

Aura South

Early Release Area Environmental Assessment Report

Prepared for: Stockland Development Pty Ltd
4 November 2026
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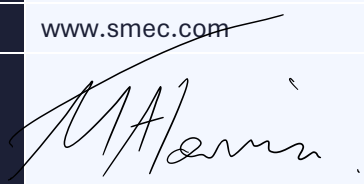
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Executive Summary

The Early Release Area (ERA) forms the first stage of Stockland's Aura South master planned community and is located within Halls Creek PDA. The ERA is located within the traditional lands of the Kabi Kabi First Nations people. The ERA sits within a highly modified, historically cleared portion of Aura South to ensure early urban development can proceed while avoiding environmental values. Aura South was approved under the Environmental Protection Biodiversity Conservation Act 1999 on 22 May 2026 (EPBC 2023/09548) following assessment via a Public Environmental Report (PER) which considered the potential impacts of the Proposed Action on Matters of National Environmental Significance (MNES). The Environmental Assessment Report evaluates State interests under the State Planning Policy, South East Queensland Regional Plan 2023, and the Sunshine Coast Planning Scheme. Together, these frameworks confirm that the ERA is a low-constraint, low-impact development area that aligns with both State and Commonwealth planning and environmental requirements.

Ecological assessments, comprising desktop review and field surveys, confirm that the ERA does not contain permanent, high-value ecological features. Vegetation is entirely Category X, dominated by exotic grassland and disturbed alluvial heath. Habitat values are generally low, with temporary inundation areas providing limited, rainfall dependent habitat for frog species recorded or potentially occurring within the locality. No threatened flora occurs within the ERA, and no koala habitat or essential habitat is mapped.

Only a small section of a regulated waterway occurs within a drainage park of the ERA. The broader Aura South drainage strategy adopts a whole-of-catchment approach, maintaining hydrological regimes, protecting downstream Matters of National and State Environmental Significance, including the Coastal Swamp Threatened Ecological Community, and delivering best-practice stormwater quality outcomes through rainwater harvesting, and bioretention systems.

The ERA aligns with the State Planning Policy coastal environment provisions. Although partly overlain by the Coastal Management District, the ERA is well outside storm-tide hazard extents, with coastal processes occurring far from the developable footprint. Coastal landforms, wetlands, scenic landscapes and ecological values associated with Pumicestone Passage are protected and retained within the broader environmental network.

The ERA occupies low-value, previously cleared land with minimal environmental constraints. Development avoids matters of national, state and local environmental significance, remnant vegetation, waterways and coastal hazards, while integrating with the extensive environmental protection, rehabilitation and offset measures established for Aura South. The ERA therefore represents a defensible and environmentally responsible early development stage consistent with the *Environment Protection and Biodiversity Conservation Act 1999*, the State Planning Policy, South East Queensland Regional Plan 2023, and the planning intent for the Halls Creek PDA.

1. Introduction

1.1 Project Background

This Environmental Assessment Report (EAR) has been prepared on behalf of Stockland Development Pty Limited (the Applicant) in support of a Priority Development Area (PDA) development application over land located at Bells Creek Road, Coochin Creek, comprising Lot 1 on SP332399 and Lot 2 on SP357748 (the site). The application seeks approval for the Early Release Area (ERA) of Stockland's Aura South project, within the Halls Creek PDA.

The development application seeks a PDA Development Permit for:

1. Reconfiguring a Lot (962 residential lots, 2 medium density lots, parks and balance land) in accordance with a Plan of Development;
2. Operational Works in accordance with a Plan of Development; and
3. Material Change of Use in accordance with a Plan of Development.

Declaration of the Halls Creek PDA established the planning framework required to accelerate the delivery of Aura South. As the first neighbourhood within the PDA, the ERA will bring forward 1,051 new homes, including three multiple dwelling sites accommodating about 80 apartments. This crucial housing supply will be supported by local services and infrastructure, five enterprise and employment lots, a neighbourhood centre, district sports and local parks, high-quality open space areas and active transport connections, establishing strong foundations for the new Aura South community.

Together, these elements will create a highly liveable, walkable and connected community which will contribute significantly to the delivery of housing, employment and community infrastructure in the southern growth corridor of the Sunshine Coast.

SMEC is supporting the Applicant in the preparation of the EAR for the ERA of the Halls Creek PDA through provision of ecological and environmental planning services. The EAR identifies and evaluates relevant State environmental interests, considers alignment with the strategic outcomes and policy directions of South East Queensland Regional Plan 2023 (ShapingSEQ) (Department of State Development, Infrastructure, Local Government and Planning, 2023), and incorporates relevant outcomes of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) assessment process.

Aura South was approved, subject to conditions, under the EPBC Act by the Commonwealth Environment Minister's delegate on 22 May 2026 (EPBC 2023/09548). The Project was assessed via a Public Environment Report (PER), which considered the potential impacts of the Proposed Action on MNES. The Commonwealth assessment process was undertaken alongside the broader master planning process, with environmental values informing the planning and design of Aura South.

1.2 Report Purpose

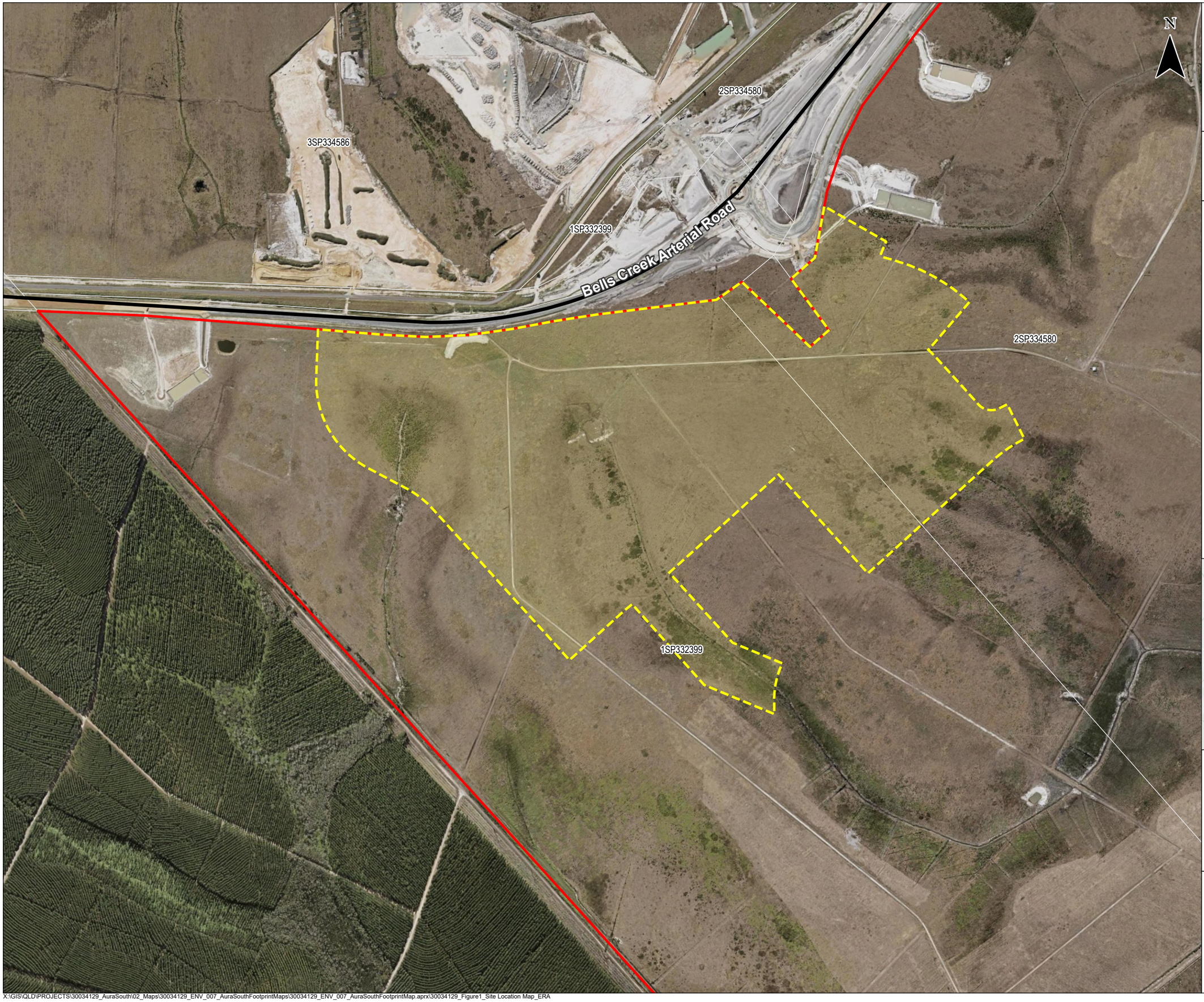
Through desktop and ecological field assessments, and data collected through the EPBC assessment process, the purpose of this EAR is to:

- Identify the presence of Matters of Local, State and National Environmental Significance (MLES, MSES and MNES), including the actual or likely presence of threatened flora and fauna species listed under the provisions of *the Nature Conservation Act 1992* (NC Act) and the EPBC Act.
- Identify threatened ecological communities (TEC) under the EPBC Act.
- Determine known and likely approval and/or permit requirements under State and Local legislation.
- Provides a comprehensive, evidence-based assessment of the ERA against the relevant State interests outlined in ShapingSEQ and the State Planning Policy 2017 (SPP).
- Describe the ecological values and characteristics and its immediate surrounds.
- Inform the Project's design to avoid, minimise, and mitigate impacts on ecological values.

1.3 Site Context

'The Site' is the ERA, within Aura South which is situated in the suburb of Coochin Creek on the Sunshine Coast, Lot 1 on SP332399 and Lot 2 on SP357748 (Figure 1). The ERA is a part of the northern portion of the Halls Creek PDA, within the Sunshine Coast Local Government Area (LGA). It is also immediately south of Stockland's master planned community Aura, within the Caloundra South PDA.

The land was extensively cleared from former forestry operations over many decades. The existing agricultural use is consistent with the current Regional Inter-urban Break zoning under the *Sunshine Coast Planning Scheme 2014*. The Site is bordered on all sides by rural agricultural use and to the north by Bells Creek Arterial Road.



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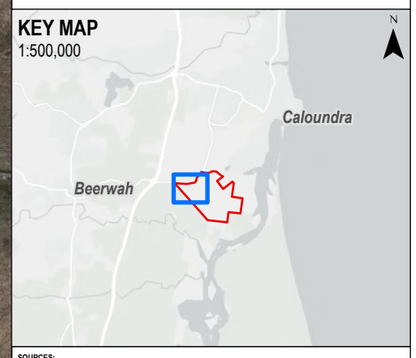
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Metres

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GDA2020 MGA Zone 56

LEGEND

- Site Boundary
- Early Release Area Boundary (ERA)
- Cadastral parcels
- State Controlled Road

KEY MAP
1:500,000



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PROJECT:	Aura South PER
PROJECT NO:	30034129
FIGURE NO:	1
FIGURE TITLE:	Site Location
CREATED BY:	MD17519
DATE:	26/08/2026
VERSION:	2

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2. Ecological Assessment

2.1 Methodology

2.2 Desktop Assessment

Prior to undertaking the ecological field assessment, a review of contemporary desktop information was completed by a suitably qualified ecologist. The desktop review involved the collation and review of relevant information concerning the ecological values of the Site with a particular focus on critically endangered, endangered, vulnerable, near threatened and least-concern colonial breeding species listed under the EPBC Act and NC Act (threatened species). The purpose of the desktop assessment was to:

- Refine a list of threatened species to be targeted during the field assessment, which had the highest likelihood of occurring on the Site; and
- Source available information concerning the specific habitat requirements of the threatened species to aid in their identification and habitat suitability.

A range of contemporary database resources and mapping products were utilised as part of the desktop review, including:

- The EPBC Act Protected Matters Search Tool (PMST), which returns results of MNES that may occur within the Site locality
- The Queensland Department of the Environment, Tourism, Science and Innovation (DETSI) WildNet Online database
- The Atlas of Living Australia (ALA) and Australia's Herbarium databases to identify known records of state and federally listed threatened, colonial breeding, and pest species recorded within the vicinity of the Site (these resources include Qld Herbarium HERBREC's records)
- The *Vegetation Management Act 1999* (VM Act) Regulated Vegetation Management and Pre-Clearing Supporting Maps produced by the Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development
- The DETSI Protected Flora Survey Trigger Map to identify survey and permit requirements relating to threatened plants
- Koala District mapping under the Nature Conservation (Koala) Conservation Plan 2017
- SPP and Development Assessment Mapping System (DAMS) maintained by the Queensland Government's State Assessment and Referral Agency (SARA)
- Environmental Management Register (EMR) and Contaminated Land Register (CLR) searches undertaken in accordance with the *Environmental Protection Act 1994* to identify any recorded notifiable activities or contaminated land affecting the Site.
- The Department of Climate Change, Energy, the Environment and Water (DCCEEW) National flying-fox monitoring dataset

All mapping searches were centred on Lat: -26.8564 Long: 153.0592 with a 10 km buffer.

2.2.1 Likelihood of Occurrence Assessment

A likelihood of occurrence (LoO) assessment for threatened species identified during the desktop review was undertaken. The process of refining the list of fauna and flora species to be targeted involved reviewing the known and likely to occur species against the known or expected availability of habitat and foraging resources on the Site and immediate surroundings. For each of the identified species, an assessment of the LoO was undertaken, with each species being assigned to one of the following categories.

- Known: The species has been positively recorded on the Site during the past 30 years.

- Likely: Suitable habitat for the species occurs on the Site, and there are records within 10m within the past 30 years.
- Possible: Suitable habitat for the species occurs on the Site albeit with no recent (during the past 30 years) records from the Site or within 10km OR suitable habitat for the species may not occur on the Site as there are recent (during the past 30 years) records.
- Unlikely: Suitable habitat for the species does not occur on the Site, and there are no records from the Site or within 10km within the last 30 years.

The results of the LoO assessment are presented in Appendix A.

2.3 Field Assessment

The most recent ecological field assessment was undertaken on the 25th March 2026. This assessment forms part of an extensive ongoing ecological survey program that has been undertaken by SMEC Ecologists since 2024, including seasonal fauna surveys, protected plant meanders, targeted species investigations and vegetation mapping. This is also supplemented with a range of other specialist assessments completed by ecologists across the Site as part of the Commonwealth EPBC approval process. Broadly, the field assessments sought to:

- Ground-truth the desktop findings, particularly with respect to the threatened species likely to occur.
- Undertake an assessment of possible fauna breeding places, as well as fauna habitat quality and extent within the Site.
- Assess the vegetation communities present within the Site (including areas containing regulated vegetation pursuant to the VM Act), using Quaternary plots as described within the Methodology for surveying and mapping Regional Ecosystems (REs) and vegetation communities in Queensland (Neldner, et al., 2023).

2.3.1 Regional Ecosystems and Threatened Ecological Communities

The flora survey was conducted to classify, map, and verify REs within the Site and to identify flora species, including threatened species. This survey employed an assessment method of the REs and flora in accordance with the methodology developed by the Queensland Herbarium, Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Neldner, et al., 2023).

Vegetation communities were sampled at several quaternary level sites across the Site, selected to sample the variation in vegetation observed. At each quaternary site, the dominant species were recorded, including a vegetation structural description of the dominant overstorey species.

2.3.2 Flora

Searches for threatened flora were undertaken while traversing the Site, targeting species listed under the NC Act and/or EPBC Act, and declared weeds listed under the *Biosecurity Act 2014* (the Biosecurity Act). A cumulative list of native and introduced flora species was recorded (Appendix B).

A protected plants flora survey in accordance with the Flora Survey Guidelines – Protected Plants V2.03 (DETSI, 2025) was not required as there is no high-risk mapping over the Site. However extensive surveys have been undertaken due to the presence of Mt Emu She-oak and Christmas bells in the wider Aura South Project area in 2025.

2.3.3 Fauna

The assessment of fauna habitat values within the Site was limited to observations of terrestrial vertebrate fauna assemblages (birds, mammals, reptiles, and amphibians) and habitat.

Survey tasks included:

- Identifying habitat features
- Fauna habitat assessments
- Active diurnal searches for animal breeding places (e.g., hollow bearing trees, burrows)

2.3.4 Habitat Assessments

Habitat assessments were conducted throughout the Site to evaluate and characterise the habitat values for fauna. The assessment locations typically coincided with the quaternary flora assessments. Habitat assessments can provide an indication of fauna and habitat suitability for threatened fauna.

Habitat assessments involved identifying available habitat for a range of taxonomic groups including birds, reptiles, amphibians, and mammals (both ground dwelling and arboreal). Complexity of the understory, availability of woody debris, hollows, stags, fallen logs, cracking clay soils, leaf and exfoliating bark were all noted. Scans of the canopy and shrub layer for nests and arboreal fauna were also undertaken, and all incidental fauna sightings were recorded (Appendix B).

2.3.5 Limitations

The field assessments were designed and completed in a manner that is consistent with the expected ecological values and the nature and magnitude of the impacts. However, there are several limitations that may impact the detectability of certain flora and fauna species including:

- The most recent field assessments were completed on a single day in Autumn. Previous surveys conducted on Site have been completed seasonally and thus have a greater chance of detected seasonally present species, though there is a possibility that cryptic species remain undetected.
- Cryptic flora species or seasonal flowering species that require the presence of reproductive material for positive identification may be less detectable.
- The fauna surveys were limited to visual assessments and habitat assessments; this may limit the detectability of certain fauna groups including small terrestrial mammals and reptiles.

Notwithstanding the limitations identified above, the survey methods and effort used are generally in accordance with relevant published guidelines and are considered adequate for the detection of those species identified during the desktop LoO assessment as ‘known’ or ‘likely’ to occur within the locality, with surveys on foot across the Survey Site ensuring adequate coverage and mapping of ecological values.

3. Results

3.1 Desktop Assessment Results

The findings of the desktop assessment are outlined in Table 1.

Table 1: Desktop assessment findings

Characteristics and Mapping Resources	Summary of Findings
EPBC Act PMST for MNES	A protected matters search was undertaken for the Site and returned the following results within a 5 km buffer: Four listed TECs were considered ‘likely’ and one ‘may’ occur: - Lowland Rainforest of Subtropical Australia (may occur) - Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland - Subtropical and Temperate Coastal Saltmarsh - Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community - Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions. One Listed Wetland of National Importance (Ramsar) was considered likely to occur - Moreton Bay

Characteristics and Mapping Resources	Summary of Findings
	120 listed threatened flora and fauna species, all of which are critically endangered/endangered/vulnerable species, were identified as potentially occurring within the search area. 78 species listed as Migratory were identified as potentially occurring within the Site / buffer area.
Flying-fox camps (National flying-fox monitoring viewer)	There are three flying fox camps relevant to the project, the first two are located approximately 8 km northeast of the Site. One is located along Tooway Creek near Bryce St in Moffat Beach (reference number 460). This camp was found to support Grey-headed flying-fox (listed as vulnerable under the EPBC Act) and Black Flying Fox (listed as a least concern colonial breeder under the NC Act) in 2019. The second camp is in Andrea Ahern Bushland Park in Battery Hill (reference number 1009). This camp was found to support Grey-headed flying-fox and Black Flying Fox in 2022. The next closest camp is located approximately 9.5 km northwest of the site at Vidler Court, Landsborough (reference number 374). This camp was found to support Grey-headed flying-fox and Black Flying Fox in 2019. No flying fox breeding colonies identified on site during previous assessments undertaken and approved as part of the PER.
Essential habitat (Qld Globe)	The Site does not contain areas mapped as essential habitat.
Nature Conservation (Koala) Conservation Plan 2017 (Qld Globe)	The Site is mapped within Koala District A and outside the mapped Koala Priority Areas No Koala Habitat Areas are mapped within the Site.
Regulated Vegetation (Qld Globe) AND Regional Ecosystems	The entire ERA is mapped as category X (non-remnant vegetation). It is also relevant to note that the Site has been mapped under a Property Map of Assessable Vegetation (PMAV). This process has locked in most of the full Aura South footprint, as Category X.
Protected Plants Flora Survey Trigger Map (Qld Globe)	The Site is not mapped within a high-risk area on the Protected Plants Flora Survey Trigger Map. Therefore, a survey in accordance with the Flora Survey Guidelines – Protected Plants V2.03 (DETSI, 2025) is not required, though surveys have been conducted across the wider project area in 2025 as part of targeted searches for the Mt Emu she-oak and Christmas bells.
Watercourse identification map (Qld Globe)	There are multiple unmapped non-perennial waterways identified under the *Water Act 2000* mapped within the Site.
Environmental Protection Policy	The site is mapped as: - EPA Environmental value zone for Pumicestone Passage under North Pumicestone as part of the Maroochy basin – lowland fresh waters
Queensland waterways for waterway barrier works (DAMS)	The Site is currently mapped to contain three low-risk (green) waterways mapped under the *Fisheries Act 1994*; however, a detailed waterway investigation refined the map extents (Appendix C), and the updated mapping was subsequently confirmed by SARA (Appendix D). These features were verified as artificial or ephemeral drainage lines with no fisheries values. Accordingly, the updated mapping now shows no

Characteristics and Mapping Resources	Summary of Findings
	mapped waterways within the Site, and the functional waterway in the broader area is located outside the developable footprint
Coastal Protection – Coastal Management District and Coastal Areas (DAMS)	The Site is partially located within a coastal management district.
Fisheries habitat and Marine plants Fisheries Act 1994 (DAMS)	The Site is not mapped within a fish habitat management area. The Site does not contain areas below the HAT area and thus Marine plants are unlikely to be present.
Queensland Wetlands Mapping (Qld Globe) MSES Wetland Values (Qld Globe) Wetland Protection Areas (DAMS and Qld Globe)	There are no Wetland Protection Areas mapped within the Site. Wetland lines under the Queensland Wetlands Mapping is mapped within the Site. MSES Wetland values are mapped: - MSES regulated vegetation (Defined watercourse) - MSES high ecological significance wetlands
MSES (Qld Globe)	The MSES values include: - MSES regulated vegetation [defined watercourse] - MSES high ecological significance wetlands (drainage line)
Sunshine Coast Planning Scheme 2014	The Site is subject to the Biodiversity, Waterways and Wetland Areas Overlay, with mapped Waterways identified within the ERA boundary.
Contaminated Land	A search of the Queensland Environmental Management Register (EMR) and Contaminated Land Register (CLR) confirms that the Site is not listed on either register. Accordingly, there is no record of the Site being subject to a Notifiable Activity or recorded as Contaminated Land under the *Environmental Protection Act 1994*.

3.1.1 Likelihood of Occurrence Assessment

The likelihood of occurrence assessment was conducted prior to the field survey and then updated based on the findings from the fauna, flora, and habitat assessments. The full likelihood of occurrence assessment can be found in Appendix A. Table 2 illustrates the species likely or known to occur within the Site.

Table 2: Species known and likely to occur within the Site

Scientific Name	Common Name	NC Act[1]	EPBC Act[2]
Likely to occur			
Fauna			
Adelotus brevis	Tusked frog	V	
Gallinago hardwickii	Latham's snipe	V	Vu
Litoria freycineti	Wallum rocketfrog	V	
Flora			
Acacia attenuata		V	Vu

[1] NC Act conservation status: V = Vulnerable / E = Endangered / SL = Special Least Concern / LC = Least Concern.
[2] EPBC Act conservation status: Vu = Vulnerable / E = Endangered / Ma = Marine / Mi = Migratory.

Scientific Name	Common Name	NC Act[1]	EPBC Act[2]
Cryptostylis hunteriana	Leafless tongue-orchid	SL	Vu
Prasophyllum exilis	Wallum leek orchid	NT	
Zieria exsul	Banished stink bush	CR	Cr
Known to occur			
Fauna			
Crinia tinnula	Wallum froglet	V	
Litoria olongburensis	Wallum sedgefrog	V	Vu
Flora			
Allocasuarina emuina	Mt Emu she-oak	E	En
Blandfordia grandiflora	Christmas bells	E	

3.2 Field Survey Results

The conditions during the survey were sunny, however, rain occurring consistently in the week before the survey. Temperatures during the survey were up to 30.0 degrees Celsius (recorded at Caloundra Weather Station).

3.2.1 Vegetation Communities

The field survey found that the vegetation communities can be further refined from the state mapped RE's. A summary of the quaternary assessment results is provided in Appendix E. Two vegetation communities were identified, with the locations and the extent of these communities shown in Figure 2 and detailed below.

3.2.1.1 Vegetation community 1 – Non-remnant exotic grassland

Vegetation across most of the Site consists of an exotic grassland (Plates 1 and 2). This community is dominated by a mixture of pasture and pasture invading species such as whiskey grass (*Andropogon virginicus*), South African pigeon grass (*Setaria sphacelata*), giant rat's tail grass (*Sporobolus pyramidalis / nepalensis*), red natal (*Melinis repens*), guinea grass (*Megathyrsus maximus var maximus*) and Qld blue couch (*Digitaria didactyla*). This community is devoid of trees and other woody species with only small exotic forbs such as *Verbena rigida* present amongst dense grass cover. The community is currently grazed by cattle.

Grass height is 0.2-1.0 m, with an average cover of 99%. Habitat features are largely absent from this community except for dense grass cover which provides cover for least concern species such as quails. Some areas where the grass is seasonally inundated may provide foraging habitat for wading bird species.

Wallum froglet was heard calling in this community and has been regularly detected calling during wet periods where water pools and flows through drainage lines.

This community is non-remnant and does not conform to any Regional Ecosystem or Threatened Ecological Community.

3.2.1.2 Vegetation community 2 – Non-remnant alluvial heath (Wallum)

Vegetation occurring along the drainage lines and low-lying areas support a non-remnant heath community (Plates 3 & 4). This community is dominated by an assortment of sedges and rushes such as *Cyperus* spp., *Fimbristylis* spp., *Schoenus* spp., *Chorizandra sphaerocephala*, and *Juncus usitatus*. Small shrubs common in Wallum communities such as blue tongue (*Melastoma malabathricum subsp. Malabathricum*), *Baeckea frutescens*, *Sprengelia sprengelioides*, *Eriocaulon australe*, *Woollsia pungens*, *Allocasuarina littoralis*, *Melaleuca thymifolia*, *Ludwigia octovalvis* and *Hakea actites* are also present. Generally, plant diversity is high, typical of Wallum communities. As this community is grazed and regularly slashed, the community exists in a state of disturbance without any mature woody vegetation.

Habitat features are sparse, consisting of the seasonally inundated low-lying vegetation which may provide temporary foraging habitat for wading birds (Plates 5 and 6). Wallum froglet has been regularly detected calling during wet periods where the heath floods and forms small ponds.

This community generally conforms to a non-remnant form of the Least Concern Regional Ecosystem 12.3.13. This community does not align with any Threatened Ecological Community.



Plate 1: Vegetation community 1



Plate 2: Vegetation community 1



Plate 3: Vegetation community 1



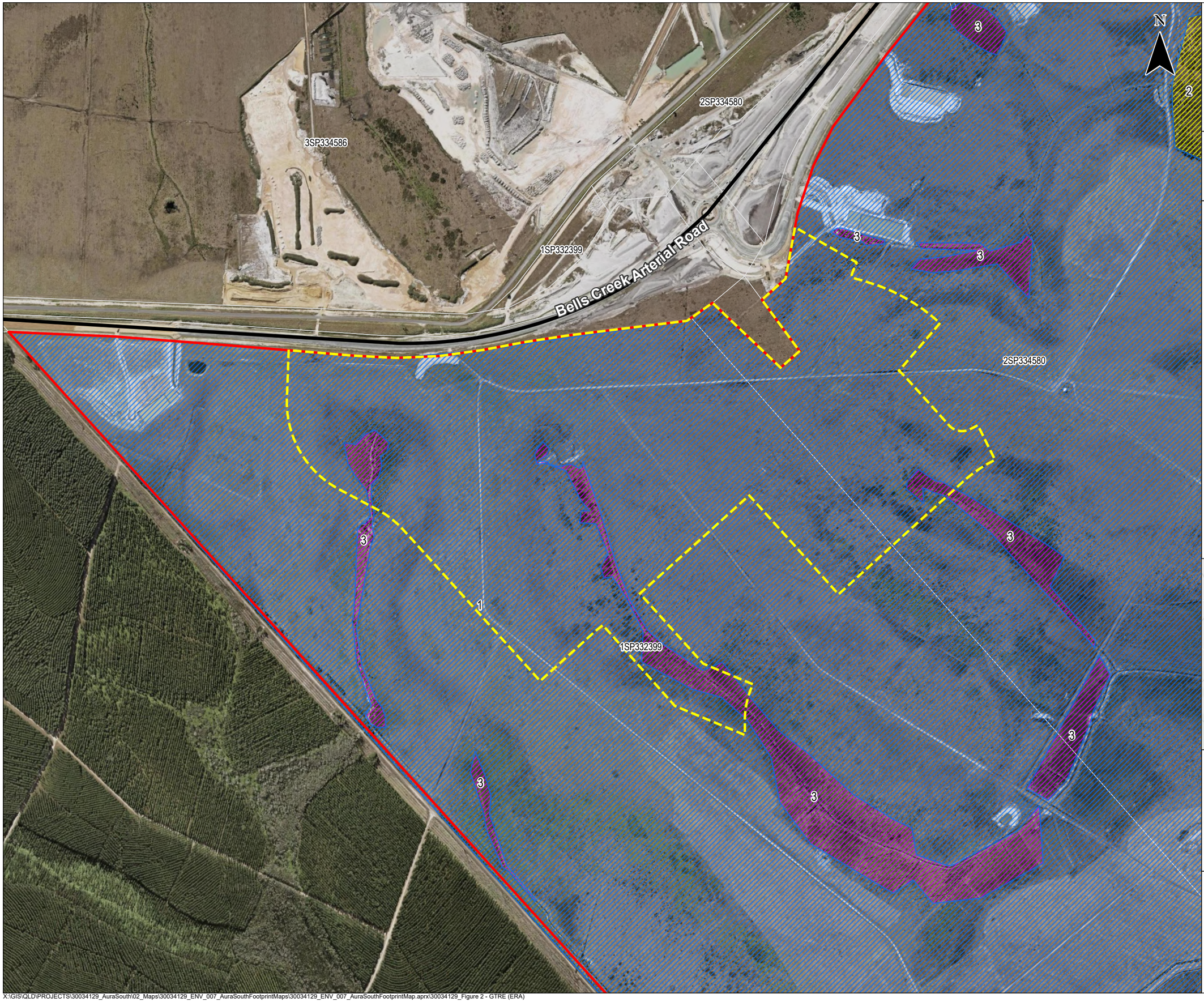
Plate 4: Vegetation community 2



Plate 5: Vegetation community 2



Plate 6: Ponding and drainage lines



smec
an SJ company

SMEC AUSTRALIA PTY LTD
ABN 47 065 475 149

0 100 200 300
Metres

Scale:1:8,000 @ A3
GDA2020 MGA Zone 56

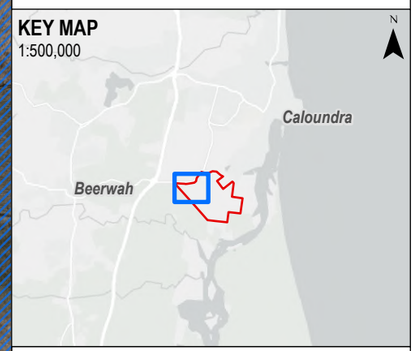
LEGEND

- Site Boundary
- Early Release Area Boundary (ERA)
- Cadastral parcels
- State Controlled Road

Ground-truthed vegetation communities

- Vegetation community 1 – Non-remnant exotic grassland
- Vegetation community 2 – Remnant alluvial heath (Wallum)
- Vegetation community 3 – Non-remnant alluvial heath (Wallum)

KEY MAP
1:500,000



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PROJECT:	Aura South PER
PROJECT NO:	30034129
FIGURE NO:	2
FIGURE TITLE:	Ground-truthed Regional Ecosystems
CREATED BY:	MD17519
DATE:	26/08/2026
VERSION:	2

X:\GIS\QLD\PROJECTS\30034129_AuraSouth\02_Maps\30034129_ENV_007_AuraSouthFootprintMaps\30034129_ENV_007_AuraSouthFootprintMap.aprx\30034129_Figure 2 - GTRE (ERA)

3.2.2 Threatened Ecological Communities

No threatened ecological communities were identified as present during the field survey, the Coastal Swamp Sclerophyll Forest of New South Wales and Southeast Queensland Threatened Ecological Community (TEC) has been identified in the wider Aura South Project area, however this is located outside the ERA area. This TEC will not be directly impacted by works proposed under the ERA and is sufficient distance (over 1.3km) from the ERA area that indirect impacts will be negligible provided best practice management measures, particularly in relation to water quality are implemented as part of any future development of the Site.

3.2.3 Flora Species

A total of 113 flora species were identified during the survey (refer to Appendix B). Of these, 102 are least concern or special least concern native species. No conservation significant species were identified on Site. It is noted that listed species such as Mt Emu she-oak (*Allocasuarina emuina*) and Christmas bells (*Blandfordia grandiflora*) have been in the wider Aura South Project area but not within the ERA. Category 3 weeds were also located on site including:

- Lantana (*Lantana camara*) - WoNS
- Giant rat's tail grass (*Sporobolus pyramidalis / nepalensis*) - WoNS
- Groundsel bush (*Baccharis halimifolia*).

3.2.4 Fauna Habitat and Breeding Features

Habitat features are very sparse across the Site. The lack of woody vegetation, frequent slashing, ponding and grazing mean that there is little habitat for woodland or forest dwelling species. Seasonal inundation of the low-lying areas may provide some temporary foraging habitat for wading birds in the streams however as the ERA is located on higher ground, low lying areas are likely to drain quickly to other areas of the Aura South project area. The small ponds and drainage lines in Vegetation Community 2 provide habitat for Wallum adapted frog species during wet periods such as Wallum froglet, Wallum rocket frog and Wallum sedge frog. Other frog species such as tusked frog may also use this habitat.

An assessment of habitat quality for species 'likely' to be present according to the Likelihood of Occurrence (Appendix A) is provided in Table 3. Habitat quality is described as either:

- Not suitable – the species will not utilise the habitat.
- Marginal habitat – habitat that is not likely to be used by the species other than for dispersal.
- Supporting habitat – the habitat may be used by the species occasionally, but it is not preferred.
- Optimal habitat – the habitat meets all the needs of a species.

Table 3: Habitat quality and suitability

Species (known or likely to occur on site)	NC Act	EPBC Act	Habitat quality within Site
Tusked frog (*Adelotus brevis*)	**V**		**Optimal habitat** Tusked frog may utilise the wetter drainage lines and ponds on the Site. Adapted to a wide range of conditions. The species was not detected during surveys undertaken within the Site.
Latham's snipe (*Gallinago hardwickii*)	**V**	**Vu**	**Supporting habitat** Latham's snipe prefers foraging in wetlands and inundated grasslands during its migratory visit to Australia. It may temporarily utilise the low-lying areas and cover for foraging in Vegetation Community 2 during wet periods.
Wallum rocketfrog (*Litoria freycineti*)	**V**		**Supporting habitat**

Species (known or likely to occur on site)	NC Act	EPBC Act	Habitat quality within Site
			May utilise the ponds and inundated heath during the wet season. Prefers remnant Wallum habitat.
Wallum sedgefrog (*Litoria olongburensis*)	**V**	**Vu**	**Supporting habitat** May utilise the ponds and inundated heath during the wet season. Prefers remnant Wallum habitat. Not located during surveys of the ERA.
Wallum froglet (*Crinia tinnula*)	**V**		**Optimal habitat** May utilise the ponds, drainage lines and inundated trenches during the wet season. Readily utilises flooded grassland and heath during wet periods

NC Act conservation status: V = Vulnerable / E = Endangered / SL = Special Least Concern / LC = Least Concern.
EPBC Act conservation status: Vu = Vulnerable / E = Endangered / Ma = Marine / Mi = Migratory.

3.2.5 Fauna Species

An incidental fauna species list is provided as Appendix B. It is important to note that the survey was undertaken across a single day, and no nocturnal surveys were conducted, so there remains a possibility that cryptic threatened species may be present but not detectable at the time of the survey. A single listed species was identified during the survey, Wallum froglet (*Crinia tinnula*) which has been regularly identified across the site during wet periods in previous survey. Least Concern colonial breeding species were identified on Site, including Australian white ibis (*Threskiornis molucca*), however there is no breeding habitat available for these species.

