28ºS ENVIRONMENTAL

Brisbane Catholic Education – Narangba College Prep to Year 12

Ecological Report

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Approval for Issue

Name	Position	Date
Mitch Taylor	Director	4th December 2024

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Acronyms

28 South – 28 South Environmental Pty Ltd.

CEMP - Construction Environmental Management Plan

CKH – Core Koala Habitat

CoMB – City of Moreton Bay

CREVNT - Critically Endangered, Endangered, Vulnerable and Near Threatened

DCCEEW - Commonwealth Department of Climate Change, Energy, the Environment and Water

DETSI - Department of Environment, Tourism, Science and Innovation

DSDILGP - Department of State Development, Infrastructure, Local Government and Planning

EPBC Act – *Environment Protection and Biodiversity Conservation Act 1999*

ESD - Ecologically Sustainable Development

ha – Hectares

LGA – Local Government Area

Master Plan – Narangba Catholic College Master Plan

Minister - Minster for the Department of State Development and Infrastructure

MLES – Matters of Local Environmental Significance

MNES – Matters of National Environmental Significance

MSES – Matters of State Environmental Significance

NC Act - *Nature Conservation Act 1992*

NJKHT – Non Juvenile Koala Habitat Tree

OSHC - Out of School Hours Care

Planning Regulation - Planning Regulation 2017 (Qld)

Planning Scheme – *Moreton Bay Planning Scheme 2016* (Version 7)

PMST - Protected Matters Search Report

Prep – Preparatory

RE – Regional Ecosystem

RVMM – Regulated Vegetation Management Map

TEC – Threatened Ecological Community

WONS - Weeds of National Significance

1. Introduction

1.1 Overview

28 South Environmental (**28 South**) has been engaged by 'The Corporation of the Trustees of the Roman Catholic Archdiocese of Brisbane – Brisbane Catholic Education' (**BCE**) (**the Proponent**) to prepare an Ecological Report for the proposed Narangba Catholic College to be submitted to the Department of Climate Change, Energy, the Environment and Water (**DCCEEW**) to assist in determining if the Proposed Action should be deemed a Controlled Action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**).

The Narangba Catholic College will provide educational opportunities for students from Preparatory (**Prep**) through to Grade 12 within the Narangba catchment (referred to herein as '**the Proposed Action**'). The Proposed Action will cater for the recent and future growth in the Narangba local area and surrounding catchment.

The Proposed Action is located over central and northern components of 2-34 and 40 Morgan Road and 156, 166, 168 and 176 Callaghan Road, Narangba, Queensland (referred to herein as the '**Site**') with its locality shown in **Figure 1** and site context shown in **Figure 2**.). The broader land holdings encompass seven lots, being:

- Lot 1 on RP207672,
- Lot 2 on RP207672,
- Lot 6 on RP78839,
- Lot 7 on RP78839,
- Lot 10 on RP78839,
- Lot 9 on RP78839, and
- Lot 1 on RP190756.

Of these allotments, the Proposed Action comprised the central and northern components. The Site's locality is shown in **Figure 1** with the Site context with regard to the broader land holdings shown in **Figure 2**. The location and extent of the Narangba Catholic College Master Plan ('the **Master Plan**') is shown in detail in **Attachment 1**, with the Proposed Action's Development Footprint occurring over 13.19 hectares (**ha**) across the central and northern components of the Site. The Development Footprint is comprised of the central and western components of the Site occurring over 10.85 ha of land; with the eastern components being comprised of the Avoidance Area (2.35 ha) along the eastern boundary where more intact mature vegetation occurs.

The Proposed Action is located within City of Moreton Bay (**CoMB**) Local Government Area (**LGA**). Pursuant to the *Moreton Bay Planning Scheme 2016* (Version 7) (**Planning Scheme**), the land parcels within the Site are zoned as follows:

- Lot 1 on RP207672, Lot 2 on RP207672, Lot 7 on RP78839 and Lot 9 on RP78839– Emerging Community (Transition) zone; and
- Lot 6 on RP78839, Lot 10 on RP78839, Lot 1 on RP190756 - 'Emerging Communities (Transition) and Rural Residential zones.

The Proposed Action is also zoned within the Urban Footprint pursuant to the *Southeast Queensland Regional Plan 2017.* The Proposed Action is situated within the Narangba East Local Development Area Plan, which has been formed and actively undergoing investigations to appropriately plan for the expected growth within the locality. CoMB has identified the locality as a likely suitable area to support future urban development for additional employment/industrial and residential uses to accommodate future growth (CoMB, 2024). Educational facilities are necessary to deliver a well-planned and complete community.

1.2 Terms and Definitions

The following descriptive terms are used through this report:

- **Site** – the total 13.19 ha footprint of the Proposed Action (**Figure 2**).
- **Development Footprint** – the 10.85 ha footprint of permanent development (**Figure 5**).
- **Avoidance Area** – the 2.35 ha area of the Site that will be retained and protected (**Figure 5**).
- **Retention Area** – the 0 ha area.

2. Proposed Action

2.1 Summary of Proposed Action

The masterplan for the Proposed Action encompasses 13.19 ha of land and will ultimately accommodate approximately 1,836 school students, 140 childcare pupils and 156 teaching and non-teaching staff upon completion of the college.

The Proposed Action will primarily allow the construction of the college which will cater to students from Prep through to Grade 12, in addition to the childcare centre and Out of School Hours Care (**OSHC**) facility. Provision for a potential future church has also been included in the Master Plan. The college is intended to be delivered in multiple stages and is estimated to be completed by approximately 2036.

Generally, the Proposed Action involves the establishment of numerous buildings for educational facilities, administration, library and maintenance buildings, play areas, sporting facilities, ecological restoration areas, utilities and services, internal roads, car parking, courtyards and a potential future church. The predominant impact is associated with the establishment of built infrastructure.

The primary construction requirements to facilitate the Proposed Action include the use of mobile earthmoving plant to conduct civil groundworks to establish appropriate levels, final landform and linear infrastructure. As a result of the civil works, the Proposed Action will require:

- Demolition of existing rural residential infrastructure
- Clearing of vegetation
- Excavation and filling
- Noise and light production during construction.

Notably, the primary direct impact is associated with the civil earthworks. Mitigation measure to reduce impact will be employed where practical, and include the use of arborist assessment, fauna spotter catchers, Construction Environmental Management Plans, and Erosion and Sediment Control Plans, such that direct impacts are minimised. Use of the latter management plans aids to ensure indirect impacts such as excessive dust, noise, and light are managed during construction.

No consequential impacts are required with access roads already existing established infrastructure. The Proposed Action is contained to the Site and areas of retention and avoidance will be appropriately protected during construction.

2.2 Proposed Action Details

More specifically, the Proposed Action involves the establishment of the following infrastructure.

- Education facilities and associated buildings for Prep – Grade 12
  - Four (4) junior classroom buildings
  - Five (5) secondary classroom buildings – including specialist buildings
  - One (1) Prep building
- Administration, library and maintenance buildings
- Tuckshop facilities
- Undercover education and play areas

- Outside School Hours Care Building
- Childcare Centre
- Sporting Facilities
  - Grassed primary school field
  - Sporting field – including athletics track and tiered seating
- Ecological Restoration Areas
- Stormwater management devices
- Associated landscaping and open space/recreational areas
- Central courtyard
- Provision for a potential future Church in the south-western corner of the Site
- Onsite Car parking and set down/ pick up areas:
  - 120 Short-term visitor and set down car parking spaces
  - 12 dedicated prep classroom car parking spaces
  - 34 dedicated childcare centre car parking spaces
  - Six (6) accessible parking spaces for persons with disabilities provided, 4 in the main school carpark and 2 in the childcare centre car parking spaces
  - Six (6) accessible parking spaces for persons with disabilities provided, four (4) in the main school car park and two (2) in the child care centre car park
  - Four (4) bus parking bays located along the Morgan Road frontage in between the two (2) proposed Site access crossovers
  - Bicycle parking spaces including 175 spaces for students, 16 spaces for staff and 17 spaces for visitors

The distribution of these areas across the Site is shown in **Attachment 1.** For the purpose of the Proposed Action, the Site is 13.19 ha, which consists of a 10.85 ha Development Footprint, a 2.35 ha of Avoidance Area and a 0 ha Retention Area (**Figure 5**).

2.2.1 Construction Approach

It is expected that all land within the Development Footprint will be cleared and subject to civil earth works to establish the necessary landform. Identified Avoidance Areas are located in the east and north east of the Site contain State mapped Core Koala Habitat (**CKH**).

In addition to the designed Avoidance Areas, individual trees will be retained within the Development Footprint, except where their removal is required to achieve the Project's intent and to deliver a safe place to learn, work and play.

The construction phase of the Proposed Action will entail the following steps;

- Pre-construction/construction activities:
  - Clear and grub of vegetated components of the Development Footprint
  - Civil groundworks to establish final landform and linear infrastructure

- Installation of erosion and sediment controls
- Installation of essential services and utilities, such as sewerage, stormwater, electricity, gas and communications
- Construction of roads and pavements, including installation of longitudinal and cross-drainage structures
- Installation of landscaping features, sports and recreation amenities (such as playgrounds, sports ovals etc.)
- Construction of education buildings, structures and facilities

- Post construction activities:
  - Rehabilitation
  - Landscaping.

2.2.2 Development Timeframe

The following timeframes are currently targeted for each corresponding milestone:

- Ministerial Infrastructure Designation (**MID**) application accepted by Queensland Government: March 2024
- All approvals in place: MID by September 2024
- Commencement of operational works: October 2025
- Opening of Stage 1 of Narangba Catholic College: January 2027
- Completion of all stages of Narangba Catholic College: January 2036

2.3 Location, boundaries and size of the Proposed Action

2.3.1 Locality and Setting

The Site is located centrally within the suburb of Narangba and is bordered by Burpengary to the north and Dakabin to the south. At an intermediate scale, the Site is located within a residential and transitioning rural-residential catchment. The Site in its regional context is shown in **Figure 1**.

More broadly the suburb of Narangba has been subject to ongoing redevelopment, transforming the suburb from larger rural and agricultural parcels into various low and medium density residential developments (**Figure 4**). This is indicative of the locality's zoning designation (**Figure 9**).

2.3.2 Site Description

The Proposed Action is situated in a peri-urban landscape dominated by historically cleared agricultural land, rural residential uses, contemporary residential developments and areas earmarked for future residential development (**Figure 2**). This area boasts a diverse mix of historical and contemporary residential developments, interspersed with commercial facilities, patches of vegetation, park reserves, schools, the North Coast Rail Line, Bruce Highway and occasional freehold allotments.

The Site is currently improved by one rural residential dwelling, complete with associated structures, dams, and access tracks. Extensive areas of well-maintained landscaped vegetation and lawns/ paddocks characterise the landscape. A tributary of Saltwater Creek meanders from west to east to the south of the Development Footprint (within the broader properties the Site forms a component of). Encircling the Site are large residential lots on all sides, with a residential development currently under construction to the south of Callaghan Road.

Surrounding areas to the southwest, south, and north predominantly consist of recently constructed low and medium-density residential developments, lacking significant ecological features (Figure 4).

2.3.2.1 Boundaries of Proposed Action

The Master Plan outlines the layout of the Proposed Action, including new buildings, parking areas, internal access arrangements, open spaces, recreational facilities, various infrastructures and the Avoidance Area is focused on the east of the Site (**Attachment 1**). It is important to note that the boundaries of the Proposed Action are limited to the areas situated within the northern to central portion of the Site.

3. Planning Context

3.1 Local Government

The Site's land use planning intent is governed by the CoMB Planning Scheme. Pursuant to the Planning Scheme, the Site is spilt zoned both Rural Residential and Emerging Community Zone, and further is identified within the Transition precinct of the Emerging Community Zone.

The purpose of the Rural Residential Zone is to:

> *'provide for residential development on large lots where infrastructure and services may not be provided and where the intensity of residential development is generally dispersed. The zone is generally located at the urban-rural fringe, having a semi-rural or bushland amenity and character with a strong dominance of open area and scope for planting. Development is characteristically low density (large lots), low intensity of built form and catering for a range of lifestyle choices. The opportunity and ability for rural uses to occur is retained. Limited provision for other low intensity non-residential uses is also provided where it is demonstrated they have minimal adverse impacts on the amenity and character of the zone.'*

The purpose of the Emerging Community Zone is to:

a) *identify land that is suitable for urban purposes and conserve land that may be suitable for urban development in the future;*

b) *manage the timely conversion of non-urban land to urban purposes;*

c) *prevent or discourage development that is likely to compromise appropriate longer term land use'.*

The purpose of the Transition precinct is to:

1. *Identify and conserve land that may be suitable for urban development in the future, allowing interim uses that will not compromise the best longer term use of the land;*

2. *Provide mechanisms to promote and implement an appropriate mix of dwelling types, consistent with a next generation neighbourhood across the transition precinct once this land is developed and serviced with all local government networks including water and sewer and is suitable for urban development.*

There are currently eight public primary schools, four public high schools, two private high schools and six private Prep to Year 12 within 12 km of the Proposed Action (**Figure 3**). Each of these schools is either at or approaching maximum capacity. The Proposed Action is intended to provide some relief to this increasing demand for school places in the Narangba and surrounding region.

Additionally, the Proposed Action is situated within the Narangba East Local Development Area Plan, which has been identified as an area of expected growth within the locality. CoMB has identified the locality as a likely suitable area to support future urban development for additional employment/industrial and residential uses to accommodate future growth (CoMB, 2024). The continued provision of educational facilities is necessary to deliver a well-planned and complete community.

3.2 State Government

The Proposed Action was endorsed for lodgement on 21/12/23 and is now undergoing public consultation and development assessment by the relevant State departments. The Infrastructure Designation application will be assessed by the Minster for the Housing, Local Government and Planning and Minister for Public Works to designate the Site for educational purposes under the MID process.

This endorsement designates the Site for 'other infrastructure' in accordance with Schedule 5, Part 2 of the *Planning Regulation 2017* (**Planning Regulation**). The following types of infrastructure are endorsed as part of the designation:

- Community and cultural facilities, including community centres, galleries, libraries and meeting halls
- Education Facilities
- Facilities at which an education and care services under the Education and Care Services National Law (Queensland) is operated
- Facilities at which a QEC approved service under the *Education and Care Services Act 2013* is operated

As such, the Department of Housing, Local Government and Planning and Department for Public Works has jurisdiction for the implementation and enforcement of development and activities in relation to the Site.

4. Desktop Assessment

To inform the requirements of the field surveys, a desktop assessment was undertaken to review contemporary and relevant database and mapping resources relating to flora and fauna, ecological communities, waterways and other Matters of National Environmental Significance (**MNES**), Matters of State Environmental Significance (**MSES**) and Matters of Local Environmental Significance (**MLES**) likely to occur within and in proximity to the Site. The outcomes sought by the desktop assessment were to:

- Refine a list of threatened species to be targeted by the ecological surveys;
- Guide the survey methods to be adopted.

In addition to review of current aerial photography, the following key Commonwealth, State and Local government desktop databases and mapping resources were reviewed are listed below.

- Commonwealth DCCEEW Protected Matters Search Report (**PMST**), under the EPBC Act (**Attachment 3**)
- Atlas of Living Australia (insofar as MNES species are concerned)
- National flying-fox monitoring map prepared by DCCEEW
- Species list generated from the Queensland Government's WildNet database (2 km radius) (**Attachment 4**)
- Vegetation Management Report, generated by Department of Resources (Queensland) (**Attachment 2**)
- Mapping of MSES (Queensland Globe)
- Protected plant trigger mapping, under the *Nature Conservation Act 1992* (**NC Act**)
- Planning Scheme environmental overlays (**Figure 10**).

A review of aerial photography history was undertaken via QImagery to assist with the broad delineation of vegetation communities and to determine historical patterns to local vegetation communities.

4.1.1 Pre-clear Vegetation Communities

Queensland Herbarium pre-clear Regional Ecosystem (**RE**) mapping shows that the Site historically would have accommodated RE 12.9-10.4 (Least Concern), with RE 12.3.6 (Least Concern) mapped over the lower riparian areas to the south of the Development Footprint (**Table 1**).

Table 1. Pre-clear regional ecosystems

Regional Ecosystem	Description
12.9-10.4	*Eucalyptus racemosa subsp. racemosa* woodland to open forest. Other species can include *Angophora leiocarpa, Eucalyptus seeana, E. siderophloia, Corymbia intermedia, E. tindaliae*, with *Lophostemon suaveolens, Melaleuca quinquenervia, E. tereticornis* common on lower slopes. Occurs on Cainozoic and Mesozoic sediments +/- remnant Tertiary surfaces. Not a Wetland.
12.3.6	*Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia* open forest to woodland with a grassy ground layer dominated by species such as *Imperata cylindrica*. Eucalyptus tereticornis may be present as an emergent layer. Eucalyptus seeana may also occur in this ecosystem to the south and east of Brisbane. Occurs on Quaternary floodplains and fringing drainage lines in coastal areas. Palustrine.

