339-349 Horsley Rd, Milperra – SSD-45998963 Biodiversity Development Assessment Report

Biodiversity Development Assessment Report

prepared for

Hale Capital Development Management

écologique | environmental consulting

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Certification

I, Kat Duchatel (BAAS17054), certify that this biodiversity development assessment report has been prepared on the basis of the requirements of (and information provided under) the current biodiversity assessment method (OEH 2020).

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11/09/2022

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Revision Schedule

Rev No	Date	Description	Issued to
00	15/08/2022	Draft BDAR for Client Review	Hale Capital, Tactical
01	11/09/2022	Final BDAR for Submission	Hale Capital, Tactical

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1. Introduction

1.1 Background

écologique was commissioned by Hale Capital Development Management to address the Secretary's Environmental Assessment Requirements (SEARs) as they related to biodiversity for proposed development of 339-349 Horsley Road, Milperra (the subject land). The proposal involves the construction and operation of a multi-unit warehouse and distribution facility, which includes:

- Demolition of all existing buildings and structures
- Site preparation works, including tree clearing
- Earthworks (to achieve an FFL of RL 11.05)
- Infrastructure comprising civil works and utilities servicing
- Three (3) vehicular crossovers to Horsley Road
- Construction of two (2) warehouse buildings, split over two (2) storeys
- On-site car parking
- Complementary landscaping and offset planting

The layout of the proposal is shown in Figure 1-1.

Figure 1-1. Proposed layout (source: SBA, 31/08/2022)

The subject land is legally identified as Lots 140 and 141 of DP 550194 (see Figure 1-2), in the Canterbury-Bankstown local government area (LGA) and is zoned IN1 General Industrial, pursuant to the Bankstown Local Environmental Plan 2015 (BLEP 2015).

The subject land is located on the western side of Horsley Road and covers approximately 3.37ha. In its existing state, comprises a one-storey factory building and a brick office building at 339 Horsley Road and two (2) one-storey warehouse buildings and a one-storey rendered office at 349 Horsley Road.

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339-349 Horsley Rd
Milperra

Figure 1-2.
Subject site

Legend

Subject_site

N

0 5 10 20 30 40
m

Coordinate System: MGA Zone 56 (GDA 2020)

Image source: Nearmap 04 June 2022

Date drawn: 29 July 2022

1.2 Secretary Environmental Assessment Requirements

Industry specific Secretary Environmental Assessment Requirements (SEARs) were issued on the 12 July 2022 for SSD -45998963. Table 1-1 summarises how the SEARs as relevant to biodiversity have been addressed.

Table 1-1. Secretary Environmental Assessment Requirements

Key Issue	Issue and assessment requirements	How it is addressed	Location within this report
SEARs			
9. Biodiversity	• Assess any biodiversity impacts associated with the development in accordance with the *Biodiversity Conservation Act 2016* (BC Act) and the Biodiversity Assessment Method 2020 (BAM), including the preparation of a Biodiversity Development Assessment Report (BDAR), unless a waiver is granted, or the site is on biodiversity certified land.	Biodiversity impacts have been assessed in accordance with the BC Act and the BAM	Purpose of this BDAR
9. Biodiversity	• If the development is on biodiversity certified land, provide information to identify the site (using associated mapping) and demonstrate the proposed development is consistent with the relevant biodiversity measure conferred by the biodiversity certification.	The development is not located on biodiversity certified land.	Not applicable
SEARs – cover letter (12 July 2022)			
Matters of National Environmental Significance (MNES)	• Any development likely to have a significant impact on MNES will require approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This approval is in addition to approvals required under NSW legislation.	MNES has been assessed in accordance with the Significant Impact Guidelines 1.1 - EPBC Act Policy Statement (2013)	Refer Section 5f

1.3 Assessment methods

1.3.1 BAM modules

The proposal has been assessed under the following streamlined assessment modules in the BAM:

- Appendix C: Streamlined assessment module – Small area, which may be used in accordance with the area clearing threshold shown in Table 12 of the BAM. Relevant to the subject land:
  - A minimum lot size of 0.15 ha applies under the current Bankstown LEP 2015,
  - The maximum area clearing limit for application of the small area development module is ≤1 ha,
  - The total area of native vegetation clearing, including both planted local and non-local native species is <0.35ha
- Appendix D: Streamlined assessment module – Planted native vegetation:
  - Where only part of the subject land contains planted native vegetation, this module may be used to assess that part of the development proposal. The standard BAM is then used to assess the remaining areas.

1.3.2 Site survey

Site surveys were conducted by two ecologists on 22 June 2022. Weather was clear with maximum temperature of 18°C. 3.4mm or rainfall occurred in the preceding week. Surveys included:

- Vegetated areas and potential habitat areas (due to the landscaped nature of the site all areas of vegetation were able to be inspected thoroughly); and
- Buildings to assess the potential for nesting birds and/or microbat roosts
- Collection of BAM floristic and site integrity plot/transects from two locations, modified in dimensions to capture both 400m2 and 1000m2 plots and 50m transects (see Figure 3-1).

1.3.3 Information sources

The following information sources were used in the preparation of this report:

- Imagery: Aerial imagery: NearMap 4 June 2022
- Australian Government Department of the Environment and Energy
  - Protected Matters Search Tool http://www.environment.gov.au/epbc/pmst/index.html
  - Species Profiles and Threats Database (SPRAT) http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl
  - Significant Impact Guidelines 1.1 - Matters of National Environmental Significance (Department of the Environment, Water, Heritage and the Arts, 2013 EPBC Act Policy Statement)
  - Interim Biogeographic Regionalisation for Australia (IBRA) version 7.0
- NSW Department of Planning and Environment (DPE), Environment, Energy and Science (EES) Group, formerly the Office of Environment and Heritage (OEH)
  - NSW (Mitchell) Landscapes - version 3.1 & BVMap_V13_SEED.gdb
  - BioNet Vegetation Classification Database & BioNet Threatened Biodiversity Data Collection
  - Biodiversity Investment Opportunities Map: Mapping Priority Investment Areas for the Cumberland Subregion (2018)
  - The Native Vegetation of the Sydney Metropolitan Area - Version 3_1 (OEH, 2016) VIS_ID 4489_
- Bannerman SM and Hazelton PA 1990, Soil Landscapes of the Penrith 1:100 000 Sheet Map, Soil Conservation Service, Sydney.
- Canopy Consulting Arboricultural Impact Assessment Horsley Road Multi-Level Warehouse, Milperra (SSD-45998963) 339-349 Horsley Rd, Milperra NSW 2214, 5 August 2022

2. Site context

2.1 Landscape features

The BAM stream-lined module requires the identification of landscape features in accordance with Section 3.1.

Landscape features relevant to the proposal have been assessed from within a 1500m buffer zone (the BDAR assessment area) around the proposed development site (subject land). Table 2-1 and Figure 2-1 identify the landscape features identified.

Table 2-1. Landscape features

Landscape features	
IBRA bioregion/subregion	Sydney Basin/Cumberland
NSW (Mitchell) landscapes	Ashfield Plains
Rivers and streams classified according to stream order	Several surface, channelised and piped first order tributaries are located in the BDAR assessment area (see Figure 2-1)
Wetlands within, adjacent to and downstream of the site	No wetlands of local, regional, national or international significance are located within the subject land or BDAR assessment area.
Connectivity of different areas of habitat	The subject land does not provide any continuous vegetation or drainage lines that provide wildlife connectivity. Figure 2-2 shows the relative isolated nature of the site from corridors mapped by OEH (2018) and High Biodiversity Value mapping provided under the BC Reg.
Geological features such as karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features	No karsts, caves, crevices, cliffs or areas of geological significance have been identified within the BDAR assessment area.
Areas of outstanding biodiversity value occurring on the subject land and assessment area	No outstanding biodiversity values occur within the BDAR assessment area. Figure 2-2 shows High Biodiversity Value mapping provided under the BC Reg.

2.2 Native vegetation

The BAM stream-lined module requires an assessment of the site context as follows:

- Native vegetation cover in accordance with Section 3.2; and
- Patch size in accordance with Subsection 4.3.2.

2.2.1 Native vegetation cover

The cover of native vegetation within the BDAR assessment area was determined as follows:

- Clipping the extent of Sydney Metropolitan Vegetation Mapping (OEH 2016) within the BDAR assessment area using ArcMap v10.8.2;
- Editing the shapefile to remove areas of vegetation no longer evident and to increase the extent of vegetation, along with the addition of polygons identifying areas of vegetation not represented in mapping.

The BDAR assessment area including the subject land is 822.3 ha. The total of native vegetation cover within the BDAR assessment area is estimated at 101.9 ha, which equates to 12.4% and an assignment to the 10-30% cover class (in accordance with the BAM Section 3.2). Figure 2-2 illustrates the extent of native vegetation within the BDAR assessment area.

2.2.2 Patch size

A patch is an area of native vegetation that occurs on the subject land and includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤ 30 m for non-woody ecosystems). A patch may extend onto adjoining land.

For each vegetation zone, the assessor must determine the patch size in hectares and assign it to one of the following classes:

a. <5 ha, or
b. 5-<25 ha, or
c. 25-<100 ha, or
d. ≥100 ha.

The patch size was assessed as 8.3 ha as shown in Figure 2-2, which equates to the 5-<25 ha class.

