Picton Farm, Picton – Ecological Tests of Significance

Sydney Water

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Template 2.8.1

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Abbreviations

Abbreviation	Description
BC Act	NSW *Biodiversity Conservation Act 2016*
BSA	Biodiversity Stewardship Agreement
BSSAR	Biodiversity Stewardship Site Assessment Report
CEEC	Critically endangered ecological community
EEC	Endangered ecological community
ELA	Eco Logical Australia Pty Ltd
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
TECs	Threatened ecological communities
WRP	Water recycling plant

1. Introduction

Eco Logical Australia Pty Ltd (ELA) was engaged by Sydney Water to complete Tests of Significance under the *Biodiversity Conservation Act 2016* (BC Act) and Assessments of Significance under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for two sites (Figure 1) at Picton Farm, Picton. Picton Farm is in the Wollondilly local government area and owned by Sydney Water. Vegetation within the study area is contiguous with a larger patch of vegetation mapped along Stonequarry Creek and extends south-east along the Nepean River as part of a Biodiversity Stewardship site currently in application. Picton Farm includes open grassy fields which are subject to regular irrigation with recycled water from the Picton Water Recycling Plant (WRP).

The proposed works at the two sites are summarised below. It is unlikely that the whole of subject sites A and B will be impacted, but a worse-case impact area of 1.41 ha has been adopted for the purpose of the assessment.

Table 1: Summary of proposed works and impacts

	Site A - Access track modification	Site B - Channel rehabilitation
Description	The existing track will be modified (widened and levelled) for the construction of a discharge main from the WRP to the Nepean River, and dispersion structure where it surfaces. Works will include underground installation of the discharge main using Horizontal Directional Drilling (HDD). The discharge main will surface approximately 18 m above water level of the Nepean River. Recycled water from the discharge main would enter into a dissipation structure, then flow through a sandstone outcrop and into the Nepean River at the base of Maldon Weir.	The existing overland discharge channel from the Picton Water Recycling Plant (WRP) to Stonequarry Creek will be rehabilitated. This will include installation of a new ~90m x 355 mm pipe, and a new headwall which will be backfilled with gravel and covered with rock rip-rap. A temporary construction laydown and compound area is also proposed.
Impacts	Impacts will be confined to a 12 m wide corridor which includes a hollow-bearing tree, stags, non-habitat trees, large woody debris (logs) and rocky outcrops, wombat burrow and termite mound. The impact area will be reduced (by about half the area) if the preferred access point shown in Figure 2 is adopted.	Impacts will be confined to a 15 m wide corridor for channel 1 and channel 2, and a 5 m wide corridor between Channel 1 and Channel 2 which will be used for access and a bypass hose during construction of Channel 1. Ecological features that could be affected include hollow-bearing trees, a wombat burrow and termite mound. .
Map	Figure 2	Figure 3
Cadastre	Lot 2 DP 818863	Lot 1 DP 818863
Impact area	0.92 ha	0.49 ha

