded onsite.

Individual	Tree species	DBH (mm)	Hollow Number	Hollow Type/Data	GPS	Understory Notes:
Tree 1	*Eucalyptus racemosa*	700	5	1 med spout 4 small lateral branches	-32.99223, 151.70426	*Exocarpos cupressiformis, Imperata cylindrica* Buffalo, Kikuyu
Tree 2	*Eucalyptus racemosa*	650	5	1 med vertical spout 4 small lateral branches 1 kingfisher/kooka nest in termite	-32.992119, 151.704300	Acacia falcata juvs, P.undulatum juv Exocarpos cupressiformis juv Buffalo
Tree 3	*Eucalyptus racemosa*	750	5	2 med spouts 3 small lateral branch	-32.992072, 151.704209	Bidens pilosa, Buffalo
Tree 4	*Angophora costata*	490	0		-32.991883, 151.704957	Native peas, Lomandra, Native violet, P. undulatum, Bracken
Tree 5	*Angophora costata*	540	1		-32.991863, 151.704862	Eucalyptus juvs, Native violet, P.undulatum Buffalo
Tree 6	*Angophora costata*	430	1	Small Lateral branch forming	-32.991889, 151.704830	Persoonia linearis, Native violet

Tree 7	*Angophora costata*	510	0		-32.991850, 151.704601	*Dipodium variegatum* at base Hardenbergia violeacea, Native couch, Guinea grass, Kikuyu, Buffalo
Tree 8	*Eucalyptus racemosa*	825	0		-32.991793, 151.704708	Kikuyu, Ambrosia, Bidens pilosa, Hovea sp & native twiners
Tree 9	*Angophora costata*	710	2	1 vertical spout forming 3 branch forming	-32.991743, 151.704415	Juv Cheese tree & Eucalypts, Cynodon, Imperata *Tricoryne elatior* at base
Tree 10	*Eucalyptus racemosa*	850	3	3 lateral branch	-32.991727, 151.703816	Cryptostylis erecta small colony at base Themeda triandra, Cynodon, Imperata Acacia falcata juvs Bracken Juv Stringy Gums
Tree 11	*Eucalyptus racemosa*	375	0		-32.991940, 151.703958	Bitou Bush, Lantana Imperata, Morning Glory
Tree 12	*Eucalyptus pilularis*	450	1	ground hollow	-32.992395, 151.703579	Bitou Bush, some juv acacia, Lantana
Tree 13	*Eucalyptus racemosa*	800	4	1 vertical spout 3 lateral branch	-32.992391, 151.703527	Bitou Bush, Lantana Imperata, Morning Glory
Tree 14	*Eucalyptus pilularis*	500	0	3 lateral branch	-32.992441, 151.703341	Bitou Bush, Lantana Imperata, Morning Glory
Stag 15	Stag		0		-32.992424, 151.703357	Bitou Bush, Lantana Imperata, Morning Glory

2.4 Habitat Zones

Three habitat zones were identified onsite, and one class- poor condition. Refer to Table 6 and Figure 4 for details of habitat zones onsite.

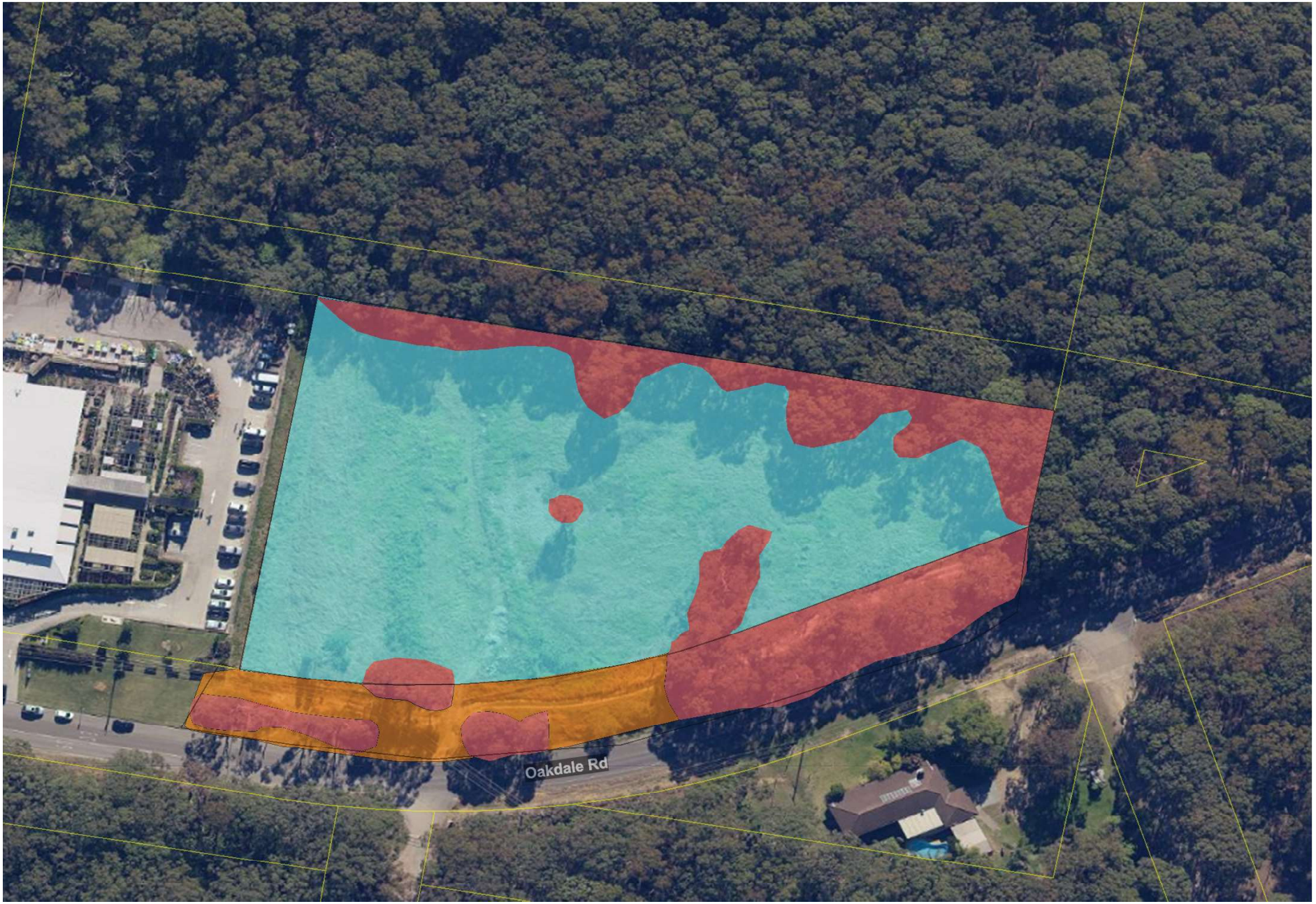
Table 6. Habitat for native species in the Study Area

