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Dear Santhurie

Biodiversity Constraints Assessment for Lot 100 DP715376 on Lawrence Hargrave Drive, Coalcliff

Project no. 40831

Biosis Pty Ltd (Biosis) was commissioned by Urban Property Group to complete a desktop constraints assessment to describe the biodiversity values and ecological constraints within the Lot 100 DP715376 (the study area) on the western side of Lawrence Hargrave Drive, Coalcliff in New South Wales (NSW) (Figure 1). Biosis have previously undertaken a biodiversity constraints assessment for the eastern portion of Lot 100 DP715376.

Biosis understands that Urban Property Group proposes to construct the Coalcliff Ecotourism Facility amongst native vegetation along the Illawarra Escarpment at Coalcliff (the project) and require a constraints assessment within the study area to identify any key biodiversity values that may be a potential obstacle for the proposed development, and to outline the likely extent of impacts to biodiversity values associated with the facility. The proposed Eco-tourist Facility will be comprised of observation decks, shelters, seating, and connections to the Wodi Wodi track, which is an existing forest hiking trail approximately 6.5 kilometres long.

The objective of this constraints assessment is to determine, using desktop research, the likely presence of any threatened flora, fauna, populations or ecological communities (entities) within the study area and, where applicable, assess the impacts of the project on any such species or their habitats, as listed under the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) and NSW *Biodiversity Conservation Act 2016* (BC Act).

Biosis acknowledges the Aboriginal and Torres Strait Islander peoples as Traditional Custodians of the land on which we live and work.
We pay our respects to the Traditional Custodians and Elders past and present and honour their connection to Country and ongoing contribution to society.

Background

The study area is approximately 4.37 hectares in size and is defined by the extent of Lot 100 DP715376, bounded by the Illawarra Escarpment to the west and the South Coast railway line and Lawrence Hargrave Drive to the east (Figure 1). The study area is located in the Wollongong City Local Government Area (LGA), approximately 8.1 kilometres southeast of Helensburgh and 24.7 kilometres northeast of the Wollongong Central Business District (CBD). It is currently zoned C2 Environmental Conservation under the *Wollongong Local Environmental Plan 2009* (LEP).

The minimum lot size is for the study area is 39.99 hectares, therefore the area clearing threshold for the study area under the BC Act is 0.5 hectares. The study area is not located within the Biodiversity Values Map (BV Map) (NSW DCCEEW 2024a).

The majority of the area surrounding the study area is comprised of land zoned for environmental conservation, public recreation and infrastructure such as railway lines and major roads, as well as low density residential development in Stanwell Park. Regional vegetation mapping indicates that the study area is comprised of two wet sclerophyll forest communities, and given its location, has the potential to support a range of habitat features that may be utilised by locally occurring flora and fauna, including threatened species. The vegetation in the study area is well connected to vegetation across the broader landscape, with dense bushland covering much of the surrounding land across the Illawarra Escarpment.

Background research also identified that the study area occurs within the Coastal Use Area Map and the Coastal Environment Area Map under Chapter 2 (Coastal Management) of the *State Environmental Planning Policy (Resilience and Hazards) 2021*. In accordance with Part 2.2 of this SEPP, development consent cannot be granted unless the consent authority is satisfied that the project will not disrupt coastal processes or result in adverse impacts to the coastal environment.

Method

Due to access restrictions, Biosis were unable to undertake a field investigation of the study area and as such, the following constraints assessment has been undertaken using desktop research only.

Background research

To complete the constraints assessment, information provided by Urban Property Group as well as the following key information was reviewed:

- Australian Commonwealth Department of Climate Change, Energy, the Environment and Water (Cth DCCEEW) Protected Matters Search Tool for matters protected by the EPBC Act.
- NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) BioNet Atlas of NSW Wildlife, for items listed under the BC Act.
- The NSW Department of Primary Industries (DPI) Spatial Data Portal for *Fisheries Management Act 1994* (FM Act) listed threatened species, populations and communities (entities).
- NSW DPI WeedWise database for *Biosecurity Act 2015* (Biosecurity Act) listed priority weeds for the Greater Sydney Local Land Services (LLS) area within the Sydney Basin region.
- Relevant vegetation mapping:
- NSW State Vegetation Type Map (SVTM C2.0M2.0) (DPE 2023).

- The implications for the project were assessed in relation to key biodiversity legislation and policy including:
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- *Environmental Planning and Assessment Act 1979* (EP&A Act).
- *Biodiversity Conservation Act 2016* (BC Act).
- *Local Land Services Act 2013* (LLS Act).
- *National Parks and Wildlife Act 1974* (NPW Act).
- *Water Management Act 2000* (WM Act).
- *Biosecurity Act 2015* (Biosecurity Act).
- *State Environmental Planning Policy (Biodiversity and Conservation) 2021.*
- *State Environmental Planning Policy (Resilience and Hazards) 2021.*
- *Wollongong Local Environmental Plan 2009.*
- *Wollongong Development Control Plan 2009*.

Results

The study area is located in Coalcliff, approximately 24.7 kilometres from Wollongong, and occurs in close proximity to rocky cliffs and sandy beaches along the northern Illawarra coastline, as well as densely vegetated parts of the Illawarra Escarpment.

Regional soil landscape mapping indicates that the study area occurs on the Watagan landscape of the Wollongong 1:100,000 Sheet map and report (Hazelton & Tille 1990). The Watagan soils landscape is characterised by moderately inclined rolling low hills to very steep hills with slopes grading from 25 to 70%. It is located along the Illawarra Escarpment north of Coalcliff, as well as along Lawrence Hargrave Drive and on slopes of valleys that dissect the Woronora Plateau. Soils are comprised of shallow to deep Lithosols/Siliceous Sands and Yellow Podzolic Soils on sandstones and steep side slopes, with moderately deep Brown Podzolic Soils. Red Podzolic Soils occur on shales on moderately steep side slopes, and Gleyed Podzolic Soils are present on shales where poorly drained. Much of this landscape has been gazetted as national park or nature reserves, with the majority of vegetation remaining intact, comprised of tall open and closed dry and wet sclerophyll forest on exposed slopes, and rainforest on sheltered slopes. Although, significant clearing has occurred on the south coast headlands. This landscape is vulnerable to erosion due to the steep slopes, particularly when soils are wet and disturbed.