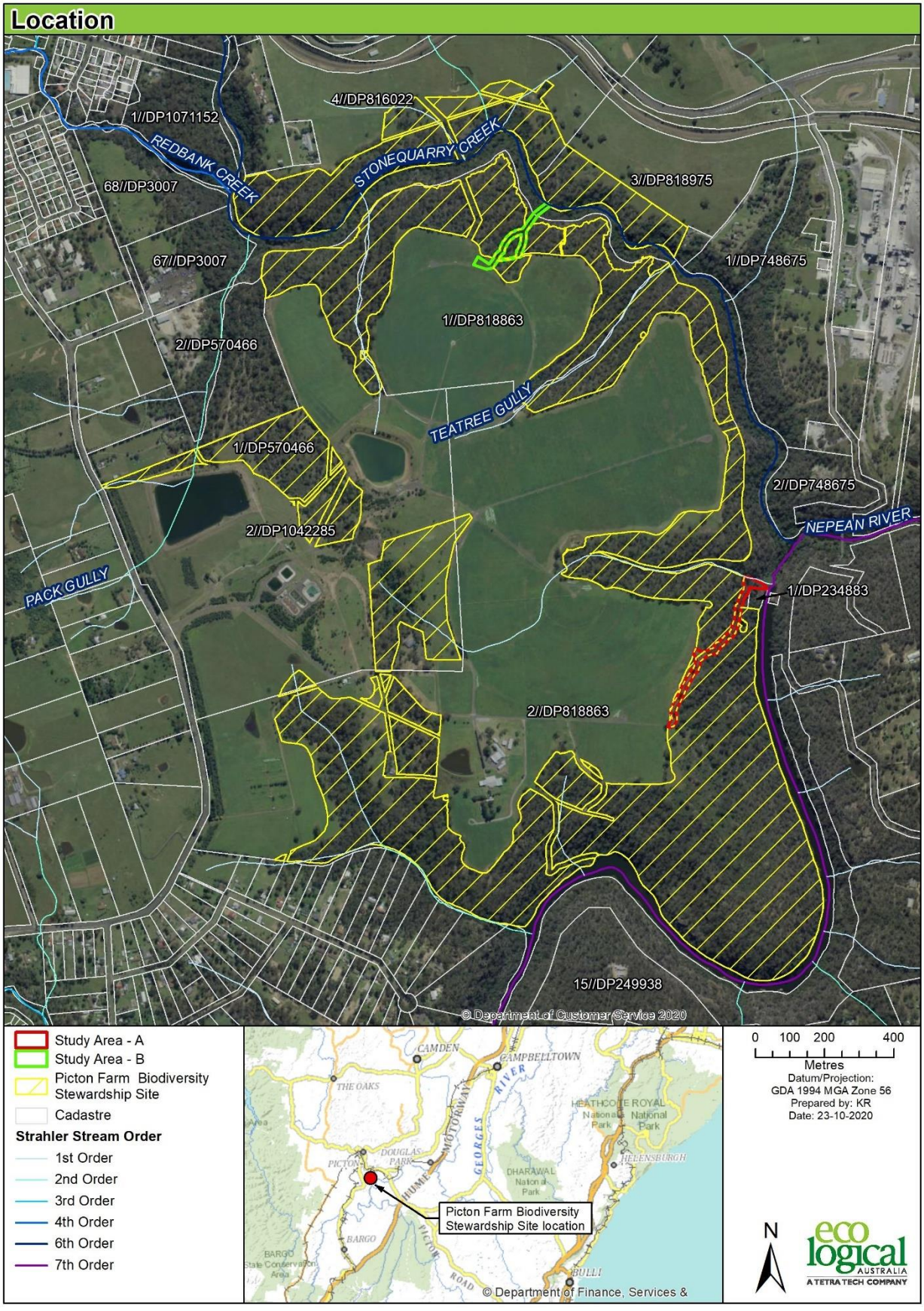

Figure 1: Study area

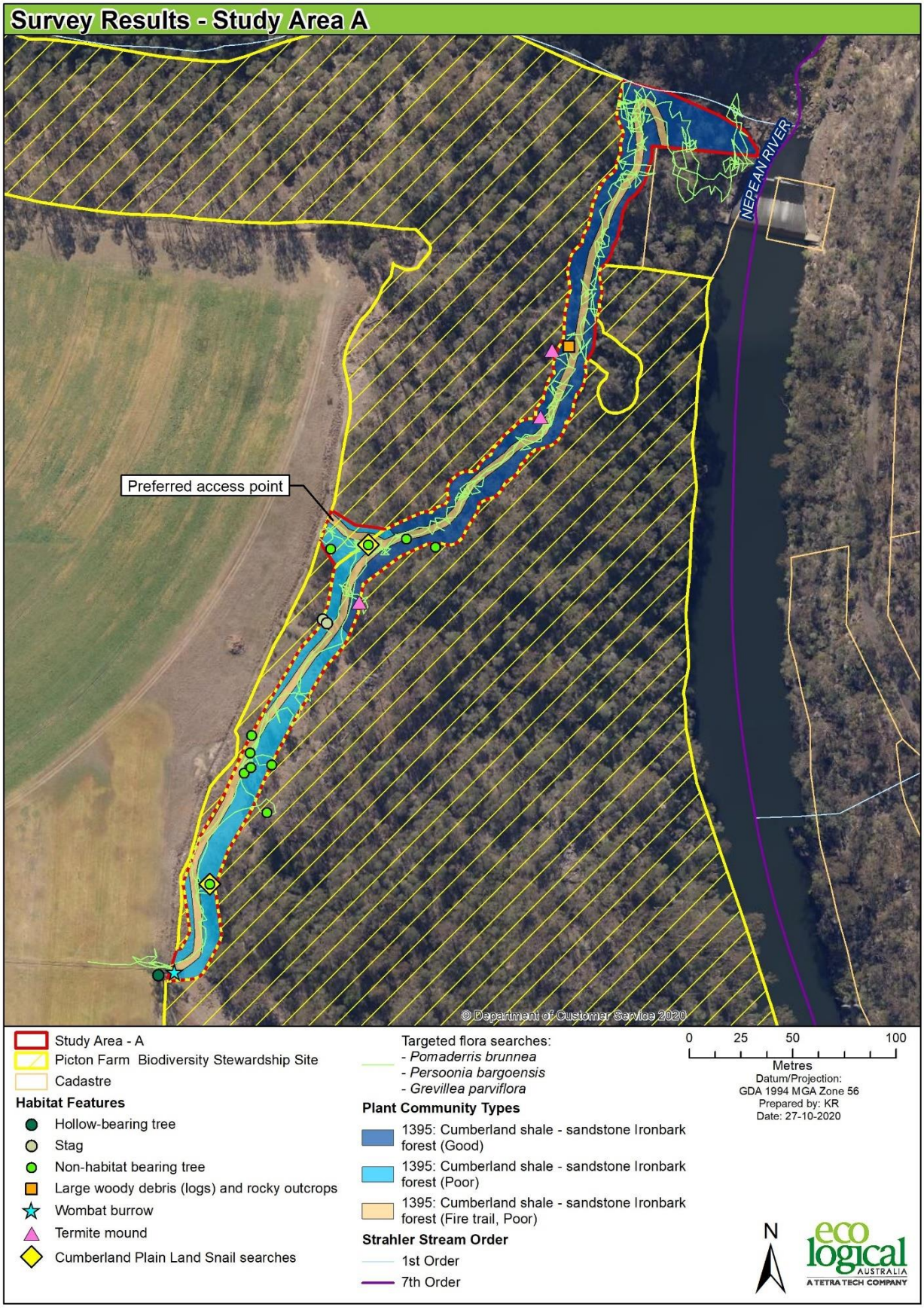

Figure 2: Subject site A – track modification

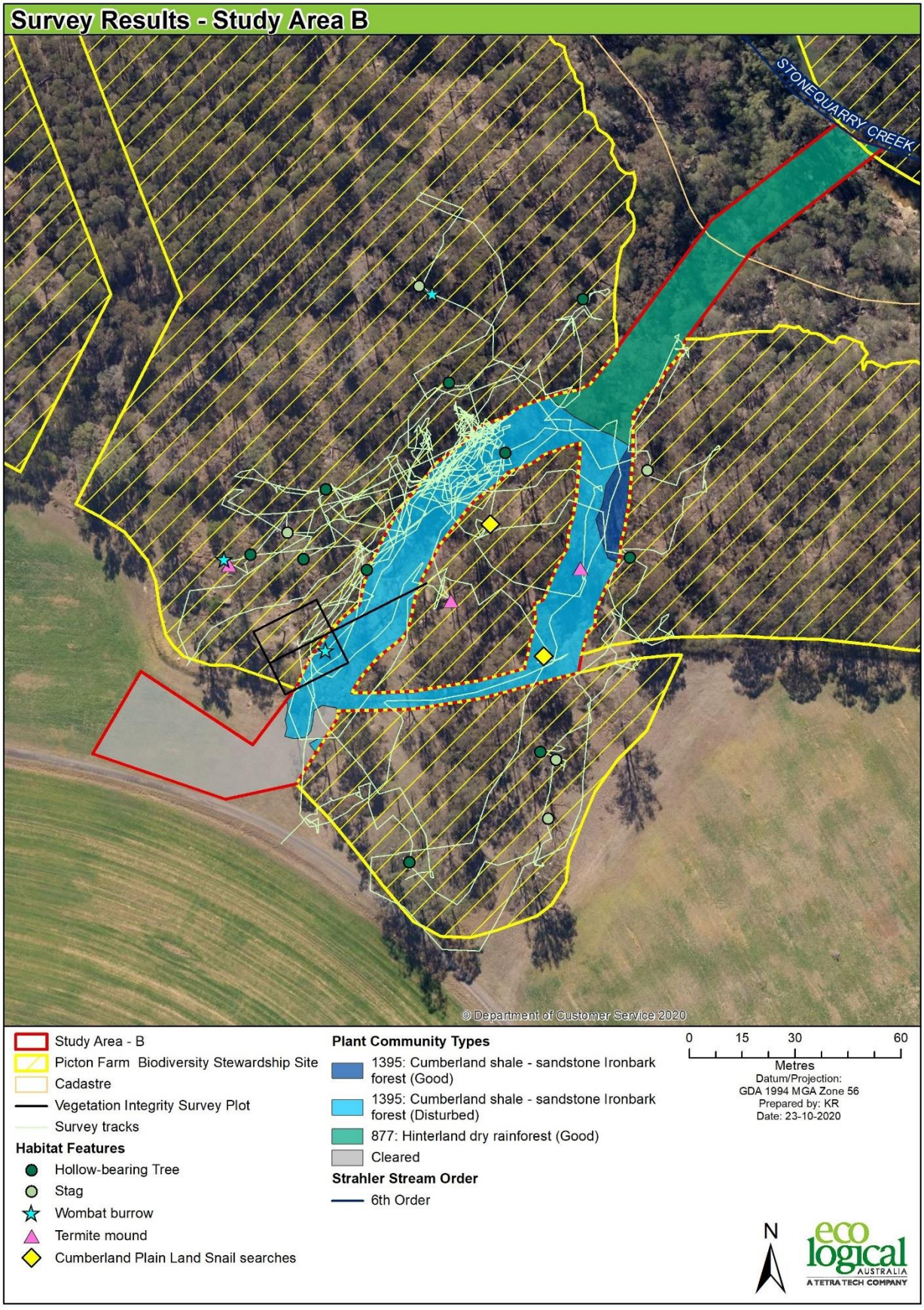

Figure 3: Subject site B – channel rehabilitation

Table 2: Legislative context for the tests of significance

Name	Relevance to the project
Commonwealth	
Environment Protection and Biodiversity Conservation Act 1999	The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) aims to protect Matters of National Environmental Significance (MNES), including vegetation communities and species listed under the EPBC Act. If a development is likely to have a significant impact on MNES, it is likely to be considered a 'Controlled Action' by the Commonwealth and requires assessment and approval by the Commonwealth in order to proceed. EPBC Act assessments of significance are provided in Appendix C.
State	
Environmental Planning and Assessment Act 1979	The proposed activity is to be assessed as part of a Review of Environmental Factors under Part 5 of the *Environmental Protection and Assessment Act 1979* (EP&A Act 1979), with the Sydney Water as the proponent and determining authority.
Biodiversity Conservation Act 2016 (BC Act)	Impacts to threatened species and threatened ecological communities listed under the BC Act are required to be assessed in accordance with Section 7.3 of the BC Act, known as 'tests of significance'. For assessments under Part 5 of the EP&A Act the Biodiversity Offsets Scheme threshold does not apply, as specified in section 7.2 (2). However, declared areas of 'outstanding biodiversity value' under section 7.2(1c) must still be considered. For a Part 5 assessment if the conclusion of the assessments of significance is that there is potential for a significant impact on a threatened species or ecological community, then the proponent has the option of preparing a Species Impact Statement (SIS), or a Biodiversity Development Assessment Report (BDAR) (section 7.8). BC Act tests of significance are presented in Appendix B. As context to the proposal, a Biodiversity Stewardship Site Assessment Report (BSSAR) has been developed by GHD (2019) on behalf of Sydney Water for the surplus vegetated land at the Picton WRP. The area of the proposed Biodiversity Stewardship Agreement (BSA) is shown in Figures 1-3. The application for BSA establishment is under review. The BSA is an in-perpetuity agreement for the landholder (Sydney Water) to offset impacts and achieve no-net-loss of biodiversity as a result of development.
Fisheries Management Act 1994 (FM Act)	The FM Act governs the management of fish and their habitat in NSW. The Schedules of the Act list key threatening processes and threatened species. The FM Act 1994 regulates the provision of permits required in relation to harm to protected marine vegetation (seagrass, macroalgae, mangroves and saltmarsh), dredging, reclamation or obstruction of fish passage on or adjacent to Key Fish Habitat (KFH). This includes direct and indirect impacts, whether temporary or permanent. KFH has been mapped along Stonequarry Creek. Potential aquatic impacts are not considered in this report.
Water Management Act 2000 (WM Act)	The aim of the WM Act is to provide sustainable and integrated management of the state's water for the benefit for both present and future generations. Sydney Water is not required to obtain Controlled Activity approval for works on waterfront land.
Planning Instruments	

Name	Relevance to the project
State Environmental Planning Policy (Coastal Management) 2018 (Coastal Management SEPP)	The proposed development is not located on land subject to the Coastal Management SEPP.
State Environmental Planning Policy No 44 – Koala Habitat Protection (Koala Habitat Protection SEPP)	This SEPP aims to encourage the conservation and management of areas of natural vegetation that provides habitat for koalas to ensure a permanent free-living population over their present range. The proposed development is located within a LGA to which the Koala Habitat Protection SEPP applies. An assessment of Koala habitat will be required in the Flora and Fauna Assessment.
Wollondilly Local Environment Plan 2011 (LEP 2011)	The study area is zoned as RU2 (Low Density Residential) under the Wollondilly LEP 2011. The study area has been zoned under the Picton Conservation Area Significance – local and zoned – Sensitive Land under the Riparian Lands and Watercourses. The proposed works must take these matters into consideration.
Wollondilly Development Control Plan (DCP) 2016	The DCP aims to consider matters such as the removal of trees, heritage values, landscaping for development applications. The proposed works must take some of these matters into consideration.

2. Method

2.1 Literature review and database search

An initial desktop study included a review of databases and previous assessments to assess potential threatened species habitat, including Sydney Water Picton Farm BSA Biodiversity Stewardship Site Assessment Report (GHD 2019) and Constraints Assessment for Stonegully Creek Picton (ELA 2019). A review of readily available data pertaining to the ecology and environmental features of the study area and surrounding area, and existing vegetation mapping was conducted to identify records of threatened species, populations and communities and their potential habitat. Data and vegetation mapping that were reviewed included:

- BioNet (Atlas of NSW Wildlife) database search (5 km) for threatened species, populations and ecological communities listed under the BC Act (August 2020)
- Protected Matters Search Tool (5 km) for threatened and migratory species, populations and ecological communities listed under the EPBC Act (August 2020)
- Aerial mapping and vegetation mapping (OEH 2013) to assess the extent of vegetation including mapped threatened ecological communities (TECs) listed under the BC Act and / or EPBC Act.

Aerial photography (Bing Maps and Google Earth) of the study area and surrounds were also used to investigate the extent of vegetation cover and landscape features. In addition, relevant Geographic Information System datasets (soil, geology, drainage) were reviewed.

Species from both the Wildlife Atlas and Protected Matters online searches were combined to produce a list of threatened species, populations and communities that may occur within the study area.

2.2 Field survey

The field survey for Site A was conducted by ELA ecologist Katy Wilkins on 8 October 2020 and field survey for Site B was conducted by ELA ecologist Belinda Failes on 2 September 2019 (ELA 2019). The aim of the field surveys was to validate the vegetation mapping, conduct threatened flora searches, and record potential habitat. Where the boundaries of vegetation communities differed from existing vegetation mapping, these were modified using ArcCollector mobile application.

The location of habitat features such as important habitat trees and termite mounds were recorded using ArcCollector. Bird species and other fauna were recorded opportunistically. A list of flora and fauna species recorded within the study area was collected during the field survey.

The extent of survey for Site A was expanded to include an alternative access point (shown as the preferred access point on Figure 2) through the proposed Biodiversity Stewardship site. The site inspection aimed to assess and compare the potential ecological impacts of the alternative access to the southern access route.

2.3 Study limitations

This assessment was not intended to provide an inventory of all species present across the study area but instead an overall assessment of the ecological values of the study area with particular emphasis on threatened species, threatened ecological communities and key fauna habitat features. It is important to note that some species may not have been detected on the study area during the inspection as they

may be cryptic or seasonal and only detectable during flowering or during breeding. In this case the likelihood of their occurrence on site has been assessed based on the presence of potential habitat.

Aquatic impacts have not been assessed in this report. General hydrology impacts to riparian vegetation are considered in the Waterway Health Technical Report.

3. Results

At the request of Sydney Water, the results of the two site investigations have been combined to present a cumulative impact. Detailed Tests of Significance are presented in Appendices B and C and summarised below. Ecological features are mapped in Figures 2 and 3.

3.1 Vegetation communities

The areas and condition of the two vegetation communities identified in the combined impact area of 1.41 ha are indicated in Table 3. Shale Sandstone Transition Forest (1.25 ha) is listed as a critically endangered ecological community (CEEC) under the BC Act and EPBC Act, and Western Sydney Dry Rainforest (0.16 ha) is listed as an endangered ecological community (EEC) under the BC Act and CEEC under the EPBC Act.

The vegetation communities were mapped according to the Vegetation Classification System (VIS) Plant Community Types (PCT) and Shale Sandstone Transition Forest corresponds with *PCT 1395 Narrow-leaved Ironbark-Broad-leaved Ironbark-Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion*. This vegetation community transitioned into Western Sydney Dry Rainforest which corresponds with *PCT 877 Grey Myrtle dry rainforest of the Sydney Basin Bioregion and South East Corner Bioregion.*

The local occurrence of PCT 1395 is approximately 1342 ha. Local occurrence is generally defined as contiguous vegetation of the same community. At the time of writing this report, much of this is currently under an application for conservation as a Biodiversity Stewardship site.

A small patch of PCT 877 was recorded as a narrow linear band of vegetation adjacent to a sheltered drainage line along the northern boundary of Site B. This vegetation community was dominated by *Backhousia myrtifolia* and a smaller shrub layer of *Notelaea longifolia.* This gully (Site B) was not assessed or mapped by GHD (2019) for the Biodiversity Stewardship application. Broader vegetation mapping by OEH (2013) did not differentiate gully vegetation from the surrounding Shale Sandstone Transition Forest (PCT 1395). Further detailed assessment would be needed to determine the local occurrence of PCT 877, although broader mapping shows that there is 338 ha remaining, mostly in the Wollondilly LGA.

The area closest to the river at Site A contained a patch of dense exotic species and does not correspond to a native vegetation community.

Table 3: Areas and condition of vegetation communities

PCT	PCT_Name	Condition	Hectares
	Site A – Access track modification		
1395	Narrow-leaved Ironbark-Broad-leaved Ironbark-Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion	Good	0.43
1395	Narrow-leaved Ironbark-Broad-leaved Ironbark-Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion	Poor (Fire trail)	0.22
1395	Narrow-leaved Ironbark-Broad-leaved Ironbark-Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion	Poor	0.26
Sub-total for Site A			*0.92*
	Site B – Channel rehabilitation		
1395	Narrow-leaved Ironbark-Broad-leaved Ironbark-Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion	Good	0.01
1395	Narrow-leaved Ironbark-Broad-leaved Ironbark-Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion	Disturbed	0.32
877	Grey Myrtle dry rainforest of the Sydney Basin Bioregion and South East Corner Bioregion	Good	0.16
Sub-total for Site B			*0.49*
Total	**Sites A & B**		**1.41**

Figure 4: Site A – PCT 1395 Shale Sandstone Transition Forest

Figure 5: Site B - PCT 1395_good Shale Sandstone Transition Forest

Figure 6: Site B - Example of PCT 1395_disturbed – Shale Sandstone Transition Forest

Figure 7: Site B - PCT 877_good Western Sydney Dry Rainforest

3.2 Threatened flora and fauna

The literature review indicated 21 threatened flora and 46 threatened fauna species as having been recorded or having the potential to occur within 5 km of the study area. Appendix A tabulates these species and assesses their likelihood of occurrence at the subject sites. A list of flora and fauna recorded during the field surveys is provided in Appendix D.

There were no records of threatened flora species within the study area. However, there were records for two threatened species, *Grevillea parviflora* subsp *parviflora* and *Persoonia bargoensis* (Bargo Geebung), within 1 km of the study area. It is considered unlikely that threatened flora species habitat is present within the study area, so no tests of significance were conducted for threatened flora species. No threatened flora species were recorded within the study area.

One threatened fauna species *Callocephalon fimbriatum* (Gang-gang Cockatoo) was heard during the field visit on 8 October 2020 and suitable foraging habitat for this species was recorded within the study area. No other threatened fauna species were observed during the field surveys.

Tests of significance were undertaken for 26 threatened fauna species due to the presence of suitable habitat (e.g. hollow-bearing trees) or previous records in the area. These are presented in Appendix B and include:

- Cumberland Land Snail
- Eastern Pygmy Possum
- Spotted-tailed Quoll
- Rosenberg's Goanna

- Parrots
- Woodland birds
- Microchiropteran bats.

A targeted survey was conducted for one threatened fauna species, *Meridolum corneovirens* (Cumberland Plain Land Snail). However, the vegetation lacked suitable habitat resources for Cumberland Plain Land Snail.

The woodland vegetation provides habitat for a number of threatened bird species including several species which have been recorded in the locality of the study area; *Daphoenositta chrysoptera* (Varied Sittella), *Climacteris picumnus victoriae* (Brown Treecreeper) and *Petroica boodang* (Scarlet Robin).

The field survey recorded several subterranean termite mounds within the study area (see photo below as an example). One mound contained scratch marks which could indicate the presence of goanna species or echidna. Subterranean termite mounds are an important habitat feature (breeding sites) for one threatened species, *Varanus rosenbergi* (Rosenberg's Goanna).

Several mistletoes were observed, however, many of these mistletoes appeared deceased. Mistletoe represents important habitat features for the *Anthochaera phrygia* (Regent Honeyeater). This species also prefers Ironbark species which were represented within the study area. This species may be an occasional non-breeding visitor during peak flower blooms.

Koala searches were conducted throughout the study property by GHD (2019), however none were recorded, and the vegetation within the study site contains limited habitat for Koalas.

4. Recommendations

It is recommended that the preferred access is adopted for Site A (shown in Figure 2) as it would have fewer impacts that the longer southern route and there would be no loss of biodiversity values for the Biodiversity Stewardship site.

Sydney Water's Environmental Safeguards should be implemented to minimise ecological impacts. These standard mitigation practices for construction activities include preclearing survey by an Ecologist, relocating logs into adjacent bushland, and avoiding habitat features such as hollow-bearing trees, termite mounds and wombat burrows where possible.

Figure 8: Site A – Habitat features to avoid (left to right: termite mound, hollow-bearing tree, wombat burrow)

5. Conclusion

Tests of Significance for the two TECs and 26 threatened fauna concluded that no significant impacts to threatened species, populations, or ecological communities listed under the BC Act or EPBC Act are likely to occur as a result of the proposed works. Therefore, a Species Impact Statement (SIS) or Biodiversity Development Assessment Report (BDAR) are not required for the works.