4.1.2 Current Vegetation

The Regulated Vegetation Management report identifies the Site as being mapped as predominantly containing 'Category X' Regulated Vegetation, with Category C Regulated Regrowth Vegetation aligning with the mapped CKH and with mapped Category B Regulated Vegetation mapped south-east of the Site (**Figure 8**).

Remnants fringing the Site to the north and east are mapped Category C - Least Concern Regulated Regrowth Vegetation containing essential habitat for *Phascolarctos cinereus* (koala). The Development Footprint has avoided mapped CKH as a key design parameter.

From desktop analysis, it is considered the Site and its immediate surrounds do not support relict or natural/ endemic vegetation communities or habitats; however, isolated elements may support older growth individual trees as planted landscape species. Findings of this desktop assessment have been refined during field surveys and outlined in later sections of this report.

4.1.3 Historic Disturbance

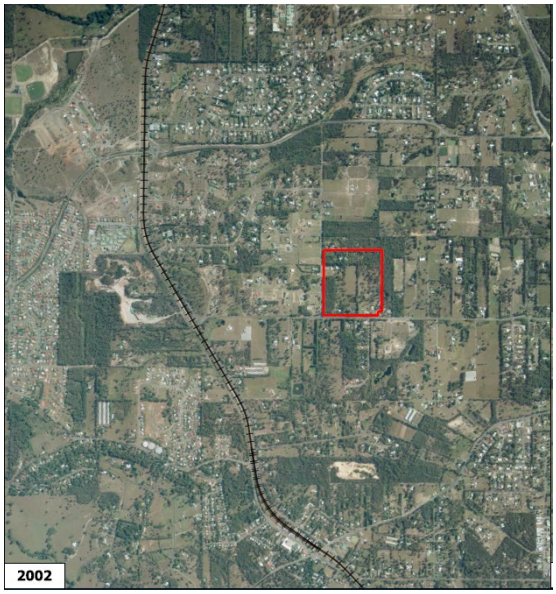
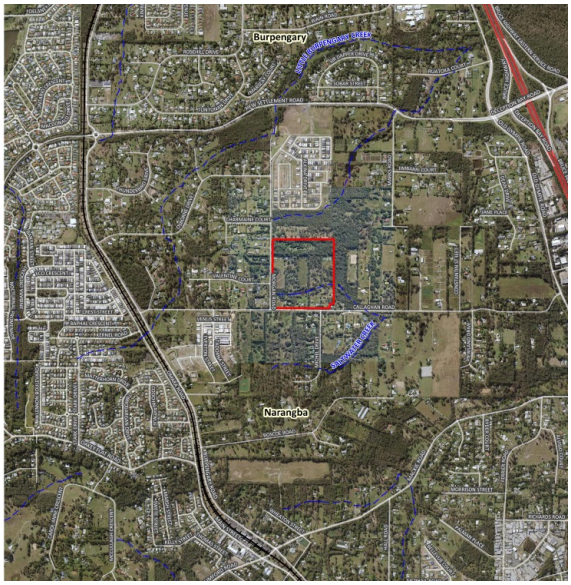
Current aerial photography illustrates that the Site has been subject to significant modification and disturbance as a result of historical and on-going agricultural activities and more recently the utilisation of the Site for rural residential uses. Areas adjoining the Site have been subject to damming of lower riparian corridors associated with historical agricultural activities.

The historical disturbance can be seen in images presented in **Table 2** which shows large scale clearing has taken place and large dams were established for agricultural pursuits. From 1964 to 1987 aerials available show the continued growth of the agricultural industry in the surrounding area with more large-scale cropping activities continue to encroach on the patch of vegetation to the west. Between 1987-2002 extensive low density residential developments have been established throughout the locality. 2023 aerials show significant patches of vegetation now only remain east of the Bruce Highway with the western side occupied by industrial and commercial businesses.

Table 2. Historical aerial photography

Year	Historical Analysis
	In 1964 the Site appears as a largely modified and divided between several landholders. Large scale clearing has taken place and large dams were established for agricultural pursuits. There appears to be a residential dwelling located on each of the 6 lots and some small-scale cropping or orchards present on Site. This use is common throughout the locality at the time with some larger cropping site present. Additionally, a large patch of remnant vegetation occurs extending from the borders of the Site to the train line in the west.

Year	Historical Analysis
	Arieal Imagery from 1976 shows continued growth of the agricultural industry in the surrounding area. More large scale cropping activities continue to encroach on the patch of vegetation to the west. Additional dams have been installed within the watercourse on Site to facilitate agriculture. Importantly, the Site at this point in time appears to be largely cleared with isolated windrows of trees retained on property boundaries and regrowth apparent in lower areas, along the eastern boundary and in the north-east of the Site.
	By 1987 rural residential developments have been introduced to the locale, especially around the Bruce Highway and Narangba train station. Large scale clearing across the locality is evident for large lot rural residential and light agriculture. Roads have been upgraded from formerly gravel roads. Large patches of the remnant vegetation to the north-west of the historical image have been cleared for low density residential development around Burpengary. The Site remains largely unchanged from previous years. Paddock trees are beginning to be confined to fence lines between lots.

Year	Historical Analysis
	Between 1987-2002 extensive low density residential developments have been established throughout the locality. The vegetated patch of vegetation to the west has been almost completed cleared for residential pursuits. Some previously small-scale agricultural land uses closer to the Bruce Highway, appear to be replaced with low density residential developments. The Site remains largely unchanged from previous years. Paddock trees continue to be thinned on the 5 southern lots, with canopy vegetation becoming more confined to fence lines between lots.
	2023 imagery shows the current extent of development in the suburb. Significant patches of vegetation now only remain east of the Bruce Highway with the western side occupied by industrial and commercial businesses. The current development pattern would suggest continued small lot residential to occupy the surrounding acreage lots. This is evident directly to the north of the Site and in the greater locality of Narangba and Burpengary notably around the North Coast Train Line. The Site remains largely unchanged from previous years. Paddock trees continue to be thinned on all 5 southern lots, with canopy vegetation becoming more scattered across paddocks.

4.2 Likelihood of Occurrence Assessment

Following a review of relevant desktop resources, a likelihood of occurrence assessment was undertaken for species listed under the NC Act and EPBC Act that:

- Have verified occurrence records within 2 km of the Site according to the Queensland WildNet online database;
- Are considered 'known' or 'likely' to occur within 2 km of the Site according to the EPBC Act PMST.

To assess the likelihood of occurrence for these species, the habitat requirements for each species was reviewed and compared against the habitat types present within the Site. The results of the likelihood of occurrence assessment are provided in **Table 4, Table 5** and **Table 6**. A summary of the perceived probability for likelihood of occurrence based off desktop assessment is provided in **Table 3**.

Table 3. Likelihood of Occurrence Classifications

Assessment	Habitat Criteria	Local Record Criteria	Perceived Probability
Known	Habitat is considered moderately to good quality and is being utilised on site.	The species has been confirmed as present within the Site, and those records are unlikely to represent transient or vagrant individuals.	100%
Likely	Habitat is considered moderately to good quality and similar to other locations where the species is found	There is a number (~5 or greater) of local (≤ 10 km from the Site), contemporary (post 1980) records of the species; or there is strong evidence that a cryptic species (which may not be frequently recorded in databases) has a nearby resident population(s).	>50%
Possible	Habitat is marginal to moderate	The species is known by a few local contemporary records and is not a transient species.	20-50%
Unlikely	The habitat is marginal	There are few, if any, local contemporary records.	1-19%
Highly unlikely	The habitat is unsuitable	There are no local contemporary records.	≤1%
Absent	No habitat present	There, local historic or contemporary records (TEC only).	0%
Transient	The habitat is suitable, marginal or good quality	The species is highly mobile and vagrant. They may infrequently appear in the local area over a long timeframe but are never resident or frequent visitors (e.g. return migrants). These species are typically birds which, while having some probability of occurring, are unlikely rely on the Site for their lifecycle or maintaining populations.	N/A

4.2.1 Threated Ecological Communities

The PMST (**Attachment 3**) indicates the potential occurrence of MNES vegetation communities and species in the locality. An assessment of the likelihood of occurrence for each Threatened Ecological Community (**TEC**s) has been undertaken as shown in **Table 4**.This assessment outlines the potential occurrence for each TECs presence both from the locality and Site. This has been based on database searches, Site attributes such as soils, locational context and known TEC bio-conditional requirements. Only those TECs known or likely to occur within the Site have been considered for further assessment in **Section 8** of this report.

Table 4. Likelihood of occurrence of TECs potentially on or within 2km of the Site as per PMST

TEC	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of Occurrence on Site	Potential for Significant Impact
Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and Southeast Queensland ecological community	Endangered	May occur	**Highly Unlikely** – In Queensland, Coastal Swamp Oak Forest are represented by Regional Ecosystem (RE) 12.1.1 (*Casuarina glauca* woodland on margins of marine clay plains) and RE 12.3.20 (*Melaleuca quinquenervia*, *Casuarina glauca* +/- *Eucalyptus tereticornis* (Queensland blue gum), *E. siderophloia* open forest (vegetated swamp), but only where dominated by *C. glauca*. Neither REs are indicated as occurring on-site by current regulated vegetation mapping or historic preclear regional ecosystem mapping. No marine clays (land zone 1 and hence RE 12.1.1) are present on Site. Historical clearing for agriculture and maintenance of the Site for rural residential pursuits has significantly modified the native vegetation coverage on the Site.	**Highly Unlikely**
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	May occur	**Unlikely** – The structure of the Coastal Swamp Sclerophyll Forest ecological community varies from open woodland to closed forest with a crown cover of at least 10% and typically no more than 70%. The canopy is typically layered, with a sub-canopy of melaleuca grading into a taller mixed *Melaleuca* spp. and/or eucalypt canopy. Typically, this is *Eucalyptus robusta* however, other *Eucalyptus*, *Corymbia*, and/or *Lophostemon* species can occur scattered throughout the canopy. The ecological community typically occurs in low-lying coastal alluvial areas with minimal relief, such as swamps, floodplain pockets, depressions, alluvial flats, back-barrier flats, fans, terraces, and behind fore-dunes. This TEC most commonly occurs at elevations below 20m above sea-level (ASL) but may occur occasionally up to 220m ASL	**Unlikely**

TEC	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of Occurrence on Site	Potential for Significant Impact
			on hill slopes, when in association with perched swamps and lakes, or a naturally high-water table. In Queensland, this TEC is represented by RE 12.2.7, 12.3.4, 12.3.4a, 12.3.5, 12.3.6, and 12.3.20 where not dominated by *Casuarina glauca* (coastal swamp oak). Historical clearing for agriculture and maintenance of the Site for rural residential pursuits has significantly modified the native vegetation coverage on the Site. The Site is above 20m ASL and is mapped to contain limited regrowth vegetation confined to the east.	
Lowland Rainforest of Subtropical Australia	Critically Endangered	May occur	**Highly Unlikely** – The Lowland Rainforest of Subtropical Australia contains a vegetation structure inclusive of emergent species to 40m-50m tall composed of species such as *Araucaria cunninghamii* (hoop pine), *Ficus* spp. (figs), *Lophostemon confertus* (brushbox). Typically, non-rainforest species such as eucalypts and brushbox comprise <30% of canopy emergents. The canopy and subcanopy layer then contain a diverse range of species, including *Araucaria cunninghamii* (hoop pine), *Ficus* spp. (figs) and a broad range of rainforest associated species. Similarly, the understory species composition reflects that of a rainforest, and less representative of dry sclerophyll associated with the Site. REs associated with the TEC include 12.3.1, 12.5.13, 12.8.3, 12.8.4, 12.11.1, 12.11.10, 12.12.1 and 12.12.16. Lowland Rainforest mostly occurs in areas <300m ASL. Aspect can result in the TEC being found above 300m altitude on north-facing slopes, but typically 300m defines the upper extent of the lowlands. In addition, Lowland Rainforest typically occurs in areas with high annual rainfall >1300 mm. Similarly, the degraded nature of the vegetation on Site has led to a notable lack of vegetative values to support this TEC. Associated REs were not present. No analogous REs are mapped in the immediate locality of the Site.	**Highly Unlikely**
Subtropical eucalypt floodplain forest and woodland of the	Endangered	Likely to occur	**Highly Unlikely** – The structure of the TEC varies from tall open forest to woodland, to scattered trees where clearing has occurred, and can also represent denser closed forest and/or low forest. The tree canopy is dominated by *Eucalypts* and/or trees from the *Angophora*, *Corymbia*, *Lophostemon* and *Syncarpia* genera. It may be dominated by a single tree species, or by a mix of several tree species but not *Eucalyptus robusta* (swamp mahogany). Typical	**Highly Unlikely**

TEC	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of Occurrence on Site	Potential for Significant Impact
New South Wales North Coast and South East Queensland bioregions			species include *Corymbia intermedia* (pink bloodwood), *E. moluccana* (grey box), *E. grandis* (flooded gum), *E. siderophloia* (grey ironbark), and *E. tereticornis* (Queensland blue gum), *Syncarpia glomulifera* (turpentine), *Eucalyptus resinifera* (red mahogany), *Lophostemon confertus* (brush box) and/*or L. suaveolens* (swamp box). The canopy may exceed 40m height and can present 40-60% crown cover when intact, though both these elements can vary to lower quantities while still representing the TEC. A mid-layer or sub-canopy of small trees may be present with *Melaleuca, Leptospermum* and related genera observable. A range of grasses, forbs, ferns, sedges and scramblers form a diverse groundcover. Eighteen (18) QLD REs are associated with this TEC and include 12.3.2, 12.3.2a, 12.3.3, 12.3.3a, 12.3.3b, 12.3.3d, 12.3.4a, 12.3.7, 12.3.7c, 12.3.7d, 12.3.10, 12.3.11, 12.3.11a, 12.3.11b, 12.3.12, 12.3.14a, 12.3.15, and 12.3.19. The TEC ranges from an area from just north of Newcastle, New South Wales (around Raymond Terrace) in the south, to just north of Gladstone in QLD. The ecological community is found on alluvial landforms, including floodplains, the riparian zones of parent rivers and other order tributaries, alluvial flats, floodplain/alluvial terraces and periodically flooded depressions. It generally occurs below 50m ASL, although it can occur up to 250m. The smallest patch size that can be identified is 0.5ha. Similar to other alluvial-based TECs, the subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions TEC contains a key diagnostic that is the occurrence of this vegetation community on alluvial plains, represented by land zone 3. The Site reflects land dominated by land zone 9-10 and lacks suitable alluvial flood plains or flats.,	
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	May occur	**Highly Unlikely** – The Box – Gum Grassy Woodlands and Derived Grasslands are characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of White Box (*Eucalyptus albens*), Yellow Box (*Eucalyptus melliodora*), and Blakely's Red Gum (*Eucalyptus blakelyi*). In QLD the TEC is a primary component of REs 11.8.2a, 11.8.8, 11.9.9a, 13.3.1, 13.11.8, 13.12.8 and 13.12.9. It can also be a smaller component of 11.3.23, 12.8.16, 13.3.4, 13.11.3 and 13.11.4. This ecological community occurs in areas where average annual rainfall is between 400 mm to 1200 mm, on moderate to highly fertile soils at altitudes of 170 m to 1,200 m.	**Highly Unlikely**

TEC	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of Occurrence on Site	Potential for Significant Impact
			Key diagnostic species of White Box (*Eucalyptus albens*), Yellow Box (*Eucalyptus melliodora*), and/or Blakely's Red Gum (*Eucalyptus blakelyi*) do not occur in the locality and the Site is well removed from this communities more western range, with none of the abovementioned associated REs identified on Site or within the locality. Additionally, the Site's elevation is entirely below that of the TECs advised altitude.	

4.2.2 Threatened Flora Species

The PMST illustrates the potential or likely occurrence of flora MNES within a 2 km search radius of the Site (**Attachment 3**). This desktop assessment is assisted through reference to the Queensland Department of Environment, Tourism, Science and Innovation (**DETSI**) Wildlife Online database, which provides verified records for some of the identified MNES (**Attachment 4**).

The PMST identified 16 threatened flora species as potentially occurring within 2 km of the Site. The 16 species that were listed in the PMST report are summarised in **Table 5**. Of these 16 species, none were identified in the Wildlife Online data. The Wildlife Online data indicates confirmed records of Critically Endangered, Endangered, Vulnerable and Near Threatened (**CREVNT**) flora species in the locality (**Attachment 4**). The conservation-significant species identified by these database searches formed a target for Site surveys.

An assessment of each flora species likelihood of occurrence has been undertaken (**Table 5**). This has been based on database searches, Site attributes such as soils, locational context, altitude and known species ecological requirements. Only those threatened flora species known or likely to occur within the Site have been considered for further assessment in **Table 5** and **Section 8** of this report. The residual matters listed in the PMST considered unlikely to occur within the Site or be impacted by the Proposed Action (e.g. rainforest species) have not been assessed given the unlikely nature of these occurring within or in proximity to the Site.

