

24 July 2020

Department of Education - School Infrastructure
Schools Infrastructure NSW
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Re: Biodiversity development assessment report waiver, Murwillumbah Education Precinct

To whom it may concern,

Schools Infrastructure NSW is seeking to develop the Murwillumbah Education Precinct (the project) at the current Murwillumbah High School site (the site). The site is located 86 Riverview St, Murwillumbah and is legally defined as Lot 2 in Deposited Plan (DP) 578679 and Lots 5 and 6 in DP 820602. The project would bring together the Murwillumbah High School, Wollumbin High School, Murwillumbah Primary School, and Murwillumbah East Primary School with an objective to provide new teaching spaces and upgrade core facilities to address enrolment growth.

EMM completed a biodiversity constraints assessment of the site on 19 February 2020. The site was inspected over approximately three hours to identify the presence of any listed ecological communities, and the potential for threatened flora and flora species to occur. The site inspection comprised a site walkover to characterise native vegetation, habitat assessments for threatened flora and ecological communities, and searches for habitat features or signs of threatened fauna

This letter provides information regarding the biodiversity assessment for Murwillumbah High School, Murwillumbah (the site). This information has been provided to support a request to waive the requirement to complete a biodiversity development assessment report (BDAR).

We request that the SEARs for the SSD application waive the requirement for the preparation of a Biodiversity Development Assessment Report (BDAR) as per the Biodiversity Assessment Method (BAM) as set out under the NSW *Biodiversity Conservation Act 2016* (BC Act). The site has minimal biodiversity values and it is considered that a BDAR is not warranted for the proposal.

This BDAR waiver request for the application has been prepared in accordance with the NSW Biodiversity Conservation Division (BCD) *BDAR waiver determinations for SSD and SSI applications fact sheet*, as detailed in Table 1 and Table 2. The waiver request has been prepared on behalf of the applicant, SINSW.

Yours sincerely



Chris Beavon
Associate Ecologist
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Reviewed by Katie Diver, National Technical Leader -Ecology

Table 1 **BDAR waiver request Information requirements**

Admin	<p>1. Proponent name and contact details</p> <ul style="list-style-type: none"> • Murwillumbah High School redevelopment- SINSW. • Contact details – Name: Mitch Walsh (Mace), Mobile: 0403 340 820, Email: Mitch.Walsh@macegroup.com <p>• Project ID</p> <ul style="list-style-type: none"> • Murwillumbah High School redevelopment. 86 Riverview St, Murwillumbah 2484. <p>2. Name/ ecological qualifications of person completing TABLE 2</p> <ul style="list-style-type: none"> • Katie Diver – Associate Ecologist, Accredited Assessor (BAAS17013)- Review and project management. • Chris Beavon – Associate Ecologist, site assessment and preparation of the report.
Site details	<p>1. Street address, Lot and DP, local government area</p> <ul style="list-style-type: none"> • 86 Riverview St, Murwillumbah 2484. Lot 2 in Deposited Plan (DP) 578679 and Lots 5 and 6 in DP 820602. <p>2. Description of existing development site</p> <p>The School site is approximately 9 hectares and is about 22 km south-west of Tweed Heads. The School is primarily surrounded by residential, recreational, and agricultural uses. The following key land uses are immediately adjacent to the site:</p> <ul style="list-style-type: none"> • North – residences along Riverview Street and James Street and an Auto One auto parts store; • South – ‘Kendovale’ jersey cattle farm; • East – sporting fields including two football fields, a field hockey pitch, a cricket pitch, and a junior AFL football pitch; and • West – residences along Riverview Street and the Murwillumbah NSW State Emergency Service (SES) Unit. <p>The site contains several existing buildings, sporting courts, carparks, paved surfaces agricultural plots, sporting ovals, cultivated gardens, windbreaks, small patches of native vegetation and a Hoop Pine (<i>Araucaria cunninghamii</i>) plantation.</p> <p>A map of the site is provided in Appendix A. Images of the site are provided in Appendix B.</p>
Proposed development	<p>SINSW is undertaking to establish a K-12 school at the current Murwillumbah High School at the Riverview Street, Murwillumbah.</p> <p>The proposed development includes:</p> <ul style="list-style-type: none"> • Removal of pine plantations on the western site boundary and trees/shrubs under buildings K and N. • Demolition of existing facilities within Blocks B, C, E and S. • Construction of a ‘fit for purpose’ facility that includes additional teaching spaces (for high school), library, and administration offices. • Construction of a new two storey primary school wrapped around the central courtyard that includes: <ul style="list-style-type: none"> – Ground floor: 13 teaching spaces, canteen, covered outdoor learning area and water closet. – Upper level: 16 teaching spaces, library/special program facility, and water closet. • Refurbishment of existing school hall to accommodate an outside school care house. • Establishment of a primary school drop off/pick up zone along High School Lane.

Table 2 Impacts of the proposed development on biodiversity values

Biodiversity value	Meaning	Relevant (✓ or NA)	Explain and document potential impacts including additional impacts prescribed under the BC Regulation
Vegetation abundance 1.4(b) BC Regulation	Occurrence and abundance of vegetation at a particular site	✓	<p>The site consists of planted endemic, non-endemic and exotic tree, shrub and grass species. The vegetation present is not considered to form a native vegetation community, due to the high level of disturbance, and extensive landscape plantings.</p> <p>Vegetation on site consists of the following:</p> <ul style="list-style-type: none"> - Planted and cultivated gardens comprised of native and exotic species; - Small patches of planted native revegetation; - Hoop Pine plantation on the western boundary; - Windbreaks dominated with Camphor Laurel (<i>Cinnamomum camphora</i>) with scattered native species; - Small patch of slash pine (<i>Pinus elliottii</i>). <p>An inventory of all species recorded on site can be found in Appendix C.</p>
Vegetation integrity 1.5(2)(a) BC Act	Degree to which the composition, structure and function of vegetation at a particular site and the surrounding landscape has been altered from a near natural state.	✓	<p>Naturally occurring native vegetation does not occur within the site. The non-endemic, endemic and introduced trees and shrubs are planted throughout the site. The site is highly modified essentially now consisting of urban landscaping.</p> <p>Given the high degree of modification, and the absence of native vegetation communities, vegetation integrity data was not collected.</p> <p>No habitat features (including hollows, caves, rocks and nests) are present on site. No water bodies are located on site.</p> <p>The vegetation integrity and functioning of the vegetation present is considered very low.</p>
Habitat suitability 1.5(2)(b) BC Act	Degree to which the habitat needs of threatened species are present at a particular site.	NA	<p>No naturally occurring threatened flora or fauna were observed during the site visit. Considering the highly modified landscape it is unlikely any threatened species will occur.</p> <p>Fauna habitat is highly limited, with a lack of structural attributes, tree hollows and foraging resources, owing to the cleared and modified nature of the site.</p> <p>Threatened flora are unlikely to occur given the clearance of the original vegetation and the current dominance of exotic species.</p>