Vegetation communities

As part of the desktop investigation, Biosis determined that various native vegetation communities have been mapped in the broader landscape (DPE 2023). Based on regional vegetation mapping, two native Plant Community Types (PCTs), have been mapped within the study area (DPE 2023). These include:

- PCT 3125 – *Illawarra Seacliff Banksia-Bangalay Forest.*
- PCT 3155 – *Illawarra North-Pittwater Bangalay Moist Forest.*

Biosis previously prepared a constraints assessment for the eastern portion of Lot 100 DP715376 on Lawrence Hargrave Drive, and as part of this assessment, a portion of the vegetation within the western lot

was mapped and assigned to PCT 771 – *Coast Banksia – Coast Tea-tree low moist forest on coastal sands and headlands, Sydney Basin Bioregion and South East Corner Bioregions.* The classification of PCTs has recently undergone a major revision by the then Department of Planning and Environment (DPE). All eastern NSW PCTs, including the coast and tablelands, have been revised and classified into new PCTs, which were released in BioNet on 24 June 2022.

Based on the species present, vegetation composition and landscape position, it is likely that PCT 771 conforms to the revised PCT 3546 - *Coastal Sands Littoral Scrub-Forest*. This PCT is associated with the following Threatened Ecological Communities (TECs):

- *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions* (Endangered Ecological Community [EEC], BC Act).
- *Kurnell Dune Forest in the Sutherland Shire and City of Rockdale* (EEC, BC Act).
- *Littoral Rainforest and Coastal Vine Thickets of Eastern Australia* (Critically Endangered Ecological Community [CEEC], EPBC Act).

In addition to the above native vegetation, a desktop review of aerial imagery and vegetation mapping indicates that small patches of cleared land, likely containing a combination of common lawn species, also occurs within the study area.

The general structure and floristic composition of the native PCTs mapped within the study area based on the community description included in the BioNet Vegetation Classification (NSW DCCEEW 2024b), are provided in Table 1, Table 2 and Table 3 below.

Table 1 PCT 3125

PCT 3125 Illawarra Seacliff Banksia-Bangalay Forest	
Common name	Illawarra Seacliff Banksia-Bangalay Forest
Vegetation formation	Wet Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	North Coast Wet Sclerophyll Forests
Description	PCT 3125 is a wind-sheared low to moderately high sclerophyll open forest, typically occurring on exposed escarpment slopes and headlands between northern Illawarra and the Hacking River. This community is comprised of a variable tree canopy due to past and current land use, but very frequently includes a sparse to moderately dense cover of Coast Banksia *Banksia* integrifolia, commonly with Bangalay *Eucalyptus botryoides,* and rarely with Turpentine *Syncarpia glomulifera.* The mid story is comprised of a mix of common species in the Illawarra littoral zone, including frequent occurrences of Coast Banksia and Coffee Bush *Breynia oblongifolia,* occasionally Coastal Tea Tree *Leptospermum laevigatum*, Large Mock-olive *Notelaea longifolia* and Lilly Pilly *Acmena smithii,* with a sparse cover of species of Allocasuarina, particularly Black She-oak *Allocasuarina littoralis*. The groundcover is comprised of a high cover of Spiny-head Mat-rush *Lomandra longifolia*, as well as grass species such as Basket Grass *Oplismenus imbecillis* and Blady Grass *Imperata cylindrica*, and other groundcover species including Native Wandering Jew *Commelina cyanea* and Bracken *Pteridium esculentum.* This PCT is found in the Sydney Basin bioregion and the Sydney Cataract sub-bioregion, in areas with an average annual rainfall of between 1165 and 1416 mm. It occurs on Narrabeen shales and sandstones between Thirroul and Cronulla.
TEC Status	There are no TECs associated with PCT 3125.

Table 2 PCT 3155

PCT 3155 Illawarra North-Pittwater Bangalay Moist Forest	
Common name	Illawarra North-Pittwater Bangalay Moist Forest
Vegetation formation	Wet Sclerophyll Forests (Grassy sub-formation)
Vegetation class	Northern Hinterland Wet Sclerophyll Forests
Description	PCT 3155 is a tall to extremely tall sclerophyll open forest typically found along the northern Illawarra Escarpment. The tree canopy is commonly comprised of Bangalay and Turpentine, which may occasionally be associated with, or replaced, by Blackbutt *Eucalyptus pilularis,* and rarely occurs Grey Ironbark *Eucalyptus paniculata* and Smooth-barked Apple *Angophora costata.* This community is often comprised of a moderately dense layer of small trees and shrubs, which frequently includes Cabbage Tree Palm *Livistona australis,* high cover of Scentless Rosewood *Synoum glandulosum* subsp. *glandulosum* and common occurrences of Lilly Pilly and Coffee Bush. Other mid story species that occasionally occur in this community include *Myrsine variabilis.* Large Mock Olive, Cheese Tree *Glochidion ferdinandi* and tall Acacia species, such as Maiden's Wattle *Acacia maidenii.* The ground layer is characterised by a dense cover of ferns, such as Soft Bracken *Calochlaena dubia,* Bracken, Gristle Fern *Blechnum cartilagineum* and Prickly Rasp Fern *Doodia aspera.* Other common groundcover species include Trailing Guinea Flower *Hibbertia dentata,* Wombat Berry *Eustrephus latifolius,* Lawyer Vine *Smilax australis* and Water Vine *Cissus hypoglauca.* This PCT is found areas with an average annual rainfall of between 1024 and 1541 mm, at elevations of less than 360 m. It grows on sheltered escarpment slopes, usually on Narrabeen sediments north from mount Keira to the Hacking Valley. It has also been recorded on Permian sediments on the northern Illawarra coastal foothills, and has outlier records in Pittwater and the lower Hawkesbury on very protected volcanic intrusions.
TEC Status	There are no TECs associated with PCT 3155.