Zone	Description	Location	Area	Important habitat	Comments for consideration
1	Remnant trees on southern boundary	Adjacent to preferred entrance point		Hollows provide habitat and tree cover is used by native species. These areas are however largely devoid of native understory flora species and habitat. Unlikely to be important habitat, however tree hollow loss for management of local squirrel glider population is an important consideration.	These trees provide supplementary habitat value to the surrounding vegetation. Hollows are present and use of these trees by native species was observed during survey. It is likely that these trees are used by listed species from time to time.
2	Remnant trees on northern boundary and eastern portion of site	At rear of subject site adjacent to good condition healthy vegetation		Hollows provide habitat and tree cover is used by native species. These areas are however largely devoid of native understory flora species and habitat. Unlikely to be important habitat, however tree hollow loss for management of local squirrel glider population is an important consideration.	These trees provide supplementary habitat value to the surrounding vegetation. Hollows are present and use of these trees by native species was observed during survey. It is likely that these trees are used by listed species from time to time.
3	Poor condition pasture and exotic grasslands	Majority of the site		No habitat for native species.	This area of the subject site is of little ecological value.
4	Poor condition exotic	Existing access point an alternative		Marginal habitat for native species.	This area of the road verge is of little

Zone	Description	Location	Area	Important habitat	Comments for consideration
	vegetation and cleared area	on road verge			ecological value. And in comparison, to other parts of the verge the most suitable for access. (in ecological terms)
5	Good condition native vegetation	Road verge		Good quality native habitat connected to large patches, provides important habitats for a few listed species	This area of the road verge is important habitat. A small area of this vegetation is required to be trimmed or an individual tree removed to improve sight at the driveway. Refer to trim line on Figure 4.

Habitat for native fauna also differs from surrounding vegetation. The remnant area outside of Lot 87 and the road verge site provides a wide range of habitat for native species, including, nesting and foraging habitats for marsupials, micro-bats, birds, and foraging habitat for flying foxes. By comparison, Lot 87 is lacking in foraging, nesting habitats and refuge areas for most native species known to the local area.

Photographs highlight the vegetation, conditions classes and habitat zones discussed above. The photographs also describe the non-native vegetation in the sites and Figure 2 and 3 shows the respective distribution of these communities and habitats.



LEGEND:

- 1638 - Smooth-barked Apple - Red Bloodwood - Scribbly Gum grass - shrub woodland on lowlands of the Central Coas
- Managed exotic and native grasslands
- Managed exotic and native grasslands Road Verge
- Site Boundary

FIGURE 2.0

Vegetation communities

JOB ADDRESS:	Gateshead, NSW	A3 SCALE:	1:14000
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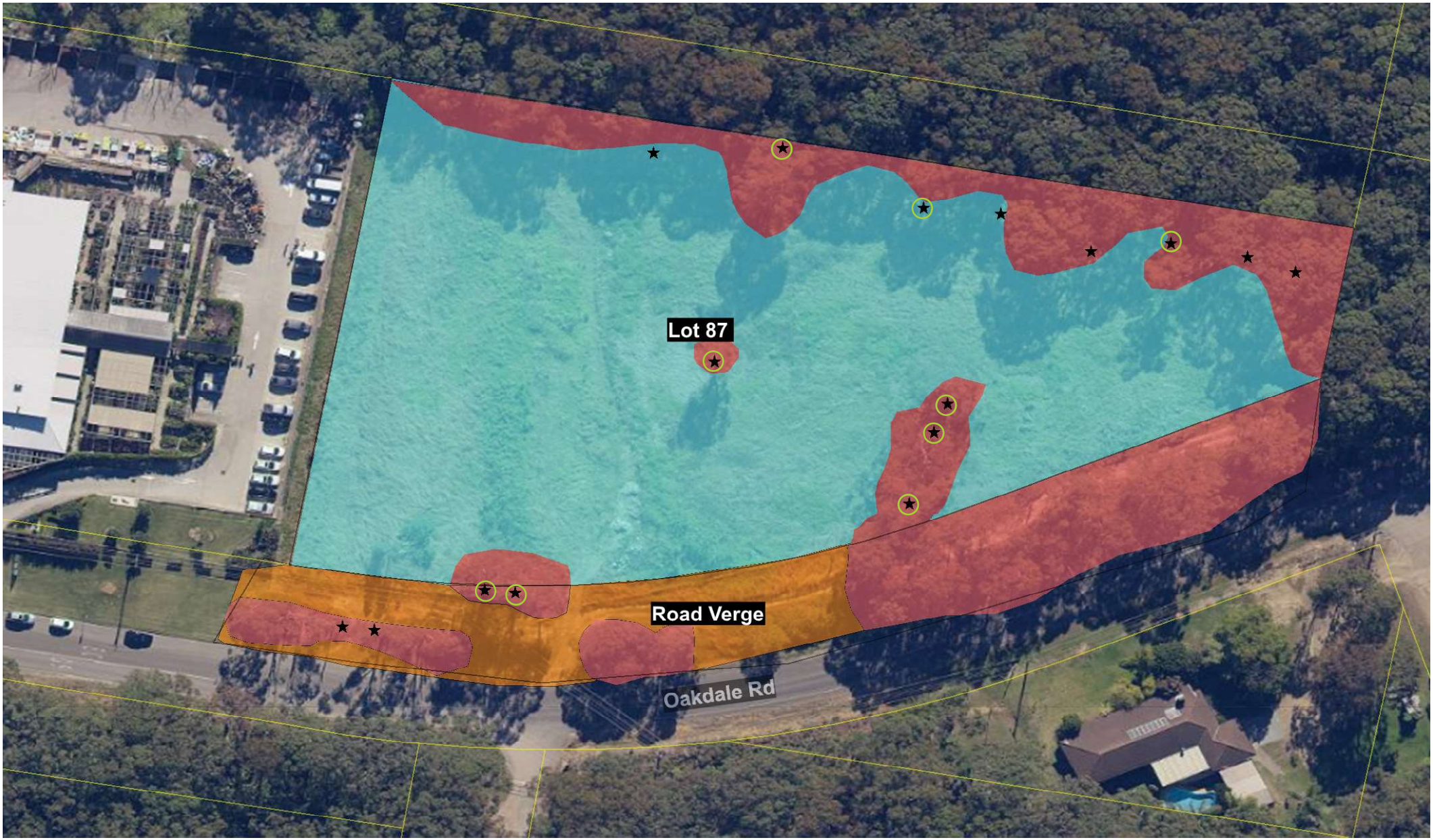

LEGEND:

- Trees
- Trees with hollows, cracks or fissures present
- 1638 - Smooth-barked Apple - Red Bloodwood - Scribbly Gum grass - shrub woodland on lowlands of the Central Coas
- Managed exotic and native grasslands
- Managed exotic and native grasslands Road Verge
- Site Boundary