Table 2 Impacts of the proposed development on biodiversity values

Biodiversity value	Meaning	Relevant (✓ or NA)	Explain and document potential impacts including additional impacts prescribed under the BC Regulation
Threatened species abundance 1.4(a) BC Regulation	Occurrence and abundance of threatened species or threatened ecological communities, or their habitat, at a particular site.	✓	<p>Three individual specimens of Davidson's Plum (<i>Davidsonia jerseyana</i>) were identified within the site. Davidson Plum is listed as an Endangered species under the <i>Environmental Protection and Biodiversity Conservation Act 1999</i> (EPBC) and Endangered under the <i>Biodiversity Conservation Act 2016</i> (BC Act). Although this species is endemic to northern NSW, evidence from construction of existing buildings, landscape gardening and historical imagery suggest this species has been planted within the study area and therefore their genetic provenance is unknown. This species is widely cultivated and planted as a bush tucker species. The site is largely isolated from natural habitat and existing populations, therefore the removal of two individuals for the proposal will not affect recovery or conservation of this species.</p> <p>Based on desktop assessments and field observations of habitat the site has potential to provide habitat mobile threatened and migratory species such as Grey-headed Flying-fox, Rose-crowned Fruit Dove, Barred Cuckoo-shrike, White-eared Monarch, White-throated Needle-tail, Rainbow Bee-eater and one microchiropteran species known to roost in buildings.</p> <p>Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>) is listed as a Vulnerable species under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC) and Endangered under the Biodiversity Conservation Act 2016 (BC Act). This species has been previously recorded on the site and is likely to utilise the vegetation on the site such as eucalypt species when in flower and fruiting rainforest tree species. No flying-fox camps occur within the site. The potential feed trees are sparsely distributed throughout the site and their removal is unlikely to have a significant impact on this highly mobile species. Therefore the removal of these trees for the proposal will not affect recovery or conservation of this species.</p>
Habitat connectivity 1.4(c) BC Regulation	Degree to which a particular site connects different areas of habitat of threatened species to facilitate the movement of those species across their range.	NA	Ecological habitat connectivity on site is negligible. The site is located within a busy education precinct, light industrial estate and residential properties to the north, east and west, and agricultural areas to the south. Given its isolation, planted vegetation within the site is not considered important to the movement of threatened species across their range. Any vegetation clearing and development on site will not impact the connectivity of habitat which facilitates the movement of threatened species across their range. Any species which might currently utilise the site for occasional foraging would be highly mobile.
Threatened species movement 1.4(d) BC Regulation	Degree to which a particular site contributes to the movement of threatened species to maintain their lifecycle.	NA	No threatened fauna species were observed on site. No suitable habitat features were observed on site, including hollows, caves, rocks and nests. The site is bordered by a busy road and public/commercial/residential buildings. Any vegetation clearing and development on site will not impact the movement of threatened species, as any species which might currently utilise the site for occasional foraging would be highly mobile.
Flight path integrity 1.4(e) BC Regulation	Degree to which the flight paths of protected animals over a particular site are free from interference.	NA	No structures that impact flight paths will be constructed. It is anticipated that the flight path integrity will not be altered as a result of the proposal, with all proposed activities remaining similar to current operations. Accordingly, the proposed development will not impact on or interfere with the flight path integrity of protected animals.

Table 2 Impacts of the proposed development on biodiversity values

Biodiversity value	Meaning	Relevant (✓or NA)	Explain and document potential impacts including additional impacts prescribed under the BC Regulation Attach additional supporting documentation where appropriate
Water sustainability 1.4(f) BC Regulation	Degree to which water quality, water bodies and hydrological processes sustain threatened species and threatened ecological communities at a particular site.	NA	No waterbodies or waterways supporting threatened species occur in the vicinity of the site. The site does not border water bodies and is located approximately 500 m from the Tweed River. The development will involve the construction of a new buildings however it is considered there will be no impact on local water bodies or hydrological processes.

The site does not contain any listed ecological community or habitat for naturally occurring threatened flora species. Two Davidson Plums are likely to be removed for the project, however these individuals are planted and do not form part of a naturally-occurring population, and therefore would not impede recovery of the species. While the Grey-headed Flying-fox and some threatened and migratory bird species have been recorded or have potential to occur at the site, they are highly mobile species that would not be significantly impacted by the removal of the Hoop Pine plantation, scattered trees and shrubs.

There is some potential that the Northern Freetail Bat may roost in existing buildings to be demolished. An inspection should be conducted in accordance with ‘Species Credit’ threatened bats and their habitats¹ prior to lodgement or during the Biodiversity and Conservation Division’s assessment of the BDAR waiver to determine the potential for threatened species to roost in buildings to be demolished and assist in assessment of potential impacts on the species.

¹ Office of Environment and Heritage 2018, ‘Species Credit’ threatened bats and their habitats: NSW Survey Guide for the Biodiversity Assessment Method, Office of Environment and Heritage, Sydney

Appendix A

Location map



Source: EMM (2020); Nearmap 2020); DFSI (2017); Tweed Shire Council (2012); GA (2011); ASGC (2006)

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- Site area
- Major road
- Local road
- Watercourse/drainage line
- Cadastral boundary
- Local government area (refer inset)
- NPWS reserve (refer inset)

- Tweed LGA vegetation 2012 (VIS ID 3912)
- 998 - Not assessed (not determined)
 - 1004 - Camphor Laurel dominant Closed to Open
 - 1005 - Native plantation (not determined)

Location map

Murwillumbah School upgrade
Biodiversity constraints assessment
Figure 1



Appendix B

Site images



Photograph B.1 Example of cultivated gardens and planted trees on site - Entrance to school from Riverview Street



Photograph B.2 Example of planted native vegetation throughout existing buildings. This area contained one of the Davidson's Plum (*Davidsonia jerseyana*) specimens.



Photograph B.3 Small patch of planted native revegetation adjacent existing school bus stop on Nullum Street. This area contained one of the Davidson's Plum (*Davidsonia jerseyana*) specimens.



Photograph B.4 Hoop Pine (*Araucaria cunninghamii*) plantation on the western boundary of the site.



Photograph B.5 Example of windbreak vegetation dominated by Camphor laurel (*Cinnamomum camphora*).



Photograph B.6 Patch of Slash Pine (*Pinus elliottii*) in southern area of the site. This area contained one of the Davidson's Plum (*Davidsonia jerseyana*) specimens.



Photograph B.7 Example of sporting fields on site.



Photograph B.7 Example of scattered gum trees (ie Eucalypt and corymbia species) scattered throughout the site).

Appendix C

Biodiversity constraint assessment

24 March 2020

Department of Education - School Infrastructure
Murwillumbah High School

Re: Murwillumbah High School Biodiversity Constraints Assessment

Dear Sir/Madam,

1 Introduction

Schools Infrastructure NSW (SINSW) is investigating future development options for Murwillumbah High School (hereafter 'the site').

SINSW is undertaking to establish a K-12 school at the current Murwillumbah High School at the Riverview Street, Murwillumbah.

The proposed development includes:

- Removal of pine plantations on the western site boundary and trees/shrubs under buildings K and N.
- Demolition of existing facilities within Blocks B, C, E and S.
- Construction of a 'fit for purpose' facility that includes additional teaching spaces (for high school), library, and administration offices.
- Construction of a new two storey primary school wrapped around the central courtyard that includes:
 - Ground floor: 13 teaching spaces, canteen, covered outdoor learning area and water closet.
 - Upper level: 16 teaching spaces, library/special program facility, and water closet.
- Refurbishment of existing school hall to accommodate an outside school care house.
- Establishment of a primary school drop off/pick up zone along High School Lane.

The purpose of the assessment was to identify biodiversity values and constraints at the site, comprising species and communities listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and/or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This report outlines the methods and results of the biodiversity constraints assessment, assesses the likelihood that listed species and ecological communities would occur at the site and the potential for development of the site to result in significant impacts.

2 Method

The following information was reviewed prior to the site assessment to identify potential biodiversity constraints:

- State Vegetation Type Map – Tweed LGA Vegetation 2012¹ (VIS ID 3912) (DPIE 2012);
- Bionet Atlas of NSW Wildlife² (database search for BC Act listed threatened species records within 10 km of the site);
- Biodiversity Values Map and Threshold Tool³ (BMAT) (DPIE 2019); and
- Protected Matters Search Tool⁴ (database search for EPBC Act listed species and ecological communities within 1 km of the site).