Table 3 PCT 3546

PCT 3546 Coastal Sands Littoral Scrub-Forest	
Common name	Coastal Sands Littoral Scrub-Forest
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Coastal Dune Dry Sclerophyll Forests
Description	PCT 3546 is a low to mid-high open forest, or very tall to extremely tall shrubland found predominantly in the littoral zone on coastal dunes between Forster and the Victorian border. The upper stratum almost always includes Coast Banksia, with a mix of Coastal Tea-tree, Tuckeroo *Cupaniopsis anacardioides* (north of the Illawarra) and Sweet Pittosporum. A canopy layer of Eucalypts is not always present but would normally include either Bangalay or Blackbutt. The shrub layer very frequently includes Coffee Bush and Tree Broom Heath *Monotoca elliptica*, with *Acacia longifolia,* Coastal Tea-tree and less commonly, Cheese Tree and Large Mock Olive. The ground cover may vary in density but commonly includes Spiny-headed Mat-rush, Bracken and occasionally Blady Grass. The groundcover also includes climbers such as Scrambling Lily *Geitonoplesium cymosum*, Climbing Guinea Flower *Hibbertia scandens*, Snake Vine *Stephania japonica* var. *discolor*, and Cockspur Thorn *Maclura cochinchinensis*. This PCT is very common within the greater Sydney Metropolitan area between the Illawarra and Newcastle on low-lying coastal sand plains. It is found in areas with an average annual rainfall of between 842 and 1470 mm, at elevations of less than 83 m.

PCT 3546 Coastal Sands Littoral Scrub-Forest	
TEC Status	**BC Act:** *Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions* (EEC). This PCT is also associated with the EEC *Kurnell Dune Forest in the Sutherland Shire and City of Rockdale*, however, the study area occurs outside the known distribution of this community. **EPBC Act:** *Littoral Rainforest and Coastal Vine Thickets of Eastern Australia* (CEEC).

Threatened species

Background searches identified 34 threatened flora species and 113 threatened fauna species recorded (DPE 2022a) or predicted to occur (Cth DCCEEW 2024) within 5 kilometres of the study area. Those species considered most likely to have habitat within the study area based on the background research are listed below.

Flora

- Leafless Tongue Orchid *Cryptostylis hunteriana* (Vulnerable, EPBC Act and BC Act).
- Magenta Lilly Pilly *Syzygium paniculatum* (Vulnerable, EPBC Act and Endangered, BC Act).
- Prickly Bush-pea *Pultenaea aristata* (Vulnerable, EPBC Act and BC Act).
- Scrub Turpentine *Rhodamnia rubescens* (Critically Endangered, EPBC Act and BC Act).

Fauna

- Eastern Pygmy-possum *Cercartetus nanus* (Vulnerable, BC Act).
- Grey-headed Flying-fox *Pteropus poliocephalus* (Vulnerable, EPBC Act and BC Act).
- Koala *Phascolarctos cinereus* (Endangered, EPBC Act and BC Act).
- Large Bent-winged Bat *Miniopterus orianae oceanensis* (Vulnerable, BC Act).
- Powerful Owl *Ninox strenua* (Vulnerable, BC Act).
- Rosenberg's Goanna *Varanus rosenbergi* (Vulnerable, BC Act).
- Sooty Owl *Tyto tenebricosa* (Vulnerable, BC Act).
- White-bellied Sea-Eagle *Haliaeetus leucogaster* (Vulnerable, BC Act).

An assessment of the habitat values of the study area is provided in Table 4 for threatened flora species and Table 5 for threatened fauna species.

Table 4 Assessment of habitat for threatened flora species

Species	Local distribution and habitat requirements	Likelihood of occurrence or impact
Leafless Tongue Orchid ***Cryptostylis hunteriana***	This species has been recorded approximately 830 m from the study area. It occupies coastal areas between the Gibraltar Range National Park and south into Victoria. It may grow in a range of communities, but larger populations typically occur in woodland dominated by Scribbly Gum *Eucalyptus*	Although there is a record within proximity to the study area, this individual is located in an area comprised of Scribbly Gum Woodland. This species is not associated with the PCTs mapped within the study area (DPE 2023) and although some of the associated canopy species may occur in these communities, they are not typically dominant. A such,