4. Legislative Considerations

4.1 Applicable Legislation

Environmental and ecologically related legislation, including regulations of relevance for the Project, is listed and briefly described below.

- The EPBC Act is the Australian Government's central piece of environmental legislation and provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, and heritage places – defined in the EPBC Act as MNES.
- The *Nature Conservation Act 1992* provides for the protection of native flora and fauna including threatened species. The NC Act designated the Protected Plants Trigger Areas to protect at-risk flora species and manage the tampering of animal habitats and breeding places, in addition to placing restrictions on the destruction or removal of threatened flora.
- The *Environmental Protection Act 1994* aims to protect Queensland's environment while allowing for sustainable development that enhances the quality of life. The EP Act establishes the EMR and CLR, which record land affected by notifiable activities and contaminated land, respectively. The Act also provides the legislative framework for the management of contaminated land and acid sulfate soils, including obligations to avoid or minimise environmental harm arising from disturbance of acid sulfate soils.
- The purpose of the *Vegetation Management Act* 1999 is to regulate the clearing of vegetation so that vegetation is conserved, ensures the management of environmental effects, and prevents the loss of biodiversity while providing for sustainable land use.
- The *Economic Development Act 2012* establishes the framework for the planning, assessment and development of PDAs. Development within a PDA is assessed against the applicable PDA Development Scheme administered by the relevant development authority, rather than the local planning scheme, to facilitate coordinated economic development while balancing environmental and community outcomes.
- The *Planning Act 2016* and Planning Regulation 2017 establish Queensland's broader development assessment framework. While development within a PDA is generally assessed under the *Economic Development Act 2012*, the Planning Act continues to apply to certain development-related matters, referral processes and approvals outside the PDA framework.
- The *Water Act 2000* provides a framework for the sustainable and integrated management of Queensland water resources and supply.
- The *Fisheries Act 1994* regulates impacts on fish habitat and marine plants.
- The *Biosecurity Act 2014* is the legislation governing the management of pest species, and other biosecurity matters within Queensland.

4.2 Ecology Approvals and Permits

A summary of approvals and permits relevant to ecology that may be required to undertake the proposed works is detailed in Table 4. The required ecological approval and permits are to be reassessed during detailed design when the scope and extent of works is confirmed. Consideration to these matters should be included in the design process.

Table 4: Environmental approval requirements

Approval/Permit Requirement	Element Present within Site?	Approval or Further Action Required	Comments
Matters of National Environmental Significance *Environment Protection and Biodiversity Conservation Act 1999*	Yes	Aura South was approved under the EPBC Act on 22 May 2026 (EPBC 2023/09548), following assessment via a PER including offset areas	The ERA supports a small area of suitable breeding habitat for Wallum sedgefrog within Vegetation Community 2; however, the species was not detected during previous surveys. The ERA does not support habitat for other MNES species or threatened ecological communities (TECs). Aura South was approved, subject to conditions, under the EPBC Act by the Commonwealth Environment Minister's delegate on 22 May 2026 (EPBC 2023/09548), following assessment via a Public Environment Report (PER). The ERA forms part of the approved action and is therefore subject to the relevant requirements, commitments and conditions established through the EPBC Act approval, including those relating to the avoidance, management and offsetting of impacts to MNES.
Protected Plants Clearing Permit *Nature Conservation Act 1992*	No	No	The Site is not mapped within a high-risk area on the Protected Plants Flora Trigger Map. Therefore, a Protected Plants Flora Survey and Flora Survey report in accordance with the Flora Survey Guidelines – Protected Plants V2.03 (DETSI, 2025) is not required. Flora surveys have been conducted across the wider Aura South Project area and relevant reporting and permit applications will be produced during the planning and approval process for the wider project.
Development Approval: Operational works that involve clearing native vegetation *Planning Regulation 2017*	Yes	No	The Project will impact Category X (non-remnant vegetation). Clearing category X vegetation is considered accepted development. Regardless, the final design should still consider minimising clearing where possible.

Approval/Permit Requirement	Element Present within Site?	Approval or Further Action Required	Comments
Species Management Program *Nature Conservation Act 1992*	Yes	Yes	An SMP "low risk of impacts" for animals classed as least concern will be required where clearing animal breeding places is proposed. Potential animal breeding places were observed in the form of amphibian habitat across the Site. Due to the presence of listed amphibian species, it is therefore likely that a High-Risk SMP will be required to manage the impacts to breeding places of listed species including: • Wallum froglet • Tusked frog • Wallum sedge frog • Wallum rocket frog
Nature Conservation (Koala) Conservation Plan 2017 *Planning Regulation 2017*	No	No	Clearing of koala habitat area or non-juvenile koala habitat trees is not proposed. No further compliance against the *Nature Conservation (Koala) Conservation Plan 2017* is required.
Development Approval: Operational work that is constructing or raising waterway barrier works *Fisheries Act 1994* *Planning Regulation 2017*	Yes	No	The Site is currently mapped to contain three low-risk (green) waterways mapped under the *Fisheries Act 1994*; however, a detailed waterway investigation refined the map extents (Appendix C), and the updated mapping was subsequently confirmed by SARA (Appendix DD). Ground-truthing confirmed that the majority of mapped drainage features comprise artificial or ephemeral drainage lines with no fisheries values. A small section of waterway has been identified within the Site; however, based on the proposed development footprint and the nature of the works, it is not anticipated that a development application under the *Fisheries Act 1994* will be required.
Riverine protection permit *Water Act 2000*	No	No	There are no mapped watercourses under the *Water Act 2000* within the Site.
Sunshine Coast Regional Council Planning Scheme	Yes	No	The Site is not mapped as containing any Biodiversity, Wetlands and Waterways overlay areas. Compliance with the Biodiversity, Wetlands and Waterways overlay code is not required

Approval/Permit Requirement	Element Present within Site?	Approval or Further Action Required	Comments
General Biosecurity Obligation *Biosecurity Act 2014*	Yes	Yes	The Site has potential to support Category 3 restricted invasive plant species as defined by the Biosecurity Act. All landholders have a general biosecurity obligation (GBO). Under the GBO, individuals and corporations whose activities pose a biosecurity risk must: • Take all reasonable and practical steps to prevent or minimise each biosecurity risk. • Minimise the likelihood of causing a 'biosecurity event ‘and limit the consequences if such an event is caused. • Prevent or minimise the harmful effects a risk could have, and not do anything that might make any harmful effects worse. Category 3 restricted invasive plants must not be distributed either by sale or gift or be released into the environment.

5. Impact and Fauna Management Plan

5.1 Avoidance

The ERA has been concentrated within existing cleared, highly modified and historically disturbed land associated with previous grazing and plantation activities, thereby substantially reducing the extent of direct ecological disturbance required to facilitate development. This is consistent with the overall approach to the Aura South masterplanning process which has been designed to avoid remnant vegetation, regrowth vegetation, wetlands, habitat corridors and environmentally sensitive areas.

5.2 Potential Impacts

The current Project extent (Figure 1) includes the proposed clearing of approximately 104.6 ha of non-remnant vegetation. The vegetation proposed for removal consists of exotic grassland and degraded non remnant alluvial heath. Based on the current design, there is expected to be no impact on areas of high ecological value. Potential direct impacts of the proposed work include:

- Vegetation clearing and destruction of non-remnant habitat.
- Movement or destruction of ground habitat e.g., grass cover, low heath.
- Disturbance of nesting sites, burrows, or breeding areas for fauna.
- Accidental injury or death of fauna during clearing or other construction activities.
- Alteration or loss of food resources, such as flowering plants or fruit-bearing trees, affecting dependent fauna.

Indirect impacts may include:

- Disturbance or displacement of fauna due to increased noise, vibrations, and human presence.
- Increased light levels from night works and the installation of new lighting, potentially disrupting fauna behaviour and natural activity patterns.
- Increased dust and air pollution.
- Potential contamination of soil or water sources from sediment, fuel, oils, or other pollutants used during construction activities.
- Introduction and spread of pest species and other biosecurity risks.
- Changes to hydrology of the Site.
- Downstream impacts upon the Coastal Swamp TEC and Moreton Bay Ramsar wetland.

5.3 Impact Mitigation

Proposed measures to mitigate impacts during each phase of the Project are detailed in Table 5.

Table 5: Mitigation Measures

Project Phase	Mitigation Measures
Pre-construction	• Minimise total clearing extent through maximising avoidance of vegetated areas and habitat features. • Habitat for acid frogs must be established within the Offset Area (located external to the ERA) prior to construction, including fencing protected conservation areas to exclude cattle. Rehabilitation works will also commence to enhance WSF movement corridors, including targeted weed control.

Project Phase	Mitigation Measures
During construction	• Comply with the conditions of the SMP "low risk of impacts" or SMP "high risk of impacts". • Prepare and implement a fire ant management plan to minimise potential impacts from invasive fire ants. • Prepare and implement Precinct-specific Construction Environmental Management Plan (CEMP) which incorporates the requirements of any relevant project environmental approval conditions. The precinct-based CEMPs will include guidance on how to manage erosion and sediment during construction works at the Site. • Detailed pre-clearance and clearance procedures will be developed as part of a Vegetation Clearing and Fauna Management Plan. Measures will include but not be limited to the following: – Site inductions for all staff and contractors to inform them of their obligation to protect ecological values. – Set and identify clear boundaries for clearing works. – A suitably qualified fauna spotter catcher will be present during all habitat removal works. – Identify and mark any large, mature trees adjoining/near clearing footprint for avoidance. – Identify and use existing access tracks and disturbed areas for areas of temporary disturbance where possible. – Directional felling must occur which directs the fall of vegetation away from areas of retained vegetation. Disturbance footprints and buffer zones will be clearly defined to all staff; preferably visibly marked onsite using flagging tape or similar. – Prior to commencement of works on Site, identify the nearest licenced wildlife rescue operation or vet clinic to which any fauna seriously injured can be transported for rehabilitation. • Undertake staged rehabilitation of environmental and buffer areas to maintain, improve, and extend existing habitat areas. • Implement management measures to prevent and minimise the spread and/or introduction of biosecurity matter (weeds/ pests) with the Site. • Manage waste generation — particularly putrescible waste — to reduce risk of attracting pest animals/predators to construction site. • Cover pipeline trenches and/or exposed pits overnight to prevent fauna from falling in. Adequately inspect these areas for trapped reptiles and mammals prior to commencing work. • Erosion and sediment control measures are to be monitored and maintained to ensure ongoing effective functioning.
Post construction	• Undertake any necessary stabilisation and revegetation works where required. • Ensure all temporary structures, such as those for controlling sediment and erosion are fully removed once the area they are in is stabilised.

6. Strategic Planning Assessment

6.1 State Interest Environmental Assessment

6.1.1 Introduction

This section provides a comprehensive, evidence-based response to relevant State interests under the ShapingSEQ and the SPP to support the approval of the ERA within the Halls Creek PDA. The assessment integrates detailed desktop mapping, ground-truthed ecological field surveys and other specialist technical investigations to verify on-ground environmental conditions and reconcile these with statutory mapping.

The purpose of this section is to demonstrate that the ERA (Figure 1) has been strategically located within a largely cleared and historically modified part of Aura South and therefore minimises impacts on Matters of National, State and Local Environmental Significance, waterways, coastal processes and downstream environmental values. The assessment confirms that the ERA is suitable for early urban development within the approved Halls Creek PDA and provides a robust and defensible basis for progression through the strategic framework.

6.1.1.1 EPBC Act Assessment and Approval

Aura South was approved, subject to conditions, under the EPBC Act by the Commonwealth Environment Minister's delegate on 22 May 2026 (EPBC 2023/09548), following assessment via PER. The ERA forms part of the approved action and has been planned and designed in accordance with the relevant requirements and commitments established through the EPBC Act approval. The development footprint is predominantly located within previously cleared, lower-value areas, consistent with an avoidance-first approach to MNES. Environmental and buffer areas, together with the dedicated Offset Area, form part of the broader Green Network and provide for the protection, management and offsetting of relevant environmental values across Aura South.

6.1.1.2 Overview of Aura South Masterplan Approach

The Aura South masterplan adopts an avoidance-led planning approach that prioritises the retention of ecological values and environmental connectivity while directing development to previously disturbed land. Any residual impacts are managed through the broader mitigation and offset framework established for Aura South. Consistent with this approach, the ERA aligns with the masterplan's intent and establishes a compact, efficient development footprint situated predominantly within already cleared and historically modified land. Through targeted offsets, long-term management and the integrated Green Network, Aura South will deliver enhanced habitat and ecological connectivity across the broader site. The ERA therefore represents a low-constraint, low-impact early development stage that is consistent with the EPBC Act approval and its associated avoidance, mitigation and offset framework, as well as the broader strategic intent to prioritise development within previously cleared and disturbed land.

6.2 State Planning Policy 2017

6.2.1 Liveable Communities

The ERA responds to the Liveable Communities requirements of the SPP by recognising that, while the ERA itself is located within a cleared and historically modified portion of the site with minimal environmental or landscape values, it forms part of a broader Aura South master planned community. The wider project has been deliberately structured to protect environmental values, maintain scenic and cultural landscape outcomes, and provide high-quality public open space at a neighbourhood and regional scale. In this context:

(a) Valuing landscape character and the natural environment

The ERA minimises impacts on areas of ecological significance, with environmental values largely retained and enhanced outside the developable footprint through designated environmental areas, buffers, and the delivery of significant offset areas as part of the broader Aura South site.

(b) Maintaining scenic amenity and cultural landscapes

Key landscape features, vegetation corridors, ridgelines and visually sensitive areas are not present within the ERA and have been excluded from development through the broader masterplanning process. These features are instead incorporated into environmental areas, buffers, transition zones and linear open spaces elsewhere within Aura South, ensuring the overall development maintains its natural setting and scenic amenity.

The ERA benefits from this structure by integrating with the wider landscape framework without generating impacts on scenic or cultural landscape values. Engagement with the Kabi Kabi People continues across the project, with the ERA forming part of the area managed under the approved Cultural Heritage Management Plan and ongoing consultation processes.

(c) Public access to the natural environment

Aura South integrates recreation areas, environmental corridors and buffer lands to provide accessible open space and connections to the natural environment, with the ERA contributing to, but not compromising, these outcomes. Accordingly, while the ERA itself contains limited intrinsic environmental or scenic values, it has been deliberately positioned to avoid such areas and supports a broader development framework that protects, enhances and provides access to the natural environment in a manner consistent with the SPP.

6.2.2 Agriculture (Fisheries Resources)

The ERA has been planned to be consistent with the fisheries resource's provisions of the SPP, ensuring that development does not compromise long-term fisheries productivity, sustainability or accessibility. Detailed field investigations undertaken across the broader Aura South, confirmed that mapped ground-truthed waterways, marine plants or aquatic habitat value are protected and managed within the ERA. As such, development within the ERA will not result in direct impacts on fisheries resources or waterway functions.

Potential indirect impacts from ERA development have been addressed through the integrated Aura South water management framework, which applies best-practice stormwater design, water quality treatment and a whole-of-catchment approach to maintaining hydrological regimes. These measures ensure that downstream receiving environments, including the verified fisheries habitat in lower Halls Creek, are protected from altered flows, sedimentation or pollutant loads. Accordingly, the ERA manages direct interaction with fisheries resources, natural waterways and aquatic habitat values, and supports the broader catchment scale water management measures that protected downstream fisheries values. This ensures the ERA remains fully consistent with the SPP Agriculture State Interest by protecting the long-term productivity, sustainability and accessibility of fisheries resources.

6.2.3 Planning for the Environment and Heritage

The ERA has been planned in accordance with the environment and heritage provisions of the SPP, ensuring that matters of environmental significance and cultural heritage are appropriately managed in line with statutory requirements. As part of the broader Aura South masterplanning process, areas of ecological and cultural heritage significance across the full site have been identified through detailed desktop assessment and ground-truthed field surveys. Aura South was approved, subject to conditions, under the EPBC Act on 22 May 2026 (EPBC 2023/09548), following assessment via a PER. The ERA forms part of the approved action and has been planned in accordance with the relevant requirements and commitments established through the EPBC Act approval. The site is declared as a Priority Development Area. Areas containing environmental significance are largely excluded from development and will be compensated through dedicated offset areas elsewhere,

Aura South planning approach acknowledges the broader cultural landscape and the enduring connection of the Kabi Kabi First Nation Traditional Owners to Country. While no cultural heritage constraints occur within the ERA, the project continues to implement the approved Cultural Heritage

Management Plan and ongoing engagement with the Kabi Kabi People to ensure cultural values are respected and protected across the wider site.

Accordingly, the ERA supports the SPP by minimising impacts on environment and heritage values, while contributing to a broader, integrated land use framework that protects, enhances and manages these values at a landscape scale.

6.2.4 Biodiversity

Consistent with the environmental provisions of the SPP, the ERA has been strategically located and designed to be largely confined to land that has been previously cleared and disturbed through its former use as a pine plantation. The vegetation proposed for removal consists of exotic grassland and degraded alluvial heath. The ERA does not support remnant vegetation and is not known to support TEC. No flora species of conservation significance are known to occur.

Habitat features are very sparse across the Site. The lack of woody vegetation, frequent slashing, ponding and grazing mean that there is little habitat for woodland or forest dwelling species. Seasonal inundation of low-lying areas may provide some temporary foraging habitat for wading birds in the streams, however as the ERA is located on higher ground; low lying areas are likely to drain quickly. During periods of prolonged or intense rainfall, small ponds and drainage lines may be utilised by species such as Wallum sedgefrog, Wallum froglet, Wallum rocket frog and Tusked frog. The occurrence of suitable habitat within the ERA is limited and highly dependent on seasonal conditions, with confirmed Wallum-associated habitat mainly situated in a small area along the southern portion of the Site. Residual impacts to ecological values will be managed through the established mitigation and offset framework for Aura South, ensuring consistency with the biodiversity outcomes sought by the SPP.

6.2.4.1 Matters of National Environmental Significance

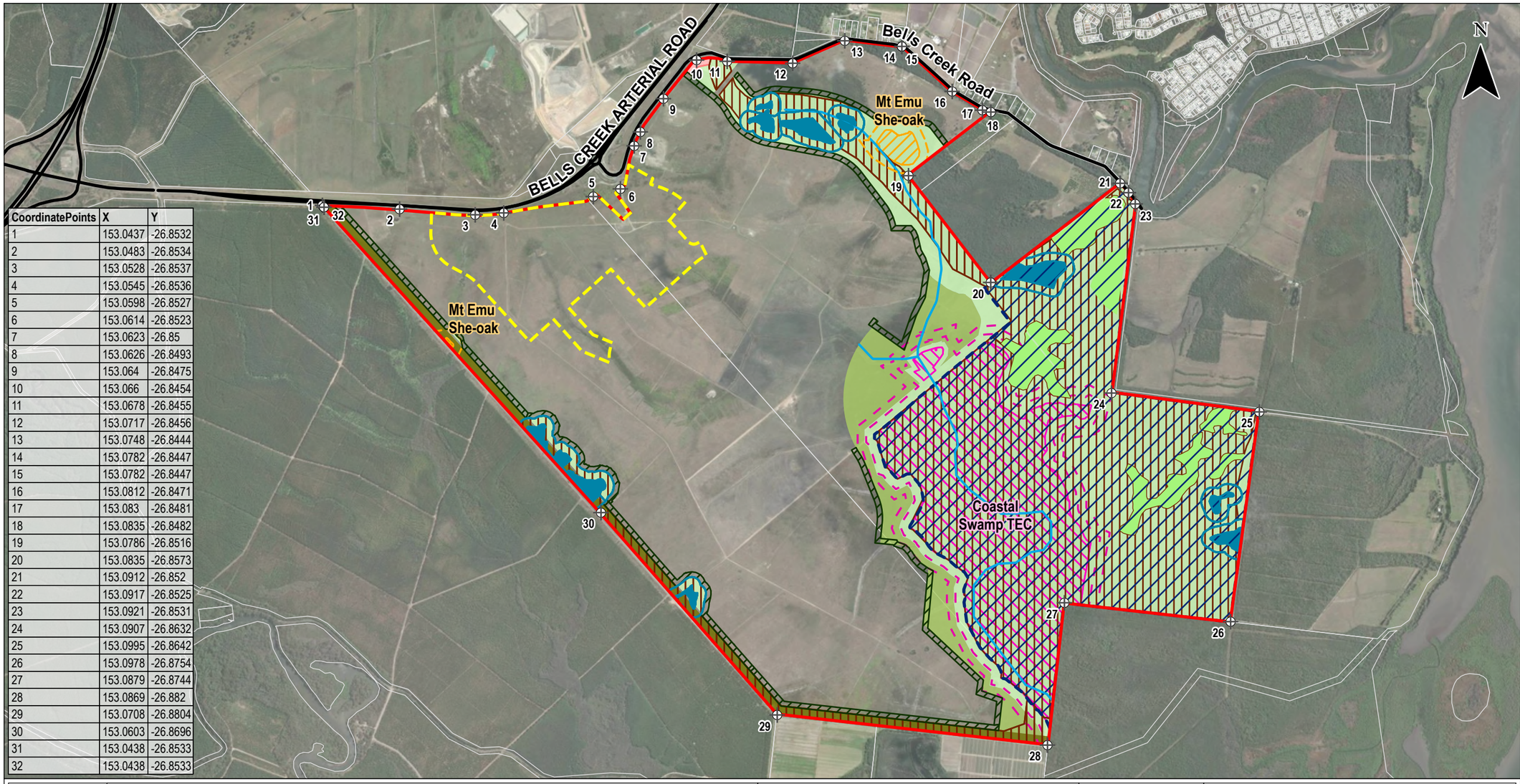
Aura South was approved, subject to conditions, under the EPBC Act by the Commonwealth Environment Minister's delegate on 22 May 2026 (EPBC 2023/09548), following assessment via a Public Environment Report (PER). The ERA forms part of the approved action and is therefore subject to the relevant requirements and commitments established through the EPBC Act approval, including the avoidance, mitigation, management and offsetting of impacts to Matters of National Environmental Significance (MNES).

The ERA has been deliberately located within a largely cleared and historically modified portion of Aura South that supports limited MNES habitat and ecological values. While the ERA will impact a small area of suitable breeding habitat for the Wallum sedgefrog, the species was not detected within this habitat during surveys undertaken in 2024 or during subsequent surveys. Residual impacts associated with the ERA are addressed as part of the broader approved offset framework for Aura South, which provides for the protection, restoration and long-term management of habitat at a landscape scale.

A key component of this framework is the consolidated 348 ha Wallum sedgefrog Offset Area, which provides for the protection and enhancement of habitat for the species and is supported by the broader network of environmental and buffer areas across Aura South. Collectively, these areas provide for the retention, creation and rehabilitation of habitat, strengthen movement opportunities and ecological connectivity, and contribute to the long-term protection and management of MNES across the broader site. The offset areas therefore form an integral component of the approved environmental framework for Aura South and provide the mechanism through which residual impacts to Wallum sedgefrog habitat associated with development, including within the ERA, are addressed.

Accordingly, the ERA is consistent with the EPBC Act approval and its associated avoidance, mitigation and offset framework. The concentration of development within previously cleared and disturbed land, combined with the protection, rehabilitation and long-term management of the dedicated offset, environmental and buffer areas, ensures that residual impacts to MNES associated with the ERA are appropriately addressed as part of the approved action and broader landscape-scale environmental outcomes for Aura South.

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CoordinatePoints	X	Y
1	153.0437	-26.8532
2	153.0483	-26.8534
3	153.0528	-26.8537
4	153.0545	-26.8536
5	153.0598	-26.8527
6	153.0614	-26.8523
7	153.0623	-26.85
8	153.0626	-26.8493
9	153.064	-26.8475
10	153.066	-26.8454
11	153.0678	-26.8455
12	153.0717	-26.8456
13	153.0748	-26.8444
14	153.0782	-26.8447
15	153.0782	-26.8447
16	153.0812	-26.8471
17	153.083	-26.8481
18	153.0835	-26.8482
19	153.0786	-26.8516
20	153.0835	-26.8573
21	153.0912	-26.852
22	153.0917	-26.8525
23	153.0921	-26.8531
24	153.0907	-26.8632
25	153.0995	-26.8642
26	153.0978	-26.8754
27	153.0879	-26.8744
28	153.0869	-26.882
29	153.0708	-26.8804
30	153.0603	-26.8696
31	153.0438	-26.8533
32	153.0438	-26.8533

Activity Area	Green Network Precinct						Environmental Transition Areas			Bells Creek Arterial Buffer	Comments
	Wallum Sedge Frog Habitat Offset Area	Wallum Sedge Frog Habitat + Buffer	Mt Emu She-oak Habitat	Mt Emu She-oak Buffer	Coastal Swamp TEC Primary Buffer	Northern Inter-Urban Break and Forestry Buffer	Coastal Swamp TEC Secondary Buffer	Lifestyle Buffer	Recreation and Environmental Transition		
Housing / Habitable Structures	N	N	N	N	N	N	N	N	N	N	
Acid Frog Habitat	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Acceptable where it can be demonstrated that suitable breeding or foraging for Wallum Sedge Frogs/Acid Frogs can be created.
Boardwalks / Pathways	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Acceptable in all zones (excluding Offset Area). Boardwalk construction may be required in environmentally sensitive areas to protect hydrology and vegetation. No boardwalk through/over Wallum Sedge Frog breeding habitat.
Water Sensitive Urban Design (WSUD)	N	Y, 1	N	Y	N	Y	Y	Y	Y	Y	All WSUD should be off-line from Wallum Sedge Frog breeding habitat to ensure no mixing of water chemistry/hydrology. Conveyance pathways must accommodate design flows plus, flood flows (10-year ARI). Bio basins (ephemeral only) must be located minimum 30m from any frog breeding ponds, with 'wet' sediment basins/wetlands located >50m. Maximum of 40% of forestry buffer to be occupied by WSUD (bio basins only).
Stormwater Conveyance	Y, 4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Permitted in all zones as is essential for site drainage and hydrology. All drainage lines for stormwater conveyance must be off-line from Wallum Sedge Frog breeding habitat and Mt Emu She-oak habitat to ensure no mixing of water chemistry/hydrology. Conveyance pathways must accommodate design flows plus flood flows (10-year ARI).
BBQ Site	N	N	N	N	N	N	Y	Y	Y	Y	Acceptable in relevant zones provided works do not affect hydrology/topography. Not within WSF buffers.
Lighting	N	N	N	N	N	N	Y	Y	Y	Y	Acceptable in relevant zones were associated with paths and cycleways to facilitate community safety. Lighting must be LED and designed to minimise light spill. Minimum 50m away from Acid Frog breeding ponds and habitats.
Toilets	N	N	N	N	N	N	Y	Y	Y	Y	Acceptable within relevant land uses. Composting toilets or similar eco friendly preferred if within Green Network Precinct.
Parks	N	N	N	N	N	Y	Y*	Y	Y*	Y	*Must include 100% native and/or endemic plants in landscaping in relevant land uses. Turf permitted.
Roads	Y, 3	N	N	N	N	Y, 2	Y	Y	Y	Y	Acceptable within relevant land uses.
Utilities (i.e., Sewer, Water, Power, Solar)	N	Y	N	Y	N	Y	Y	Y	Y	Y	Acceptable within relevant land uses. Construction/operation must not alter or impact frog breeding zones.

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0 200 400 600 800 1000
Metres

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MAP LEGEND

- Site Boundary Coordinates
- Site Boundary
- Early Release Area Boundary (ERA)
- Lifestyle Buffer (30m) - Can Include Park

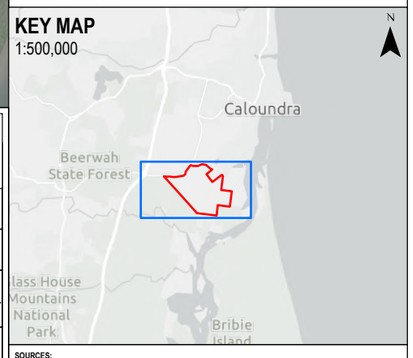
Environmental and Buffer Areas:

- Wallum Sedge Frog Offset Area
- Wallum Sedge Frog Breeding Habitat - Protected
- Wallum Sedge Frog Breeding Habitat - Created
- Wallum Sedge Frog Non-breeding Habitat
- Coastal Swamp TEC
- Mt Emu She-oak
- Northern Inter-Urban Break and Forestry Buffer (60m)
- Green Network Precinct
- Recreation and Environmental Transition
- Bells Creek Arterial (BCA) Buffer (40m)
- Coastal Swamp TEC Primary (50m) and Secondary Buffer (50m)
- Mt Emu She-oak Buffer (50m)
- Property Boundary
- Wallum Sedge Frog Breeding Habitat - Protected Buffer
- Halls Creek (and Tributaries)
- Road

TABLE LEGEND

Y: Compatible and accepted land use
N: Land use not accepted within environmental area
1. Minimum 30m buffer required from retained or created habitat.
2. Permitted only where crossing perpendicular to the buffer / boundary to provide future local traffic access to Roys Road through forestry
3. Fire and maintenance access roads only
4. Water discharge points only

KEY MAP
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World Imagery: City of Moreton Bay, Vantor

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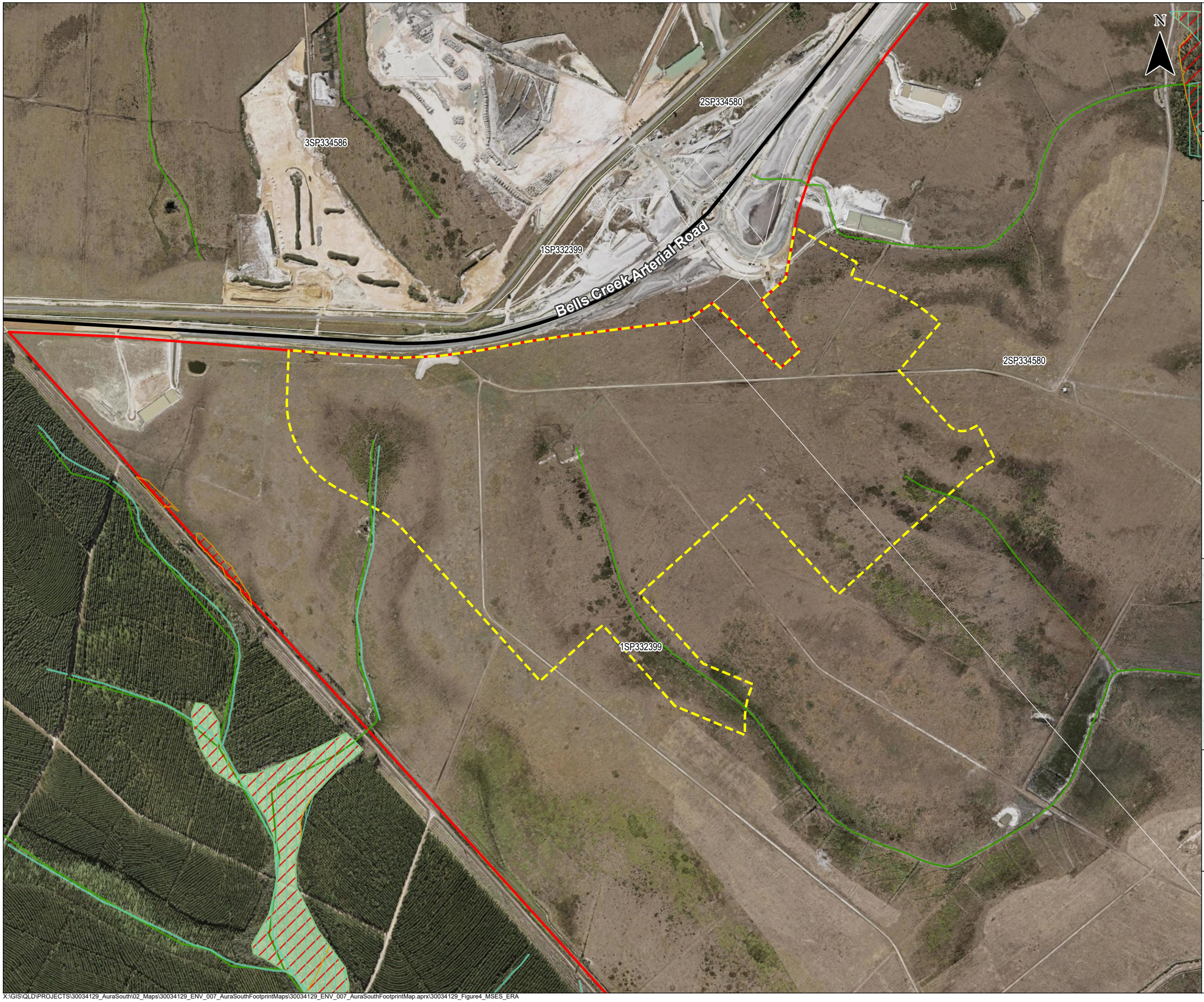
PROJECT: Aura South PER
PROJECT NO: 30034129
FIGURE TITLE: Environmental and Buffer Area Plan
CREATED BY: MD17519
DATE: 27/08/2026
VERSION: 1

6.2.4.2 Matters of State Environmental Significance

The ERA does not intersect mapped terrestrial Matters of State Environmental Significance (MSES) (Figure 4). MSES features such as essential habitat, wildlife habitat, high ecological significance wetlands, watercourse vegetation, and coastal environment layers mainly intersect environmental and buffer areas of Aura South, outside the developable area. These occur in lower catchments, riparian corridors, remnant vegetation patches, and waterways that connect to Pumicestone Passage and its estuarine and intertidal systems. These features are largely retained within the broader master-planned environmental network and is subject to a PMAV that confirms the area as Category X (non-remnant vegetation) (Figure 5). Species such as Wallum froglet, Wallum rocket frog and Tusked frog may utilise small ponds and drainage lines within the ERA during periods of prolonged or intense rainfall when temporary inundation creates suitable ephemeral habitat. The occurrence of suitable habitat within the ERA is limited and highly dependent on seasonal conditions.

The broader avoidance, retention, restoration and offset measures established for Aura South, including those forming part of the EPBC Act approval, are expected to provide complementary benefits for MSES where habitat values overlap with MNES. As potential habitat for MNES and MSES species overlap across portions of the site, the extensive retention, restoration and offset measures implemented as part of the Aura South master plan are also expected to contribute to the protection and enhancement of habitat values relevant to species such as the Wallum froglet, Wallum rocket frog and Tusked frog.

Accordingly, the combined desktop assessment and SMEC field verification confirm that the ERA is situated outside most mapped and observed MSES values, with any minor or transient ecological values addressed through the broader development framework. Any residual impacts, including to ephemeral frog habitat, will be addressed through the established EPBC offset framework and, where MSES values are not substantially the same as MNES, through State offset processes.