The site was surveyed by Chris Beavon (Associate Ecologist) on 19 February 2020 to determine the potential for biodiversity constraints identified during the desktop review to occur. The site was inspected over approximately three hours to identify the presence of any listed ecological communities, and the potential for threatened flora and flora species to occur.

The site inspection comprised a walkover to characterise native vegetation, conduct habitat assessments for threatened flora and ecological communities, and conduct searches for habitat features or signs of threatened fauna (ie nests, burrows, hollows, scats and tracks).

3 Biodiversity constraints and opportunities

3.1 Site overview

The site is located at 86 Riverview St, Murwillumbah and is legally defined as Lot 2 in Deposited Plan (DP) 578679 and Lots 5 and 6 in DP 820602. The site and surrounding local features are shown in Figure 1. The site is approximately 9 hectares and is 22 km south-west of Tweed Heads. The site is surrounded by residential, recreational, and agricultural uses. The following key land uses are immediately adjacent to the site:

- North – residences along Riverview Street and James Street and an Auto One auto parts store;
- South – ‘Kendovale’ jersey cattle farm;
- East – sporting fields including two football fields, a field hockey pitch, a cricket pitch, and a junior AFL football pitch; and
- West – residences along Riverview Street and the Murwillumbah NSW State Emergency Service (SES) Unit.

The site contains several existing buildings, sporting courts, carparks, paved surfaces agricultural plots, sporting ovals, cultivated gardens, windbreaks, small patches of native vegetation and a Hoop Pine (*Araucaria cunninghamii*) plantation. The large sporting ovals in the south of the site are comprised of

¹ Department of Planning, Industry and Environment 2012, Tweed LGA Vegetation, <https://researchdata.ands.org.au/tweed-lga-vegetation-visid-3912/1343512>

² Office of Environment and Heritage 2019, Bionet Atlas of NSW Wildlife, www.environment.nsw.gov.au/atlasapp/

³ Department of Planning, Industry and Environment 2019, Biodiversity Values Map and Threshold Tool, <https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSEMap>

⁴ Department of the Environment and Energy 2019, Protected Matters Search Tool, www.environment.gov.au/pmst

maintained grass. These cleared and developed areas do not contain biodiversity values, and therefore present no development constraint.

3.2 Landscaped gardens and plantations

Vegetation at the site consists of planted garden beds, planted native revegetation areas, windbreaks and plantations containing a variety of trees and shrubs. Some trees and shrubs are locally endemic to the region, some are native but not locally endemic, while others are exotic Table 3.1.

The planted garden beds, native revegetation areas and windbreaks do not pose a high constraint to development and provide limited habitat and resources for fauna. The vegetation present is not considered to represent any native plant community type due to the high level of disturbance, extensive landscape plantings and high occurrence of introduced species.



Source: EMM (2020); Nearmap 2020); DFSI (2017); Tweed Shire Council (2012); GA (2011); ASGC (2006)



Location map

- Site area
- Major road
- Local road
- Watercourse/drainage line
- Cadastral boundary
- Local government area (refer inset)
- NPWS reserve (refer inset)
- Tweed LGA vegetation 2012 (VIS ID 3912)
- 998 - Not assessed (not determined)
- 1004 - Camphor Laurel dominant Closed to Open
- 1005 - Native plantation (not determined)

Murwillumbah School upgrade
Biodiversity constraints assessment
Figure 1

Table 3.1 Flora species inventory

Species name	Common name	Origin	NSW Weed Status	BC Act listing	EPBC listing
<i>Acmena smithii</i>	Lilly pilly	Exotic/ Cultivated			
<i>Agathis robusta</i>	Kauri Pine	Non-endemic	Cultivated		
<i>Ageratina riparia</i>	Mistflower	Exotic	General Biosecurity Duty		
<i>Alchornea ilicifolia</i>	Native Holly	Endemic			
<i>Aleurites remyi</i>	Candle Nut	Exotic/ Cultivated	Naturalised		
<i>Ambrosia artemisiifolia</i>	Annual ragweed	Exotic	General Biosecurity Duty		
<i>Anredera cordifolia</i>	Madiera vine	Exotic	Prohibition on dealings		
<i>Aphananthe philippinensis</i>	Rough-leaved elm	Endemic			
<i>Araucaria bidwillii</i>	Bunya pine	Endemic/ Cultivated			
<i>Araucaria cunninghamii</i>	Hoop pine	Endemic/ Plantation			
<i>Archontophoenix cunninghamiana</i>	Bangalow palm	Endemic			
<i>Asparagus aethiopicus</i>	Ground asparagus	Exotic/ Introduced	Prohibition on dealings		
<i>Banksia integrifolia</i>	Coast Banksia	Endemic/ Cultivated			
<i>Bidens pilosa</i>	Cobblers Pegs	Exotic	Naturalised		
<i>Brachychiton acerifolius</i>	Flame Tree	Endemic			
<i>Brachychiton populneus</i>	Kurrajong	Endemic			
<i>Callisia fragrans</i>	Inch Plant	Exotic	Cultivated		
<i>Cardiospermum grandiflorum</i>	Balloon Vine	Exotic	General Biosecurity Duty		
<i>Carya illinoensis</i>	Pecan	Exotic/ Cultivated	Cultivated		
<i>Castanospermum australe</i>	black bean	Endemic			
<i>Castanospora alphandii</i>	Brown tamarind	Endemic			
<i>Celtis sinensis</i>	Chinese celtis	Exotic	Regional Recommended Measure: Containment		
<i>Centella asiatica</i>	Gotu Cola	Endemic			
<i>Chloris virgata</i>	Feathertop Rhodes Grass	Exotic	Naturalised		
<i>Cinnamomum camphora</i>	Camphor laurel	Exotic	General Biosecurity Duty		
<i>Cirsium vulgare</i>	Spear Thistle	Exotic	Naturalised		
<i>Coffea arabica</i>	Coffee	Exotic/ Cultivated	Cultivated		
<i>Commelina cyanea</i>	Scurvy Weed	Endemic			
<i>Corymbia citriodora</i>	Lemon-scented Gum	Endemic			
<i>Corymbia intermedia</i>	Pink bloodwood	Endemic			

Table 3.1 Flora species inventory

Species name	Common name	Origin	NSW Weed Status	BC Act listing	EPBC listing
<i>Corymbia torelliana</i>	Cadaghi	Non-endemic	Cultivated		
<i>Cupaniopsis anacardioides</i>	Tuckeroo	Endemic			
<i>Cycas revoluta</i>	Sago Palm	Exotic	Cultivated		
<i>Cynodon dactylon</i>	Couch	Endemic/ Cultivated			
<i>Davidsonia jerseyana</i>	Davidson Plum	Endemic		Endangered	Endangered
<i>Delonix regia</i>	Royal Poinciana	Exotic	Naturalised		
<i>Desmodium uncinatum</i>	Silver-leaved Desmodium	Exotic	Naturalised		
<i>Digitaria ciliaris</i>	Summer Grass	Exotic	Naturalised		
<i>Digitaria didactyla</i>	Queensland Blue Couch	Endemic/ Cultivated			
<i>Dolichandra unguis-cati</i>	Cat's Claw Creeper	Exotic	Prohibition on dealings		
<i>Dracaena marginata</i>	Dracaena	Exotic / Cultivated			
<i>Duranta erecta</i>	Sky Flower	Exotic	Naturalised		
<i>Elaeocarpus grandis</i>	Blue Quandong	Endemic			
<i>Elaeocarpus reticulatus</i>	Blueberry Ash	Endemic			
<i>Endiandra pubens</i>	Hairy Walnut	Endemic			
<i>Eucalyptus microcorys</i>	Tallowwood	Endemic			
<i>Eucalyptus tereticornis</i>	Forest Red Gum	Endemic			
<i>Eugenia uniflora</i>	Brazil Cherry	Exotic	Naturalised		
<i>Ficus coronata</i>	Creek Sandpaper Fig	Endemic			
<i>Ficus fraseri</i>	Sandpaper Fig	Endemic			
<i>Ficus obliqua</i>	Small-leaved Fig	Endemic			
<i>Flindersia australis</i>	Crows Ash	Endemic			
<i>Flindersia schottiana</i>	Bumpy Ash	Endemic			
<i>Fraxinus angustifolia</i>	Desert ash	Exotic	Naturalised		
<i>Geitonoplesium cymosum</i>	Scrambling Lily	Endemic			
<i>Glochidion ferdinandi</i>	Cheese Tree	Endemic			
<i>Gmelina leichhardtii</i>	White Beech	Endemic			
<i>Guioa semiglauca</i>	Guioa	Endemic			
<i>Hardenbergia violacea</i>	False Sarsaparilla	Endemic			
<i>Harpullia hillii</i>	Blunt-leaved Tulipwood	Endemic			
<i>Harpullia pendula</i>	Tulipwood	Endemic			
<i>Hovea acutifolia</i>	Hovea	Endemic			
<i>Hypoestes phyllostachya</i>	Polka Dot Plant	Exotic	Naturalised		
<i>Inga edulis</i>	Ice Cream Bean	Exotic	Cultivated		
<i>Ipomoea cairica</i>	Coastal morning glory	Exotic	Naturalised		