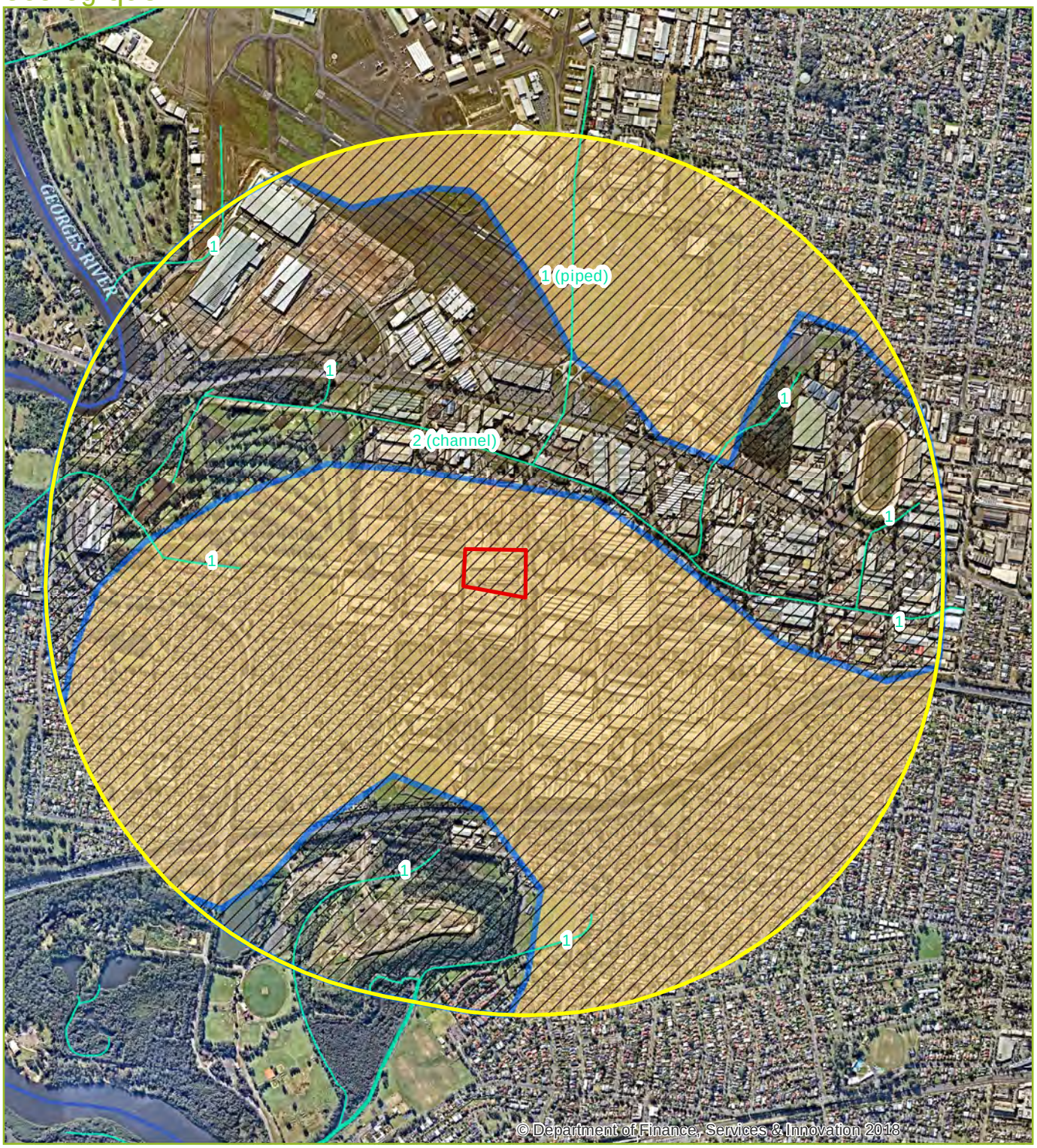

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Figure 2-1. Landscape assessment

Legend

- BDAR assessment area
- Subject site
- Cumberland IBRA subregion

Mitchell landscape

- Ashfield Plains
- Georges River Alluvial Plain

Coordinate System: MGA Zone 56 (GDA 2020)

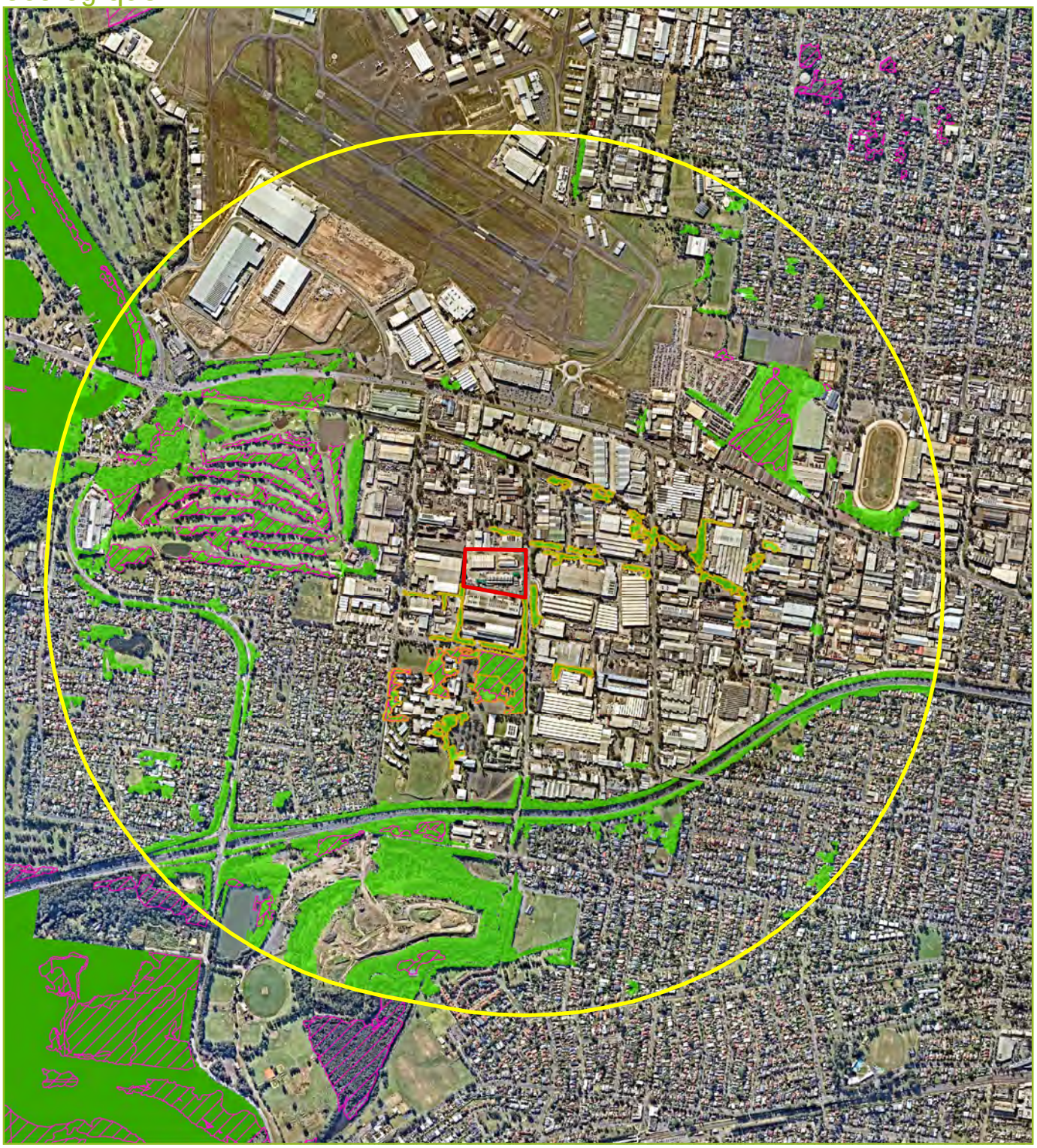
Image source: Nearmap 04 June 2022

Data sources: IBRA7 Subregions
Land_Mitchell_Landscapes_v3
NSW Hydrography (DSFI, 2018)

Date drawn: 29 July 2022

N

0 0.2 0.4 0.8 1.2 1.6 km



SSD-45998963 339-349 Horsley Road, Milperra

Legend

- BDAR assessment area
- Subject site
- Patch size
- BV mapping
- Subject site vegetation
- Native vegetation cover
- Cumberland corridors

N

0 0.2 0.4 0.8 1.2 1.6 km

Figure 2-2. Vegetation cover

Coordinate System: MGA Zone 56 (GDA 2020)

Image source: Nearmap 04 June 2022

Data sources: BV13_Web (SEED) gdb
SydneyMetroArea_v3_2016_E_4489 (modified)
Cumberland Subregion Regional Corridors (2015)

Date drawn: 29 July 2022

3. Native Vegetation

3.1 Existing vegetation

Existing vegetation within the subject land is a mixture of planted native and exotic tree and shrub species, landscaped planter beds and lawns, with small areas of self-seeded local and non-local native species evident along the southern boundary. Table 3-1 summarises the species observed within the subject land along with a description of whether the plant is of local or non-local origin[1].

Table 3-1. Subject land vegetation

Species name	Common name	Origin or habitat
Native local species		
Acacia decurrens	Green wattle	Native to locality
Acacia mearnsii	Black wattle	Not expected to occur: grows in wet sclerophyll forest, woodland and coastal scrub, on hillsides, ridgetops and creekbanks, in clay or sandy soils.
Archontophoenix cunninghamiana	Bangalow palm	Not expected to occur: grows in or near rainforest in coastal districts, in moist sites beside creeks and alluvial flats
Callistemon salignus	White bottlebrush	Not expected to naturally occur within the site. Mostly grows in low-lying river flats and damp creeks, rarely in dry areas.
Casuarina glauca	Swamp oak	Not expected to occur: grows in brackish situations along coastal streams, somewhat farther inland along major river valleys
Corymbia maculata	Spotted gum	Native to locality
Eucalyptus punctata	Grey gum	Native to locality
Eucalyptus tereticornis	Forest redgum	Native to locality
Glochidion ferdinandi	Cheese tree	Native to locality
Melaleuca armillaris	Bracelet honey myrtle	Not expected to occur: widespread in heath communities, often on headlands or coastal ranges.
Melaleuca ericifolia	Swamp paperbark	Not expected to occur: grows along stream banks and in low-lying coastal swamps.
Native non-local species		
Alectryon tomentosus	Hairy birds eye	Grows in rainforests north from the Hunter River
Callistemon viminalis	Weeping bottlebrush	Occurs north from the Gloucester area
Corymbia citriodora	Lemon scented gum	Distributed from the Cooktown area to south of Gladstone in Queensland. Sparingly naturalised in NSW
Corymbia intermedia	Pink bloodwood	Distributed north from Gloucester
Eucalyptus grandis	Flooded gum, rose gum	Distributed north from near Newcastle
Eucalyptus leucoxylon	Pink flowered yellow gum	Localised in N.S.W., scattered occurrences along the Murray west from Barham
Lophostomen confertus	Brush box	Distributed north from the Hunter Valley
Melaleuca bracteata	black tea-tree	Distributed north from the Macleay River
Melaleuca quinquenervia	Broad-leaved paperbark	Distributed north from Botany Bay
Washingtonia robusta	Mexican cotton fan palm	Recorded as naturalised at the Albury Sewerage Works, Albury

[1] Distribution of species sourced from the NSW PlantNet, Royal Botanic Gardens and Domain Trust V2.0.