Table 5. Likelihood of occurrence of Flora MNES potentially on or within 2km of the Site as per PMST.

Flora MNES	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of occurrence on Site	Potential for Significant Impact
Arthraxon hispidus (Hairy -joint grass)	Vulnerable	Likely	**Highly unlikely** – Hairy-joint Grass has been recorded from scattered locations throughout Queensland and on the northern tablelands and north coast of New South Wales. In NSW and QLD, Hairyjoint Grass is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks and swamps. In SEQ, Hairy-joint Grass has also been recorded growing around freshwater springs on coastal foreshore dunes, in shaded small gullies, on creek banks, and on sandy alluvium in creek beds in open forests. Records of Hairy-joint Grass are not present within a 2 km locality according to Queensland WildNet and ALA sightings data. The Site does not contain the specific habitat values the grass is known to inhabit and requires. As such, this species is considered highly unlikely to occur on Site.	**Highly unlikely**
Macadamia integrifolia (Macadamia Nut)	Vulnerable	Likely	**Highly unlikely** – Macadamia Nut occurs from Mt Bauple, near Gympie, to Currumbin Valley in the Gold Coast hinterland, SEQ. This species grows in remnant rainforest, including complex mixed notophyll forest, and prefers partially open areas such as rainforest edges. No records of Macadamia Nut are present within a 2 km locality according to Queensland WildNet and ALA sightings data. Preferred habitat of notophyll vine forest and rainforest is not present on-site and lack of local records within the WildNet and ALA sightings data indicate it is highly unlikely that this species would occur onsite.	**Highly unlikely**
Macadamia ternifolia (Small-fruited Queensland Nut)	Vulnerable	Likely	**Highly unlikely** – The Small-fruited Queensland Nut's remaining habitat is fragmented and found within lowland warm complex notophyll vine forest and *Araucarian notophyll* vine forest on basic and intermediate volcanic soils and alluvia in higher rainfall areas of south-east Queensland. The species generally occurs in south-facing gullies with fertile, basalt-derived krasnozem soils and are primarily located on moderate to steeply inclined hillslopes and footslopes as well as steep to very steep tor or talus slopes at 100–320 m ASL.	**Highly unlikely**

Flora MNES	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of occurrence on Site	Potential for Significant Impact
			No records of Macadamia Nut are present within a 2 km locality according to Queensland WildNet and ALA sightings data. There are three records in the broader locality, the nearest being approximately 3.3 km northwest of Site from 2013. Preferred habitat of notophyll vine forest and rainforest is not present on-site and lack of local records within the WildNet and ALA sightings data indicate it is highly unlikely that this species would occur onsite.	
Phaius australis (Lesser Swamp-orchid)	Endangered	Known	**Highly unlikely** – The distribution of the Lesser Swamp-orchid has been tentatively described as being north from Lake Cathie (near Port Macquarie), but mainly north of the Evans Head area to the Barron River in northeast Queensland. Most populations of the Lesser Swamp-orchid are sporadically distributed between Coffs Harbour and Fraser Island. The Lesser Swamp-orchid is commonly associated with coastal wet heath/sedgeland wetlands, swampy grassland or swampy forest and often where Broad-leaved Paperbark or Swamp Mahogany are found. The species is also associated with swamp-forest margins, where it occurs in swamp sclerophyll forest, swampy rainforest, or fringing open forest. No records of Macadamia Nut are present within a 2 km locality according to Queensland WildNet and ALA sightings data. One record in the broader locality is present approximately 3 km southeast of Site from 1992. Preferred habitat of swamps and wetlands is not mapped to occur on-site and lack of local records within the WildNet and ALA sightings data indicate it is highly unlikely that this species would occur onsite.	**Highly unlikely**
Rhodamnia rubescens (Scrub Turpentine)	Critically Endangered	Likely	**Unlikely** – Scrub Turpentine is known to occur from coastal districts of NSW north from Batemans Bay to Bundaberg in Queensland. The distribution occasionally extends inland onto the escarpment up to 600m ASL in areas with rainfall of 1000-1600mm. Commonly occurs in all rainforest subforms except cool temperate rainforest. Species occupies a range of volcanically derived and sedimentary soils and is a common pioneer species in Eucalypt forests. Often found in wet sclerophyll associations in rainforest transition zones and Creekside riparian associations.	**Unlikely**

Flora MNES	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of occurrence on Site	Potential for Significant Impact
			No records of Scrub Turpentine are present within a 2 km locality according to Queensland WildNet and ALA sightings data. Preferred habitat of rainforest and rainforest subforms are not present on-site and lack of local records within the WildNet and ALA sightings data indicate it is unlikely that this species would occur onsite.	
Rhodomyrtus psidioides (Native Guava)	Critically Endangered	Likely	**Unlikely** – Known to occur from coastal districts of NSW north from Gosford to Maryborough in Queensland. Occurrence records are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120km inland in the Hunter and Clarence River catchments and along the Border Ranges. The species flowers in late spring to early summer, producing fruits in summer. Habitat is likely to include subtropical rainforests, warm temperate rainforests, littoral rainforest, and wet sclerophyll forests. No records of Native Guava are present within a 2 km locality according to Queensland WildNet and ALA sightings data. While some records of this species exist within the broader locality, the preferred habitat in the form of rainforest, rainforest subforms and wet sclerophyll forest are not present on-site. The Site itself does not contain habitat that would support the species, and given the current use as rural agricultural land, it is unlikely the species would persist.	**Unlikely**

4.2.3 Threatened Fauna Species

The PMST (**Attachment 3**) indicates the potential occurrence of MNES threatened fauna species in the locality of a 2 km radius. A desktop assessment of the likelihood of occurrence for each fauna species been undertaken as shown in **Table 6**. This assessment outlines the potential occurrence for each species presence from the Site. This has been based on database searches and only those species known, likely or possible to occur within the Site have been considered for further assessment in **Section 6.3** and subsequently **Section 8** of this report if the species is identified for further assessment. The residual matters listed in the PMST considered unlikely to occur within the Site or be impacted by the Proposed Action (e.g. marine species) have not been assessed any further due to the unlikely they would occur within or proximate the Site**.**

Table 6. Likelihood of occurrence of Fauna MNES potentially on or within 2km of the Site as per PMST.

Fauna MNES	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of occurrence on Site	Potential for Significant Impact
BIRDS				
Botaurus poiciloptilus (Australasian Bittern)	Endangered	Likely to occur within the area	The Australasian Bittern is distributed along the east coast of Australia from Yeppoon in QLD to the Murray River corridor in Victoria. It also occurs in South Australia and Tasmania. Australasian Bitterns favour freshwater wetlands consisting of dense tall reeds and rushes with access to shallow water or reed mats from which it forage for fish, frogs, reptiles and freshwater invertebrates. The species can occur in periodically inundated agricultural habitats that provide suitable dense vegetative cover. No records of Australasian Bittern are present within a 2 km locality according to Queensland WildNet and ALA sightings data. One record in the broader locality is present approximately 4.6 km east of Site from 1980. Given the lack of recent local records and degraded nature of the Site and adjacent land to the south, the Site is considered significantly modified to the extent that habitat value to support this species is likely to be low with no suitable wetland habitat as required by this species.	**Unlikely**
Calidris canutus (Red Knot)	Endangered	Likely to occur within the area	The Red Knot is known to inhabit coastal environments including intertidal sandflats, mudflats and beaches, and associated lakes, lagoons and ponds. No coastal-associated waterbodies are located on Site and no records of Red Knot are present within a 2 km locality according to Queensland WildNet and ALA sightings data. There are forty five records in the broader region, the nearest being approximately 4.6 km east of Site, and the most recent from 2021. As there is a lack of suitable foraging habitat within Site, it is considered unlikely for the Red Knot to occur on Site. At most, this species may occur as a transient fly-over individual.	**Unlikely**
Calidris ferruginea (Curlew Sandpiper)	Critically Endangered	Likely to occur within the area	The Curlew Sandpiper inhabits saline and freshwater wetlands, saltmarshes, estuaries, and mudflats with preference for areas with exposed mud for foraging. No records of Curlew Sandpiper are present within a 2 km locality according to Queensland WildNet and ALA	**Unlikely**

Fauna MNES	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of occurrence on Site	Potential for Significant Impact
			sightings data. There are one hundred and thirty one records in the broader region, the nearest being approximately 5.4 km east of Site, and the most recent from 2022. As there is a lack of suitable foraging habitat within Site, it is considered unlikely for the Curlew Sandpiper to occur on Site. At most, this species may occur as a transient fly-over individual.	
Calyptorhynchus lathami lathami (South-eastern Glossy Black-Cockatoo)	Vulnerable	Likely to occur within the area	The South-eastern Glossy Black-Cockatoo prefers woodland areas dominated by she-oak *Allocasuarina*, or open sclerophyll forests and woodlands with a stratum of *Allocasuarina* beneath *Eucalyptus, Corymbia* or *Angophora* genus trees. South-eastern Glossy black-cockatoos have also been observed in mixed *Allocasuarina, Casuarina*, cypress *Callitris* and *Acacia harpophylla* (brigalow) woodland assemblages. In SEQ west of the Great Dividing Range, they have been observed feeding in remnant *Casuarina cristata* (belah) and *Allocasuarina luehmannii* (bulloak) forests. This species is also known to utilise appropriate remnant woodlands, and individual or small pockets of *Allocasuarina* and *Casuarina* feed trees in urban areas. No records of South-eastern Glossy Black Cockatoo are present within a 2 km locality according to Queensland WildNet and ALA sightings data. There are three records in the broader locality, the nearest being approximately 2.2 km northeast of Site from 2021. Where *Allocasuarina littoralis* is present and/or breeding habitat in the form of old-growth, hollow-bearing *Eucalyptus tereticornis* (Queensland blue gum) then the amenity of the Site would increase. However, given the degraded nature of the Site from agricultural and rural residential pursuits, it is less likely forage trees and large trees that offer suitable shelter are abundant. This species has been assessed further in **Section 6.3.4**.	**Possible**
Charadrius leschenaultia (Greater Sand Plover)	Vulnerable	Likely to occur within the area	The Greater Sand Plover occurs in coastal areas in all states, though the greatest numbers occur in northern Australia, especially the north-west. In the non-breeding grounds in Australasia, the species is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons and inshore reefs, rock platforms, small rocky islands or sand cays on coral reefs. They are occasionally recorded on near-coastal saltworks and saltlakes, including marginal saltmarsh, and on brackish swamps. They seldom occur at shallow freshwater wetlands and have only once been recorded in a poorly grassed paddock with large bare areas, more than 1 km from the nearest water during a sever drought period, according to the SPRAT Profile.	**Highly Unlikely**

Fauna MNES	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of occurrence on Site	Potential for Significant Impact
			No records of Greater Sand Plover are present within a 2 km locality according to Queensland WildNet and ALA sightings data. There are twenty three records in the broader locality, the nearest being approximately 5.7 km east of Site, and the most recent from 2022, however these observations are on or close to the shores of Moreton Bay. The occurrence of this species is considered highly unlikely as the Site does not exhibit the coastal-associated waterbodies that this species is known to utilise for foraging within.	
Erythrotriorchis radiatus (Red Goshawk)	Endangered	Likely to occur within area	The Red Goshawk prefers open forests, woodlands, wetlands and rainforest fringes with very large home ranges several thousand hectares in area. This species prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds) and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest and rainforest margins. Habitat has to be open enough for fast attack and maneuvering in flight but provide cover for ambushing of prey. Red goshawks typically breed in trees >20 m tall (range 18.5–40.5 m) with an open limb and canopy structure (Aumann & Baker-Gabb 1991; Debus 2017). They're otherwise known to pick the tallest stands of trees which occur commonly in proximity to, or along, a watercourse or wetland (Debus 2017). The species rarely breeds in fragmented areas (Aumann & Baker-Gabb 1991; Czechura 2001). No records of Red Goshawk are present within a 2 km locality according to Queensland WildNet and ALA sightings data. This site does not contain the mosaic of vegetation types that this species favours and lacks large, tall trees for roosting given the extensive historic clearing which has occurred across the vast majority of Site. Additionally, while some small farm dams are present adjacent the Site, these are not considered significant enough to maintain an abundance of prey species the Red Goshawk is reliant on. Further, there is an abundance of preferable foraging resources available in the broader contextual region, particularly the large intact areas of vegetation surrounding Lake Kurwongbah and Lake Samsonvale as well as Freshwater National Park to the northwest of the Site. These areas contain rivers and streams near larger rivers and water bodies better suited for the species, and comparatively, the Site presents unlikely habitat for this species to visit or rely upon.	**Highly Unlikely**
Falco hypoleucos (Grey Falcon)	Vulnerable	Likely to occur within area	The Grey Falcon occurs in arid and semi-arid Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia. The species is mainly found where annual rainfall is less than 500mm, except when wet years are followed by drought, when the species might become marginally more widespread, although it is essentially confined	**Highly Unlikely**

Fauna MNES	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of occurrence on Site	Potential for Significant Impact
			to the arid and semi-arid zones at all times. Within these areas, the Grey Faclon has been known to inhabit timbered lowlands plains with acacia shrublands and treed watercourses. The species has also been observed in grasslands and open woodlands. The Grey Falcon preys mostly on other bird species but has very infrequently been observed predating small mammals and lizards. No records of Grey Falcon are present within a 2 km locality according to Queensland WildNet and ALA sightings data. The occurrence of this species is considered highly unlikely given the species' known geographic extent and the location of the Site being well outside of this range. Further, given the level of historic and ongoing disturbance associated with the Site, residual habitat value on Site is not considered significant enough to maintain an abundance of prey species the Grey Falcon is reliant on. Simultaneously, there is an abundance of preferable foraging resources available in the broader contextual region, particularly the large intact areas of vegetation surrounding Lake Kurwongbah and Lake Samsonvale as well as Freshwater National Park to the northwest of the Site. These areas contain rivers and streams near larger rivers and water bodies better suited for the species, and comparatively, the Site presents unlikely habitat for this species to visit or rely upon	
Hirundapus caudacutus (White-throated Needletail)	Vulnerable	Known to occur within the area	The White-throated Needletail is widespread in eastern and south-eastern Australia. In eastern Australia, the species is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Dividing Range and occasionally onto the adjacent inland plains. The White-throated Needletail is mostly aerial, from heights of less than 1 m up to more than 1000 m above the ground. They are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings. They have also been observed flying above farmlands and coastal areas including sandy beaches and mudflats, often in areas that create prominent updraughts. During the non-breeding season in Australia, the White-throated Needletail has been recorded eating a wide variety of insects, including beetles, cicadas, flying ants, bees, wasps, flies, termites, moths, locusts and grasshoppers. Nine records of White-throated Needletail are present within a 2 km locality according to Queensland WildNet and ALA sightings data, most recently in 2023. Ground changes to vegetation are likely to have little, if any, impact on the species' utilisation of the Site. The Site itself represents only a fraction of this species' potential area	**Likely**

Fauna MNES	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of occurrence on Site	Potential for Significant Impact
			of activity. However, given the species presence in the locality and utilisable habitat values, the White-throated Needletail has been assessed further in **Section 6.3.5**.	
Lathamus discolor (Swift Parrot)	Critically Endangered	Likely to occur within the area	The Swift Parrot breeds in Tasmania during the summer and the entire population migrates north to mainland Australia in autumn for the non-breeding season. Small numbers of migrating swift parrots (usually involving 1–5 or sometimes up to 12 birds) rarely reach SEQ (outer Brisbane and Ipswich areas, and occasionally Warwick, Toowoomba, Bundaberg areas), as this represents the northern extremity of their winter range (Debus pers. comm. 2021). Their occurrence in Queensland is related to the availability of food (or lack thereof) farther south (ibid). In periods of drought or lower foraging resources on the tablelands of the New England region to the south and south-west, swift parrots will seek foraging and shelter resources in coastal areas, traversing the Great Dividing Range escarpment to find suitable winter resources (Debus pers. comm. 2022). Occasionally when present in SEQ, swift parrots will remain for an extended period of time (the example being one bird which remained at Springfield Lakes for all of July 2019 (BirdLife Australia 2019)). Records of the Swift Parrot indicate that the main movement pathways in the region are along the Flinders/ Mount Goolman Range. Research within mainland over-wintering habitats has identified key foraging habitat types. In Southeast Queensland these habitats include the following key species: *Eucalyptus microcarpa, Eucalyptus melliodora, Eucalyptus robusta* and *Eucalyptus tereticornis*. Within these habitats, Swift parrots have been found to preferentially forage in large, mature trees that provide more reliable foraging resources than younger trees. Although they are also known to use a wider range of habitat types, they are thought to do so opportunistically as these do not provide the quality and quantity of resources upon which the species can depend. Disturbed areas may be used but are also thought to provide sub-optimal habitat insofar that co-existence with aggressive species that tend to inhabit such areas may be energetically expensive and reduce overall fitness and survival of the species (Saunders and Tzaros 2011). No records of Swift Parrot are present within a 2 km locality according to Queensland WildNet and ALA sightings data (**Attachment 4**). Limited winter flowering resources occurs within the Site. Suppressed and widely scattered *Eucalyptus tereticornis* (Queensland blue gum) occur within the Development Footprint and Site, and it is of limited extent (being restricted to a small number of immature to semi mature individuals). There is also limited	**Unlikely**