Table 3.1 Flora species inventory

Species name	Common name	Origin	NSW Weed Status	BC Act listing	EPBC listing
<i>Ipomoea plebeia</i>	Bellvine	Endemic			
<i>Jacaranda mimosifolia</i>	Jacaranda	Exotic	Naturalised		
<i>Jagera pseudorhus</i>	Foam Bark Tree	Endemic			
<i>Lagerstroemia indica x fauriei</i>	Crepe Myrtle	Exotic	Cultivated		
<i>Lantana camara</i>	Lantana	Exotic	Prohibition on dealings		
<i>Libidibia ferrea</i>	Leopard Tree	Exotic	Cultivated		
<i>Ligustrum sinense</i>	Small-leaved Privet	Exotic	General Biosecurity Duty		
<i>Lobelia purpurascens</i>	Whiteroot	Endemic			
<i>Lomandra longifolia</i>	Spiny-headed mat-rush	Endemic			
<i>Maclura cochinchinensis</i>	Cockspur Thorn	Endemic			
<i>Macroptilium atropurpureum</i>	Siratro	Exotic	Naturalised		
<i>Mallotus philippensis</i>	Red Kamala	Endemic			
<i>Malva parviflora</i>	Small-flowered Mallow	Exotic	Naturalised		
<i>Mangifera indica</i>	Mango	Exotic/ Cultivated	Naturalised		
<i>Megathyrsus maximus</i>	Guinea Grass	Exotic	Naturalised		
<i>Melia azedarach</i>	White Cedar	Endemic			
<i>Monstera deliciosa</i>	Fruit Salad Plant	Exotic/ Cultivated	Naturalised		
<i>Morus alba</i>	Mulberry	Cultivated	Naturalised		
<i>Murraya paniculata</i>	Murraya	Introduced/ Cultivated	Naturalised		
<i>Neolitsea dealbata</i>	Hairy-leaved Bolly Gum	Endemic			
<i>Neonotonia wightii</i>	Glycine	Exotic	Naturalised		
<i>Ochna serrulata</i>	Mickey mouse plant	Exotic	Naturalised		
<i>Oplismenus aemulus</i>	Basket grass	Endemic			
<i>Pandorea pandorana</i>	Wonga Wonga Vine	Endemic			
<i>Parsonsia straminea</i>	Monkey rope vine	Endemic			
<i>Paspalum dilatatum</i>	Paspalum	Exotic	Naturalised		
<i>Paspalum distichum</i>	Water couch	Endemic/ Cultivated			
<i>Passiflora suberosa</i>	Cork passionflower	Exotic	Naturalised		
<i>Passiflora subpeltata</i>	White passionflower	Exotic	Naturalised		
<i>Pellaea viridis</i>	Green Cliff Brake	Exotic	Naturalised		
<i>Persea americana</i>	Avocado	Exotic/ Cultivated	Cultivated		
<i>Phyllanthus tenellus</i>	Hen and chicken	Exotic	Naturalised		
<i>Physalis peruviana</i>	Cape Gooseberry	Exotic	Naturalised		
<i>Pinus elliotii</i>	Slash pine	Exotic	Naturalised		

Table 3.1 Flora species inventory

Species name	Common name	Origin	NSW Weed Status	BC Act listing	EPBC listing
<i>Planchonella chartacea</i>	Thin-leaved Coondoo	Endemic/ Cultivated			
<i>Platyserium bifurcatum</i>	Elkhorn fern	Endemic			
<i>Podocarpus elatus</i>	Plum Pine	Endemic			
<i>Psidium guajava</i>	Common guava	Exotic/ Cultivated	Naturalised		
<i>Pyrrosia rupestris</i>	Rock Felt Fern	Endemic			
<i>Rhodamnia rubescens</i>	Scrub Turpentine	Endemic			
<i>Rhodosphaera rhodanthema</i>	Deep Yellow Wood	Endemic			
<i>Schefflera actinophylla</i>	Umbrella tree	Non-endemic	Naturalised		
<i>Senna pendula</i> var. <i>glabra</i>	Easter Cassia	Exotic	General Biosecurity Duty		
<i>Setaria palmifolia</i>	Palm grass	Exotic	Naturalised		
<i>Setaria sphacelata</i>	South African Pigeon Grass	Exotic	Naturalised		
<i>Sida rhombifolia</i>	Paddy's Lucerne	Exotic	Naturalised		
<i>Sloanea australis</i>	Blush Carrabeen	Endemic/ Cultivated			
<i>Solanum chrysotrichum</i>	Giant Devil's Fig	Exotic	Regional Recommended Measure: Containment		
<i>Solanum mauritianum</i>	Wild Tobacco Bush	Exotic	Naturalised		
<i>Solanum nigrum</i>	Black-berry nightshade	Exotic	Naturalised		
<i>Sporobolus creber</i>	Slender rat's tail grass	Endemic			
<i>Stenocarpus sinuatus</i>	Firewheel Tree	Endemic			
<i>Streblus brunonianus</i>	Whalebone Tree	Endemic			
<i>Syagrus romanzoffiana</i>	Queen palm	Exotic	Cultivated		
<i>Tradescantia fluminensis</i>	Trad	Exotic	General Biosecurity Duty		
<i>Tradescantia zebrina</i>	silvery inch plant	Exotic	Naturalised		
<i>Triadica sebifera</i>	Chinese Tallow	Exotic	Regional Recommended Measure: Containment		
<i>Waterhousea floribunda</i>	Weeping lilly pillly	Endemic/ Cultivated			

3.3 Listed ecological communities

The State Vegetation Type Map – Tweed LGA Vegetation 2012⁵ (VIS ID 3912) (DPIE 2012) does not predict ecological communities listed under the BC Act to occur at the site. However, two areas of vegetation

⁵ Department of Planning, Industry and Environment 2012, Tweed LGA Vegetation, <https://researchdata.and.s.org.au/tweed-lga-vegetation-visitid-3912/1343512>

mapped on site (Figure 1) were designated 'Not assessed (not determined)' and an additional area was mapped as 'Native Plantation (not determined)'.

The area of vegetation designated 'Not assessed (not determined)' located in the south west of the site was confirmed as an extension of the area mapped as 'Native Plantation (not determined)'. The area of vegetation designated 'Not assessed (not determined)' located in the south east of the site was confirmed as a Slash Pine (*Pinus elliottii*) with very sparse understorey comprising a mix of native and exotic species. The area of vegetation designated 'Native Plantation (not determined)' was confirmed as a Hoop Pine (*Araucaria cunninghamii*) plantation. The sparse understorey comprises a mix of native and exotic species. These plantations do not represent any native plant community type or ecological community listed under the BC Act.