Species	Local distribution and habitat requirements	Likelihood of occurrence or impact
	sclerophylla, Silvertop Ash *Eucalyptus sieberi*, Red Bloodwood *Corymbia gummifera* and Black Sheoak *Allocasuarina littoralis.* It is mostly known from coastal heathlands, margins of coastal swamps and sedgelands, coastal forest, dry woodland and lowland forest, preferring open areas in the understory of forested communities.	this species is considered to have a low likelihood of occurrence within the study area.
Magenta Lilly Pilly ***Syzgium paniculatum***	This species has been recorded on three occasions within 5 km of the study area, with the closest record occurring approximately 1.3 km from the study area boundary. It is a small to medium sized rainforest tree, restricted to a narrow, linear coastal strip between Conjola State Forest in the south and Upper Lansdowne in the north. It is typically found in remnant stands of littoral rainforest and riverside gallery rainforests.	This species has been recorded within proximity to the study area and is associated with the PCTs mapped within the study area using regional vegetation mapping (DPE 2023). One of the five main populations of this species is located in the Coalcliff area on the Illawarra Escarpment, and it is associated with many of the species typically found in the PCTs mapped within the study area. Therefore, Magenta Lilly Pilly is considered to have a moderate or higher likelihood of occurrence within the study area.
Prickly Bush-pea ***Pultenaea aristata***	This species has been recorded on over 630 occasions within 5 km of the study area, with the closest record occurring approximately 830 m from the study area boundary. It is largely restricted to the Woronora Plateau, between Mt Kiera and Helensburgh, and occurs in either dry sclerophyll woodland or wet heath on sandstone.	The study area is located less than 1 km east of a large population of Prickly Bush-pea. This species has a very large number of records within the locality and is associated with one of the PCTs mapped within the study area. Given that the study area is likely to contain suitable habitat and due to the large number of nearby records, this species is considered to have a moderate or higher likelihood of occurrence within the study area.
Scrub Turpentine ***Rhodamnia rubescens***	This species has been recorded on eight occasions within 5 km of the study area, with the closest record located less than 500 m from the study area boundary. Scrub Turpentine typically occurs in coastal regions, sometimes extending into escarpments, in areas with an annual rainfall of between 1000 and 1600 mm and elevations up to 600 m. It often grows in littoral, warm temperate and subtropical rainforest, as well as wet sclerophyll forest, on volcanic and sedimentary soils.	Scrub Turpentine is associated with two of the PCTs mapped within the study area using regional vegetation mapping (DPE 2023). The species has also been recorded in close proximity to the study area, in vegetation comprised of the same PCT as that mapped within the study area. Given that the study area occurs within this species distributional range, the proximity of records and that the study area likely contains suitable habitat, this species is considered to have a high likelihood of occurrence.

Based on desktop assessment, the study area is considered to have a moderate-high likelihood of containing threatened flora species.

Table 5 Assessment of habitat for threatened fauna species

Habitat feature	Relevance and threatened fauna association	Likelihood of occurrence
Feed trees	Angophoras, Eucalypts and other flowering perennial species likely to occur in the study area may provide nectar resources suitable for a range of arboreal and flying fauna (such as Grey-headed Flying-fox and Koala) whilst in flower. If any *Allocasuarina* spp. are present, these may also provide foraging habitat for threatened species such as South-eastern Glossy Black Cockatoo *Calyptorhynchus lathami* (Vulnerable, EPBC Act and BC Act).	Each of the adjacent listed species have a moderate likelihood of utilising feed trees within the study area for foraging. A known Grey-headed Flying fox camp is located less than 12 km southwest of the study area in Thirroul. Flying-fox individuals were last surveyed and recorded in this camp in 2020. Given the presence of foraging resources in the study area and proximity of a breeding camp, this species has a moderate likelihood of occurrence and further assessment should be undertaken. Koala feed trees for the Central Coast Management Area have the potential to occur within the study area, based on NSW vegetation mapping (DPE 2023) and vegetation mapping undertaken by Biosis. Given the likely occurrence of vegetation communities containing feed tree species, and the number of nearby records, the study area has the potential to contain suitable habitat and as such, the species has a moderate likelihood of occurrence. A field investigation should be undertaken to determine the presence of local feed trees. *Allocasuarina* spp. are associated with the PCTs mapped within the study area, which represent an important foraging resource for Glossy Black Cockatoos. Due to the potential for suitable habitat within the study area, this species has a moderate likelihood of occurrence.
Hollow-bearing trees	When considering that the study area contains dense vegetation, likely including large canopy species, it is highly likely that these areas would also contain l hollow-bearing trees. Hollow-bearing trees have the potential to provide suitable roosting and/or nesting habitat for locally occurring fauna, including threatened species such as threatened microbats, large Forest Owls, and other arboreal species.	Based on the dense vegetation present, it is likely that areas of wooded vegetation would contain hollows suitable for roosting and/or nesting microbats, large forest owls, cockatoos and other arboreal species.
Waterways (creek, river or dams)	Waterways have the potential to provide suitable foraging and breeding habitat for a number of threatened species, including microbats and frog species. No watercourses, dams or drainage lines have been mapped within the study area based on topographic data.	Given the absence of mapped waterways within the study area, species utilising this habitat feature have a low likelihood of occurrence. The presence of watercourses or suitable habitat for these species should be confirmed by field investigation.
Rocky outcrops	Based on aerial imagery and topographic data, no rocky outcrops or cliff lines are present within the	Given the absence of rocky outcrops within the study area based on aerial imagery and

Habitat feature	Relevance and threatened fauna association	Likelihood of occurrence
	study area. However, given the proximity to the Illawarra Escarpment, there are likely areas containing cliffs, rocky ridges and overhangs within the broader locality.	topographic data, species utilising this habitat feature have a low likelihood of occurrence. The presence of rocky habitat should be confirmed by field investigation.
Caves and shelters	Based on aerial imagery and topographic data, no caves or shelters are present within the study area. However, given the proximity to the Illawarra Escarpment, there is potential that areas containing cliffs, rocky ridges, caves and overhangs occur within the broader locality.	Given the absence of caves within the study area based on aerial imagery and topographic data, species utilising this habitat feature have a low likelihood of occurrence. The presence of caves should be confirmed by field investigation.
Stick Nests	White-bellied Sea-eagle requires the presence of tall, well-developed trees to construct stick nests for breeding.	Based on vegetation modelling, the canopy species present are likely able support stick nests suitable for these species. Ten records of the White-bellied Sea-eagle occur within 5 km of the study area, with the closest recorded less than 110 m from the study area boundary. Given the likely presence of suitable vegetation and the proximity of recent records of this species, White-bellied Sea-eagle has a moderate likelihood of occurrence within the study area. However, a field investigation should be undertaken to confirm the presence/absence of stick nests and determine whether this species is likely to be using the study area for breeding or occasional foraging.

Based on desktop assessment, the study area has a moderate to high likelihood of containing threatened fauna species.