(LPI NSW Imagery 2020; NSW Spatial Services 2020)

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FIGURE 3
Tree Hollows

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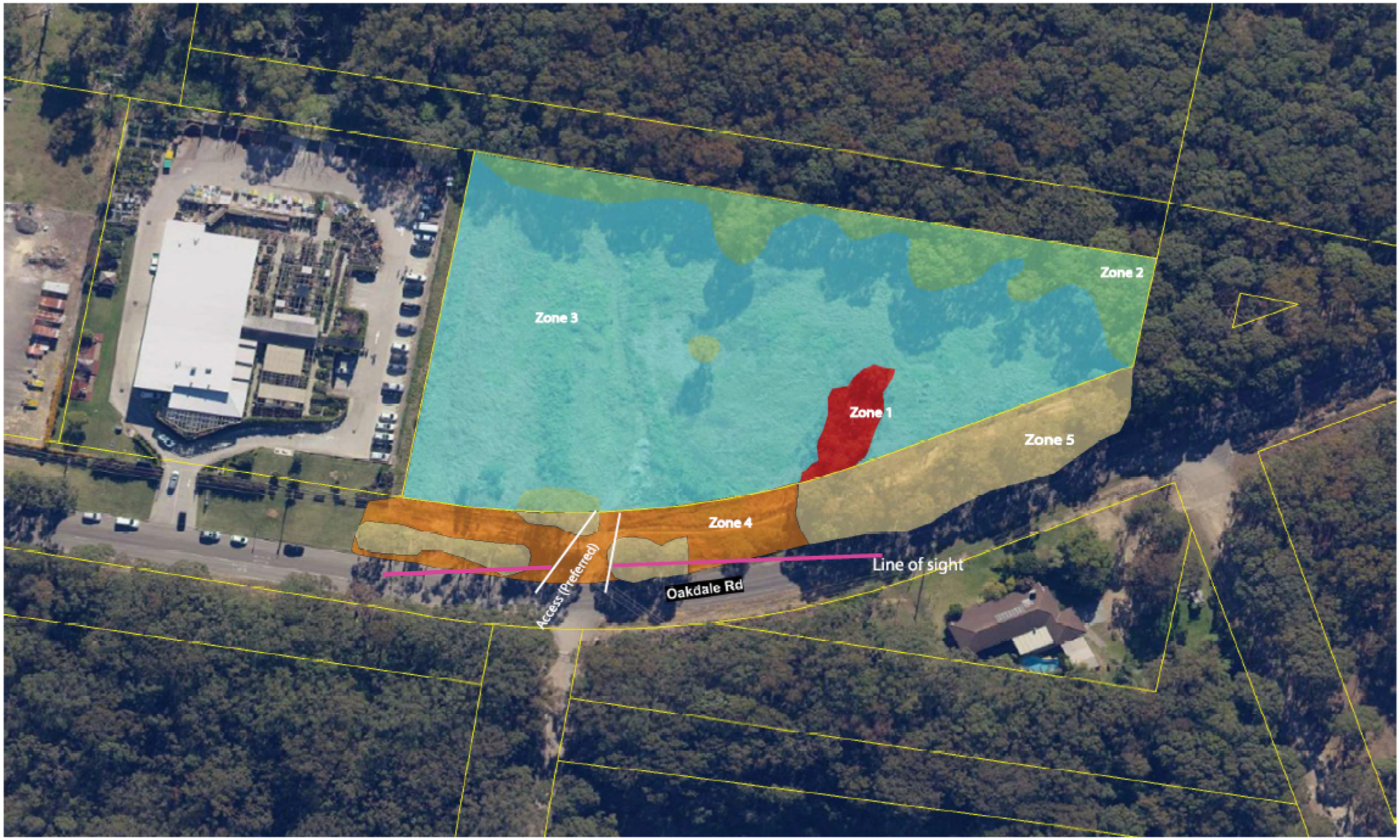

LEGEND:

Lot 97:

- Zone 1
- Zone 2
- Zone 3

Road Verge:

- Zone 4
- Zone 5

(LPI NSW Imagery 2020) NSW Spatial Services 2020)
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FIGURE 4.0

Zones recorded onsite

JOB ADDRESS:	Gaveshead, NSW	A3 SCALE:	1:14000
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Photograph 1. *This is typical of the plant cover in Zone 1. Dominated by Scribbly, with managed Bladdy grass as the understory. This tree is closet to the southern boundary.*

Photograph 2. *Zone 1 adjacent tree to photograph 1 has suitable hollows for gliders but the area lacks understory and native species.*

Photograph 3. *Zone 1- Scribbly gum adjacent to the southern boundary, the high level of management is evident in the photograph*

Photograph 4. *Zone 1- Scribbly gum adjacent to the southern boundary, further west than the other clump. Suitable hollows for native species, mixture of exotic and native flora in the understory.*

Photograph 5. *Zone 1- Scribbly gum adjacent to tree above. No hollows for native species, mixture of exotic and native flora in the understory.*

Photograph 6. *Zone 2- At the north/eastern boundary of the Subject Site there is a clump of trees, species in this clump include Smooth-barked Apple and Scribbly gum. There are a higher number of native flora species in this area, however, their cover and condition are controlled by maintenance.*

Photograph 7. *Zone 2- Evidence of suitable trees hollows for native species and native flora species present in understory*

Photograph 8. *Zone 2 – Evidence of suitable trees hollows for native species and native flora species present in understory*

Photograph 9. *Zone 2- further west along the southern boundary there are two scattered trees.*

Photograph 10. *Zone 2- further west along the southern boundary there are scattered trees.*

Photograph 11. *Zone 2- further west along the southern boundary there are scattered trees.*

Photograph 12. *Zone 2- further west along the southern boundary there are scattered trees.*

Photograph 13. *Zone 4- alternate access point typical of non-native areas of road verge. Exotic and native species, no trees or native shrubs present. This is looking west.*

Photograph 14. *Zone 4- Preferred access point on road verge. Exotic and native species, no trees but one native shrub present. This is looking east.*

Photograph 15. *Zone 5- road verge. Exotic and native species, no trees or native shrubs present. Healthy example of PCT* ***1638 - Smooth-barked Apple - Red Bloodwood - Scribbly Gum grass - shrub woodland on lowlands of the Central Coast.***

2.5 Potentially affected threatened species, risks, and mitigation options

Table 7. Species that may be found on site or in the local area, and potential mitigation and management measures