Two ecological communities listed under the EPBC Act are predicted to occur within 1 km of the site. No critically endangered ecological community listed under the EPBC Act were identified within the site.

3.4 Threatened flora habitat assessment

Fifty-five threatened flora species have previously been recorded within 10 km of the site on the Bionet Atlas of NSW Wildlife. Table 3.2 provides an assessment of their likely occurrence within the site based on desktop assessments and field observations of habitat. Due to a large portion of the site being highly disturbed, and landscaped gardens and windbreaks present do not support preferred habitat for target threatened flora species, the site is not predicted to support any naturally occurring listed threatened flora species that are endemic to the region. Accordingly, threatened flora species do not pose a development constraint.

Three individual specimens of Davidson's Plum (*Davidsonia jerseyana*) were identified within the site. Davidson Plum is listed as an Endangered species under the EPBC Act and Endangered under the BC Act. Although this species is endemic to northern NSW, evidence from construction of existing buildings, landscape gardening and historical imagery indicates that this species has been planted within the study area.

Table 3.2 Threatened flora habitat assessment

Species	BC Act conservation status	EPBC Act conservation status	Likelihood of occurrence within the site
<i>Acacia bakeri</i> - Marblewood	Vulnerable	Not listed	Unlikely. The site does not contain its preferred habitat, wet sclerophyll eucalypt forest and rainforest.
<i>Acalypha eremorum</i> - Acalypha	Endangered	Not listed	Unlikely. The site does not contain its preferred habitat, subtropical and dry rainforest.
<i>Angiopteris evecta</i> – Giant fern	Endangered	Not listed	Unlikely. The site does not contain its preferred habitat, subtropical rainforest in the Tweed Valley.
<i>Archidendron hendersonii</i> – White lace flower	Vulnerable	Not listed	Unlikely. The site does not contain its preferred habitat, riverine and lowland subtropical rainforest, north from Alstonville.
<i>Bosistoa transversa</i> - Yellow Satinheart	Vulnerable	Vulnerable	Unlikely. The site does not contain its preferred habitat, rainforest to an altitude of 150 m ASL.
<i>Caesalpinia bonduc</i> - Knicker Nut	Endangered	Not listed	Unlikely. The site does not contain its preferred habitat, on/ near waterways.

Table 3.2 Threatened flora habitat assessment

Species	BC Act conservation status	EPBC Act conservation status	Likelihood of occurrence within the site
<i>Cassia marksiana</i>	Endangered	Not listed	Unlikely. The site does not contain its preferred habitat, littoral and riverine rainforest, north from Brunswick River.
<i>Corokia whiteana</i> - Corokia	Vulnerable	Vulnerable	Unlikely. The site does not contain its preferred habitat, warm-temperate rainforest on poorer soils; rare, known only from the Nightcap Range.
<i>Cryptocarya foetida</i> - Stinking Cryptocarya	Vulnerable	Vulnerable	Unlikely. The site does not contain its preferred habitat, littoral rainforest.
<i>Cupaniopsis serrata</i> - Smooth Tuckeroo	Endangered	Not listed	Unlikely. The site does not contain its preferred habitat, subtropical and dry rainforest, Tweed Valley, very rare in NSW.
<i>Cyperus semifertilis</i> - Missionary Nutgrass	Endangered	Vulnerable	Unlikely. The site does not contain its preferred habitat, light gaps in wet sclerophyll forest and rainforest margins.
<i>Davidsonia jerseyana</i> - Davidson's Plum	Endangered	Endangered	Three individuals were recorded on the site. This species is endemic to the region, however, is widely planted. Evidence supports these individuals were planted. It is unlikely this species would be naturally occurring on site.
<i>Davidsonia johnsonii</i> - Smooth Davidson's Plum	Endangered	Endangered	Unlikely. The site does not contain its preferred habitat, subtropical rainforest or on the margin with wet sclerophyll forest.
<i>Dendrocnide moroides</i> – Gympie stinger	Endangered	Not listed	Unlikely. The site does not contain its preferred habitat, in rainforest north of the Clarence River, rare in NSW.
<i>Desmodium acanthocladum</i> – Thorny Pea	Vulnerable	Vulnerable	Unlikely. The site does not contain its preferred habitat, Grows mainly along rivers in Lismore-Grafton district.
<i>Diospyros mabacea</i> – Red-fruited ebony	Endangered	Endangered	Unlikely. The site does not contain its preferred habitat, lowland subtropical rainforest.
<i>Diospyros yandina</i> – Shiny-leaved ebony	Endangered	Not listed	Unlikely. The site does not contain its preferred habitat, understorey of riverine or lowland subtropical rainforest.
<i>Diploglottis campbellii</i> – Small-leaved tamarind	Endangered	Endangered	Unlikely. The site does not contain its preferred habitat, riverine rainforest.
<i>Doryanthes palmeri</i> – Giant spear lily	Vulnerable	Not listed	Unlikely. The site does not contain its preferred habitat, Coastal ranges that are part of the Mt Warning Caldera.
<i>Drynaria rigidula</i> – Basket fern	Endangered	Not listed	Unlikely. This species is primarily found in rainforest habitats. No records exist on the site.
<i>Elaeocarpus sedentarius</i> – Minyon Quandong	Endangered	Endangered	Unlikely. This very rare species is only known from the Whian Whian and Mount Jerusalem areas.
<i>Elaeocarpus williamsianus</i> – Hairy Quandong	Endangered	Endangered	Unlikely. This species is only known from nine locations within the Tweed Valley and Byron Bay Local Government Areas. The species has not been recorded on the site.

Table 3.2 Threatened flora habitat assessment

Species	BC Act conservation status	EPBC Act conservation status	Likelihood of occurrence within the site
<i>Eleocharis tetraquetra</i> – Square-stemmed Spike-rush	Endangered	Not listed	Unlikely. This species is not known to occur on the site.
<i>Endiandra floydii</i> – Crystal Creek Walnut	Endangered	Endangered	Unlikely. Occurs in warm-temperate and subtropical rainforest. No records exist on the site.
<i>Endiandra hayesii</i> – Rusty Rose Walnut	Vulnerable	Vulnerable	Unlikely. Habitat consists of lowland subtropical rainforest. No records are known from the site.
<i>Endiandra muelleri</i> subsp. <i>Bracteata</i> – Green-leaved Rose Walnut	Endangered	Not listed	Unlikely. This species is found in a wide range of habitats from subtropical rainforest to disturbed forests. No records exist on or near the site.
<i>Floydia praealta</i> – Ball Nut	Vulnerable	Vulnerable	Unlikely. Occurs within riparian and subtropical rainforest habitats. No records or habitat exist on the site.
<i>Fontainea australis</i> – Southern Fontainea	Vulnerable	Vulnerable	Unlikely. Primarily occurs in lowland subtropical rainforest. No known records exist for the site.
<i>Geodorum densiflorum</i> – Pink Nodding Orchid	Endangered	Not listed	Unlikely. Grows in dry sclerophyll forests and coastal swamp forests on sandy substrates. Suitable habitat does occur on the site.
<i>Grevillea hilliana</i> – White Yiel Yiel	Endangered	Not listed	Unlikely. This species grows within subtropical rainforest and remaining populations in NSW are known only from Mt Chincogan and in patches of remnant habitat near Terranora.
<i>Hicksbeachia pinnatifolia</i> – Red Boppel Nut	Vulnerable	Vulnerable	Unlikely. Preferred habitats include subtropical rainforest, moist eucalypt woodland and <i>Lophostemon confertus</i> vegetation communities. No records or preferred habitat exist on the site.
<i>Isoglossa eranthemoides</i> - Isoglossa	Endangered	Endangered	Unlikely. This species has a highly restricted geographical range and is only known from a limited number of locations which do not include the site. The known populations occur within lowland subtropical rainforest.
<i>Lepiderema pulchella</i> – Fine-leaved Tuckeroo	Vulnerable	Not listed	Unlikely. Occurs in lowland subtropical rainforest with most known remaining populations existing on private tenure within the Tweed Valley. No previous records exist on the site.
<i>Lindsaea brachypoda</i> – Short-footed Screw Fern	Endangered	Not listed	Unlikely. Grows in very moist areas of subtropical rainforest. Within NSW, the species has only been recorded from a limited number of sites including Nightcap NP, Mooball, Mullumbimby, and Tumbulgum, with no known records for the species on the site.