Fauna MNES	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of occurrence on Site	Potential for Significant Impact
			mature Queensland blue gum in the surrounding landscape, suggesting the Site does not provide a locally important movement pathway for this species.	
Numenius madagascariensis (Eastern Curlew)	Critically Endangered	Likely to occur within the area	Eastern Curlew are migratory shorebird species which breed in Siberia and eastern Russia and spend the non-breeding season in Australia. Within Australia they are distributed in all states and territories, with a mostly coastal distribution. They mainly forage on open intertidal mudflats or sandflats that are without vegetation or seagrass. They will also use also forages near mangroves, on saltflats or saltmarsh, around rockpools, amongst rubble on coral reefs, and on ocean beaches near the tideline. They preferentially use soft substrate with little or no hard materials. They feed mainly on crustations, although will also consume small molluscs ad some insects. While in Australia, they roost during high tide periods on sandy spits and islets, especially on dry beach sand near the high-water mark and amongst coastal vegetation, including low saltmarsh or mangroves. No records of Eastern Curlew are present within a 2 km locality according to Queensland WildNet and ALA sightings data. There are numerous records in the broader locality, the nearest being approximately 5.3 km east of Site in the vicinity of Morton Bay, and the most recent from 2023. The occurrence of this species is considered highly unlikely as the Site does not contain coastal-associated waterbodies or suitable intertidal foraging habitat that this species is known to occur within.	**Highly Unlikely**
Rostratula australis (Australian Painted Snipe)	Endangered	Likely to occur within the area	The Australian Painted Snipe occurs in shallow freshwater (occasionally brackish) wetlands, both ephemeral and permanent, such as lakes, swamps, claypans, inundated or waterlogged grassland/saltmarsh, dams, rice crops, sewage farms and bore drains, generally with a good cover of grasses, rushes and reeds, low scrub, lignum, open timber or samphire. The Australian Painted Snipe sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber. Breeding habitat requirements can be specific, requiring shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. Nest records are all, or nearly all, from or near small islands in freshwater wetlands, provided that these islands are a combination of very shallow water, exposed mud, dense low cover and sometimes some tall dense cover (Rogers et al. 2005). No records of Australian Painted Snipe are present within a 2 km locality according to Queensland WildNet and ALA sightings data.	**Highly Unlikely**

Fauna MNES	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of occurrence on Site	Potential for Significant Impact
			Given the extensive clearing the Site has been subjected to, the existing habitat is considered heavily degraded, and generally lacking the environments that typically reflect a freshwater wetland. The farm dams located south of the Site provide marginal habitat given the surrounding level of historic disturbance. Surrounding vegetation values to the dams do not represent ideal loafing habitat, appearing subject to periodic routine maintenance. As such, it is considered unlikely for the species to occur or have significant impacts from the Proposed Action that result in suitable habitat removed.	
Turnix melanogaster (Black-breasted Button-quail)	Vulnerable	Likely to occur within the area	Black-breasted button-quail occur in vine thickets, softwood scrubs, bottle tree scrubs, vine scrub regrowth, Lantana (*Lantana camara*) and other shrubs under mature Hoop Pine plantations, and Acacia and *Austromyrtus* scrubs on coastal soils. They search leaf litter for invertebrates and seed. They prefer deep, well-developed and extensive leaf-litter layer. No records of Black-breasted Button-quail are present within a 2 km locality according to Queensland WildNet and ALA sightings data. The occurrence of this species is considered highly unlikely as the Site does not exhibit the landscape characteristics that this species is known to occur within.	**Highly Unlikely**
AMPHIBIANS				
Mixophyes iteratus (Giant Barred Frog)	Vulnerable	Known to occur within the area	The Giant Barred Frog is widely distributed from Doongul Creek near Hervey Bay, southeast Queensland, to Warrimoo in the Blue Mountains, New South Wales. It is a habitat specialist which stays in the riparian zone year round, largely staying within a narrow strip of vegetation on either side of a stream or river, which provides it with deep, damp leaf litter required for shelter and foraging. It occurs near permanent flowing drainages from shallow, rocky rainforest streams to slow-moving rivers, primarily in lowland open wet-forests although can occur on cleared land. On occasion, the have been found in drier forest, degraded remnants and around dams. There are no suitable riparian habitats within the Site. No records of Giant Barred Frog are present within a 2 km locality according to Queensland WildNet and ALA sightings data. The occurrence of this species is considered highly unlikely as the Site does not exhibit the habitat characteristics this species is reliant upon. Flowing streams and damp leaf litter environments are not present.	**Highly Unlikely**

Fauna MNES	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of occurrence on Site	Potential for Significant Impact
MAMMAL				
Dasyurus hallucatus (Northern Quoll)	Endangered	Likely to occur within the area	The Northern quoll was once spread across the northern third of Australia, although its range is now restricted and is discontinuous across Australia. Core populations are in rocky and/or high rainfall areas. Within Queensland, they are found in the central and northern parts including upland rocky areas (Cape Cleveland/Mt Elliott, Mareeba, Crediton, Eungella, Clarke Range) and several coastal sites (Cleveland, Cape Upstart, Cape Gloucester, Condor Range). They occur in a variety of habitats without any specific requirements including rocky areas, eucalyptus forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. They generally occur in areas containing some form of rocky area for denning, although they have been found to shelter in rocky outcrops, tree hollows, hollow logs, termite mounds, goanna burrows and human dwellings. They forage opportunistically, feeding on a range of items according to season and availability. Items include invertebrates, fruits, vertebrates including mammals, birds and frogs, bird eggs, nectar and from garbage bins and road kill. Critical habitat is where they are least exposed to threats or least likely to be in the future, particularly rocky areas and offshore islands. Northern quolls have short life spans generally only surviving for one breeding season, with the oldest recorded being a three year old female. Female Northern Quolls occupy a home range of 35 ha, males home range is similar but can range over 100 ha during breeding season. No records of Northern Quoll are present within a 2 km locality according to Queensland WildNet and ALA sightings data. The occurrence of this species is considered highly unlikely as the Site does not exhibit the landscape characteristics that this species is known to occur within. Areas of remnant vegetation are preferred for habitat and larger contiguous tracts of remnant vegetation are preferred over isolated patches. The Site contains no remnant vegetation given the extent of historic clearing and continued disturbance associated with agricultural pursuits and rural residences. As such, the occurrence of the Northern Quoll is considered highly unlikely.	**Highly Unlikely**

Fauna MNES	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of occurrence on Site	Potential for Significant Impact
Dasyurus maculatus maculatus (SE mainland population) (Spot-tailed Quoll)	Endangered	Likely to occur within the area	The Spotted-tailed Quoll occurs from south-eastern Queensland to western Victoria in fragmented and isolated populations. They are solitary animals occurring at low density. Males have a home range of up to a few thousand ha, with females ranging several hundred ha. They have a preference for mature wet forest habitats with 600 mm/year rainfall, although have been found to occur in closed forests (temperate and sub-tropical rainforest), tall eucalypt forests, open woodlands, open forests, drier rainshadow woodlands and coastal heaths. They shelter during the day in fallen logs, boulder piles, burrows, tree hollows and occasionally under human dwellings. Spotted-tailed Quolls primarily prey on medium sized mammals including Ringtail Possum (*Pseudocheirus pererinus*), Common Brushtail Possum (*Trichosurus vulpecula*), Mountain Brushtail Possum (*Trichosurus caninus*), Greater Gilder (*Petauroides volans*) and Rabbit. They will also consume insects, lizards, crayfish, poultry, birds, small mammals, frogs, fish, plant material and human waste. No records of Spotted-tail Quoll are present within a 2 km locality according to Queensland WildNet and ALA sightings data. The occurrence of this species is considered highly unlikely as the Site does not exhibit the landscape characteristics that this species is known to occur within. The local region is too highly urbanised and fragmented to support anything beyond the extremely rare possibility of a vagrant individual.	**Highly Unlikely**
Petauroides Volans (Greater Glider (southern and central))	Endangered	Likely to occur within the area	Greater Glider (southern and central) are distributed from near Proserpine in Qld, to Wombat State Forest in central Victoria, occurring in elevation range from 0 – 1200 m. They are predominantly solitary, nocturnal arboreal marsupials. They occur in Eucalypt forests and woodlands, most frequently in taller, montane, moist eucalypt forests with fertile soils with large old trees holding abundant hollows, although have also been found in drier habitats in south east Qld. They feed primarily on eucalypt leaves, as well as buds and flowers. Greater gliders require tree hollows for shelter throughout the day. They have a preference for large hollows with a diameter > 10 cm in large old trees, although will use dead trees. One individual will use multiple dens, with probability of occurrence of Greater Gliders positively correlating with availability of tree hollows (Andrews et al. 1994; Smith et al. 1994a,b; Lindenmayer et al. 2020). In south east Qld, 2 -4 live den trees appear to be required for every 2 ha of suitable forest habitat (Eyre 2002).	**Possible**

Fauna MNES	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of occurrence on Site	Potential for Significant Impact
			There are two records of Greater Glider present within a 2 km locality according to Queensland WildNet and ALA sightings data, however spatial uncertainty is ~10 km or greater. The species is typically restricted to eucalypt forests and woodlands with larger, relatively old trees and abundant hollows. Patches of intact native vegetation of at least 160 km^2 are typically required to maintain viable populations. However, vegetated values on Site have potential to support an individual. This species has been assessed further in **Section 6.3.3**.	
Petaurus australis australis (Yellow-bellied Glider (south-eastern)	Vulnerable	Likely to occur within the area	Yellow-bellied Glider (south-eastern) occur in a patchy distribution from south-eastern Qld to far south-eastern South Australia in elevation range from 0 – 1400 m. In Queensland, it mostly occurs in a coastal distribution with isolated subpopulations in Blackdown and Carnarvon Ranges. They occur in eucalypt-dominated woodlands and forests, including wet and dry sclerophyll forests, with abundance largely determined on forest age and structure. They have a preference for large patches of mature old growth forest as well as a high proportion of winter-flowering and smooth barked eucalyptus from which loose bark hangs providing shelter for insect prey. They are unlikely to persist in forests dominated by one or two tree species due to a need for year round floristic diversity. They are a social subspecies living in family groups with a large home range of approximately 50 – 65 ha, a requirement for sufficient foraging trees for each season. It has been suggested that 320 km^2 is the minimum area required for a viable subpopulation in southern Qld (Eyre 2002). No records of Yellow-bellied Glider (south-eastern) are present within a 2 km locality according to Queensland WildNet and ALA sightings data. The species is typically restricted to eucalypt forests and woodlands with larger, relatively old trees and abundant hollows. Patches of intact native vegetation of at least 160 km^2 are typically required to maintain viable populations. Limited winter flowering resources occur within the Site. Suppressed and widely scattered *Eucalyptus tereticornis* (Queensland blue gum) occur within the Development Footprint and Site, and it is of limited extent (being restricted to a small number of immature to semi mature individuals). There is also limited mature Queensland blue gum in the surrounding landscape.	**Highly Unlikely**

Fauna MNES	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of occurrence on Site	Potential for Significant Impact
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) (Koala)	Endangered	Known to occur within area.	The Koala has a wide distribution across eastern Australian forests and woodlands. They are tree dwelling, obligate folivores feeding in a limited variety of *Eucalyptus*, *Corymbia* and *Angophora* species. They utilise up to 400 different species across their range for feeding and sheltering. They have special dietary requirements, which vary between region due to the chemical profile and water contend of their food, with both intra and inter-specific variability in palatability and nutritional content of the leaves. The size and context of their home range varies and can include patches of forest, riparian, linear and roadside vegetation associations, open ground, corridors and scattered paddock trees used for breeding or dispersal. Given the lack of mapped vegetation values on Site, the Site itself has a significantly reduced ability to support a population of the Koala. However, given the presence of regrowth vegetation, Koala records within the vicinity of the Site, and presence of tracts of remnant Koala supporting vegetation in the surrounding region, this species has been assessed as known to occur on Site and has been further assessed in **Section 6.3.1**.	**Known**
Pteropus poliocephalus (Grey-headed Fly-fox)	Vulnerable	Roosting known to occur within area	The Grey-headed Flying-fox occur from Rockhampton in central Queensland to Melbourne in Vicotria. The species migrate within a region in response to plant flowering and fruiting times resulting in local variation in occurrence and relative abundance. The Grey-headed Flying-fox selectively forages where food is available, using only a small portion of its range at any one time; resulting in intermittent and irregular local occurrence (Eby & Lunny 2002). The species feed on nectar and fruits in the canopy of rainforest, open forest, closed and open woodlands, *Melaleuca* swamp and *Banksia* woodlands; as well as commercial fruit crops and planted species in urban areas. The species will forage up to 40 km from their roost in one night. The species typically roost near water on exposed branches in rainforest patches, *Melaleuca*, mangroves and riparian vegetation, although are also know no use highly modified urban and suburban vegetation. No records of Grey-headed Flying-fox are present within a 2 km locality according to Queensland WildNet and ALA sightings data. While vegetation values on-site have been previously impacted, some suitable foraging habitat exists mostly in the form of regrowth. While the species hasn't been recorded within a 2 km locality on ALA, it is likely to be present as a flyover occurrence or for opportunistic foraging. Resultantly, this species has been assessed further in **Section 6.3.2**.	**Likely**

Fauna MNES	Threatened Status	Likelihood of Occurrence within 2km	Likelihood of occurrence on Site	Potential for Significant Impact
Xeromys myoides (Water Mouse)	Vulnerable	Likely to occur within the area	The Water Mouse has a disjunct, coastal and near coastal range across Queensland and the Northern Territory. Within south-east Queensland they occur from the Gold Coast and Morton Bay to the Great Sandy Strait and inland to Beerwah State Forest. The Water Mouse occurs in aquatic environments, including coastal saltmarsh, samphire shrublands, saline reed-beds and saline grasslands, mangroves, and coastal freshwater wetlands, and wet heathlands. They forage on tidal flats and around the waters edge, feeding on crustaceans, polyclad worms, pulmonated snails and bivalves. They construct mud based nests above the high tide mark for breeding and refuge. Habitat must provide for the species life stages including breeding, nest construction, foraging, refuge and dispersal, and so must include, but is not limited to: intact hydrology, prey resources, a defined supralittoral bank; and structures (tidal pools, channels, crab holes, pneumatophores, crevices in bark and around roots, hollows in standing and fallen timber/mangroves, suspended drifts of twigs and leaves and driftwood). No records of Water Mouse are present within a 2 km locality according to Queensland WildNet and ALA sightings data. The occurrence of this species is considered highly unlikely as the Site does not contain coastal-associated breeding habitat or suitable foraging habitat that this species is known to occur within.	**Highly Unlikely**

4.3 Other Matters of National Environmental Significance

4.3.1 World heritage areas

There is no mapped world heritage listed areas within the Site (2 km search) or buffer zone, no further assessment required (PMST, 2023).

4.3.2 National heritage places

There is no mapped national heritage listed places within the Site (2 km search) or buffer zone, no further assessment required (PMST, 2023).

4.3.3 Wetlands of international importance (listed under the Ramsar convention)

The PMST highlights that the Site falls within the 10 km buffer of the Ramsar wetland Moreton Bay. The Proposed Action will not have impact on this value. The Site does not contain any wetland protection areas and there was no further assessment required. Further explained in **Section 6.4**.

4.3.4 Commonwealth marine areas

There are no mapped commonwealth marine areas within the Site (2 km search) or buffer zone, no further assessment required (PMST, 2023).

4.3.5 Great barrier reef marine park

There is no mapped Great barrier reef park within the Site (2 km search) or buffer zone, no further assessment required (PMST, 2023).

4.3.6 Nuclear actions (including uranium mines)

There are no mapped nuclear actions within the Site (2 km search) or buffer zone, no further assessment required (PMST, 2023).

4.3.7 Water resources (that relate to coal seam gas development and large coal mining development).

There are no mapped water resources within the Site (2 km search) or buffer zone, no further assessment required (PMST, 2023).

5. Ecological Survey Methods

Flora and fauna surveys have taken place between 2020 and 2024 by Saunders Havill Group and 28 South. Surveys consisted of a variety of flora and fauna assessment with determining habitat extent that will be or are likely to be significantly impacted by the proposed action.

5.1 Flora Survey

Surveys have been conducted for a variety of purposes across this period, such surveys have included:

- validation of existing Queensland Government (Version 13.0) remnant RE mapping.
- target threatened flora species and their habitats identified from database searches.
- compilation of comprehensive floral inventory for all vegetation communities.
- BioCondition Assessment.