6. References

ELA 2019. *Constraints Assessment for Stonegully Creek Picton*. Prepared for Sydney Water.

GHD 2019. *Picton Farm BSA – Biodiversity Stewardship Site Assessment Report*. Prepared for Sydney Water.

Appendix A Likelihood of occurrence table

An assessment of likelihood of occurrence was made for threatened and migratory species identified from the database search. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposed development site, results of the field survey and professional judgement. The terms for likelihood of occurrence are defined below:

- "known" = the species was or has been observed on the site
- "likely" = a medium to high probability that a species uses the site
- "potential" = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- "unlikely" = a very low to low probability that a species uses the site
- "no" = habitat on site and in the vicinity is unsuitable for the species.

Key to the table:

- BC Act = Listing under the NSW Biodiversity Conservation Act 2016
- CE = Critically Endangered
- E1 = Endangered (BC Act)
- E2 = Endangered Population (BC Act)
- E4 = Extinct (BC Act)
- V = Vulnerable
- M = migratory (EPBC Act)

Scientific Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Ecological Communities					
Shale Sandstone Transition Forest in the Sydney Basin Bioregion	CEEC	CEEC	Occurs at the edges of the Cumberland Plain, where clay soils from the shale rock intergrade with earthy and sandy soils from sandstone, or where shale caps overlay sandstone. The boundaries are indistinct, and the species composition varies depending on the soil influences. The main tree species include Forest Red Gum (*Eucalyptus tereticornis*), Grey Gum (*E. punctata*), stringybarks (*E. globoidea, E. eugenioides*) and ironbarks (*E. fibrosa* and *E. crebra*). Areas of low sandstone influence (more clay-loam soil texture) have an understorey that is closer to Cumberland Plain Woodland. Before European settlement, this community was extensive around the edges of the Cumberland lowlands throughout western Sydney, most particularly in the southern half. The bulk of the remaining community occurs in the Hawkesbury, Baulkham Hills, Liverpool, Parramatta, Penrith, Campbelltown and Wollondilly LGAs.	Identified within the subject site during field surveys	Yes
Western Sydney Dry Rainforest in the Sydney Basin Bioregion	EEC	CEEC	Very restricted and occurs most commonly in the far southern section of the Cumberland Plain, in the Razorback Range near Picton. Outlying occurrences have been recorded at Grose Vale and Cattai. There are 338 hectares remaining intact, the majority of these occurring in the Wollondilly local government area, but occurring to a lesser extent in the Baulkham Hills, Camden, Hawkesbury, Parramatta and Ryde local government areas. A small remnant can be seen in Fairfield City Farm.	Identified within the subject site during field surveys	Yes

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Fauna							
Pseudophryne australis	Red-crowned Toadlet	V		Confined to the Sydney Basin, from Pokolbin in the north, the Nowra area to the south, and west to Mt Victoria in the Blue Mountains. Open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings.	1	Unlikely - suitable habitat not present within the subject site. Most recent record in 2010 located at Thirlmere Lakes.	No
Anthochaera phrygia	**Regent Honeyeater**	**E4A**	**CE**	**Inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, most records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions; also recorded in the Central Coast and Hunter Valley regions. Eucalypt woodland and open forest, wooded farmland and urban areas with mature eucalypts, and riparian forests of Casuarina cunninghamiana (River Oak).**	**3**	**Potential - foraging habitat (*Eucalyptus crebra)* present within the subject site. Most recent records in 1996 located at Picton.**	**Yes**
Artamus cyanopterus cyanopterus	**Dusky Woodswallow**	**V**		**Widespread in NSW from coast to inland including the western slopes of the Great Dividing Range and farther west. Species have also been recorded in southern and southwestern Australia. Woodlands and dry open sclerophyll forest, usually eucalypts and mallee associations. Also have recordings in shrub and heathlands and various modified habitats, including regenerating forests. In western NSW, this species is primarily associated with River Red Gum/Black**	**29**	**Potential - marginal foraging and roosting habitat present within the subject site. Most recent record in 2016 located at Lakesland.**	**Yes**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
				Box/Coolabah open forest/woodland and associated with larger river/creek systems.			
Botaurus poiciloptilus	Australasian Bittern	E1	E	Found over most of NSW except for the far north-west. Permanent freshwater wetlands with tall, dense vegetation, particularly Typha spp. (bullrushes) and Eleocharis spp. (spikerushes).	1	Unlikely - habitat not present within the subject site. Single record in 2014 located at Thirlmere Lakes NP.	No
Burhinus grallarius	Bush Stone-curlew	E1		In NSW, found sporadically in coastal areas, and west of the divide throughout the sheep-wheat belt. In NSW, it occurs in lowland grassy woodland and open forest.	1	Unlikely - margin habitat present within the subject site. Single record in 1991 located at Couridjah.	No
Callocephalon fimbriatum	**Gang-gang Cockatoo**	**V**		**In NSW, distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. Isolated records known from as far north as Coffs Harbour and as far west as Mudgee. Tall mountain forests and woodlands in summer; in winter, may occur at lower altitudes in open eucalypt forests and woodlands, and urban areas.**	**12**	**Likely - foraging habitat present within the subject site. One heard during field survey by ELA (2020).**	**Yes**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Calyptorhynchus lathami	Glossy Black-Cockatoo	V		In NSW, widespread along coast and inland to the southern tablelands and central western plains, with a small population in the Riverina. Open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur.	23	Unlikely- feed trees not present within the subject site. Most recent record in 2019, location notes withheld.	No
Chthonicola sagittata	**Speckled Warbler**	**V**		**From south-eastern Qld, the eastern half of NSW and into Victoria, as far west as the Grampians, mostly on hills and tablelands of the Great Dividing Range and rarely on coast. Eucalyptus-dominated communities with a grassy understorey and sparse shrub layer, often on rocky ridges or in gullies.**	**7**	**Potential - marginal foraging habitat (HBT) present within the subject site. Most recent record in 2017 located at St Marys Towers East.**	**Yes**
Climacteris picumnus victoriae	**Brown Treecreeper (eastern subspecies)**	**V**		**From eastern through central NSW, west to Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. Eucalypt woodlands and dry open forest.**	**21**	**Potential - foraging and nesting habitat present within the subject site. Most recent record in 2019 located at Wilton.**	**Yes**
Daphoenositta chrysoptera	**Varied Sittella**	**V**		**Distribution in NSW is nearly continuous from the coast to the far west. Inhabits eucalypt forests and woodlands, mallee and Acacia woodland.**	**35**	**Potential - foraging and nesting habitat present within the subject site. Most recent records in 2017 located at Bargo and St Mary's Towers.**	**Yes**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Glossopsitta pusilla	**Little Lorikeet**	**V**		**In NSW, found from the coast westward as far as Dubbo and Albury. Dry, open eucalypt forests and woodlands, including remnant woodland patches and roadside vegetation.**	**46**	**Likely - foraging and nesting habitat present within the subject site. Most recent record in 2019 located at Douglas Park.**	**Yes**
Haliaeetus leucogaster	White-bellied Sea-Eagle	V		Distributed along the coastline of mainland Australia and Tasmania, extending inland along some of the larger waterways, especially in eastern Australia. Freshwater swamps, rivers, lakes, reservoirs, billabongs, saltmarsh and sewage ponds and coastal waters. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest and urban areas.	4	Potential – Secondary foraging habitat present, however, preferred foraging habitat within open waterbodies not present in subject site. Most recent record in 2019 within the subject property (GHD 2019).	No - negligible impact on foraging habitat and no nests detected during field surveys.
Hieraaetus morphnoides	Little Eagle	V		Throughout the Australian mainland, with the exception of the most densely-forested parts of the Dividing Range escarpment. Open eucalypt forest, woodland or open woodland, including sheoak or Acacia woodlands and riparian woodlands of interior NSW.	13	Potential - foraging and nesting habitat present within the subject site. Most recent record in 2018 located near Wilton. None detected during field surveys (ELA 2019; GHD 2019).	No - negligible impact on foraging habitat and no nests detected during field surveys.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Hirundapus caudacutus	White-throated Needletail		M	All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide. Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland.	2	Unlikely - roosting habitat available within the subject site. Most recent record in 2017 located at St Mary's Towers.	No - negligible impact on foraging habitat and no nests detected during field surveys.
Lathamus discolor	**Swift Parrot**	**E1**	**CE**	**Migrates from Tasmania to mainland in Autumn-Winter. In NSW, the species mostly occurs on the coast and south west slopes. Box-ironbark forests and woodlands.**	**7**	**Potential - marginal winter foraging habitat is present within the subject site. Most recent record in 2017 located at Wilton.**	**Yes**
Lophoictinia isura	Square-tailed Kite	V		In NSW, it is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast. Timbered habitats including dry woodlands and open forests, particularly timbered watercourses.	7	Potential - foraging and nesting habitat present within the subject site. Most recent record in 2018 located north of Picton Rd adjacent to Hume Motorway.	No - negligible impact on foraging habitat and no nests detected during field surveys.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V		Found throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies picata. Open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas.	3	Potential - marginal foraging habitat present within the subject site. Most recent record in 2012 on private property.	Yes
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V		Widespread in NSW from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. Also Richmond and Clarence River areas and a few scattered sites in the Hunter, Central Coast and Illawarra regions. Open forests or woodlands dominated by box and ironbark eucalypts, or by smooth-barked gums, stringybarks, river sheoaks and tea-trees.	7	Potential - marginal foraging and nesting habitat present within the subject site. Most recent record in 2007 located at Tahmoor.	Yes
Neophema pulchella	Turquoise Parrot	V		Occurs along the length of NSW from the coastal plains to the western slopes of the Great Dividing Range. Eucalypt and cypress pine open forests and woodlands, ecotones between woodland and grassland, or coastal forest and heath.	2	Potential - marginal foraging and nesting habitat present within the subject site. Most recent record in 2015 located at Bingara.	Yes

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Ninox connivens	Barking Owl	V		Wide but sparse distribution in NSW, avoiding the most central arid regions. Core populations exist on the western slopes and plains and in some northeast coastal and escarpment forests. Woodland and open forest, including fragmented remnants and partly cleared farmland, wetland and riverine forest.	3	Potential - marginal foraging habitat present within the subject site. Most recent record in 2011 located at Tahmoor.	No - negligible impact on foraging habitat and no nests detected during field surveys.
Ninox strenua	Powerful Owl	V		In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains. Woodland, open sclerophyll forest, tall open wet forest and rainforest.	14	Potential - marginal foraging habitat present within subject site. Suitable roosting and nesting habitat not present. Most recent record in 2019 located at Wilton.	No - negligible impact on foraging habitat and no nests detected during field surveys.
Petroica boodang	**Scarlet Robin**	**V**		**In NSW, it occurs from the coast to the inland slopes. Dry eucalypt forests and woodlands, and occasionally in mallee, wet forest, wetlands and tea-tree swamps.**	**16**	**Potential - marginal foraging and nesting habitat present within the subject site. Most recent records in 2017 located at Pheasants Nest, Upper Nepean SCA and St Marys Towers.**	**Yes**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Petroica phoenicea	**Flame Robin**	**V**		**In NSW, breeds in upland areas, and in winter many birds move to the inland slopes and plains, or occasionally to coastal areas. Likely that there are two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands. Breeds in upland tall moist eucalypt forests and woodlands. In winter uses dry forests, open woodlands, heathlands, pastures and native grasslands. Occasionally occurs in temperate rainforest, herbfields, heathlands, shrublands and sedgelands at high altitudes.**	**1**	**Potential - marginal foraging habitat present within the subject site. Most recent record in 2017 located at the Upper Nepean SCA.**	**Yes**
Stagonopleura guttata	**Diamond Firetail**	**V**		**Widely distributed in NSW, mainly recorded in the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina, and less commonly found in coastal areas and further inland. Grassy eucalypt woodlands, open forest, mallee, Natural Temperate Grassland, secondary derived grassland, riparian areas and lightly wooded farmland.**	**11**	**Potential - foraging habitat present within the subject site. Most recent record in 2016 located at Upper Nepean SCA.**	**Yes**
Tyto tenebricosa	Sooty Owl	V		Occupies the easternmost one-eighth of NSW, occurring on the coast, coastal escarpment and eastern tablelands. Dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests.	2	Potential - marginal foraging habitat present within the subject site. Most recent record in 2004 located at Nattai NP.	No - negligible impact on foraging habitat.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Meridolum corneovirens	Cumberland Plain Land Snail	E1		Areas of the Cumberland Plain west of Sydney, from Richmond and Windsor south to Picton and from Liverpool, west to the Hawkesbury and Nepean Rivers at the base of the Blue Mountains. Primarily inhabits Cumberland Plain Woodland. Also known from Shale Gravel Transition Forests, Castlereagh Swamp Woodlands and the margins of River-flat Eucalypt Forest.	38	Likely - suitable habitat is present within the subject site. Most recent record in 2019 at the subject property (GHD 2019).	Yes
Cercartetus nanus	Eastern Pygmy-possum	V		In NSW it extents from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes. Rainforest, sclerophyll forest (including Box-Ironbark), woodland and heath.	2	Potential - foraging and nesting habitat present within subject site. Most recent record in 2015 located in the Upper Nepean SCA.	Yes (if HBTs removed)
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Recorded from Rockhampton in Qld south to Ulladulla in NSW. Largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes. Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country.	26	Likely - foraging and potential roosting habitat (HBT) present within the subject site. Recorded within the subject property in October 2019 (GHD 2019).	Yes
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Qld. Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	9	Potential - habitat present within the subject site. Most recent record in 2017 at Upper Nepean SCA.	Yes