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Metres

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LEGEND

- Site Boundary
- Early Release Area Boundary (ERA)
- Cadastral parcels
- State Controlled Road

MSES Wetland Values

- MSES high ecological significance wetlands

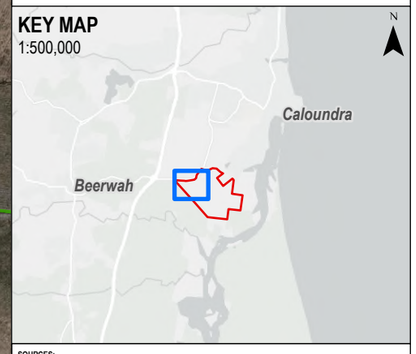
MSES Wildlife Habitat

- MSES wildlife habitat [endangered or vulnerable]

MSES Regulated Vegetation

- MSES regulated vegetation [defined watercourse]
- MSES regulated vegetation [100m from wetland]
- MSES regulated vegetation [essential habitat]

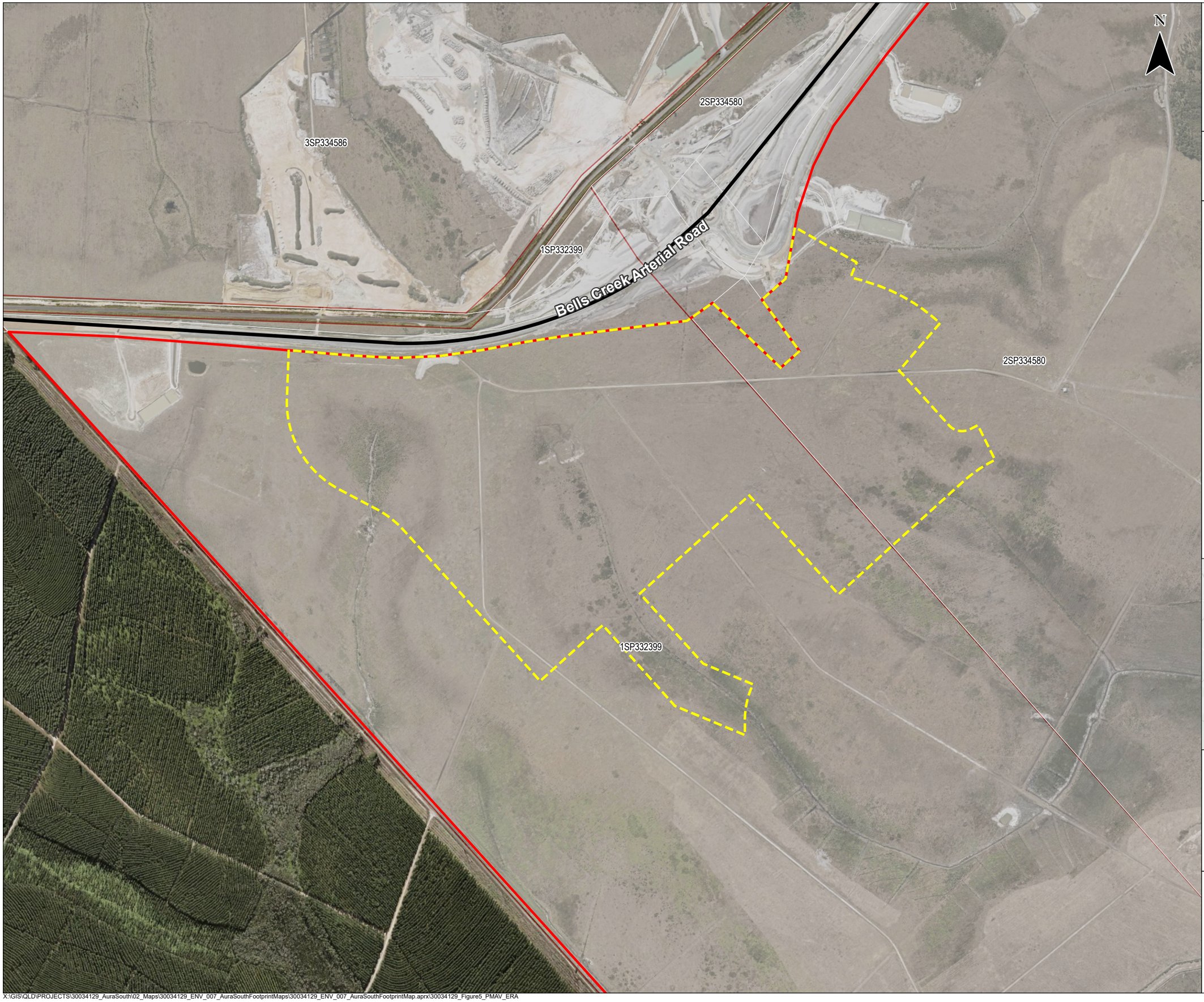
KEY MAP
1:500,000



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MSES regulated vegetation [essential habitat]: Source Data: Department of Resources 2022
MSES: Department of Environment and Science 2022
Light Gray Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community
MSES wildlife habitat [endangered or vulnerable]:
MSES high ecological significance wetlands: © State of Queensland (Department of Environment and Science) 2022.
MSES regulated vegetation [defined watercourse]: Source Data: Department of Resources 2022
MSES: Department of Environment and Science 2022
MSES regulated vegetation [100m from wetland]: Source Data: Department of Resources, 2022
MSES: Department of Environment and Science, 2022
Population centres: © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development)

PROJECT:	Aura South PER
PROJECT NO:	30034129
FIGURE NO:	4
FIGURE TITLE:	MSES
CREATED BY:	MD17519
DATE:	26/08/2026
VERSION:	2

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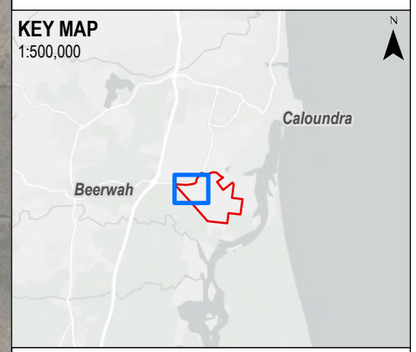
LEGEND

- Site Boundary
- Early Release Area Boundary (ERA)
- Cadastral parcels
- State Controlled Road

Property Map Of Assessable Vegetation [PMAV]

- Category X

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PROJECT: Aura South PER
PROJECT NO: 30034129
FIGURE NO: 5
FIGURE TITLE: PMAV
CREATED BY: MD17519
DATE: 26/08/2026
VERSION: 2

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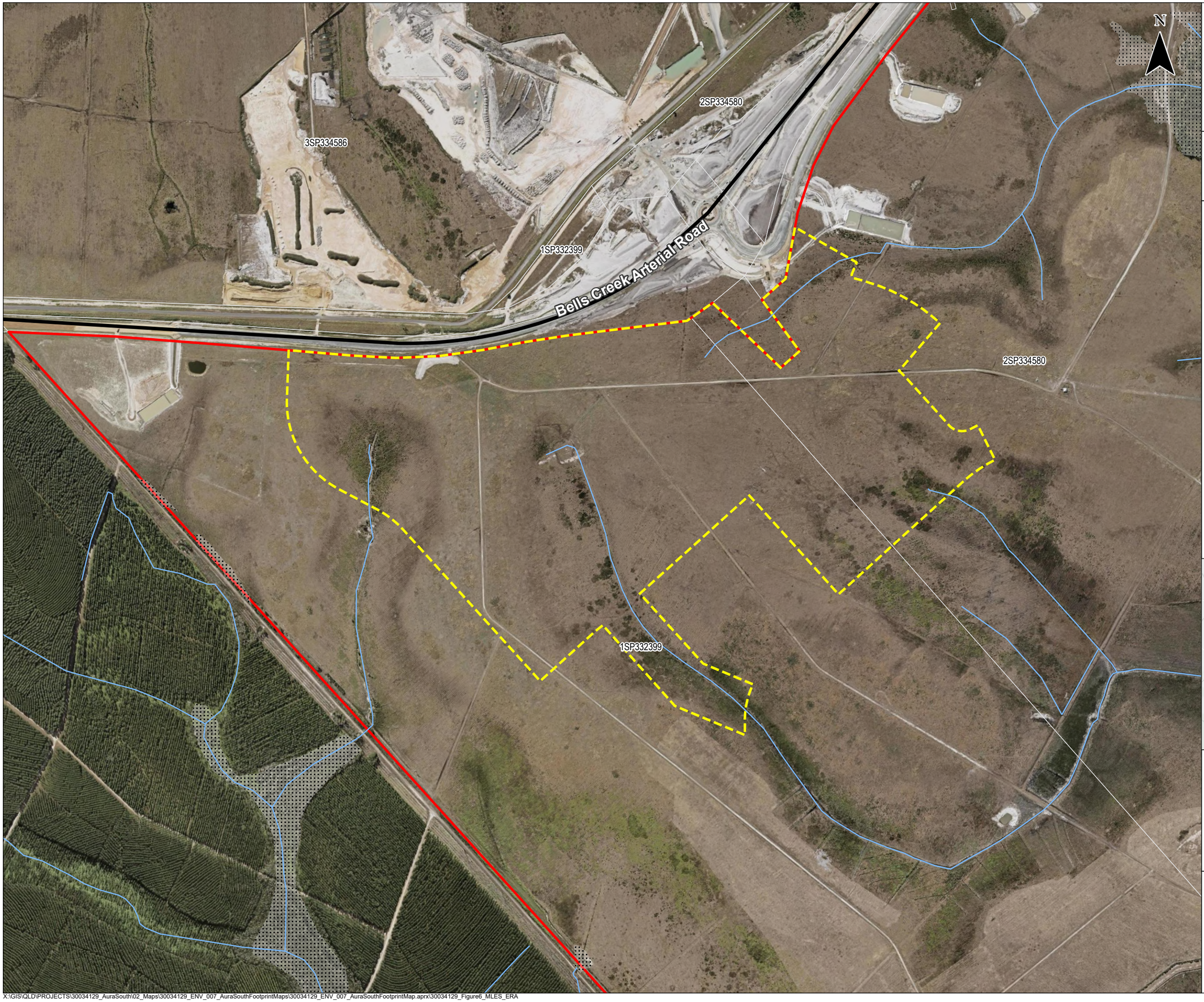
6.2.4.3 Matters of Local Environmental Significance

The ERA does not intersect mapped Matters of Local Environmental Significance (MLES) under the Sunshine Coast Planning Scheme 2014, with significant ecological values occurring outside the ERA footprint (Figure 6). Sunshine Coast Council overlays indicate that MLES features, including local biodiversity areas, riparian corridors, wetlands, habitat linkages and scenic or landscape features, are generally confined to the surrounding landscape, particularly along the Pumicestone Passage, estuarine interfaces and retained vegetation corridors to the east, north and south of the Site.

Within the ERA, land comprises cleared and historically modified areas associated with previous pine plantation and grazing land uses, which are generally considered to have limited ecological structure and function relative to mapped MLES values. While the MLES waterway layer identifies several intersections of mapped stream order 1–2 drainage features within the ERA, these correspond to highly modified drainage lines with limited representation of the ecological and geomorphic characteristics typically associated with mapped MLES waterways. No mapped wetlands, riparian corridors, biodiversity areas or ecological linkages intersect the ERA, and no locally significant buffers extend into the developable area.

This pattern is consistent across the broader Aura South footprint, where MLES values are retained within an integrated environmental network external to urban development areas. As such, the ERA avoids direct impacts to mapped MLES values, and development will not result in the loss or fragmentation of locally significant environmental features identified under the planning scheme.

Overall, the absence of mapped MLES within the ERA supports its suitability for urban development, with locally significant ecological values retained and managed within the surrounding conservation and open space network.



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Metres

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LEGEND

- Site Boundary
- Early Release Area Boundary (ERA)
- State Controlled Road

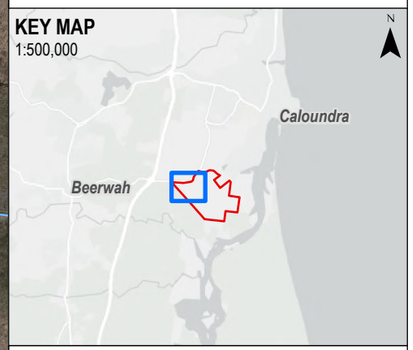
MLES - Wetlands

- Natural Wetland

MLES - Waterways

- Stream Order 1-2

KEY MAP
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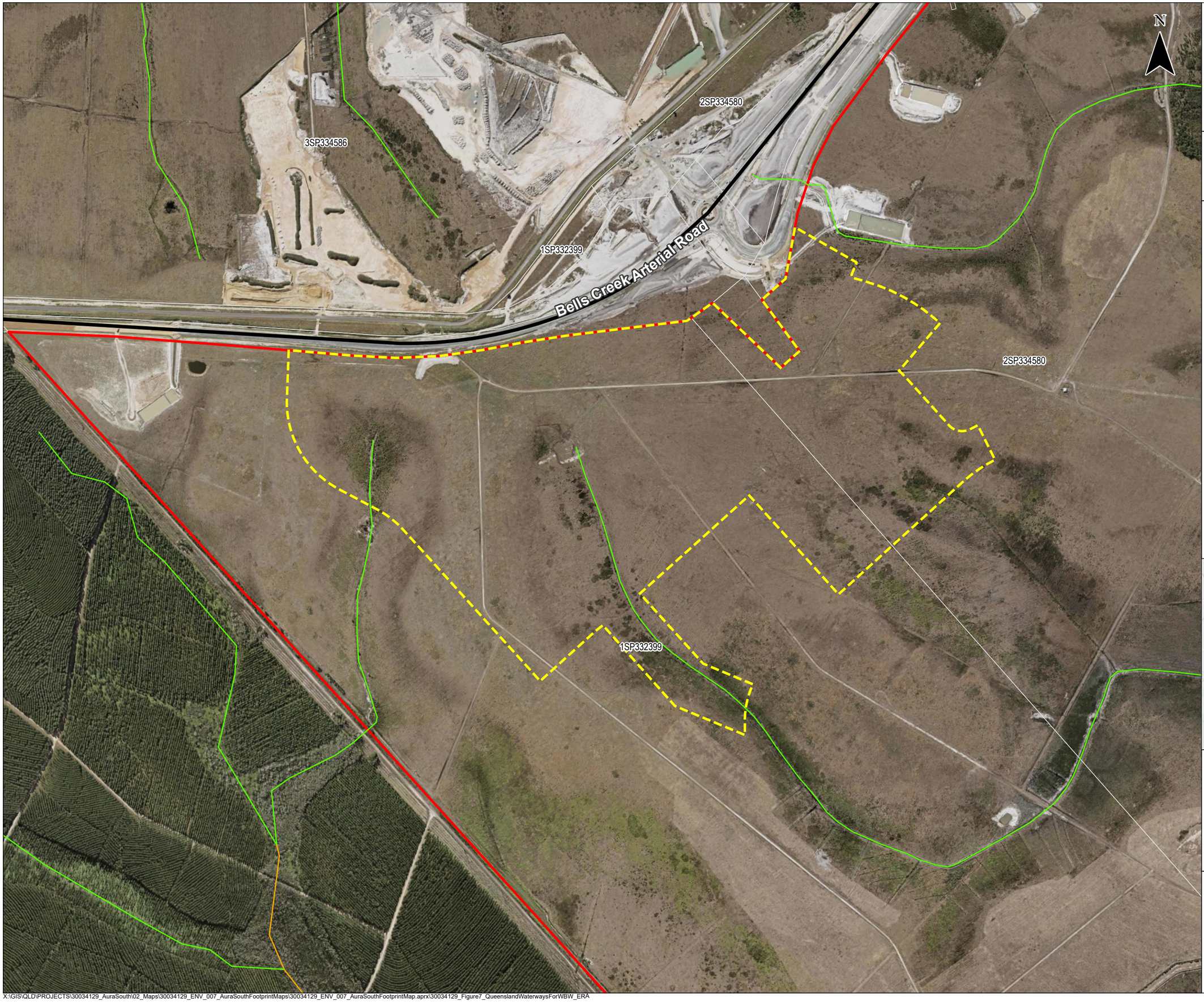
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PROJECT:	Aura South PER
PROJECT NO:	30034129
FIGURE NO:	6
FIGURE TITLE:	MLES
CREATED BY:	MD17519
DATE:	26/08/2026
VERSION:	2

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6.2.5 Waterways

State waterway mapping identifies three intersecting green (low-risk) waterways within the ERA under the *Fisheries Act 1994* waterway barrier works layer. These regional datasets pre-date extensive historical modification and therefore over-represent the extent and function of waterways (Figure 7). The Fishology assessment and pre-lodgement advice from SARA and DPI (Appendix D) provide the verified basis for determining the actual waterway extent within the ERA. The Fishology report confirms that only one minor mapped waterway intersects the Site, and that this feature does not function as a regulated waterway under the *Fisheries Act 1994*. The waterway will continue to function as the site's stormwater drainage, with no modification to the existing habitat proposed. The mapped waterway is appropriately protected and does not constrain the remainder of the ERA. Further details are provided in the Fishology memorandum in Appendix C.



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Metres

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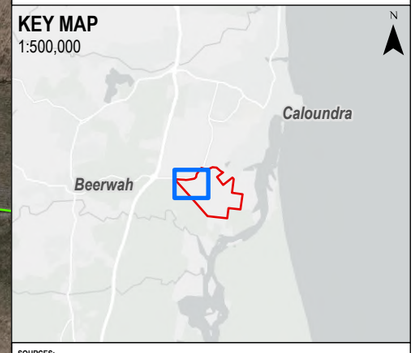
LEGEND

- Site Boundary
- Early Release Area Boundary (ERA)
- State Controlled Road

Queensland waterways for waterway barrier works

- Moderate
- Low

KEY MAP
1:500,000

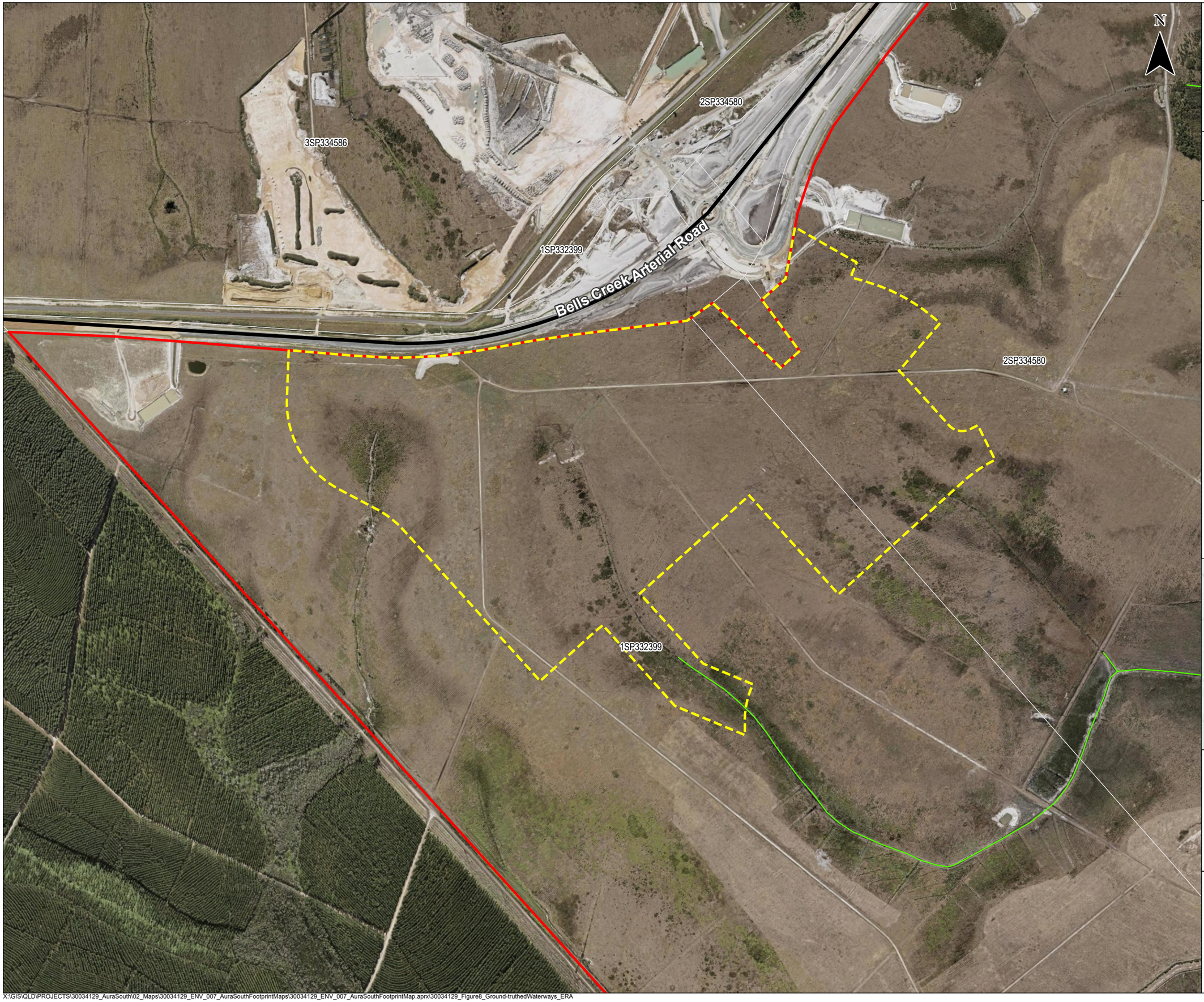


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Queensland waterways for waterway barrier works: © State of Queensland (Department of Agriculture and Fisheries) 2023

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PROJECT:	Aura South PER
PROJECT NO:	30034129
FIGURE NO:	7
FIGURE TITLE:	Queensland Waterways for WBW
CREATED BY:	MD17519
DATE:	26/08/2026
VERSION:	2

X:\GIS\QLD\PROJECTS\30034129_AuraSouth\02_Maps\30034129_ENV_007_AuraSouthFootprintMaps\30034129_ENV_007_AuraSouthFootprintMap.aprx\30034129_Figure7_QueenslandWaterwaysForWBW_ERA



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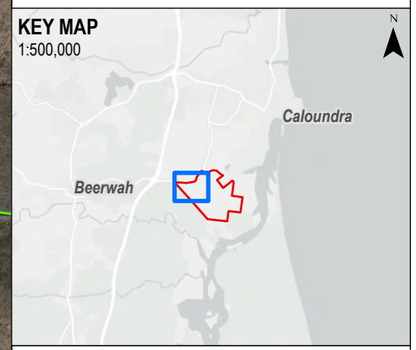
LEGEND

- Site Boundary
- Early Release Area Boundary (ERA)
- State Controlled Road

Alternative Waterway Mapping

- Low

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PROJECT:	Aura South PER
PROJECT NO:	30034129
FIGURE NO:	8
FIGURE TITLE:	Ground-truthed waterways
CREATED BY:	MD17519
DATE:	26/08/2026
VERSION:	2

X:\GIS\QLD\PROJECTS\30034129_AuraSouth\02_Maps\30034129_ENV_007_AuraSouthFootprintMaps\30034129_ENV_007_AuraSouthFootprintMap.aprx\30034129_Figure8_Ground-truthedWaterways_ERA

6.2.6 Coastal environment

The ERA has been planned to be aligned with the coastal environment provisions of the SPP. While the ERA is partially overlain by the Coastal Management District (CMD), this mapping applied at a broad cadastral scale and does not reflect site-specific coastal process constraints (Figure 9). Detailed assessment confirms the ERA is located well outside both medium and high storm tide inundation extents, with areas subject to coastal processes occurring well away from the developable footprint. Accordingly, the CMD function as a precautionary overlay rather than an indication of coastal hazard risk within the ERA.

In this context:

(a) Concentration of development

The ERA forms part of the Halls Creek PDA, a designated future growth area, consolidating development within identified potential urban footprint rather than extending into sensitive coastal environments.

(b) Protection of coastal resources

Coastal landforms, wetlands and native vegetation associated with coastal process are retained outside the ERA. These areas are secured within environmental areas, buffers, open space networks and offset lands established through the Aura South master plan, ensuring coastal resource and ecological functions are protected at a landscape scale.

(c) Scenic amenity

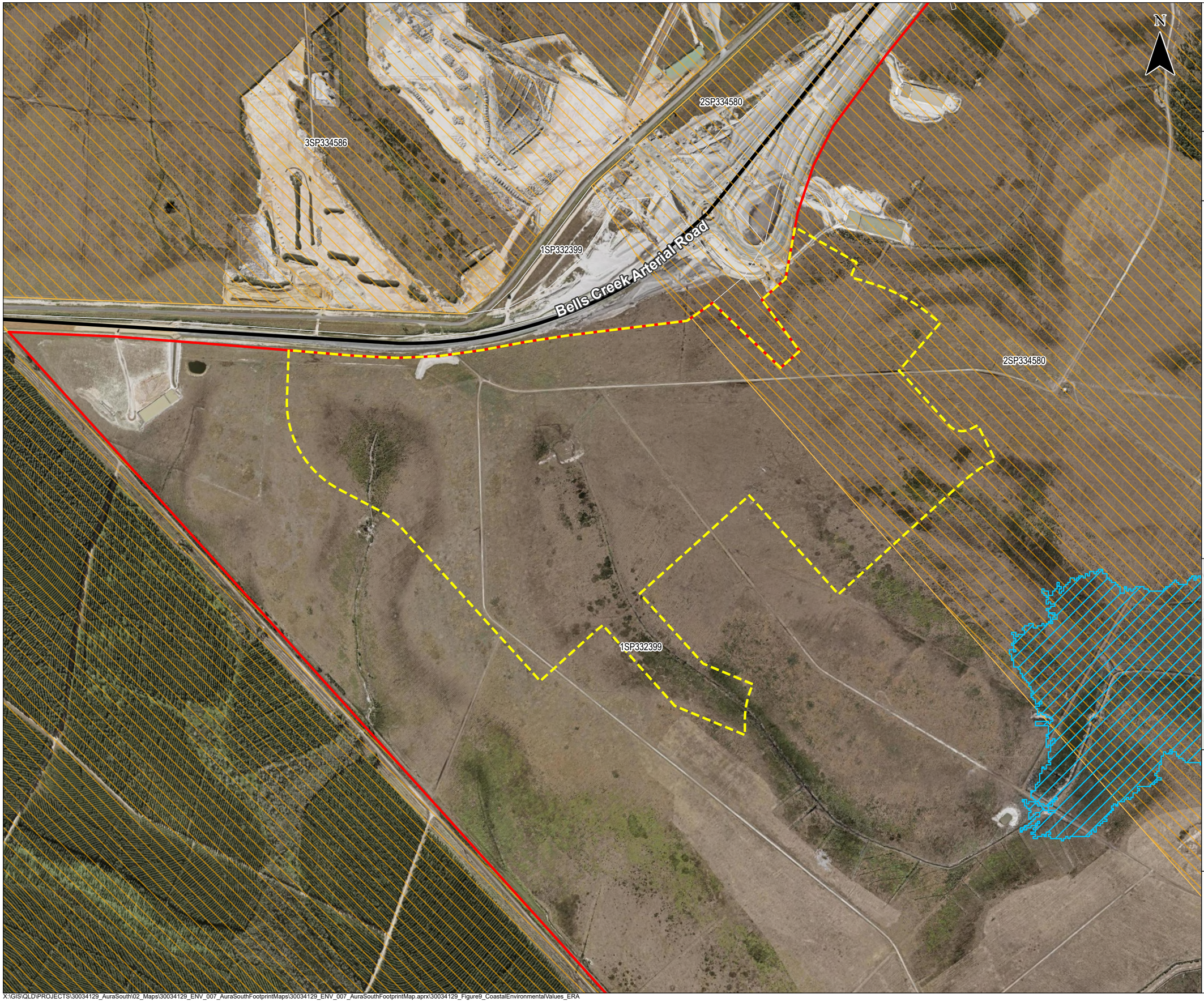
Important coastal landscapes, views and visual catchments, particularly those associated with the Pumicestone Passage and estuarine margins, are maintained outside the ERA, preserving natural coastal character and scenic amenity.

The broader Aura South development incorporates a whole-of-catchment approach to coastal processes, hydrology and water quality. The integrated stormwater management strategy includes key features such as the Green Heart Lake, bioretention basins, and rainwater tanks. Together, these measures will help maintain natural hydrological regimes, protect water quality, and prevent adverse offsite impacts on downstream coastal environments and other sensitive receiving waters. Importantly, the ERA avoids areas subject to coastal processes and is fully consistent with the SPP coastal environment provisions. The maintained protection of coastal resources, ecological values and scenic landscapes supports the suitability of the ERA for early urban development within Aura South.

(d) Acid sulfate soils

The Queensland Acid Sulfate Soils Mapping indicates that the ERA has an extremely low probability of containing acid sulphate soils. The ERA is situated on land above 5m AHD and therefore avoids lower lying areas where there is a higher risk of encountering acid sulphate soils.

If acid sulphate soils are identified, it will be managed in accordance with current best practice management procedures, including the preparation and implementation of an Acid Sulfate Soils Management Plan (ASSMP), where required. These measures will ensure that ASS is appropriately treated and managed to minimise the risk of acid generation and the mobilisation of metals, thereby protecting the natural and built environments and human health.



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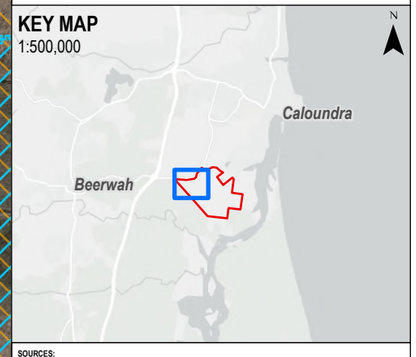
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Metres

Scale:1:8,000 @ A3
GDA2020 MGA Zone 56

LEGEND

- Site Boundary
- Early Release Area Boundary (ERA)
- Storm Tide Inundation Area - Medium Hazard
- Coastal management district
- Cadastral parcels
- State Controlled Road

KEY MAP
1:500,000



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PROJECT NO: 30034129
FIGURE NO: 9
FIGURE TITLE: Coastal Environmental Values
CREATED BY: MD17519
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6.2.6.1 Water quality

The ERA forms part of the broader Aura South stormwater management framework established through the approved EPBC Act assessment, which is designed to protect downstream environmental values, including the Coastal Swamp TEC and the High Ecological Value waters of Pumicestone Passage. The Aura South Early Release Area Stormwater Quality Management Plan (SQMP) prepared by Design Flow establishes an integrated treatment train incorporating rainwater harvesting and reuse, gross pollutant traps, precinct-scale sediment basins and bioretention systems, and vegetated drainage channels.

The treatment systems have been located and sized having regard to the proposed development catchments, drainage requirements, available open space and downstream environmental constraints. MUSIC modelling confirms the proposed treatment strategy achieves the stormwater quality objectives established for Aura South, including pollutant reduction targets that exceed State Planning Policy requirements. Further detail regarding the stormwater quality management strategy, treatment systems and modelling is provided in Appendix F.

6.2.7 EPBC Approval Framework and Relationship to MNES and MSES

MNES associated with the Aura South development have been comprehensively assessed under the EPBC Act. Aura South was approved, subject to conditions, by the Commonwealth Environment Minister's delegate on 22 May 2026 (EPBC 2023/09548), following assessment via a PER. The ERA forms part of the approved action and is therefore subject to the relevant requirements and commitments established through the EPBC Act approval for the avoidance, mitigation, management and offsetting of impacts to MNES.

The approved environmental framework for Aura South adopts an avoidance mitigation offset approach, with development directed away from areas of higher ecological value and residual impacts addressed through management and offset measures. A key component of this framework is the Wallum Sedge Frog Offset Strategy, which provides for retained and created breeding habitat, rehabilitation of foraging and movement habitat, and additional habitat within the Coastal Swamp TEC. These measures benefit Wallum sedgefrog and other wallum-dependent species across the broader Aura South site and may also provide complementary benefits for MSES where habitat values overlap with MNES.

The broader Aura South water management framework also provides for the maintenance of downstream hydrological and water quality processes to protect receiving environmental values. Accordingly, the ERA is consistent with the EPBC Act approval and its associated environmental management and offset framework, ensuring that relevant MNES values are appropriately avoided, managed and protected as part of the approved action.

6.3 ShapingSEQ South East Queensland Regional Plan 2023

The Aura South development is now located within the approved Halls Creek PDA, and the ERA has been strategically positioned within a largely cleared and historically modified part of the site. This placement aligns with the regional intent for the PDA, which directs growth to suitable, previously disturbed land while protecting high-value ecological areas, coastal environments and landscape-scale environmental processes. Across Aura South, Matters of National, State and Local Environmental Significance have been identified through detailed assessment and the EPBC PER process (EPBC 2023/09548). These values are protected through a consolidated environmental network, buffers, rehabilitation corridors and dedicated offset areas. The ERA benefits from this structure by being largely located outside MNES, MSES, wetlands, riparian corridors and functional biodiversity linkages, ensuring regional ecological outcomes are maintained. Accordingly, the ERA supports regional intent by minimising environmental and heritage impacts, aligning with the approved PDA structure, and contributing to a coordinated land-use pattern that protects and manages environmental values at a landscape scale.

7. Summary

The ERA represents a low-constraint, low-impact development area that aligns with the relevant State interests of the SPP and the regional planning intent of the Halls Creek PDA. The developable footprint is predominantly located within cleared and historically modified land, supporting the efficient delivery of urban development while avoiding areas of higher ecological and environmental value.

The ERA has been strategically located to avoid or minimise impacts to MNES and MSES, with higher-value environmental areas retained and managed within the broader Aura South environmental network. Habitat values within the ERA are generally limited, with targeted surveys identifying predominantly ephemeral and rainfall-dependent habitat for Wallum sedgefrog, Wallum froglet, Wallum rocket frog and Tusked frog. Residual impacts to relevant ecological values are addressed through the broader avoidance, mitigation, management and offset framework established for Aura South, including habitat protection, restoration and long-term management measures that support ecological connectivity at a landscape scale.

Aura South was approved, subject to conditions, under the EPBC Act on 22 May 2026 (EPBC 2023/09548), following assessment via a PER. The ERA forms part of the approved action and is therefore subject to the relevant requirements and commitments established through the EPBC Act approval for the protection and management of MNES. The location and design of the ERA, together with the broader environmental and offset framework for Aura South, are consistent with the avoidance-led approach underpinning the approved action.

Field investigations have also refined the extent and function of mapped waterways within the ERA. The assessment confirms that mapped drainage features are predominantly artificial or ephemeral and have limited fisheries habitat value. Relevant waterways and downstream environmental values are protected through the broader open space and drainage network and the implementation of appropriate hydrological, stormwater quality and erosion and sediment control measures.

Although the ERA is partially mapped within the Coastal Management District, detailed assessment confirms that the developable footprint is located outside areas subject to significant storm-tide inundation and coastal processes. Coastal landforms, wetlands, vegetation and other sensitive receiving environments are predominantly located outside the ERA and are protected within the broader Aura South environmental network.

Overall, the ERA demonstrates an avoidance-led planning approach that concentrates development within previously disturbed land while protecting and managing environmental values through the broader Aura South masterplanning and environmental management framework. The ERA is consistent with the EPBC Act approval, relevant State environmental interests and the strategic planning intent for the Halls Creek PDA and is considered suitable to progress as an early stage of the Aura South development.Design and Construction Considerations

Based on the results of this desktop assessment and ecology field survey, below is a summary of the key considerations that should be integrated into the Project design and construction.

- Habitat for acid frogs must be established within the Offset Area (external to the ERA) before construction begins, as per the Wallum Sedge Frog Offset Strategy. Rehabilitation works must also commence to enhance WSF movement corridors, including targeted weed control as per Wallum Sedge Frog Management Plan.
- Comply with the conditions of any SMP “low risk of impacts” or SMP “high risk of impacts”.
- Prepare and implement a fire ant management plan to minimise potential impacts from invasive fire ants.
- Prepare and implement Precinct-specific Construction Environmental Management Plan (CEMP) which incorporates the requirements of any relevant project environmental approval conditions. The precinct-based CEMPs will include guidance on how to manage erosion and sediment during construction works at the Site.
- Detailed pre-clearance and clearance procedures will be developed as part of a Vegetation Clearing and Fauna Management Plan.
- Undertake staged rehabilitation of environmental and buffer areas to maintain, improve, and extend existing habitat areas.

- Manage waste generation — particularly putrescible waste — to reduce risk of attracting pest animals/predators to construction site.

Mitigation measures are further detailed in Table 5.

7.1 Approvals and Permits

As outlined in Table 4, the following approvals, permits and other requirements will be triggered:

- A Species Management Program - High Risk of Impact for listed and Least concern colonial breeding species will be required. As a minimum, the following species should be included:
  - Wallum froglet
  - Tusked frog
  - Wallum sedge frog
  - Wallum rocket frog
- A Significant Residual Impact Assessment may be required for MSES values associated with Tusked Frog, Wallum Froglet, and any other MSES species or habitats identified during future approvals processes that are not considered substantially the same as Matters of National Environmental Significance addressed under the EPBC Act approval and associated Commonwealth offset framework.
- The Project will have general obligations under the Biosecurity Act.

8. References

Department of Environment and Energy. (2020). *National Light Pollution Guidleines for Wildlife*. Canberra: Department of Environment and Energy.

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DETSI. (2025). *Flora Survey Guidelines - Protected Plants*. Brisbane: Queensland Government.

DoE. (2013). *Matters of National Environmental Significance Significant impact guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999*. Canberra: Department of Environment.