Species name	Common name	Location of habitat	Risks	Mitigation and Management	Can these potential risks be managed?	Future works needed?
Rutidosis heterogama	Heath Wrinklewort	Road Reserve Zones- 5 87 Oakdale Rd Zones- None	Low. Not recorded during flowering season, unlikely to be onsite.	There is habitat for this species in Zone 5- road verge, however this habitat area is only on the ridge top and upper slopes of the cut.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Tetratheca juncea	Black-eyed Susan	Road Reserve Zones- 5 87 Oakdale Rd Zones- None	Low. Not recorded during flowering season, unlikely to be onsite.	There is habitat for this species in Zone 5- road verge, however this habitat area is on the ridge top and upper slopes of the cut. On the lower slopes and within 2 metres of the road verge the vegetation is exotic and managed.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Diuris praecox	Rough Doubletail	Road Reserve Zones- 5 87 Oakdale Rd Zones- None	Low. Not recorded during flowering season, unlikely to be onsite.	There is habitat for this species in Zone 5- road verge, however this habitat area is on the ridge top and upper slopes of the cut. On the lower slopes and within 2 metres of the road verge the vegetation is exotic and managed.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Haliaeetus leucogaster	White-bellied Sea-Eagle	Road Reserve Zones- 4 & 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during flowering season, unlikely to be onsite.	White-bellied Sea-Eagle can be found using isolated trees for roosting and thus could be found in Zone 1,2, 4 or 5.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Callocephalon fimbriatum	Gang-gang Cockatoo	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during flowering season, unlikely to be onsite.	Gang-gang Cockatoo is a forest bird so Zones 1,2 and 5 are potential habitat.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.

Species name	Common name	Location of habitat	Risks	Mitigation and Management	Can these potential risks be managed?	Future works needed?
Calyptorhynchus lathami	Glossy Black-Cockatoo	Road Reserve Zones- 5 87 Oakdale Rd Zones- None	Low. No Allocasuarina recorded in Lot 87 and no suitable sized hollows for this species. Recorded outside of the site in local area vegetation habitat during surveys.	Where possible plantings of Allocasuarina spp. within landscape designs.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Tyto novaehollandiae	Masked Owl	Road Reserve Zones- 4 & 5 87 Oakdale Rd Zones- 1,2, and 3	Not recorded during surveys, however the open edge nature of the site and the local area is ideal foraging habitat for this species.	The inclusion of specific Masked Owl Nest box to retained trees would be beneficial.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Daphoenositta chrysoptera	Varied Sittella	Road Reserve Zones- 5 87 Oakdale Rd Zones- None	Low. Not recorded during surveys and tends to prefer more dense habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during surveys but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Petaurus norfolcensis	Squirrel Glider	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Moderate. Squirrel Glider population in the local area is important for conservation of the species at the wider scale. Recent research by the author in the local patches shows not all patches are occupied and not many of the occupied patches are fully used, so a basic patch size, connectiveness approach may overestimate population size.	The retention of zone 1 trees will retain tree hollows and habitat adjacent to potential corridor; however, the development will still result in the loss of 6 trees with hollows. This can be mitigated by replacement; however, this may be inconsistent with the Squirrel glider management strategy.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.

Species name	Common name	Location of habitat	Risks	Mitigation and Management	Can these potential risks be managed?	Future works needed?
Pteropus poliocephalus	Grey-headed Flying-fox	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during surveys but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during surveys but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during surveys, but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Scoteanax rueppellii	Greater Broad-nosed Bat	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during surveys, but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Vespadelus troughtoni	Eastern Cave Bat	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Not recorded during surveys, but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.
Miniopterus australis	Little Bent-winged Bat	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Recorded during surveys, but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.

Species name	Common name	Location of habitat	Risks	Mitigation and Management	Can these potential risks be managed?	Future works needed?
Miniopterus orianae oceanensis	Large Bent-winged Bat	Road Reserve Zones- 5 87 Oakdale Rd Zones- 1 & 2	Low. Recorded during surveys, but can be often found in similar habitats in the local area.	The retention of zone 1 trees will retain what marginal habitat there is. The design of the development must be sensitive to downstream impacts on surrounding habitats.	Yes.	Further Assessment required at Development Application stage to inform design to enable avoidance or mitigation of impact where appropriate.

2.6 General species conditions and recommendations

2.6.1 flora

There is no habitat on Lot 87 for listed flora species. By contrast there is suitable habitat within the road reserve for several species, however the proposed access point and tree line trimming will not remove or modify any areas of suitable native habitat for these species. The historical clearing and ongoing maintenance have removed and controlled habitats for these species. The road verge does however provide habitat for several of the listed species. Surveys undertaken in this zone targeting these species did not locate any individuals. Notwithstanding, we recommend that the access point for the development be in the already cleared and weedy zone 4. Zone 5- road verge will be impacted by trimming of branches and possible loss of an individual tree. Whilst this scale of impact is small, further surveys will be required to inform access and egress design at DA stage.

2.6.2 Mammals (Koala, Squirrel Glider, micro-bats and Grey-headed Flying Fox)

Whilst there is habitat for threatened non-flying mammals on Lot 87 this proposed rezoning is unlikely to cause significant impacts on these species. There may be downstream impacts on habitat, but these risks can be managed by the design of suitable sensitive development on the land. Micro-bats will lose foraging habitats but again this will be minimal and can be offset. Grey-headed flying fox could use the local area extensively and will only be impacted if changes in hydrological are extensive enough to impact on food resource downstream. The implementation of a well-designed storm water management system that controls hydrological regimes and qualities to the highest standard will mitigate impacts on these species.

Squirrel glider habitat could potentially be impacted by future development. We recommend the integration of zone 1 vegetation into landscape design of any future DA for development (See Figure 3). This will retain 3 of the 10 hollows onsite and improve the corridor connection along Oakdale Road. Even the loss of a small number of hollows from the local area can be deleterious, however without an understanding of patch occupancy, percentage of patch utilised, quantification of resources in the patch i.e. number of hollows and winter flowering shrubs it is impossible to determine the level of impact on the local population. Whilst the LMMC management strategy has modelled occupancy, critically our data suggests that this may be an overestimation of the local population. Nonetheless, further assessment specific to the design of a proposed land use will serve to clarify this issue.

Therefore, we recommend further assessment is undertaken as part of any DA design preparations to include adjoining habitats to obtain this data and better inform the likelihood of impacts. Notwithstanding, the complications in estimating impacts on the local population, there is scope onsite and in the local area to compensate for this small degree of potential loss of habitat or avoid the potential for adverse impact by the retention of hollow bearing trees as part of the landscaping within future development proposals.

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2.6.3 Birds

Glossy Black Cockatoo was recorded adjoining the site on several occasions. Following the 2019-2020 fires that devastated habits for this species, coastal habitats that have local populations, such as this local area, are likely critical to the long-term survival of the species (others are currently doing work on this). Whilst this loss of these small number of non-breeding trees is not a direct impact on the species, we recommend that a suitable nest box be installed in Zone 1 trees.