The below provides a summary of the survey effort:

- The Site was surveyed in compliance with the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland, Version 7* (Neldner et al. 2017). Assessment sites were performed throughout the Site surrounding vegetated areas so as to thoroughly assess Queensland Government mapped remnant vegetation.
- The validation and mapping of remnant vegetation was undertaken at a total of 8 vegetation assessment sites. Multiple sites were conducted within each RE type.
- Full tree survey, using differential GPS to <1 m accuracy.

5.2 Fauna Survey

Various fauna surveys have been conducted across the Site since 2020 by Saunders Havill Group and 28 South. Survey effort encompassed the entire Site and were generally guided by but not limited to the following methodologies:

- Survey guidelines for Australia's threatened bats.
- Terrestrial Vertebrate Fauna Survey Guidelines.
- Survey Guidelines for Australia's Threatened Mammals.
- EPBC Act referral guidelines for the endangered Koala.

Surveys have been conducted for a variety of purposes across this period, such surveys have included;

- 2020-2021
  - Observational survey for significant flora and fauna, habitat trees and biodiversity values.
  - Ground-truthing of vegetation communities.
  - Koala presence and habitat survey.
  - GPS Tree Plot.
- 2023
  - Tree Survey.

- Spot Assessment Technique.
- Habitat Assessment Techniques.

- 2024
  - Spot Assessment Technique.
  - Stag watching Spotlighting surveys.
  - Habitat Assessment Techniques.
  - Hollow bearing feature analysis.

5.3 Habitat Assessment

Habitat surveys were conducted by a team of five ecologists and botanists over the Site in January and March 2024. These surveys were detailed in nature and traversed the entirety of the Site as well as well vegetated adjoining lands. Surveys provided an insight into the ecological condition of vegetation communities within and adjoining the Site and potential for MNES fauna species or populations to occur within them. The purpose and description of each survey is provided in **Section 5.4**.

5.4 Field Survey Techniques

A range of field survey techniques were used as part of the ecological assessment for the Site. **Table 7** explains the purpose and description of each of the methods.

Table 7. Field Survey Techniques

Technique	Purpose	Description
Spotlighting	To determine the relative value of habitats for native fauna and compile a comprehensive fauna list.	Undertaken on foot through representative habitats, at a leisurely pace using hand-held spotlights and/ or head torches. This method samples nocturnal mammals (flying, arboreal and terrestrial), birds (owls and nightjars), reptiles (geckos) and amphibians. Spotlighting was undertaken between the 4th and 6th of March at dusk (approximately 6:30pm) and involved two ecologists traversing a 1 km transect line with two observers for a total of 265 minutes across the three nights.
Spot Assessment Techniques	The Spot Assessment Technique (**SAT**) was used to determine the localised level of use by koala.	Three SAT surveys were undertaken on Site in accordance with the methodology developed by the Australian Koala Foundation (Phillips, 2011). A Non-Juvenile Koala Habitat (**NJKHT**), which are known to be a food tree for koala, is identified within the Site and searched for the presence of koala, recording any identifiable koala scats.
Stag-watch Spotlighting	To determine the presence of significant species, including cryptic or rare species such as greater glider.	Undertaken on foot through representative habitats, using hand-held spotlights and/or head torches to search for target fauna. Surveys included intermittent nocturnal voice playback to elicit a response from target species. Greater glider specific field surveys to determine habitat suitability and species presence were undertaken at three different locations at dusk (approximately 6:30pm) with 2 observers between the 4th March and 6th March 2024. Each night the observer spent

Technique	Purpose	Description
		approximately 20-30 mins at the stag watch spotlighting location assigned. Spotlighting techniques utilised an adapted version of the Department of Sustainability and Environment (Victoria, Australia), Approved Survey Standards*: Greater Glider Petauroides volans (May 2011) (version 1.0)* while also using elements of the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (2018).* Importantly, the mythologies are focused on the detection of presence of greater glider, and are also sufficient to detect other MNES including koala and grey-headed flying-fox. Based on the aforementioned tree hollow assessment, spotlighting transects also ensured that hollow bearing features were included whilst also covering the entire Site on multiple occasions per night. NOTE: these methods require spotlighting teams to cover a minimum 1km transect at a pace of 10 minutes per 100m per the methods outlined within The Department of Environment, Land, Water and Planning Forest Protection Survey Program Survey Guideline – *Spotlighting and Call Playback (2020) (version 4.1) and Conservation Regulator Victoria Guidance Note: Reporting detections of Greater Gliders (2021)*. Each night over the survey period, numerous transects were undertaken to achieve the above requirements. During all transect walks any fauna species detected were required along the transect such as aves, amphibians, arboreal/terrestrial/flying mammals. This methodology is considered to be suitable for the detection of koala and grey-headed flying-fox and aligns with the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (2022).*
Hollow Bearing Feature Analysis	To review the mature vegetation's hollow bearing features of the Site with regard to the abundance, size and type of hollows supported within the Site.	All mature trees were inspected from the ground via binoculars to search for hollow bearing features and potential hollow bearing features. This occurred over three days by two experienced ecologists (60 person hours). Trees were also observed for a longer period of time where avian activity (notably species reliant on hollows) was high and where early evening possum activity was high.

5.5 Survey Limitations

While surveys are considered sufficient to detect relevant matters for consideration (namely MNES), ecological survey often fails to record all species of flora and fauna present in any location for a variety of reasons, including seasonal absence or reduced flowering during certain seasons; migratory patterns, cryptic behaviours; temporal survey periods; or population fluctuations. The ecology and nature of some significant and/ or cryptic species means that such species are potentially not recorded during short survey periods. This assessment has incorporated a level of assessment to overcome these limitations by identifying those species that were not recorded but still considered to have a potential of being present (based on known distribution, contemporary local records and habitat availability within the Site and immediate surrounds).

6. Findings of the Site Assessment

6.1 Vegetation and Flora

The vegetation on Site consists of sparse paddock trees and mowed lawn with retained vegetated patches, dams and fruit orchards.

Three (3) vegetation communities were present onsite and included:

- Vegetation Community 1 – *Eucalyptus siderophloia, Eucalyptus microcorys* and *Eucalyptus racemosa* open forest;
- Vegetation Community 2 – Sedgeland
- Vegetation Community 3 – Open areas, paddocks, lawns and gardens.

Further description of these vegetation communities is provided in the following sections.

6.1.1 Description of vegetation

6.1.1.1 Vegetation Community 1 – Eucalyptus siderophloia, Eucalyptus microcorys and Eucalyptus racemosa open forest

This community occurs adjacent to the northern boundary of the Site and is comprised of a variety of native species which are generally co-dominant. Canopy species are reasonably dense indicating a historical clearing event. there is a moderately dense midstorey comprised of *Corymbia intermedia* (pink bloodwood), *Lophostemon confertus* (brush box), *Lophostemon suaveolens* (brush box) and *Alphitonia excelsa* (red ash). Shrubs are sparse and consist of *Ochna serrulata* (ochna), *Lophostemon suaveolens* (brush box) and *Alphitonia excelsa* (red ash). Groundcovers are sparse, with the most common species being *Entolasia stricta* (wiry panic).

This community also extends further south on the Site, however, in these areas the midstorey, shrubs and native groundcover are absent due to grazing or mowing. Exotic species such as *Cynodon dactylon* (couch grass) dominate the groundcover.

6.1.1.2 Vegetation Community 2 – Sedgeland

This community is restricted to a small area near Morgan Road. It is dominated by *Machaerina rubiginosa* (soft twig rush). Other species include *Juncus usitatus* (Tall sedge), *Hypolepis muelleri* (swamp fern) and *Pultenaea myrtoides* (swamp pea). There is a large area of *Urochloa mutica* (para grass) present. This area is unlikely to contain acidic frog species due to the surrounding cleared land and exotic flora species present which are sensitive to low PH.

6.1.1.3 Vegetation Community 3 – Open areas, paddocks, lawns, gardens

This community occurs throughout the Site and is dominated by the exotic species *Cynodon dactylon* (couch grass). Other common species include *Paspalum notatum* (lawn paspalum), *Axonopus compressus* (broad-leaved carpet grass), *Setaria sphacelata* (pigeon grass), *Eragrostis brownii* (love grass) and *Ageratum houstonianum* (blue billy goat weed). There are various landscape trees such as *Macadamia integrifolia* (macadamia), *Melaleuca viminalis* (river bottle brush), *Pinus elliottii* (slash pine), *Eucalyptus grandis* (flooded gum), *Syzygium luehmannii* (riberry), *Buckinghamia celsissima* (ivory curl tree), *Jacaranda mimosifolia* (jacaranda) and *Araucaria cunninghamii* (hoop pine). *Macadamia integrifolia* occurs as a small plantation in the north of the Site – importantly this plantation is considered to be 'Not in the Wild' for the purposes of the NC Act and outside of its typically habitat.

6.1.2 Threatened Ecological Communities

Surveys did not identify any TECs listed as MSES under the EPBC Act. Surveys determined that tree species on the Site are generally consistent with the Regulated Vegetation Management Map (**RVMM**).

Based on the in-field assessment results, the known distribution and ecological/ biophysical requirements of the listed TECs, it is considered that no TECs are present on Site, nor would be present into the future. As such no TEC MNES will be impacted by the Action and no further assessment is required.

6.1.3 Threatened Flora Species

The likelihood of occurrence assessment completed for threatened species in accordance with the methodology outlined in **Section 4.2.2** is provided in **Table 4** of this report. The results of the likelihood of occurrence assessment for threatened flora indicates that no species of conservation significance are likely to occur within the Site.

The extent of flora species were ground-truthed within the Site via field surveys as outlined in **Section 5.1** of this report. Field surveys did not identify any threatened flora species listed as MNES under the EPBC Act[1]. Surveys determined that tree species on the Site are generally consistent with the RVMM.

Based on the in-field assessment results, the known distribution and ecological/biophysical requirements of the listed flora species, it is considered that no threatened flora are present on Site currently and given the on-going use/ management would be present into the future. As such no flora MNES will be impacted by the Action and no further assessment is required.

6.1.4 General Flora Species

As outlined in **Section 4.2.1** and **Section 4.2.2**, a respective summary of threatened TECs and flora MNES potentially on or within 2km of the Site was conducted. To further this assessment, and to address further information requested by DCCEEW, flora that comprise the balance of species on or potentially within Site has been conducted.

A flora species list derived from the botanical and BioCondition assessment is provided as **Attachment 5** and represents flora species detected on Site via these assessment methodologies. 167 species were identified, of which 105 were native, and 62 were exotic. Additionally, **Attachment 6** contains a species list derived from the tree survey performed across the Site to detail the general forested composition of the Site. 82 tree species were identified. Further, to outline the non-threatened/general flora species surrounding the Site, a species list was requested from the WildNet database for all species, both native and introduced, of any conservation status, for all records from 1980. These results are outlined in **Attachment 7** and indicated the records of five flora species.

6.1.5 Weeds

There are no Weeds of National Significance (**WONS**) that are recorded within or immediately adjoining the Site (DCCEEW, 2023).

6.2 Fauna Values

6.2.1 Connectivity

The Site and the surrounding area have undergone significant historical transformations due to widespread clearing, agricultural activities, and urban development, including the establishment of rural residential zones and transportation infrastructure. The riparian corridor of Saltwater Creek has been extensively cleared and altered over the past six decades, with multiple damming activities documented through aerial mapping (see **Figure 2**).

Remaining vegetation patches to the east, north, and southeast of the Site offer some stepping stone connectivity with additional green spaces and remnants further north and south, important for mobile fauna species such as birds, flying mammals, and to a lesser extent, climbing mammals and larger land mammals. However, the presence of roads like Callaghan Road and Morgan Road, as well as recent residential subdivisions to the north, southwest, and directly south, pose significant ecological barriers to fauna movement between these patches, particularly for ground-dwelling and to a lesser extent scansorial and glider species.

Beyond the immediate vicinity of the Site, habitats are transitioning from large rural residential lots to denser residential developments, accompanied by increased domestic animal presence and scattered street trees.

[1] or any CREVNT species ('in the wild') listed under the NC Act.

Connectivity further east is constrained by major roads like Burpengary Road and the Bruce Highway, while the Caboolture/ Sunshine Coast Rail Line runs to the west of the Site. Notably, the Site is relatively distant from larger patches of remaining intact forest areas, with the closest significant bushland parcels situated approximately 2 km to the east, beyond the Bruce Highway (as seen in **Figure 2**).

Vegetation east of the riparian corridor is sparse and fragmented by industrial activities along the Bruce Highway. The land south of Callaghan Road comprises a recently developed low-density residential area, with environmental reserves adjoining for conservation and recreational purposes. Consequently, connectivity beyond the Site is limited, emphasising the importance of preserving the riparian corridor of Saltwater Creek and the vegetation along the eastern edge of the Site.

Arboreal mammals like gliders and koalas, as well as macropods and other forest-dependent species, may utilise the higher ecological values along Burpengary Creek, Little Burpengary Creek, and Freshwater National Park to the east for movement opportunities, albeit becoming increasingly restricted to intact bushland habitats and preserved environmental corridors outlined in the Planning Scheme.

The Site itself contains scattered native and exotic trees within its boundaries, but many lack significant habitat features such as hollow-bearing limbs. While some faunal habitat features are present, the overall lack of vegetation structure diminishes the likelihood of substantial faunal populations relying solely on the Site's habitats. However, larger mature vegetation in the northern and northeastern parts of the Site offers higher quality habitats and connectivity to adjacent areas of vegetation to the east.

Lower-lying areas in the southern and eastern parts of the Site provide a local riparian corridor and movement habitat for mobile fauna species, particularly open-country birds, scansorial mammals, and flying mammals. Beyond the Site, lands to the north, southwest, and south have been developed into low-density residential areas with minimal ecological features, further restricting connectivity in the locality to lower drainage features supporting intact riparian vegetation and scattered patches of vegetation.

Vegetation associated with riparian areas beyond the Site remains somewhat connective, undergoing extensive rehabilitation and revegetation as surrounding lands are redeveloped for residential estates. However, local movement corridors intersected by roads and highways, like the Caboolture/ Sunshine Coast Rail Line and the Bruce Highway, impede fauna connectivity across the broader region, along with urbanised areas in Morayfield, Burpengary and Dakabin to the north and south, respectively.

The retained environmental areas outlined in the Master Plan, particularly along the eastern boundary and in the south of the Site, serve as steppingstone habitats and maintain connectivity through and around the Site from east to west. These areas will be preserved and enhanced as part of the Master Plan to ensure continued connectivity within the Site's ecosystem.

6.2.2 Fauna Habitat Assessment

Surveys described in **Section 5.2** involved the identification and spatial mapping of Non-Juvenile Koala Habitat Trees (**NJKHTs**) within the Site. All trees surveyed have area illustrated within a Conceptual Tree Plan (**Figure 6**) with their individual details shown within the associated Tree Schedule. During the spatial mapping of NJKHTs, visual scanning of trees for koala presence and evidence such as scratches and scats was undertaken. While koala habitat trees were observed across the Site, habitats supported within the Site represent a moderate quality habitat and context for koala, noting large domestic dogs present within the Site and goat fencing along a number of boundaries limiting ease of koala movement where canopy gaps exist.

The current contextual position in the landscape of these habitats' places koala at a high risk to impacts from vehicle strike and also potential for interaction with dogs (e.g. having to spend a longer period of time on the ground between shelter trees as opposed to higher quality habitats with interlocking canopies/ a higher density of shelter trees).

6.2.3 General Fauna Species

As outlined in **Section 4.2.3**, a summary of threatened fauna MNES potentially on or within 2km of the Site was conducted. To further this assessment, and to address further information requested by DCCEEW, fauna that comprise the balance of species on or potentially within Site has been conducted. To outline the non-threatened/general flora species surrounding the Site, a species list was requested from the WildNet database for all species, both native and introduced, of any conservation status, for all records from 1980. These results are outlined in **Attachment 7**. Fish have been removed from the species list as the Site does not contain adequate aquatic habitat to sustain fish species beyond isolated specimens introduced into dams. The list is dominated by highly mobile avi-fauna and mobile mammals that are assumed to stochastically utilise the Site from time to time. Avoidance, Mitigation and Management Measures (**Section 7**) remain applicable to these species to ensure potential impact is mitigated to the highest degree possible.

6.3 Threatened Fauna Species

The likelihood of occurrence assessment completed for threatened fauna in accordance with the methodology outlined in **Section 4.2.3** is provided in **Table 6.** Likelihood of occurrence of Fauna MNES potentially on or within 2km of the Site as per PMST.

Fauna surveys conducted by 28 South Environmental have identified one species that is known to utilise the Site, being the koala. Other species there were targeted during habitat surveys were the grey-headed flying-fox and greater glider. While it is considered unlikely that greater glider occurs on Site or within the locality around the Site, more detailed and thorough assessment of its habitat requirements and those present at and around the Site has been provide to demonstrate no suitable glider habitat is present or are gliders likely to occur.