3.2 Assessment of planted native vegetation

As identified in Table 3-1, most of the native vegetation within the subject land is of planted origin. The exception being two locations along the southern boundary of the subject land, which include the following:

- Planted and self-seeded species (self-seeded species assumed to have arisen from adjacent plantings), and
- Planted species with colonising growth arising through suckering (i.e., clonal growth).

These areas have been conservatively assessed as native vegetation that can be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal (refer Section 3.3).

The remaining planted native vegetation has been assessed under Appendix D of the BAM (assessment of planted native vegetation module).

3.2.1 D.1 Assessment of planted native vegetation

Table 3-2 outlines how the decision-making key provided in Section D1 of Appendix D has been applied and photographic plates 1 to 8 show the various area of planted native vegetation.

Table 3-2. D1 Decision-making key

Key	Decision
1. Does the planted native vegetation occur within an area that contains a mosaic of planted and remnant native vegetation and which can be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal?	Most of the subject land's planted native vegetation does not occur in remnant native vegetation which can be reasonably assigned to a PCT known to occur in the same IBRA subregion as the proposal.
i. Yes .... The planted native vegetation must be allocated to the best-fit PCT and the BAM must be applied.	Not applicable
ii. No..... Go to 2.	No
2. Is the planted native vegetation:	
a. planted for the purpose of environmental rehabilitation or restoration under an existing conservation obligation listed in BAM Section 11.9(2.), and	No
b. the primary objective was to replace or regenerate a plant community type or a threatened plant species population or its habitat?	No
i. Yes .... The planted native vegetation must be assessed in accordance with Chapters 4 and 5 of the BAM.	Not applicable
ii. No..... Go to 3.	
3. Is the planted/translocated native vegetation individuals of a threatened species or other native species planted/translocated for the purpose of providing threatened species habitat under one of the following:	
a. a species recovery project	No
b. *Saving our Species* project	No
c. other types of government funded restoration project	No
d. condition of consent for a development approval that required those species to be planted or translocated for the purpose of providing threatened species habitat	No

Key	Decision
e. legal obligation as part of a condition or ruling of court. This includes regulatory directed or ordered remedial plantings (e.g., Remediation Order for clearing without consent issued under the BC Act or the Native Vegetation Act)	No
f. ecological rehabilitation to re-establish a PCT or TEC that was, or is carried out under a mine operations plan, or	No
g. approved vegetation management plan (e.g., as required as part of a Controlled Activity Approval for works on waterfront land under the NSW *Water Management Act 2000*)?	No
i. Yes .... The planted native vegetation must be assessed in accordance with Chapters 4 and 5 of the BAM.	Not applicable
ii. No..... Go to 4.	
4. Was the planted native vegetation (including individuals of a threatened flora species) undertaken voluntarily for revegetation, environmental rehabilitation or restoration without a legal obligation to secure or provide for management of the native vegetation?	No
i. Yes..... Go to D.2 Assessment of planted native vegetation for threatened species habitat (the use of Chapters 4 and 5 of the BAM are not required to be applied).	Not applicable
ii. No..... Go to 5.	
5. Is the native vegetation (including individuals of a threatened flora species) planted for functional, aesthetic, horticultural or plantation forestry purposes? This includes examples such as: windbreaks in agricultural landscapes, roadside plantings (including street trees, median strips, roadside batters), landscaping in parks, gardens and sport fields/complexes, macadamia plantations or tea-tree farms?	No
i. Yes .... Go to D.2 Assessment of planted native vegetation for threatened species habitat (the use of Chapters 4 and 5 of the BAM are not required to be applied).	Not applicable
ii. No..... Go to 6.	
6. Is the planted native vegetation a species listed as a widely cultivated native species on a list approved by the Secretary of the Department (or an officer authorised by the Secretary)?	Not able to be assessed. A list of widely cultivated native species approved by the Secretary of the Department (or an officer authorised by the Secretary) has not yet been made available.
i. Yes .... Go to D.2 Assessment of planted native vegetation for threatened species habitat (the use of Chapters 4 and 5 of the BAM are not required to be applied).	
ii. No..... There may be other types of occurrences of planted native vegetation that do not easily fit into the decision-making key above. Assessors should contact the BAM Support mailbox at bam.support@environment.nsw.gov.au for further advice on using the BAM to assess other types of occurrences of planted native vegetation.	Assessment of planted native vegetation for threatened species habitat (D.2 Assessment of planted native vegetation for threatened species habitat) applied in Section 3.2.2.

Photo plate 1: No.349 exit driveway viewed from Horsley Rd

Photo plate 2: No.349 planted brush box in between car park and from Horsley Rd

Photo plate 3: No.349 showing plantings surrounding office buildings

Photo plate 4: No.349 showing planted natives in garden bed

Photo plate 5: Western boundary of No.349

Photo plate 6: No.349 showing planted mixture of native and exotic species to the north of office buildings

Photo plate 7: No.339 street frontage showing non-local native plantings

Photo plate 8: No.339 showing exotic plantings around buildings

3.2.1 D.2 Assessment of planted native vegetation for threatened species habitat

An assessment of the potential for the planted native vegetation to provide habitat for threatened species is required. If there is evidence that threatened species are using the planted native vegetation as habitat, the assessor must apply Section 8.4 of the BAM to mitigate and manage impacts on these species. Species credits are not required to offset the proposed impacts.

Records of threatened species from a 10km radius of the subject land (the locality) was generated from the NSW Bionet threatened species database[2]. The subject land does not provide habitat for any threatened species recorded from the locality, due to the following:

- The subject land being in a highly industrialised setting and lack of wildlife corridors to areas within the locality and where threatened species have been recorded from; and
- A lack of habitat features that would support threatened species, such as remnant patches of vegetation that contain native shrub and ground layers, hollow bearing trees, bush rock, large woody debris, and watercourses/drainage lines.

Site surveys of the subject land did not find any incidental sightings or evidence of threatened species (e.g., scats, stick nests, diggings, burrows, scratches/runways on trees, faecal matter).

Man-made structures within the subject land were also inspected for evidence of any potential use by threatened birds and microbat species and none detected. An assessment of threatened species habitat requirements is provided in Section 4.2.

3.3 Plant community types

In accordance with Chapter 4.2 of the BAM, the dominant plant community type (PCT) on the subject land must be identified either through (a) use of existing information, or (b) collection of plot-based survey data. Identification of plant community types (PCTs) was confirmed during site surveys with reference to the BioNet Vegetation Classification database and data collected from floristic and site integrity plot/transects.

Two PCTs have been identified:

- Cumberland shale plains woodland (PCT 849), and
- Cumberland swamp oak forest (PCT 1800).

[2] In addition to the list of candidate threatened species generated by the BAM calculator for the PCTs assessed under the BAM in this assessment.

Figure 3-1 shows the extent of each PCT and the location of floristic and site integrity plot/transects. Plot/transect data is provided in Appendix A.

3.3.1 Cumberland shale plains woodland (PCT 849)

PCT 849 is found in the Sydney Basin IBRA Bioregion and Cumberland IBRA Sub-region and comprises an open grassy woodland dominated by *Eucalyptus moluccana* (grey box), *Eucalyptus tereticornis* (forest red gum) and *Eucalyptus crebra*/*Eucalyptus fibrosa* (ironbark) within localised patches of *Corymbia maculata* (spotted gum) as well as other species that include *Acacia decurrens* (black wattle). Self-seeding black wattle is evident within the southern boundary of the subject land.

This species has been planted elsewhere on the subject land and it is possible that a dead tree evident within the southeastern corner of the subject land may have been a planted specimen of black wattle (and the source of self-seeding juvenile specimens evident).

The nature of the soils on which the allocated PCT 849 occurs is highly modified and includes an artificially constructed embankment. The origin of the embankment is uncertain but does coincide with the adjacent property's entrance road, which was historically evident prior to the existing development within the subject site. Assessment of historical imagery (refer Appendix D) does not provide evidence of any substantial earthworks within the subject land. It is most likely that the embankment is a result of fill of unknown sources. Site investigations found the soil medium to be relatively depauperate and most likely of subsoil origin compared to original A-horizon soils.

The allocated PCT 849 within the subject land extends over 0.03 ha, as shown in Figure 3-1 and photographic plates 9 to 12.

Photo plate 9. View from north to southeast corner of site, showing black wattle regrowth

Photo plate 10. View from west to southeast corner of site, showing planted and self-seeded spotted

Photo plate 11. View from east to west along southern boundary

Photo plate 12. View from east to west further along southern boundary

3.3.2 Cumberland swamp oak forest (PCT 1800)

PCT 1800 is found in the Sydney Basin IBRA Bioregion and Cumberland IBRA Sub-region and comprises prominent stands of *Casuarina glauca* (swamp oak) found along or near streams. The subject site does not contain suitable habitat for this PCT, but due to variation in stem sizes (i.e., the diameter at breast heigh or DBH of each stem present) it has been conservatively assessed as PCT 1800.

As evident in Appendix A (BAM plot data) no other native species occur within this PCT. Figure 3-1 shows the extent of vegetation assessed as PCT 1800 and photographic plates 13 to 16 illustrate the nature of PCT 1800 in the subject land.

Photo plate 13: PCT 1800 viewed from the north

Photo plate 14: PCT 1800 viewed from the northeast

Photo plate 15. The southwestern extend of PCT 1800 viewed from the northeast

Photo plate 16. Immediately east of PCT 1800 showing exotic understorey and *Ligustrum lucidum* (broad-leaved privet in background).

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Figure 3-1.
Subject site vegetation

Legend

- Subject site
- PCT 849
- PCT 1800
- Planted native
- Planted non-local native
- Planted non-local and exotic
- Exotic

BAM plots

- 400m2
- 1000m2

N

0 10 20 40 60 80 m

Coordinate System: MGA Zone 56 (GDA 2020)

Image source: Nearmap 04 June 2022

Data source: SydneyMetroArea_v3_1_2016 (modified)

Date drawn: 5 September 2022

3.4 Threatened ecological communities

PCTs 849 and 1800 are associated with threatened ecological communities (TECs) listed under both the NSW BC Act and Commonwealth EPBC Act. Neither PCTs are considered characteristic of the TEC's discussed below. The EBPC Act is considered in Section 5.