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		South-east coast and ranges of Australia, from southern Qld to Victoria and Tasmania. In NSW, records extend to the western slopes of the Great Dividing Range. Tall (greater than 20m) moist habitats.	8	Likely - foraging and potential roosting habitat (HBT) present within the subject site. Recorded at Douglass Park and within the subject property in October 2019 (GHD 2019).	Yes
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V		Found along the east coast from south Queensland to southern NSW. Dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range.	32	Likely - foraging and potential roosting habitat present within the subject site. Recorded within the subject property in October 2019 (GHD 2019).	Yes
Miniopterus australis	Little Bentwing-bat	V		East coast and ranges south to Wollongong in NSW. Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub.	11	Likely - foraging and potential roosting habitat present within the subject site. Recorded within the subject property in October 2019 (GHD 2019).	Yes
Miniopterus orianae oceanensis	Large Bent-winged Bat	V		Occur along the east and north-west coasts of Australia Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Hunt in forested areas, catching moths and other flying insects above the tree tops.	16	Likely - foraging and potential roosting habitat present within the subject site. Recorded within the subject property in October 2019 (GHD 2019).	Yes
Myotis macropus	Southern Myotis	V		In NSW, found in the coastal band. It is rarely found more than 100 km inland, except along major rivers. Foraging habitat is waterbodies (including streams, or lakes or reservoirs) and fringing areas of vegetation up to 20m.	28	Likely - foraging and potential roosting habitat present within the subject site. Recorded within the subject property in October 2019 (GHD 2019).	Yes

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Petauroides volans	Greater Glider population in the Eurobodalla local government area	E2	V	This population on the south coast of NSW is bounded by the Moruya River to the north, Coila Lake to the south and the Princes Highway and cleared land exceeding 700 m in width to the west. Eucalypt forests and woodlands.	8	Unlikely - suitable habitat not present within the subject site. Most recent records in 2017 located at Bargo River, St Marys Towers and Thirlmere.	No
Petaurus australis	Yellow-bellied Glider	V		Along the eastern coast to the western slopes of the Great Dividing Range, from southern Qld to Victoria. Tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils.	2	Unlikely - suitable habitat not present within the subject site. Most recent record in 2015 located at Tahmoor.	No
Petaurus norfolcensis	Squirrel Glider	V		Widely though sparsely distributed on both sides of the Great Dividing Range in eastern Australia, from northern Qld to western Victoria. Mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas.	3	Unlikely - suitable habitat not present within the subject site. Most recent records in 2017 located at Tahmoor, Myrtle Creek and Picton.	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Petrogale penicillata	Brush-tailed Rock-wallaby	E1	V	In NSW they occur from the Qld border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges.	2	Unlikely – suitable habitat not present within the subject site due to the absence of nearby rocky escarpment habitat. Most recent record in 2006.	No
Phascolarctos cinereus	Koala	V	V	In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. There are sparse and possibly disjunct populations in the Bega District, and at several sites on the southern tablelands. Eucalypt woodlands and forests.	154	Potential - suitable habitat present within the subject site. Most recent records in 2019 located at Pheasant Nest and Picton.	No - negligible impact on foraging habitat and none detected during targeted searches (ELA 2019; GHD 2019).
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria. Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	98	Potential - suitable foraging habitat present within the subject area. Most recent records in 2019 located at Thirlmere, Douglass Park and within the subject property (GHD 2019).	No - negligible impact on foraging habitat, and no camps within study site.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Saccolaimus flaviventris	**Yellow-bellied Sheathtail-bat**	**V**		**There are scattered records of this species across the New England Tablelands and North West Slopes. Rare visitor in late summer and autumn to south-western NSW. Almost all habitats, including wet and dry sclerophyll forest, open woodland, open country, mallee, rainforests, heathland and waterbodies.**	**4**	**Potential - suitable foraging and roosting habitat present within the subject site. Recorded on the subject property in October 2019 (GHD 2019).**	**Yes**
Scoteanax rueppellii	**Greater Broad-nosed Bat**	**V**		**Both sides of the great divide, from the Atherton Tableland in Qld to north-eastern Victoria, mainly along river systems and gullies. In NSW it is widespread on the New England Tablelands. Woodland, moist and dry eucalypt forest and rainforest.**	**15**	**Potential - suitable foraging and roosting habitat present within the subject site. Most recent record in 2019 located at Lakesland.**	**Yes**
Hoplocephalus bungaroides	Broad-headed Snake	E1	V	Largely confined to Triassic and Permian sandstones within the coast and ranges in an area within approximately 250 km of Sydney. Dry and wet sclerophyll forests, riverine forests, coastal heath swamps, rocky outcrops, heaths, grassy woodlands.	1	Unlikely - suitable habitat not present within the subject site. Most recent record in 2014 (location withheld).	No
Varanus rosenbergi	**Rosenberg's Goanna**	**V**		**Occurs on the Sydney Sandstone in Wollemi National Park to the north-west of Sydney, in the Goulburn and ACT regions and near Cooma in the south. There are records from the South West Slopes near Khancoban and Tooma River. Found in heath, open forest and woodland.** **Associated with termites, the mounds of which this species nests in; termite mounds are a critical habitat component. Individuals require**	**0**	**Potential – suitable habitat present within the subject site. Although there are no BioNet records, the species is listed as known or predicted in the Cumberland IBRA subregion in which the study site is located.**	**Yes**

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
				large areas of habitat. Feeds on carrion, birds, eggs, reptiles and small mammals. Shelters in hollow logs, rock crevices and in burrows, which they may dig for themselves, or they may use other species' burrows, such as rabbit warrens.			
Flora							
Acacia bynoeana	Bynoe's Wattle	E1	V	Found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leaved Apple.	24	Unlikely - suitable habitat not present withing subject site. Most recent record in 2016 located at Wilton.	No
Commersonia prostrata	Dwarf Kerrawang	E1	E	In NSW, found in the Southern Highlands and Southern Tablelands (Penrose State Forest, Tallong, near the Corang, and Rowes Lagoon), the Thirlmere Lakes area and on the North Coast (Tomago sandbeds north of Newcastle). Eucalyptus pauciflora (Snow Gum) Woodland; Ephemeral Wetland floor; E. agglomerata (Blue leaved Stringybark) Open Forest; E. mannifera (Brittle Gum) Low Open Woodland; E. haemostoma (Scribbly Gum)/ E. robusta (Swamp Mahogany) Ecotonal Forest.	*82*	Unlikely - suitable habitat not present within subject site. Most recent record in 2017 located at Thirlmere Lakes NP.	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Cynanchum elegans	White-flowered Wax Plant	E1	E	Restricted to eastern NSW, occurs primarily at the transition zone (ecotone) between dry subtropical rainforest and sclerophyll forest/woodland communities in eastern NSW, from Brunswick Heads on the north coast to the Illawarra region and as far west as Merriwa in the upper Hunter River valley. It inhabits rainforest gullies,scrub and scree slopes (Harden & Williams, 1992); from the Gloucester district to the Wollongong area and inland to Mt Dangar.	9	Potential - habitat present within the subject site (area of indirect impact). Most recent record in 2017 located at Razorback growing over an *Eucalyptus moluccana,* amongst a disturbed understory of rainforest species.	No - negligible impact on habitat and none detected during field surveys in 2019 (ELA 2019; GHD 2019)
Darwinia peduncularis		V		Disjunct populations in coastal NSW with a couple of isolated populations in the Blue Mountains. Rocky outcrops on sandy, well drained, low nutrient soil over sandstone. Grows in dry sclerophyll forest on sandstone hillsides and ridges; Hornsby to Hawkesbury R. and west to Glen Davis.	1	Unlikely - suitable habitat not present within subject site. Most recent records in 2016 and 2017 located near Tahmoor Gorge and in the Upper Nepean SCA.	No
Epacris purpurascens var. purpurascens		V		Recorded from Gosford in the north, to Narrabeen in the east, Silverdale in the west and Avon Dam vicinity in the South. Sclerophyll forest, scrubs and swamps. Most habitats have a strong shale soil influence.	208	Potential - habitat present within subject site. Most recent record in 2008 located at Bingara and Douglas Park.	No - None detected during field surveys in 2019 (ELA 2019; GHD 2019)

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Eucalyptus macarthurii	Camden Woollybutt	E1	E	From the Moss Vale District to Kanangra Boyd National Park. Grassy woodland on relatively fertile soils on broad cold flats.	1	Unlikely - habitat not present within the subject site. Single record in 1995 of a cultivated specimen planted at Stonequarry Creek, Picton.	No
Galium australe	Tangled Bedstraw	E1		Recorded historically in the Nowra (Colymea) and Narooma areas; extant in Nadgee Nature Reserve, south of Eden. Unconfirmed records from the Sydney region. Turpentine forest and coastal Acacia shrubland in NSW. Elsewhere sand dunes, sand spits, shrubland and woodland.	1	Unlikely - suitable habitat not present within subject site. Single record in 2000 located at St Johns Monastery near the Colliery.	No
Genoplesium baueri	Bauer's Midge Orchid	E1	E	Has been recorded from locations between Nowra and Pittwater and may occur as far north as Port Stephens. Dry sclerophyll forest and moss gardens over sandstone.	1	Unlikely - suitable habitat not present within subject site. Single record in 2020 (location withheld).	No
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V	V	Sporadically distributed throughout the Sydney Basin and in the Hunter in the Cessnock - Kurri Kurri area. Also known from Putty to Wyong and Lake Macquarie on the Central Coast. Heath and shrubby woodland to open forest on sandy or light clay soils usually over thin shales. Recorded from Cumberland Plain Woodland, Castlereagh Ironbark Woodland, Castlereagh Scribbly Gum Woodland and Shale/Gravel Transition Forest.	138	Potential - suitable habitat present within the subject site. Most recent records in 2018 located at St Marys Tower.	No - none detected during targeted searches within the study site (ELA 2019) or field

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
							surveys within the subject property (GHD 2019).
Leucopogon exolasius	Woronora Beard-heath	V	V	Restricted to Upper Georges River area and in Heathcote National Park, the Woronora and Grose Rivers and Stokes Creek, Royal N.P. Woodland e.g. with Eucalytus piperita, E. sieberi and shrubs Pultenaea flexilis, Leptospermum trinervium, Dillwynia retorta. Sandy alluvium and rocky sandstone hillsides near creeks, low nutrient soils.	1	Unlikely - suitable habitat not present within the subject site. Most recent record in 2003 located in Buxton.	No
Melaleuca deanei	Deane's Paperbark	V	V	Ku-ring-gai/Berowra area, Holsworthy/Wedderburn area, Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas. Occurs mostly in ridgetop woodland, with only 5% of sites in heath on sandstone.	42	Unlikely - suitable habitat not present within the subject site. Most recent record in 2016 located at Bingara Gorge, Wilton.	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Persicaria elatior	Tall Knotweed	V	V	In south-eastern NSW recorded from Mt Dromedary, Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests). In damp places, usually on the margin of standing water. Beside streams and lakes, swamp forest or disturbed areas.	2	Unlikely - suitable habitat not present within the subject site. Most recent record in 2010 located at Thirlmere Lakes NP.	No
Persoonia bargoensis	Bargo Geebung	E1	V	Restricted to a small area south-west of Sydney on the western edge of the Woronora Plateau and the northern edge of the Southern Highlands (Bargo area). The historical limits are Picton and Douglas Park (northern), Yanderra (southern), Cataract River (eastern) and Thirlmere (western). Woodland or dry sclerophyll forest on sandstone and on heavier, well drained, loamy, gravelly soils of the Wianamatta Shale and Hawkesbury Sandstone. It favours interface soil landscapes such as between the Blacktown Soil Landscape and the complex Mittagong Formation soils (Lucas Heights Soil Landscape) with the underlying sandstone (Hawkesbury Soil Landscape and Gymea Soil Landscape). Some of the vegetation the species occurs within would be recognised as the Shale/Sandstone Transition Forest, a listed community.	245	Potential - habitat present within the subject site. Most recent record in 2018 located at St Marys Tower.	No - none detected during targeted searches within the study site (ELA 2019) or field surveys within the subject property (GHD 2019).