Two other MNES threatened species, the white-throated needletail and grey-headed flying-fox, are likely to occur in proximity to, overfly and forage around the Site. The white-throated needletail is likely to utilise the air space above the Site, primarily in summer preceding rainfall and storm events, but is not expected to be reliant on on-ground habitat values. Consequently, it is not expected to be impacted by the Proposed Action. The Proposed Action will result in the removal of foraging resources (blossoming eucalypts) for grey-headed flying-fox.

6.3.1 Koala (*Phascolarctos cinereus*)

6.3.1.1 Habitat requirements

The koala, a specialist in leaf consumption, primarily feeds during dawn, dusk, or night. Its diet mainly consists of Eucalyptus spp. foliage but can include related genera such as *Corymbia* spp., *Angophora* spp., and *Lophostemon* spp. Additionally, it may consume foliage from other species like Leptospermum spp. and *Melaleuca* spp

While koalas have been seen interacting with up to 120 eucalypt species across Australia, individual koalas typically focus on obtaining nutrition from one or a few species in their vicinity. Preferences for specific species may vary depending on the region or season, making assessments of habitat quality based on local species preferences and availability crucial. Koalas exhibit distinct preferences even among trees within the same species, and experiments suggest that chemical anti-feedants may deter koalas from feeding on preferred foliage. This variability creates a nutritional patchiness, potentially leading to overestimations of high-quality habitat and food tree availability when assessing habitat based solely on species (DAWE, 2022).

6.3.1.2 Findings

Evidence of scats and scratches with one sighting was recorded during recent surveys of koala utilisation of trees on the Site. The Proposed Action in relation to the Development Footprint and mapped NJKHTs is shown in **Figure 7**.

Significant impact assessments have been conducted, in reference to the Matters of National Environmental Significance: Significant impact guidelines 1.1, for the MNES species that have potential to occur on Site, being the koala (**Section 8.1**).

The Commonwealth provides guidance on the assessment of Koala habitat (Department of Climate Change, Energy, the Environment and Water, 2022) and 28 South Environmental has adopted the methodology described in the recent publication by the Australian National University (Youngentob K.N, 2021).

Table 8: Applicable Koala habitat assessment criteria (Youngentob K.N, 2021)

Section of the Report	Habitat assessment criteria	Relevance to Proposed Action
3.2	Locally important Koala tree *The document states "The combination of koala occurrence and LIKT provides a strong indication that an area is koala habitat. However, it is important to recognise that the absence of koalas does not mean that an area with LIKT is not potential koala habitat."*	The Development Footprint includes LIKTs. The Development Footprint is noted as being 13.19 ha, with impacted vegetation noted as being 3.9 ha. Vegetation community values that support the species are described in **Section 6.1.1**
3.2	Ancillary habitat The document states *"In some areas, the availability of certain tree species and other vegetation types not commonly recognised as important food may still be essential for koala survival due to the shelter or other resources they provide"*	The Development Footprint includes Ancillary Habitat. Vegetation community values that support the species are described in **Section 6.1.1**
4	Open ground The document states "…*the ground itself forms an essential component of koala habitat"*	The Development Footprint is largely comprised of 'Open Ground'. The Development Footprint is noted as being 13.19 ha, with impacted vegetation noted as being 3.9 ha. Thus the majority (9.29 ha or 70%) of the Development Footprint is comprised of 'Open Ground'.

Significant impact assessments have been conducted, in reference to the Matters of National Environmental Significance: Significant impact guidelines 1.1, for the MNES species that have potential to occur on Site, being the koala (**Section 8.1**).

6.3.2 Grey-headed Flying-fox (*Pteropus poliocephalus*)

6.3.2.1 Habitat requirements

The grey-headed flying-fox occupies the coastal lowlands and slopes of southeastern Australia from Bundaberg to Geelong. It is usually found at altitudes < 200 m. Areas of repeated occupation extend inland to the tablelands and western slopes in northern New South Wales and the tablelands in southern Queensland.

The grey-headed flying-fox requires a continuous sequence of productive foraging habitats, the migration corridors or stopover habitats that link them, and suitable roosting habitat within nightly commuting distance of foraging areas. Areas with these characteristics are considered to be habitat critical to the survival of the grey-headed flying fox. On the basis of current knowledge, foraging habitat that meets at least one of the following criteria can be explicitly identified as habitat critical to survival, or essential habitat, for grey headed flying-foxes.

Natural foraging habitat that is:

- Productive during winter and spring when food bottlenecks have been identified;
- Known to support populations of > 30,000 individuals within an area of 50 km radius (the maximum foraging distance of an adult);

- Productive during the final weeks of gestation, and during the weeks of birth, lactation and conception (September to May);
- Productive during the final stages of fruit development and ripening in commercial crops affected by grey-headed flying-foxes (months vary between regions); and
- Known to support a continuously occupied camp.

Grey-headed flying-fox roosts in large aggregations in the exposed branches of canopy trees. The locations of camps are generally stable through time, and several sites have documented histories that exceed 100 years. Camps provide resting habitat, sites of social interactions and refuge for animals during significant phases of their annual cycle, such as birth, lactation and conception. On the basis of current knowledge, roosting habitat that meets at least one of the following criteria can be explicitly identified as habitat critical to survival, or essential habitat, for grey-headed flying-foxes.

Roosting habitat is that which meets one or more of the following criteria:

- Is used as a camp either continuously or seasonally in > 50% of year
- Has been used as a camp at least once in 10 years (beginning in 1995) and is known to have contained > 10,000 individuals, unless such habitat has been used only as a temporary refuge, and the use has been of limited duration (i.e. in the order of days rather than weeks or months); and
- Has been used as a camp at least once in 10 years (beginning in 1995) and is known to have contained > 2,500 individuals, including reproductive females during the final stages of pregnancy, during lactation, or during the period of conception (i.e. September to May).

6.3.2.2 Findings

Surveys did not detect the presence of grey-headed flying-fox. No roosts were detected within or in the surrounding peripheral to the Site. Vegetation within the Site is considered to provide 3.9 ha foraging habitat for this species, given the distribution of important winter and spring flowering species including Corymbia and Eucalypts within the Site. The nearest recorded grey headed flying fox roost is approximately 3.2 km away from the project location.

Significant impact assessments have been conducted, in reference to the Matters of National Environmental Significance: Significant impact guidelines 1.1, for the MNES species that have potential to occur on Site, being the grey-headed flying fox (**Section 8.2**).

6.3.3 Greater Glider (*Petauroides Volans*)

6.3.3.1 Habitat requirements

The greater glider is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria (Wombat State Forest), with an elevational range from sea level to 1,200 m above sea level. The greater glider is a nocturnal species largely restricted to *Eucalyptus* sp. and woodlands. The species primary diet is the *Eucalyptus* leaves with occasionally flowers. It is typically found in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows (DCCEEW, Guide to greater glider habitat in Queensland, 2022). Larger trees within a forest stand are favoured for both foraging (>30 cm DBH) and denning (>50 cm DBH) (Eyre, et al., 2022). Thus, greater gliders are more likely to occur and reach higher densities where larger trees are more common. In Queensland, greater gliders are more common in moist Eucalypt-forest compared to drier forest types, which may be due to higher site productivity, higher leaf nutrient status and lower foliar toxin concentrations (Eyre T. J., 2006). The most commonly used species for foraging by the glider are *Corymbia citriodora, C. intermedia, Eucalyptus fibrosa, E. moluccana and E. portuensis* being the most frequently recorded feeding observations.

The species is an arboreal folivore dependent on large tree hollows (Kavanagh & Lambert, 1990; Comport, Ward, & Foley, 1996; Eyre T. J., 2006; Smith, Mathieson, & Hogan, 2007; Jensen, Wallis, & Foley, 2015; Hofman, Gracanin, & Mikac, 2022) for shelter and breeding, and the loss of this habitat resource has been closely linked to greater glider decline. The greater glider dens within large tree hollows in diurnal periods with a preference of larger

hollows with a diameter >100 mm, generally in larger older trees. Greater gliders occupy hollows with a mean entrance diameter of 181 ± .6 mm (range 80 – 350 mm) (Kehl & Borsboom, 1984). Den trees range in size from 300 mm to 1930 mm DBH with 81% over 500 mm DBH (Kavanagh & Wheeler, 2004; Smith, Mathieson, & Hogan, 2007). The availability of tree hollows is considered a key limiting resource for the greater glider (DCCEEW, Guide to greater glider habitat in Queensland, 2022). The DCCEEW Conservation Advice states, "*The probability of occurrence of the species is positively correlated with the availability of tree hollows, which is a key limiting resource*." It is also noted, statutory documents advise that in southern Queensland, greater gliders require a minimum of 2-4 live den trees within each 2 ha of suitable habitat (Eyre T. J., 2002). The abundance of greater glider is positively related to the number of live hollow-bearing trees, from 0.7 gliders predicted per 3 ha with one hollow-bearing tree ha-1 to 2.3 gliders with 8 hollow-bearing trees ha-1 (Eyre T. J., 2006).

Greater glider tends to occupy hollows in ecologically mature live trees (Comport, Ward, & Foley, 1996; Kavanagh & Wheeler, 2004; Smith, Mathieson, & Hogan, 2007). As larger trees are older, they have had more time for hollow-forming processes to operate (Mackowski, 1984).Therefore, larger trees 1) have a higher probability of having hollows, 2) have a higher number of hollows and 3) are more likely to have large hollows. Due to its patchy use of habitat and limited dispersal ability the greater glider may have difficulty persisting in smaller, isolated forest stands. Habitat critical to the survival of the greater glider is defined as (DCCEEW, Guide to greater glider habitat in Queensland, 2022):

- Large contiguous areas of eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species' preferred food species in a particular region.
- Smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonization.
- Cool microclimate forest/woodland areas (e.g. protected gullies, sheltered high elevation areas, coastal lowland areas, southern slopes).
- Areas identified as refuges under future climate changes scenarios.
- Short-term or long-term post-fire refuges (i.e. unburnt habitat within or adjacent to recently burnt landscapes) that allow the species to persist, recover and recolonise burnt areas.

6.3.3.2 Findings

The likelihood of occurrence assessment of the greater glider outlined that this species is unlikely to occur within the Site and the surrounding locality. The locality lacks suitable habitat characteristics defined by the Guide to greater glider habitat in Queensland (Eyre, et al., 2022).

In-field assessments specifically focused on greater glider habitat assessment and detection of this species through various survey methods. This included:

- A review of suitable denning tree and hollow bearing features;
- A review of suitable foraging habitat and connectivity within/beyond the Site;
- Stag watching surveys; and
- Targeted spotlighting transects within the Site and adjoining habitats in accordance with *The Department of Environment, Land, Water and Planning Forest Protection Survey Program Survey Guideline – Spotlighting and Call Playback (2020) (version 4.1)* and Conservation Regulator Victoria Guidance Note: *Reporting detections of Greater Gliders (2021).*

Results of the in-field surveys confirmed a distinct lack of suitable hollow bearing trees within the Site. In-field assessments also failed to detect the presence of greater glider; however, did observe an abundance of competitive species (e.g. brush-tail possum (*Trichosurus vulpecula*)). To further assess the Site's habitat values and its relevance to greater glider, an assessment of the Site's attributes against the Conservation Advice's definition of '*habitat critical to the survival*' of greater glider has been undertaken. This assessment also considers the qualitative and quantitative attributes of greater glider habitat as noted in the *Guide to greater glider habitat in Queensland*

(Eyre, et al., 2022). Both documents and their provisions are presented in relevance to the Site in **Table 9** and **Table 10** respectfully.

Table 9: Habitat critical to the survival of greater glider assessment

Habitat Definition	Relevance to Site	Conclusion
Large contiguous areas of eucalypt forest, which contain mature hollow-bearing trees[2] and a diverse range of the species' preferred food species in a particular region.	The Development Footprint and surrounding locality have been subject to historical clearing (refer **Table 2**). The Development Footprint occurs over lands which largely support scattered eucalypts with limited preferred feed tree species. No suitably large hollow bearing trees are noted within the Site. The Development Footprint does not form a component of a large area of contiguous eucalypt forest and has numerous ecological barriers between areas of intact habitat such as major rail lines, highways and dense urban development areas.	The Development Footprint does not support large contiguous tracts of eucalypt forest. The Development Footprint does not represent Habitat critical to the survival of the greater glider.
Smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonization	As noted above, the Site is not connective with any large areas of intact habitat and severed by major ecological impediments such as the Bruce Highway 1.5 km to the east, the main northern rail line 800 m to the west and dense residential development to the north and south. While minor lower, riparian areas are present, these are regularly severed by these significant ecological barriers.	The Development Footprint is not connected to larger patches of habitat. The Development Footprint does not represent Habitat critical to the survival of the greater glider.
Cool microclimate forest/woodland areas (e.g. Protected gullies, sheltered high elevation areas, coastal lowland areas, southern slopes)	The Proposed Actions' Development Footprint does not provide components of intact gullies or sheltered high elevation areas or coastal lowland forests. As noted above, historical clearing, major ecological barriers and residential development sever the Site from these ecological features.	The Project does not represent microclimate forest/woodlands. The Development Footprint does not represent Habitat critical to the survival of the greater glider.
Areas identified as refuges under future climate changes scenarios	The Proposed Action's Development Footprint would not provide suitable climate change refugia for greater gliders. Existing land uses will continue and as the area's planning scheme amendments integrate the Site and surrounding areas into the emerging community zones, the land will be developed for urban	The Development Footprint does not offer refugia from climate change scenarios. The Development Footprint does not represent Habitat critical to the survival of the greater glider.

[2] Tree hollows can be difficult to detect in ground-based surveys. The presence of trees with diameter at breast height > 30 cm can be used as a proxy measure for tree hollows used by greater gliders in Queensland (Eyre, et al., 2022)

Habitat Definition	Relevance to Site	Conclusion
	purposes in the short term (next five years).	
Short-term or long-term post-fire refuges (i.e. Unburnt habitat within or adjacent to recently burnt landscapes) that allow the species to persist, recover and recolonise burnt areas	The Proposed Actions' Development Footprint does not provide connectivity to areas of intact forest and would not be accessible post bushfire events to glider populations. As noted above, historical clearing, major ecological barriers and residential develop sever the Site from these ecological features.	The Development Footprint is not connective to larger areas of habitat and would be accessible in the short or long term after bushfire scenarios in distant known habitat areas. The Development Footprint does not represent Habitat critical to the survival of the greater glider.

Table 10. Guide to greater glider habitat in Queensland

Qualifier	Relevance to Site	Conclusions
Habitat: ▪ Regional ecosystems with confirmed greater glider records ▪ Contains habitat attributes (but not necessarily all attributes), such as live and dead hollow-bearing trees for denning, feed trees, large trees, habitat connectivity across the landscape	The Development Footprint does not contain any areas of remnant regional ecosystems. The Development Footprint does not contain any suitable large hollows. It is also noted, statutory documents advise that in southern Queensland, greater gliders require a minimum of 2-4 live den trees within each 2 ha of suitable habitat. Given the above and lack of records the Development Footprint does not contain suitable denning habitat nor does it contain any Remnant Vegetation and is not considered 'habitat' for greater glider.	The Development Footprint is not considered 'Habitat' with regard to the Guide to greater glider habitat in Queensland.
Potential Habitat ▪ Regional ecosystems that do not have confirmed greater glider records but are identified by experts as potential greater glider habitat ▪ Contains habitat attributes (but not necessarily all attributes), such as live and dead hollow-bearing trees for denning, feed trees, large trees, habitat connectivity across the landscape	The Development Footprint does not contain any areas of Remnant regional ecosystems. The Development Footprint does not contain any suitable large hollows. It is also noted, statutory documents advise that in southern Queensland, greater gliders require a minimum of 2-4 live den trees within each 2 ha of suitable habitat. Given the above and lack of records the Development Footprint does not contain suitable denning habitat nor does it contain any Remnant Vegetation and is not considered 'potential habitat' for greater glider.	The Development Footprint is not considered 'Potential Habitat' with regard to the Guide to greater glider habitat in Queensland.
Not Habitat ▪ Regional ecosystems with no confirmed records of greater gliders, and identified by experts as non-habitat ▪ Does not contain habitat attributes such as live and dead hollow-bearing trees for denning, feed trees, large trees, habitat connectivity across the landscape.	The Development Footprint does not contain Remnant Vegetation, nor does it contain records of greater gliders. The Development Footprint does not contain any suitable denning features such as live and dead hollow-bearing trees not is it connective with larger tracts of suitable habitat.	The Development Footprint is considered to be 'Not Habitat' with regard to the Guide to greater glider habitat in Queensland.