3.4.1 PCT 849

PCT 849 is associated with the critically endangered Cumberland Plain Woodland in the Sydney Basin Bioregion in NSW (CPW). The presence of planted spotted gum and self-seeded black wattle is the only similarity that PCT 849 within the subject land has with Cumberland Plain Woodland.

As discussed in Section 3.3.1, PCT 849 within the subject area is located on artificially constructed land and no evidence of remnant vegetation is found in historical imagery dating back to 1930 (refer Appendix D).

3.4.2 PCT 1800

PCT 1800 is associated with the endangered Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and Southeast Corner Bioregions. This community is associated with grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains.

These habitat features do not currently, or historically, occur within the subject land.

As discussed in Section 3.3.2, PCT 1800 within the subject area is of planted origin and not naturally occurring. This evidenced in historical imagery (refer Appendix D).

3.4.3 SAII assessment

Cumberland Plain Woodland is a listed SAII entity. An impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of an ecological community becoming extinct.

As discussed in Section 3.3.1 and Section 3.4.1, PCT 849 within the subject land is not considered commensurate with Cumberland Plain Woodland.

The removal of 555m^2 of the vegetation allocated to PCT 849 will not contribute significantly to the risk of CPW becoming extinct.

Additional impact assessment provisions for TECs at risk of an SAII are provided in Table 3-3.

Table 3-3. SAII impact assessment

Additional information required	Response
1. The assessor is required to provide further information in the BDAR or BCAR regarding the impacts on each TEC at risk of an SAII. This must include the action and measures taken to avoid the direct and indirect impact on the TEC at risk of an SAII.	The area of PCT 849 that would be cleared is not considered commensurate with Cumberland Plain Woodland (refer Sections 3.3.1 and 3.4.1 and Section 7).
2. The assessor must consult the TBDC and/or other sources to report on the current status of the TEC including:	
a. evidence of reduction in geographic distribution (Principle 1, clause 6.7(2)(a) BC Regulation) as the current total geographic extent of the TEC in NSW AND the estimated reduction in geographic extent of the TEC since 1970 (not including impacts of the proposal)	At the time of preparing this BDAR, an estimate of reduction since 1970 was not available. Available pre-European and later dated estimates are inconsistent, but the percent reduction remains relatively constant and provides evidence of the reduction of geographic extent as follows: • Tozer (2003): 8.8% since 1997 and estimated 11,054 (±1,564) ha • DECCW (2011): 8% since assume circa.1997 and estimated 24,530 ha • Bionet Vegetation Classification (2020): 8% since assume circa.1997 and estimated 11,200 ha The difference between DECCW (2011) and Tozer (2003) / Bionet (2020) reported extents may be due to DECCW (2011) including both relatively intact canopy and scattered canopy, whereas Tozer (2003) / Bionet (2020) most likely only report relatively intact canopy.
b. extent of reduction in ecological function for the TEC using evidence that describes the degree of environmental degradation or disruption to biotic processes (Principle 2, clause 6.7(2)(b) BC Regulation) indicated by:	
i. change in community structure	Changes in structure contribute to a very large reduction in the ecological function of CPW. Almost all of the remaining area of CPW is regrowth forest and woodland from past clearing activities. Mean tree densities in contemporary stands of the community have been found to be substantially higher than historical estimates and tree sizes thought to be smaller. Large trees approximating the stature of the community prior to European settlement occur very sparsely within remnant patches of vegetation or remain as isolated individuals within paddocks or urban areas (DPIE, 2008-2010).

Additional information required	Response
ii. change in species composition	Changes in species composition are referred to in the above structural changes and the below invasion and establishment of exotic species and degradation of habitat. In particular: • Increased native shrub layer; • Weed infestations of exotic shrub and ground layers; • Pastural grasses; and • Reduced genetic diversity through disruption to pollination and dispersal of fruits or seeds.
iii. disruption of ecological processes	Other structural changes to the community include the removal of fallen woody debris and standing dead trees, the removal of woody understorey plants, or conversely the development of regrowth stands with very high densities of eucalypt saplings or shrubs, notably Bursaria spinosa, which may suppress the ground flora (DPIE, 2008-2010).
iv. invasion and establishment of exotic species	The characteristics of a grassy understorey, relatively fertile soils and past land uses make many of the Cumberland Plain plant communities highly vulnerable to weed invasion. Weeds such as African Lovegrass, Rhodes Grass, Bridal Veil Creeper, Paddy's Lucerne, African Olive and Boxthorn, have been able to establish widely (DEC, 2005). Weed species have established themselves widely in CPW, displacing native plants and affecting the regeneration of communities (DECCW, 2011).
v. degradation of habitat, and	Clearing for rural and residential developments, industry, and agricultural land uses has led to increasingly isolated small remnants which are more susceptible to degradation, provide less habitat values and support fewer species (DECCW, 2011). The integrity and survival of small, isolated stands is impaired by the small population size of many species, enhanced risks from environmental stochasticity, disruption to pollination and dispersal of fruits or seeds, and likely reductions in the genetic diversity of isolated populations (DPIE, 2008-2010).
vi. fragmentation of habitat	CPW is severely fragmented, with more than half of the remaining tree cover mapped by Tozer (2003) and based on 1997 data occurring in patches of less than 80 ha and half of all mapped patches being smaller than 3 ha.

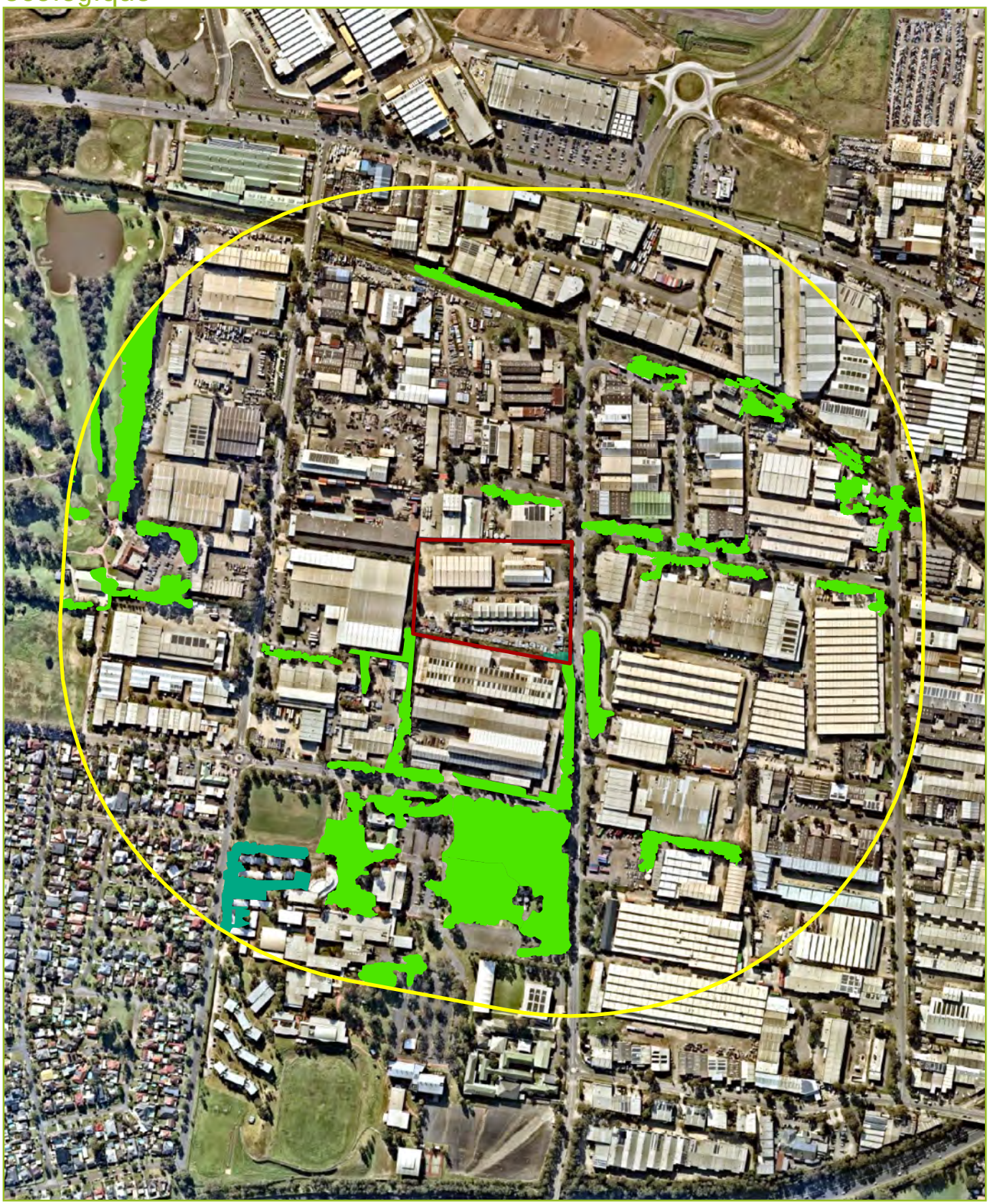
Additional information required	Response
c. evidence of restricted geographic distribution (Principle 3, clause 6.7(2)(c) BC Regulation), based on the TEC's geographic range in NSW according to the:	
i. extent of occurrence ii. area of occupancy, and iii. number of threat-defined locations	CPW as the name implies is restricted to the Cumberland Plain IBRA subregion. The geographic location of the Cumberland Plain encompasses a 275,693-ha area containing a broad shale basin in western Sydney and across 16 LGAs (pre-amalgamation of many local government areas). The CPW geographic location also coincides with major growth centres within the region, including the South West and North West growth areas, the Wilton Growth Area, the Greater Macarthur Growth area, the Western Sydney Employment Area (WSEA) and the Western Sydney Aerotropolis. In accordance with Clause 4.21 of the BC Reg. the NSW Scientific Committee (the Committee) published guidelines for interpreting listing criteria for species, populations and ecological communities under the BC Act Subclause 4.10f of the BC Reg. requires an estimate of the number of threat-defined locations that are occupied relative to the extent of serious plausible threats. For the purpose of interpreting Clause 4.10f, the Committee has recommended the thresholds used by the IUCN (Bland et al., 2017) be used. For the threat category of critically endangered the following applies: • No. of locations required under Clause 4.10f of BC Reg: *extremely low* • No. of locations threshold under IUCN Red List for ecosystems criteria: *one location* For the purpose of this assessment, it is assumed that all threats to CPW have and continue to impact on CPW, with the potential exception of those areas of CPW retained in conservation areas. As CPW is critically endangered one threat-defined location applies.
d. evidence that the TEC is unlikely to respond to management (Principle 4, clause 6.7(2)(d) BC Regulation).	Management of CPW loss is now regulated under the BC Act and BC Reg. and is also a major consideration under the DRAFT Cumberland Plain Conservation Plan (DPIE 2020). The Draft Cumberland Plain Conservation Plan (CPCP, DPIE 2020) has been prepared for the specific purpose of arresting further development impacts on CPW and other PCTs within the Cumberland Plain. This is intended to be done through a