Assessment against key legislation

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is the Australian Government's key piece of environmental legislation. The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (NES) protected under the EPBC Act. Any action likely to cause a significant impact to Matters of National Environmental Significance (MNES) require further assessment in the form of an assessment against the Significant Impact Criteria (SIC) assessment guidelines (DoE 2013) under the EPBC Act. If the SIC assessment determines that a significant impact is likely, then the project requires a referral to the Commonwealth Minister.

Nine Matters of NES are identified under the EPBC Act:

- World heritage properties.
- National heritage places.
- Wetlands of international importance (also known as 'Ramsar' wetlands).

- Nationally threatened species and ecological communities.
- Migratory species.
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions (including uranium mining).
- A water resource, in relation to coal seam gas development and large coal mining development.

One TEC and a number of threatened species listed under the EPBC Act were assessed as having a moderate or higher likelihood of occurrence within the study area. If future development will impact areas providing habitat for a threatened species, an assessment against the Significant Impact Criteria (DoE 2013) must be prepared to determine if this impact is likely to be significant.

Biodiversity Conservation Act 2016

The NSW BC Act requires that the Biodiversity Assessment Method (BAM) be applied to all proposals that trigger the Biodiversity Offset Scheme (BOS), and in cases where the BOS is triggered, a Biodiversity Development Assessment Report (BDAR) is required to be submitted to the approval authority. A number of threatened ecological communities and threatened species listed under the BC Act were assessed as having a medium or greater likelihood of occurring within the study area. Further assessment in the form of a Test of Significance (ToS) assessment is required to evaluate the significance of impacts in accordance with the BC Act.

Table 6 Biodiversity Offset Scheme assessment

BOS Trigger	Triggered?
Clearing threshold	The study area is subject to a clearing threshold of 0.5 ha based on a minimum lot size of 39.99 ha. Therefore, if the vegetation clearing required for the proposed Eco-tourist Facility exceeds this threshold, the BOS will be triggered and a BDAR will be required.
BV map	The study area does not contain area included in the Biodiversity Values mapping (BV mapping) and as such, impacts to BV mapped areas is unlikely.
Significant impact	TECs and at minimum, habitat for threatened species, are likely to occur within the study area based on the density of intact vegetation present and the number of nearby records of threatened species. Once the proposed impact footprint is confirmed, further assessment is required to determine if impacts are likely to result in a significant impact.

State Environmental Planning Policies (SEPPs)

Biodiversity and Conservation SEPP 2021

Chapter 2: Vegetation in non-rural areas

This chapter aims to protect the biodiversity values of trees and other vegetation in non-rural areas of NSW and to preserve the amenity of non-rural areas through the preservation of trees and other vegetation by ensuring that the BOS will apply to all clearing of native vegetation that exceeds the offset thresholds in urban areas and environmental conservation zones that do not require development consent.

This chapter applies to all land zones and LGAs defined in Clause 2.3 of Chapter 2. As the study area is located on land zone C2, which is listed under Clause 2.3, any future development is subject to the requirements laid out in this Chapter.

Chapter 3: Koala Habitat Protection 2020

This chapter applies to land zoned RU1, RU2 or RU3. As the proposal occurs on land zoned C2, this chapter does not apply.

Chapter 4: Koala Habitat Protection 2021

Chapter 4 Koala Habitat Protection aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline.

The study area is located within the City of Wollongong (Council) LGA, which is listed under Schedule 2, Chapter 4 of SEPP, and is therefore subject to the requirements laid out by the policy. Specifically, this means before a consent authority may grant consent to a Development Application (DA), it must satisfy itself whether or not the land is potential Koala habitat and core Koala habitat.

The study area does not have an approved Koala Plan of Management (KPoM).

Council is not prevented from granting consent to a development application for consent to carry out development on land if:

- The land does not have an approved KPoM applying to the land, or
- The Council is satisfied that the land is not core Koala habitat.

Based on previous vegetation mapping undertaken by Biosis and current NSW vegetation mapping (DPE 2023), the PCTs mapped within the study area have the potential to contain feed trees, including Bangalay, for the Central Coast Koala Management Area which includes the Shoalhaven LGA, as defined in Schedule 3 of the SEPP.

As the vegetation in the study area likely represents potential Koala habitat, determination of whether the land constitutes core Koala habitat is required.

Core Koala habitat means:

- An area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas are recorded as being present at the time of assessment of the land as highly suitable koala habitat, or
- An area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas have been recorded as being present in the previous 18 years.

Twelve records of Koala have been recorded within five kilometres of the study area, with the closest record located approximately 360 metres from the study area, with the most recent recorded in 2006. Based on the vegetation mapping and aerial imagery, Koala feed trees are likely present and surrounding habitat is likely to comprise of intact, moderate to high condition vegetation. Based on the assessment above, the study area has the potential to represent core Koala habitat, however, this should be confirmed following a field investigation.

If the land has been identified as core Koala habitat, a KPoM must be prepared in accordance with Chapter 4 of the SEPP.

Chapter 13: Strategic conservation planning

This chapter aims to facilitate appropriate development on biodiversity certified land. It requires asset protection zones (APZ) (associated vegetation clearance) to be wholly located on Certified – Urban Capable Land and the approved mitigation measure be complied with. As the study area is not located on biodiversity certified land, this chapter does not apply to the project.

Resilience and Hazards SEPP 2021

The *State Environmental Planning Policy (Resilience and Hazards) 2021* is a consolidated SEPP that commenced in 2021 and includes the now repealed SEPP (Coastal Management) 2018 as a Chapter.

The study area occurs within the Coastal Use Area Map and the Coastal Environment Area Map under Chapter 2 (Coastal Management) of this SEPP. In accordance with Part 2.2 subsection 2.10 of this SEPP, development consent cannot be granted on land included in the coastal environment area map unless the consent authority has considered that future development will not adversely impact the following:

- The integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment.
- Coastal environmental values and natural coastal processes.
- The water quality of the marine estate (within the meaning of the Marine Estate Management Act 2014), in particular, the cumulative impacts of the proposed development on any of the sensitive coastal lakes identified in Schedule 1.
- Marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms.
- Existing public open space and safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability.
- Aboriginal cultural heritage, practices and places.
- The use of the surf zone.