Neldner, V., Wilson, B., Dillewaard, H., Ryan, T., Butler, D., McDonald, W., . . . Appelman. (2023). *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 7.0*. Brisbane: Queensland Herbarium, Queensland Department of Environment, Science and Innovation.

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Appendix A

Likelihood of Occurrence

A-1-1 Fauna

Taxon ID	Scientific Name	Common Name	NCA	EPBC	Mi/ Ma	Rec ords	year	Source	General	Breeding	Foraging	Movement	Distribution	Reference	Habitat within Survey Area	LoO
324	*Delma torquata*	Adorned Delma, Collared Delma	V	Vu				PMST	The Collared Delma normally inhabits eucalypt dominated woodland and open forest where it is associated with suitable micro-habitats (exposed rocky outcrops). The ground cover is predominantly native grasses, such as Kangaroo Grass (Themeda triandra), Barbed-wire Grass (Cymbopogon refractus), Wiregrass (Aristida sp.) and Lomandra (Lomandra sp.) (Peck & Hobson, 2007).				The Collared Delma is known from the western suburbs of Brisbane, Queensland, and the following sites: Bunya Mountains, Blackdown Tableland National Park (NP), Bullyard Conservation Park, D'Aguilar Range NP, Expedition NP, Naumgna and Lockyer Forest Reserves, Western Creek near Millmerran and the Toowoomba Range (Davidson, 1993; Ryan, 2006). The Collared Delma occurs within the South East Queensland, Condamine, Burnett Mary and Fitzroy (Queensland) Natural Resource Management regions.		No	Unlikely
	Lathamus discolor	Swift parrot							The swift parrot is mostly bright green in colour, with dark-blue patches on the crown, a prominent red face, and the chin and throat are narrowly bordered with yellow. It is approximately 25 cm in length, the wingspan is 32 to 36 cm and it weighs approximately 65 g. It is a slim, medium-sized parrot with angular pointed wings and a slender tail giving it the characteristic streamlined flight-silhouette.	Swift parrots breed in tree-hollows in old-growth or other forest with suitable hollows, in relatively close proximity to the main food source, flowering Tasmanian blue gum. Several pairs often nest in close proximity, in the same or neighbouring trees. Breeding success is correlated with the intensity and extent of flowering, which is highly variable between years. In poor years, swamp (black) gum (E. ovata) is used as food source.	They feed preferentially in the largest trees available. Their distribution fluctuates with food availability as they feed on psyllid lerps, seeds and fruit. Non-breeding birds preferentially feed in inland box-ironbark and grassy woodlands, and coastal swamp mahogany (E. robusta) and spotted gum (Corymbia maculata) woodland when in flower; otherwise often in coastal forests from eastern Victorian to the central coast of New South Wales.	Whilst on the mainland the swift parrot disperses widely to forage on flowers and psyllid lerps in Eucalyptus species, with the majority being found in Victoria and New South Wales. In Victoria, swift parrots are predominantly found in the dry forests and woodlands of the box-ironbark region on the inland slopes of the Great Dividing Range	The swift parrot breeds in Tasmania during the summer and the entire population migrates north to mainland Australia for the winter. They occupy habitats across all tenures, with most habitats occurring outside formal conservation reserves.		No	Unlikely
	Rostratula australis	Australian Painted Snipe							Prefers the fringes of swamps, dams or nearby marshy areas, often where there is grass cover, lignum, low scrub or open timber.	Breeds in response to local conditions (generally between September to December in NSW). The nest consists of a scrape in the ground, lined with grasses and leaves, generally amongst tall grasses or reeds.	Forages on mud-flats or in shallow-water, feeding on worms, molluscs, insects and plant-matter.	Migration patterns are poorly known. The species may be dispersive or migratory, with irregular occurrences and breeding recorded in some areas.	Commonly recorded at scattered locations throughout eastern Australia, including in Queensland, NSW, Victoria and south-eastern South Australia. Records of the species occur in wetlands across all Australian States.		Marginal	Possible
1865	*Limnodromus semipalmatus*	Asian Dowitcher	V	Vu	Mi/Ma			PMST	Habitat critical to the survival of the Asian dowitcher occurs in sheltered coastal environments such as embayment's, coastal lagoons, estuaries, and tidal creeks. The species is known to frequent shallow water and exposed mudflats or sandflats, as well as the round ponds and channels of saltworks and sewage farms. Two important	Non-breeding season in Australia. Asian dowitchers breed near freshwater wetlands in the steppe and forest-steppe zones of Siberia, Mongolia, and around Heilongjiang in north-	The species feeds on inter-tidal mudflats. This habitat is often vulnerable to pollution (e.g., oil spill and urban waste). Asian dowitcher are	The species arrives in Australia from August. The south-east coast of Sumatra and northern Java are probably the main staging and nonbreeding areas for the species. Only a few individuals arrive in Australia, with no known movements within Australia. They	The Asian dowitcher is only a regular visitor to coastal areas between Broome and Port Headland and the Port McArthur tidal wetlands in the Gulf of Carpentaria. Elsewhere, the species' occurrence is sporadic and		No	Unlikely

						distributional areas have been identified in northern Australia, including coastal areas between Broome and Port Headland and the Port McArthur tidal wetlands in the Gulf of Carpentaria. Outside of these two key range areas, Asian dowitchers are irregularly sighted in low numbers (often single birds) at widely dispersed locations on the northern and eastern Australian coastline. During the non-breeding season, the bird roosts in sheltered coastal environments such as estuarine and intertidal mudflats, lagoons, creeks and saltworks.	east China. Suitable habitats include lake shores, river deltas, flooded meadows and grassy bogs along rivers with short grass and sedge vegetation.	carnivorous and feed primarily on small fish, insect larvae, and oligochaetes when breeding, and on polychaetes, insect larvae, and molluscs when migrating or overwintering.	are occasionally recorded in the Northern Territory and rarely in Western Australia or along the south-west coast. They have been recorded along the east coast from mid-September, but are rare in eastern Australia.	rare, typically only appearing along the northern and eastern Australian coastline.			
1836	*Botaurus poiciloptilus*	Australasian Bittern	E	En		PMST	In wetlands and fringing with dense vegetation of reeds, sedges and rushes in south-west and southeastern Australia (Martinez-Vilalta, Motis and Kirwan, 2020). Prefers shallow water with little variation in level where it feeds on fish, crayfish, amphibians, arthropods and some reptiles.	Breeding occurs in summer from October to January; nests are built in secluded places in densely vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch	Foraging mainly takes place at night. Diet includes frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains.			Martínez-Vilalta, A., A. Motis, and G. M. Kirwan (2020). https://doi.org/10.2173/bow.ausbit1.01	No	Unlikely
2008	*Argynnis hyperbius inconstans*	Australian Fritillary	E	Cr		PMST	The Australian fritillary is restricted to areas where its larval food plant, Viola betonicifolia (the arrowhead violet), occurs (NSW Scientific Committee 2002). The arrowhead violet is widespread throughout Queensland and NSW, at both high and low altitudes. However, the Australian fritillary appears to only occupy lower altitude sites (<600m)				The Australian fritillary has been recorded in scattered locations across south-eastern Queensland and north-eastern New South Wales (Braby 2000; Sands & New 2002). The subspecies appears to have had a core distribution between Gympie in Queensland and Port Macquarie in NSW, although there are historical records which extend beyond this range. The subspecies has been recorded as far north as Mt Bellenden Ker in Queensland, and as far south as the Hunter Valley in NSW (Sands & New 2002).	Conservation Advice Argynnis hyperbius inconstans	No	Unlikely
1092	*Turnix melanogaster*	Black-breasted Button-quail	V	Vu		PMST	Restricted to rainforests and forests with areas with rainfall between 770-1200mm. Prefer drier, low, closed forests, particularly where vine thicket or vine forest is present (Bennett 1985; Hughes & Hughes 1991; Marchant & Higgins 1993; Milledge 2000; Smyth et al. 2001).	Breeds from September to April/ May. Nests consist of a ground scrape, lined with leaves, grass or moss. Nests are generally well-concealed in the base of a fern, low bush or grass tussock.	Feed on invertebrates from leaf litter on the forest floor. May also consume seeds.	The species is generally considered to be sedentary, but dispersion of the species is poorly understood.	Restricted to coastal and near-coastal regions of south-eastern Queensland and north-eastern NSW, extending from Byfield in the north of Queensland, south the the NSW border and west to Palm Grove National Park and Barakula State Forest.		No	Unlikely
1256	*Thalassarche melanophris*	Black-browed Albatross	SL	Vu	Mi/Ma	PMST	Non-breeding visitor. They forage in the coastal waters of continents, over up-wellings or boundaries of currents and are often found sheltering in harbours, bays or channels. The species is usually associated with mixed flocks of other seabirds, including other albatrosses and giant petrels (Marchant and Higgins 1990).	Black-browed Albatrosses fly fairly low and take food from the sea surface or just below. They eat mostly krill and fish, with some salps, jellyfish and cephalopods. Black-browed Albatrosses are also enthusiastic scavengers (Marchant and Higgins 1990). The species will also accompany fishing boats, where birds scavenge offal, waste	They forage in the coastal waters of continents, over up-wellings or boundaries of currents and are often found sheltering in harbours, bays or channels. The species is usually associated with mixed flocks of other seabirds, including other albatrosses and giant petrels		During winter, Black-browed Albatrosses migrate northwards for foraging. Most birds migrate from breeding colonies to continental shelf waters off Australia (to 28°S on west coast and 24°S on east coast),	Commonwealth Listing Advice on Black-browed Albatross (Thalassarche melanopris)	No	Unlikely

									and bait (Roberston and Gales 1998).	(Marchant and Higgins 1990).					
1855	*Limosa limosa*	black-tailed godwit	E	En	Mi/Ma	115	1994	WN/PMST	Migratory, non-breeding visitor. During the non-breeding season, roosting habitat occurs on tropical shorelines, mainly roosting on sandy beaches and foraging on soft, muddy tidal flats. Black-tailed godwits also use freshwater habitats including lake shores, pools, flooded grasslands, and irrigated rice fields (Weller et al. 2020). Modelling summarised in Hansen et al. (2016) estimated that only about three percent of the Australian population of black-tailed godwit occurs in inland wetlands.		Feeding habitat includes areas of mud or soft, wet sand within sandflats, intertidal mudflats, saltmarshes, and the beaches of oceanic coastlines, bays, and estuaries (Johnsgard 1981; del Hoyo et al. 1996). In general, feeding takes place over the whole tidal range; however, most subpopulations will likely spend disproportionately large amounts of time foraging on the upper tidal flats (Wu & Wilcove 2020)	During the austral summer non-breeding season, black-tailed godwits are found in all states and territories of Australia; however, coastal regions support the highest densities of the species. The largest populations are found on the north coast between Darwin and Weipa. The species is generally found in small numbers elsewhere, including scattered inland records (Watkins 1993).	Conservation Advice for Limosa limosa (black-tailed godwit)	No	Possible
22456	*Climacteris picumnus victoriae*	Brown Treecreeper (south-eastern)	V	Vu				PMST	Occupies eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; prefers inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (Eucalyptus camaldulensis) forests bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses. Fallen timber is an important habitat component for foraging. Gregarious and usually observed in pairs or small groups of 8 to 12 birds; terrestrial and arboreal in about equal proportions; active, noisy and conspicuous while foraging on trunks and branches of trees and amongst fallen timber; spend much more time foraging on the ground and fallen logs than other treecreepers.	The species breeds in pairs or co-operatively in territories which range in size from 1.1 to 10.7 ha. Each group is composed of a breeding pair with retained male offspring and, rarely, retained female offspring. Hollows in standing dead or live trees and tree stumps are essential for nesting.	Forage in trees and on the ground. Species will peck and probe for insects, mostly ants, amongst the litter, tussocks and fallen timber, and along trunks and lateral branches; up to 80% of the diet is comprised of ants; other invertebrates (including spiders, insects larvae, moths, beetles, flies, hemipteran bugs, cockroaches, termites and lacewings) make up the remaining percentage. Will aslo consume nectar from Mugga Ironbark (Eucalyptus sideroxylon) and paperbarks, and food scraps. Young birds are fed ants, insect larvae, moths, craneflies, spiders and butterfly and moth larvae.	Present in all seasons or year-round at many sites; territorial year-round, though some birds may disperse locally after breeding.		Conservation Advice for Climacteris picumnus victoriae (brown treecreeper (south-eastern))	No	Unlikely
33169	*Thalassarche impavida*	Campbell Albatross, Campbell Black-browed Albatross	SL	Vu	Mi/Ma			PMST	Pelagic and marine / shorebird species						No	Unlikely
511	*Acanthophis antarcticus*	common death adder	V			1	1992	WN	Acanthophis antarcticus inhabits a broad range of habitat types, including wet and dry forests/woodlands, rainforests, grasslands, shrublands and coastal heaths. A highly cryptic species that spends most of its time concealed under leaf litter.						No	Unlikely

1853	*Tringa nebularia*	common greenshank	E	En	Mi/Ma	254	1995	WN/PMST	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores.	The Common Greenshank does not breed in Australia.	The species is known to forage at edges of wetlands, in soft mud on mudflats, in channels, or in shallows around the edges of water often among pneumatophores of mangroves or other sparse, emergent or fringing vegetation, such as sedges or saltmarsh. It will occasionally feed on exposed seagrass beds.	The Common Greenshank is a migratory species, breeding in the Palaearctic and flying south, in a broad front, overland and along coasts to non-breeding areas for the boreal winter.	The Common Greenshank does not breed in Australia; however, the species occurs in all types of wetlands and has the widest distribution of any shorebird in Australia. In Queensland, The species is widespread in the Gulf country and eastern Gulf of Carpentaria. It has been recorded in most coastal regions, possibly with a gap between north Cape York Peninsula and Cooktown. Inland, there have been a few records south of a line from near Dalby to Mt Guide, and sparsely scattered records elsewhere		No	Unlikely
1885	*Actitis hypoleucos*	Common Sandpiper	SL		Mi/Ma			PMST	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow and may be steep. The species is often associated with mangroves and sometimes found in areas of mud littered with rocks or snags (Geering et al. 2007; Higgins & Davies 1996). Generally, the species forages in shallow water and on bare soft mud at the edges of wetlands; often where obstacles project from substrate, e.g. rocks or mangrove roots. Birds sometimes venture into grassy areas adjoining wetlands (Higgins & Davies 1996). Generally, the species forages in shallow water and on bare soft mud at the edges of wetlands; often where obstacles project from substrate, e.g. rocks or mangrove roots. Birds sometimes venture into grassy areas adjoining wetlands (Higgins & Davies 1996). This species does not breed in Australia.	Species does not breed in Australia. The Common Sandpiper mainly breeds in parts of Europe and Asia, and occasionally Africa. The population that migrates to Australia breeds in the Russian far east.	Feeds molluscs such as bivalves, crustaceans. Generally, the species forages in shallow water and on bare soft mud at the edges of wetlands; often where obstacles project from substrate, e.g. rocks or mangrove roots. Birds sometimes venture into grassy areas adjoining wetlands.	Post breeding, the southward migration usually begins July–November, with individuals arriving from July onwards in South Australia, Western Australia and the Northern Territory, and from August onwards in New Soth Wales and Queensland. The non-breeding movements of the species within Australia are poorly known	Found along all coastlines of Australia and in many areas inland, the Common Sandpiper is widespread in small numbers. The population when in Australia is concentrated in northern and western Australia. Areas of national importance and maximum counts include Kakadu National Park, Northern Territory (300) Darwin area, Northern Territory (52). Nuytsland Nature Reserve, Western Australia (52) Roebuck Bay, Western Australia (40). South-eastern Gulf of Carpentaria, Queensland (235) Cairns Foreshore, Queensland (42)	Department of the Environment (2022). Actitis hypoleucos in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: https://www.environment.gov.au/sprat. Accessed Thu, 11 Aug 2022 11:32:03 +1000.	No	Unlikely
1899	*Sterna hirundo*	common tern	SL		Mi/Ma	16865	2020	WN	Pelagic and coastal / shorebird species						No	Unlikely
1164	*Cyclopsitta diophthalma coxeni*	Coxen's Fig-Parrot	CR	Cr				PMST	Associated with drier rainforests and adjacent wetter eucalypt forest but rarely seen due to its small size and cryptic habits. Also know to occur in wetter lowland rainforests that are now largely cleared in NSW.		Believed to prefer fig trees, but also feeds on other fruiting rainforest species, lichen, nectar and grubs.			SPRAT	No	Unlikely
1895	*Thalasseus bergii*	crested tern	SL		Mi/Ma	50320	2020	WN	Pelagic and coastal / shorebird species						No	Unlikely
1878	*Calidris ferruginea*	curlew sandpiper	CR	Cr	Mi/Ma	2522	2010	WN/PMST	In Australia, curlew sandpipers occur around the coasts and are also widespread inland, though erratic in their appearance across much of the interior. There are records from all states during the non-breeding period, and during the breeding season when many non-breeding birds remain in Australia rather than migrating north. This species does not breed in Australia. In Australia, curlew sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries,	Non-breeding season in Australia. Males depart breeding grounds in Siberia during early July. Females depart slightly later in July and early August, followed by juveniles in August. Will roost on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes	Forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. Curlew Sandpipers are omnivorous, feeding on worms, molluscs,	The curlew sandpiper is a migratory shorebird. Substantial numbers of curlew sandpipers remain in northern Australia throughout the nonbreeding season. Other individuals' stopover in northern Australia before continuing their migration to south-east Australia. The first individuals arrive in south-east Australia in late August, but the majority do not arrive until September. Some individuals are	Curlew sandpipers are most common in the far south-east and north-west of Australia. They are found in many Australian coastal sites and may also be seen inland in suitable wetland habitats. In Queensland there are scattered records in the Gulf of Carpentaria. The species is widespread along the coast south of Cairns. Inland, the	SPRAT	No	Unlikely

								bays, inlets and lagoons, and around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters	in salt marsh, among beach-cast seaweed, or on rocky shores.	crustaceans, insects and some seeds.	thought to move through the Gulf of Carpentaria to east and south-east Australia.	species is sparsely scattered, but there have been regular sightings around Mount Isa.			
1355	*Stagonopleura guttata*	Diamond Firetail	V	Vu				PMST	Diamond Firetails occur in eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees. They prefer areas with relatively low tree density, few large logs, and little litter cover but high grass cover.				Diamond Firetails occur on the south-east mainland of Australia from south-east Queensland to Eyre Peninsula, South Australia, and about 300 km inland from the sea		Yes	Possible
1946	*Charadrius bicinctus*	double-banded plover	SL		Mi/Ma	221	1993	WN/PMST	Non breeding visitor. It occurs in a range of coastal and freshwater habitats, usually near the coast, including estuaries, swamps, lagoons, beaches, salt-lakes and saltmarshes						Yes	Possible
487	*Furina dunmalli*	Dunmall's Snake	V	Vu				PMST	Forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow (Acacia harpophylla), other Wattles, native Cypress (Callitris spp.) or Bull-oak (Allocasuarina luehmannii) or various Spotted Gum (Corymbia citriodora), Ironbark (Eucalyptus crebra and E. melanophloia), White Cypress Pine (Callitris glaucophylla) and Bulloak open forest and woodland associations on sandstone derived soils.						No	Unlikely
1843	*Numenius madagascariensis*	eastern curlew	CR	Cr	Mi/Ma	2325	2020	WN/PMST	In the non-breeding season, the species' distribution is essentially coastal, occurring in sheltered estuaries, mangrove swamps, saltmarshes, and intertidal flats, particularly those with extensive seagrass (Zosteraceae) meadows. Far eastern curlews 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. Far eastern curlews occasionally roost on reef-flats, in the shallow water of lagoons, and other near-coastal wetlands. In exceptionally warm conditions, they may roost around sites where damp substrate lowers the local temperature. Where natural habitat is limited in availability, anthropogenic wetlands such as aquaculture ponds, saltworks, and sewage farms can provide alternative coastal habitats for the species.	Breeding takes place each year in Siberia, far eastern Russia, and north-eastern China.	During the non-breeding season, the far eastern curlew mainly forages around sheltered intertidal sandflats or mudflats that are open and without vegetation or seagrass. The species often also forages near mangroves, on saltflats or saltmarsh, around rockpools, amongst rubble on coral reefs, and on ocean beaches near the tideline. The species shows a preference for soft substrates containing little or no hard material that provide better access to their prey.	During the austral summer non-breeding season, most (estimated at 73 percent) of the species' population occurs in Australia. Within Australia, far eastern curlews have a mostly coastal distribution; they are rarely recorded inland. The species is found in all states and territories, but is most prominent in the north, east, and south-east regions, including Tasmania. The distribution of the far eastern curlew is continuous from Barrow Island and the Dampier Archipelago in Western Australia, through the Kimberley Division and along the Northern Territory, Queensland, the islands of the Torres Strait and New South Wales coasts. They occur patchily elsewhere.	Far eastern curlews are endemic to the East Asian – Australasian Flyway. The species breeds in Siberia and far eastern Russia. Far eastern curlews are migrants in Mongolia, Japan, Democratic People's Republic of Korea, the Republic of Korea, and China.		No	Unlikely
675	*Mixophyes fleayi*	Fleay's Frog	E	En				PMST	Disjunct distribution between Conondale Range, Queensland and Trynney Creek, New South Wales (Hines et al., 2002). Adults are found in rainforest and adjacent wet sclerophyll forest amoungst leaflitter and along watercourses (Hines et al., 2002). Breeding occurs between July and March with eggs laid in shallow parts of streams in a deperssion of rock, gravel or leaf litter (Hines et al., 2002).	Breeding takes place from July to March in permanent to semi-permanent stream habitats when conditions are suitable (TSSC, 2021). Eggs may be pasted directly onto bed rock or in shallow excavations in stream bed in flat, shallow	Diet is not well known.		Far south-east Queensland and far north-east New South Wales.		No	Unlikely

									sections of stream that flow between deep pools. Long-lived tadpoles may present year-round at some sites (Hines 2012)						
1198	*Ardenna carneipes*	Flesh-footed Shearwater, Fleshy-footed Shearwater	SL	Mi/Ma			PMST	The Flesh-footed Shearwater mainly occurs in the subtropics over continental shelves and slopes and occasionally inshore waters. Individuals also pass through the tropics and over deeper waters when on migration. Pairs breed on islands in burrows on sloping ground in coastal forest, scrubland, shrubland or grassland.						No	Unlikely
1965	*Apus pacificus*	fork-tailed swift	SL	Mi/Ma	0	1992	WN/PMST	The Fork-tailed Swift is a non-breeding visitor to all states and territories of Australia (Higgins 1999). There are scattered records of the Fork-tailed Swift in the Gulf Country, and a few records on Cape York Peninsula. In the north-east region there are many records east of the Great Divide from near Cooktown and south to Townsville. They are also widespread but scattered in coastal areas from 20° S, south to Brisbane and in much of the south south-eastern region. They are more widespread west of the Great Divide and are commonly found west of the line joining Chinchilla and Hughenden. They are found to the west between Richmond and Winton, Longreach, Gowan Range, Maraila National Park and Dirranbandi. They are rarely found further west to Windorah and Thargomindah (Higgins 1999). The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines (Higgins 1999). They forage aerially, up to hundreds of metres above ground, but also less than 1 m above open areas or over water.	Non-breeding in australia.	They forage aerially, up to hundreds of metres above ground, but also less than 1 m above open areas or over water	Arrives in Australia around October; some arrive early in September. The birds also depart via north-east Queensland, with sightings common from February–March and most birds having departed by May.	There are scattered records in the Gulf Country, and a few records on Cape York Peninsula. In the north-east region there are many records east of the Great Divide from near Cooktown and south to Townsville. They are also widespread but scattered in coastal areas from 20° S, south to Brisbane and in much of the south-eastern region.	Department of the Environment (2022). Apus pacificus in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: https://www.environment.gov.au/sprat. Accessed Thu, 11 Aug 2022 11:35:19 +1000.	No	Unlikely
676	*Mixophyes iteratus*	Giant Barred Frog, Southern Barred Frog	V	Vu			PMST	Occurs along shallow rocky streams in rainforest, wet sclerophyll forest and farmland from 100 to 1000 m or along deep, slow moving streams with steep banks in the lowlands. In south-east Queensland it is currently known from scattered locations in the catchments of the Mary, Upper Stanley, Caboolture and Coomera Rivers. A population in the Conondale Range, which was previously thought to be extinct, appears to be recovering.	Breeding takes place from late spring to summer. The female will kick her fertilised eggs out of the water to an overhanging or steeply sloped bank. The eggs stick to the bank and on hatching, the tadpoles drop or wriggle from there into the water. The tadpoles are large (~11 cm) and the period between egg-laying and metamorphosis may be as long as 14 months.	The species is a generalist feeder. Its diet may include large insects, snails, spiders and smaller frogs.	Generally found within about 20m of a stream, although outside the breeding season, this species may be 50m or further away.	Sparely distributed along the coast and ranges from Eumundi in south-east Queensland to Warrimoo in the Blue Mountains.		No	Unlikely

22494	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)	V	Vu		75	2023	WN/PMST							
1825	*Plegadis falcinellus*	glossy ibis	SL		Mi/Ma	28	1994	WN	The Glossy Ibis' preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. The species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons (del Hoyo et al. 1992; Hancock et al. 1992; Marchant & Higgins 1990). Within Australia, the largest contiguous areas of prime habitat is inland and northern floodplains. The Glossy Ibis is commonly in largest numbers in drying Top End grass/sedge swamps and Channel Country grass/forb meadows. The species is sometimes recorded in wooded swamps, artificial wetlands (such as irrigated fields), and in mangroves for breeding (Chatto 2000; Marchant & Higgins 1990). The species may retreat to permanent wetlands and/or coastal areas (including tidal wetlands) during drought (Marchant & Higgins 1990). Glossy Ibis roost in trees or shrubs usually near, but sometimes far, from water bodies (Brown et al. 1982; Marchant & Higgins 1990).	The species nests in mixed species colonies, either in small groups (from 5–100 pairs in Africa) (Brown et al. 1982) or in large aggregations of thousands of pairs (del Hoyo et al. 1992). The Glossy Ibis has low breeding site fidelity. The nest is a platform of twigs and vegetation usually positioned less than one metre above water (occasionally up to 7 m) in tall dense stands of emergent vegetation (e.g. reeds or rushes), low trees or bushes	The species feeds in very shallow water (Hancock et al. 1992), probing the water and mud with their long, curved bill.	Within Australia, the species moves in response to good rainfalls, expanding its range, however the core breeding areas used are within the Murray-Darling Basin region of NSW and Victoria, the Macquarie Marshes in New South Wales, and in southern Queensland. The Glossy Ibis often moves north in autumn, then return south to the main breeding areas in spring and summer.	Within Australia, the Glossy Ibis is generally located east of the Kimberley in Western Australia and Eyre Peninsula in South Australia. The species is also known to be patchily distributed in the rest of Western Australia.	Department of the Environment (2022). Plegadis falcinellus in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: https://www.environment.gov.au/sprat. Accessed Thu, 11 Aug 2022 15:52:32 +1000.	Yes	Likely
1282	*Fregata minor*	great frigatebird	SL		Mi/Ma	0	1981	WN/PMST	Pelagic / coastal shorebird						No	Unlikely
1856	*Calidris tenuirostris*	great knot	V	Vu	Mi/Ma	366	1993	WN/PMST	Found within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons. Often recorded on sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms.		Forages methodically by thrusting its bill deep into the mud to search for invertebrates, such as bivalve molluscs, gastropods, polychaete worms and crustaceans.	Migrates to Australia from Most birds return north in March and April, however some individuals may stay over winter in Australia; late August to early September, although juveniles may not arrive until October-November.			No	Unlikely
848	*Petauroides volans*	Greater Glider (southern and central)	V	En				PMST	Species is generally restricted to eucalypt forests and woodlands. More commonly associated with taller, montane, moist eucalypt forests with relatively old trees and abundant hollows (Andrews et al., 1994; Smith et al., 1994, 1995; Kavanagh 2000; Eyre 2004; van der Ree et al., 2004; Vanderduys et al., 2012). Due to seasonal variation in its preferred tree species, the species favours forests with a diversity of eucalypt species, (Kavanagh, 1984).	A single offspring is born from March to June (Tyndale-Biscoe & Smith 1969b; McKay 2008). Due to the relatively low reproductive rate (Henry 1984), small, isolated populations in small remnants can be prone to extinction (van der Ree 2004; Pope et al., 2005).	Diet mostly includes eucalypt leaves, and occasionally flowers (Kehl & Borsboom 1984; Kavanagh & Lambert 1990; van der Ree et al., 2004).	Occupies a relativly small home rangha) (−4 ha)(Henry 1984; Kehl & Borsboom 1984; Comport et al., 1996; Gibbons & Lindenmayer 2002; Pope et) but005), but are larger in lower productivity forests and more open woodlands (up to 16 ha: Eyre 2004; Smith et al., 2007). Makes homranges are larger than females (Kavanagh & Wheeler 2004; Pope et al., 2005), with male home ranges being largely non-overlapping (Henry 1984; Kavanagh & Wheeler 2004; Pope et al., 2005).		SPRAT	No	Unlikely
1948	*Charadrius leschenaultii*	greater sand plover	V	Vu	Mi/Ma	576	1993	WN/PMST	Generally associated with coastal areas such as sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Species will roost during high tide on sandy beaches and rocky shores and will begin foraging activity on wet ground at low tide, usually away from the edge of the water. The species has been observed foraging and roosting with other waders.	Non-breeding in Australia. Greater sand plovers breed in open, dry, treeless, uncultivated areas up to 3,000 metres, including dried mud, silt and clay flats, hard saltpans overgrown with halophytic plants and rocky plains near mountains in desert or semi-desert.	Feeding usually takes place within sheltered sandy, shelly, or muddy coastal areas, as well as around large intertidal mudflats, sandbanks, saltmarshes, estuaries, coral reefs, rocky islands tidal lagoons and dunes near the coast. The species	The greater sand plover is a migratory shorebird. The migratory route of the greater sand plover is more westerly than other shorebirds that visit Australia.	Approximately 68 percent of the Flyway population spends the non-breeding season in Australia. Whilst in Australia, the species occurs in coastal areas of all the states, but most individuals occur along the north-west coast. In Queensland, greater sand plovers are found across the south-eastern parts of the Gulf of Carpentaria and widespread from the Torres Strait along the eastern coast	SPRAT	No	Unlikely

										will forage on insects, crustaceans, polychaete worms and molluscs.		of Queensland. The species is also found from the Queensland border along the coast to the Northern Rivers region, with occasional records south to about Shoalhaven Heads.			
1705	*Falco hypoleucos*	Grey Falcon	V	Vu				PMST	The species occurs in arid and semi-arid Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia (Marchant and Higgins 1993). The species is mainly found where annual rainfall is less than 500 mm, except when wet years are followed by drought, when the species might become marginally more widespread, although it is essentially confined to the arid and semi-arid zones at all times (Schoenjahn 2018). The species appears to be absent from Cape York Peninsula, areas east of the Great Dividing Range in Queensland and New South Wales, south of the Great Dividing Range in Victoria, and south of latitude 26ºS in Western Australia (Barrett et al. 2003; Schoenjahn 2018). The species frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses (Garnett et al. 2011; Watson 2011; Schoenjahn 2013, 2018; Janse et al. 2015; Ley and Tynan 2016). The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter (Olsen and Olsen 1986; Schoenjahn 2018). Breeding occurs from June to November. Clutch size can vary from 1 – 4 eggs (Olsen and Olsen 1986; Garnett et al. 2011; Schoenjahn 2013). Eggs are laid in the old nests of other birds, particularly those of other raptors or corvids. The nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (Eucalyptus camaldulensis) and Coolibah (E. coolabah), but falcons also nest in telecommunication towers (Marchant and Higgins 1993; Schoenjahn 2013, 2018; Falkenberg 2010).	Breeding occurs from June to November. Eggs are laid in the old nests of other birds, particularly those of other raptors or corvids. The nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (Eucalyptus camaldulensis) and Coolibah (E. coolabah), but falcons also nest in telecommunication towers.	Feed almost exclusively on birds including doves, pigeons, small parrots and cockatoos, and finches, but a variety of other bird prey species has been recorded.	Typically, young Grey Falcons and their parents will stay together for up to at least 12 months after fledging, even when the parents have a new brood.	Occurs at low densities across inland Australia. The species 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 500 mm, except when wet years are followed by drought, when the species might become marginally more widespread, although it is essentially confined to the arid and semi-arid zones at all times.	SPRAT	No	Unlikely
1931	*Pluvialis squatarola*	grey plover	V	Vu	Mi/Ma	1	1990	WN/PMST	Almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes.	non-breeding population in Australia	usually forage on large areas of exposed mudflats and beaches of sheltered coastal shores such as inlets, estuaries and lagoons. They also occasionally feed in pasture and at the muddy margins of inland wetlands such as lakes, swamps and bores	breeding in the Northern Hemisphere and flying south for the boreal winter	Within Australia, two of the major staging areas are Eighty Mile Beach and Roebuck Bay, both near Broome		No	Unlikely
476	*Hemiaspis damelii*	Grey Snake	E	En				PMST	In Queensland, grey snake habitat is Brigalow Acacia harpophylla and Belah Casuarina cristata woodlands on heavy, dark brown to black cracking clay soils, particularly in association with water bodies, areas with small gullies and ditches, and floodplain environments where the species shelters beneath logs, rocks and soil cracks	The grey snake is live bearing (viviparous) and gives birth to 4-16 (average = 10) young between January and March. Juvenile snakes are approximately 140 mm in length; males mature at around seven months of age and	The grey snake predominantly feeds on frogs.	The grey snake is predominately active at dusk or at night and it may be encountered sheltering under cover or in soil cracks during the day.	In Queensland, the grey snake has a broader and more dispersed distribution, with most records along the Macintyre and Condamine Rivers and associated floodplains of the southern Brigalow Belt from Goondiwindi and Dalby west to Glenmorgan, on the Darling Downs and western		No	Unlikely