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Persoonia glaucescens	Mittagong Geebung	E1	V	Recent surveys place the present southern limit near Berrima and the northern limit near Buxton. Woodland to dry sclerophyll forest on clayey and gravely laterite. The preferred topography is ridge-tops, plateaux and upper slopes.	13	Unlikely - marginal habitat present within subject site. Subject site further north than known extent of distribution. Most recent record in 2017 located at Couridjah.	No
Persoonia hirsuta	Hairy Geebung	E1	E	Scattered distribution around Sydney, from Singleton in the north, along the east coast to Bargo in the south and the Blue Mountains to the west. Sandy soils in dry sclerophyll open forest, woodland and heath on sandstone, or very rarely on shale. Persoonia hirsuta subsp. hirsuta: from Gosford to Royal N.P., below 300 m alt.	7	Unlikely - suitable habitat not present within subject site. Most recent record in 2017 located in Couridjah.	No
Persoonia mollis subsp. Revoluta		V	V	Endemic to New South Wales where it is currently known to occur in seven populations, primarily in the area between Mittagong, Paddys River and High Range in the Southern Highlands with an outlying population in the Bindook Highlands. Most of the populations occur between 600 and 800m a.s.l.,and with an average annual rainfall across the range of between 700 and 900 mm. Mainly on relatively deep sandy soils on broad ridgetops and upper slopes. Frequently on Hawkesbury Sandstone on Soapy Flat or Sandy Flat soil landscapes.	1	Unlikely - suitable habitat is not present within the subject site. Most recent record in 2001 located at Thirlmere Lakes NP.	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
Pimelea curviflora var. curviflora		V	V	Confined to the coastal area of the Sydney and Illawarra regions between northern Sydney and Maroota in the north-west and Croom Reserve near Albion Park in the south. Woodland, mostly on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes.	2	Potential - habitat present within the subject site. Most recent record 2000 located at St Johns Monastery.	No - none detected during targeted searches within the study site (ELA 2019) or field surveys within the subject property (GHD 2019).
Pimelea spicata	Spiked Rice-flower	E1	E	Two disjunct areas; the Cumberland Plain (Marayong and Prospect Reservoir south to Narellan and Douglas Park) and the Illawarra (Landsdowne to Shellharbour to northern Kiama). Well-structured clay soils. Eucalyptus moluccana (Grey Box) communities and in areas of ironbark on the Cumberland Plain. Coast Banksia open woodland or coastal grassland in the Illawarra.	16	Unlikely - suitable habitat (well-structured clay soils) not present within subject site. Most recent record in 2016 at Douglas Park.	No
Pomaderris brunnea	Brown Pomaderris	E1	V	In NSW, found around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands. Moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	9	Potential - marginal habitat present within the subject site. Most recent record in 2018 within the Subject Property.	No - none detected during targeted searches within the study site

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Number of records within 5 km	Likelihood of Occurrence on Subject Site	Impact Assessment Required
							(ELA 2019) or field surveys within the subject property (GHD 2019).
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	Only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. Subtropical and littoral rainforest. On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	1	Unlikely - suitable habitat (grey soils over sandstone) not present within the subject site. Most recent record in 2016 located at Thirlmere (plantings?).	No
Tetratheca glandulosa		V		Found from Sampons Pass (Yengo NP) in the north to West Pymble (Lane Cove NP) in the south. The eastern limit is at Ingleside (Pittwater LGA) and the western limit is at East Kurrajong (Wollemi NP). Heath, scrub, woodlands and open forest on upper-slopes and mid-slope sandstone benches. Soils generally shallow, consisting of a yellow, clayey/sandy loam.	1	Unlikely - suitable habitat not present within the subject site, and it is further south than known distribution for the species. Single unconfirmed record in 2001 located at property west of Thirlmere.	No

Appendix B BC Act Tests of Significance

The threatened species 'test of significance' (or '5-part test') is used to determine if a development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. The test of significance is set out in s.7.3 of the Biodiversity Conservation Act 2016, and is completed in accordance with the questions set out below:

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

a. in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

b. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

i i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

ii ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

c. in relation to the habitat of a threatened species or ecological community:

i i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

ii ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

iii iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Threatened Species and Ecological Communities that have been assessed against the test of significance were identified through the development of the Likelihood of Occurrence (Appendix A). The following species are assessed below:

Ecological Communities

Shale Sandstone Transition Forest in the Sydney Basin Bioregion (SSTF)

Western Sydney Dry Rainforest in the Sydney Basin Bioregion (WSDR)

Fauna

- *Meridolum corneovirens* (Cumberland Plain Land Snail)
- *Cercartetus nanus* (Eastern Pygmy-possum)
- *Dasyurus maculatus* (Spotted-tailed Quoll)
- *Varanus rosenbergi* (Rosenberg's Goanna)
- Parrots:
  - *Callocephalon fimbriatum* (Gang-gang Cockatoo)
  - *Glossopsitta pusilla* (Little Lorikeet)
  - *Lathamus discolor* (Swift Parrot)
  - *Neophema pulchella* (Turquoise Parrot)
- Woodland Birds:
  - *Anthochaera phrygia* (Regent Honeyeater)
  - *Artamus cyanopterus cyanopterus* (Dusky Woodswallow)
  - *Chthonicola sagittate* (Speckled Warbler)
  - *Climacteris picumnus victoriae* (Brown Treecreeper - eastern subspecies)
  - *Daphoenositta chrysopterac* (Varied Sittella)
  - *Melanodryas cucullata cucullate* (Hooded Robin -south-eastern form)
  - *Melithreptus gularis gularis* (Black-chinned Honeyeater - eastern subspecies)
  - *Petroica boodang* (Scarlet Robin)
  - *Petroica phoenicea* (Flame Robin)
  - *Stagonopleura guttata* (Diamond Firetail)
- Microchiropteran Bats:
  - *Chalinolobus dwyeri* (Large-eared Pied Bat)
  - *Falsistrellus tasmaniensis* (Eastern False Pipistrelle)
  - *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat)
  - *Miniopterus australis* (Little Bentwing-bat)
  - *Miniopterus orianae oceanensis* (Large Bent-winged Bat)
  - *Myotis macropus* (Southern Myotis)
  - *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat)
  - *Scoteanax rueppellii* (Greater Broad-nosed Bat)

B1 Shale Sandstone Transition Forest in the Sydney Basin Bioregion (SSTF)

BC Act	Question	Response
7.3.1 a)	In the case of a threatened species: whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	Not a threatened species
7.3.1 b) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	The total area of SSTF in the two sites is 1.25 ha, which represents 0.09% of the local occurrence (~1342 ha). Even if all of this were to be cleared under the proposal, it is unlikely to place the community at risk of local extinction.
7.3.1 b) ii	In the case of an endangered ecological community or critically endangered ecological community: Whether the proposed development or activity is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	Most of the local occurrence will be retained and is protected under a Biodiversity Stewardship Agreement, so its composition will not be modified in a way that will place it at risk of extinction.
7.3.1 c) i	In relation to the habitat of a threatened species or ecological community: The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	Approximately 0.09% of SSTF in the locality will be removed under this proposal.
7.3.1 c) ii	In relation to the habitat of a threatened species or ecological community: Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	The proposed works will increase fragmentation of the SSTF, although some of these areas have previously been disturbed.
7.3.1 c) iii	In relation to the habitat of a threatened species or ecological community: The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	Priority has been given to utilising the area of SSTF that is already in a degraded condition due to substantial erosion, slumping, low native species diversity and weeds. Better condition SSTF has been avoided where possible and is protected under the Stewardship Agreement.
7.3.1 d)	Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).	No declared areas of outstanding biodiversity value will be affected.
7.3.1 e)	Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	The proposed works will contribute to one key threatening process, clearing of native vegetation. Only ~0.09% of the local occurrence of SSTF will be cleared, which is considered a minor impact.
Conclusion	**Is there likely to be a significant impact?**	**No**

B2 Western Sydney Dry Rainforest in the Sydney Basin Bioregion (WSDR)

BC Act	Question	Response
7.3.1 a)	In the case of a threatened species: whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	Not a threatened species
7.3.1 b) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	The total area of WSDR in the two sites is 0.16 ha, which represents 0.04% of the remaining community (~338 ha). Even if all of this were to be cleared under the proposal, it is unlikely to place the community at risk of local extinction.
7.3.1 b) ii	In the case of an endangered ecological community or critically endangered ecological community: Whether the proposed development or activity is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	Most of the local occurrence will be retained and is protected under a Biodiversity Stewardship Agreement, so its composition will not be modified in a way that will place it at risk of extinction.
7.3.1 c) i	In relation to the habitat of a threatened species or ecological community: The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	Approximately 0.04% of WSDR in the locality will be removed under this proposal.
7.3.1 c) ii	In relation to the habitat of a threatened species or ecological community: Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	The proposed works will increase fragmentation of the WSDR.
7.3.1 c) iii	In relation to the habitat of a threatened species or ecological community: The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	This PCT appears to exist as a small remnant in the gully at Site B. However, it represents only 0.04% of the remaining vegetation.
7.3.1 d)	Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).	No declared areas of outstanding biodiversity value will be affected.
7.3.1 e)	Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	The proposed works will contribute to one key threatening process, clearing of native vegetation. Only ~0.04% of the local occurrence of WSDR will be cleared, which is considered a minor impact.
Conclusion	**Is there likely to be a significant impact?**	**No**

B3 *Meridolum corneovirens* (Cumberland Plain Land Snail)

Cumberland Plain Land Snail (CPLS) is listed as endangered under the BC Act. The Cumberland Plain Land Snail is a native snail species with a typical adult shell diameter ranging between 25-30 mm.

Current knowledge suggests that Cumberland Plain Land Snail is restricted to the Cumberland Plain and Castlereagh Woodlands of Western Sydney and also along the fringes of River-flat Eucalypt Forest, especially where it meets Cumberland Plain Woodland. It is currently known from over 100 locations. However, most of these populations are scattered throughout the region and are often small and isolated (DEC 2007). Cumberland land snail typically occurs under logs and other debris, amongst leaf and bark accumulations and sometimes under grass clumps. Where possible it will burrow into loose soil (DEC 2007).

The CPLS does not require large areas to maintain a viable population and have been demonstrated to be highly structured at very short distances (2 m) and after about 350 m the populations are random. Therefore, individuals within a 350 m radius are more likely to be related than they would be if found more than this distance apart (Clark et al., 2004).

No Cumberland Plain Land Snail individuals were recorded during the September 2019 field survey of the study site (ELA 2019); however, this species was recorded within the Picton Farm property in October 2019 (GHD 2019). There are also a number of Bionet records within 5 km of the study site. Additionally, suitable habitat in the form of Shale Sandstone Transition Forest (*PCT 1395 Narrow-leaved Ironbark-Broad-leaved Ironbark-Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion*) was recorded within the study site.

BC Act	Question	Response
7.3.1 a)	In the case of a threatened species: whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	Factors likely to have an adverse effect on the life cycle of *Meridolum corneovirens* include a substantial loss and / or fragmentation of habitat or alteration of fire regime. The proposal will not alter the fire regime but will result in further loss and fragmentation of habitat for this species. Compared to the surrounding habitat that is protected and unaffected by the proposed works, the disturbance area is minor (up to 1.41 ha) and will not place the species at risk of local extinction.
7.3.1 b) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	Not applicable.
7.3.1 b) ii	In the case of an endangered ecological community or critically endangered ecological community: Whether the proposed development or activity is likely to substantially and adversely modify the composition of the ecological community such that	Not applicable.

BC Act	Question	Response
	its local occurrence is likely to be placed at risk of extinction.	
7.3.1 c) i	In relation to the habitat of a threatened species or ecological community: The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	Up to 1.41 ha of vegetation will be cleared. Only part of this will be suitable habitat for this species. Logs and debris (suitable habitat) from the impact area should be relocated into the surrounding bushland to minimise impact to this species.
7.3.1 c) ii	In relation to the habitat of a threatened species or ecological community: Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	The proposed works will increase fragmentation of this species.
7.3.1 c) iii	In relation to the habitat of a threatened species or ecological community: The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	As this species has a small range and does not require large areas to maintain a viable population (and has not be found in the subject sites), and potential habitat (logs and debris) can be moved into the adjacent bushland, the survival of the species is unlikely to be affected by the proposed works
7.3.1 d)	Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).	No area of declared outstanding biodiversity will be impacted.
7.3.1 e)	Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	Habitat loss from the clearing of native vegetation and associated weed invasion is a key threatening process relevant to the proposed works. The final determination for *Meridolum corneovirens* identifies habitat loss as part of the decline of this species. Under the proposed works, a small amount of vegetation removal and trimming is unlikely to exacerbate this key threatening process.
Conclusion	**Is there likely to be a significant impact?**	**No**

B4 *Cercartetus nanus* (Eastern Pygmy-possum)

Eastern Pygmy-possum is listed as vulnerable under the BC Act. The Eastern Pygmy-possum is a tiny (15 to 43 g) active climber, with almost bare, prehensile tails, and big forward-pointing ears. They are light-brown above and white below. Adults have a head and body length between 70 – 110 mm and a tail length between 75 – 105 mm.

The Eastern Pygmy-possum is found in south-eastern Australia, from southern Queensland to eastern South Australia and in Tasmania. In NSW it extends from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes. Although the Eastern Pygmy-possum is broadly distributed, recent studies have shown that within this range the species appears to be patchily distributed and its overall abundance is low. Despite a large number of intensive trapping programs undertaken in the eastern forests and woodlands of New South Wales, only a small number of captures (154) have resulted from a total trapping effort of 315,000 Elliott trap-nights and 57,000 pitfall trap-

nights (Bowen and Goldingay 2000). Other detection techniques such as spotlighting, predator scat analysis, hair tubes and trapping in trees have produced similar low rates of detection. Capture rates are highest for installed nest-boxes and traps set in flowering banksias. This may reflect a habitat preference or a more successful trapping method. From these and more recent studies (A. Tulloch, pers. comm.) there were only six, localities where more than 10 observations of Pygmy-Possums have been made. These were the Pilliga area, New England Tablelands, Barren Grounds Nature Reserve-Budderoo National Park, Royal and Heathcote National Parks, Kioloa State Forest and the Eden area.

The Eastern Pygmy-possum is found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. The species feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable. It also feeds on insects throughout the year; this feed source may be more important in habitats where flowers are less abundant such as wet forests.

The Eastern Pygmy-possum shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (*Pseudocheirus peregrinus*) dreys or thickets of vegetation, (e.g. grass-tree skirts); nest-building appears to be restricted to breeding females; tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks. The species appears to be mainly solitary, each individual using several nests, with males having non-exclusive home-ranges of about 0.68 hectares and females about 0.35 hectares. Young can be born whenever food sources are available, however most births occur between late spring and early autumn.

The Eastern Pygmy-possums are agile climbers, but can be caught on the ground in traps, pitfalls or postholes. They are generally nocturnal and frequently spends time in torpor (especially in winter) with body curled, ears folded and internal temperature close to the surroundings.

Cercartetus nanus has small, short-term home-range areas with males generally utilising 0.24-1.68 ha, and females utilising 0.18-0.61 ha (Ward 1990). Nest sites are changed frequently and do not appear to be used exclusively by any single animal or group of animals (Bladon et al. 2002; Ward 1990).

The Eastern Pygmy-possum was not detected during the targeted threatened species searches for candidate threatened species on the subject property (GHD 2019). Given the low detection rate for this species, and that it is unknown whether the spotlighting and daytime habitat searches for arboreal mammals were conducted by GHD within the study site, a precautionary approach was taken when assessing the impacts for this species.