In accordance with Part 2.2 subsection 2.11 of this SEPP, development consent cannot be granted on land included in the coastal use area map unless the consent authority has considered that future development will not adversely impact the following:

- Existing, safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability.
- Overshadowing, wind funnelling and the loss of views from public places to foreshores.
- The visual amenity and scenic qualities of the coast, including coastal headlands.
- Aboriginal cultural heritage, practices and places.
- Cultural and built environment heritage.

In addition, development consent must not be granted on land within the coastal environment area map or the coastal use area map unless the consent authority is satisfied that:

- The development is designed, sited and will be managed to avoid an adverse impact referred to in subsection (1).
- If that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact.
- If that impact cannot be minimised—the development will be managed to mitigate that impact.

Water Management Act 2000

The WM Act provides for the sustainable and integrated management of the state's water. Under the WM Act an approval is required to undertake controlled activities on waterfront land, unless that activity is otherwise exempt under Section 91E of the WM Act. Waterfront land is defined within the Act as the bed of any river, lake or estuary and any land within 40 metres of the river banks, lake shore or estuary mean high water mark.

Impacts to riparian zones are also protected under the WM Act. The WM Act is supported by a series of guidelines which provide design considerations and overarching management measures for works on waterfront land. The following guidelines are relevant:

- *Controlled activities on waterfront land - guidelines for riparian corridors on waterfront land* (DPE 2022b).
- *Guidelines for watercourse crossings on waterfront land* (DPE 2022c).
- *Guidelines for outlet structures on waterfront land* (DPE 2022d).
- *Guidelines for laying pipes and cables in watercourses on waterfront land* (DPE 2022e).
- *Guidelines for instream works on waterfront land* (DPE 2022f).

Proposed impacts should be guided by the *Guidelines for controlled activity on waterfront land – Riparian corridors* (DPE 2022b). Works within 40 metres of the top bank of mapped watercourses will therefore need to be consistent with the riparian corridor matrix which requires a vegetated riparian zone (VRZ) be preserved. The VRZ applies to each side of the watercourse, and it is recommended that the width of this buffer be based on watercourse order under the Strahler method, in order to protect waterways from damage such as erosion (Strahler 1964). As no watercourses or associated riparian corridors are mapped within the study area based on topographic data, future development is unlikely to occur within a riparian buffer or occur within 40 metres of a mapped waterway.

If disturbance to a riparian corridor is anticipated, a Controlled Activity Approval under s91 of the WM Act is required, and a Vegetation Management Plan (VMP) outlining how the corridor will be revegetated and rehabilitated will also be required as part of the controlled activity approval process.

Constraints assessment

Based on preliminary desktop research, a number of ecological values were identified within the study area that will require consideration for future development.

One TEC and potential habitat for a number of threatened flora and fauna species listed under the BC Act and EPBC Act are likely present within the study area, including one species, Scrub Turpentine, listed as a candidate at risk of Serious And Irreversible Impact (SAII) based on the principles set out in clause 6.7 of the *Biodiversity Conservation Regulation 2017*.

Aerial imagery indicates that the study area also contains small areas of open grassland, which are unable to be accurately assessed via a desktop assessment but are assumed to be comprised of common lawn species.

Based on the dense vegetation mapped across the study area and the high likelihood of occurrence of TECs and habitat for threatened species, the study area is highly constrained. If vegetation removal required for the proposed Eco-tourist Facility will exceed 0.5 hectares, or significant impacts are likely to occur to threatened entities, the BOS will be triggered and a BDAR will be required to support the DA. However, if a BDAR is prepared, the proposal will need to demonstrate how future development has been designed to avoid and minimise impacts to threatened entities as far as practicable. The avoid and minimise component of the BDAR, in accordance with the BAM (DPIE 2020), is a critical component of the impact assessment and areas of high constraint will require consideration as part of this process.

The ecological constraints within the study area are provided in Figure 1. These constraints are ranked as high, moderate or low, based on the criteria outlined in Table 7.

Table 7 Ecological constraints in the study area

Constraint	Value	Justification	Recommendations
High	• Threatened Ecological Communities • Habitat for SAII listed entities (Scrub Turpentine). • Non-threatened native vegetation representing potential habitat for threatened species.	• Vegetation communities listed as endangered under the BC Act and critically endangered under the EPBC Act. • The patches are contiguous with larger patches of native vegetation that extend across the Illawarra Escarpment. • Likely contains hollow bearing trees. • Potential to provide habitat for threatened fauna/flora species.	• Impact to these areas should be avoided where feasibly possible. • A BDAR would be required if cumulative impacts exceed 0.5 ha of native vegetation. Furthermore, the likelihood of a significant impact triggering the BOS is highest in these areas. If a BDAR is prepared, impacts to these areas would have to include appropriate justification if areas of high constraint cannot be avoided.
Moderate	The majority of the mapped native vegetation within the study area is considered a high constraint. As such, no ecological values within the study area are considered a moderate constraint.	N/A	N/A
Low	• Open grassland	• Likely does not form part of an ecological community. • Does not contain any hollow-bearing trees. • Is unlikely to provide potential habitat for threatened flora or fauna.	• Development likely suitable in these areas. • Confirmation of condition of this vegetation is required. If considered native, impacts to these areas will contribute to the 0.5 ha clearing threshold for the BOS to be triggered.