Additional information required	Response
	combination of bio-certification and the reservation of additional dedicated areas in which CPW will be conserved. To this end, it is currently difficult to provide evidence that CPW is unlikely to respond to management, given the NSW government's current incentives that aim to do otherwise.
3. Where the TBDC indicates data is 'unknown' or 'data deficient' for a TEC for a criterion listed in Subsection 9.1.1(2.), the assessor must record this in the BDAR or BCAR.	The TBDC currently indicates that the SAII thresholds and condition of CPW is still in progress.
4. In relation to the impacts from the proposal on the TEC at risk of an SAII, the assessor must include data and information on:	
a. the impact on the geographic extent of the TEC (Principles 1 and 3) by estimating the total area of the TEC to be impacted by the proposal: i. in hectares, and ii. as a percentage of the current geographic extent of the TEC in NSW.	0.009 ha of planted PCT 849 will be directly impacted as a result of the proposal. This equates to a minimum and maximum of 0.00008% and 0.00003% (respectively) of the minimum (11,200 ha) and maximum (24,560 ha) of estimated geographic extent of the TEC in NSW (refer response to 2a).
b. the extent that the proposed impacts are likely to contribute to further environmental degradation or the disruption of biotic processes (Principle 2) of the TEC by: i. estimating the size of any remaining, but now isolated, areas of the TEC; including areas of the TEC within 500 m of the development footprint or equivalent area for other types of proposals ii. describing the impacts on connectivity and fragmentation of the remaining areas of TEC measured by: ▪ distance between isolated areas of the TEC, presented as the average distance if the remnant is retained AND the average distance if the remnant is removed as proposed, and ▪ estimated maximum dispersal distance for native flora species characteristic of the TEC, and ▪ other information relevant to describing the impact on connectivity and fragmentation, such as the area to perimeter ratio for remaining areas of the TEC as a result of the development	Figure 3 2 shows the nearest mapped patch of PCT 849 within a 500m buffer area around the subject land, which is approximately 0.64ha, which is approximately 500m to the southwest of the subject land. As shown in Figure 3 2 this patch is located within a developed area (i.e., the mapped patch is located along a road frontage and in between several buildings. Other mapped remnant native vegetation within the 500m buffer area does not contain CPW, with most associated with street tree plantings and assigned 'not assessed'. Connectivity to larger more intact areas of native vegetation is shown in Figure 2-2, which shows the subject land to be located centrally within a highly industrialised environment.

Additional information required	Response
iii. describing the condition of the TEC according to the vegetation integrity score for the relevant vegetation zone(s) (Section 4.3). The assessor must also include the relevant composition, structure and function condition scores for each vegetation zone.	The vegetation integrity score for the planted PCT 849 within the subject land is 18.8. The relevant composition, structure and function condition scores are provided in Table 3-4 at the end of this table.
5. The assessor may also provide new information that demonstrates that the principle identifying that the TEC is at risk of an SAII is not accurate.	The assessor has not elected to provide new information that demonstrates that the principle identifying that the TEC is at risk of an SAII is not accurate.

Table 3-4. Composition, structure and function condition scores

Attribute	Benchmark	Subject land
Tree Richness	5	2
Shrub Richness	8	0
Grass and Grass Like Richness	12	0
Forb Richness	14	0
Fern Richness	2	0
Other Richness	5	0
Tree Cover	53	46.25
Shrub Cover	16	0
Grass and Grass Like Cover	58	0
Forb Cover	9	0
Fern Cover	1	0
Other Cover	4	0
Total length of fallen logs	40	0
Litter Cover	40	53
Number of Large Trees	3	0



SSD-45998963 339-349 Horsley Road, Milperra

Legend

- Subject site
- 500m buffer zone
- Other mapped vegetation
- PCT 849

N

0 80 160 320 480 640 m

Figure 3-2. SAII extent

Coordinate System: MGA Zone 56 (GDA 2020)

Image source: Nearmap 04 June 2022

Data source: SydneyMetroArea_v3_1_2016 (modified)

Date drawn: 29 July 2022

4. Threatened Species

4.1 Assessing habitat suitability for threatened species

The Threatened Biodiversity Data Collection (TBDC) identifies the threatened species that are likely to occur on or use the subject land and thereby predicts the species that may require assessment. This is automatically populated in the BAM-C based on the information collected from assessing the subject land.

The BAM stream-lined module requires the suite of threatened species likely to occur on or use the development site according to Steps 1-2 in Section 5.2. This includes the predicted species assessed for ecosystem credits and the candidate species assessed for species credits.

4.1.1 Ecosystem Credit Species

Ecosystem credit species are those threatened species where the likelihood of occurrence of a species or elements of the species' habitat can be predicted by vegetation surrogates and landscape features, or for which targeted survey has a low probability of detection. A targeted survey is not required to identify or confirm the presence of ecosystem credit species.

No predicted ecosystem credit species have been incidentally recorded on the subject land. The list of predicted ecosystem credit species is provided in Appendix C.

4.1.2 Species Credit Species

Species credit species are threatened species for which vegetation surrogates and/or landscape features cannot reliably predict the likelihood of their occurrence or components of their habitat.

Under the BAM stream-lined module:

- All of the candidate species credit species identified that are at risk of a serious and irreversible impact (SAII) must be further assessed in accordance with Steps 3–5 in Section 5.2.
- Candidate species credit species that are not at risk of an SAII and are not incidentally recorded on the subject land do not require further assessment.

No candidate species credit species were incidentally recorded on the subject land.

4.2 Threatened species at risk of an SAII

Candidate species credit species that are at risk of an SAII are listed in Table 4-1. Listed species have been obtained from both the BAM-C and the Bionet Atlas database for a 10km search radius from the subject land.

In accordance with Steps 3–5 (Section 5.2 of the BAM) field surveys determined that the subject land does not contain microhabitats required by the species listed in Table 4-1. This is due to a lack of the following microhabitats:

- Forested areas, open woodland, heath, rainforest or wet sclerophyll communities
- Water courses, waterbodies, drainage lines or other moist conditions
- Ridgetops, rock outcrops, cliffs and caves
- Disused, bottle-shaped mud nests of the Fairy Martin
- Man-made structures such as culverts, bridges and habitat within buildings

A candidate species credit species that does not have suitable habitat does not require further assessment. Habitat requirements and justification of why further assessment is not required is provided for each species in Table 4-1.

Table 4-1. Threatened flora species records

Species name	Common name	Source	Habitat requirements	Justification for not assessing species further
Flora				
Caladenia tessellata	Thick lip spider orchid	BAM-C	Currently known from two disjunct areas; one population near Braidwood on the Southern Tablelands and three populations in the Wyong area on the Central Coast. Populations from the Sydney and South Coast areas thought to be extinct as not recorded since the mid-1900s. The species is generally found in grassy sclerophyll woodland on clay loam or sandy soils.	**Habitat degraded:** subject land has not supported a sclerophyll woodland with a grassy understorey since before 1930. Species not recorded from 10km search area.
Deyeuxia appressa		BAM-C	A highly restricted NSW endemic known only from two pre-1942 records in the Sydney area. Given that D. appressa hasn't been seen in over 60 years, almost nothing is known of the species' habitat and ecology but cited as growing in moist conditions.	**Indicative habitat absent:** no moist areas occur within the subject land. Species not recorded from 10km search area.
Hibbertia sp. Bankstown		BIONET	Citing Toelken & Miller in TSPD: known only from Tertiary alluvial soil along Airport Creek on Bankstown Airport and not from areas where subsequent fill has been deposited in between (Gibson 2007a, b). The plant assemblage is attributable to "Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion".	**Habitat absent:** alluvial soil and Cooks River/Castlereagh Ironbark Forest absent from the subject land. All Bionet records are from Bankstown Airport.
Melaleuca deanei	Deane's paperbark	BIONET	Occurs in two distinct areas, in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas respectively. There are also more isolated occurrences at Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas. Found mostly in mostly in ridgetop woodland, with only 5% of sites in heath on sandstone.	**Habitat absent:** ridgetop woodland absent from the subject land. Bionet record from Sandy Point Quarry, Menai and subject land not located within areas of occurrence.
Pilularia novae-hollandiae	Austral pillwort	BAM-C	Grows in shallow swamps and waterways, often among grasses and sedges. This species is probably ephemeral (especially in the drier parts of its range), appearing when soils are moistened by rain.	**Habitat absent:** shallow swamps and waterways absent from the subject land. Species not recorded from 10km search area.
Rhodamnia rubescens	Scrub Turpentine	BIONET	Occurs in coastal districts north from Batemans Bay, approx. 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	**Habitat absent:** littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils absent from the subject land.