2.6.4 Endangered Ecological Communities

No endangered ecological communities were identified onsite.

2.6.5 Limitations

No limitations of this study were identified.

3.0 Outcomes of Surveys, Conclusions and Recommendations

The focus of assessing biodiversity impacts in NSW has shifted so that greater efforts are made to protect biodiversity at the earliest stages of project design. Specifically, to submit documentation for approval, the proponent must demonstrate that they have undergone four major steps, these are:

1. Project design, as much as possible, shall avoid areas of native vegetation and other habitats for native species (i.e., caves); then,

2. Minimise biodiversity impacts further by smart sustainable design and integration of biodiversity conservation objectives; then,

3. Only after all attempts are made in step 1 and 2 to avoid and minimise impacts on biodiversity, one can then begin to assess the final design against biodiversity: and finally,

4. The proponent must then commit to proposed offsets for all residual impacts.

This report has been prepared to assist and guide the sustainable design in line with step 1 and 2 above. The design and site selection for this project has avoided areas of native remnant biodiversity, and whilst the project does include the removal of a very small area of potential poor condition habitat for Squirrel glider, with the implementation of proposed measures, none of these impacts are likely to be significant in nature.

The Office of Environment and Heritage (OEH) Biodiversity Values Map (BV Map) showed that the Subject Site is not mapped as Biodiversity Value (BV) land, But the Study Area is (as defined by the *Biodiversity Conservation Regulation 2017)*. The Biodiversity Offset Scheme (BOS) threshold of native vegetation clearing associated with the study area is >0.5ha (See supplementary material). If the planned clearing of native vegetation were to exceed 0.5ha then this would trigger the Biodiversity Assessment Method (BAM) and BOS. Additional ecological assessment works would be required to determine the suitable offsets for the proposed activity. Mapping shows that the direct impacts on the Subject Site are unlikely to result in a Serious and Irreversible Impact.

Assessment of the proposal under other relevant environmental policy instruments including Koala Habitat Protection SEPP confirms that the proposal will not impact on koala habitat.

3.1 Biodiversity Offsets Scheme

The BOS threshold is a test used to determine when to undertake a BAM to assess the impacts of a proposal, thus triggering the BOS or the Significant impact tests.

The Biodiversity Conservation Regulation 2017 sets out threshold levels for when the BOS will be triggered. The threshold has two elements:

1. Whether the amount of native vegetation being cleared exceeds a threshold area, or

2. Whether the impacts occur on an area mapped on the Biodiversity Values map published by the Chief Executive of the NSW Office of Environment and Heritage.

If clearing and other impacts exceeds either trigger, the BOS applies to the proposed development including biodiversity impacts prescribed by Section 6.1 of the Biodiversity Regulation 2017.

The BOSET report (See Appendix A) reports that the planned area crosses into the BV Map area and therefore triggers the BOS and a Development Application will require that a Biodiversity Development Assessment Report (BDAR) be prepared consistent with the BAM.

3.2 Conclusion and Recommendations

In conclusion, this assessment has identified some issues that will require further ecological works to be undertaken during the preparation of a Development Application. Largely, these additional works are triggered due to Squirrel glider habitat. Nonetheless, because this project will only result in clearing of a very small area of habitat, this should be a streamlined assessment. In short, the conclusions that can be drawn thus far, and the issues requiring further investigations as part of a DA process are:

- The use of the land for industrial Land use purposes is unlikely to impact on the life cycle of any species, populations, or communities so that they are put at further risk pursuant to the BC Act;
- The use of the land for industrial Land use purposes is unlikely to trigger the need to prepare a BDAR;
- Future development is likely to require a VMP and the integration of vegetation into a landscape scheme;
- It is unlikely to result in offsets as the process should result in no net change in the vegetation integrity, thus no credits will be generated;
- There appears to be scope for any design for future land use to clear less than 0.5ha of vegetation, thereby an Offset liability is not necessarily likely; and,
- The use of the land for industrial Land use purposes is unlikely to trigger for Koala Habitat Protection SEPP.

Yours Sincerely,

John Paul King
Principal Ecologist

Supplementary material

- **Appendix A - Flora recorded**
- **Appendix B –Fauna recorded**
- **Appendix C – BOSET report**

Appendix A

Job No/name: Oakvale Rd, Gateshead	Date: 31/01/22	Plot ID: 1A	Bearing: NNW GPS: (-32.992059, 151.703610)	Staff:GS
-				
Tree: 0%	Shrub: 3%	Vine: 15%	Litter: 0.5%	
Mid: 0%	Grass: 95%	Weeds: 99%	Forbs:	

Upper	C	Ab	Mid	C	Ab	shrub Lower	C	Ab	ground Lower (Con.)	C	Ab
			Acacia longifollia var. sophorae	###	1	*Hardenbergia violiaceae*	###				
			Westringia fruiticosa	###	5	*Kennedia rubicundra*	<1		*Lomandra lonfifolia var. longifolia*	0.2	5
			Chrysanthemoides monilifera subsp. rotundata *	2%	20				*Juncus ucitatus*	<1	10
			Sida rhombifolia *	0.5	10				*Commelina cyanea*	<1	
			Crotaliaria lanceolata *	<1	10	*Ipompea indica* *	15	50	*Cynodon dactylon*	3	
			Verbena bonariensis *	1	15	*Vicia sativa* *	<1	20	*Cyperus eragrostis* *		
			Bidens pilosa *	1	10	*Plantago sp.* *	1	30	*Andropogon virginicus* *	10	
			Lactuca serriola *	<1	10	*Hypocharis radiata* *	###	20	*Pennisetum clandestinum* *	2	
			Euryops chrysanthemoides *	0.5	4	*Neomarica caerulea* *	<1		*Setaria sphacelata* *		
			*Rumex crispus**	2	10	*Trifolium repens* *	<1	20	*Megathyrsus maximus var. maximus* *	5	
			Cirsium vulgare *	0.1		*Medicago sp.* *	<1	15	*Cortaderia sp.* *	1%	2
			Oenothera lindheimeri *	0.1					*Stenotaphrum secundatum* *	85%	
			Senecio madagascariensis *	0.1	5				*Paspalum dialatum* *	1.5	20
			Conyza sumatrensis *	1	10				*Sporobolus africanus* *	<1%	

C(%cover)= 0.1, 0.20.3, …1,2,3…10,15,20,25…(nearest 5%)

Ab (abundance)= 1-20,50,100,500,1000 (greater than twenty estimate only. Overhanging count as 1.