									females mature at 12 months.			Lockyer Valley, near Rockhampton on the central Queensland coast, and on the Darling Riverine Plains near Currawinya in south-western Queensland.			
962	*Pteropus poliocephalus*	grey-headed flying-fox		Vu	5002	1994	WN/PMST	Grey-headed flying fox is distributed between Bundaberg, Queensland and Geelong Vistoria on coastal lowlands, tablelands and slopes below 200 m ASL (DAWE, 2021). Grey-headed flying-fox is largeyly nocturnal roosting at camp sites which are mostly associated with creeks, rivers and swamps (DAWE, 2021).	Mate in early autumn. Following this, larger camps break up before reforming in late spring to early summer. Males and females segregate in October when females give birth.	A canopy feeding frugivore and nectarivore, feeding primarily on the blossom of Eucalyptus and related genera. May also feed on rainforest fruits. The species may feed across a variety of vegetation communities, including rainforest, open forest and woodlands.	The species is highly mobile, commuting daily to foraging areas. These generally occur within 15km of the day roost (Tidemann 1998). Grey-headed Flying-foxes will migrate in response to changes in food availability and distribution. Seasonal movements may also occur between camps (Eby 2000).	Occurs in the coastal belt from Rockhampton, central Queensland, to Melbourne, Victoria. The distribution of the species across this range varies in response to the availability of foraging resources. Generally widespread throughout this range during summer, occupying coastal lowlands during autumn.		No	Possible
1860	*Tringa brevipes*	grey-tailed tattler	SL		Mi/Ma	2460	2019	WN/PMST	Often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide. It has been found around shores of rock, shingle, gravel or shells and on intertidal mudflats in embayments, estuaries and coastal lagoons, especially fringed with mangroves. In Moreton Bay, Queensland, it is most abundant in areas with dense beds of seagrass. Usually roosts in the branches of mangroves or, rarely, in dense stands of other shrubs, or on snags or driftwood. Where mangroves are not present, it roosts on rocks that are sometimes partly submerged. It is also known to roost on beaches and reefs; however, it is rarely reported roosting on bare sandy beaches or sandbanks.	The species breeds in Siberia and moves south for the boreal winter. It moves mainly along the east coast of Asia but also across the south-west Pacific Ocean.	Usually forages in shallow water, on hard intertidal substrates, such as reefs and rock platforms, in rock pools and among rocks and coral rubble, over which water may surge. It has also been recorded foraging on exposed intertidal mudflats, especially with mangroves and possibly seagrass nearby. Occasionally it forages on intertidal sandflats, around banks of seaweed or protruding rocks or lumps of coral.	The species arrive in Australia mostly in August; however, they sometimes appear south of the breeding range as early as July. Some are known to remain on breeding grounds as late as September or October. Adults arrive at the north Australian coast from late August and early September, with first-year birds apparently arriving four weeks later. Generally, leaves Australia to return to breeding areas by early or mid-April.	The Grey-tailed Tattler is found along the entire coast, with small numbers located in the Gulf of Carpentaria. It is widespread along the east coast and the Torres Strait. There is a continuous population along the entire east coast of Cape York Peninsula. Inland records include Burdekin Weir, Charters Towers and Mount Isa; however, these are rare, with the species preferring coastal locations		No	Unlikely
18166	*Pseudomugil mellis*	Honey Blue Eye, Honey Blue-eye	E	En			PMST	Inhabits slow-flowing, tannin-stained freshwater creeks and coastal dune lakes with sandy or muddy bottoms. Often found amongst aquatic vegetation along grassy banks.				Endemic to south-eastern Queensland, from the upper reaches of Water Park Creek, northeast of Rockhampton, coastal streams from southeast of Maryborough to north of Caboolture, and Fraser Island.		No	Unlikely
1252	*Thalassarche carteri*	Indian Yellow-nosed Albatross	V	Vu	Mi/Ma		PMST	The Indian Yellow-nosed Albatross has been observed over waters of surface-temperature 10° to 23°C, but is most abundant over the warmer parts of the subtropical zone (Biermann & Voous 1950; Brown et al. 1975; Cooke & Mills 1972). In breeding and non-breeding seasons, the species concentrates over the productive waters of continental shelves, often at coastal upwellings and the boundaries of currents (Brown et al. 1975; Cooke & Mills 1972; Weimerskirch et al. 1985).	The species nests on tussock-covered coastal cliffs and slopes, often in rocky situations (Grindley 1981; Weimerskirch et al. 1986). On Ile Amsterdam, the birds are confined to steeper slopes, nesting up to 800 m asl., on bare ground or among Poa or Scirpus (Jouventin et al. 1983) (Marchant & Higgins 1990).	The Indian Yellow-nosed Albatross takes cephalopods (squid) and fish and is often seen following fishing trawlers.	In waters off southern Western Australia and South Australia the species is most abundant between March and May. Large numbers occur in the Tasman Sea, off southern NSW, in May to June, with adult birds first to arrive, then immatures (Barton 1979). Apparently, the species moves northwards along the coast, favouring inshore waters. The immature birds return south in September to October (Barton 1979; Marchant & Higgins 1990).	In the Australasian region, the species occupies inshore and offshore waters (Latham 1980; Storr 1964; Swanson 1983), particularly where there are calm seas and light winds (Cox 1973; Storr 1964). The birds fly low or at medium heights over the sea, using air currents rising off swells for lift (Marchant & Higgins 1990).	SPRAT	No	Unlikely
860	*Phascolarctos cinereus*	koala	E	En		2	2025	WN	Distributed in coastal and subcoastal eastern Australia from eastern South Australia to Cairns, Queensland (DESEWPaC, 2012). The species is limited	Females breed at two years of age and produce one young per year.	Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt	Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.		SPRAT	No	Unlikely

								by altitude (found below 800 m a.s.l.), temperature and leaf moisture (which restricts the distribution into arid areas (DESEWPaC, 2012). Found in a wide range of forest types typically dominanted by Eucalyptus genera and preferred food species varies between localities (DESEWPaC, 2012).		species, but in any one area will select preferred browse species.					
971	*Chalinolobus dwyeri*	Large-eared Pied Bat, Large Pied Bat	E	En				PMST	Almost all records of the species are within several kilometres of clifflines or rocky terrain, although extensive trapping and call data indicates that bats do not usually forage in sandstone habitat. Modelling based on presence-only data indicates that bats forage in fertile valleys and plains, as well as areas with moderately-tall to taller trees along water courses. Most records are from canopied habitat, suggesting a sensitivity to clearing, although narrow connecting riparian strips in otherwise cleared habitat are sometimes quite heavily used	The large-eared pied bat is dependent on the presence of diurnal roosts for shelter. Roosts are utilised during the day and at night when not feeding, as well as for the raising of young. This bat has been known to roost in disused mine shafts, caves, overhangs and abandoned fairy martin Hirundo ariel nests.			The large-eared pied bat is known from Shoalwater Bay, north of Rockhampton, Qld, south to the vicinity of Ulladulla in NSW		No	Unlikely
1857	*Gallinago hardwickii*	Latham's snipe	V	Vu	Mi/Ma	52	1994	WN/PMST	In Australia, Latham's Snipe occurs in a single, dispersed non-breeding population (Garnett & Crowley 2000). In Australia, Latham's Snipe occurs in a wide variety of permanent and ephemeral wetlands (Naarding 1981). They usually occur in open, freshwater wetlands that have some form of shelter (usually low and dense vegetation) nearby (Frith et al. 1977; Naarding 1983; Weston 2006, pers. comm.). They generally occupy flooded meadows, seasonal or semi-permanent swamps, or open waters (Frith et al. 1977; Naarding 1983), but various other freshwater habitats can be used including bogs, waterholes, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains (Frith et al. 1977; Naarding 1981, 1983). The structure and composition of the vegetation that occurs around these wetlands is not important in determining the suitability of habitat (Naarding 1983). As such, snipe may be found in a variety of vegetation types or communities including tussock grasslands with rushes, reeds and sedges, coastal and alpine heathlands, lignum or tea-tree scrub, button-grass plains, alpine herbfields and open forest (Chapman 1969; Frith 1970; Frith et al. 1977; Naarding 1983; Wall 1990). Latham's Snipe sometimes occur in habitats that have saline or brackish water, such as saltmarsh, mangrove creeks, around bays and beaches, and at tidal rivers (Frith et al. 1977; Naarding 1983; Patterson 1991). These habitats are most used when the birds are on migration (Frith et al. 1977). They are regularly recorded in or around modified or artificial habitats including pasture, ploughed paddocks, irrigation channels and drainage ditches, ricefields, orchards, saltworks, and sewage and dairy farms (Fielding 1979; Frith et al. 1977; Lane & Jessop 1985; Naarding 1982, 1983). They can also occur in various sites close to humans or human activity (e.g. near roads, railways, airfields, commercial or industrial complexes) (Frith et al. 1977; Naarding 1983). The foraging habitats of Latham's Snipe are characterized by areas of mud	No breeding habitat in Australia	feeds on seeds and other plant material, and on invertebrates including insects. Foraging is characterized by areas of mud (either exposed or beneath a very shallow covering of water) and some form of cover (e.g. low, dense vegetation). Can occur coincidentally with the Painted Snipe Rostratula benghalensis.	Is a passage migrant through northern Australia. They breed in Japan and far eastern Russia during the northern hemisphere summer. They migrate south after the breeding season, travelling across Papua New Guinea to winter in eastern Australia Species is highly mobile, will readily move between locations as conditions become more or less favourable.	Non-breeding visitor to south-eastern Australia and is a passage migrant through northern Australia. Has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern South Australia (including the Adelaide plains and Mount Lofty Ranges, and the Eyre Peninsula). The range extends inland over the eastern tablelands in south-eastern Queensland (and occasionally from Rockhampton in the north), and to west of the Great Dividing Range in New South Wales. They are widespread in Tasmania and is found in all regions of Victoria except for the north-west. Most birds spend the non-breeding period at sites located south of the Richmond River in New South Wales.	Department of the Environment (2022). Gallinago hardwickii in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: https://www.environment.gov.au/sprat. Accessed Thu, 11 Aug 2022 15:10:14 +1000.	Yes	Likely

								(either exposed or beneath a very shallow covering of water) and some form of cover (e.g. low, dense vegetation) (Frith et al. 1977; Todd 2000). The snipe roost on the ground near (or sometimes in) their foraging areas, usually in sites that provide some degree of shelter, e.g. beside or under clumps of vegetation, among dense tea-tree, in forests, in drainage ditches or plough marks, among boulders, or in shallow water if cover is unavailable (Frith et al. 1977; Naarding 1982, 1983).								
1281	*Fregata ariel*	lesser frigatebird	SL		Mi/Ma	1	1995	WN/PMST	Pelagic Coastal / shorebird							No	Unlikely
1936	*Charadrius mongolus*	lesser sand plover	E	En	Mi/Ma	807	1994	WN/PMST	Inhabits coastal areas favouring the beaches of sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats. Also known to occur on sandy beaches, coral reefs and rock platforms. Highly gregarious, frequently seen in flocks exceeding 100 individuals; also often seen foraging and roosting with other wader species.	Species will roost during the high tide on sandy beaches, spits and rocky shores.	Foraging occurs on wet ground at low tide, usually away from the water's edge. The species diet includes insects, crustaceans, molluscs and marine worms.			SPRAT	No	Unlikely
1844	*Numenius minutus*	little curlew	SL		Mi/Ma	15	1993	WN/PMST	This species congregates around pools, river beds and water-filled tidal channels, and shallow water at edges of billabongs. The species prefers pools with bare dry mud (including mudbanks in shallow water) and they do not use pools if they are totally dry, flooded or heavily vegetated. They have also been recorded resting in grassy, open woodlands and on bare blacksoil plains, or on dry or recently burnt grasslands on floodplains, which may be without vegetation for hundreds of metres, and occasionally on mudflats when nearby grasslands are unburnt, or around swamps. Resting has also been recorded under partly submerged vegetation. After freshwater pools dry up, roosting may occur in the shallows of reservoirs and the sea.	Non-breeding season in northern Australia from Port Hedland in Western Australia to the Queensland coast. Does not breed in Australia.	Foraging is in relatively short grass (around 20 cm tall) as the birds avoid dense tall grasses. Foraging sites are usually within 5 km of daytime roosting sites, as birds move between grassland and wetland, most feeding in drier grassland occurring during the first few hours after dawn and the late afternoon.	Movement patterns are poorly understood in Australia. In the non-breeding season it can be seen in dense flocks of several hundred, sometimes thousands, on coastal and inland grasslands and blacksoil plains of northern Australia, most often near freshwater swamps and pools or flooded ground. The species arrives in a broad front across northern Australia.	Generally spend the non-breeding season in northern Australia from Port Hedland in Western Australia to the Queensland coast In Australia, birds have probably benefited from the provision of watering holes and grassland for livestock		No	Unlikely
1905	*Sternula albifrons*	little tern	SL	Vu	Mi/Ma	7689	2020	WN/PMST	Pelagic Coastal / shorebird							No	Unlikely
18794	*Potorous tridactylus tridactylus*	Long-nosed Potoroo (northern)	V	Vu				PMST	There seems to be no consistent pattern of habitat as they are found in wet eucalypt forests with heavy ground cover, heath-woodland, open forest and coastal heaths and scrubs (Seebeck 1995b; Mason 1997). They require dense vegetation for shelter and an abundance of fungi resources (Claridge et al 1992). They typically do not build nests and instead shelter in a shallow squat.	Breeds all year round. Sexual maturity is reached at around 12 months and they can live up to 10 years (Hughes 1962).	Primary food source is fungi, feeding on both hypogeous and epigeous components of the fungal fruit body. Other elements of their diet include vascular plant components (flower, fruit, seed, leaf, stem, root and bulb) and invertebrates (Seekbeck et al. 2007).	Female home ranges are 1.4ha and males 2.0ha with considerable overlap in within-sex and between-sex comparisons (Data based on south-western Victoria populations, Bennett 1987).	Occurs along the south-eastern coast of mainland Australia, from south-eastern South Australia through Victoria and New South Wales to south-eastern Queensland.	SPRAT	No	Unlikely
1841	*Tringa stagnatilis*	marsh sandpiper	SL		Mi/Ma	53	1995	WN/PMST	The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes.	Non-breeding in Australia.	The Marsh Sandpiper usually forages in shallow water at the edge of wetlands.	The Marsh Sandpiper is a migratory species that breeds in east Europe, southern Siberia and northern China. The species migrates south for the boreal winter to non-breeding areas from Africa, across southern Asia to Australia. Most birds spend the non-breeding period in Africa and Indian subcontinent.	The Marsh Sandpiper is found on coastal and inland wetlands throughout Australia. The species is widespread in coastal Queensland, but few records exist north of Cooktown	SPRAT	No	Unlikely

18169	*Maccullochella mariensis*	Mary River Cod	E	En				PMST	The Mary River cod inhabits from high gradient, rocky, upland streams, to large, slow-flowing pools in lowland areas.	Mary River cod form pairs and spawn annually around spring. Hollow logs are considered potential nesting sites. Spawning takes place soon after the water temperature rises to 20°C.		The Mary River cod is known to migrate into smaller tributaries from the main river in late winter. Depending on flows and time of year the Mary River cod may move over 30 km up or down stream.	The Mary River cod occurs in southeast Queensland in the Mary River system. There are three areas within the Mary River system where cod are present. These are TinanaCoondoo Creek upstream from Tinana Barrage, Six Mile Creek downstream from Lake Macdonald, and upper Obi Obi Creek. Mary River cod have also been reported from Widgee, Glastonbury, Amamoor, and Yabba Creeks, and other parts of the Mary River since 1990.		No	Unlikely
30038	*Mordacia praecox*	Non-parasitic Lamprey, Precocious Lamprey	E	En				PMST							No	Unlikely
1223	*Macronectes halli*	northern giant-petrel	V	Vu	Mi/Ma	1	1997	WN/PMST							No	Unlikely
800	*Dasyurus hallucatus*	Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu]	C	En				PMST	Northern quoll exist over the northern third of mainland Australia (Hill and Ward, 2010). With some records as far south as the Sunshine Coast Hinterland (DES, 2021). Northern quoll are most abundant in hilly or rock country within proximity to permanent water and where remnant vegetation cover is >70% in a 4 km radius (DES, 2021).	Rocky area for denning purposes. Rocky habitats are usually of high relief, often rugged and dissected but can also include tor fields or caves in low lying areas such as in Western Australia. Eucalypt forest or woodland habitats usually have a high structural diversity containing large diameter trees, termite mounds or hollow logs for denning purposes. Dens are made in rock crevices, tree holes or occasionally termite mounds	As for general habitat	As for general habitat	Across northern Australia, occurring almost continuously from the Pilbara, Western Australia, to near Brisbane, Queensland		No	Unlikely
1736	*Cuculus optatus*	Oriental Cuckoo, Horsfield's Cuckoo	SL	Mi				PMST	Usually inhabits forest canopy, in rainforest margins, monsoon forest, vine scrub, riverine thickets, wetter, densely canopied eucalypt forest paperbark swamp, mangroves. Typically found in denser vegetation with more closed canopy.	Not recorded breeding in Australia	Hunts from perch, taking insects from leaf litter on ground, or from branches and leaves of trees and shrubs.	Breeds in large range from Eurasia. Overwinters in South East Asia and northern Australia, where it is often solitary and dispersed.	Widely distributed across north and east Australia.		Yes	Likely
1939	*Charadrius veredus*	Oriental Plover, Oriental Dotterel	SL	Mi/Ma				PMST	Oriental Plovers spend a few weeks in coastal habitats such as estuarine mudflats and sandbanks, on sandy or rocky ocean beaches or nearby reefs, or in near-coastal grasslands, before dispersing further inland Thereafter they usually inhabit flat, open, semi-arid or arid grasslands, where the grass is short and sparse, and interspersed with hard, bare ground, such as claypans, dry paddocks, playing fields, lawns and cattle or open areas that have been recently burnt. At the onset of the Wet Season, some may move into lightly wooded grasslands. Some remain in estuarine and littoral environments, and a few are occasionally recorded around terrestrial wetlands or flooded paddocks.	The species does not breed in Australia.	Oriental Plovers usually forage among short grass or on hard stony bare ground (McCrie 1984), but also on mudflats or among beachcast seaweed on beaches.	The Oriental Plover is a migratory species, breeding in the Northern Hemisphere and flying south for the boreal winter.	The Oriental Plover is a non-breeding visitor to Australia, where the species occurs in both coastal and inland areas, mostly in northern Australia. Most records are along the north-western coast, between Exmouth Gulf and Derby in Western Australia, and there are records at a few scattered sites elsewhere, mainly along the northern coast, such as in the Top End, the Gulf of Carpentaria and on Cape York Peninsula. The species also often occurs further inland on the 'blacksoil' plains of northern Western Australia, the Northern Territory and north-western	SPRAT	No	Unlikely

													Queensland ('the Gulf Country'). It is seldom recorded in southern Australia		
18167	*Nannoperca oxleyana*	Oxleyan Pygmy Perch	E	En			PMST	Pygmy perch are generally regarded as restricted to streams, swampy areas and lakes in coastal 'wallum' (Banksia dominated heathlands					Oxleyan pygmy perch have a restricted and patchy distribution. They are found in the swamps, streams and lakes of coastal lowland wallum heathlands, from Fraser Island and the Tin Can Bay area in south-east Queensland. Pygmy perch have been recorded in approximately 20 locations in south-east Queensland. Mainland locations include Searys, Carland and Coondoo/Tinana Creeks (a tributary of the Mary River) in the Tin Can Bay area; the Noosa River and its tributaries; Marcus, Mellum and Blue Gum creeks near the Glasshouse Mountains; [3] and Burpengary Creek, Deception Bay	No	Unlikely
1944	*Pluvialis fulva*	Pacific golden plover	SL		Mi/Ma	1148	2020	WN/PMST	In non-breeding grounds in Australia this species usually inhabits coastal habitats, though it occasionally occurs around inland wetlands. Pacific Golden Plovers usually occur on beaches, mudflats and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as Sarcocornia, or beds of seagrass) in sheltered areas including harbours, estuaries and lagoons, and in evaporation ponds in saltworks.	The Pacific Golden Plover breeds mostly in northern Siberia, between the Yamal Peninsula and the Chukotski Peninsula and the Gulf of Anadyr.	This species usually forages on sandy or muddy shores (including mudflats and sandflats) or margins of sheltered areas such as estuaries and lagoons, though it also feeds on rocky shores, islands or reefs. In addition, Pacific Golden Plovers occasionally forage among vegetation, such as saltmarsh, mangroves or in pasture or crops.	The Pacific Golden Plover is a migratory species, breeding in the Northern Hemisphere and flying south for the boreal winter.	Within Australia, the Pacific Golden Plover is widespread in coastal regions, though there are also several inland records (in all states), sometimes far inland and usually along major river systems, especially the Murray and Darling Rivers and their tributaries. Most Pacific Golden Plovers occur along the east coast, and are especially widespread along the Queensland and NSW coastlines.	No	Unlikely
1879	*Calidris melanotos*	Pectoral Sandpiper	SL		Mi/Ma			PMST	In Queensland, most records for the Pectoral Sandpiper occur around Cairns. There are scattered records elsewhere, mainly from east of the Great Divide between Townsville and Yeppoon. Records also exist in the south-east of the state as well as a few inland records at Mount Isa, Longreach and Oakley. In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum. They forage in shallow water or soft mud at the edge of wetlands (Higgins & Davies 1996).	"Does not breed in Australia. The Pectoral Sandpiper breeds in northern Russia and North America. In Russia, its breeding distribution is from the Yamal Peninsula, east along the Arctic coast, through the Deltas of Lena and Kolmyra Rivers, to the Chukotskiy Peninsula. In North America, its breeding distribution extends from Goodnews Bay, north through Wales to Point Barrow, east and north Canada from the northern regions of Yukon and Mackenzie, north to Banks, Bathurst, Devon, north Baffin	They forage in shallow water or soft mud at the edge of wetlands. They are omnivorous, consuming algae, seeds, crustaceans. They walk slowly on grass fringing water.	The species is transient through Central America and the Caribbean while on route to the non-breeding areas in South America, from Peru to Bolivia, south to south-central Chile and from southern Brazil and south to Argentina. In the tropical Pacific, there are scattered records from Hawaii, Polynesia, Micronesia and Australasia. The species occurs in small numbers through east Asia, including Ussuriland, Japan and the Korean Peninsula.	In Queensland, most records for the Pectoral Sandpiper occur around Cairns. There are scattered records elsewhere, mainly from east of the Great Divide between Townsville and Yeppoon. Records also exist in the south-east of the state as well as a few inland records at Mount Isa, Longreach and Oakley.	SPRAT	No	Unlikely

								Island and south and west to Hudson Bay."						
32227	*Phyllodes imperialis smithersi*	Pink Underwing Moth		En			PMST	The larvae eat Carronia Vine leaves in subtropical rainforests in north-east New South Wales and south-east Queensland. Adult moths feed on the soft fruits of native rainforest plants.						No	Unlikely
	Ninox strenua	Powerful owl						Inhabits a range of vegetation types, including woodland, open sclerophyll forest, tall open wet forest and rainforest. Generally requires intact forest but may also occupy fragmented landscapes. Roosts in dense vegetation consisting of species such as Turpentine (Syncarpia glomulifera), Black She-oak (Allocasuarina littoralis), Blackwood (Acacia melanoxylon), Rough-barked Apple (Angophora floribunda) and several Eucalypt species. Hollows and a shrub layer also form important habitat components, as most of the Powerful Owl's prey items require these habitat components.	Nest in large tree hollows (at least 0.5m deep) in large eucalypts that are at least 100 years old (dbh of 80-240cm). Nesting occurs from late autumn to mid-winter.	Hunt medium-sized arboreal marsupials, particularly Greater Gliders, Ringtail Possums and Sugar Gliders. In some areas, Flying Foxes form an important part of the diet. Birds may also comprise between 10-50% of the diet.	Pairs demonstrate high site fidelity to their territory, which may vary from 400ha in good habitat to 4000ha where hollow trees and prey have been depleted.	Endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria. In NSW, the species occurs throughout the eastern forests from the coast inland to the tablelands. Scattered records occur on the western slopes and plains.		No	Unlikely
1728	*Erythrotriorchis radiatus*	red goshawk	E	En	0	1992	WN/PMST	The Red Goshawk occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia (Marchant & Higgins 1993). Riverine forests are also used frequently (Debus 1991, 1993). Such habitats typically support high bird numbers and biodiversity, especially medium to large species which the goshawk requires for prey. The Red Goshawk nests in large trees, frequently the tallest and most massive in a tall stand, and nest trees are invariably within one km of permanent water (Aumann & Baker-Gabb 1991; Debus & Czechura 1988b). 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.	Red Goshawks breeding is likely to be in spring and summer in southern Queensland and NSW. The birds lay clutches of 1-2 eggs between July and September, in a stick nest in a tall tree (>20 m tall) within 1 km of a watercourse or wetland. Young fledge around November and December. Young remain with their parents for at least 70-80 days after they leave the nest and may remain with their parents for 4-5 months.	Diet consists of medium to large birds, including species as large as Australian Brush-turkeys, Kookaburras, Tawny Frogmouths, Sulphur-crested Cockatoos and Rainbow Lorikeets. Also known to feed on mammals, reptiles and insects. Red Goshawks usually hunt from concealed or, less often, exposed perches, but also fly close above or through forest or woodland searching for prey. The species will hunt from perches early in the morning and late in the day.	Adults have large home-ranges, estimated in the Northern Territory to be as great as about 120 km2 for females and 200 km2 for males. Along eastern Australia, the birds appear to move from nesting sites in the ranges to coastal plains, where they are associated with permanent wetlands.		SPRAT	No	Unlikely
1877	*Calidris canutus*	Red Knot, Knot	V	Vu	Mi/Ma		PMST	The Red Knot mainly occurs in small numbers on intertidal mudflats, estuaries, bays, inlets, lagoons, harbours and sandflats and sandy beaches of sheltered coasts. It is occasionally found on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms and is a rare visitor to terrestrial saline wetlands and freshwater swamps. It is rarely found on inland lakes or swamps.	Non-breeding season in Australia. The red knot is a migratory shorebird. The subspecies C. c. rogersi breeds in north-east Siberia, including around the Chukotskiy Peninsula and possibly farther west, and migrates mainly to Australia and New Zealand. The birds roost on sandy beaches, spits, islets and mudflats close to feeding grounds, usually in open areas.	Species generally forages near the water's edge, with feeding activity regulated by the tide as birds closely follow the tide-edge. The diet consists of worms, bivalves, gastropods, crustaceans and echinoderms.	Most red knots arrive on the north-west coast and the Gulf of Carpentaria from late August. In the Gulf of Carpentaria, tens of thousands of individuals are recorded in September and October, before numbers drop by December. The Gulf of Carpentaria is probably the main staging area for individuals moving to New Zealand and south-east Australia. Southward migrations mostly occur along coasts, with some inland records from September–November.	Red knots are widespread around the Australian coast. Very large numbers are regularly recorded in north-west Australia, with Eighty Mile Beach and Roebuck Bay being strongholds for the species. Small numbers visit Tasmania and its offshore islands, and the species is occasionally recorded inland in all regions. The species is less numerous in south-west Australia. The only places where the species is not found in significant numbers are the northern part of the Great Australian Bight in South Australia and Western Australia, and along much of the New South Wales coast,	NSW BioNet Threatened Biodiversity Database; Full reference not included in BioNet table	No	Unlikely

														where shorebird habitat is scarce.		
1880	*Calidris ruficollis*	red-necked stint	SL		Mi/Ma	383	2020	WN/PMST							No	Unlikely
1273	*Phaethon rubricauda*	red-tailed tropicbird	V		Mi/Ma	1	1988	WN/PMST	Pelagic / coastal shorebird						No	Unlikely
1478	*Anthochaera phrygia*	Regent Honeyeater	CR	Cr				PMST	The Regent Honeyeater inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River She oak. Associated with woodlands that have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes; To successfully manage the recovery of this species a full understanding of the habitats used in the non-breeding season is critical.	Non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River She oak. Found nesting in horizontal branches or forks in tall mature eucalypts and She oaks. Also nest in mistletoe haustoria. An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female. Two or three eggs are laid and incubated by the female for 14 days. Nestlings are brooded and fed by both parents at an average rate of 23 times per hour and fledge after 16 days. Fledglings fed by both parents 29 times per hour.	Considered a generalist forager. Although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Other tree species may be regionally important. Flowering of associated species such as Thin-leaved Stringybark Eucalyptus eugenioides and other Stringybark species, and Broad-leaved Ironbark E. fibrosa can also contribute important nectar flows at times. Nectar and fruit from the mistletoes Amyema miquelii, A. pendula and A. cambagei are also utilised. When nectar is scarce lerp and honeydew can comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important components of the diet of nestlings.	Colour-banding of Regent Honeyeater has shown that the species can undertake large-scale nomadic movements in the order of hundreds of kilometres. However, the exact nature of these movements is still poorly understood. It is likely that movements are dependent on spatial and temporal flowering and other resource patterns.		SPRAT	No	Unlikely
2014	*Ornithoptera richmondia*	Richmond birdwing	V			2	1993	WN	Subtropical rainforest where its larval host plants Richmond birdwing vine and mountain aristolochia vine grow. The Richmond birdwing vine occurs below 600m asl on basaltic slopes, creek banks, or on volcanic alluvial soils near watercourses, while mountain aristolochia vine occurs on basaltic ridges and slopes at >800m asl.			Flying period from September to April in coastal areas and November to February in coastal ranges. Adults fly throughout the day but are more active during the early morning and late afternoon.	Only known in two areas from Caboolture to Kin Kin in the north and Nerang to Wardell in New South Wales in the south.		No	Unlikely
1872	*Arenaria interpres*	ruddy turnstone	V	Vu	Mi/Ma	5	1992	WN/PMST	Coastal regions with exposed rock coast lines or coral reefs, near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. Occasional sightings in estuaries, harbours, bays and coastal lagoons, among low saltmarsh or on exposed beds of seagrass, around sewage ponds and on mudflats.	non-breeding population in Australia	Forages between lower supralittoral and lower littoral zones of foreshores, from strand-line to wave-zone. They often forage among banks of stranded seaweed or other tide-wrack. Also known to forage on exposed rocky	The birds move south to non-breeding areas with a partial overlap of populations on passage. There may be two routes of migration to Australia, with birds occurring in east Australia and New Zealand. The birds in the western areas of Australia apparently come from populations migrating south from east Asia who then return north via east Asia	Common throughout Australasia and widespread within Australia. Found in most coastal regions, with occasional records of inland populations.		No	Unlikely

										platforms, coral reefs and mudflats.				
1849	*Calidris pugnax*	Ruff	SL		Mi/Ma	PMST	In Australia the Ruff is found on generally fresh, brackish of saline wetlands with exposed mudflats at the edges. It is found in terrestrial wetlands including lakes, swamps, pools, lagoons, tidal rivers, swampy fields and floodlands. They are occasionally seen on sheltered coasts, in harbours, estuaries, seashores and are known to visit sewage farms and saltworks. They are sometimes found on wetlands surrounded by dense vegetation including grass, sedges, saltmarsh and reeds. They have been observed on sand spits and other sandy habitats including shingles. The Ruff forages on exposed mudflats, in shallow water and occasionally on dry mud. They have been observed foraging in dry waterside plants and in swampy areas next to aeration tanks in sewage farms. They prefer to roost amongst shorter vegetation (Higgins & Davies 1996).	The Ruff breeds in Europe from north Russia to north-west Kazakhstan.	The Ruff is insectivorous throughout the breeding grounds, however, it is omnivorous elsewhere. It is diurnal and nocturnal. The species uses its bill to probe and peck in water, dry land and among dead vegetation at the edge of the water.	The Ruff is migratory, breeding in Eurasia and north-west Alaska and migrating south for the winter. The origin of the birds that migrate to Australia, including there migration route, is not known. They are known to be in Australia from September–April (Higgins & Davies 1996).	The Ruff is a rare but regular visitor to Australia, being recorded in all States and Territories. In Queensland the Ruff is widely scattered at several localities. It has been recorded at Edward River, Hasties Swamp, Atherton Tableland, Townsville and Alva. In the south-east it has been recorded at Lytton, Myrtletown, Luggage Point, Nudgee and Dyer's Lagoon. There is also an unverified report of the species at Cairns.		No	Unlikely
34156	*Thalassarche salvini*	Salvin's Albatross	SL	Vu	Mi/Ma	PMST	Pelagic / Marine shorebird species						No	Unlikely
33588	*Cherax robustus*	Sand Yabby	V	Vu		PMST	Cherax robustus is largely restricted to wallum areas, where it prefers acidic, soft, tannin-stained freshwater marsh, swamps, fens, lakes, and small creeks, often surrounded by Melaleuca (paperbark) and dominated by sedges				Cherax robustus is largely restricted to the sandy, lowland coastal areas of Southeast Queensland often referred to as “wallum”. Within coastal wallum, the species is primarily found in sedgelands, wet heaths and fens within woodlands/open forests dominated or co-dominated by broad-leafed paperbark.		No	Unlikely
1875	*Calidris alba*	sanderling	SL		Mi/Ma	1	1990	WN/PMST	Often found in coastal areas on low beaches of firm sand, near reefs and inlets, along tidal mudflats and bare open coastal lagoons; individuals are rarely recorded in near-coastal wetlands. Generally occurs in small flocks, however may associate freely with other waders. Individuals run behind receding waves, darting after insects, larvae and other small invertebrates in the sand, then dart back up the beach as each wave breaks. Roosts on bare sand, behind clumps of beach-cast kelp or in coastal dunes. Breeding occurs in the Northern Hemisphere.	Generally feeds on plants, seeds, worms, crustaceans, spiders, jellyfish and fish, foraging around rotting heaps of kelp, at the edges of shallow pools on sandspits and on nearby mudflats				SPRAT	No	Unlikely
1874	*Calidris acuminata*	sharp-tailed sandpiper	V	Vu	Mi/Ma	1293	1995	WN/PMST	The Sharp-tailed Sandpiper spends the non-breeding season in Australia with small numbers occurring regularly in New Zealand. Most of the population migrates to Australia, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage (Cramp 1985; Higgins & Davies 1996). In Queensland, they are recorded in most regions, being widespread along much of the coast and are very sparsely scattered inland, particularly in central and south-western regions (Higgins & Davies 1996). In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast,	Non-breeding season in Australia. breeds in northern Siberia, from the delta of the Lena River, east to Chaun Gulf and east of the Kolyma River delta.	Species generally forages at the edge of the water of wetlands or intertidal mudflats, either on bare wet mud or sand, or in shallow water. They also forage among inundated vegetation of saltmarsh, grass or sedges. They forage in sewage ponds, and often in hypersaline environments. After rain, they may forage in paddocks of short grass, well away from water	During the non-breeding season they can occur on the coast of north-east Queensland from late August. After arriving in Australia, most birds move slowly south across the continent to south-east Australia. Temporary influxes occur in Darwin, north-west Queensland, and the inland wetlands of arid and east Australia between August and December. At least some move north from south-east Australia via the coast of Queensland, during March and April.	In Queensland, they are recorded in most regions, being widespread along much of the coast and are very sparsely scattered inland, particularly in central and south-western regions	Department of the Environment (2022). Calidris acuminata in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: https://www.environment.gov.au/sprat. Accessed Thu, 11 Aug 2022 11:40:45 +1000.	No	Unlikely

									and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and swamps and creeks lined with mangroves. They tend to occupy coastal mudflats mainly after ephemeral terrestrial wetlands have dried out, moving back during the wet season. They may be attracted to mats of algae and water weed either floating or washed up around terrestrial wetlands, and coastal areas with much beachcast seaweed. Sometimes they occur on rocky shores and rarely on exposed reefs.						
1190	*Ardenna tenuirostris*	short-tailed shearwater	SL		Mi/Ma	7	1994	WN	Pelagic / Marine shorebird species					No	Unlikely
1251	*Thalassarche cauta*	Shy Albatross	E	En	Mi/Ma			PMST	Pelagic / Marine shorebird species					No	Unlikely
1258	*Phoebetria fusca*	Sooty Albatross	V	Vu	Mi/Ma			PMST	Pelagic / Marine shorebird species					No	Unlikely
1200	*Ardenna grisea*	Sooty Shearwater	V	Vu	Mi/Ma			PMST	Pelagic / Marine shorebird species					No	Unlikely
1222	*Macronectes giganteus*	southern giant-petrel	E	En	Mi/Ma	1	1997	WN/PMST	Found in southern ocean breeding in Antarctica between Chile and Argentina (Carboneras, Jutglar and Kirwan, 2020). Forages across southern oceans into subtropics (Carboneras, Jutglar and Kirwan, 2020).	Breeds on six subantarctic and Antarctic islands in Australian territory; Macquarie Island, Heard Island and McDonald Island in the Southern Ocean, and Giganteus Island, Hawker Island, and Frazier Island in the Australian Antarctic Territories.	Opportunist scavenger and predator. Catches and kills live birds, cephalopods, krill and other crustaceans, kelp, fish, and rabbits.	In summer, predominantly occurs in subantarctic to Antarctic waters, usually below a latitude of 60° south in the South Pacific and southeast Indian Oceans, or 53° S in the regions of Heard Island and Macquarie Island. Some adults are mainly sedentary, remaining close to their subantarctic breeding islands throughout the year. Throughout the colder months, immatures and most adults disperse widely, with Antarctic colonies becoming completely deserted during winter. The winter dispersal is circumpolar, extending north from 50° south to the Tropic of Capricorn (23° south) and sometimes beyond these latitudes. Thus, in winter they are rare in the southern waters of the Indian Ocean, and more common off South America, South Africa, Australia and New Zealand. The waters off southeastern Australia may be particularly important wintering grounds.	Widespread throughout the Southern Ocean.	No	Unlikely
2455	*Petauroides volans volans*	southern greater glider	E	En		3	1995	WN/PMST	The greater glider is an arboreal nocturnal marsupial, predominantly solitary and largely restricted to eucalypt forests and woodlands of north-eastern Australia. It is typically found in highest abundance on high elevation, wetter sites in open woodland to open forests, containing relatively old trees and abundant hollows (preference for large hollows (diameter >10 cm)). It is likely that only a proportion of forest in potential habitat areas is suitable for the species, as the structural attributes of the forest overstorey and forage quality it relies on vary considerably across the landscape.	Females give birth to a single young from March to June.	Corymbia citriodora, C. intermedia, Eucalyptus fibrosa, E. moluccana and E. portuensis are the perferred feed tree species. It is primarily folivorous, with a distinct preference for young foliage, supplemented by buds and flowers. It feeds from a restricted range of eucalypt species, and favours forests	Home ranges are typically relatively small and are larger for males (2.5 ha) than for females (1.3 ha), with male home ranges being overlapping with other males and females. However, it has been reported that the greater glider (northern) has a home range of about 1–12 ha, with home ranges also overlapping.	The greater glider occurs in the wet-dry tropical region of north-eastern Australia, including the Wet Tropics World Heritage Area. It is distributed from around Townsville northwards to the Windsor Tablelands. This distribution is very patchy with some isolated subpopulations.	No	Unlikely