Species name	Common name	Source	Habitat requirements	Justification for not assessing species further
Aves				
Anthochaera phrygia	Regent honeyeater	BAM-C	The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. In particular, woodlands that have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes and support high species richness of bird species. There are three known key breeding areas, two of them in NSW - Capertee Valley and Bundarra-Barraba regions.	**Habitat degraded:** subject land lacks significantly large numbers of mature trees, high canopy cover and abundance of mistletoes and does not support high species richness of bird species. **Breeding habitat absent:** i.e., subject land not within a mapped breeding area for the species. Species not recorded from 10km search area.
Mammalia				
Chalinolobus dwyeri	Large-eared pied bat	BAM-C, BIONET	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin. 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.	**Habitat constraints:** caves, cliffs, old mine workings, disused fairy martin nests, tree hollows and well-timbered areas containing gullies, and forest canopies absent from the subject land.
Miniopterus australis	Little bent-winged bat	BAM-C	Found in moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Roost 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.	**Habitat constraints:** caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges, moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub absent from the subject land. Inspection of all buildings did not detect the presence of microbat habitat. Species not recorded from 10km search area.
Miniopterus orianae oceanensis	Large bent-winged bat	BAM-C, BIONET	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Hunt in forested areas, catching moths and other flying insects above the tree-tops.	**Habitat constraints:** caves, derelict mines, storm-water tunnels, and forested areas absent from the subject land. Inspection of all buildings did not detect the presence of microbat habitat. Species records in BioNet are not from 'IC – in cave'; 'E nest-roost'; or with numbers of individuals >500; or from the scientific literature.

5. Matters of NES

Additional matters relating to impacts on flora and fauna which are not covered by the BC Act must also be addressed for the proposal. Relevant and potential MNES listed under the EPBC Act include both PCTs 849 and 1800, as follows:

5.1 Threatened ecological communities

5.1.1 Cumberland Plain Woodland

PCT 849 Cumberland shale plains woodland is listed as the critically endangered TEC Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest.

The occurrence of the allocated PCT 849 within the subject land does not meet the criteria for consideration as a MNES, due to its small extent and highly degraded understorey, which doesn't contain perennial native species (see Figure 5-1).

5.1.2 Cumberland swamp oak forest

PCT 1800 Cumberland Swamp oak floodplain forest is commensurate with Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions, an endangered community listed under the EPBC Act.

The occurrence of the allocated PCT 1800 does not meet the criteria for consideration as a MNES, due to the small extent and highly degraded understorey, which doesn't contain perennial native species (see Figure 5-1).

5.2 Threatened and migratory species

Table 5-1 lists threatened and migratory fauna species listed under the EPBC Act that have been recorded within a 10km radius of the subject land, along with the justification that the subject land does not contain habitat of any importance for these species.

Table 5-1. EPBC Act listed species

Scientific name	Common name	EPBC Status	Justification
Litoria aurea	Green and Golden Bell Frog	V	Discounted in Table 4-2
Chalinolobus dwyeri	Large-eared Pied Bat	V	
Hirundapus caudacutus	White-throated Needletail	V	
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	E	
Lathamus discolor	Swift Parrot	CE	
Phascolarctos cinereus	Koala	E	
Caretta caretta	Loggerhead Turtle	E	Marine species
Ardenna tenuirostris	Short-tailed Shearwater	Mig	Pelagic species
Calidris acuminata	Sharp-tailed Sandpiper	Mig	Shorebird/wader species
Gallinago hardwickii	Latham's Snipe	Mig	Wetland species
Hirundapus caudacutus	White-throated Needletail	Mig	Non-breeding almost exclusively aerial species. Probably recorded most often above wooded areas, including open forest and rainforest
Hydroprogne caspia	Caspian Tern	Mig	Pelagic species
Limosa lapponica	Bar-tailed Godwit	Mig	Shorebird/wader species
Limosa	Black-tailed Godwit	Mig	Shorebird/wader species
Tringa nebularia	Common Greenshank	Mig	Shorebird/wader species

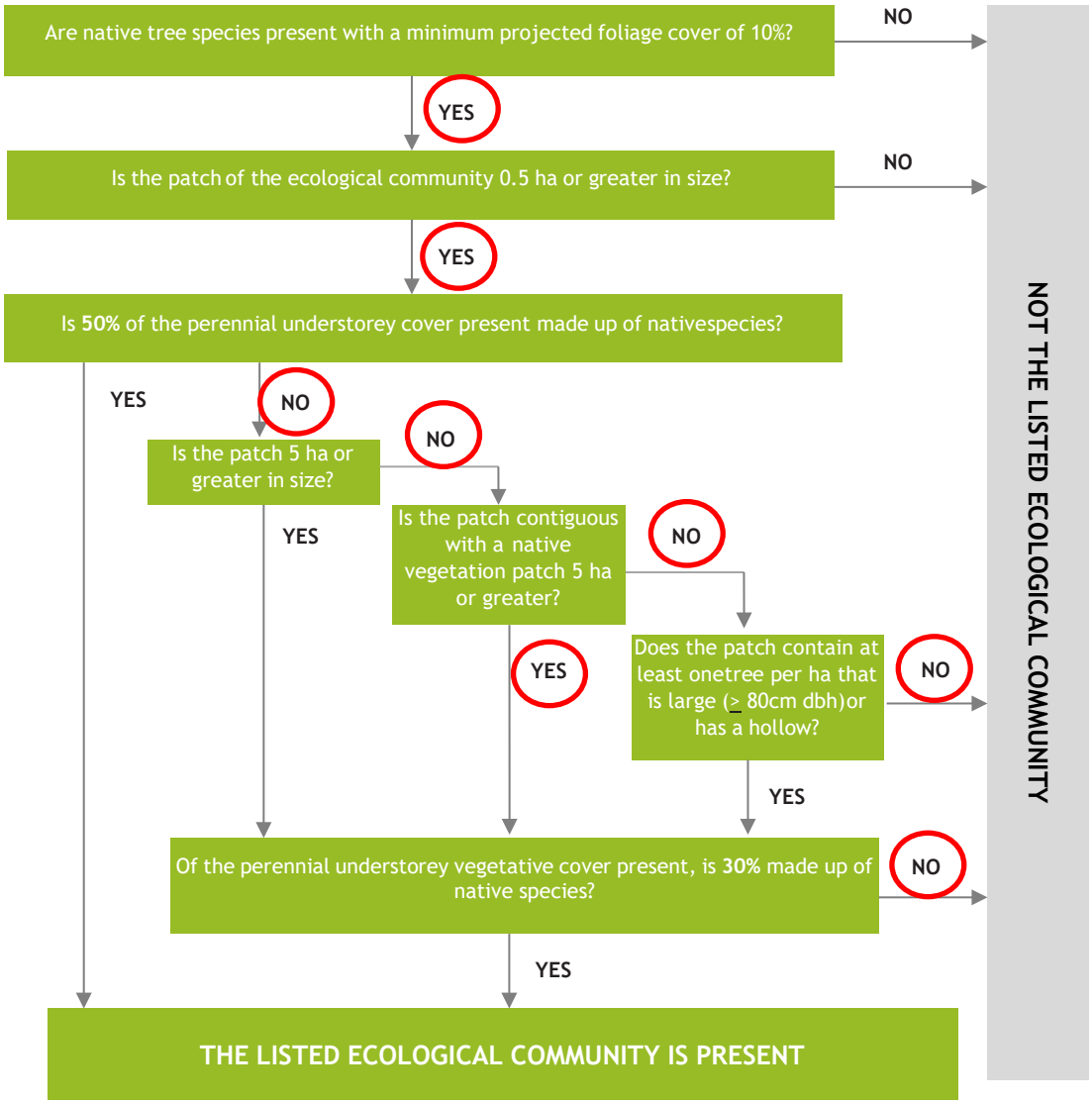


Figure 5-1. CPW diagnostic features and condition thresholds (adapted from DAWE guidelines, 2010)

6. Prescribed Impact Identification

Prescribed additional biodiversity impacts (prescribed impacts) must be assessed as per clause 6.1 of the BC Reg. Prescribed impacts include those impacts on the habitat of threatened species or ecological communities from development that is not directly caused as a result of vegetation clearing.

Table 6-1 lists the prescribed impacts, which are identified in Clause 6.1 of the BC Reg and the relevance of each prescribed impact in relation to the proposal.

Table 6-1. Prescribed and Uncertain Impacts

Will there be impacts on any of the following	Yes/No	If Yes, address the assessment questions from section 9.2.1 of the BAM
(a) Development on the habitat of threatened species or ecological communities associated with: i. karst, caves, crevices, cliffs, rock outcrops and other geological features of significance; ii. human-made structures; iii. non-native vegetation;	NO	i. no karst, caves, crevices, cliffs and other features of geological significance occur on or near the subject land. ii. existing dwellings have been inspected for potential habitat and none found. iii. non-native vegetation within the subject land has been assessed as not providing habitat for any threatened species
(b) on areas connecting threatened species habitat, such as movement corridors	NO	The subject land is not mapped within any connecting threatened species habitat movement corridors.
(c) that affect water quality, water bodies and hydrological processes that sustain threatened entities (including from subsidence or upsidence from underground mining)	NO	The proposal will not result in impacts to water quality, water bodies and hydrological processes that sustain threatened entities. The subject land does not contain watercourses and stormwater runoff will be managed on-site prior to discharge to the existing stormwater network.
(d) on threatened and protected animals from turbine strikes from a wind farm	NO	No wind turbines are proposed
(e) on threatened species or fauna that are part of a TEC from vehicle strikes	NO	The proposal will not impact on any threatened or other fauna as a result of vehicle strikes. The subject land does not provide habitat for any land dwelling threatened fauna species. The existing environment is a highly developed industrial area.

7. Avoid or Minimise Impacts

7.1 Avoidance of direct impacts

As required under Section 7.1 of the BAM the proposed development is to be designed to avoid or minimise direct and indirect impacts on native vegetation, threatened species, threatened ecological communities and their habitat.

The initial design of the proposal comprised the following:

- Retention of ten native trees in comparison to 36 native trees that will be retained as a result of the final design; and
- Clearing of 0.15 ha of planted native vegetation compared to 0.40 ha, as a result of the final design

The final design has reduced the initial clearing of vegetation attributed to PCT 849 from approximately 0.03 ha to 0.009 ha.

Thereby demonstrating that the design has complied with Section 7.1 of the BAM as far as practical.

Trees and shrubs that will have been avoided through iterative design are summarised in Table 7-1.