BC Act	Question	Response
7.3.1 a)	In the case of a threatened species: whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	Factors likely to have an adverse effect on the life cycle of *Cercartetus nanus* include isolation of sub-populations with little opportunity for dispersal which increases the risk of local extinction, clearing that results in habitat loss and fragmentation, inappropriate fire regimes that remove nectar-producing understorey plants, the loss of nest sites due to past intensive forestry and firewood collection, and predation by foxes and cats.

BC Act	Question	Response
		The proposal will not result alter the fire regime, or increase risk of predation by foxes and cats. Vegetation clearing will be minimal in the context of local habitat protected under the Stewardship site and unlikely to adversely affect the lifecycle of the species such that its local population would be placed at risk of extinction.
7.3.1 b) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	Not applicable.
7.3.1 b) ii	In the case of an endangered ecological community or critically endangered ecological community: Whether the proposed development or activity is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	Not applicable.
7.3.1 c) i	In relation to the habitat of a threatened species or ecological community: The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	Up to 1.41 ha of vegetation will be cleared. Only part of this will be suitable habitat for this species.
7.3.1 c) ii	In relation to the habitat of a threatened species or ecological community: Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	The proposed works will increase fragmentation of this species. However, this species is highly mobile and arboreal, moving through canopies of low vegetation (1-2 m), taller rainforest vegetation (>12 m) and on the ground where trees are sparse or absent after fire. They have also been observed crossing busy double-lane roads. The impact of habitat fragmentation is expected to be minor for his species.
7.3.1 c) iii	In relation to the habitat of a threatened species or ecological community: The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	As this species has a small range and does not require large areas to maintain a viable population the remaining potential habitat is expected to support the long-term survival of the species in the locality.
7.3.1 d)	Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).	No area of declared outstanding biodiversity value will be impacted.
7.3.1 e)	Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	The following key threatening processes are relevant to the proposed works: clearing of native vegetation; loss of hollow-bearing trees; removal of dead wood or dead trees; introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae; infection of native plants by

BC Act	Question	Response
		Phytophthora cinnamomic; invasion of native plant communities by exotic perennial grasses. The small amount of native vegetation proposed to be cleared is unlikely to exacerbate the key threatening process of clearing native vegetation. Provided that the measures outlined in the "Sydney Water Environmental Safeguards", are implemented, the proposed works are unlikely to increase the impact of the key threatening processes listed above.
Conclusion	**Is there likely to be a significant impact?**	No

B5 *Dasyurus maculatus* (Spotted-tailed Quoll)

The Spotted-tailed Quoll is about the size of a domestic cat, from which it differs most obviously in its shorter legs and pointed face. The average weight of an adult male is about 3500 grams and an adult female about 2000 grams. It has rich-rust to dark-brown fur above, with irregular white spots on the back and tail, and a pale belly. The spotted tail distinguishes it from all other Australian mammals, including other quoll species. However, the spots may be indistinct on juvenile animals.

The range of the Spotted-tailed Quoll has contracted considerably since European settlement. It is now found in eastern NSW, eastern Victoria, south-east and north-eastern Queensland, and Tasmania. Only in Tasmania is it still considered relatively common.

The Spotted-tailed Quoll has been recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites.

The Spotted-tailed Quoll is mostly nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. They use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals.

The Spotted-tailed Quoll is a generalist predator with a preference for medium-sized (500g-5kg) mammals. They consume a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits, reptiles and insects. They also eat carrion and take domestic fowl.

Females occupy home ranges of 200-500 hectares, while males occupy very large home ranges from 500 to over 4000 hectares. They are known to traverse their home ranges along densely vegetated creeklines. The average litter size is five and both sexes mature at about one year of age. Life expectancy in the wild is about 3-4 years.

Factors likely to have an adverse effect on the life cycle of *Dasyurus maculatus* include: loss, fragmentation and degradation of habitat; competition with introduced predators such as cats and

foxes; deliberate poisoning, shooting and trapping, primarily in response to chicken predation; roadkill; poisoning from eating cane toads in the wild.

The Spotted-tailed Quoll is classified as an ecosystem species under the BC Act. Ecosystem species are those which are predicted to utilise habitat at a site, based on the vegetation types and habitat resources present. Targeted surveys were not conducted for this species during the 2019 surveys (GHD 2019), as they are not required for predicted threatened ("ecosystem) species.

BC Act	Question	Response
7.3.1 a)	In the case of a threatened species: whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	The proposed works are not likely to have an adverse effect on factors likely to have an adverse effect on the life cycle including competition with introduced predators; deliberate poisoning, shooting or trapping; roadkill; or poisoning from canetoads.
7.3.1 b) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	Not applicable.
7.3.1 b) ii	In the case of an endangered ecological community or critically endangered ecological community: Whether the proposed development or activity is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	Not applicable.
7.3.1 c) i	In relation to the habitat of a threatened species or ecological community: The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	Up to 1.41 ha of vegetation will be cleared. Only part of this will be suitable habitat for this species.
7.3.1 c) ii	In relation to the habitat of a threatened species or ecological community: Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	Females occupy home ranges of 200-500 ha, and males occupy very large home ranges from 500 to over 4000 ha. They are known to traverse their home ranges along densely vegetated creeklines. *Dasyurus maculatus* move in both a walk and a bounding gait along the ground. Trails are not used extensively, however fallen logs are used as runways wherever possible. Roads are also used for foraging and scent marking. *Dasyurus maculatus* climbs vertical tree trunks, travels on the branches (including the thin outer branches), and crosses between contiguous tree canopies. Given the species mobility, and that the habitat to be removed is likely to only be used as an occasional foraging resource over a larger home range, the

BC Act	Question	Response
		proposed works will not isolate or fragment an area of habitat from other areas of habitat.
7.3.1 c) iii	In relation to the habitat of a threatened species or ecological community: The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	The majority of local habitat for this highly mobile species will be retained so its long-term survival will not be affected.
7.3.1 d)	Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).	No area of declared outstanding biodiversity is located within the vicinity of the proposed works area
7.3.1 e)	Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	The following key threatening processes are relevant to the proposed works: clearing of native vegetation; loss of hollow-bearing trees; removal of dead wood or dead trees. These impacts are likely to be minor.
Conclusion	**Is there likely to be a significant impact?**	No

B6 *Varanus rosenbergi* (Rosenberg's Goanna)

Rosenberg's Goanna reaches up to 1.5 m in length. It is dark grey above, finely spotted with yellow or white, and with paired, blackish cross-bands from the neck to the end of the tail. The pairs of narrow, regular bands around the entire length of the tail is a distinguishing feature, separating it from the more common Lace Monitor, *V. varius*, which has very wide, light and dark bands towards the tip of the tail. Rosenberg's Goanna also has distinct, finely barred "lips", whereas the Lace Monitor has far broader bands around the snout. A pale-edged black stripe runs from the eyes, across the ears and onto the neck. Juveniles are brighter in colour, having an orange wash on the sides of the face and body.

Rosenberg's Goanna occurs on the Sydney Sandstone in Wollemi National Park to the north-west of Sydney, in the Goulburn and ACT regions and near Cooma in the south. There are records from the South West Slopes near Khancoban and Tooma River. Also occurs in South Australia and Western Australia.

Rosenberg's Goanna occurs heath, open forest and woodland communities. Termite mounds are a critical habitat component, as Rosenberg's Goanna nests in them. Individuals require large areas of habitat. The goanna shelters in hollow logs, rock crevices and in burrows of other species, or ones they dig for themselves.

One termite mound was recorded within the Stonequarry Creek study area and showed evidence of animal disturbance in the form of surface digging/ scratching on the mound. Three termite mounds were recorded within/adjacent to the Nepean River access track study area. One mound is positioned amongst a sandstone outcrop near the base of a large Ironbark, so it is unlikely that the access track would be widened into this location. One termite mound was on the study area boundary, which may be possible to avoid during construction. The third termite mound was recorded 2 m upslope of the study area, and therefore unlikely to be impacted by the proposal.

Fallen timber, including hollow logs, was present within the study areas. Sydney Water Environmental Safeguards require the retention of dead tree trunks, bush rock or logs in situ unless they are in the

disturbance corridor and moving is unavoidable, in which case the material is to be repositioned elsewhere on the site.

There was one wombat burrow observed in the Stonequarry creek study area. This burrow is in the location of one of the proposed discharge channels, and therefore not possible to avoid under the current proposal. There was also one wombat burrow observed within the Nepean River access track study area. This was located at the most south-western edge of the study area. Impacts to this could be avoided if the alternative access route is chosen.

BC Act	Question	Response
7.3.1 a)	In the case of a threatened species: whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	Factors likely to have an adverse effect on the life cycle of *Varanus rosenbergi* include loss, fragmentation and degradation of habitat, such as removal of termite mounds and fallen timber; car strike and predation by cats and dogs. The proposed works are not likely to have an adverse effect on car strike or predation by cats or dogs. Habitat features may be able to be retained so there would be no impact to the life cycle of the species.
7.3.1 b) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	Not applicable.
7.3.1 b) ii	In the case of an endangered ecological community or critically endangered ecological community: Whether the proposed development or activity is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	Not applicable.
7.3.1 c) i	In relation to the habitat of a threatened species or ecological community: The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	Up to 1.41 ha of vegetation will be cleared. Only part of this will be suitable habitat for this species, and key habitat features should be retained (e.g. termite mounds) or relocated into adjacent bushland (e.g. logs).
7.3.1 c) ii	In relation to the habitat of a threatened species or ecological community: Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	*Varanus rosenbergi* are mostly terrestrial, and shelter in burrows, hollow logs and rock crevices. Although some of these habitat features within the study area will be impacted by the proposal, most of the area to be impacted comprises of eroded channels and a maintained access track. The habitat features for this species are also present in the stewardship site adjacent to the study area. Given the species mobility, and that the habitat to be removed is likely to only be used as an occasional foraging resource over a larger home range, the proposed works will not isolate or fragment an area of habitat from other areas of habitat.

BC Act	Question	Response
7.3.1 c) iii	In relation to the habitat of a threatened species or ecological community: The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	It is expected that important habitat features such as termite mounds, burrows and logs can be retained. Even if some cannot be retained, the surrounding bushland has these features.
7.3.1 d)	Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).	No area of declared outstanding biodiversity is located within the vicinity of the proposed works area
7.3.1 e)	Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	The following key threatening processes are relevant to the proposed works: clearing of native vegetation; loss of hollow-bearing trees; removal of dead wood or dead trees. These impacts are likely to be minor.
Conclusion	**Is there likely to be a significant impact?**	No

B7 Parrots

The following parrots have potential to occur in the subject site:

- *Callocephalon fimbriatum* (Gang-gang Cockatoo)
- *Glossopsitta pusilla* (Little Lorikeet)
- *Lathamus discolor* (Swift Parrot)
- *Neophema pulchella* (Turquoise Parrot)

Gang-gang Cockatoo is listed as vulnerable under the BC Act. It occurs from southern Victoria through south and central-eastern NSW. Only one breeding population is known in the Sydney Metropolitan region in the Hornsby – Ku-ring-gai areas. In spring and summer Gang-gang Cockatoos are found in tall mountain forests, in winter they move to lower altitudes in drier, open eucalypt forests and woodlands. While this species is unlikely to utilise foraging habitat on a regular basis, vagrant individuals may occasionally forage within the SSTF within the subject site.

Little Lorikeet is a vulnerable species listed under the BC Act. It is a small parrot which is distributed widely across coastal areas of eastern Australia and the Great Divide from Cape York to South Australia. Within NSW the species occurs from coastal areas to as far west as Dubbo and Albury. The species primarily forages in the canopy of open eucalypt forest and woodland though also utilises other trees including *Angophora* spp., *Melaleuca* spp. and other tree species. Riparian habitats are commonly used, due to higher soil fertility and greater productivity. Forages mostly on nectar and pollen and only occasionally on native fruits such as mistletoes. The species roosts in canopy vegetation, often at distances from feeding habitat. Nesting occurs in hollow bearing eucalypts in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Hollows are typically small and located high above the ground with riparian trees often chosen, including *Allocasuarina* spp.

Swift Parrot is a vulnerable species listed under the BC Act. The species is a winter migrant to the south-eastern Australia mainland (March – October) from Tasmania, where it feeds on winter-flowering eucalypts, such as *Eucalyptus tereticornis, Corymbia maculata* and *Eucalyptus robusta*. The Swift Parrot is a highly mobile species able to utilise a variety of foraging resources over a large area. Potential winter foraging resources are available in the site with the presence of *E. tereticornis* and *C. maculata.* However, these resources are likely to only be used on an intermittent basis.

Turquoise Parrot is a listed as a vulnerable species under the BC Act. The Turquoise Parrot's range extends from southern Queensland through to northern Victoria. This species inhabits the margins of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. This species nests in tree hollows, logs or posts, from August to December. It forages on the ground for seeds and herbaceous plants and may be quite tolerable of disturbance.

BC Act	Question	Response
7.3.1 a)	In the case of a threatened species: whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	Factors likely to have an adverse effect on the life cycle of listed parrot species would include a substantial loss and / or fragmentation of habitat or alteration of fire regime. The proposed development will result in impacts of up to 1.41 ha of potential habitat for Gang-Gang Cockatoo, Glossy Black Cockatoo, Little Lorikeet, Swift Parrot and Turquoise Parrot. Gang-gang Cockatoo typically breed in tall forest in large patches of intact vegetation and therefore are considered unlikely to be breeding in the subject site which is generally located within disturbed habitat. Swift Parrot breeds only in Tasmania and therefore would not be breeding within the subject site. Potential roosting and breeding habitat is available within the subject site for Little Lorikeet and Turquoise Parrot. While habitat trees will be retained where possible, hollow-bearing trees may be removed as a result of the proposal, which could provide potential breeding habitat for Little Lorikeet and Swift Parrot. The above listed threatened parrot species are highly mobile and are likely to only utilise habitat within the subject site on an occasional basis for foraging. Considering the significant area of potential foraging and breeding/roosting to be retained nearby, the proposed development is unlikely to have an adverse effect on the lifecycle of Gang-Gang Cockatoo, Little Lorikeet, Swift Parrot and Turquoise Parrot such that a viable local population would be placed at risk of extinction.
7.3.1 b) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:	Not applicable. Listed Parrots are not a TEC.