Job No/name: Oakvale Rd, Gateshead	Details: bam 1b	Date: 31/01/22	Plot ID: 1B	Bearing: NNW GPS: (-32.9920362, 151.7036119

Temp(_27__), Rain(_no__),clouds(___no_____),wind_speed(_12km/hr__),wind_direc(__SE_), water_cond(____),(start_T(_____),Finish_T(_____),Photo (_yes__)

Stem Size class (DBH 1.3 High)	**Presence and Absence (>50cm)**	**Hollow Bearing Trees**			**Leaf_Lit (5 x1m2 plots) (5,15,25,35,45 along transect)offset first 5 metres___Includes all debris <10cm. Attached or onground**				Notes:
<5CM	P_n_/A_1_		A. longifolia var. sophorae	0	**I**	**Leaf Litter (gm)/cover%**	**Bare gr(%)**	**Rocks(%)**	Rocks' in plot are foreign concrete - dumped
5-9cm	P_n_/A__	No&Spec_T			1(0ffset)	0 (NB: 100% live veg cover)	0	0	
10-19cm	P_n_/A__				2	0 (NB: 100% live veg cover)	0	0	Fauna observations: frog possibly Crinia signifera,
20-29cm	P_n_/A__	No_Holl			3	0 (NB: 100% live veg cover)	0	0	channel billed cuckoo, fairy wrens
30-49cm	P_n_/A__				4	0 (NB: 100% live veg cover)	0	0	2 mini ridge lines from ground works? Compacted ground
50-79cm	P_n_/A__	No_G_Holl			5	5%	0	5	Adjacent troughs supporting a few natives
>80cm	P_n_/A__	Total= 0							
		Metres of debris on ground(>10cm_W&>50cm_L							
		Total= 0							

Weeds (%),clearing_Erosion_EdgeEffects_Grazing_Fire_other.

Weeds 100%	Minimal shrubs, no trees

Habitat description:

Resilience improved at Northen end of transect - juv Eucs, Acacias, Native grasses & groundcover appearing

	Job No/name: 87 Oakdale Rd, Gateshead			Date: 31/01/22			Plot ID: 2A			Bearing: E GPS: (-32.992401, 151.703915)		Staff: GS	
	Overall cover												
	Tree: 0			Shrub: 23%			Vine: 17%			Litter: 2%			
	Mid: 3%			Grass: 25%			Weeds: 80%			Forbs: 14%			
	Upper	**C**	**Ab**	**Mid**	**C**	**Ab**	**Lower**	**C**	**Ab**	**Lower (Con.)**	**C**	**Ab**
1	*Glochidion ferdinandi*	3%	5	*Acacia falcata*	1%	5	*Ipomoea indica* *	15%		*Andropogon virginicus* *	40	500
2	*Allocasuarina littoralis*	0.5	1	*Breynia oblongafolia*	1%	10	*Ipomoea cairica* *	1%		*Megathyrsus maximus var. maximus* *	2	
3	*Banksia integrifolia juv.*	0.1	1	*Lantana camara* *	20%	50	*Araujia sericifera* *	1%		*Paspalum dialatum* *	2	
4	*Acacia juv*	<1	10	*Sida rhombifolia* *	1%	15				*Bromus catharticus*	1	
5				*Kennedia rubicundra*	0.1	5				*Setaria sphacelata* *	1	
6				*Rubus fruiticosus sp. agg.* *	0.1	5				*Stenotaphrum secundatum**	15	
				Hydrocotyle bonariensis *	####	20				*Cynodon dactylon*	3	
7				*Conyza sumatrensis* *	1	20				*Briza subaristata* *	1	
8				*Foenecium vulgare* *	10%	200				*Pennisetum clandestinum* *	15	
9				*Verbena bonariensis* *	1%	30				*Eragrostis sp.* *	0.5	
10				*Bidens pilosa* *	2%	50				*Sporobolus africanus* *	0.5	
11				*Ambrosia sp.* *	2%	100				*Agave attenuata* *	1	
12				*Plantago sp.* *	1							
13				*Rumex crispus* *	5%	75						
14				*Senecio madagascariensis* *	0.1	5						
15												
16												
17												
Note:	C(%cover)= 0.1, 0.20.3, …1,2,3…10,15,20,25…(nearest 5%)						Ab (abundance)= 1-20,50,100,500,1000 (greater than twenty estimate only. Overhanging count as						

Job No/name: Oakvale Rd, Gateshead	Details:BAM 1B			Date: 31/01/21 & 2/2/22		Plot ID: 2B	Bearing: E GPS: (-32.992401, 151.703915)				
Temp(_30/21__), Rain(__no/yes_),clouds(___no/yes_____),wind_speed(_37km/hr__),wind_direc(__S_), water_cond(____),(start_T(_____),Finish_T(_____),Photo_yes(_x_)											
Stem Size class (DBH 1.3 High)	**Presence and Absence (>50cm)**	**Hollow Bearing Trees**			**Leaf_Lit (5 x1m2 plots) (5,15,25,35,45 along transect)offset first 5 metres___Includes all debris <10cm. Attached or onground**				Notes :		
<5CM	P_y_/A__19	No&Spec_T	A. costata	0	**No**	**Leaf Litter (gm)/cover%**	**Bare gr(%)**	**Rocks(%)**	includes access road in plot = approx 75m2 bare track		
5-9cm	P_y_/A__2		E. pilularis	0	1(0ffset)	0 (NB: 100% live veg cover)	0	0%	evidence of suburban dumping - garden waste -->		
10-19cm	P_y_/A__10		E. racemosa	14	2	0 (NB: 100% live veg cover)	0	0%			
20-29cm	P_y_/A__4		A. littoralis	0	3	10	0	0			
30-49cm	P__y/A__8		E. piperita	0	4	85%	5%	10%			
50-79cm	P__y/A__2		G. ferdinandi	0	5	100%	0	0			
>80cm	P_n_/A__0	No_Holl	14								
		No_G_Holl	0								
		Total= 14									
		Metres of debris on ground(>10cm_W&>50cm_L									
		Total= 3 m									
Weeds (%),clearing_Erosion_EdgeEffects_Grazing_Fire_other.											
Access rd used for 4x4 and dirt bikes --> erosion & compaction in future											
Habitat description:											
0-20m of plot- weed infested with minimal native recruitment											
1 x Cheese Tree - height 5m, understory of Lantana											
impenetrable weeds at W end of plot, increased resilience at E. intact leaf & bark mulch layer support native grasses & groundcovers											
Some native recruitment on edge of access rd ie. where exotic competition thins											

Habitat recorded onsite and species recorded during all surveys.