										with a diversity of eucalypt species due to seasonal variation in its preferred tree species. The tree species favoured by greater gliders varies regionally. Approximately 85% of the greater glider's water requirements are provided by consumed leaves.					
18168	*Mogurnda adspersa*	southern purplespotted gudgeon		En	2	2012	WN	The Murray-Darling Basin population is usually located in areas of the Basin that are not subject to flooding in sluggish, low-flow or no-flow parts of rivers, creeks, billabongs and wetlands. It is most often found in habitats with abundant cover, like snags, rocks, cobble, and aquatic vegetation, especially with submerged vegetation along undercut banks with root masses				The southern purple-spotted gudgeon Murray-Darling Basin is restricted to the confines of the Murray-Darling Basin	SPRAT	No	Unlikely
803	*Dasyurus maculatus maculatus (SE mainland population)*	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	E	En			PMST	Prefers mature, wet forest in areas with 600mm/year rainfall (Edgar & Belcher 2008; Green & Scarborough 1990). This species also shows preference to unlogged or less disturbed forests (Cattling et al 1998, 2000). They have been recorded in a wide range of habitats: temperate and subtropical rainforests, wet sclerophyll forest, lowland forest, open and closed eucalypt forest, sub-alpine woodlands and coastal heathlands. During the day these quolls rest in dens such as hollow logs, tree hollows, rocky outcrops or caves (NPSW 1999)	In captivity, females older than three did not produce young. Males sired young up to the age of five. Mating and births occur from June-August (Dawson 2005; Collins et al 1993). Litters of 4-6 are born in late July-early August (Belcher 2003). Females utilise maternal dens during this time	Predators of medium-sized mammals including ringtail possum, brushtail possum, greater glider and rabbit. Additionally they will consume insects, lizards, birds, frogs, fish, plant material (Edgar and Belcher 2008). These quolls can climb high into trees to capture prey.	Home ranges are estimated as 620-2560ha for males and 90-650ha for females (Claridge et al. 2005).		SPRAT	No	Unlikely
1242	*Calonectris leucomelas*	streaked shearwater	SL		Mi/Ma	1	1984	WN/PMST	Pelagic / coastal shorebird species						No	Unlikely
1858	*Gallinago megala*	Swinhoe's Snipe	SL		Mi/Ma			PMST	In it's non-breeding range the species occurs in dense growths of grass and rushes around the edge of fresh and brackish (Higgins and Davies 1996) marshes (Higgins and Davies 1996, del Hoyo et al. 1996), swamps, pools, small streams, rice paddy-fields, sewage ponds, rank grassland and dry cultivated areas				Non breeding visitor to northern Australia		No	Unlikely
1827	*Xenus cinereus*	terek sandpiper	V	Vu	Mi/Ma	255	1993	WN/PMST	Preferring to roost in or among mangroves, birds may perch in branches or roots up to 2 m from the ground, or beneath them in the shade on hot days. Occasionally, they roost in dead trees or among tangled driftwood.	non-breeding population in Australia	Forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayments, harbours or lagoons.	visiting north-western Australia are most likely from the same population as the eastern Indonesian birds, and probably breed farther north than slightly smaller birds that visit western Indonesia and south-east Asia	Primarily coastal distribution, with occasional records inland. It is more widespread and common in northern and eastern Australia than southern Australia.		No	Unlikely
279	*Coeranoscincus reticulatus*	Three-toed Snake-tooth Skink	C	Vu				PMST	In coastal areas and adjacent ranges between Macleay Valley, NSW and Cooloola Queensland (TSSC, 2008). Known from rainforest and occasionally wet sclerophyll forest on loam or sandy soils with a foliage projective cover of >70% (TSSC, 2008). Foound in deep leaf litter mostly adjacent to fallen woodt material (TSSC, 2008).		Diet consists of earthworms and beetle grubs.				No	Unlikely
706	*Adelotus brevis*	tusked frog	V			15	2023	WN	Male tusked frogs to spend approximately three months of the year in suitable breeding habitat at the edge of pools during the breeding season and consequently forage on the edges of ponds molluscs inhabit. In contrast, female tusked frogs only frequent these ponds for mating and laying eggs returning to drier adjacent	Eggs are laid as a foamy mass on the surface of permanent ponds, stream pools, water-filled crayfish holes, or cattle tracks. Nests usually made below	Tusked frog primarily feeds on invertebrates, predominantly arthropods including: beetles, bugs, ants and wasps, and, spiders and mites.	As for other habitat types.	Found from the mid north coast of NSW to Eungella in mid north QLD along the coast, and extending inland to the ranges. Tusked frog is distributed along the east coast of Australia between Shoalwater Bay, Queensland	SPRAT	Yes	Likely

								forests where arthropods are more common.	debris of sticks, rocks and leaf litter.	However, tusked frog have also been found to feed on molluscs (specifically pond snails), crustaceans (isopods and amphipods) and metamorphs of other frogs	and Moss Vale, New South Wales with disjunct populations in the central Queensland (Clark Range) and central-western Queensland (Blackdown Tableland, Carnavon Gorge and Barakula State Forest			
686	*Crinia tinnula*	wallum froglet	V		474	2023	WN	Wallum Froglets are found in a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedge lands and wet heathlands. They can also be found along drainage lines within other vegetation communities and disturbed areas, and occasionally in swamp sclerophyll forests. The wallum froglet will shelter under leaf litter, vegetation, other debris or in burrows of other species. These sites are generally wet or very damp, often located near the water's edge. the males can be heard calling throughout the year at any time of day which will peak following rain.	The species breeds in swamps with permanent water as well as shallow ephemeral pools and drainage ditches. The breeding season generally peaks in the colder months, but can occur throughout the year following rain. Eggs of 1.1-1.2mm are deposited in water with a pH of <6 and tadpoles take 2-6 months to develop into frogs.				Yes	Known
609	*Litoria freycineti*	wallum rocketfrog	V		49	2023	WN	Inhabits coastal wet heath where it can be found around sedge swamps, freshwater lakes and drainage lines on low nutrient soils. Animals have been recorded a considerable distance from water in eucalypt forest near wet heath habitat					Yes	Likely
593	*Litoria olongburensis*	wallum sedgefrog	V	Vu	41	2011	WN/PMST	The species is found in emphemeral and semi-permenant swamps with reeds, ferns and sedges in undistrubed coastal wallum between Fraser Island, Queensland and Woolgoolga, New South Wales (Meyer et al, 2006). Males call from sedges above acidic (pH <6.0) water with eggs laid at the base of sedges (Meyer et al., 2006). Breeding occurs in summer, autumn or spring after rain (Meyer et al., 2006).	Breeding habitat is typified by emergent sedges, with upright species such as Baumea spp. and Schoenus spp. preferred by adult frogs for perching. Frogs will occupy breeding habitat all year and may utilise drier areas adjacent to primary habitat. Breeding occurs primarily in spring, summer and autumn after rain. Eggs are laid singly in water at the base of sedges.				Yes	Likely
1255	*Diomedea exulans*	Wandering Albatross	V	Vu	Mi/Ma		PMST	Does not breed within Australian waters (DSEWPaC, 2011). Occasionally foraging across southern Australian waters (del Hoyo et al., 2020).	The species breeds on several islands just north of the Antarctic Circle, including; South Georgia Island (belonging to the UK), Prince Edward and Marion Islands (South Africa), Crozet and Kerguelen Islands (French Southern Territories) and Macquarie Island (Australia). Breeding takes place in small, loose colonies on exposed ridges and hillocks, amongst open and patchy vegetation , using a large mud nest. The species will mate for life; but do not reach sexual maturity until 9-11 years of age. Both parents incubate the egg (that hatches after two	Known to forage in pelagic, offshore and inshore waters, generally at night, taking fish and cephalopods such as squid, crustaceans and carrion. Also known to follow ships feeding on the refuse they trail.		SPRAT	No	Unlikely

									months) and feed the growing chick, which remains on the nest for around 9 months.					
1861	*Tringa incana*	wandering tattler	SL		Mi/Ma	1	1993	WN/PMST	Pelagic / Coastal shorebird species				No	Unlikely
724	*Xeromys myoides*	water mouse	V	Vu		1	1989	WN/PMST	habitat including mangroves and the associated saltmarsh, sedgelands, clay pans, heathlands and freshwater wetlands. five types of nests: free-standing, termitarium-like mound nests or mounds at the base of mangrove trees (e.g. Avicennia marina), mound nests on small elevated 'islands' within the tidal zone, mound nests or holes in supralittoral banks; nests inside hollow tree trunks, and nests in spoil heaps created because of human activity	in the absence of further information on breeding it would appear that the water mouse is capable of breeding throughout the year.	Composition of the diet included a variety of crustaceans, marine polyclads, marine pulmonates and marine bivalves.	Nothing is known about dispersal movements in this species although habitat type and topography of land to migrate through and recent weather may impact capacity for dispersal.	occurs in three regions of coastal Australia: The Northern Territory, central south Queensland and south-east Queensland.	No	Possible
1188	*Ardenna pacifica*	wedge-tailed shearwater	V		Mi/Ma	66	1992	WN	The Wedge-tailed Shearwater is a pelagic, marine bird known from tropical and subtropical waters. The species tolerates a range of surface-temperatures and salinities, but is most abundant where temperatures are greater than 21 °C and salinity is greater than 34.6 %. In tropical zones the species may feed over cool nutrient-rich waters. The species has been recorded in offshore waters of eastern Victoria and southern NSW, mostly over continental slope with sea-surface temperatures of 13.9–24.4 °C (Drummond 1985; Reid et al. 2002) and usually off the continental shelf in north-west Australia (Collins & Jessop 1997; Marchant & Higgins 1990).	The Wedge-tailed Shearwater breeds colonially and is rarely seen alone during this period. Small flocks are formed at the start of the breeding season and birds often gather in large flocks (up to 600 have been recorded in one flock) in areas where food is concentrated (Marchant & Higgins 1990; Reid et al. 2002). The species breeds throughout its known range, mainly on vegetated islands, atolls and cays, but one colony is known on the Australian mainland. Twenty-five per cent of Australian breeding occurs within the Great Barrier Reef and the largest breeding colony is recorded at the Capricorn-Bunker group of islands (Congdon et al. 2007).	Adults in the Great Barrier Reef undertake short one to four day foraging trips with interspersed eight to ten day longer trips to cooler waters with greater foraging resources (Congdon et al. 2007).	Movements of population in the southern Great Barrier Reef are unknown (Marchant & Higgins 1990). Birds may disperse for winter over nearby waters centring on Coral Sea mounts and the eastern edge of the Australian Continental Shelf where upswelling's may provide greater food resources. These areas are also considered highly important for Great Barrier Reef nesting birds in the breeding season (Congdon et al. 2007).	In the Pacific Ocean it has been recorded from the Bonin Islands to Montague Island, Vanuatu, New Caledonia, Fiji, Samoa, Pitcairn Island and the Revilla Gigedo Islands (Lindsey 1986; Marchant & Higgins 1990). The species is virtually absent from the south-west Pacific between New Zealand and Samoa from June–September. (Lindsey 1986; Marchant & Higgins 1990)	No	Unlikely
1867	*Limosa lapponica baueri*	Western Alaskan bar-tailed godwit	E	En		8614	2020	WN/PMST	Occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. Usually roosts on sandy beaches, sandbars, spits and also in near-coastal saltmarsh.	The migratory bar-tailed godwit (western Alaskan) does not breed in Australia.	Usually forages near the edge of water or in shallow water, mainly in tidal estuaries and harbours. They prefer exposed sandy or soft mud substrates on intertidal flats, banks and beaches.	Breeds in the northern hemisphere and migrates southwards for the boreal winter. Post-breeding migration involved several weeks of staging in southwest Alaska followed by non-stop flights across the Pacific Ocean to New Zealand (11,690 km in a complete track) or stopovers on islands in the south-western Pacific en route to New Zealand and eastern Australia. Thought to have high site fidelity in the non-breeding season.	Recorded in the coastal areas of all Australian states. Widespread in the Torres Strait and along the east and south-east coasts of Queensland, NSW and Victoria. In Tasmania, the bar-tailed godwit has mostly been recorded on the south-east coast. In South Australia it has mostly been recorded around coasts from Lake Alexandrina to Denial Bay. In Western Australia it is widespread around the coast, from Eyre to Derby. Populations have also been recorded in the northern Australia, from Darwin east to the Gulf of Carpentaria. The bar-tailed godwit is a regular migrant to Christmas Island, Norfolk	No	Unlikely

												Island, Lord Howe Island. It has also been recorded on subantarctic islands such as Macquarie Island, Snares Islands, Auckland Islands and Campbell Islands. During the non-breeding period it occurs predominately New Zealand, northern and eastern Australia. In Australia, they mainly occur along the north and east coasts.		
1845	*Numenius phaeopus*	whimbrel	SL		Mi/Ma	1386	2020	WN/PMST	The Whimbrel is often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. It is occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms. It has been infrequently recorded using saline or brackish lakes near coastal areas. It also used saltflats with saltmarsh, or saline grasslands with standing water left after high spring-tides, and in similar habitats in sewage farms and saltfields.	Non-breeding in Australia.	The Whimbrel generally forages on intertidal mudflats, along the muddy banks of estuaries and in coastal lagoons, either in open unvegetated areas or among mangroves. It has occasionally been sighted feeding on exposed coral or rocky reefs and rock platforms. It is known to probe holes and crevices among rubble and on reef flats, but not on reef crests.	The Whimbrel is a regular migrant to Australia and New Zealand, with a primarily coastal distribution.	There are also scattered inland records of Whimbrels in all regions. It is found in all states but is more common in the north.	No	Unlikely
27766	*Thalassarche steadi*	White-capped Albatross	V	Vu	Mi/Ma			PMST	Pelagic / coastal shorebird					No	Unlikely
1286	*Phaethon lepturus*	white-tailed tropicbird	SL		Mi/Ma	1	1995	WN/PMST	Pelagic / coastal shorebird					No	Unlikely
1971	*Hirundapus caudacutus*	white-throated needletail	V	Vu	Mi/Ma	1951	2010	WN/PMST	Almost exclusively aerial. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. Recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows. When flying over farmland they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks.	No breeding habitat in Australia	Forage aerially, at heights up to 'cloud level', above a wide variety of habitats ranging from heavily treed forests to open habitats, such as farmland, heathland or mudflats	Mainly enter Australia via the Torres Strait, usually during September and October, and sometimes in early November. After reaching Australia, they move south along both sides of the Great Divide in Queensland and NSW in October and November, usually arriving in southern parts of their range (Victoria and Tasmania) in November, with increasing numbers recorded from December and peaking in March. Birds leave Australia in February, but most leave between mid-March and April	Widespread in eastern and south-eastern Australia	No	Possible
1920	*Chlidonias leucopterus*	white-winged black tern	SL		Mi/Ma	1122	2003	WN	Pelagic / Coastal shorebird species					No	Unlikely
1852	Tringa glareola	Wood Sandpiper	SL		Mi/Ma			PMST	The Wood Sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially Melaleuca and River Red Gums Eucalyptus camaldulensis and often with fallen timber.	The Wood Sandpiper breeds across Eurasia, mostly in Scandinavia, the Baltic countries and Russia.	The Wood Sandpiper forages on moist or dry mud at the edges of wetlands, either along shores, among open scattered aquatic vegetation, or in clear shallow water.	The Wood Sandpiper is migratory species that breeds throughout Eurasia, mainly between 50° N and 70° N. The non-breeding areas are mainly in tropical and subtropical Africa, south Asia to south China, Philippines, Indonesia and Australia.	The Wood Sandpiper has its largest numbers recorded in north-west Australia, with all areas of national importance located in Western-Australia. In Queensland there are sparsely scattered records, generally south of 17° S, but also around Cairns.	No	Unlikely
875	Petaurus australis australis	Yellow-bellied Glider	V	Vu				PMST	Commonly associated with tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Prefers forests with latitude and elevation in		Primarily food source is plant and insect exudates, including nectar, sap,	Highly mobile species that occupies a large home range between 20 to 85 ha in order to		No	Unlikely

	(south-eastern)	addition to mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. The species lives in small family groups with two - six individuals in hollows of large trees.	honeydew and manna with pollen and insects providing protein.	encompass dispersed and seasonally variable food resources.

*NC Act conservation status: V = Vulnerable / E = Endangered / CR = Critically Endangered / SL = Special Least Concern / LC = Least Concern.

EPBC Act conservation status: V = Vulnerable / E = Endangered / CE = Critically Endangered / Ma = Marine / Mi = Migratory.

A-1-2 Flora

Taxon ID	Scientific Name	Common Name	NCA	EPBC	No. records	Last recorded	Source	General	Distribution	Reference	Habitat within Survey Area	LoO
14929	*Acacia attenuata*		V	Vu	3	2023	WN/PMST	Acacia attenuata is found in wet heathland and open eucalypt forest communities in low-lying coastal habitats where soils are sandy / peaty and subject to seasonal waterlogging. It is also found in open woodland and open forest communities, usually with a heath understorey (Barker 1995; Brownlie 2007; Queensland Herbarium 2011)	Acacia attenuata is endemic to southeast Queensland. It is found from just north of Bundaberg to Burleigh Heads on the Gold Coast and never more than 30 km inland from the sea. The species is located within the Burleigh Knoll Conservation Park, Great Sandy national Park, Littabella National park, Mooloolah River national Park, Noosa National Park, Poona National Park, Tewantin National park, Toolara State Forest and Tuan State Forest (Queensland Herbarium, 2012).		Marginal	Likely
	Prasophyllum exilis	Wallum Leek Orchid	NT		1		WN	Flowering occurs from June to early September. Prasophyllum exile grows in damp, grassy places in coastal and near-coastal forest and woodland.	It occurs from Cudgen in far north-eastern New South Wales north to south-eastern Queensland.		Marginal	Likely
15774	*Acacia baueri subsp. baueri*	tiny wattle	V		1	2010	WN	*Acacia baueri subsp. baueri* is found on infertile and often seasonally waterlogged sands in coastal heath (wallum) habitat and adjacent plateaus and low open woodland.	This subspecies is found in coastal areas from the Burrum Coast just south of Bundaberg, Queensland to north of Botany Bay, New South Wales.		Not Present	Possible
9477	*Acronychia littoralis*	Scented Acronychia	E	En			PMST	Occurs in coastal areas, generally associated with sub-littoral rainforest in the transitional zone between littoral rainforest and swamp sclerophyll forest. Also found in littoral and coastal cypress pine communities or on the margin of littoral forest and cleared land (Benwell 1994a, 1996; Floyd 1989; Harden 2002; Hartley & Williams 1983; Hunter et al. 1992). Associated tree species can include Brush Box (Lophostemon confertus), Coast Banksia (Banksia integrifolia), Coast Cypress Pine (Callitris columellaris), Hoop Pine (Araucaria cunninghamii), Pink Bloodwood (Eucalyptus intermedia) and Broad-leaved Paperbark (Melaleuca quinquenervia) (Benwell 1996). NSW populations occur in north-east NSW between Ballina and Tweed Heads (Hunter et al. 1992). Species grows only on Quaternary geology, marine-aeolian sands on outer barrier Holocene dunes, inner barrier Pleistocene sands, alluvial benches of re-worked sand and alluvium close to river estuaries or low coastal hills mantled with wind-blown sand.			Not Present	Unlikely
9786	*Allocasuarina emuina*	Emu Mountain Sheoak, Mt Emu She-oak	E	En			PMST	Distinct preference of heathland habitats. Occurs in a linear range between Beerburrum and Noosa with majority of individuals occurring in low-lying areas and slopes of Mount Emu (Department of the Environment, 2021).		SPRAT	Present	Likely (Known in wider Aura South project area
9787	*Allocasuarina thalassoscopica*	Mt. Coolum she-oak	E	En	16	2024	WN/PMST	Restricted to the low closed heathland community on trachyte on the upper slopes of Mt. Coolum at an altitude of 150-200 m (DEWHA, 2008).			Not present	Unlikely
9964	*Arthraxon hispidus*	Hairy-joint Grass	V	Vu			PMST	Found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps (Queensland CRA/RFA Steering Committee, 1997, 1998; DECC NSW, 2005), as well as woodland (Queensland Herbarium, 2008). In south-east Queensland, 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 (Queensland CRA/RFA Steering Committee, 1997, 1998), and with bog mosses in mound springs (Queensland Herbarium, 2008).	In Australia, the species has been recorded from scattered locations throughout Queensland and on the northern tablelands and north coast of NSW (DECC NSW, 2005; Bostock & Holland, 2007). This species occurs as far south as Kempsey, and west to Glen Innes, NSW; in Queensland it occurs north to Port Douglas, and west to disjunct occurrences around mound springs in Carnavon National Park (NP); however, most occurrences are from Noosa southwards			Unlikely
17868	*Blandfordia grandiflora*	christmas bells	E		3	2022	WN	Grows in damp sandy and/or peaty soils in wet heathland of coastal and tableland habitats; north of Hawksbury River area, inland to Glen Innes district (PlantNET, 2015)		PlantNET. (2015). Flora Online. Retrieved from Blandfordia grandiflora R.Br.: https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Blandfordia~grandiflora	Present	Likely (known in wider Aura South project area
11988	*Bosistoa transversa*	Three-leaved Bosistoa,	C	Vu			PMST	Lowland subtropical rainforest up to 300 m above sea level. Reddish loam over basalt rock on a very steep slope in complex notophyll vine forest with emergent Brush Box (Lophostemon confertus). Associated canopy species include White Booyong, Soft Corkwood (Caldcluvia paniculosa),	found from the Nightcap Range north of Lismore in north-east NSW to Mount Larcom (near Gladstone) in south-east Queensland		Not present	Unlikely

		Yellow Satinheart						Rosewood (Dysoxylum fraserianum), Yellow Carabeen (Sloanea woollsii) and Giant Water Gum (Syzygium francisii).				
41034	*Coleus omissus*	null	E	En			PMST	Plectranthus omissus has been recorded on steep rocky outcrops approximately 300-400 m above sea level on the margin of vine forest or sclerophyll forests (Halford 1998).	Plectranthus omissus is known from only five sites between the Conondale Ranges and Gayndah, Queensland. The population at one site is estimated to be only 30 to 40 plants (Halford, 1998). The species occurs within Conondale National park, Wratten Resource Reserve, Grongah National Park, Miva State Forest and Mudlo National Park (Queensland Herbarium, 2012).		Not present	Unlikely
17577	*Cryptocarya foetida*	Stinking Cryptocarya, Stinking Laurel	V	Vu			PMST	Found in littoral rainforest between Iluka, NSW north to Fraser Island, Queensland on sandy or basalt soils (DEWHA, 2008).			Not present	Unlikely
22074	*Cryptostylis hunteriana*	Leafless Tongue-orchid	SL	Vu			PMST	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland.			Present	Likely
14648	*Cupaniopsis shirleyana*	Wedge-leaf Tuckeroo	V	Vu			PMST	Cupaniopsis shirleyana occurs at 20 to 550 m elevation. Recorded in a variety of rainforest types including vine thicket and dry rainforest. Occurs on hillsides, mountain tops, lower slopes of valleys, stream beds and along riverbanks. Grows in a variety of soil types (Queensland Herbarium, 2012).	Cupaniopsis shirleyana is restricted to south east Queensland, from Brisbane, north to Bundaberg. Cupaniopsis shirleyana is known from It occurs in Pine Mountain Reserve, Mt Gravatt, Cold Creek State Forest and Miva State Forest (Queensland Herbarium, 2012).		Not present	Unlikely
14603	*Diploglottis campbellii*	Small-leaved Tamarind	E	En			PMST	Occurs in forest types ranging from lowland subtropical rainforest to drier rainforest with a Brush Box (Lophostemon confertus) open overstorey. The preferred habitat type is well-watered but well-drained sites on basalt-derived soils or alluvium at low altitude. Also known from yellow podzol soils on quartz monozonites.			Not present	Unlikely
14609	*Dodonaea rupicola*	Velvet hop bush	V	Vu	1	2005	WN/PMST	D. rupicola is found amongst rocks and rock cracks on both lower and upper mountain slopes including platform areas. It is found in soils built from the breakdown of mosses, lichens, leaf fall and accumulated wash. Recorded as low as 50m above sea level in both grassy open hardwood forest, melaleuca forest, wallum or heath.	Restricted to south eastern Queensland in the Glasshouse Mountains area north of Brisbane		Not present	Possible
13612	*Eucalyptus conglomerata*	swamp stringybark	E	En	3	2014	WN/PMST	Occurs mostly in the ecotone between wet heath (wallum) and tall open forest communities. The soils are infertile, deep and sandy or peaty in texture and tend to be seasonally water-logged (Department of the Environment, 2021)		SPRAT	Not present	Possible
17256	*Eucalyptus curtisii*	Plunkett mallee	NT		1	2014	WN	The shorter mallee form is more likely to occur as the only eucalypt species on poorly drained lowland sites in shrubland dominated by banksia,The larger growth form occurs as scattered individuals on better drained soils in the more open areas of mixed eucalypt forests. Commonly associated species include Corymbia citriodora subsp. variegata, C. trachyphloia and Callitris endlicheri, less commonly associated with E. fibrosa, E. planchoniana and E. acmenoides. E. curtisii occurs on sandy podsoils with impeded drainage, shallow stony soils, clay loams and stony clays with a surface layer of loose stones (Wang & Borsboom, 1996).	Scattered distribution throughout south east Queensland. 80 km north and south of Brisbane, extending NW to the Dalby and Miles district.		Not present	Possible
13202	*Floydia praealta*	Ball Nut, Possum Nut, Big Nut, Beefwood	V	Vu			PMST	Floristically rich, tall, closed riverine to subtropical rainforest and coastal scrub. The species is recorded on gently sloping alluvial levees to moderately sloped footslopes and hillslopes, as well as steeply sloping screeslopes at altitudes from 50—350 m. Usually on red, loamy, basalt derived soil. (DoE, 2022)	Occurs in small, scattered populations from Gympie, Queensland, south to the Clarence River, near Dorrigo in north-east NSW	SPRAT	Not present	Unlikely
27385	*Gossia fragrantissima*	Sweet Myrtle, Small-leaved Myrtle	E	En			PMST	Subtropical and riverine rainforest species	Occurs in south-east Queensland and in north-east NSW south to the Richmond River. Mostly found on basalt-derived soils.		Not present	Unlikely
16746	*Macadamia integrifolia*	Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak	V	Vu			PMST	Remnant rainforest, preferring partially open areas such as rainforest edges (Gross, 1995). High nutrient alluvial and volcanic soils predominate often with considerable exposure of rock fragments or substrate, mostly basalt and diorite. The surface soils are uniformly dark, slightly acid (pH 5.5–6.5) and varying in texture from clayey-sand through various loams to silty-clay. All sites are well-drained, some excessively so (Barry & Thomas, 1994).	Found in remnant rainforest in northern NSW and south-east Queensland (Gross 1995).		Not present	Unlikely
16747	*Macadamia ternifolia*	small-fruited Queensland nut	V	Vu	1	2013	WN/PMST	Macadamia ternifolia is found in several rainforest regional ecosystems including complex and simple notophyll vine forest and simple microphyll-notophyll vine forest with emergent Araucaria and Argyrodendron. Macadamia ternifolia is identified in the Queensland Herbarium REDD as occurring in endangered RE 12.3.1 (see Table 6), though it is also frequently found in RE 12.8.3, 12.11.10, 12.12.1 and 12.12.16 (Powell unpublished data). The occupied habitat is approximately 1,350 hectares and the modelled extent of available habitat is approximately 22,000ha within an area of 3,100km2. The total population is found within approximately 60 key locations with 5 - 25 mature specimens at each. Significant population clusters occur in the north from Goomboorian to Cooroy; the centre of the species range in the Blackall Range, Maleny and Buderim; in the Conondale Ranges and west of Kenilworth; and Samford Valley/ Mt Nebo in the south.			Not present	Unlikely
16748	*Macadamia tetraphylla*	0	V	Vu	1	2016	WN/PMST	Distributed south from Coomera River, Queensland to Richmond River in NSW (Costello, Gregory and Donatiu, 2009). Found in a variety of forest types from complex notophyll vine scrub, littoral rainforest and wet sclerophyll forest (Costello, Gregory and Donatiu, 2009).	Rough-shelled Bush Nut occurs from north-east New South Wales (chiefly in the Richmond & Tweed River areas) to south-east Queensland (Mt Glorious, near Brisbane) (Stanley & Ross, 1986; Floyd, 1989; Gross,	SPRAT	Not present	Unlikely

									1995; Sheringham & Westaway, 1995). Populations at any given location tend to be small, with fewer than 20 individuals (Fanning et al., 1998). Populations in the south-east Queensland Regional Forest Agreement area are estimated at 350 mature individuals in 12 populations (Queensland CRA/RFA Steering Committee, 1997). There are no population estimates available for New South Wales. The geographic range of the Rough-shelled Bush Nut is estimated to be less than 100 km (Briggs & Leigh, 1996).			
9680	*Notelaea lloydii*	Lloyd's Olive	V	Vu			PMST	Occurs in open eucalypt forest, often near the margins of vine thickets, vine forests and softwood scrub at altitudes between 80 and 480 m. It is usually found on stony, shallow and rocky soils derived from sandstone or acid volcanic rocks, often on steep slopes, or near drainage lines.			Not present	Unlikely
5983	*Pararistolochia praevenosa*	0	NT		0	2011	WN	Subtropical rainforests on the eastern coast and lower ranges (<600 m), with plant communities on nutrient-rich volcanic, alluvial or, uncommonly, sandy soils (WPSQ & DES, 2013).	North-eastern Qld – Lake Eacham; southeastern Qld – coastally, Kin Kin to Currumbin; subcoastally, Conondale, Blackall and northern D'Aguilar Ranges, Upper Ormeau, Tamborine, Canungra and McPherson Range. NSW – coastally, Tweed River and Cudgen to Broken Head and Blackwall Range; subcoastally, Border Ranges and Tweed Valley to Mallanganee. The distribution of the vine is fragmented and disjunct throughout the natural range.	WPSQ & DES. (2013). Birdwing Butterfly Vine Factsheet. Retrieved from BIRDWING BUTTERFLY VINE: https://wildlife.org.au/wp-content/uploads/2013/12/Birdwing_Butterfly_Vine_Factsheet.pdf	Not present	Unlikely
13157	*Persicaria elatior*	Knotweed, Tall Knotweed	V	Vu			PMST	Scattered distribution between central coast NSW and the Moreton botanical district in Queensland (DEWHA, 2008). Grows on sandy alluvium in riparian areas around watercourses and lakes			Marginal	Possible
12722	*Phaius australis*	Lesser Swamp-orchid	E	En			PMST	Commonly associated with coastal wet heath/sedgeland wetlands, swampy grassland or swampy forest and often where Broad-leaved Paperbark or Swamp Mahogany are found. Typically, the Lesser Swamp-orchid is restricted to the swamp-forest margins, where it occurs in swamp sclerophyll forest (Broad-leaved Paperbark/Swamp Mahogany/Swamp Box (Lophostemon suaveolens)), swampy rainforest (often with sclerophyll emergents), or fringing open forest. It is often associated with rainforest elements such as Bangalow Palm (Archontophoenix cunninghamiana) or Cabbage Tree Palm (Livistona australis).	Occurs in southern Queensland and northern NSW		Marginal	Possible
12723	*Phaius bernaysii*	Yellow Swamp-orchid	E	En			PMST	Only known from one population on North Stradbroke Island, Queensland on the edge of a swamp with a ground layer of sedges with emergent Melaleuca quinquinervia and Eucalyptus robusta (DEWHA, 2008).			Not present	Unlikely
10604	*Picris evae*	Hawkweed	V	Vu			PMST	Hawkweed occurs in Eucalyptus open woodland with a grassy understorey composed of Dichanthium spp. Upper stratum species include Eucalyptus melliodora, E. crebra, E. populnea, E. albens, Angophora subvelutina, Allocasuarina torulosa, and Casuarina cunninghamiana (Holzapfel, 1994). Collections have been made along roadsides and in cultivated areas, such as paddocks, on black, dark grey or red-brown soils, reddish clay-loam or medium clay soils (DECC, 2005a).	Hawkweed occurs north of the Inverell area in NSW and has been collected at Elsmore (16 km east of Inverell), Oxley Park (Tamworth), and Dangars Falls in Oxley Wild Rivers National Park in the NSW northern tablelands (DECC, 2005a). This species also occurs at 30 sites in the Darling Downs and Moreton pastoral districts in south-east Queensland (Bostock & Holland, 2007). It occurs within the Border Rivers–Gwydir, Northern Rivers (NSW), South West Queensland, Border Rivers Maranoa–Balonne, and Condamine (Queensland) Natural Resource Management Regions.		Not present	Unlikely
5210	*Planchonella eerwah*	Shiny-leaved Condoo, Black Plum, Wild Apple	E	En			PMST	Grows in subtropical rainforest, dry rainforest and hoop pine (Araucaria cunninghamii) vine scrub. Populations in the Ipswich– Beaudesert area occur on rocky slopes and drainage lines on a variety of soils. Populations in the Beenleigh–Ormeau–Pimpama area occur on nutrient poor soils derived from metasediments. Populations in the Nambour–Maleny area all occur on well-drained basaltic, dark sandy loams. The populations south of Brisbane occur in Araucarian Notophyll Vine Forest and Araucarian Microphyll Vine Forest dominated by Flindersia species, with occasional emergent Araucaria cunninghamii and Harpullia pendula. The northern populations occur in the canopy and lower strata of remnant Complex Notophyll Vine Forest (Department of the Environment, 2021).	Populations known from Ipswich-Beaudesert, Beenleigh-Ormeau-Pimpama, and Nambour-Maleny.	SPRAT	Not present	Unlikely
8488	*Prasophyllum wallum*	Wallum Leek-orchid	V	Vu			PMST	Prasophyllum wallum occurs in south-east Queensland, in wallum communities and adjacent stabilised dunes (Jones, 1991) and coastal Melaleuca swamp wetlands (Joyce, 2006). The species is represented in the Queensland Herbarium by a single specimen collected at Coolum Beach in 1976 (BRI collection records, n.d.). Jones (1991) stated that the species was distributed from Hervey Bay to Coolum. Stanley and Ross (1989) recorded the distribution of the species (as Prasophyllum sp. 1)			Not present	Unlikely

								as “coastal areas in Moreton and Wide Bay districts”. Prasophyllum wallum is reserved in Coolum Environmental Park (Briggs & Leigh, 1996). This species occurs within the Burnett Mary and South East Queensland Natural Resource Management Regions.				
14255	*Rhodamnia rubescens*	Scrub Turpentine, Brown Malletwood	CR	Cr			PMST	Occurs in all rain forest subforms except cool temperate rainforest. The species occupies a range of volcanically derived and sedimentary soils and is a common pioneer species in eucalypt forests (Floyd 2008). Populations and individuals of R. rubescens are often found in wet sclerophyll associations in rainforest transition zones (including open forest of Eucalyptus tereticornis and E. bosistoana in the Sydney region) and creekside riparian associations (Benson and McDougall 1998).	Coastal districts of NSW north from Batemans Bay (35.71° S, 150.18° E) to Bundaberg in Queensland (24.86° S, 152.35° E). The distribution of R. rubescens occasionally extends inland onto the escarpment up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm (Benson & McDougall 1998).		Not present	Unlikely
16290	*Rhodomyrtus psidioides*	native guava	CR	Cr	2	2023	WN/PMST	The habitat of R. psidioides is likely to include the following vegetation types: Subtropical Rainforests, Warm Temperate Rainforests, Littoral Rainforest, and Wet Sclerophyll Forests (Keith 2004; Floyd 2008). The species may be found in the adjoining margins of sclerophyll vegetation associated with any of these rainforest formations.	Occurs from coastal districts of NSW north from Gosford (33.43° S, 151.34° E) to Maryborough in Queensland (25.52° S, 152.70° E). 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 (B. Makinson in litt. April 2016).		Not present	Unlikely
14088	*Ricinocarpos speciosus*		V		1		WN	Found in a range of habitats, on creek banks, rocky slopes of hillsides, ridge tops, and old floodplains			Not present	Possible
12377	*Romnalda strobilacea*	null	V	Vu			PMST	Tufted perennial in complex notophyll rainforest prefers moist gullies or stream banks and level to steeply inclined slopes where the soil is nutrient rich.		SPRAT	Not present	Unlikely
33391	*Samadera bidwillii*	Quassia	V	Vu			PMST	Occurs in lowland rainforest often with Araucaria cunninghamii or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland, it is commonly found in areas adjacent to both temporary and permanent watercourses up to 510 m altitude (QDNR 2001)	Samadera bidwillii is endemic to QLD and has been collected from Scawfell Island, east of Mackay, to as far south as Bauple and west to Biloela Queensland Herbarium, 2012)	SPRAT	Not present	Unlikely
12658	*Sarcochilus fitzgeraldii*	Ravine Orchid	E	Vu			PMST	Found in subtropical and temperate rainforest on rocks, in organic matter, in shady ravines, gorges and on cliff faces that are cool and moist; sometimes grows on the base of fibrous-barked trees			Not present	Unlikely
10791	*Sophora fraseri*	null	V	Vu			PMST	Grows in moist habitats, often in hilly terrain at altitudes from 60–660 m on shallow soils along rainforest margins in eucalypt forests or in large canopy gaps in closed forest communities (DEWHA, 2008).	Found north of Casino in northern NSW, where it is very rare, and into south-east Queensland, where it is widespread but not common.	SPRAT	Not present	Unlikely
13499	*Syzygium hodgkinsoniae*	Smooth-bark Rose Apple, Red Lilly Pilly	V	Vu			PMST	Grows in riverine subtropical or gallery rainforest on deep rich alluvial and basalt soils at altitudes of up to 300 m above sea level. The species is considered a rheophyte (adapted to growing along or sometimes within fast-flowing streams).		SPRAT	Not present	Unlikely
13501	*Thesium australe*	Austral Toadflax,	V	Vu			PMST	Semi-parasitic on roots of a range of grass species (Copeland 2000 pers. comm.; Leigh et al. 1984), notably Kangaroo Grass (Themeda triandra) (Scarlett et al. 1994). It occurs in subtropical, temperate and subalpine climates over a wide range of altitudes. It occurs on soils derived from sedimentary, igneous and metamorphic geology on a range of soils including black clay loams to yellow podzolics and peaty loams (Leigh et al. 1984; Hunter et al. 1999; Cohn 2004). It occurs in shrubland, grassland or woodland, often on damp sites (George 1984; Harden 1992). Vegetation types include open grassy heath dominated by Swamp Myrtle (Leptospermum myrtifolium), Small-fruit Hakea (Hakea microcarpa), Alpine Bottlebrush (Callistemon sieberi), Woolly Grevillea (Grevillea lanigera), Coral Heath (Epacris microphylla) and Poa spp. (Griffith 1991); Kangaroo Grass grassland surrounded by Eucalyptus woodland; and grassland dominated by Barbed-wire Grass (Cymbopogon refractus) (Leigh et al. 1984; Hunter et al. 1999). At a NSW coastal site, associated plants included Coastal Wattle (Acacia sophorae), Coast Banksia (Banksia integrifolia), Zieria prostrata and Bitou Bush (Chrysanthemoides monilifera) (Cohn 2004).	Current distribution is sporadic but widespread occurring between the Bunya Mountains in south-east Queensland to northeast Victoria (Scarlett et al., 2003) and as far inland as the southern, central and northern tablelands in New South Wales and the Toowoomba region	SPRAT	Present	Possible
13085	*Triunia robusta*	Glossy Spice Bush	E	En			PMST	Triunia robusta grows in simple and complex notophyll vine forest communities at 20-200m above sea level. The soils are variable, from clayey sand, loamy sand or loam, usually derived from basalt and rhyolitic rocks. It has also been recorded on moderate to steep slopes, alluvial terraces and along drainage lines. (Halford 1998; TSSC 2008).	Triunia robusta is found between Pomona and Woombye on the Sunshine Coast in south-eastern Queensland. (TSSC 2008; Herbrecs 2008).	SPRAT	Not present	Unlikely
28663	*Zieria exsul*	banished stink bush	CR	Cr	2	2023	WN/PMST	Zieria exsul is restricted to lowland wallum woodland and open forest on sandy substrates that are often seasonally waterlogged. Dominant canopy species include Corymbia intermedia, Eucalyptus racemosa, E. robusta, Syncarpia glomulifera, with the mid and under storeys usually quite dense with a high diversity of wallum species. Individuals of Z. exsul have been usually found in ecotonal areas between continuously moist areas and higher better drained habitats.	Zieria exsul is endemic to the Sunshine Coast of south-east Queensland, Australia where it is known from four locations (with sublocations) from Mooloolaba in the north to Elimbah in the south	SPRAT	Marginal	Likely

*NC Act conservation status: V = Vulnerable / E = Endangered / CR = Critically Endangered / NT = Near Threatened.