Table 7-1. Retained native vegetation

Scientific name	Common name	Origin	DBH (cm)
Trees			
Corymbia citriodora	lemon-scented gum	Non-local native	10-20 x 5
			21-30 x 2
			31-40 x 2
			41-50 x 2
Corymbia maculata	spotted gum	Local native	<10 x 1
			10-20 x 4
			21-30 x 7
			31-33 x 2
Eucalyptus tereticornis	forest red gum	Local native	75
			75
			85
Eucalyptus leucoxylon subsp. *leucoxylon*	yellow gum	Non-local native	15
Lophostemon confertus	brush box	Non-local native	50-60 x 5
Shrubs			
Callistemon viminalis	weeping bottlebrush	Non-local native	27
Callistemon salignus	white bottlebrush	Local native	40

7.2 Direct impacts

The proposal will unavoidably impact on approximately 2,475m^2 (0.25 ha) of planted vegetation that comprises local, non-local native, and exotic species as summarised in Table 7-2.

Table 7-2. Vegetation to be cleared

Vegetation to be cleared	Area (m^2)	Total Area (m^2)
Trees assigned to PCTs and assessed under Chapter 4.2 of the BAM		
Planted native (assigned to PCT 849)	92	
Planted native (assigned to PCT 1800)	249	**34**
Trees assessed under the BAM native planted module		
Planted native	218	
Planted non-local native	602	
Planted non-local and exotic mixture	223	**1,043**
Exotic	1,091	**1,091**
Total vegetation clearing		**2,475**

8. Thresholds for Assessment

Section 9 of the BAM sets out the impact thresholds that must be applied, which include:

1. Impacts on an entity that is at risk of a serious and irreversible impact;
2. Impacts for which the assessor is required to determine an offset requirement;
3. Impacts for which the assessor is not required to determine an offset requirement; and
4. Impacts that do not require further assessment by the assessor.

8.1 Impacts on serious and irreversible impacts

The determination of a serious and irreversible impact (SAII) on biodiversity values is to be made by the decision-maker in accordance with the principles set out in the BC Reg. Information is provided in Sections 3.4.3 and 4.2 to assist the decision-maker to evaluate the extent and severity of the impact from the proposed clearing of planted PCT 849 within the subject area.

8.2 Impacts that require an offset

8.2.1 Ecosystem credits

Table 8-1 summarises the impacts that the proposal requires ecosystem credit offsetting and includes the current and future vegetation integrity scores for each zone.

Table 8-1. Change in vegetation integrity scores

PCT ID	PCT name	Area (ha)	Condition	Vegetation integrity score			Credits required
				Current	Future	Change	
849	Cumberland shale plains woodland	0.009	Low	18.8	0	-18.8	1
1800	Cumberland swamp oak forest	0.025	Low	9.7	0	-9.7	0

Table 8-2 identifies the composition, structure and function condition scores as required by Chapter 4 and Appendix K Table 24 of the BAM.

Table 8-2. Vegetation integrity scores

PCT zone	Scores			
	Composition	Structure	Function	Current VIS
PCT 849 zone 1	4.3	34.8	45	18.8
PCT 1800 zone 1	1.8	17.5	28.8	9.7

8.2.2 Species credits

No species credits are required.

8.3 Impacts that do not require an offset

Table 8-2 summarises the areas impacted that do not require offsetting, which includes:

- PCT 1800 for which the BAM-C resulted in a vegetation integrity score below the offsetting threshold;
- Planted native vegetation, assessed under Appendix D of the BAM;
- Planted exotic vegetation; and
- Buildings and hardstand areas.

Table 8-3. Impacts that do not require offsetting

Areas not requiring an offset obligation	(ha)
Cumberland swamp oak floodplain forest (PCT 1800)	**0.025**
Planted native species	**0.131**
Planted mix of native/exotic species	**0.022**
Planted exotic	**0.109**
Buildings / other	**2.974**
Total area	**3.261**

Figure 8-1 illustrates areas requiring an offset, and vegetation to be removed and retained.

339-349 Horsley Road
Milperra SSD-45998963

Figure 8-1.
Vegetation clearing

Legend

- Subject site
- Offsetting required
- Retained vegetation
- To be cleared
- PCT 849
- PCT 1800
- Planted native
- Planted non-local native
- Planted non-local and exotic
- Exotic

N

0 10 20 40 60 80 m

Coordinate System: MGA Zone 56 (GDA 2020)

Image source: Nearmap 04 June 2022

Data source: SydneyMetroArea_v3_1_2016 (modified)

Date drawn: 5 September 2022

9. Mitigation Measures

The proposal will ensure any direct and indirect impacts on biodiversity are avoided, minimised and mitigated through the implementation of relevant best management practices and subject to the proposal's consent conditions.

Relevant best management practices, as they relate to biodiversity are anticipated to include:

- Pre-clearance and clearance procedures to identify, rescue and relocate any resident fauna that may potentially be nesting, roosting or sheltering in areas to be cleared.
- Protection of native vegetation to be retained from construction impacts.
- Sediment and erosion controls to prevent construction impacts on ecosystems downstream of the subject land's stormwater catchment.
- Preventing the introduction or spread of existing weed infestations, pest species, disease or pathogens (or biosecurity risks).

9.1 Pre-clearance and clearance procedures

9.1.1 Pre-clearance surveys

Pre-clearing surveys are undertaken to provide a final check for presence of flora and fauna species and habitat on a site immediately before clearing begins. Pre-clearing surveys are required to:

- Identify habitat features suitable for native fauna that will require clear felling supervision and which will require a two-stage clearance procedure;
- Identify areas of high priority weeds requiring specific controls;
- Identify any threatened flora or fauna that may have that may have moved into the subject site since ecological surveys were conducted;
- Provide input into determining appropriate exclusion zones; through
    - Recording the details for all habitat features found in vegetation to be cleared (including where applicable: GPS location; species or type of habitat feature)
    - Marking the limits of clearing, habitat features in areas to be cleared and native vegetation to be protected during construction, using suitable methods
- Locate nearby habitat suitable for the release of fauna that may be encountered during the pre-clearing process or habitat removal;
- Prepare constraints mapping; and
- Detail monitoring and reporting required.

9.1.2 Clearing procedures

Where areas of habitat have been identified in vegetation to be cleared, a two staged clearing process and supervision by an experienced ecologist required.

A two-stage clearing process is designed to enable fauna to feel secure whilst clearing occurs around their tree, and to allow them a chance to self-relocate at night to coincide with typical foraging behaviours of arboreal animals.

Firstly, vegetation not identified during pre-clearance surveys as fauna habitat will be cleared. All vegetation around the habitat item will be cleared so that the fauna habitat item is isolated.

Secondly, identified habitat trees are left to stand overnight to allow resident fauna to voluntarily move from the area. Habitat trees are then cleared using the following protocols:

- Trees will be gently agitated by machinery prior to clearing to encourage any animals remaining to leave the hollows;

- An excavator will be used to start pushing the tree over. The excavator should have a grab mechanism that allows for the habitat tree to be lowered to the ground slowly, thus minimising the risk of injury or mortality to fauna. If salvageable, branches with hollows and sections of trunk will be marked and set aside for transfer to a storage area for eventual placement within rehabilitation areas;
- The ecologist onsite will inspect all visible hollows for the presence of fauna following felling of the tree; and
- The felled habitat tree will then be left over night to allow further opportunity for resident fauna to relocate. Following this, the tree is to be mulched to prevent any additional fauna returning to the tree or transported to the rehabilitation area to be used to provide fauna habitat.

9.1.3 Post-clearance

Following clearing, a post-clearing assessment will be prepared and must include at minimum the following results:

- Details of native fauna captured and relocated, injured or deceased;
- Photos of rescued fauna;
- Number of habitat features felled;
- Analysis of the effectiveness of clearing and fauna rescue methods; and
- Details of any woody debris, bush rock or hollow bearing trees that have been retained for habitat.

9.2 Biosecurity risk management

Biosecurity is the protection of the economy, environment and community from the negative impacts of pests and diseases, weeds and contaminants.

The *Biosecurity Act 2015* (the Biosecurity Act) introduces the premise that biosecurity is a shared community responsibility and introduces the legally enforceable concept of a General Biosecurity Duty (GBD). The GBD means that any person dealing with a biosecurity risk must take measures to prevent, minimise or eliminate the biosecurity risk (as far as is reasonably practicable).

Biosecurity risks include priority weeds, feral and pest animals, and the potential introduction and spread of pathogens and disease. Mitigation measures that will be required to ensure that the GBD is fulfilled include, but may not be limited to the following:

- Identification of priority weeds (during pre-clearance surveys) and mapping of the following:
  - Priority weeds that should be controlled prior to earthworks;
  - Woody weeds that should not be used for mulching once chipped; and
  - Topsoils that should not be reused in landscaping.
- Recommended methods to ensure weeds are appropriately controlled;
- Control of drainage that may contain weed seeds, pathogens, disease or pest species;
- Procedures for managing stockpile sites and other areas to control erosion and weed invasion;
- Hygiene protocols to ensure that plant and machinery enter / leave the site clean to prevent the spread of weed species.

Appendix A. BAM plot data

Survey Name: 349 Horsley Rd, Milperra **Zone ID:** Zone 1 22.06.2022
Plot no: 1

Location:	Zone	Easting	Northing	Bearing
	56H	314635	6243061	270
Vegetation formation:		**Vegetation class:**		**PCT (if known)**
Grassy Woodlands		Coastal Valley Grassy Woodlands		PCT 849

CONDITION (400m^2 plot)

Composition:	**Tree**	**Shrub**	**Grass grasslike**	**Forb**	**Fern**	**Other**
Native Richness count:	2	0	0	0	0	0
Structure:	**Tree**	**Shrub**	**Grass grasslike**	**Forb**	**Fern**	**Other**
Cover of each group:	46.25	0	0	0	0	0

FUNCTION (1,000m^2 plot)

Tree regeneration (<5cm)		**Stem classes**		**No large trees (>50cm DBH)**	**No. of HBTs**	**Length of LWD (m):**
Present	✓	5-9	✓	0	0	0
		10-19	✓			
~~Absent~~		20-29	✓			
		30-49	✓			

FUNCTION (50m transect)

Litter cover	**5m**	**15m**	**25m**	**35m**	**45m**	**Average**
	80	40	50	60	35	53