BC Act	Question	Response
	Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	
7.3.1 b) ii	In the case of an endangered ecological community or critically endangered ecological community: Whether the proposed development or activity is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	Not applicable. Listed Parrots are not a TEC.
7.3.1 c) i	In relation to the habitat of a threatened species or ecological community: The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	The proposal will result in the removal of up to 1.41 ha of potential habitat for Gang-Gang Cockatoo, Little Lorikeet, Swift Parrot and Turquoise Parrot.
7.3.1 c) ii	In relation to the habitat of a threatened species or ecological community: Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	These species are high mobile so there would be negligible fragmentation of habitat.
7.3.1 c) iii	In relation to the habitat of a threatened species or ecological community: The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	The habitat to be removed is likely to only be used as an occasional foraging resource across a larger foraging and home range. It is noted that potential breeding habitat is available within hollow-bearing trees for Little Lorikeet and Turquoise Parrot. Considering the small proportion of potential habitat to be impacted within the locality, the habitat to be removed is not considered critical to the long-term survival of these species within the locality.
7.3.1 d)	Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).	No critical habitat (declared areas of outstanding biodiversity value under the BC Act) has been declared for these species.
7.3.1 e)	Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	Habitat loss from the clearing of native vegetation and associated weed invasion is a key threatening process relevant to the proposed works. The final determination for listed Parrots identifies habitat loss as part of the decline of these species. Under the proposed works, a small amount of vegetation removal and trimming will occur.
Conclusion	**Is there likely to be a significant impact?**	**No**

B8 Woodland birds (passerines)

The following woodland birds have the potential to occur in the subject site:

- *Anthochaera phrygia* (Regent Honeyeater)

- *Artamus cyanopterus cyanopterus* (Dusky Woodswallow)
- *Chthonicola sagittate* (Speckled Warbler)
- *Climacteris picumnus victoriae* (Brown Treecreeper - eastern subspecies)
- *Daphoenositta chrysoptera* (Varied Sittella)
- *Melanodryas cucullata cucullata* (Hooded Robin - south-eastern form)
- *Melithreptus gularis gularis* (Black-chinned Honeyeater - eastern subspecies)
- *Petroica boodang* (Scarlet Robin)
- *Petroica phoenicea* (Flame Robin)
- *Stagonopleura guttata* (Diamond Firetail)

The **Regent Honeyeater** mostly occurs in dry-ironbark eucalypt woodland and dry sclerophyll forest associations, where they prefer the most fertile site available, e.g. along creek flats, or in broad river valleys and foothills. In NSW, riparian forests containing *Casuarina cunninghamiana* (River Oak), and with *Amyema cambagei* (Needle-leaf Mistletoe), are also important for feeding and breeding. They may also use other woodland types and wet lowland coastal forest dominated by *Eucalyptus robusta* (Swamp Mahogany) or *E. maculata* (Spotted Gum).

The **Dusky Woodswallow** occurs throughout eastern, southern and south-western Australia. They inhabit dry open eucalypt forests and woodland and less commonly in heathlands, shrublands, moist forests and rainforests.

The **Speckled Warbler** inhabits a wide range of eucalypt dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Large, relatively undisturbed remnants are required for the species to persist in an area. The diet of this species consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees.

The **Brown Treecreeper** inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey within coastal areas. They nest in hollows in standing dead or live trees and tree stumps. Fallen timber is an important habitat component for this species. It is considered a sedentary species, with territories ranging between approximately 1ha to 11ha, though some birds may disperse locally after breeding. Populations consist of pairs to groups of three to six.

Varied Sittella has a widespread range across mainland Australia, excluding some areas of the arid interior (Nullarbor, Pilbara and Simpson Desert). The species inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. The Varied Sittella feeds on arthropods gleaned from crevices in rough bark, dead branches, standing dead trees, and from small branches and twigs in the tree canopy.

Hooded Robin is a large Australian robin reaching 17 cm in length. The Hooded Robin is common in few places, and rarely found on the coast. It is considered a sedentary species, but local seasonal movements are possible. The south-eastern form is found from Brisbane to Adelaide throughout much of inland NSW, with the exception of the north-west. The species is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. The Hooded Robin prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. The Hooded Robin requires structurally

diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.

Black-chinned Honeyeater is a large honeyeater reaching 17 cm in length. The eastern subspecies extends south from central Queensland, through NSW, Victoria into south eastern South Australia, though it is very rare in the last state. In NSW it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. It is rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond and Clarence River areas. It has also been recorded at a few scattered sites in the Hunter, Central Coast and Illawarra regions, though it is very rare in the latter. The Black-chinned Honeyeater occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*). It also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees. It is a gregarious species usually seen in pairs and small groups of up to 12 birds. Feeding territories are large making the species locally nomadic. Recent studies have found that the Black-chinned Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 hectares. The species moves quickly from tree to tree, foraging rapidly along outer twigs, underside of branches and trunks, probing for insects. Nectar is taken from flowers, and honeydew is gleaned from foliage. Breeds solitarily or co-operatively, with up to five or six adults, from June to December. The nest is placed high in the crown of a tree, in the uppermost lateral branches, hidden by foliage. It is a compact, suspended, cup-shaped nest.

Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter.. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees. Birds forage from low perches, fence-posts or on the ground, from where they pounce on small insects and other invertebrates which are taken from the ground, or off tree trunks and logs; they sometimes forage in the shrub or canopy layer. Scarlet Robin pairs defend a breeding territory and mainly breed between the months of July and January; they may raise two or three broods in each season. This species' nest is built in the fork of tree usually more than 2 metres above the ground; nests are often found in a dead branch in a live tree, or in a dead tree or shrub.

Flame Robin occurs from near the Queensland border to south eastern Australia and Tasmania. It breeds in spring to summer upland areas and moves to lower areas in open habitat in winter.

Diamond Firetail can be found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Woodlands. This species can also be found in open forest, mallee, riparian vegetation, and

grasslands. This species is usually seen in flocks of between five to forty birds. This species is a ground feeder, feeding on ripe and partly-ripe grass, herb seeds, green leaves, and on insects.

BC Act	Question	Response
7.3.1 a)	In the case of a threatened species: whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	Factors likely to have an adverse effect on the life cycle of listed Woodland birds (passerines) include a substantial loss and / or fragmentation of habitat or alteration of fire regime. The proposed development will result in loss of up to 1.41 ha of potential habitat which is a small proportion of the locally available foraging and breeding/roosting habitat, so the proposed development is unlikely to have an adverse effect on the lifecycle of woodland birds such that a viable local populations would be placed at risk of extinction.
7.3.1 b) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	Not applicable. Listed Woodland birds (passerines) species are not a TEC.
7.3.1 b) ii	In the case of an endangered ecological community or critically endangered ecological community: Whether the proposed development or activity is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	Not applicable. Listed Woodland birds (passerines) species are not a TEC.
7.3.1 c) i	In relation to the habitat of a threatened species or ecological community: The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	The proposal will result in the removal of up to 1.41 ha of potential habitat for woodland birds.
7.3.1 c) ii	In relation to the habitat of a threatened species or ecological community: Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	Considering the high mobility of these woodland birds, the proposal will not substantially isolate or fragment areas of habitat for these species.
7.3.1 c) iii	In relation to the habitat of a threatened species or ecological community: The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	The habitat to be removed is likely to only be used as an occasional foraging resource across a larger foraging and home range. Considering the small proportion of potential habitat to be impacted within the locality, the habitat to be removed is not considered critical to the long-term survival of these species within the locality.
7.3.1 d)	Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).	No critical habitat (declared areas of outstanding biodiversity value under the BC Act) has been declared for these species

BC Act	Question	Response
7.3.1 e)	Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	The following key threatening processes are relevant to the proposed works: clearing of native vegetation; loss of hollow-bearing trees; removal of dead wood or dead trees; aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners *Manorina melanocephala*; introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae; infection of native plants by Phytophthora cinnamomic; invasion of native plant communities by exotic perennial grasses. These impacts are likely to be minor and can be managed in accordance with Sydney Water's standard environmental mitigation measures.
Conclusion	**Is there likely to be a significant impact?**	**No**

B9 Microchiropteran bats

Due to similar habitat requirements and associated impacts, a single test of significance has been undertaken for the following microchiropteran bats:

- *Chalinolobus dwyeri* (Large-eared Pied Bat)
- *Falsistrellus* tasmaniensis (Eastern False Pipistrelle)
- *Micronomus norfolkensis* (Eastern Freetail-bat)
- *Miniopterus australis* (Little Bentwing-bat)
- *Miniopterus schreibersii oceanensis* (Large Bentwing-bat)
- *Myotis macropus* (Southern Myotis)
- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat).

Roosting habitat was available for these species within the subject site, present as two hollow bearing trees

The **Large-eared Pied Bat** is mainly found in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes. The species roosts in caves, crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. The species has been found in well-timbered areas containing gullies. The relatively short, broad wing combined with the low weight per unit area of wing indicates manoeuvrable flight. This species probably forages for small, flying insects below the forest canopy. The species likely hibernates through the coolest months. It is uncertain whether mating occurs early in winter or in spring.

The **Eastern False Pipistrelle** is wide-ranging, occurring along the southeast coast of Australia with records from South East Queensland, New South Wales, Victoria and Tasmania. The species occurs in sclerophyll forests from the Great Dividing Range to the coast, and generally prefers wet habitats where trees are more than 20 m high. Roosting occurs in hollow trunks of eucalypt trees, usually in single sex colonies, but the species has been recorded roosting in caves under loose bark and occasionally in old wooden buildings. Their flight pattern is high and fast and they forage within or just below the tree canopy. They feed on a variety of prey including moths, rove beetles, weevils, plant bugs, flies and ants. The local population is considered to be any individuals within a 5 km radius of the study area.

The **Eastern Freetail-bat** is found along the east coast from south Queensland to southern NSW and occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. The Eastern Freetail-bat roost mainly in tree hollows but will also roost under bark or in man-made structures. They are usually solitary but also recorded roosting communally, probably insectivorous. The local population is considered to be any individuals within a 5 km radius of the study area.

The **Little Bentwing-bat** inhabits moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. This species roosts in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. They often share roosting sites with the Common Bentwing-bat. Maternity colonies form in spring. Males and juveniles disperse in summer. The local population is considered to be any individuals within a 5 km radius of the study area.

Large Bentwing-bat occurs on both sides of the Great Dividing Range, from the coast inland to Moree, Dubbo and Wagga Wagga. It is found in rainforest, wet and dry sclerophyll forest, monsoon forest, open woodland, paperbark forests and open grassland. The Large Bentwing-bat forages above and below the tree canopy on small insects. The bats congregate at the same maternity roosts each year to give birth and rear young. In the southern part of the species' range this occurs during spring. Maternity roosts may be located in caves, abandoned mines, concrete bunkers and lava tubes. Over-wintering roosts used outside the breeding period include cooler caves, old mines, and stormwater channels, under bridges and occasionally buildings.

The **Southern Myotis** is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. This species generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. This bat forages over streams and pools catching insects and small fish by raking their feet across the water surface. The local population is considered to be any individuals within a 5 km radius of the study area.

Yellow-bellied Sheathtail-bat roosts singly or in groups of up to six, in tree hollows and buildings. In treeless areas they are known to utilise mammal burrows. They forage in most habitats throughout their very wide range, including areas with and without trees and appear to defend an aerial territory. The local population is considered to be any individuals within a 5 km radius of the study area.

Greater Broad-nosed Bat is a large bat that feeds on moths and other large insects along edges of forest, cleared paddocks and tree-lined water courses. This species uses mostly tree hollows for roosting and

they have been recorded in a variety of vegetation types from woodland to rainforest. The local population is considered to be any individuals within a 5 km radius of the study area.

BC Act	Question	Response
7.3.1 a)	In the case of a threatened species: whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	Potential breeding and roosting habitat is available within hollow-bearing trees within the subject site. Hollows are of variable size and quality and not all hollow-bearing trees would be suitable for breeding. Potential breeding habitat within hollows is available for Eastern False Pipistrelle, Eastern Freetail-bat, Southern Myotis, Yellow-bellied Sheath tail-bat and Greater Broad-nosed Bat. Secondary roosting habitat is also available for Little Bentwing Bat and Large Bentwing Bat, however, these species are known to breed only in a small number of caves and are unlikely to breed within tree hollows in the subject site. The surrounding habitat to be retained is likely to contain a substantial number of suitable hollows which would provide potential breeding habitat for those hollow dependent microbats. The above listed threatened microbats are highly mobile and several species may only utilise habitat within the subject site on an occasional basis for foraging and dispersal. Considering the significant area of potential foraging and breeding/roosting to be retained, the proposed development is unlikely to have an adverse effect on the lifecycle of the above listed Microchiropteran Bats such that a viable local population would be placed at risk of extinction.
7.3.1 b) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	Not applicable. Listed Microchiropteran Bat species are not a TEC.
7.3.1 b) ii	In the case of an endangered ecological community or critically endangered ecological community: Whether the proposed development or activity is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	Not applicable. Listed Microchiropteran Bat species are not a TEC.
7.3.1 c) i	In relation to the habitat of a threatened species or ecological community: The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	The proposal will result in the removal of up to 1.41 ha of potential habitat for the above listed Microchiropteran Bats.