EPBC Act conservation status: V = Vulnerable / E = Endangered / CE = Critically Endangered.

Appendix B

Species List

Fauna species list

Family	Scientific Name	Common Name	NC Act Status	EPBC Act Status	Exotic	Restricted matter category
Amphibians						
Bufonidae	*Rhinella marina*	Cane Toad			Yes	
Hylidae	*Litoria nasuta*	Striped Rocketfrog	LC			
Limnodynastidae	*Limnodynastes peronii*	Striped Marshfrog	LC			
Myobatrachidae	*Crinia tinnula*	Wallum Froglet	V			
Birds						
Acanthizidae	*Gerygone olivacea*	White-Throated Gerygone	LC			
Accipitridae	*Aviceda subcristata*	Pacific Baza	LC			
Accipitridae	*Elanus axillaris*	Black-Shouldered Kite	LC			
Accipitridae	*Haliastur indus*	Brahminy Kite	LC	Ma		
Accipitridae	*Haliastur sphenurus*	Whistling Kite	LC	Ma		
Ardeidae	*Bubulcus ibis*	Cattle Egret	LC, Colonial breeder			
Artamidae	*Gymnorhina tibicen*	Australian Magpie	LC			
Cacatuidae	*Eolophus roseicapilla*	Galah	LC			
Campephagidae	*Coracina novaehollandiae*	Black-Faced Cuckoo-Shrike	LC	Ma		
Charadriidae	*Vanellus miles*	Masked Lapwing	LC			
Columbidae	*Geopelia humeralis*	Bar-Shouldered Dove	LC			
Columbidae	*Geopelia placida*	Peaceful Dove	LC			
Columbidae	*Ocyphaps lophotes*	Crested Pigeon	LC			
Cuculidae	*Centropus phasianinus*	Pheasant Coucal	LC			
Falconidae	*Falco berigora*	Brown Falcon	LC			
Falconidae	*Falco cenchroides*	Nankeen Kestrel	LC	Ma		
Falconidae	*Falco subniger*	Black Falcon	LC			
Hirundinidae	*Hirundo neoxena*	Welcome Swallow	LC, Colonial breeder	Ma		
Locustellidae	*Cincloramphus timoriensis*	Tawny Grassbird	LC			

Maluridae	*Malurus lamberti*	Variegated Fairy-Wren	LC			
Maluridae	*Malurus melanocephalus*	Red-Backed Fairy-Wren	LC			
Meliphagidae	*Manorina melanocephala*	Noisy Miner	LC			
Meliphagidae	*Philemon corniculatus*	Noisy Friarbird	LC			
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit	LC	Ma		
Phasianidae	*Synoicus ypsilophorus*	Brown Quail	LC			
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail	LC			
Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis	SL	Ma, Mi		
Threskiornithidae	*Threskiornis spinicollis*	Straw-Necked Ibis	LC, Colonial breeder	Ma		
Turnicidae	*Turnix pyrrhothorax*	Red-Chested Button-Quail	LC			
Tytonidae	*Tyto javanica*	Eastern Barn Owl	LC			
Zosteropidae	*Zosterops lateralis*	Silvereye	LC	Ma		
Mammals						
Bovidae	*Bos taurus*	European Cattle			Yes	
Camelidae	*Camelus dromedarius*	One-Humped Camel			Yes	
Canidae	*Canis familiaris*	Dog			Yes	3, 4 and 6
Felidae	*Felis catus*	Cat			Yes	3, 4 and 6
Leporidae	*Lepus europaeus*	European Brown Hare			Yes	
Macropodidae	*Macropus giganteus*	Eastern Grey Kangaroo	LC			
Suidae	*Sus scrofa*	Pig			Yes	
Reptiles						
Elapidae	*Demansia psammophis*	Yellow-Faced Whipsnake	LC			
Elapidae	*Pseudonaja textilis*	Eastern brown snake	LC			
Elapidae	*Pseudechis porphyriacus*	Red-bellied black snake	LC			

Flora species list

Family	Scientific Name	Common Name	NC Act Status	EPBC Act Status	Exotic	Biosecurity Act Restricted matter category	Family
Apiaceae	*Centella asiatica*		Least Concern	-	-	-	Apiaceae
Apiaceae	*Platysace linearifolia*		Least Concern	-	-	-	Apiaceae
Apocynaceae	*Parsonsia straminea*	Monkey Rope	Least Concern	-	-	-	Apocynaceae
Asteraceae	*Ageratum houstonianum*	Blue Billygoat Weed	-	-	Yes	-	Asteraceae
Asteraceae	*Baccharis halimifolia*	Groundsel Bush	-	-	Yes	3	Asteraceae
Asteraceae	*Cyanthillium cinereum*		Least Concern	-	-	-	Asteraceae
Asteraceae	*Sphaeromorphaea australis*		Least Concern	-	-	-	Asteraceae
Blechnaceae	*Telmatoblechnum indicum*		Special Least Concern	-	-	-	Blechnaceae
Campanulaceae	*Lobelia membranacea*		Near Threatened	-	-	-	Campanulaceae
Campanulaceae	*Lobelia purpurascens*	White Root	Special Least Concern	-	-	-	Campanulaceae
Casuarinaceae	*Allocasuarina littoralis*		Least Concern	-	-	-	Casuarinaceae
Casuarinaceae	*Casuarina glauca*	Swamp She-oak	Least Concern	-	-	-	Casuarinaceae
Cyperaceae	*Caustis pentandra*	Thick Twistrush	Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Chorizandra sphaerocephala*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Cyperus exaltatus*	Tall Flatsedge	Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Cyperus haspan subsp. juncoides*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Cyperus pilosus*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Cyperus polystachyos*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Eleocharis equisetina*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Eleocharis minuta*		-	-	Yes	-	Cyperaceae

Cyperaceae	*Ficinia nodosa*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Fimbristylis cinnamometorum*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Fimbristylis dichotoma*	Common Fringe-rush	Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Fimbristylis nutans*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Fimbristylis polytrichoides*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Fimbristylis velata*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Fuirena ciliaris*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Gahnia sieberiana*	Sword Grass	Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Lepironia articulata*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Machaerina articulata*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Ptilothrix deusta*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Rhynchospora brownii*	Beak Rush	Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Rhynchospora corymbosa*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Rhynchospora rubra*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Schoenoplectiella mucronata*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Schoenus apogon*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Schoenus calostachyus*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Schoenus melanostachys*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Schoenus sparteus*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Schoenus vaginatus*		Least Concern	-	-	-	Cyperaceae
Cyperaceae	*Scleria mackaviensis*		Least Concern	-	-	-	Cyperaceae
Dennstaedtiaceae	*Pteridium esculentum*	Common Bracken	Least Concern	-	-	-	Dennstaedtiaceae
Dicksoniaceae	*Calochlaena dubia*		Least Concern	-	-	-	Dicksoniaceae

Droseraceae	*Drosera pygmaea*		Special Least Concern	-	-	-	Droseraceae
Ericaceae	*Sprengelia sprengelioides*	Sprengelia	Least Concern	-	-	-	Ericaceae
Ericaceae	*Woollsia pungens*		Least Concern	-	-	-	Ericaceae
Eriocaulaceae	*Eriocaulon australe*		Least Concern	-	-	-	Eriocaulaceae
Gleicheniaceae	*Gleichenia dicarpa*	Pouched Coral Fern	Least Concern	-	-	-	Gleicheniaceae
Goodeniaceae	*Goodenia bellidifolia subsp. argentea*		Least Concern	-	-	-	Goodeniaceae
Goodeniaceae	*Goodenia stelligera*		Least Concern	-	-	-	Goodeniaceae
Hemerocallidaceae	*Dianella caerulea*		Least Concern	-	-	-	Hemerocallidaceae
Iridaceae	*Patersonia sericea*		Least Concern	-	-	-	Iridaceae
Juncaceae	*Juncus continuus*		Least Concern	-	-	-	Juncaceae
Juncaceae	*Juncus usitatus*		Least Concern	-	-	-	Juncaceae
Lauraceae	*Cassytha filiformis*	Dodder Laurel	Least Concern	-	-	-	Lauraceae
Laxmanniaceae	*Lomandra hystrix*		Least Concern	-	-	-	Laxmanniaceae
Laxmanniaceae	*Lomandra laxa*	Broad-leaved Matrush	Least Concern	-	-	-	Laxmanniaceae
Laxmanniaceae	*Lomandra longifolia*		Least Concern	-	-	-	Laxmanniaceae
Laxmanniaceae	*Sowerbaea juncea*	Vanilla Plant	Least Concern	-	-	-	Laxmanniaceae
Leguminosae	*Desmodium uncinatum*		-	-	Yes	-	Leguminosae
Leguminosae	*Lotus uliginosus*		-	-	Yes	-	Leguminosae
Leguminosae	*Macroptilium lathyroides*		-	-	Yes	-	Leguminosae
Leguminosae	*Pultenaea myrtoides*		Least Concern	-	-	-	Leguminosae
Lentibulariaceae	*Utricularia lateriflora*	Small Bladderwort	Special Least Concern	-	-	-	Lentibulariaceae
Lycopodiaceae	*Palhinhaea cernua*		Least Concern	-	-	-	Lycopodiaceae
Lygodiaceae	*Lygodium microphyllum*	Snake Fern	Least Concern	-	-	-	Lygodiaceae
Lythraceae	*Cuphea carthagenensis*		-	-	Yes	-	Lythraceae

Melastomataceae	*Melastoma malabathricum subsp. Malabathricum*		Least Concern	-	-	-	Melastomataceae
Menispermaceae	*Stephania japonica*		Least Concern	-	-	-	Menispermaceae
Myrtaceae	*Baeckea frutescens*		Least Concern	-	-	-	Myrtaceae
Myrtaceae	*Leptospermum whitei*		Least Concern	-	-	-	Myrtaceae
Myrtaceae	*Lophostemon confertus*	Brush Box	Least Concern	-	-	-	Myrtaceae
Myrtaceae	*Melaleuca pachyphylla*		Least Concern	-	-	-	Myrtaceae
Myrtaceae	*Melaleuca quinquenervia*	Swamp Paperbark	Least Concern	-	-	-	Myrtaceae
Myrtaceae	*Melaleuca thymifolia*	Thyme Honeymyrtle	Least Concern	-	-	-	Myrtaceae
Myrtaceae	*Melaleuca viminalis*		Least Concern	-	-	-	Myrtaceae
Onagraceae	*Ludwigia octovalvis*	Willow Primrose	Least Concern	-	-	-	Onagraceae
Papilionoideae	*Daviesia umbellulata*		Least Concern	-	-	-	Papilionoideae
Papilionoideae	*Gompholobium pinnatum*	Poor Mans Gold	Least Concern	-	-	-	Papilionoideae
Passifloraceae	*Passiflora suberosa*	Corky Passion Flower	-	-	Yes	-	Passifloraceae
Philydraceae	*Philydrum lanuginosum*	Frogsmouth	Least Concern	-	-	-	Philydraceae
Pinaceae	*pinus elliottii*	Slash Pine	-	-	Yes	-	Pinaceae
Poaceae	*Alloteropsis semialata*	Cockatoo Grass	Least Concern	-	-	-	Poaceae
Poaceae	*Andropogon virginicus*	Whiskey Grass	-	-	Yes	-	Poaceae
Poaceae	*Chloris gayana*	Rhodes Grass	-	-	Yes	-	Poaceae
Poaceae	*Cynodon dactylon*		-	-	Yes	-	Poaceae
Poaceae	*Entolasia marginata*	Bordered Panic	Least Concern	-	-	-	Poaceae
Poaceae	*Eriochloa crebra*	Spring Grass	Least Concern	-	-	-	Poaceae
Poaceae	*Imperata cylindrica*	Blady Grass	Least Concern	-	-	-	Poaceae
Poaceae	*Paspalidium distans*	Shotgrass	Least Concern	-	-	-	Poaceae
Poaceae	*Paspalum conjugatum*	Sourgrass	-	-	Yes	-	Poaceae
Poaceae	*Paspalum scrobiculatum*	Ditch Millet	Least Concern	-	-	-	Poaceae
Poaceae	*Sacciolepis indica*	Indian Cupscale Grass	Least Concern	-	-	-	Poaceae
Poaceae	*Setaria sphacelata*		-	-	Yes	-	Poaceae

Poaceae	*Sporobolus pyramidalis*	Giant Rat's Tail Grass	-	-	Yes	3	Poaceae
Poaceae	*Themeda triandra*	Kangaroo Grass	Least Concern	-	-	-	Poaceae
Polygalaceae	*Polygala paniculata*		-	-	Yes	-	Polygalaceae
Polygonaceae	*Persicaria strigosa*		Least Concern	-	-	-	Polygonaceae
Polygonaceae	*Persicaria subsessilis*	Hairy Knotweed	Least Concern	-	-	-	Polygonaceae
Proteaceae	*Banksia oblongifolia*	Dwarf Banksia	Least Concern	-	-	-	Proteaceae
Proteaceae	*Banksia robur*	Broad-leaved Banksia	Least Concern	-	-	-	Proteaceae
Proteaceae	*Hakea actites*		Least Concern	-	-	-	Proteaceae
Proteaceae	*Persoonia virgata*	Small-leaved Geebung	Least Concern	-	-	-	Proteaceae
Pteridaceae	*Acrostichum speciosum*	Mangrove Fern	Special Least Concern	-	-	-	Pteridaceae
Restionaceae	*Baloskion pallens*		Least Concern	-	-	-	Restionaceae
Restionaceae	*Eurychorda complanata*		Least Concern	-	-	-	Restionaceae
Restionaceae	*Sporadanthus interruptus*		Least Concern	-	-	-	Restionaceae
Verbenaceae	*Lantana camara*	Lantana	-	-	Yes	3	Verbenaceae
Verbenaceae	*Stachytarpheta cayennensis*		-	-	Yes	-	Verbenaceae
Xyridaceae	*Xyris juncea*	Dwarf Yellow-eye	Least Concern	-	-	-	Xyridaceae

*NC Act conservation status: LC = Least Concern.

EPBC Act conservation status: Ma = Marine.

Appendix C

Waterway Investigation with Halls Creek Catchment (Fishology)

TECHNICAL MEMORANDUM

Early Release Area, Aura South

Date: 28 August 2026

To: Stockland Development Pty Ltd

From: Fishology Consulting Pty Ltd

Project: Early Release Area, Aura South, Halls Creek PDA

Issue: Issue A

Introduction

Stockland Development Pty Ltd (Stockland) is seeking approval for an Early Release Area within the Aura South development site within the declared Halls Creek Priority Development Area (PDA). The Early Release Area (ERA) is the first stage of a proposed master planned community.

A waterway investigation was undertaken as part of the initial site investigations to inform the master planning process. This technical memo summarises the findings of the waterway investigation confirming that the ERA will not require a development permit for operational works involving waterway barrier works.

Legislative Framework

Planning Act 2016

Fisheries development works are administered under the *Planning Act 2016* and its regulation including operational work for waterway barrier works. Fisheries development works are generally not overridden by the *Economic Development Act 2012* with the exception of operational works involving marine plants.

Under the *Planning Act 2016* a development permit is required for operational work that is the construction or raising of waterway barrier works unless the works are accepted development (*Planning Regulation 2017*, Schedule 10, Part 6, Division 4).

Fisheries Act 1994

The *Fisheries Act 1994* defines waterway barrier works as meaning a dam, weir or other barrier across a waterway if the barrier limits fish stock access and movement along a waterway. Waterway barrier works are triggered if the works are proposed within a waterway and are a physical structure likely to limit fish passage.

A legislative definition of a waterway is provided to assist identifying when works involve waterway barrier works. The *Fisheries Act 1994* defines a waterway as including a river, creek, stream, watercourse drainage feature or inlet of the sea.

The Department of Primary Industries (DPI) provides guidance material[1] to assist with the interpretation and application of the *Fisheries Act 1994* definition of a waterway including:

- Waterway mapping,
- Queensland waterways for waterway barrier works mapping User Guide, and
- Waterways in Queensland (fact sheet).

Environmental Offsets Act 2014

Environmental Offsets Regulation 2014 identifies waterways providing fish passage as prescribed environmental matters (Matters of State Environmental Significance)[2]. As waterways providing fish passage are matters of state environmental significance (MSES) the 'avoid, minimise, mitigate then offset' assessment hierarchy applies. The assessment hierarchy is captured in State Code 18, the assessment benchmarks for waterway barrier works and considered when fisheries development works require assessment under the *Planning Act 2016*.

Consistent with the waterway guidance material, early site investigations were completed to identify the extent of waterways within the future Aura South development site, Halls Creek Priority Development Area (PDA) site (the Site).

Mapped Waterways

The Site does not intersect with any watercourses mapped under the *Water Act 2000.*

At the time of the investigation the waterway mapping indicated the Site contained four mapped waterways classified as a green "low risk" and a single section of amber 'moderate risk' waterway (Halls Creek) for waterway barrier works under the *Fisheries Act 1994* (Figure 1). The waterway mapping indicates that all waterway head waters are within the subject site. There also appeared to be a network of constructed drains within the site.

Figure 1 also provides a copy of the current waterway mapping for the Site.

All iterations of the waterway guidance material acknowledges that anomalies may become apparent when ground truthing occurs (DAF, 2023). Further the current guide states that '*the definition of a waterway under the Fisheries Act applies if the mapping is inconsistent with on-ground features*.'

Identifying and confirming the extent of waterways providing fish passage within the Site was considered necessary to inform planning and subsequently the development design process to avoid and minimise impacts to MSES wherever possible.

[1] Waterway guidance material has been updated numerous times since investigation works have been completed however, the waterway definition has not changed.
[2] Section 5(3) of the *Environmental Offsets Regulation 2014* provides that both marine plants and waterways providing fish passage are not a ***prescribed environmental matter*** when they occur in an urban area (areas zoned for urban purposes as defined under the *Planning Act 2016*).

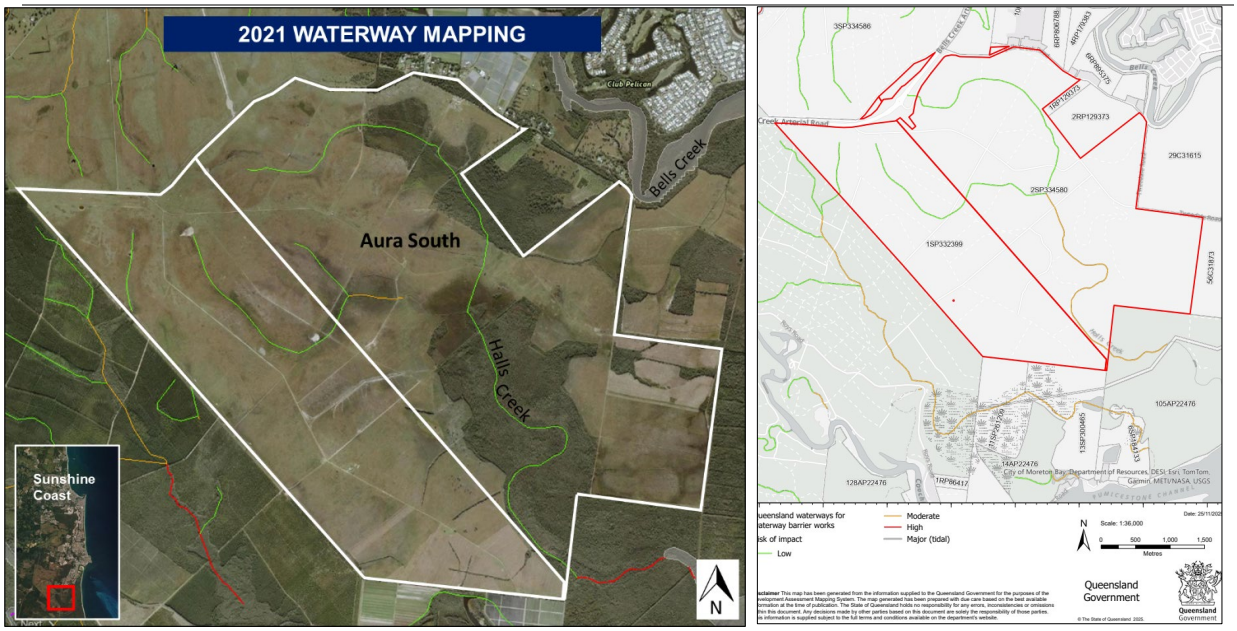


Figure 1: 2021 Mapped Waterways and 2026 Mapped waterways (Source: Queensland Globe, 2021 and Queensland Government, DAMS, 25 November 2025)

Alternative Mapped Waterways

Site assessments were undertaken by Fishology Consulting in March 2021 to assess the physical and hydrological features of the mapped waterways within the site. Halls Creek and its tributaries and a mapped green 'low risk' waterway in the north-west of the site, that flows south to the adjoining state forest within the Coochin Creek catchment were investigated. This investigation was undertaken consistent with the guidance material for determining waterways current at the time.

Fishology Consulting found that the upper extents of the green waterways are not as extensive as the then mapped waterways. Fishology Consulting provided alternative waterway mapping based on the investigation results presented in *Waterway investigation within Halls Creek catchment, Aura South, Final Report - March 2021*. This alternative waterway mapping is reproduced in Figure 2 below.

On completion of the site investigation SARA pre-lodgement advice, was sought to have the state agencies review the waterway investigation report prepared by Fishology Consulting and initiate consultation. SARA prelodgement advice is the States preferred process for waterway determinations. Formal prelodgement advice was issued dated the 15 July 2021 (SARA reference: 2106-23283 SPL). This advice recognised that DAMS mapping did not accurately reflect the waterways present on site as ground-truthed by Fishology Consulting.



Figure 2: Alternative waterway mapping, proposed by Fishology Consulting, March 2021

A copy of the waterway investigation report is provided in Attachment 1: Waterway investigation within Halls Creek catchment, Aura South, Final Report - March 2021.

Prelodgement Advice

SARA and DPI reviewed the waterway investigation report prepared by Fishology Consulting in 2021 as part of pre-lodgement engagement in 2021 (SARA reference: 2106-23283 SPL).

SARA and DPI confirmed the following:

- the lower reach of Halls Creek ha[d] a higher classification for fish passage than [was] indicated by the [DPI] waterway mapping [in 2021];
- the mapped green waterway within the Coochin Creek catchment (site 13) is not a waterway as it did not contain adequate flows to sustain ecological processes;
- none of the constructed drains are waterways and have not formed natural waterway features. These drains are cut into wetland habitat which is connected to Halls and Bells Creeks through flooding. The drains can provide habitat (as noted in the report) but exhibit poor connectivity, flow inadequacy, and lack defined bed and banks formed by natural flows and the local topography; and
- Halls Creek is a waterway providing for fish passage although the upper limits are not as extensive as currently mapped.

A copy of the pre-lodgement meeting minutes has been provided in Attachment 2: SARA Prelodgement Advice (2106-23283 SPL).

Importantly, SARA (and DAF) agreed with the findings of the Fishology Consulting Report and the alternative waterway mapping included at Figure 2 of this letter. Whilst this is the case, the DAMS mapped waterways was not altered as part of this engagement or subsequent mapping updates.

However, the prelodgement advice further advised to submit a copy of the waterway determination report and the SARA pre-lodgement advice with any future development application to ensure that the waterway barrier works development trigger was accurately applied to development applications made over the Site.

Aura South Master Plan – Waterway incorporation

A detailed master planning and urban design process has been undertaken by Stockland and Place Design Group to encapsulate the waterways and other important ecological features into the retained and protected areas of the site.

Consistent with the assessment hierarchy for MSES, the Aura South PDA master plan proposes to avoid the Sites waterways as much as possible, however bulk earthworks may require minor realignment of the confirmed 'low-risk' green waterways to protect higher level waterways and environmental areas downstream. As detailed design of precincts progress, waterway barrier works associated with the provision of infrastructure such as waterway crossings for vehicles and pedestrians, may be necessary at the operational works phase of the development.

Early Release Area

An early release area (ERA), including up to 1,000 dwellings and some light industrial area, is proposed to be delivered as part of the first stage of Aura South (Figure 3). The ERA will avoid the confirmed waterways as previously agreed by SARA and DPI in 2021.

As per the SARA advice 2106-23283 SPL the attached Fishology Consulting Report and SARA advice is being submitted to demonstrate that the application for the ERA will not involve waterway barrier works.

Conclusion

The Early Release Area ROL application does not require an application for waterway barrier works.

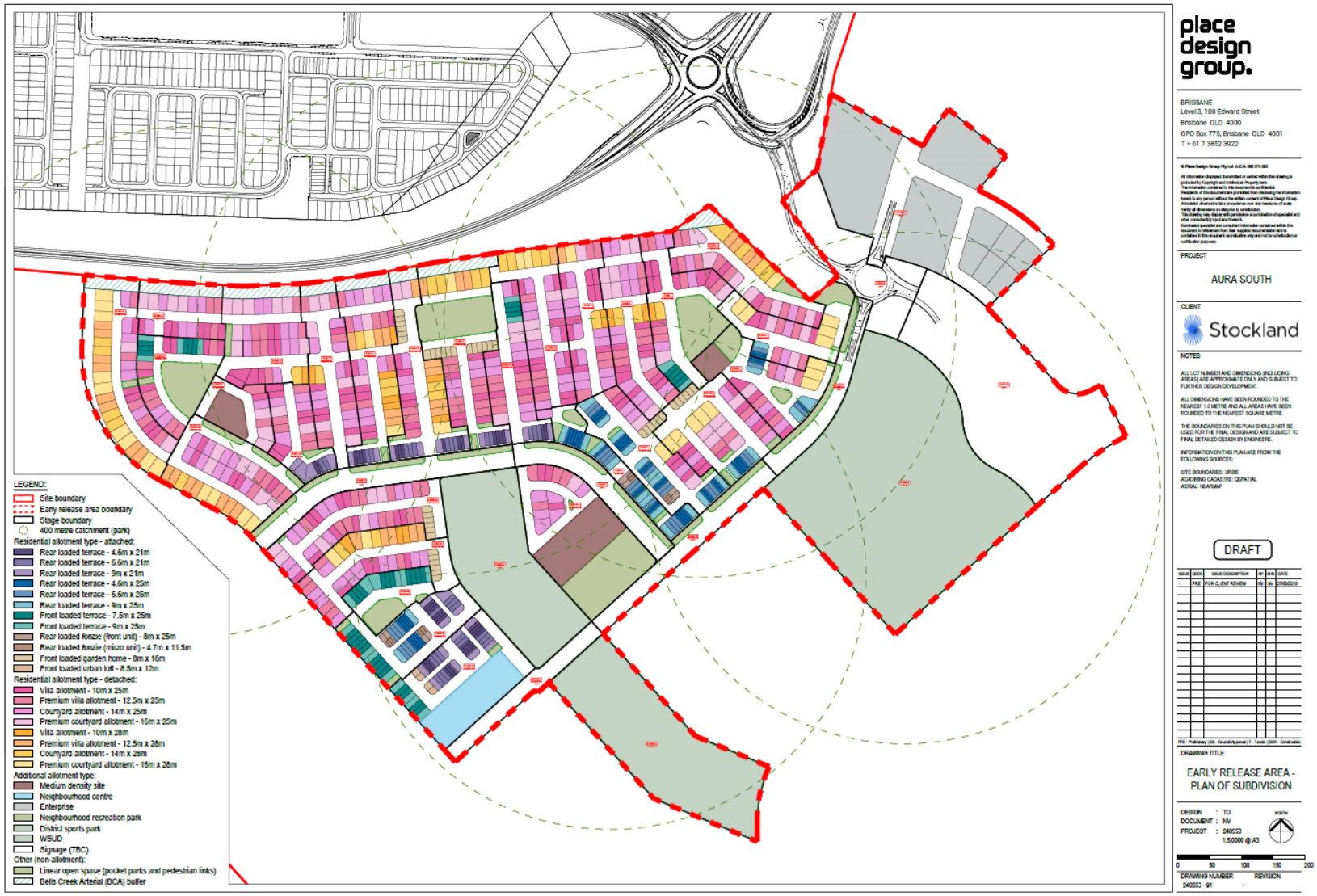


Figure 3. Layout of ERA.

Attachment 1 – Waterway Investigation

Fishology.



Waterway investigation within Halls Creek catchment, Aura South

Final Report - March, 2021

Document Control

Project Title	Waterway investigation within the Halls Creek catchment, Aura South.
Authors	Nicole McKirdy
Client	Stockland Development Pty Ltd
Contact	Mark Stephens

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Cover photograph

Pool habitat within site 2 of the main channel of Halls Creek.

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1.0 Introduction

Fishology Consulting have been engaged Stockland Development Pty Ltd (Stockland) to investigate the presence and extent of waterways within Lots 1 and 2 on RP910848, collectively known as Aura South.

The site under investigation includes Halls Creek, its upper tributaries and drains that flow into Halls Creek, Bells Creek and Coochin Creek. The upper portion of the Halls Creek catchment is wholly contained within the site and flows across the site into Bribie Island National Park before discharging to the Pumicestone Passage to the south-east. The south-west portion of the site is part of the adjoining Coochin Creek catchment. A small portion of the site drains also north to Bells Creek. The site potentially contains both mapped and unmapped waterways.

1.1 Waterway mapping

The *Fisheries Act 1994* defines a waterway as including a river, creek, stream, watercourse drainage feature or inlet of the sea. This definition includes freshwater and tidal waters and both permanent and ephemeral waterways. It also includes channels along which fish are expected to move if they connect isolated water bodies to defined waterways during times of flow. However, it does not include isolated waterbodies where no connectivity is available.

The site contains four Department of Agriculture and Fisheries (DAF) mapped waterways classified as a green “low risk” and a single section of amber ‘moderate risk’ waterway (Figure 1). The waterway mapping indicates that all waterway head waters are within the subject site. There also appears to be a network of constructed drains within the site.

In addition to the DAF waterway mapping layer, it is also understood that currently DAF are also referring to the watercourse mapping layer (QLD Globe, 2021), to indicate the extent of waterways within the sites. This mapping layer was developed to assist with the administration of the Water Act 2000. Within the Halls Creek catchment Halls Creek and its upper catchment are identified as unmapped within this mapping layer and mimic the DAF waterway layer (QLD Globe, 2021).

The DAF waterway mapping layer was derived from existing data sets with some ground truthing as set out in Fisheries Queensland’s Guide for the determination of waterways using the spatial layer Queensland waterways for waterway barrier works (DAFF, 2013[1]). As this mapping layer is indicative only the responsibility for determining the fitness of the mapping in representing the on-ground site conditions, rests solely with the user (DAFF, 2013). To satisfy this responsibility the extent of waterways on site is to be confirmed.

In-line with guidance provided in DAF fact sheet *What is a waterway?* (DAF, 2020), baseline surveys are required to ground truth physical and hydrological features of potential waterways within the site. Where relevant it is recommended to undertake fish surveys to confirm fish

[1] This guideline is currently under review.

habitats and fish assemblages within waterways. The results of these baseline surveys will facilitate discussions with DAF and enable confirmation of the extent and classification (risk to fish passage) of waterways within the Aura South site and if necessary, amend the waterway mapping layer.