GF code	Scientific Name	Common Name	N, E or HTW	Cover	Abund	Stratum
TG	Corymbia maculata	Spotted gum	N	45	16	OS
TG	Acacia decurrens	Black wattle	N	1.25	5	MS
				46.25		
	WEEDS					
GG	*Cenchus clandestinum*	Kikuyu	HTW	10	40m^2	US
GG	*Dietes sp.*	Wild iris	E	0.5	4	US
GG	*Ehrharta erecta*	Panic veldt grass	HTW	2.5	18	US
FG	*Bidens pilosa*	Cobblers pegs	HTW	1.5	22	US
FG	*Cirsium vulgare*	Spear thistle	E	5	57	US
FG	*Modiola caroliniana*	Mallow weed	E	1.5	13	US
FG	*Senecio madagascariensis*	Fireweed	HTW	0.2	11	US
FG	*Taraxaum officinale*	Dandelion	E	0.1	7	US
OG	*Passiflora subpeltata*	White passionfruit	E	20	80m^2	US
OG	*Araujia sericifera*	Moth vine		0.1	5	
				41.4		
	BARE			**40**		

GF Code: Growth Form **N**: native, **E**: exotic, **HTW**: high threat weed

Stratum: **OS**: overstorey , **MS**: midstorey, **US**: understorey

Survey Name: 349 Horsley Rd, Milperra

Zone ID: PCT 849 Zone 1 **Plot no:** 1

GF code	Scientific Name	Common Name	N, E or HTW	Cover	Abund	Stratum
TG	Corymbia maculata	Spotted gum	N	45	16	OS
TG	Acacia decurrens	Black wattle	N	1.25	5	MS
				46.25		
	WEEDS					
GG	*Cenchus clandestinum*	Kikuyu	HTW	10	40m^2	US
GG	*Dietes sp.*	Wild iris	E	0.5	4	US
GG	*Ehrharta erecta*	Panic veldt grass	HTW	2.5	18	US
FG	*Bidens pilosa*	Cobblers pegs	HTW	1.5	22	US
FG	*Cirsium vulgare*	Spear thistle	E	5	57	US
FG	*Modiola caroliniana*	Mallow weed	E	1.5	13	US
FG	*Senecio madagascariensis*	Fireweed	HTW	0.2	11	US
FG	*Taraxaum officinale*	Dandelion	E	0.1	7	US
OG	*Passiflora subpeltata*	White passionfruit	E	20	80m^2	US
OG	*Araujia sericifera*	Moth vine		0.1	5	
				41.4		
	BARE			**40**		

GF Code: Growth Form

N: native, **E:** exotic, **HTW:** high threat weed

Stratum: **OS**: overstorey , **MS**: midstorey, **US**: understorey

Survey Name: 349 Horsley Rd, Milperra **Zone ID:** Zone 1 22.06.2022
Plot no: 1

Location:	Zone	Easting	Northing	Bearing
	56H	314415	6243100	50
Vegetation formation:		**Vegetation class:**		**PCT (if known)**
Forested Wetlands		Coastal Floodplain Wetlands		PCT 1800

CONDITION (400m^2 plot)

Composition:	**Tree**	**Shrub**	**Grass grasslike**	**Forb**	**Fern**	**Other**
Native Richness count:	1	0	0	0	0	0
Structure:	**Tree**	**Shrub**	**Grass grasslike**	**Forb**	**Fern**	**Other**
Cover of each group:	25	0	0	0	0	0

FUNCTION (1,000m^2 plot)

Tree regeneration (<5cm)		**Stem classes**		**No large trees (>50cm DBH)**	**No. of HBTs**	**Length of LWD (m):**
Present	✓	5-9	✓	0	0	0
		10-19	✓			
~~Absent~~		20-29	✓			
		30-49	✓			

FUNCTION (50m transect)

Litter cover	**5m**	**15m**	**25m**	**35m**	**45m**	**Average**
	60	100	80	10	0	50

GF code	Scientific Name	Common Name	N, E or HTW	Cover	Abund	Stratum
TG	Corymbia maculata	Spotted gum	N	45	16	OS
TG	Acacia decurrens	Black wattle	N	1.25	5	MS
				46.25		
	WEEDS					
GG	*Cenchus clandestinum*	Kikuyu	HTW	10	40m^2	US
GG	*Dietes sp.*	Wild iris	E	0.5	4	US
GG	*Ehrharta erecta*	Panic veldt grass	HTW	2.5	18	US
FG	*Bidens pilosa*	Cobblers pegs	HTW	1.5	22	US
FG	*Cirsium vulgare*	Spear thistle	E	5	57	US
FG	*Modiola caroliniana*	Mallow weed	E	1.5	13	US
FG	*Senecio madagascariensis*	Fireweed	HTW	0.2	11	US
FG	*Taraxaum officinale*	Dandelion	E	0.1	7	US
OG	*Passiflora subpeltata*	White passionfruit	E	20	80m^2	US
OG	*Araujia sericifera*	Moth vine		0.1	5	
				41.4		
	BARE			**40**		

GF Code: Growth Form **N**: native, **E**: exotic, **HTW**: high threat weed

Stratum: **OS**: overstorey , **MS**: midstorey, **US**: understorey

Survey Name: 349 Horsley Rd, Milperra

Zone ID: PCT 849 Zone 1 **Plot no:** 1

GF code	Scientific Name	Common Name	N, E or HTW	Cover	Abund	Stratum
TG	Casuarina glauca	Swamp oak	N	25	13	OS
				25		
	WEEDS					
GG	*Cenchus clandestinum*	Kikuyu	HTW	10	40m^2	US
GG	*Dietes sp.*	Wild iris	E	0.5	4	US
GG	*Ehrharta erecta*	Panic veldt grass	HTW	2.5	18	US
FG	*Bidens pilosa*	Cobblers pegs	HTW	1.5	22	US
FG	*Cirsium vulgare*	Spear thistle	E	5	57	US
FG	*Modiola caroliniana*	Mallow weed	E	1.5	13	US
FG	*Senecio madagascariensis*	Fireweed	HTW	0.2	11	US
FG	*Taraxaum officinale*	Dandelion	E	0.1	7	US
OG	*Passiflora subpeltata*	White passionfruit	E	20	80m^2	US
OG	*Araujia sericifera*	Moth vine		0.1	5	
				41.4		
	BARE			**40**		

GF Code: Growth Form

N: native, **E:** exotic, **HTW:** high threat weed

Stratum: **OS**: overstorey , **MS**: midstorey, **US**: understorey

Appendix B. BAM summary reports

BAM Credit Summary Report

Proposal Details

Assessment Id
00034604/BAAS17054/22/00034605

Proposal Name
SSD45998963 Horsley Road Milperra

BAM data last updated *
16/06/2022

Assessor Name
Kat Duchatel

Report Created
12/09/2022

BAM Data version *
54

Assessor Number
BAAS17054

BAM Case Status
Finalised

Date Finalised
12/09/2022

Assessment Revision
1

Assessment Type
Major Projects

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Cumberland shale plains woodland												
1	849_Low	Not a TEC	18.8	18.8	0.01	PCT Cleared - 93%	High Sensitivity to Gain			2.50		1
											Subtotal	**1**
Cumberland Swamp Oak riparian forest												
2	1800_Low	Not a TEC	9.7	9.7	0.03	PCT Cleared - 60%	High Sensitivity to Gain			1.75		0
											Subtotal	**0**
											Total	**1**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00034604/BAAS17054/22/00034605

Proposal Name
SSD45998963 Horsley Road Milperra

BAM data last updated *
16/06/2022

Assessor Name
Kat Duchatel

Assessor Number
BAAS17054

BAM Data version *
54

Proponent Names

Report Created
12/09/2022

BAM Case Status
Finalised

Assessment Revision
1

Assessment Type
Major Projects

Date Finalised
12/09/2022

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
849-Cumberland shale plains woodland	Not a TEC	0.0	0	1	1
1800-Cumberland Swamp Oak riparian forest	Not a TEC	0.0	0	0	0

849-Cumberland shale plains woodland

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Coastal Valley Grassy Woodlands This includes PCT's: 116, 834, 849, 1326	Coastal Valley Grassy Woodlands >=90%	849_Low	No	1	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

1800-Cumberland Swamp Oak riparian forest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Coastal Floodplain Wetlands This includes PCT's: 780, 828, 835, 926, 1234, 1235, 1386, 1651, 1720, 1727, 1728, 1800	Coastal Floodplain Wetlands >=50% and <70%	1800_Low	No	0	Cumberland, Burragorang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

Appendix C. Predicted ecosystem credit species

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00034604/BAAS17054/22/00034605	SSD45998963 Horsley Road Milperra	16/06/2022
Assessor Name	Report Created	BAM Data version *
Kat Duchatel	05/09/2022	54
Assessor Number	Assessment Type	BAM Case Status
BAAS17054	Major Projects	Finalised
Assessment Revision		Date Finalised
0		05/09/2022

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Black Bittern	Ixobrychus flavicollis	1800-Cumberland Swamp Oak riparian forest
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Diamond Firetail	Stagonopleura guttata	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Dusky Woodswallow	Artamus cyanopterus cyanopterus	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Eastern Osprey	Pandion cristatus	1800-Cumberland Swamp Oak riparian forest
Flame Robin	Petroica phoenicea	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Gang-gang Cockatoo	Callocephalon fimbriatum	849-Cumberland shale plains woodland

Grey-headed Flying-fox	Pteropus poliocephalus	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Large Bent-winged Bat	Miniopterus orianae oceanensis	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Little Bent-winged Bat	Miniopterus australis	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Little Eagle	Hieraaetus morphnoides	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Little Lorikeet	Glossopsitta pusilla	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Masked Owl	Tyto novaehollandiae	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Painted Honeyeater	Grantiella picta	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Powerful Owl	Ninox strenua	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Regent Honeyeater	Anthochaera phrygia	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Scarlet Robin	Petroica boodang	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Speckled Warbler	Chthonicola sagittata	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Spotted Harrier	Circus assimilis	849-Cumberland shale plains woodland
Spotted-tailed Quoll	Dasyurus maculatus	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Square-tailed Kite	Lophoictinia isura	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Swift Parrot	Lathamus discolor	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Turquoise Parrot	Neophema pulchella	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Varied Sittella	Daphoenositta chrysoptera	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest

White-bellied Sea-Eagle	Haliaeetus leucogaster	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
White-throated Needletail	Hirundapus caudacutus	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	849-Cumberland shale plains woodland
		1800-Cumberland Swamp Oak riparian forest

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

Appendix D. Historical imagery

1930

1951

1961

1970

 f	1978
	1986

	1991
	2009

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