Table 3.2 Threatened flora habitat assessment

Species	BC Act conservation status	EPBC Act conservation status	Likelihood of occurrence within the site
<i>Macadamia tetraphylla</i> – Rough-shelled Bush Nut	Vulnerable	Vulnerable	Unlikely. Naturally found in lowland subtropical rainforest. Records away from this habitat are considered most likely to be propagated populations. No known records or natural habitat occur on the site.
<i>Marsdenia longiloba</i> – Slender Marsdenia	Endangered	Vulnerable	Unlikely. Preferred habitats of subtropical rainforest or adjacent moist eucalypt woodland does not occur on the site.
<i>Maundia triglochinoidea</i>	Vulnerable	Not listed	Unlikely. Habitat consists of wet areas including freshwater swamps, dams, creeks, and channels. These habitats do not occur on the site.
<i>Mitrasacme pygmaea</i> – Pygmy Bishop’s Hat	Endangered	Not listed	Unlikely. The species extent in NSW is only known from rocky outcrops within Wollumbin National Park.
<i>Niemeyera whitei</i> – Rusty Plum	Vulnerable	Not listed	Unlikely. It is primarily found in subcoastal regions within dense rainforest gullies and moist eucalypt forests.
<i>Oberonia titania</i> – Red-flowered King of the Fairies	Vulnerable	Not listed	Unlikely. Preferred habitat in the southern extant of this species range includes subtropical rainforest communities and Paperpark swamps. These habitats do not occur on the site.
<i>Ochrosia moorei</i> – Southern Ochrosia	Endangered	Endangered	Unlikely. This species grows in subtropical rainforest communities including riparian zones. No records or suitable habitat exists on the site.
<i>Owenia cepiodora</i> – Onion Cedar	Vulnerable	Vulnerable	Unlikely. The species is found within subtropical and dry rainforest communities in association with basalt derived soils. Preferred habitat and records of this species do not occur on the site.
<i>Ozothamnus vagans</i> – Wollumbin Dogwood	Endangered	Vulnerable	Unlikely. Only known to occur at elevations above 500 m ASL.
<i>Peristeranthus hillii</i> – Brown Fairy-chain Orchid	Vulnerable	Not listed	Unlikely to occur. This epiphytic orchid is primarily associated with coastal and near-coastal littoral or subtropical rainforest communities. No records or habitat is known from the site.
<i>Pomaderris notata</i> – McPherson Range Pomaderris	Vulnerable	Not listed	Unlikely. Grows within montane heathlands and scrubby rainforest communities in association with basalt. Suitable habitat does not occur on the site.
<i>Randia moorei</i> – Spiny Gardenia	Endangered	Endangered	Unlikely. The species is found in most rainforest type communities, particularly those with canopies dominated by Brush Box or Hoop Pine. Suitable habitat does not occur on the site.

Table 3.2 Threatened flora habitat assessment

Species	BC Act conservation status	EPBC Act conservation status	Likelihood of occurrence within the site
<i>Rhodamnia rubescens</i> – Scrub Turpentine	Critically Endangered	Not listed	Unlikely. Grows in wet sclerophyll forests and range of rainforest communities primarily associated with volcanic or sedimentary soil types. Known records or suitable habitats do not occur on the site.
<i>Rhodomyrtus psidioides</i> – Native guava	Critically Endangered	Not listed	Unlikely. This pioneer species is found in coastal and sub-coastal wet eucalypt woodlands and rainforest communities, primarily associated with creeks or drainage lines. Habitat preferred by this species does not occur on the site.
<i>Rhynchosia acuminatissima</i> – Pointed Trefoil	Vulnerable	Not listed	Unlikely. This species is only known from nine locations in NSW. It almost exclusively grows in or near dry rainforest communities dominated by Hoop Pine. No records or suitable habitat exist on the site.
<i>Sarcochilus fitzgeraldii</i> – Ravine Orchid	Vulnerable	Vulnerable	Unlikely. Grows primarily on rocky substrates amongst organic matter within gorges and ravines above 500 m ASL.
<i>Symplocos baeuerlenii</i> – Small-leaved Hazelwood	Vulnerable	Vulnerable	Unlikely. This species has been recorded from subtropical rainforests in association with rhyolite derived soils. Suitable habitat does not occur on the site.
<i>Syzygium hodgkinsoniae</i> – Red Lilly Pilly	Vulnerable	Vulnerable	Unlikely. This species is found within subtropical rainforest communities in association with highly fertile basaltic or alluvial soils. Suitable habitat or known records do not occur on the site.
<i>Syzygium moorei</i> - Durobby	Vulnerable	Vulnerable	Unlikely. This species primarily occurs in lowland subtropical rainforests but has also been recorded as isolated paddock trees. No records are known from the site.
<i>Tinospora tinosporoides</i> – Arrow-head Vine	Vulnerable	Not listed	Unlikely. Known from wet areas of subtropical rainforest on basaltic soils. No records exist on the site.
<i>Triflorensia cameronii</i> – Cameron’s Tarena	Endangered	Not listed	Unlikely. The site does not contain its preferred habitat, dry rainforest on volcanic soils derived from basalt.

3.5 Threatened fauna habitat assessment

Sixty threatened fauna species have previously been recorded within 10 km of the site on the Bionet Atlas of NSW Wildlife. Table 3.3 assesses their likelihood of occurrence within the site. Based on desktop assessments and field observations of habitat, the site has potential to provide habitat for mobile threatened species such as Grey-headed Flying-fox, Rose-crowned Fruit Dove and Northern Free-tailed Bat. There is also potential for migratory species listed under the EPBC Act Barred Cuckoo-shrike, White-eared Monarch, White-throated Needletail, Rainbow Bee-eater to occasionally use vegetation at the site.