6.3.4 South-eastern Glossy Black-Cockatoo (*Calyptorhynchus lathami lathami*)

6.3.4.1 Habitat requirements

Glossy Black Cockatoos have a patchy distribution along the east coast and ranges south from near the Paluma Range in north QLD to the Gippsland region in Victoria. An isolated population is located on Kangaroo Island in South Australia. Three subspecies are recognised throughout this range, the south-eastern subspecies (*Calyptorhynchus lathami lathami*) occurs from around Bundaberg south into Victoria. This subspecies was listed as Vulnerable on the 10 August 2022 (DCCEEW, 2022) due to substantial declines (30-50%) in the last three generations (Cameron M. , 2009), (DCCEEW, 2022). While declines are mostly attributed to the 2019-20 bushfires, historical and contemporary habitat loss has resulted in a retraction in both Area of Occupancy and Extent of Occurrence. The species is modelled to have declined by 16% in three generations had the fires not occurred (DCCEEW, 2022).

Birds inhabit woodlands and forests that have abundant *Allocasuarina* trees and abundant large hollows suitable for nesting. Many populations are restricted to remnant vegetation within hills and gullies surrounded by agricultural land (Higgins 1999); however, some populations move through artificial landscapes such as semi-urban parks, gardens and golf courses to access favoured food resources (Higgins, 1999), M. Sanders pers. obs.). Groups are never far from waterbodies, which are visited daily.

Typically encountered in small family parties, the Glossy Black Cockatoo is a dietary specialists, feeding exclusively on the seeds in *Allocasuarina* and *Casuarina* spp. Typically birds rely on one or two species within a region (Higgins, 1999) and in south-east Queensland this includes *A. torulosa* and *A. littoralis* (Conservancy Glossy Black, 2010); other species that are taken infrequently include *Corymbia equisetifloia*, *Corymbia cunninghamiana*, and *Corymbia glauca* (DCCEEW, 2022). Observations of the species feeding on other resources (e.g., Callitris and Banksia) are likely to represent food switching during periods of poor *Allocasuarina* cone production (Chapman T. F., 2007).

Birds show a preference for productive trees (e.g., higher seed/fruit weight ratio), notwithstanding the influence of other factors such as distance from water or breeding hollows (Clout, 1989); (Pepper, 2000); (Crawley, 2001); (Cameron M. a., 2006); (Chapman T. F., 2006); (Chapman T. F., 2007). Stands of *Allocasuarina* are therefore not of uniform value, and the loss of individual stands or trees may have disproportionate impacts. The production of cones by *Allocasuarina* trees closely tracks rainfall (Cameron M. , 2006), and hence the availability of resources for resident Glossy Black Cockatoos fluctuates between years. While resources may be sufficient to support existing birds, drought is likely to reduce breeding success (Cameron M. , 2009).

Pairs breed during winter, mainly from April to July, although breeding has been recorded as late as August or as early as March (Beruldsen, 2003). Nests are located in a large hollow typically with the following features: (i) > 8 m above the ground, (ii) in branches >30cm in diameter, (iii) branch no more than 45o from vertical and (iv) minimum hollow entrance of >15cm (Cameron M. , 2006). Hollows may be reused over many years (Beruldsen, 2003). On Kangaroo Island nest trees are within 1.5 km (average 200m) of food resources and 200m of water, though birds can commute up to 14 km (average 2.9km) between primary feeding and nesting areas (Garnett, 1999), (Mooney, 2005).

Females incubate and care for the young alone but are regularly attended and fed by the male. Only one egg is produced, which hatches in about 30 days. Once hatched the chick fledges in around 60 days but remains with its parents and is fed for another three months (Garnett, 1999).

6.3.4.2 Findings

The Development Footprint, Site and surrounding habitats did not support suitable nesting trees given historical clearing events and regenerating nature of mature trees. As such, the Development Footprint does not represent breeding habitat for this species.

Vegetation values on-site have been previously impacted to the extent that suitable foraging habitat containing the required tree species by the South-eastern Glossy Black-Cockatoo is severely limited. While black she-oak has been identified on Site (four individuals noted from bio-condition surveys), individuals were scattered and limited to approximately <10 trees which occur outside of the Development Footprint (and can be retained as a part of the

Proposed Action). Trees were identified as immature, and few cones were observed on the individual specimens or on the ground. Other required vegetative assemblages to support the species were not identified. Given the low abundance of records in the locality and lack of significant assemblages of forage trees and hollows across the Development Footprint and surrounding locality, the likelihood of the South-eastern glossy black-cockatoo occurring on Site is unlikely. As such, no further assessment is warranted nor are any impacts expected. The Proponent also has the ability to establish foraging resources with the Avoidance Area of the Proposed Action and it is likely to be a component of the educational curriculum for future students.

6.3.5 White-throated needletail (*Hirundapus caudacutus*)

6.3.5.1 Habitat requirements

The White-throated Needletail is widespread in eastern and south-eastern Australia. In eastern Australia, the species is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Dividing Range and occasionally onto the adjacent inland plains. The White-throated Needletail is mostly aerial, from heights of less than 1 m up to more than 1000 m above the ground. they are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings. They have also been observed flying above farmlands and coastal areas including sandy beaches and mudflats, often in areas that create prominent updraughts. During the non-breeding season in Australia, the White-throated Needletail has been recorded eating a wide variety of insects, including beetles, cicadas, flying ants, bees, wasps, flies, termites, moths, locusts and grasshoppers.

6.3.5.2 Findings

Threats to white-throated needletail are not considered likely from the Proposed Action. The Site or Proposed Action will not result in the loss of breeding habitat, secondary poisoning or loss of prey due to organochlorine use and wind turbine mortality. The decline in populations of white-throated needletails is most likely attributed to loss of breeding habitat in Siberia (TSSC, 2019). Within Australia they are aerial foragers which can be observed hunting over almost every type of land-based ecosystem including urban areas. Loss of vegetation is unlikely to have a significant impact, though some have suggested forest loss may impact prey (aerial insect) abundance or limit roosting Sites (TSSC, 2019).

The Proposed Action will result in some vegetation loss (3.9 ha), though the majority is regrowth or widely scattered vegetation over the Site. This could hardly be considered important to the species considering the Sites location in a fragmented landscape or the abundance of similar vegetation in the broader region. The species is highly mobile and will readily avoid mortality from clearing. As such, no further assessment is warranted nor are any impacts expected.

6.4 Other Matters of National Environmental Significance

The Moreton Bay Ramsar wetland is on the coastline directly 5.4 km east. The Proposed Action is not expected to result in:

- Destruction or substantial modification of the wetland;
- Substantial or measurable change in the hydrological regime of the wetland;
- Impact to the habitat or lifecycle of native species that occupy the wetland;
- Substantial and measurable change in the water quality of the wetland; and
- Invasive species that is harmful to the ecological character of the wetland.

Consequently, the Proposed Action is not expected to result in a significant impact to the Moreton Bay Ramsar Wetland, per the Significant impact guidelines 1.1 (DoE, 2013). Therefore, the potential impacts of the Proposed Action on the Ramsar wetland are not considered any further in this Report. There are no other MNES places, properties or areas within proximity to the Site.

7. Avoidance, Mitigation and Management Measures

The mitigation hierarchy is a tool that is used to limit the amount of damage an action, such as a development, will have on the environment. There are three steps, being 'Avoid', 'Mitigate' and 'Offset'. Each step must be followed in order and to the greatest extent possible before moving on to the next. This section provides discussion on the measures that have been adopted to avoid, in the first instance, then minimise potential impacts to MNES and their habitat.

7.1 Ecologically Sustainable Development

The principles of Ecologically Sustainable Development (**ESD**), as defined by section 3A of the EPBC Act, are:

a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;

b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;

c) the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;

d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making; and

e) improved valuation, pricing and incentive mechanisms should be promoted.

Discussion on how the Proposed Action aligns with these five overarching principles of ESD is provided below.

7.1.1 Principal (a)

This Report provides detail on the short and long term ecological effects of the Proposed Action. However, it is also well documented that South East Queensland is experiencing accelerated population growth, with the regional population expected to reach 6 million by 2046[3] (DSDILGP, 2023). An increasing population is coupled with a growing demand for housing, as well as supporting services and infrastructure, such as education facilities.

The Proposed Action includes provision of new prep- year 12 school, Narangba Catholic College to support the population growth in the area.

7.1.2 Principal (b)

This Report outlines investigations undertaken to determine the inherent environmental values of the Site and its role in the broader landscape. The investigations are comprehensive and scientifically robust, and where minor uncertainty exists the precautionary principle has been adopted.

7.1.3 Principal (c)

In conjunction with strategic orientation of the development plan, the Proposed Action relies heavily on the 'Avoid' principle of the mitigation hierarchy and represents a development outcome that, when coupled with the provision of on-site compensation and offsets, will provide a better ecological outcome for the MNES of relevance.

[3] Current population 3.8 million

7.1.4 Principal (d)

The conservation of biological diversity and ecological integrity is a primary focus of the design of the Proposed Action and the assessment thereof. Ecologically conscious infrastructure design contributes to the avoidance of those identified features. Making a well-informed referral application ensures DCCEEW, as a decision-maker, can ensure an appropriate balance of biodiversity and ecological conservation is upheld.

7.1.5 Principal (e)

The costs for addressing biodiversity impacts arising from the Proposed Action are imposed solely on the Proponent.

7.2 Impact Avoidance

7.2.1 Alternative Sites

Educational demand modelling has identified an emerging need for new educational facilities in proximity to residential growth areas in Narangba and surrounding suburbs. The suitability of the Site for development is indicated, in part, by the local land use zoning (**Section 3**), with the Site spilt zoned both Rural Residential and Emerging Community Zone, and further identified within the Transition precinct of the Emerging Community Zone. Consequently, the Proposed Action is compatible with the identified development intent. In order to review a property or an amalgamation of properties suitability, the following optioneering is undertaken by the Proponent:

- The Proponent, as part of its future growth strategy, continues to identify and acquire land to service the needs of a growing population.
- These opportunities exist in both new growth areas, as well as existing urban areas, and interact with our existing school network to meet demand. The Proponent continually investigates opportunities surrounding existing schools to expand to meet future needs.
- The Proponent purchased 156 – 180 Callaghan Road and 2 and 40 Morgan Road, Narangba between 2017 and 2019, for the purposes of a Prep to Year 12 school.
- The proposed school site area comprises 13 ha of land which is situated within a key growth corridor of Brisbane.
- The surrounding catchment is also experiencing further renewal, with several residential developments as well as shopping centre precincts being developed in the locality.
- The catchment is projected to increase by 92,360 total persons by 2041, placing additional strain on the existing school network through an additional estimated 18,000 school aged persons.
- The Queensland Schools Planning Reference Committee - a cross-sectoral schools planning group determines the requirement for three schools to be built in the Narangba region by 2046.
- The proposed Prep-12 school will be home to over 1,800 students and 280 staff upon completion, helping to respond to the education needs of the growing community.

As the Site meets the various critical parameters required to deliver the necessary schooling in the locality coupled with the relatively low impacts identified through due diligence, no alternative sites have been considered for the Proposed Action.

7.2.2 Impact Avoidance Through Design

The proposed Master Plan has been designed and orientated to avoid disturbance to remnant vegetation, whilst achieving the footprint requirement for a Prep-Grade 12 school and their ancillary facilities (**Section 2**). These areas of higher value habitat are avoided and designated as a CKH Area as a part of conservation efforts.

By avoiding development in the eastern portion of the Site, the Proponent ensures the preservation of local connectivity for fauna movement across the Site and broader landscape. This strategic approach prioritises the protection of areas with higher ecological significance, thereby minimising environmental impact and maintaining movement opportunities around and through the Site (noting the use remains permeable to most fauna).

Given the presence of mapped CKH areas and the Site's location within the State's Koala Protection Area (**KPA**), the proposed Master Plan has undergone extensive scrutiny and refinement. Through multiple design iterations, the design team have considered and incorporated measures to safeguard and enhance opportunities for koala movement, ensuring the protection of the endangered species and their habitat.

Table 11: Avoidance and mitigation through design

Mitigation Matter	Consideration in Design
Koala habitat	The Master Plan has been designed to retain Koala habitat areas as far as practicable within the Development Footprint. The Master Plan retains 1.50 ha of CKH within the Avoidance Area along the northern and eastern boundary. The Master Plan includes open space and recreation areas void of built infrastructure adjoining and buffering the retained CKH area. As such, the Development Footprint has been designed such that the Proposed Action will not result in potential future consequential clearing into areas of retained Koala Habitat. The Proposed Action will include the provision of restoration works within the retained remnant vegetation corridor on-site. Such work will incorporate assisted natural regeneration methods to actively remove pest plant infestations from within the remnant vegetation.
Fauna movement	The Master Plan has been designed with consideration of the ecological and environmental values of the Site's context in the locality. Fauna movement opportunities will be retained and improved within and around the Site. Given the Proposed Actions use (educational facility), fauna movement through the Site will be largely uninhibited outside of school hours and weekends.
Threatened Ecological Communities	The Master Plan has been designed to avoid direct impacts to any important vegetation communities and does not impact any TECs.
Protection of retained vegetation	The Master Plan has been designed such that retained vegetation will be protected from potential future consequential clearing. The Proposed Action includes provision of restoration works within the Avoidance Area within the Site.
Lighting	The Master Plan has been designed such that buildings and associated facilities likely to result in light spill have been sited such that impacts to fauna are minimized once the Proposed Action is operational. It is noted that the Proposed Action is for an Educational Facility and associated education/ care uses which generally have limited hours of operation. To further minimise impacts to fauna from light spill, sensitive lighting design will be incorporated into the detailed design of the Proposed Action.

7.3 Impact Minimisation Through Mitigation

The Proposed Action has taken into consideration the Site's ecological, environmental and landscape character when considering impact avoidance and mitigation. While largely reliant on avoidance, impacts from the Proposed Action can be further mitigated and minimised.

The following mitigation measures will be implemented to ensure that impacts to MNES and their habitat that cannot be avoided are minimised to the greatest extent possible:

3. Development and implementation of a Construction Environmental Management Plan (**CEMP**) to outline relevant environmental requirements for undertaking the works;

4. Hours of work will be limited to Monday to Saturday between 6:30 am to 6:30 pm, excluding public holidays, thereby avoiding potential nighttime disturbance from noise, vibration and lighting.

5. An Erosion and Sediment Control Plan will be developed, certified by a Registered professional Engineer Queensland (**RPEQ**) or an accredited professional in erosion and sediment control, and implemented.

6. Implementation of weed management and controls across the Site and reestablishment of native grasses;

7. The extent of permissible clearing will be clearly demarcated by an ecologist prior to the commencement of construction works to prevent clearing in excess of the approved footprint of works.

8. Felled trees will be mulched on-site for use in rehabilitation works. Other habitat features (e.g. boulders, logs etc.) will be retained and reinstated across the disturbed footprint as part of Site rehabilitation works.

9. A licensed Wildlife Spotter/Catcher under the *Nature Conservation Act 1992* is to undertake a survey of the site to identify any fauna or habitat features (e.g. nests, tree hollows) and certify that any necessary fauna protection measures or relocation procedures have been implemented.

7.4 On Site Compensation

A 2.35 ha Avoidance Area, which includes CKH, has been incorporated into the development plan for the Proposed Action (**Figure 5**). This area will be subject to post-construction infill planting and management to provide compensation for impacts across the Development Footprint and provide a long-term ecological benefit to the Site, relative to present day condition.

8. Assessment against Significant Impact Guideline 1.1

The following sections provide significant impact assessments under the MNES Significant Impact Guidelines 1.1 (DoE, 2013) for the koala.

8.1 Koala

The koala is an Endangered species under the EPBC Act and therefore the significance of impact on this matter has been assessed against the significant impact criteria for 'Critically endangered and endangered species' in the MNES Significant impact guidelines 1.1 (DoE, 2013).

8.1.1 Avoidance and Mitigation

The Proposed Action will result in the permanent development of 10.85 ha of the Site, which is regarded as currently offering foraging and movement habitat for koala. This is noting that of the 10.85 ha, only 3.9 ha supports foraging resources, with the residual (6.95 ha or 64%) comprised of 'Open Ground' only providing for movement habitat.

Given the presence of mapped CKH areas and the Site's location within the State's KPA, the proposed Master Plan has undergone extensive scrutiny and refinement. Through multiple design iterations, the design team have considered and incorporated measures to safeguard and enhance opportunities for koala movement, with the allocation of an Avoidance Area (2.35 ha) (**Figure 5**).

Additional mitigation measures are outlined in **Section 7.3**.

8.1.2 Significant Impact Assessment

A significant impact assessment for koala is presented in **Table 12**.

Table 12. Significant impact assessment for koala

Criteria	Proposed Action Response
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a population	Whilst the clearing of trees will not result in a direct impact to the size of the regional koala population, it will cause a short term reduction in the occupancy area for this species. The Proposed Action retains areas of higher value koala habitat along its eastern verge which adjoins other similar areas of peri-urban land supporting a patch work of koala habitat.
Reduce the area of occupancy of the species	The Proposed Action will require permanent development of 10.85 ha of the Site, which is regarded as currently offering foraging and movement habitat for koala. While there will be clearing associated with the Development Footprint, the area of reduced foraging habitat will only be minor and the use (educational facility) does not pose on-going movement restrictions. Further, landscaping works will utilise koala foraging resources, accessible to koala at any stage.
Fragment an existing population into two or more populations	Clearing of any vegetation on Site would not result in fragmentation of an existing population of Koala. Koala movement through the Site and surrounding areas such as the lower riparian areas to the south of the Site will maintain on-going safe movement opportunities, thus not fragmenting koala populations or inhibiting movement and gene flow.