Conclusion and recommendations

The flora and fauna constraints assessment has highlighted a range of values and constraints within the study area. Biosis makes the following recommendations regarding the impact area for the proposed Eco-tourist Facility:

- Undertake a field investigation, including a habitat-based assessment and detailed vegetation mapping, in order to accurately map TECs and suitable habitat for threatened species within the study area. Determining the presence or absence of Scrub Turpentine should be a priority as it is listed as a candidate for potential SAII, and surveys for this species can be undertaken all-year round. The possible presence of this species is a potential hurdle for development as Council cannot consent to a DA if the approval authority determines there is likely to be a SAII.
- Avoid clearing of native vegetation, where possible.
- Avoid impacts to TECs or areas identified as habitat for threatened species.
- Avoidance of hollow-bearing trees as far as practicable.
- Minimise impacts to vegetation that represents habitat for entities at risk of SAII.
- The avoidance and minimisation of impacts to biodiversity values should be considered further during the detailed design phase of the project.
- Following ground-truthing of assumed PCTS and habitat values, prepare NSW Test of Significance and Commonwealth Significant Impact Criteria assessments to evaluate impacts to threatened species and/or their habitat.
- Where possible, restrict impacts to areas of open grassland to reduce overall clearing of native vegetation. Impacts to native vegetation contribute to the allowable clearing threshold, and exceeding this threshold will trigger the BOS.

I trust that this advice is of assistance to you however please contact me if you would like to discuss any elements of this ecological advice further.

Yours sincerely

Kaisha Edwards
Botanist

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Appendices

Appendix 1 Figures

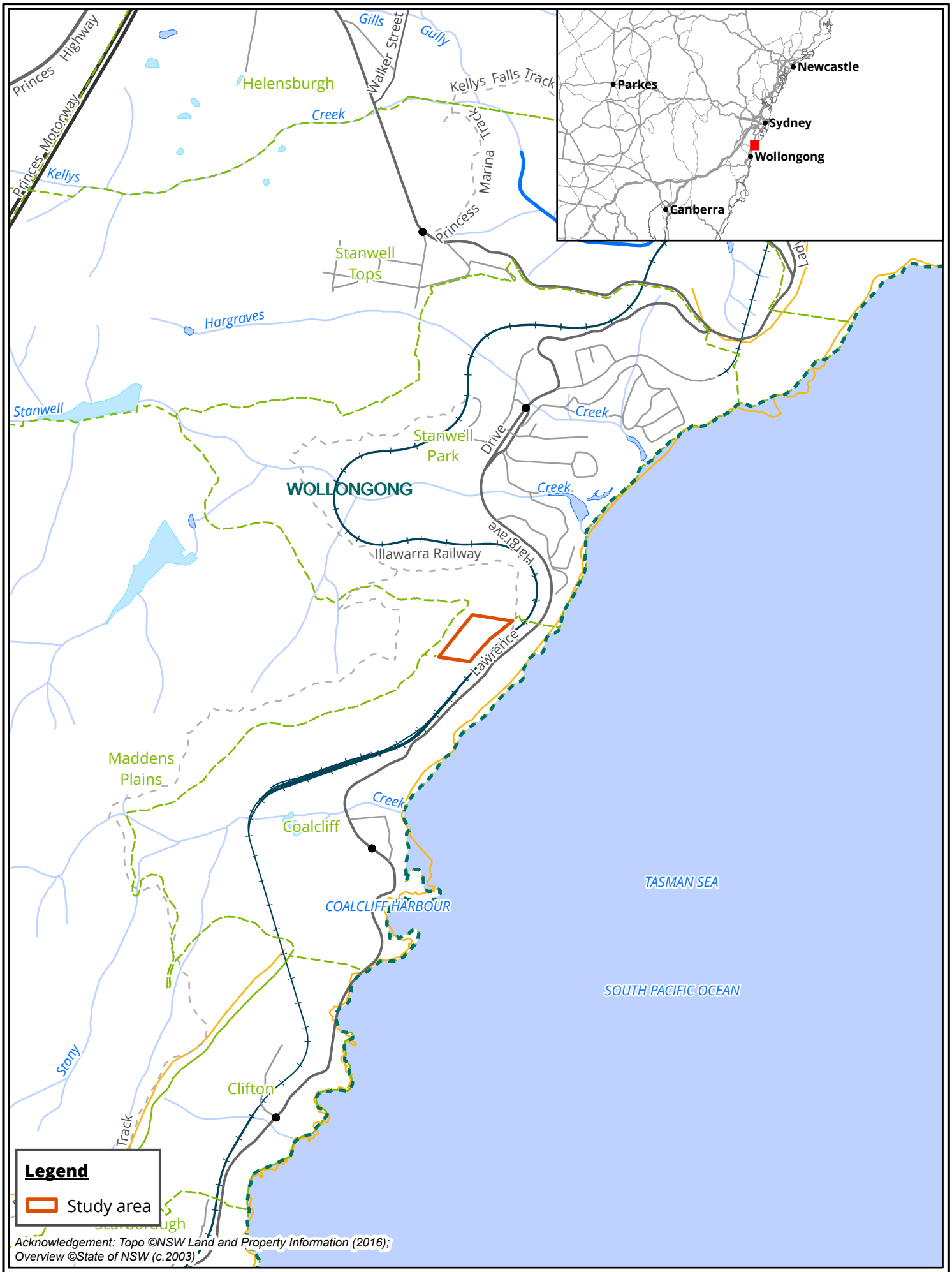

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Figure 1 Location of the study area

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Checked by: KE, Drawn by: JET, Last edited by: jtownsend
Location:P:\40800s\40831\Mapping\40831_LHG_Constraints