Table 3.3 Threatened fauna habitat assessment

Species	BC Act conservation status	EPBC Act conservation status	Likelihood of occurrence within the site
Amphibians			
Pouched Frog (<i>Assa darlingtonia</i>)	Vulnerable	Not Listed	Unlikely. The site does not contain preferred habitat of high-elevation forests above 800 m.
Fleay's Barred Frog (<i>Mixophyes fleayi</i>)	Endangered	Endangered	Unlikely. This species occurs in rainforest and wet sclerophyll woodlands with rocky creeks which are not present on the site.
Giant Barred Frog (<i>Mixophyes iteratus</i>)	Endangered	Endangered	Unlikely. The site does not contain its preferred habitat of riparian habitats including rainforest and eucalypt woodland.
Loveridge's Frog (<i>Philoria loveridgei</i>)	Endangered	Not Listed	Unlikely. Within the region, this species is mostly restricted to permanently wet areas within protected areas including Nightcap National Park, Wollumbin National Park and the Border Ranges.
Birds			
Pale-vented Bush-hen (<i>Amaurornis moluccana</i>)	Vulnerable	Not Listed	Unlikely. Dense wetland habitats preferred by this species are not present.
Cattle Egret (<i>Ardea ibis</i>)	Not Listed	Migratory	Unlikely. The site is in proximity to preferred habitat, however preferred habitat does not occur on the site.
Wedge-tailed Shearwater (<i>Ardenna pacificus</i>)	Not Listed	Migratory	Unlikely. This pelagic species prefers inshore and offshore oceanic habitats.
Bush Stone-curlew (<i>Burhinus grallarius</i>)	Endangered	Not Listed	Unlikely. Preferred habitat does not occur on the site.
Red-tailed Black-Cockatoo (coastal subspecies) (<i>Calyptorhynchus banksii banksia</i>)	Critically Endangered	Not Listed	Unlikely. Limited recent records of this species exist in the region and preferred habitat does not exist on the site.
Glossy Black-Cockatoo (<i>Calyptorhynchus lathami</i>)	Vulnerable	Not Listed	Unlikely. Habitats with <i>Allocasuarina spp.</i> do not exist on the site.
White-eared Monarch (<i>Carterornis leucotis</i>)	Vulnerable	Not Listed	Low potential. This species prefers areas of rainforest and other dense habitats such riparian vegetation which does not occur on the site.
Spotted Harrier (<i>Circus assimilis</i>)	Vulnerable	Not listed	Unlikely. This species has potential to occur on adjacent open grasslands but is unlikely on the site.
Brown Treecreeper (eastern subspecies) (<i>Climacteris picumnus victoriae</i>)	Vulnerable	Not listed	Unlikely. Open woodland habitats with fallen-timber does not occur on the site.
Barred Cuckoo-shrike (<i>Coracina lineata</i>)	Vulnerable	Not Listed	Low potential. A frugivorous species that may utilise the rainforest tree species on the site, particularly <i>Ficus</i> species.
Coxen's Fig-Parrot (<i>Cyclopsitta diophthalma coxeni</i>)	Critically Endangered	Endangered	Unlikely. This species is extremely rare and no recent verified records exist.
Varied Sittella (<i>Daphoenositta chrysoptera</i>)	Vulnerable	Not listed	Unlikely to occur. Although suitable habitat is potentially present, the forest is a small patch that is highly isolated from other remnant areas.

Table 3.3 Threatened fauna habitat assessment

Species	BC Act conservation status	EPBC Act conservation status	Likelihood of occurrence within the site
Black-necked Stork (<i>Ephippiorhynchus asiaticus</i>)	Endangered	Not listed	Unlikely. The site does not contain its preferred habitat, comprising Floodplain wetlands.
Red Goshawk (<i>Erythrotriorchis radiatus</i>)	Critically Endangered	Vulnerable	Unlikely. This species has undergone an extreme range contraction and is considered regionally extinct.
Beach Stone-curlew (<i>Esacus magnirostris</i>)	Critically Endangered	Not Listed	Unlikely. This species is restricted to coastal beaches and estuarine systems which do not occur on the site.
Latham's Snipe (<i>Gallinago hardwickii</i>)	Not Listed	Migratory	Unlikely. Wetlands habitats preferred by the species do not occur on the site.
White-bellied Sea Eagle (<i>Haliaeetus leucogaster</i>)	Vulnerable	Marine	Unlikely. This species may only utilise the airspace over the site.
Little Eagle (<i>Hieraaetus morphnoides</i>)	Vulnerable	Not Listed	Unlikely. This species may only utilise the airspace over the site.
White-throated Needletail (<i>Hirundapus caudacutus</i>)	Not Listed	Migratory	Likely. This species is highly aerial and will forage over a broad range of habitats.
Comb-crested Jacana (<i>Irediparra gallinacea</i>)	Vulnerable	Not Listed	Unlikely. This species is restricted to wetlands with floating vegetation which do not occur on the site.
Black Bittern (<i>Ixobrychus flavicollis</i>)	Vulnerable	Not listed	Unlikely. The site does not contain its preferred habitat, comprising terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation.
Mangrove Honeyeater (<i>Lichenostomus fasciolaris</i>)	Vulnerable	Not Listed	Unlikely. This species is primarily restricted to mangrove habitats which do not exist on the site.
Albert's Lyrebird (<i>Albert's Lyrebird</i>)	Vulnerable	Not Listed	Unlikely. This species is restricted to rainforest and wet sclerophyll forests.
Rainbow Bee-eater (<i>Rainbow Bee-eater</i>)	Not Listed	Migratory	Likely. This species occurs in a broad range of habitats and has been recorded nearby.
Powerful Owl (<i>Ninox strenua</i>)	Vulnerable	Not listed	Unlikely. The site does not contain its preferred habitat, comprising hollow-bearing trees that contain prey species, and are used for nests.
Eastern Curlew (<i>Numenius madagascariensis</i>)	Not listed	Critically endangered	Unlikely. The site does not contain its preferred habitat, comprising sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass.
Blue-billed Duck (<i>Oxyura australis</i>)	Vulnerable	Not listed	Unlikely. This species is restricted to deep wetland habitats such as lakes and dams which do not occur on the site.
Olive Whistler (<i>Pachycephala olivacea</i>)	Vulnerable	Not listed	Unlikely. This species is restricted to high elevations associated with <i>Nothofagus moorei</i> in the northern section of their range.

Table 3.3 Threatened fauna habitat assessment

Species	BC Act conservation status	EPBC Act conservation status	Likelihood of occurrence within the site
Eastern Osprey (<i>Pandion cristatus</i>)	Vulnerable	Marine, Migratory	Unlikely. The site does not contain its preferred habitat, comprising coastal areas, especially the mouths of large rivers, lagoons and lakes.
Marbled Frogmouth (<i>Podargus ocellatus</i>)	Vulnerable	Not listed	Unlikely. This species is restricted to areas of rainforests, particularly dense gullies or creeks exhibiting high densities of Palms such as <i>Archontophoenix cunninghamiana</i> .
Wompoo Fruit-dove (<i>Ptilinopus magnificus</i>)	Vulnerable	Not listed	Unlikely. Mostly restricted to rainforest habitats.
Rose-crowned Fruit-dove (<i>Ptilinopus regina</i>)	Vulnerable	Not listed	Potential. This frugivorous species prefers rainforests and other dense habitats but will also utilise isolated areas of fruiting trees including introduced species such as <i>Cinnamomum camphora</i> .
Superb Fruit-dove (<i>Ptilinopus superbus</i>)	Vulnerable	Not listed	Unlikely. The site does not contain its preferred habitat, comprising rainforest and similar closed forests.
Red-backed Button-quail (<i>Turnix maculosus</i>)	Vulnerable	Not listed	Unlikely. This species primarily occurs in dense grasslands and swampy, coastal heathlands.
Masked Owl (<i>Tyto novaehollandiae</i>)	Vulnerable	Not listed	Unlikely. The preferred habitat of tall eucalypt woodland with hollow bearing trees does not occur on the site.
Sooty Owl (<i>Tyto tenebricosa</i>)	Vulnerable	Not listed	Unlikely. Preferred habitat of tall wet sclerophyll forest does not occur on the site.
Mammals			
Spotted-tailed Quoll (<i>Dasyurus maculatus</i>)	Vulnerable	Endangered	Unlikely. Preferred habitat of wet sclerophyll forest does not occur on the site.
Eastern Coastal Free-tailed Bat (<i>Micronomus norfolkensis</i>)	Vulnerable	Not Listed	Unlikely. The site does not contain its preferred habitat, comprising dry sclerophyll forest, woodland, swamp forests and mangrove forests.
Little Bent-winged Bat (<i>Miniopterus australis</i>)	Vulnerable	Not listed	Unlikely. This species prefers to forage in densely vegetated habitats that are not found on the site. In addition, caves or culverts in which this species would roost area absent.
Large Bent-winged Bat (<i>Miniopterus orianae oceanensis</i>)	Vulnerable	Not listed	Unlikely. This species prefers to forage in densely vegetated habitats that are not found on the site. In addition, caves or culverts in which this species would roost area absent.
Southern Myotis (<i>Myotis macropus</i>)	Vulnerable	Not listed	Unlikely. The site does not contain its preferred habitat, comprising large, still waterbodies with adjacent hollow trees, caves or culverts for roosting.
Eastern Tube-nosed Bat (<i>Nyctimene robinsoni</i>)	Vulnerable	Not listed	Unlikely. This species favours dense riparian vegetation such as gallery rainforest or moist eucalypt woodlands with an understory dominated by rainforest species.