Job No/name: Oakvale Rd, Gateshead			Date: 31/01/22			Staff:GS	
Plot ID: Habitat 2 (bam 2)			Bearing: E	GPS: -32.992255, 151.704498			
Native							
CANOPY		**SHRUB**		**VINES**		**GROUND**	
Eucalyptus racemosa	Snappy Gum	*Allocasuarina littoralis*		*Desmodium varians*		*Pteridum esculentum*	Bracken Fern
Eucalyptus pillularis	Blackbutt	*Banksia integrifolia*	Coastal Banksia	*Desmodium rhytidophyllum*		*Centella asiatica*	Gotu Kola
Eucalyptus piperita	Sydney Peppermint	*Bossiea obcordata*		*Hardenbergia violacea*	False Sarsparilla	*Lomandra obliqua*	Fishbone Lomandra
Angophora costata	Snmooth-bark Apple	*Hibbertia diffusa*	Wedge Guinea Flower	*Cassytha glabella f. glabella*		*Lomandra multiflorum*	
		Pittosporum undulatum		*Kennedia rubicundra*	Running Postman	*Lomandra longifolia*	Basket Grass
		Exocarpos cupressiformis	Cherry Ballart	*Eustrephus latifolius*	Wombat Berrt	*Lomandra filiformis*	
		Acacia falcata		*Hibbertia dentata*		*Lepidosperma laterale*	
		Acacia longifolia ssp. sophorae		*Cissus antarctica*	Kangaroo Vine	*Dianella caerulea var. assera*	Blue-flax Lily
		Polyscias sambuccifolia		*Hovea linearis*		*Lobelia purpurea*	White root
		Glochidion ferdinandi	Cheese Tree			*Pseuderanthemum variable*	Pastel Flower
		Breynia oblongifolia	Coffee Bush			*Viola hederacea*	Native Violet
		Acacia ulicifolia	Prickly Moses			*Cryptostylis erecta*	Common Bonnet Orchid
		Dodonea triquetra				*Xanthorrhoea latifolia subsp. latifolia*	Grass Tree
						Thelymitra sp.	Sun Orchid
						Imperata cylindrica	Blady Grass
						Rytiodsperma pallidum	Wallaby Grass
						Cynodon dactylon	Couch
						Themeda triandra	Kangaroo Grass
						Entolasia stricta	Right angled Grass
						Poa affinis	
						Ghania sp.	Saw sedge
						Echinopogon sp.	Echidna Grass

Exotic						
CANOPY	**SHRUB**		**VINES**		**GROUND**	
	Senna pendula var. glabrata		Ipomoea indica	Blue Morning Glory	*Andropogon virginicus* *	Whiskey Grass
	Chrysanthemum monifera ssp. rotunda	Bitou Bush	*Ipomoea cairica* *	Purple Morning Glory	*Cortaderia sp.* *	Pampas
	Lantana camara	Lantana	*Araujia sericifera* *	Moth Vine	*Megathyrsus maximus var. maximus* *	Guinea Grass
	Conyza sumatrensis *	Tall Fleabane			*Paspalum dialatum* *	
	Sida rhombifolia *	Paddy's Lucerne			*Bidens pilosa* *	Farmers Friend
	Rubus fruiticosus sp. agg. *	Blackberry			*Setaria sphacelata* *	Foxtail Grass
	Verbena bonariensis *	Purple Top			*Stenotaphrum secundatum**	Buffalo
					Briza subaristata *	
					Pennisetum clandestinum *	Kikuyu
					Senecio madagascariensis *	Fireweed
					Hypochaeris radicata	Cat's Ear

Appendix B

Scientific Name	Exotic	Common Name	NSW status	Comm. status	Lot 87	Road verge
Crinia signifera		Common Eastern Froglet	P			Y
Litoria fallax		Eastern Dwarf Tree Frog	P		Y	Y
Limnodynastes peronii		Brown-striped Frog	P		Y	
Ctenotus robustus		Robust Ctenotus	P			Y
Eulamprus quoyii		Eastern Water-skink	P			Y
Saproscincus mustelinus		Weasel Skink	P			Y
Pogona barbata		Bearded Dragon	P		Y	
Varanus varius		Lace Monitor	P		Y	Y
Cacophis squamulosus		Golden-crowned Snake	P			Y
Coturnix sp.		Unidentified Quail	P			Y
Macropygia phasianella		Brown Cuckoo-Dove	P			Y
Spilopelia chinensis	*	Spotted Turtle-Dove			Y	
Podargus strigoides		Tawny Frogmouth	P		Y	Y
Apus pacificus		Fork-tailed Swift	P	C,J,K	Y	Y
Hirundapus caudacutus		White-throated Needletail	P	V,C,J,K		Y
Cacatua galerita		Sulphur-crested Cockatoo	P		Y	Y
Eolophus roseicapilla		Galah	P		Y	Y
Zanda funereus		Yellow-tailed Black-Cockatoo	P			Y
Platycercus elegans		Crimson Rosella	P			Y
Platycercus eximius		Eastern Rosella	P		Y	Y
Trichoglossus chlorolepidotus		Scaly-breasted Lorikeet	P		Y	Y
Trichoglossus haematodus		Rainbow Lorikeet	P			Y
Eudynamys orientalis		Eastern Koel	P		Y	Y
Scythrops novaehollandiae		Channel-billed Cuckoo	P		Y	Y
Dacelo novaeguineae		Laughing Kookaburra	P		Y	Y
Todiramphus sanctus		Sacred Kingfisher	P			Y