BC Act	Question	Response
7.3.1 c) ii	In relation to the habitat of a threatened species or ecological community: Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	Considering the high mobility of Microchiropteran Bats, the areas to be cleared will not substantially isolate or fragment habitat for these species.
7.3.1 c) iii	In relation to the habitat of a threatened species or ecological community: The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	The habitat to be removed is likely to only be used as an occasional foraging resource across a larger foraging and home range. It is noted that potential breeding and roosting habitat is also available within suitable hollows. Considering the small proportion of potential habitat to be affected, it is not considered critical to the long-term survival of these species within the locality.
7.3.1 d)	Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).	The study area does not contain any declared areas of outstanding biodiversity value.
7.3.1 e)	Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	Three key threatening processes are relevant to the proposed development: clearing of native vegetation; loss of hollow-bearing trees, and removal of dead wood and dead trees. These impacts are likely to be minor and can be avoided by retained hollow bearing trees where possible.
Conclusion	**Is there likely to be a significant impact?**	**No**

Appendix C EPBC Act Assessments of Significance

C1 Critically endangered - Swift Parrot & Regent Honeyeater

Criterion	Question	Response
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility of the following:		
1)	will the action lead to a long-term decrease in the size of a population	No Minor habitat clearing for these mobile species will not result in a decrease in population size
2)	will the action reduce the area of occupancy of the species	Yes – minor impact Up to 1.41 ha of bushland will be cleared, but this is a small proportion of the total patch size
3)	will the action fragment an existing population into two or more populations	No Minor habitat clearing for these mobile species will not fragment the populations
4)	will the action adversely affect habitat critical to the survival of a species	No There is no critical habitat in the study area
5)	will the action disrupt the breeding cycle of a population	No Preclearing surveys need to be conducted to check that there are no active nests in trees to be cleared. Breeding cycles of these populations will not be affected by temporary and minor vegetation clearing.
6) i	will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No Minor habitat removal will not result in species decline.
6) ii	will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	No No change is expected to the presence of invasive species as a result of proposed works.
7)	will the action introduce disease that may cause the species to decline	No Minor habitat removal is unlikely to result in the introduction of disease for these species.
8)	will the action interfere with the recovery of the species	No These species are highly mobile and there will only be minor impact to foraging habitat.
Conclusion	**Is there likely to be a significant impact?**	No

C2 Endangered species - Spotted-tailed Quoll

Criterion	Question	Response
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility of the following:		
1)	will the action lead to a long-term decrease in the size of a population	No Minor clearing of foraging habitat for this mobile species is unlikely to affect its population size
2)	will the action reduce the area of occupancy of the species	Yes – minor impact Up to 1.41 ha of bushland will be cleared, but this is a small proportion of the total bushland patch size. The species will continue to be able to forage over a broad region of bushland.
3)	will the action fragment an existing population into two or more populations	No Even though the clearing will fragment the bushland, the population of this mobile species is unlikely to fragmented as individuals will continue to be able to move across the modified landscape
4)	will the action adversely affect habitat critical to the survival of a species	No There is no critical habitat in the study area
5)	will the action disrupt the breeding cycle of a population	No Minor clearing of foraging habitat will not affect the breeding patterns of this species.
6) i	will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No Up to 1.41 ha of potential foraging habitat will be cleared. In the context of the adjacent Stewardship site, the area of impact is small and the species is unlikely to decline as a result.
6) ii	will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	No Invasive species such as foxes and feral cats are already present in the area.
7)	will the action introduce disease that may cause the species to decline	No Minor habitat removal is unlikely to result in the introduction of disease for this species
8)	will the action interfere with the recovery of the species	No The species is highly mobile and there will only be minor impact to foraging habitat.
Conclusion	**Is there likely to be a significant impact?**	**No**

Vulnerable Species - Large-eared Pied Bat

Criterion	Question	Response
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1)	lead to a long-term decrease in the size of an important population of a species	No The study area does not have an important population, as defined in the EPBC Act Significant Impact Guidelines 1.1.
2)	reduce the area of occupancy of an important population	No The study area does not have an important population
3)	fragment an existing important population into two or more populations	No The study area does not have an important population
4)	adversely affect habitat critical to the survival of a species	No Only minor clearing of potential foraging and breeding habitat is proposed, and this is not considered habitat critical to the survival of the species.
5)	disrupt the breeding cycle of an important population	No The study area does not have an important population.
6)	modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Yes – minor impact Up to 1.41 ha of potential foraging habitat will be cleared and some potential breeding habitat (hollow-bearing trees) may also be cleared, although habitat trees should be retained where possible. In the context of the adjacent Stewardship site, the area of impact is small and the species is unlikely to decline as a result.
7)	result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	No This species is vulnerable to predation by feral cats, and these are already likely to be present in the region.
8)	introduce disease that may cause the species to decline, or	No Minor habitat removal is unlikely to result in the introduction of disease for this species.
9)	interfere substantially with the recovery of the species.	No The species is highly mobile and there will only be minor impact to foraging and potential breeding habitat.
Conclusion	**Is there likely to be a significant impact?**	**No**

Critically Endangered Ecological Communities – SSTF & WSDR

Criterion	Question	Response
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:		
1)	reduce the extent of an ecological community	Yes – minor impact A total of up to 1.41 ha will be cleared, comprising 1.25 ha of SSTF and 0.16 of WSDR.
2)	fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	Yes – minor impact Vegetation clearing will increase fragmentation of the community.
3)	adversely affect habitat critical to the survival of an ecological community	Yes – minor impact The works will involve habitat clearing, although this is a small proportion of the total patch size.
4)	modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	Yes – minor impact The proposal will require minor vegetation clearing, earthworks and changes to surface water drainage. Part of this area has previously been disturbed and is in poor condition. The surrounding vegetation will not be affected by the proposed works.
5)	cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	No The proposal will not involve activities that would cause a decline or loss of a functionally important species.
6) i	cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: assisting invasive species, that are harmful to the listed ecological community, to become established, or	Yes – minor impact The disturbance area is likely to increase edge effects and the risk of further weeds.
6) ii	cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or	Yes – minor impact The proposal could result in the release of pollutants to the environment which could harm the adjacent bushland. The risk of this is low as the infrastructure will be managed in accordance with Sydney Water's requirements.
7)	interfere with the recovery of an ecological community.	Yes – minor impact Clearing part of these communities is not consistent with recovery, however, the area to be cleared is small in the context of its local occurrence.
Conclusion	**Is there likely to be a significant impact?**	**No**

Appendix D Species List

Family	Scientific Name	Common Name	Exotic	BC Act	EPBC Act
Flora					
Acanthaceae	*Pseuderanthemum variabile*	Pastel Flower			
Adiantaceae	*Adiantum aethiopicum*	Common Maidenhair			
Adiantaceae	*Adiantum hispidulum* var. *hispidulum*	Rough Maidenhair			
Adiantaceae	*Pellaea falcata*	Sickle Fern			
Apiaceae	*Cyclospermum leptophyllum*	Slender Celery	*		
Apiaceae	*Hydrocotyle sibthorpioides*				
Asparagaceae	*Asparagus asparagoides*	Bridal Creeper	*		
Asteraceae	*Ageratina adenophora*	Crofton Weed	*		
Asteraceae	*Bidens pilosa* var. *pilosa*		*		
Asteraceae	*Calotis dentex*	Burr-daisy			
Asteraceae	*Cirsium vulgare*	Spear Thistle	*		
Asteraceae	*Conyza* spp.	A Fleabane	*		
Asteraceae	*Cotula australis*	Common Cotula			
Asteraceae	*Facelis retusa*		*		
Asteraceae	*Gamochaeta purpurea*	Purple Cudweed	*		
Asteraceae	*Hypochaeris radicata*	Catsear	*		
Asteraceae	*Senecio madagascariensis*	Fireweed	*		
Asteraceae	*Sigesbeckia orientalis* subsp. *orientalis*	Indian Weed			
Asteraceae	*Sonchus oleraceus*	Common Sowthistle	*		
Boraginaceae	*Echium vulgare*	Viper's Bugloss	*		
Campanulaceae	*Wahlenbergia gracilis*	Sprawling Bluebell			
Caprifoliaceae	*Lonicera japonica*	Japanese Honeysuckle	*		
Casuarinaceae	*Allocasuarina littoralis*	Black She-Oak			
Chenopodiaceae	*Einadia hastata*	Berry Saltbush			
Convolvulaceae	*Dichondra repens*	Kidney Weed			
Crassulaceae	*Crassula sieberiana*	Australian Stonecrop			
Cupressaceae	*Callitris rhomboidea*	Port Jackson Pine			
Cyperaceae	*Gahnia aspera*	Rough Saw-sedge			
Cyperaceae	*Lepidosperma laterale*	Variable Sword-sedge			
Cyperaceae	*Schoenus melanostachys*				
Euphorbiaceae	*Beyeria viscosa*	Sticky Wallaby Bush			
Fabaceae (Faboideae)	*Jacksonia scoparia*	Dogwood			
Fabaceae (Faboideae)	*Podolobium ilicifolium*	Prickly Shaggy Pea			

Family	Scientific Name	Common Name	Exotic	BC Act	EPBC Act
Fabaceae (Faboideae)	*Vicia* spp.	Vetch	*		
Fabaceae (Mimosoideae)	*Acacia binervia*	Coast Myall			
Fabaceae (Mimosoideae)	*Acacia floribunda*	White Sally			
Gentianaceae	*Centaurium* spp.		*		
Lamiaceae	*Plectranthus parviflorus*				
Lobeliaceae	*Lobelia purpurascens*	Whiteroot			
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush			
Lomandraceae	*Lomandra multiflora* subsp. *multiflora*	Many-flowered Mat-rush			
Luzuriagaceae	*Geitonoplesium cymosum*	Scrambling Lily			
Malvaceae	*Modiola caroliniana*	Red-flowered Mallow	*		
Malvaceae	*Sida rhombifolia*	Paddy's Lucerne	*		
Myrtaceae	*Backhousia myrtifolia*	Grey Myrtle			
Myrtaceae	*Eucalyptus crebra*	Narrow-leaved Ironbark			
Myrtaceae	*Eucalyptus globoidea*	White Stringybark			
Myrtaceae	*Eucalyptus tereticornis*	Forest Red Gum			
Myrtaceae	*Kunzea ambigua*	Tick Bush			
Myrtaceae	*Melaleuca diosmatifolia*	Pink Honeymyrtle			
Myrtaceae	*Tristaniopsis laurina*	Kanooka			
Oleaceae	*Ligustrum lucidum*	Large-leaved Privet	*		
Oleaceae	*Notelaea longifolia*	Large Mock-olive			
Phormiaceae	*Dianella revoluta* var. *revoluta*	A Blue Flax Lily			
Phyllanthaceae	*Breynia oblongifolia*	Coffee Bush			
Phyllanthaceae	*Phyllanthus* spp.				
Phyllanthaceae	*Poranthera microphylla*	Small Poranthera			
Phytolaccaceae	*Phytolacca octandra*	Inkweed	*		
Pittosporaceae	*Billardiera scandens*	Hairy Apple Berry			
Pittosporaceae	*Bursaria spinosa* subsp. *spinosa*	Native Blackthorn			
Pittosporaceae	*Pittosporum revolutum*	Rough Fruit Pittosporum			
Plantaginaceae	*Plantago debilis*	Shade Plantain			
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	*		
Poaceae	*Austrostipa ramosissima*	Stout Bamboo Grass			
Poaceae	*Briza maxima*	Quaking Grass	*		
Poaceae	*Briza minor*	Shivery Grass	*		
Poaceae	*Cenchrus clandestinus*	Kikuyu Grass	*		
Poaceae	*Cynodon dactylon*	Common Couch			

Family	Scientific Name	Common Name	Exotic	BC Act	EPBC Act
Poaceae	*Echinopogon ovatus*	Forest Hedgehog Grass			
Poaceae	*Ehrharta erecta*	Panic Veldtgrass	*		
Poaceae	*Entolasia marginata*	Bordered Panic			
Poaceae	*Eragrostis curvula*	African Lovegrass	*		
Poaceae	*Imperata cylindrica*	Blady Grass			
Poaceae	*Microlaena stipoides* var. *stipoides*	Weeping Grass			
Poaceae	*Oplismenus aemulus*				
Poaceae	*Themeda triandra*	Kangaroo Grass			
Polygonaceae	*Acetosa sagittata*	Rambling Dock	*		
Primulaceae	*Anagallis* spp.		*		
Proteaceae	*Persoonia linearis*	Narrow-leaved Geebung			
Pteridaceae	*Cheilanthes sieberi* subsp. *sieberi*	Rock Fern			
Ranunculaceae	*Clematis aristata*	Old Man's Beard			
Rosaceae	*Rubus fruticosus* sp. agg.	Blackberry complex	*		
Rubiaceae	*Galium propinquum*	Maori Bedstraw			
Rubiaceae	*Morinda jasminoides*	Sweet Morinda			
Rubiaceae	*Pomax umbellata*	Pomax			
Santalaceae	*Exocarpos cupressiformis*	Cherry Ballart			
Solanaceae	*Solanum nigrum*	Black-berry Nightshade	*		
Solanaceae	*Solanum prinophyllum*	Forest Nightshade			
Violaceae	*Hybanthus monopetalus*	Slender Violet-bush			
Fauna					
Acanthizidae	*Acanthiza pusilla*	Brown Thornbill			
Acanthizidae	*Sericornis frontalis*	White-browed Scrubwren			
Calyptorhynchinae	***Calyptorhynchus lathami***	**Glossy Black-cockatoo**		**V**	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo Shrike			
Eupetidae	*Psophodes olivaceus*	Eastern Whipbird			
Maluridae	*Malurus cyaneus*	Superb Fairy-wren			
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird			
Meliphagidae	*Manorina melanophrys*	Bell miner			
Monarchidae	*Grallina cyanoleuca*	Magpie-lark			
Pachycephalidae	*Pachycephala pectoralis*	Golden Whistler			
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail			
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna			

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