Table 3.3 Threatened fauna habitat assessment

Species	BC Act conservation status	EPBC Act conservation status	Likelihood of occurrence within the site
Eastern Long-eared Bat (<i>Nyctophilus bifax</i>)	Vulnerable	Not listed	Unlikely. Occurs primarily in lowland subtropical rainforest or moist eucalypt woodlands which do not occur on the site.
Northern Free-tailed Bat (<i>Ozimops lumsdenae</i>)	Vulnerable	Not listed	Potential. Known to occur in a range of habitats including urban and peri-urban environments. This species has been recorded roosting in both tree hollows and buildings.
Greater Glider (<i>Petaurus volans</i>)	Not listed	Vulnerable	Unlikely to occur. Woodlands with high eucalypt diversity and widespread hollow bearing trees do not occur on the site.
Yellow-bellied Glider (<i>Petaurus australis</i>)	Vulnerable	Not listed	Unlikely. Preferred habitat of tall wet sclerophyll forest does not occur on the site.
Squirrel Glider (<i>Petaurus norfolcensis</i>)	Vulnerable	Not listed	Unlikely. Although the remnant forest provides potentially suitable habitat, the patch is small and very isolated, and therefore is unlikely to support a population of the species.
Koala (<i>Phascolarctos cinereus</i>)	Vulnerable	Vulnerable	Unlikely to occur. Although some suitable feed tree species including Swamp Mahogany, Forest Red Gum and Tallowwood have been planted at the site, the species is unlikely to occur as the site is isolated from large remnant patches and is surrounded by heavily developed areas and as such is unlikely to be occupied by Koalas.
Long-nosed Potoroo (<i>Potorous tridactylus</i>)	Vulnerable	Vulnerable	Unlikely. This species prefers coastal heathlands and sclerophyll forests with adjacent open areas for foraging. These habitats do not occur on the site.
Long-nosed Potoroo, Cobaki Lakes and Tweed Heads West population (<i>Potorous tridactylus</i>)	Endangered population/ Vulnerable	Vulnerable	Unlikely. This species prefers coastal heathlands and sclerophyll forests with adjacent open areas for foraging. These habitats do not occur on the site.
Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>)	Vulnerable	Vulnerable	Likely. This species has been previously recorded on the site and is likely to utilise the vegetation on the site such as eucalypt species when in flower and fruiting rainforest tree species. No flying-fox camps occur within the site.
Greater Broadnosed Bat (<i>Scoteanax rueppellii</i>)	Vulnerable	Not listed	Unlikely. The site does not contain its preferred habitat, comprising tall wet forests.
Common Blossom-bat (<i>Syconycteris australis</i>)	Vulnerable	Not listed	Unlikely. This species roosts primarily in littoral rainforests adjacent to foraging habitats of heathland and melaleuca wetlands. They have also been recorded foraging in other habitats such as subtropical rainforest and wet sclerophyll forest.
Red-legged Pademelon (<i>Thylogale stigmatica</i>)	Vulnerable	Not listed	Unlikely. This species prefers areas rainforest with dense undergrowth which does not exist on the site.
Reptiles			

Table 3.3 Threatened fauna habitat assessment

Species	BC Act conservation status	EPBC Act conservation status	Likelihood of occurrence within the site
White-crowned Snake (<i>Cacophis harriettae</i>)	Vulnerable	Not listed	Unlikely. This species prefers eucalypt woodlands with an abundance of groundlayer microhabitats such as litter and woody debris.
Stephens' Banded Snake (<i>Hoplocephalus stephensii</i>)	Vulnerable	Not listed	Unlikely. Mostly restricted to rainforest and eucalypt woodlands with sufficient microhabitats for shelter consisting of decorticated bark, rocks and hollow logs.

4 Potential impacts

The design of the school redevelopment is still being finalised. However, the current design concept would require removal of the Hoop Pine plantation to facilitate construction of new buildings and provide an asset protection zone. Some individual trees and shrubs may also need to be removed between existing buildings to facilitate the construction of new buildings.

Given the high degree of modification and landscaping, vegetation at the site does not represent any native plant community type or ecological community listed under the BC Act and/or EPBC Act. Accordingly, the project will not impact listed ecological communities.

Three individual specimens of Davidson's Plum (*Davidsonia jerseyana*) were identified within the site, two of which occurs between existing buildings and may require removal. Although this species is endemic to northern NSW and is a listed species, it is also widely cultivated and planted as a bush tucker plant in northern NSW. Evidence from construction of existing buildings, landscape gardening and historical imagery indicates that this species has been planted within the study area and therefore the genetic provenance of the individuals is unknown. In addition, the site is largely isolated from its preferred habitat and naturally-occurring populations and is not considered to form part of these. Accordingly, the removal a planted individual for the proposal will not affect recovery or conservation of this species.

Grey-headed Flying-fox (*Pteropus poliocephalus*) has been previously recorded on the site and is likely to forage on eucalypt species when in flower and fruiting rainforest tree species. No flying-fox camps occur within the site. The site also has potential to provide foraging habitat for other mobile threatened species including the Rose-crowned Fruit Dove and migratory species including the Barred Cuckoo-shrike, White-eared Monarch, White-throated Needletail and Rainbow Bee-eater. The potential feed trees are sparsely distributed throughout the site and their removal is unlikely to have a significant impact on this highly mobile species. Therefore, the removal of these trees for the proposal will not affect recovery or conservation of these highly mobile species.

There is potential that the Northern Free-tailed Bat may roost in existing buildings at the site. As Buildings Blocks B, C, E and S are planned to be demolished, there is potential that roosting habitat would be affected for this species. An inspection is recommended to be completed in accordance with 'Species Credit' threatened bats and their habitats⁶ prior to lodgement of the BDAR waiver to determine the potential for threatened species to roost in buildings to be demolished.

⁶ Office of Environment and Heritage 2018, 'Species Credit' threatened bats and their habitats: NSW Survey Guide for the Biodiversity Assessment Method, Office of Environment and Heritage, Sydney

5 Conclusion

The site does not contain any listed ecological community or habitat for naturally occurring threatened flora species. Two Davidson Plums are likely to be removed for the project, however these individuals are planted and do not form part of a naturally-occurring population, and therefore would not impede recovery of the species. While the Grey-headed Flying-fox and some threatened and migratory bird species have been recorded or have potential to occur at the site, they are highly mobile species that would not be significantly impacted by the removal of the Hoop Pine plantation, scattered trees and shrubs.

There is some potential that the Northern Freetail Bat may roost in existing buildings to be demolished. An inspection should be conducted in accordance with 'Species Credit' threatened bats and their habitats⁷ prior to lodgement or during the Biodiversity and Conservation Division's assessment of the BDAR waiver to determine the potential for threatened species to roost in buildings to be demolished and assist in assessment of potential impacts on the species.

Yours sincerely



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⁷ Office of Environment and Heritage 2018, 'Species Credit' threatened bats and their habitats: NSW Survey Guide for the Biodiversity Assessment Method, Office of Environment and Heritage, Sydney