Criteria	Proposed Action Response
Adversely affect habitat critical to the survival of a species	Being an Endangered species, the Department specifies that all habitat is habitat critical to the survival of koala and that even small areas of habitat loss (as little as 1 ha) can have a significant impact. The Proposed Action will result in removal of 990 NJKHTs. While not considered significant insofar as impacting species occupancy rates, breeding cycles or movement opportunities, the removal of trees is likely to result in impact to koala with regard to the DCCEEW Conservation Advice.
Disrupt the breeding cycle of a population	The Proposed Action would not result in disruption to the breeding cycle of a population. Being an educational facility, the use does not lend itself to severing connectivity through Site, with movement opportunities maintained around the perimeter of the Development Footprint, and landscaping within the Development Footprint providing for stochastic movement opportunities throughout.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Development Footprint will result in a footprint of 10.85 ha over patchy regrowth vegetation comprised of 3.9 ha of woody vegetation. This represents a very small reduction in the area of potential occupancy of the species, while maintaining opportunities for koala to continue to utilise the Site for foraging and movement/ dispersal. Due to the small, isolated nature of the Proposed Action, coupled with the ability to maintain foraging and movement opportunities around and within the Development Footprint and within facility once built, it is not expected that the Proposed Action will result in the decline in the species.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Measures will be implemented to prevent the introduction and spread of invasive species. Particularly in areas that will not be subject to clearing and/ or where areas of ecological value will be retained. Given the use of the Proposed Action, dogs and other predatory species will not be introduced to the Site unlikely other forms of urban development.
Introduce disease that may cause the species to decline	The Proposed Action is unlikely to introduce or increase the prevalence of a disease that is harmful to koala, e.g. Chlamydia.
Interfere with the recovery of the species	The Proposed Action is not expected to interfere with, nor assist in the recovery of the species.
Conclusion:	
While the Proposed Action has maintained the higher value koala habitat within the Site (nominally the eastern components) and maintains on-going opportunity for safe koala movement around and through the Development Footprint and Site, the Proposed Action will impact koala foraging resources and is likely to be considered a Significant Impact under the DCCEEW MNES Significant impact guidelines 1.1 (DoE, 2013).	

8.2 Grey-headed Flying Fox

Grey-headed flying-fox is a Vulnerable species under the EPBC Act and therefore the significance of impact on this matter has been assessed against the significant impact criteria for 'Vulnerable species' in the MNES Significant impact guidelines 1.1 (DoE, 2013).

8.2.1 Avoidance and Mitigation

Survey has determined that the Site and adjoining areas do not have any roost sites for grey-headed flying-fox. Grey-headed flying-fox has not been detected by in-field surveys however, given its mobility and known camps

within the region, it is considered likely to occur at the Site when foraging resources are available (e.g. flowering eucalyptus).

8.2.2 Significant Impact

A significant impact assessment for the grey- headed flying-fox is presented in **Table 13**.

Table 13. Significant impact assessment for grey-headed flying fox

Criteria	Proposed Action Response
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a population	The Proposed Action does not impact breeding or roosting habitat for the grey-headed flying-fox. The Proposed Action will result in the removal of (3.9 ha) foraging resources for grey-headed flying-fox; however, the vegetation communities and dominate tree species generally comprising the Development Footprint are not considered to be prolific flowering species nor are known to flower during the winter and early spring bottlenecking periods. Whilst the clearing of these trees will not result in a direct impact to the size of the regional grey-headed flying-fox population, it will cause a short-term reduction of foraging resources for this species (noting these resources are common and abundant in the locality and region generally). The Proposed Action retains areas of higher value grey-headed flying-fox habitat along its eastern verge which adjoins other similar areas of peri-urban land supporting a patch work of grey-headed flying-fox habitat.
Reduce the area of occupancy of the species	There were no grey-headed flying-fox individuals found on Site during field surveys. The nearest known camp to the Site occurs 3 km to the west. The Proposed Action is unlikely not result in the reduce occupancy of the species within the locality given the species high vagility, abundance of foraging resources and number of camps within the locality (noting 15 flying-fox camps are located within 10 km of the Site with numerous supporting grey-headed flying-fox – reference: DCCEEW National flying-fox monitoring viewer).
Fragment an existing population into two or more populations	There were no grey-headed flying-fox individuals found on Site during field surveys. The nearest known camp to the Site occurs 3 km to the west. The Proposed Action is unlikely fragment a population of the species within the locality given the species high vagility, abundance of foraging resources and number and number of camps within the locality (noting 15 flying-fox camps are located within 10 km of the Site with numerous supporting grey-headed flying-fox – reference: DCCEEW National flying-fox monitoring viewer).
Adversely affect habitat critical to the survival of a species	The Proposed Action will not impact any suitable current or potential roosting habitat. Spring foraging resources are considered to be critical to the survival of the species (DoE, 2001). Trees that will be cleared for the Proposed Action include winter and spring flowering species (e.g. *E. siderophloia*, *E. microcorys, E. racemosa*). Therefore, the 3.9 ha (equivalent canopy area) that will be cleared for the Proposed Action aligns with the definition of 'habitat critical to the survival of the species'.
Disrupt the breeding cycle of a population	The Site does not support any breeding habitat, nor is it within proximity to any known breeding habitat/ roost sites, with the nearest roost site some 3 km to the west.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent	The Proposed Action is expected to result in the clearing of 3.9 ha patchy vegetation that includes foraging resources for the grey-headed flying-fox. This results in a small reduction in the area of available foraging habitat which is highly abundant and common the locality. While there will be a short-term loss of foraging habitat, this will be replaced in the medium term by landscaping throughout the Development Footprint utilising native vegetation as well as rehabilitation in the Avoidance Area. Due to the small, isolated nature of the Proposed Action, is not expected to result in the decline in

Criteria	Proposed Action Response
that the species is likely to decline	the species, as no roosts will be impacted, and the population will not ultimately be effected by the Proposed Action, particularly given the use (educational facility) not impacting nocturnal periods and it's replacement of lost foraging resources with endemic landscaping.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The Proposed Action's use (educational facility) is unlikely to result in the introduction of invasive species that might otherwise become harmful or established on-site. Measures will be implemented to prevent the introduction and spread of invasive species as a result of the Proposed Action. Particularly in areas that will not be subject to clearing and/ or where areas of ecological value will be retained.
Introduce disease that may cause the species to decline, or	The listing advice for the species Australian Bat Lyssavirus, Bat Paramyxovirus and Menangle Pig virus as being potential threats to the grey-headed flying-fox, but of unknown magnitude or severity. Though it is noted that the incidence of Australian Bat Lyssavirus in the species is very low whilst approximately 25% of wild flying-foxes carry antibodies to Menangle Pig virus. The Proposed Action is not expected to result in the introduction or exacerbation in occurrence of any of these pathogens.
Interfere with the recovery of the species.	The Proposed Action is not expected to interfere with, nor assist in the recovery of the species.
Conclusion:	
Survey has determined that the Site and adjoining areas do not support a roost site for grey-headed flying-fox. Grey-headed flying fox has not been detected by Site during survey periods. It is considered that grey-headed flying-fox is a likely occurrence on the Site at some point in time, where the blossoming sclerophyll vegetation provides forage habitat. The Proposed Action has been configured to impact regenerating regrowth vegetation in the Site's west and central areas and largely retain the remnant/ regrowth vegetation in the Site's east, which also contributes to local patchwork and stepping stone habitats. Impacted foraging habitat is marginal foraging habitat with limited winter flowering canopy species, with total area of canopy impact being 3.9 ha of the 13.19 ha Site and 10.85 ha Development Footprint. The Proposed Action retains the highest quality, mature vegetation within the Site (in the Avoidance Area) and will rehabilitate the Avoidance Area and landscape the Development Footprint with endemic flora species which flower prolifically during the winter and early spring bottlenecking period. The Proposed Action is expected to result in a significant impact to grey-headed flying fox on the basis that it will result in the clearing of the equivalent of 3.9 ha of foraging habitat for the species. In doing so, the Proposed Action will adversely affect habitat critical to the survival of a species.	

8.3 Greater Glider

The Greater Glider is an Endangered species under the EPBC Act and while **Section 6.3.3** concludes the Site does not contain habitat critical for the greater glider, further assessment has been undertaken below for completeness. As such, the significance of impact on this matter has been assessed against the significant impact criteria for 'Endangered species' in the MNES Significant impact guidelines 1.1 (DoE, 2013).

8.3.1 Avoidance and Mitigation

Survey has determined that the Development Footprint and adjoining areas do not have any suitable habitat characteristics defined by the Guide to greater glider habitat in Queensland (Eyre, et al., 2022). Greater Glider has not been detected by Site and is considered an unlikely occurrence on the Site. Review of Fauna Spotter Catcher

records for the locality (noting substantive data has been collected within the locality for other urban development projects) has not seen any recent records of this species collected.

8.3.2 Significant Impact

This assessment is presented in **Table 14** will demonstrate the significant impact assessment for the greater glider.

Table 14. Significant impact assessment for greater glider

Criteria	Proposed Action Response
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a population	Surveys have determined that the Development Footprint does not contain suitable habitat characteristics defined by the *Guide to greater glider habitat in Queensland* (Eyre e*t al,* 2022b). This has been outlined through an assessment of the Site, its in-situ values and that of the surrounding locality. A review of the Site and surrounding locality notes that significant historical broad-scale land clearing has occurred (**Section 4.1.3**), reducing the abundance and availability of older growth trees with suitable hollow bearing (denning) features for this species. An analysis of the Development Footprint, its values and surrounding habitats against the '*Habitat critical to the survival of greater glider assessment'* and '*Guide to greater glider habitat in Queensland*' has been undertaken and presented in **Table 9** and **Table 10**. Both assessments determined that the Development Footprint Both assessments concluded that the Development Footprint does not support habitat critical to the survival of the greater glider and that the Development Footprint is considered '*Not Habitat*' (**Section 6.3.3**). Based on survey data, assessment of the Site and Development Footprint's values with reference to relevant guidelines, it is considered unlikely that the Proposed Action would results in a long-term decrease in the size of a population; and, the Proposed Action is not likely to result in a Significance Residual Impact to greater glider.
Reduce the area of occupancy of the species	As noted in **Table 9** and **Table 10**, the Development Footprint is not considered to be habitat for greater glider due to a lack of suitable mature trees that could provide hollows (**Section 6.3.3**). As such, the Proposed Action is unlikely to result in the reduction of occupancy of the greater glider.
Fragment an existing population into two or more populations	No populations of greater glider are known to the locality. The Site and surrounding areas are not considered to support any large contiguous tracts of eucalypt forest capable of supporting a population. All larger areas of intact forest are severed from the Site and surrounding locality by major ecological barriers such as the Bruce Highway, North Coast Train Line and dense urban development fronts. No recent records of greater glider occur (noting substantial clearing work throughout the locality undertaken with the supervision of qualified Fauna Spotter Catchers). As the Site is severed from large tracts of native eucalypt forest and was found to have a distinct lack of suitable hollow bearing trees , the Site is not considered to support greater glider habitat, nor are there any known populations within the locality.It is unlikely the Proposed Action would result in fragmentation of greater glider populations.
Adversely affect habitat critical to the survival of a species	As noted in **Table 9** and **Table 10**, the Proposed Action is unlikely to impact any habitat critical to the survival of the greater glider.

Criteria	Proposed Action Response
Disrupt the breeding cycle of a population	No populations of greater glider are known to the locality. The Site and surrounding areas are not considered to support any large contiguous tracts of eucalypt forest capable of supporting a population due to a lack of suitable hollows (**Section 6.3.3)**. All larger areas of intact forest are severed from the Site and surrounding locality by major ecological barriers such as the Bruce Highway, North Coast Train Line and dense urban development fronts. Due to the lack of habitat and known populations, it is unlikely the Proposed Action would result in the disruption of greater glider breeding cycles.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No populations of greater glider are known to the locality. The Site and surrounding areas are not considered to support any large contiguous tracts of eucalypt forest capable of supporting a population. All larger areas of intact forest are severed from the Site and surrounding locality by major ecological barriers such as the Bruce Highway, North Coast Train Line and dense urban development fronts. No recent records of greater glider occur (noting substantial clearing work throughout the locality undertaken with the supervision of qualified Fauna Spotter Catchers). As the Site is severed from large tracts of native eucalypt forest, is not considered to support greater glider habitat, nor are there any known populations within the locality, it is unlikely the Proposed Action would result in the modification of, destroy, remove, isolate or decrease the availability or quality of habitat to the extent the species would decline. It is noted that the higher quality habitats within the Site are retained within the Avoidance Area.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Measures will be implemented to prevent the introduction and spread of invasive species. Particularly in areas that will not be subject to clearing and/ or where areas of ecological value will be retained. Given the use of the Proposed Action, dogs and other predatory species will not be introduced to the Site unlikely other forms of urban development.
Introduce disease that may cause the species to decline	The Proposed Action is unlikely to introduce or increase the prevalence of a disease that is harmful to greater glider.
Interfere with the recovery of the species	The Proposed Action is not expected to interfere with, nor assist in the recovery of the species.
Conclusion:	
A review of the Site and surrounding locality notes that significant historical broad-scale land clearing has occurred (**Section 4.1.3**), reducing the abundance and availability of older growth trees with suitable hollow bearing (denning) features for this species (**Section 6.3.3)**. Surveys have determined that the Development Footprint does not contain suitable habitat characteristics defined by the *Guide to greater glider habitat in Queensland* (Eyre e*t al,* 2022b) nor would it be considered 'habitat' or 'potential habitat' when reviewed against the *Guide to greater glider habitat in Queensland*. This has been outlined through an assessment of the Site, its in-situ values and that of the surrounding locality and presented in **Table 9** and **Table 10**. No recent records of greater glider have been identified through the substantive works carried out in the locality under the supervision of suitably qualified Fauna Spotter Catchers. Based on survey data, assessment of the Site and Development Footprint's values with reference to relevant guidelines, it is considered that the Proposed Action would not result in a Significance Residual Impact to the greater glider.	

9. Summary and Conclusion

The purpose of this report is to support a referral to be submitted to the DCCEEW to assist in determining if the Proposed Action should be deemed a Controlled Action under the EPBC Act.

The Proposed Action, the development and operation of Naranga Catholic College, is a proposal for a new BCE education facility (Prep – Grade 12) to support the expanding community growth of the area and the associated demand for enrolments in primary and secondary schools.

A combination of desktop assessment and various Site surveys have been conducted to determine the likelihood of MNES occurring in proximity to and being impacted by the Proposed Action. This assessment has determined that two (2) MNES are likely to be impacted by the Proposed Action, being koala (Endangered) and grey-headed flying-fox (Vulnerable) as outlined in **Section 8.1** and **Section 8.2,** respectfully.

Assessment of the extent of the Development Footprint and Avoidance Area concludes that the area of impact to koala is 10.85 ha (area impacting foraging and movement habitat); while impacts to grey-headed flying-fox habitat total 3.9 ha (area of foraging habitat removed – cleared paddocks between trees are not considered habitat given this species overflies open country, urban areas etc.).

Assessment of the Site and Proposed Action against other MNES concluded that either limited to no habitat for each MNES is present within the Site; or, the Proposed Action would not result in an impact to each matter as discussed in **Sections 4.2** and **4.3**.

Assessment of koala and grey-headed flying fox against the Significant impact guidelines 1.1 (DoE, 2013) has concluded that both species are likely to be significantly impacted by the Proposed Action and that the proposal is likely to be determined a Controlled Action by the Minister for the Environment.

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Figures

Figure 1. Locality

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Figure 3. Surrounding Schools

Figure 4. Surrounding Developments

Figure 5. Project Footprint

Figure 6. Impact to Trees

Figure 7. Impact to NJKHTs

Figure 8. Regulated Vegetation

Figure 9. Planning Scheme Zones

Figure 10. Planning Scheme Environmental Values

Figure 11. Fauna Survey Results

Figure 12. Greater Glider Records Within 25 km

Figure 13. Koala Records within 2 km

Attachment 1 – Narangba College Master Plan

28ºS ENVIRONMENTAL

Attachment 2 – Protected Matters Search Tool

28ºS ENVIRONMENTAL

Attachment 3 – WildNet Database Report

Attachment 4 – Regulated Vegetation Management Reports

28ºS ENVIRONMENTAL

Attachment 5 – Flora Species List (Botanical and BioCondition)

28°S ENVIRONMENTAL

Attachment 6 – Flora Tree Species List (GPS Tree Survey)

28ºS ENVIRONMENTAL

Attachment 7 - Flora and Fauna Species List (WildNet)