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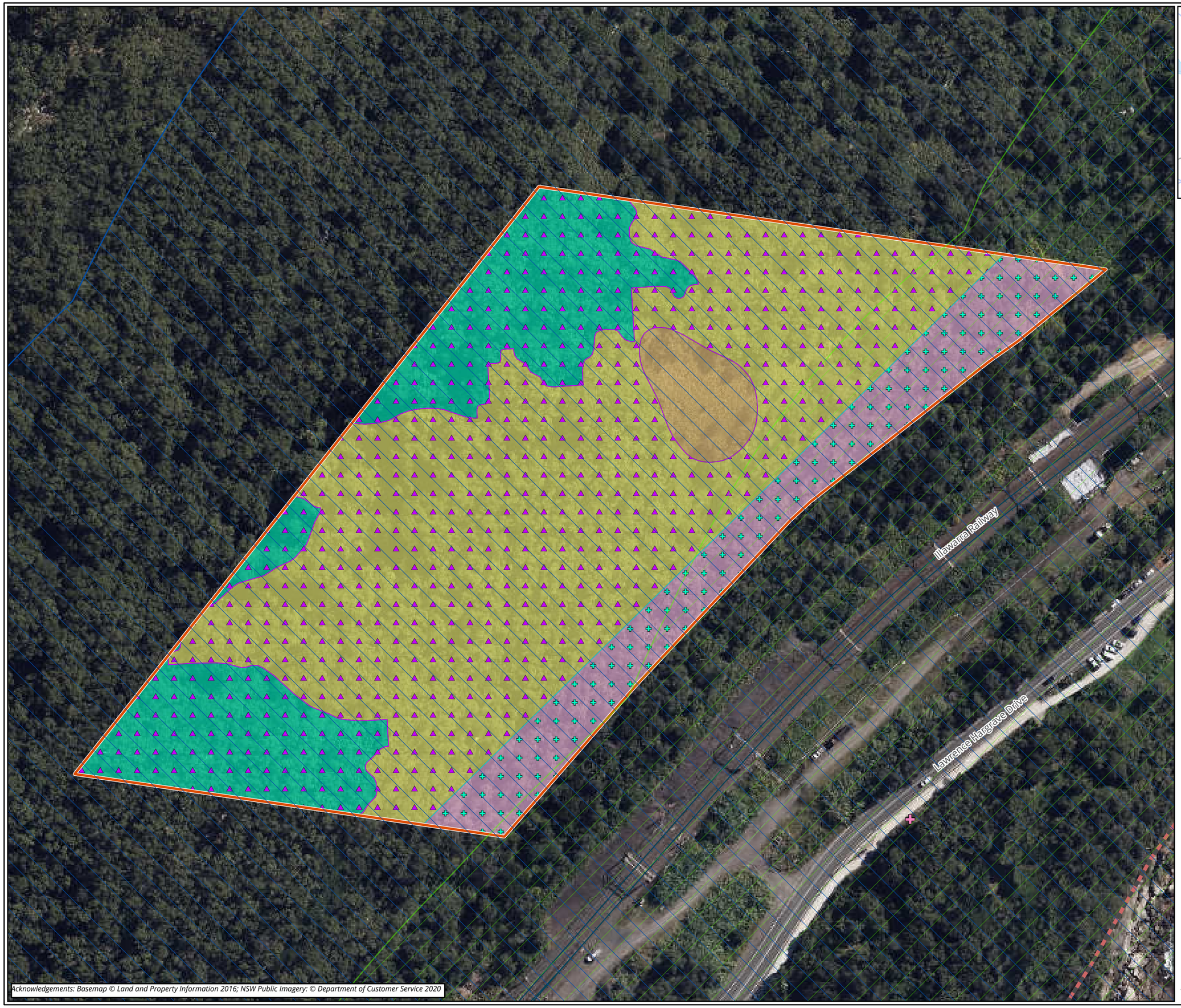
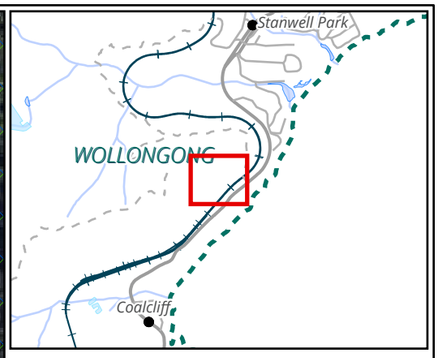
Metres

N

Scale 1:25,000 @ A4, GDA2020 MGA Zone 56





Legend

Study area

Resilience and Hazards SEPP

Coastal use area

Coastal environmental area

Threatened fauna (Bionet)

White-bellied Sea-Eagle

Threatened ecological communities (TEC)

Bangalay Sand Forest of the Sydney Basin and South East Corner bioregion (EEC, BC Act) and Littoral Rainforest and Coastal Vine Thickets of Eastern Australia (CEEC, EPBC Act)

Serious and Irreversible impacts (SAII)

Habitat for threatened species at risk of SAII (Scrub Turpentine)

Plant community type

Urban Native/Exotic

3125

3155

3546

Figure 2 Ecological features of the study area

0 10 20 30 40 50

Metres

Scale: 1:1,300 @ A3

Coordinate System: GDA2020 MGA Zone 56

N

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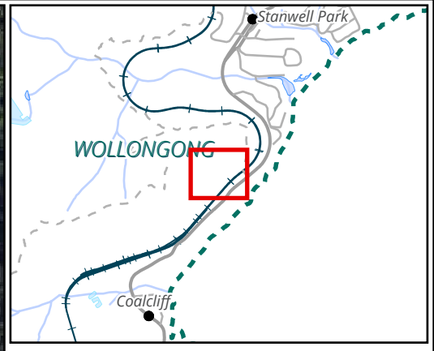
Matter: 40831, Date: 30 May 2024,
Drawn by: JET, Checked by: KE, Last edited by: jtownsend
Layout: 40831_F2_Eco
Project: P:\40800s\40831\Mapping\
40831_LHG_Constraints.aprx

Acknowledgements: Basemap © Land and Property Information 2016; NSW Public Imagery: © Department of Customer Service 2020



Legend

- Study area
- Desktop assessment only

Constraints

- High
- Low

Figure 3 Constraints

0 10 20 30 40 50

Metres

N

Scale: 1:1,300 @ A3

Coordinate System: GDA2020 MGA Zone 56

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