Appendix B

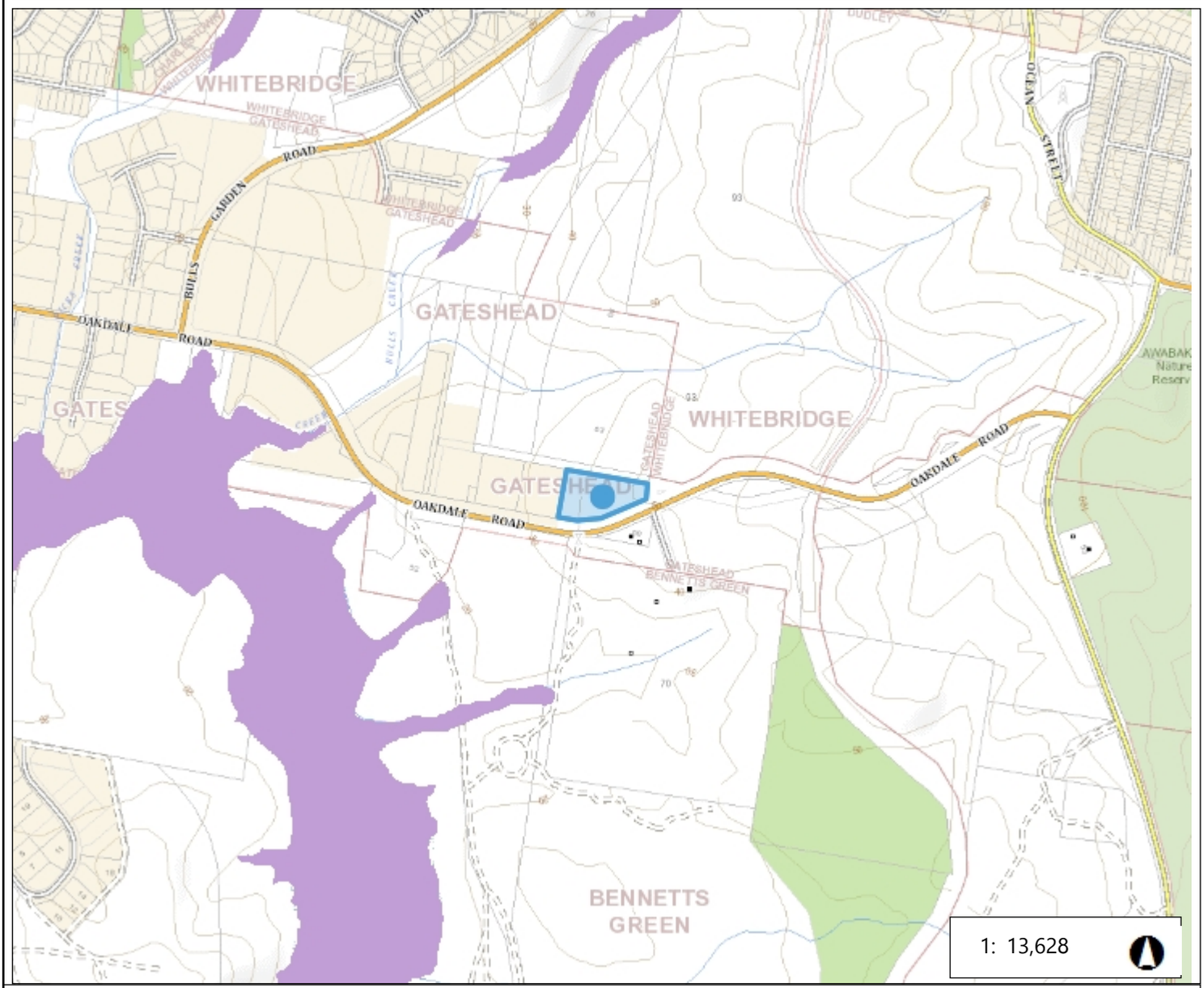
Scientific Name	Exotic	Common Name	NSW status	Comm. status	Lot 87	Road verge
Eurystomus orientalis		Dollarbird	P		Y	Y
Malurus cyaneus		Superb Fairy-wren	P			Y
Acanthiza nana		Yellow Thornbill	P			Y
Acanthiza pusilla		Brown Thornbill	P		Y	Y
Sericornis frontalis		White-browed Scrubwren	P			Y
Pardalotus punctatus		Spotted Pardalote	P		Y	Y
Acanthorhynchus tenuirostris		Eastern Spinebill	P			Y
Anthochaera carunculata		Red Wattlebird	P			Y
Caligavis chrysops		Yellow-faced Honeyeater	P		Y	Y
Manorina melanocephala		Noisy Miner	P		Y	Y
Philemon corniculatus		Noisy Friarbird	P			Y
Phylidonyris niger		White-cheeked Honeyeater	P			Y
Coracina novaehollandiae		Black-faced Cuckoo-shrike	P		Y	
Colluricincla harmonica		Grey Shrike-thrush	P			Y
Pachycephala pectoralis		Golden Whistler	P			Y
Cracticus nigrogularis		Pied Butcherbird	P		Y	
Gymnorhina tibicen		Australian Magpie	P		Y	Y
Rhipidura leucophrys		Willie Wagtail	P		Y	
Corvus coronoides		Australian Raven	P		Y	
Grallina cyanoleuca		Magpie-lark	P		Y	
Hirundo neoxena		Welcome Swallow	P		Y	
Acridotheres tristis	*	Common Myna			Y	
Zosterops lateralis		Silvereye	P			Y
Neochmia temporalis		Red-browed Finch	P			Y
Antechinus stuartii		Brown Antechinus	P			Y
Isoodon macrourus		Northern Brown Bandicoot	P			Y

Appendix B

Scientific Name	Exotic	Common Name	NSW status	Comm. status	Lot 87	Road verge
Petaurus norfolcensis		Squirrel Glider	V,P			Heard nearby
Pseudocheirus peregrinus		Common Ringtail Possum	P			Y
Trichosurus vulpecula		Common Brushtail Possum	P			Y
Pteropus poliocephalus		Grey-headed Flying-fox	V,P	V		Heard nearby
Austronomus australis		White-striped Freetail-bat	P			Y
Chalinolobus gouldii		Gould's Wattled Bat	P			Y
Vespadelus vulturnus		Little Forest Bat	P			Y
Miniopterus australis		Little Bent-winged Bat	V,P			Y
Miniopterus orianae oceanensis		Large Bent-winged Bat	V,P			Y
Rattus fuscipes		Bush Rat	P			Y
Rattus rattus	*	Black Rat				Y
Vulpes vulpes	*	Fox			Y	
Oryctolagus cuniculus	*	Rabbit			Y	Y
				Total	29	54

APPENDIX C. BOSET REPORT

Biodiversity Offset Scheme (BOS) Entry Threshold Map



692.3 0 346.16 692.3 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days

Notes

Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	01/03/2022 11:44 AM		**BDAR Required***
Total Digitised Area	1.1	ha	
Minimum Lot Size Method	LEP		
Minimum Lot Size	40	ha	
Area Clearing Threshold	1	ha	
Area clearing trigger Area of native vegetation cleared	Unknown #		Unknown #
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no		no
Date of the 90 day Expiry	N/A		

*If BDAR required has:

- at least one 'Yes': you have exceeded the BOS threshold. You are now required to submit a Biodiversity Development Assessment Report with your development application. Go to https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor to access a list of assessors who are accredited to apply the Biodiversity Assessment Method and write a Biodiversity Development Assessment Report
- 'No': you have not exceeded the BOS threshold. You may still require a permit from local council. Review the development control plan and consult with council. You may still be required to assess whether the development is '"likely to significantly affect threatened species' as determined under the test in s. 7.3 of the Biodiversity Conservation Act 2016. You may still be required to review the area where no vegetation mapping is available.

Where the area of impact occurs on land with no vegetation mapping available, the tool cannot determine the area of native vegetation cleared and if this exceeds the Area Threshold. You will need to work out the area of native vegetation cleared - refer to the BOSET user guide for how to do this.

On and after the 90 day expiry date a BDAR will be required.

Disclaimer

This results summary and map can be used as guidance material only. This results summary and map is not guaranteed to be free from error or omission. The State of NSW and Office of Environment and Heritage and its employees disclaim liability for any act done on the information in the results summary or map and any consequences of such acts or omissions. It remains the responsibility of the proponent to ensure that their development application complies will all aspects of the *Biodiversity Conservation Act 2016.*

The mapping provided in this tool has been done with the best available mapping and knowledge of species habitat requirements. This map is valid for a period of 30 days from the date of calculation (above).

Acknowledgement

I as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature_____ Date:01/03/2022 11:44 AM