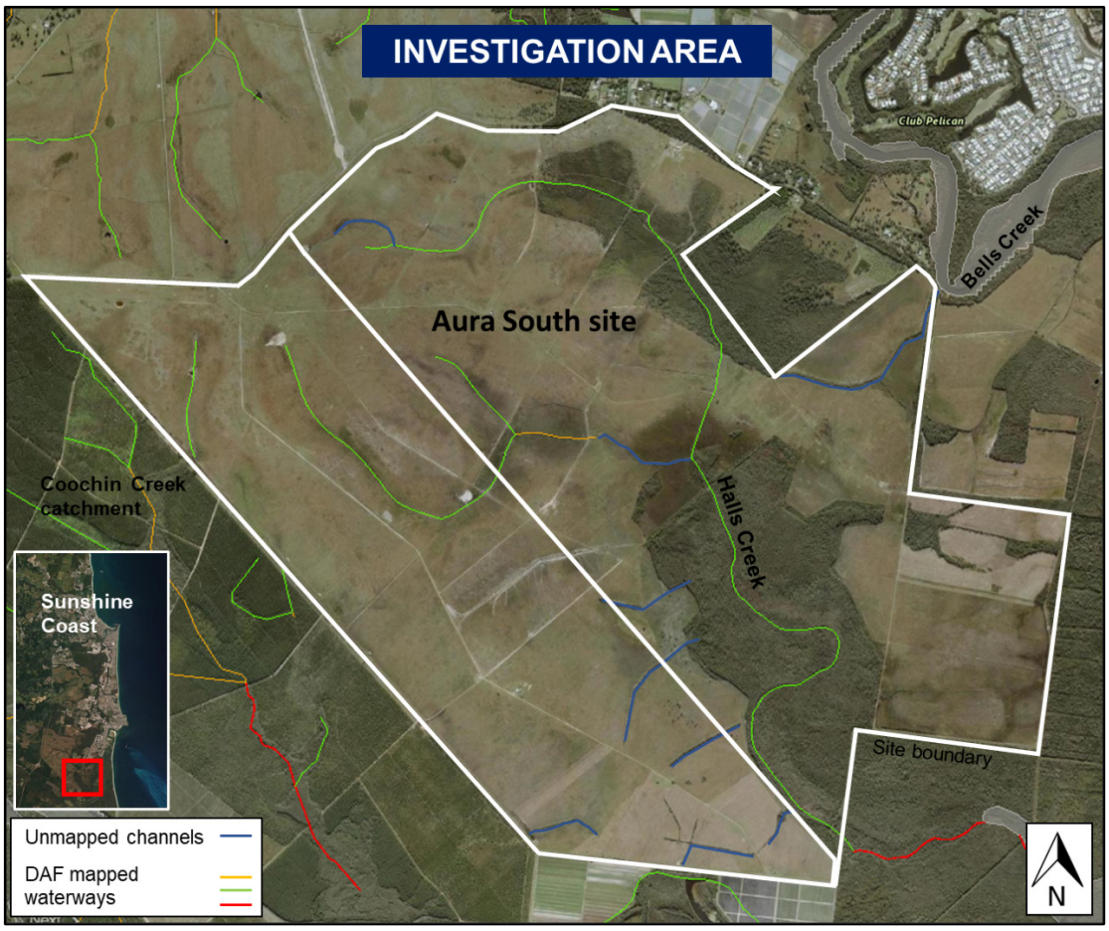


Figure 1. Location of the DAF mapped waterways within the subject site.

1.2 Land use

The Aura South site has been subject to various land uses, with the site being initially cleared in the 1970's and used for cattle grazing. After this, the site was used for forestry with pine plantations covering much of the site between 1995 and approximately 2004 (QLD Globe, 2021). The site is currently used for grazing (camels and cattle) and much of the site is slashed to prevent regrowth of pine wildings. Historical clearing and land uses are likely to have significantly modified site hydrology and associated aquatic habitats. The site has mostly been cleared, with vegetation remaining along the lower reach of Halls Creek and part of the northern tributary (Figure 1).

Aerial imagery shows the site was mostly vegetated in 1958 and the lower reach of the Halls Creek channel was clearly visible (Appendix A). No waterway channels are discernible in the upper portion of the catchment, although these could have been obscured by vegetation. The

aerial imagery shows areas of low-lying land associated with upper Halls Creek catchment and is likely to have consisted of broad wallum and paperbark wetlands that drained to the main channel of Halls Creek to the east of the site.

Clearing of the upper portion of the site is obvious by 1977 with the construction of dams, access roads, fencing lines and drains (Appendix A). Significant works to improve the drainage of the site is evident with shallow channels being cut in the low-lying areas in the upper portion of the site. The cut channels generally connected to either Halls Creek or Coochin Creek. Drainage works were also undertaken that join the northern arm of Halls Creek to Bells Creek (Appendix A).

1.3 Scope of study

The scope of this study is to investigate all potential waterway channels and confirm the presence, and extent of waterways within the site. This will include:

- Confirmation of waterway characteristics (physical and hydrological), aquatic habitat and fisheries values of the waterways.
- Confirmation of fish assemblage to determine the risk to fish passage (waterway classification).
- An assessment of waterway connectivity.

2.0 Methods

2.1 Study area

Aura South is located on land at Bells Creek Road within Lots 1 and 2 RP910848. The site contains four DAF mapped green 'low risk' waterways and a single section of an amber 'moderate risk' waterway. This includes the Halls Creek and its tributaries and a mapped green 'low risk' waterway in the north-west of the site, that flows south to the adjoining state forest within the Coochin Creek catchment (Figure 1). The site also appears to contain additional channels, potential waterways that may provide fish passage that are likely to be constructed drains (Figure 1).

Only mapped and unmapped potential waterways located within the site were investigated during this project.

2.2 Study sites

Prior to the site inspection, interrogation of aerial imagery and watercourse mapping was undertaken to identify areas within the site containing potential waterways. Individual sites were selected during walkovers of the channels to ensure any areas of potential fish habitat were adequately investigated and surveyed.

To provide an accurate assessment of the presence of waterway characteristics and features within the development site aquatic habitat and fisheries values were assessed within 21 representative sites (Figure 2). Thirteen sites were located on the DAF mapped waterways and eight sites were located on potential unmapped waterways. Fish sampling was only undertaken at all sites where suitable fish habitat occurred. Fish sampling was conducted at a total of nine sites.

2.3 Waterway features

To assess the physical and hydrological features of the mapped waterway within the site a walkover of the mapped and unmapped channels was undertaken where access was possible. The physical, hydrological and habitat features were described and quantified within all assessment sites. This included mean and maximum depth (calculated from a minimum of 10 representative measurements at each site) and width of low flow channel, high flow channel (mean value calculated from three measurements at each site). A visual assessment was made of bed and bank features, any obstructions to channel, presence of any fish habitat features and hydrological characteristics. For example, riverine flow characteristics (pool, rifle, run, dry), presence of riverine flow. Photos of site characteristics are presented in Appendix A.

A description of the aquatic habitat was recorded for each site. Habitat features within sites were subjectively quantified including riparian vegetation (native trees, exotic trees, shrubs, littoral grasses and terrestrial grasses), aquatic vegetation (species of rushes/sedges, floating macrophytes, submergent macrophytes and algae) and habitat cover components (rock,

timber, undercuts, plant litter). Each of the habitat variables were recorded as abundant (>90%), frequent (50 – 90%), occasional (10 – 50%), rare (< 10%) or absent (0%).

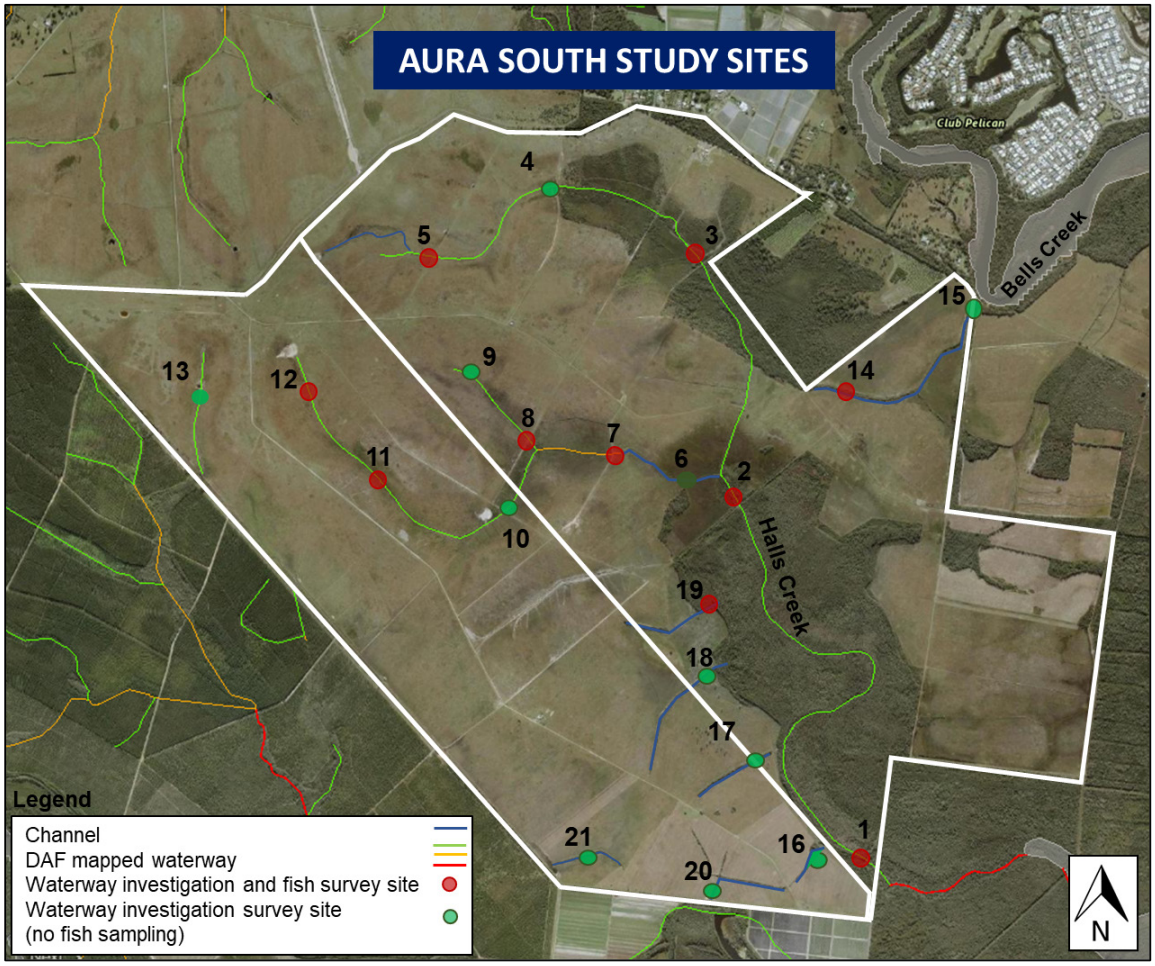


Figure 2. Waterway investigation and fish survey sites showing location in relation to DAF mapped waterway and the study area.

2.4 Fish sampling

Backpack electrofishing was used as the primary fish sampling methodology. This technique is commonly used for sampling small creeks and wetlands, because of the ability to sample complex structure, aquatic vegetation and water depths under 1m (Schoenebeck *et al.,* 2005). Backpack electrofishing provides robust estimates of relative abundances and fish diversity within sites (Lake, 2013), and all wadable habitat types within a stream reach can be sampled. Within each site comparable electrofishing effort was used so that resulting fish abundance data was consistent between sites.

Within each site all available habitat types were sampled with backpack electrofishing. During the survey fish counts were recorded and 30 individual fish from each were measured to obtain minimum and maximum lengths for each species. During electrofishing operations any fish that are observed and could be positively identified were added to the total catch.

Fyke nets (5m wings, 1.5m drop with 4mm mesh) were set overnight, two at sites 1 and 2 and a single net was set within site 7. The double winged fyke nets were set in the afternoon and retrieved the following morning. Each net is set out from the bank with wooden stakes which were used to keep the fyke net wings and cod end in place. A polystyrene float is placed in the cod end of the net to keep the net afloat in case any air breathing animals were caught.

A dip net (long handle net with 4mm mesh) was used opportunistically to sample for aquatic biota in small standing sections of water within the site. Whilst this sampling method is not effective in sampling fish abundance or to determine the fish community, it is effective in determining the presence or absence of fish and crustaceans within small, contained waterbodies. This technique was used in small, isolated areas of standing water where electrofishing could not be utilised.

This project was undertaken under General Fisheries Permit number 181014 and animal ethics approval CA 2015/07/888.

2.5 Study conditions

Field investigations for this project were undertaken on 10th to 12th November 2020. In the week prior to the field investigation, the region experienced a total 19mm mm of rain with over 115mm in the two weeks prior to the investigation. In October 2020, the region experienced approximately 135.2 mm of rain (BOM current weather observations Beerburrum Forest Station). This is well above the mean monthly rainfall of 91.4mm for October. At the time of the site visit the property was green, much of the land wet and some low-lying tracks were inaccessible by vehicle.

All sites were revisited on the 26th November 2020 to confirm the permanency of flows following a period of low rainfall.

The mapped waterways and drains within the Coochin Creek catchment were investigated on the 14th January 2021 following above average rainfall the previous month (Dec, 2020) and approximately 80mm of rainfall in the two weeks prior.

3.0 Results and Discussion

3.1 Fish community

A total of 1,827 individual fish and a single broad shelled turtle (*Chelodina expansa*) were captured during the surveys of 10 sites within the study area (Table 1). This catch was represented by a total of nine native fish species and two pest fish species (Table 1). In addition, a total of 126 freshwater crayfish were captured, representing two species, including swamp crayfish (*Tenuibranchiurus glypticus*) and the orange fingered yabby (*Cherax depressus*). Three migratory native catadromous native fish species were recorded within the study sites, including two eel species and the empire gudgeon (Table 1).

The native fish community consisted mostly of small bodied species. The dominant fish species was the firetail gudgeon (*Hypseleotris galii*), with this species accounting for 71% of the total catch (Table 1). This species was widespread within the study area and captured in nine of the ten survey sites. Empire gudgeons (*Hypseleotris compressa*) were relatively abundant but were only found within the two lower Halls Creek sites (sites 1 and 2) (Figure 3; Table 1). Four other small-bodied fish species were also caught in low numbers within the study area, including purple spotted gudgeons (*Mogurnda adspersa*) (Figure 3), striped gudgeons (*Gobiomorphus australis*), crimson spotted rainbowfish (*Melanotaenia duboulayi)* and glassfish (*Ambassis agassizii*) (Table 1). The occurrence of purple spotted gudgeons was highly unusual with this species not normally occurring in melaleuca or wallum habitats.

The pest fish species caught included tilapia (*Oreochromis mossambicus*) and mosquitofish (*Gambusia holbrooki*) (Table 1). Mosquitofish were the most abundant pest fish captured within the study area, and were widespread, being found in the majority of the ten survey sites (Table 1). Tilapia were only captured within site 7 where six individuals were captured.



Figure 3. Some of the species from the study area, top left empire gudgeon, bottom left purple spotted gudgeon, top middle tilapia (pest fish), middle bottom right firetail gudgeon, and right orange fingered crayfish.

Table 1. Native fish and turtles from the study area.

FAMILY / species	Common name	Halls Ck		Halls Ck north		Halls Ck south			Middle channel	Drains		Total
Site		1	2	3	5	7	11	12	8	14	19	
Native fish												
AMBASSIDAE												
Ambassis agassizii	Glassfish	-	-	-	-	11	-	-	1	-	-	12
ANGUILLIDAE												
Anguilla australis	Short finned eel	-	1	-	-	-	-	-	-	-	-	1
Anguilla reinhardtii	Long finned eel	1	9	-	-	1	-	-	-	-	-	1
ELEOTRIDAE												
Mogurnda adspersa	Purple spotted gudgeon	-	5	-	-	8	-	-	-	-	-	13
Gobiomorphus australis	Striped gudgeon	1	20	-	-	-	-	-	-	2	-	23
Hypseleotris compressa	Empire gudgeon	207	82	-	-	-	-	-	-	-	-	289
Hypseleotris galii	Firetail gudgeon	40	684	4	16	66	41	-	4	43	4	902
MELANOTAENIIDAE												
Melanotaenia duboulayi	Rainbowfish	-	-	-	-	2	-	-	-	-	-	2
SYNBRANCHIDAE												
Ophisternon sp.	Swamp eel	-	1	-	-	-	-	-	-	-	-	1
Pest fish												
CHICHLIDAE												
Oreochromis mossambicus	Tilapia	-	-	-	-	6	-	-	-	-	-	6
POECILIIDAE												
Gambusia holbrooki	Mosquitofish	31	359	55	30	32	9	-	14	25	-	555
Crayfish and turtles												
PARASTACIDAE												
Cherax depressus	Yabby	-	1	25	33	1	13	32	3	1	22	130
Tenuibranchiurus glypticus	Swamp crayfish	-	1	1	-	3	-	1	-	-	-	6
CHELIDAE												
Chelodina expansa	Broad shelled turtle	-	1	-	-	-	-	-	-	-	-	1
Total native fish catch		249	802	4	16	99	41	0	6	45	4	1266
Total pest fish catch		31	359	55	30	38	9	0	14	25	0	561
Total yabbies		0	1	26	33	4	13	33	3	3	22	136

3.2 Physical and hydrological features

3.2.1 Lower Halls Creek

Lower Halls Creek was found to be a natural channel within a melaleuca wetland and due to the wet conditions only sites with access could be investigated. Two sites (sites 1 and 2) were established in this reach to detail the physical and hydrological characteristics present. Due to the predominant wetland characteristics of the area, the waterway had little flow despite the main channel and the adjoining wetland being inundated.

The channel in this reach had defined bed and banks with emergent and submergent macrophytes present suggesting permanency of flow within this reach (Table 2, Appendix B). Undercut banks and exposed root masses were present but submerged indicating the water levels at the time of sampling were higher than the most frequent flows experienced by the site. Other physical fish habitat features present included both small and large woody debris.

There was an absence of pool, riffle and run formations as the channel had a very low bed gradient with continuous standing water through the entire main channel and adjoining wetland. The maximum water depth was 1.5m, with a low flow channel 3.5m to 4.5m wide (Table 2). No high banks were present due to the channel being within a melaleuca wetland.

Below site 1 a slightly raised vehicle track incorporating pipe culverts separates Aura South from Bribie Island National Park to the south. In the main channel of Halls Creek, a single 800mm diameter pipe culvert set at bed level provides connectivity to the downstream waterway reaches in the National Park. At the time of sampling the culvert remained only partially full and had very low flows despite the extent of inundation upstream. An additional pipe culvert was observed further along the vehicle track and would provide connectivity during high flow events when water levels extend into the adjoining melaleuca wetland. There may have been additional pipes present.

Upstream of site 2 (between site 2 and 3) the channel contained very shallow isolated pools and did not appear to receive much inflow.

Table 2. Physical and hydrological attributes of lower Halls Creek, north arm, and lower south arm. Habitat features described as abundant (A) (>90%), frequent (F) (50 – 90%), occasional (O) (10 – 50%), rare (R) (< 10%).

	Lower Halls Creek		Northern arm			Lower south arm
Site Characteristics	1	2	3	4	5	6
Waterway type (DAF risk rating)	**Green 'low' risk**	**Green 'low' risk**	**Green 'low' risk**	**Green 'low' risk**	**Green 'low' risk**	**Unmapped**
Hydrology / bed	Defined natural channel within broad melaleuca wetland. Inundation extended into floodplain / wetland.	Defined natural channel within broad melaleuca wetland. Inundation extended into floodplain / wetland.	Bed and banks.	Bed and banks. No adequacy of flow.	Bed and banks. Isolated shallow pools.	Bed and banks. Pool 6m long
Permanency of habitat	Permanent	Permanent	Ephemeral	Dry	Ephemeral	Ephemeral
Mean water depth (cm)	60	80	40	-	20	70
Max depth (cm)	>150	120	70	20	40	120
Wetted width (m)	3.5	4.5	2.5	1.1	1.3	6
Top of bank width (m)	>50	>50	8	4.2	3.5	10.5
Habitat features	Undercut bank (F), emergent macrophytes (F), submergent macrophytes (A), exposed root mass (A), small woody debris (F), large woody debris (O). Some flow within channel. Raised road with culvert (1/800mm Ø).	Undercut bank (F), emergent macrophytes (F), submergent macrophytes (O), exposed root mass (A), small woody debris (F), large woody debris (R).	Bed material – sand, silt. Undercut banks (F), emergent macrophytes (O)	Absence of fish habitat features.	Emergent macrophytes (O), small woody debris (O), undercut banks (O).	Emergent macrophytes (F), undercut banks (O), exposed root mass (O), small woody debris (O) Vehicle crossing (1/800mm Ø)
Native riparian canopy	<50m Established melaleuca wetland	>50m Established melaleuca wetland Exotic grasses.	>50m Melaleuca within and adjacent to channel. Heath species.	No canopy cover. Limited regrowth (heath, melaleuca). Gahnia, frogsmouth.	Unvegetated. Limited regrowth (heath, melaleuca). Gahnia, frogsmouth, bracken fern.	Poor canopy cover. Scattered regrowth (heath spp, melaleuca)

Table 3. Physical and hydrological attributes of the upper south arm of Halls Creek. Habitat features described as abundant (A) (>90%), frequent (F) (50 – 90%), occasional (O) (10 – 50%), rare (R) (< 10%).

	South arm (upper catchment of Halls Creek)						Upper Coochin Creek
Site Characteristics	7	8	9	10	11	12	13
Waterway type (DAF risk rating)	**Amber 'moderate' risk**	**Green 'low' risk**	**Green 'low' risk**	**Green 'low' risk**	**Green 'low' risk**	**Green 'low' risk**	**Green 'low' risk**
Hydrology / bed	Bed and bank formations.	Bed and bank.	Poorly defined channel	Bed and banks. Enhanced features	Bed and bank	Bed and banks. Single isolated pool.	Channelised with bed and banks. Shallow sheet flow over clay.
Permanency of habitat	Ephemeral	Ephemeral	Dry	Dry	Ephemeral	Ephemeral	Ephemeral
Mean water depth (cm)	30	15	-	1	20	15	2.5
Max water depth (cm)	60	40	-	20	40	25	7
Wetted width (m)	3.2	3.2	1.2	60	3.5	80	<1
Top of bank width (m)	8.2	4.2	3.5	4	5.5	4	2.7
Habitat features	Emergent macrophytes (F), undercut banks (A), submergent vegetation (O)	Emergent macrophytes (A).	Emergent macrophytes (A). Puddle forming from tree removal contained gambusia.	Emergent macrophytes (O). Vehicle crossing (1/800mm Ø) Single pool below crossing with *gambusia holbrooki*.	Marginal habitat Emergent macrophytes (F), smally woody debris (O), undercut bank (A).	Emergent macrophytes (O). Upper waterway limit.	Clay bed. Emergent macrophytes (R).
Native riparian canopy	Unvegetated Scattered regrowth (heath spp, melaleuca) Gahnia	Unvegetated. Limited regrowth (heath, melaleuca). Gahnia	Unvegetated. Limited regrowth (heath, melaleuca). Gahnia	Unvegetated. Limited regrowth (heath, melaleuca). Gahnia, frogsmouth,	Unvegetated. Limited regrowth (heath, melaleuca). Gahnia, frogsmouth,	Unvegetated.	No canopy. Limited regrowth (heath, melaleuca). Gahnia, frogsmouth,

3.2.2 Halls Creek north arm

Three sites were established to document the physical and hydrological features of the north arm of Halls Creek. The north arm was found to be highly ephemeral with a large section of this mapped waterway having no water present after substantial rainfall in the catchment (areas above and below site 4). Site investigations found standing shallow water providing small pool habitats in both site 3 (40cm max water depth) and site 5 (20cm max water depth) whilst site 4 was dry (Table 2). Two weeks later the entire upper reach of this waterway was dry (Figure 4).

The channel was narrow throughout the north arm, with the channel ranging between 1.1m at site 4 and 2.5 at site 3 (2.5m wetted width) (Table 2). There were no high banks typical of a waterway present, this is likely due to this area being subject to historical channelisation and drainage works. Physical habitat features present at sites 3 and 5 included occasional emergent macrophytes and undercut banks (Table 2). There was very limited habitat, above site 4, with much of it in poor condition or entirely absent in the upper reaches upstream of site 3. No fish habitat features were found at site 4.

The upper reach of this mapped green waterway above site four was degraded, had poorly defined bed and bank features and was either dry or was dry soon after significant rainfall (Figure 4). The current channel is present due to the construction of the dam and historical land drainage activities rather than natural waterway processes (stream dynamics). It is for these reasons that alternative waterway mapping is proposed.

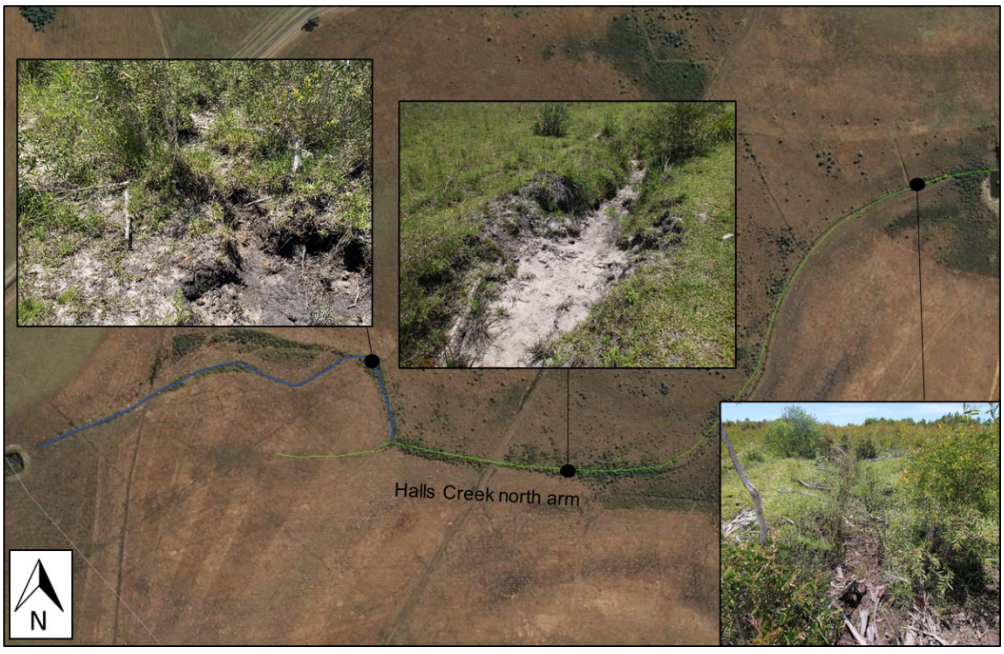


Figure 4. Dry channel 2 weeks after significant rainfall. Identified overland flow path (blue line)

3.2.3 Halls Creek south arm

Both the unmapped and mapped sections of the Halls Creek south arm were investigated. Site 6 was established in the unmapped lower reach of the south arm. This site had constructed bed and bank features with a wetted width of 6m and the top of bank was 10.5m wide (Table 3). Site 6 had ponded water with a mean water depth of 700mm and a maximum depth of 1.2m. The site had both emergent and submergent vegetation and was likely to hold permanent water. Other habitats included occasional exposed root masses and undercut banks however there was an absence of woody debris. No typical waterway features associated with stream dynamics such as adequacy of flow were present (e.g., pools, riffles or runs).

It is unlikely that a waterway channel existed in the unmapped section prior to the construction of the existing channel. The existing constructed channel is currently providing connectivity and fish passage to the habitats found upstream. This connectivity is likely to be greater than would have naturally occurred increasing fish access to the upper catchment.

Site 7 was established in the mapped amber reach of the south arm below an informal waterway crossing. The waterway crossing included a 1 x 800mm diameter pipe culvert set slightly above the existing bed level. There was a small amount of flow through the culvert at the time of sampling.

The channel at site 7 had a wetted width of 3.2m and channel banks 8.2m wide. This site consisted of ponded water (6m long) with a maximum water depth of 600mm (mean water depth of 300mm) (Table 3). Instream habitats included occasional undercut banks, exposed root mass and abundant emergent vegetation.

Three sites (10, 11 and 12) were established in the upper reach of Halls Creek south arm to document any physical and hydrological waterway attributes present. The lower section of this reach (site 10) was dry, degraded and contained poor habitat features. Habitat improved further upstream within site 11 where shallow pools and runs were present. The shallow pools within site 11 that had a mean depth of 200mm (maximum depth of 400mm) and wetted width of 3.5m wide (channel banks 5.5m wide).

The upper areas of this mapped green waterway (approximately 500m) had poorly defined bed and banks, was degraded and and was either dry or would dry soon after significant rainfall. It is for these reasons that alternative waterway mapping is proposed.

3.2.4 Tributary of Halls Creek south arm

Two sites, sites 8 and 9, were established to describe the physical and hydrological characteristics of the mapped green tributary of the Halls Creek south arm. The entire middle channel was traversed to identify potential habitat. Most of this channel was dry and only the lower section (site 8) contained fish habitat. The lower section of this channel held shallow water with a mean depth of 150mm and a maximum depth 400mm at the time of sampling. In this lower section the wetted width was 3.2m wide with channel banks 4.2m wide (Table 3).

The bed and banks features of this channel were likely to have been constructed. There was abundant emergent vegetation within the channel.

Most of this channel would not retain any water and the lower section would be highly ephemeral. Above site 8 a vehicle access track incorporating a pipe culvert would limit upstream connectivity. The upper areas of this mapped green waterway (approximately 500m) had poorly defined bed and banks, was degraded and and was either dry or would dry soon after significant rainfall. It is for these reasons that alternative waterway mapping is proposed.

3.2.5 Coochin Creek catchment

The upper reaches of a mapped waterway within the Coochin Creek catchment, exits the site on the eastern boundary before flowing into forestry land downstream (Figure 3). A walkover of this mapped green waterway after rainfall, found that it was very shallow (mean depth of 35mm) and contained a small amount of flow. The bed and banks of the existing channel had been constructed with historical spoil mounds evident. The channel is relatively uniform and had been etched into a clay bed (upstream wetted width was 20cm with a downstream wetted width of 2.2m). The channel bed is flat and does not allow for the concentration of flows and pools have not formed over time. The maximum water depth was 70mm and the mean water depth was 35mm. Bank collapse had occurred due to water seepage and stock access and not instream flows as per natural waterway processes.

The habitat features were limited to emergent vegetation occasionally occurring within the downstream section.

3.2.6 Drains

Bells Creek catchment

Two sites were established on the constructed channel that drains north to Bells Creek to document any waterway features present. The upstream site (site 14) had standing water within the channel with a mean depth of 600mm and a maximum depth of 800mm (Table 4). The channel in this location had a wetted width of 4m and had a 6m top of bank width (Appendix B). It appeared that the upper portion of the drain had semi-permanent water and flows from the north arm of Halls Creek upper catchment are possibly diverted to this drain in certain flow conditions. This however could not be verified at the time of sampling.

Site 15 is located immediately above the drain's confluence with Bells Creek upstream of the vehicle crossing. This site was dry at the time of sampling and showed no evidence of recent flows connecting to Bells Creek. The bed of the drain measured 4.5m wide and high channel banks measured 10 m wide (Table 4). The drain including the bed was vegetated with terrestrial vegetation. The vehicle crossing included 2 x 800mm diameter pipe culverts that would allow for connectivity during times of flow.

Halls Creek catchment

Multiple drains had been constructed in the southern portion of the site directing runoff to Halls Creek. Each drain was investigated to document the presence of any waterway features. It was found that the drains were not continuous and did not extend into the Halls Creek wetland.

The upper reaches of the drains directed flows towards the wetland, but the drains terminated before entering the Halls Creek wetland (Appendix B – site 18). The drains were predominantly dry. There was shallow standing water in the lower section of the drain at sites 18 and 19 with a maximum depth of 20cm (Table 4). No waterway features were found in the drains.

The area downstream of the drains within the wetland area was investigated for connectivity. There was a remnant channel below site 19 that contained habitat features and was holding water of reasonable depth (max depth 60cm). The channel in the wetland had a low flow channel 2.5m wide and a high bank approximately 6.5m. It is important to note that the channel was discontinuous and did not connect to the main channel of Halls Creek or to the upstream drainage channel. Whilst this channel is likely to be ephemeral it would be inundated regularly.

Coochin Creek catchment

There were two drains located in the southern portion of the site within the Coochin Creek catchment. A walk over of both drains was completed to identify any waterway features. Both drains did not continue beyond the property and ceased within farm dams. The bottom section of site 21 had standing water due to the dam. No drains, channels or flow paths existed downstream of the property that could be seen.

Site 20 had a 2.5m wide bed with 3.5m wide high banks and site 21 had a bed with of 1.2m with a bank width of 1.5m (Table 4). Both channels contained emergent vegetation with limited fringing vegetation along the banks. Site 21 also contained woody debris and exposed root mass along the constructed banks.

Table 4. Physical and hydrological attributes of the drains. Habitat features described as abundant (A) (>90%), frequent (F) (50 – 90%), occasional (O) (10 – 50%), rare (R) (< 10%).

	Bells Creek drains		Halls Creek drains					Coochin Creek drains	
Site Characteristics	14	15	16	17	18	19a	19b	20	21
Waterway type (DAF risk rating)	**Drain**	**Drain**	**Drain**	**Drain**	**Drain**	**Drain – upper section**	**Drain – wetland section**	**Drain**	**Drain**
Hydrology / bed	Constructed features. Ponded water.	Constructed features.	Constructed features.	Constructed features.	Constructed features. Predominantly dry. Ponding in lower 30m.	Constructed features.	Constructed features within wetland	Constructed drain and farm dam. Below farm dam no defined bed or banks.	Constructed drain and farm dam. Below farm dam no defined bed or banks.
Permanency of habitat	Semi-permanent	Dry	Dry	Dry	Dry	Ephemeral	Ephemeral	Dry	Ephemeral
Mean water depth (cm)	60	-	-	-	10	20	20	-	40
Max water depth (cm)	80	-	-	-	15	25	60	-	50
Wetted width (m)	-	-	0.8	1.2	2.2	1.8	2.5	0.6	1.2
Top of bank width (m)	6	10	4.5	-	2.5	2.5	6.5	3.5	1.5
Native riparian canopy	5m wide Scattered pine trees, melaleuca, wattles. Gahnia.	Pines along drain. Scattered melaleuca and eucalypt trees	~2m wide Scattered melaleuca, pine and eucalypts.	~2m wide Scattered melaleuca, pine and eucalypts. Gahnia.	~3.5m wide Scattered melaleuca, pine and eucalypts. Gahnia, juncus spp.	5m wide Scattered melaleuca, pine and eucalypts. Gahnia, juncus spp.	>50m wide Established melaleuca wetland	~2m wide Scattered melaleuca, pine and eucalypts. Bracken fern.	2m wide Scattered melaleuca, pine and eucalypts.
Habitat features	Emergent macrophytes (F), Submergent macrophytes (A), exposed root mass (F), woody debris (O).	Emergent macrophytes (F), Culvert crossing (2/ 100mm Ø). Draining to Bells Creek	Emergent macrophytes (A) Drains to Halls Creek flood plain - constructed channel extending into floodplain	Drains to Halls Creek flood plain - constructed channel does not extend into floodplain	Emergent macrophytes (O) Standing water in bottom reach of drain (~30m long).	Connectivity through channel impeded from clearing activities (bank collapse, large root masses in channel)	Constructed channel does not extend to Halls Creek. Limited connectivity.	Emergent macrophytes (O)	Emergent macrophytes (O), undercut banks (R), root mass (O), small woody debris (O). Water retained in bottom reach of drain due to dam.

3.3 Fisheries values

3.3.1 Lower Halls Creek

Lower Halls Creek is a DAF mapped green waterway that traverses the site from north to south and continues into Bribie Island National Park south of the site (Figure 2). Within this reach there was a defined deep channel that contains permanent water and fish habitat. Many of the fish habitats in this reach were more typical of a melaleuca wetland, with no high flow banks next to the waterway channel. Instead, there was an inundated area over 100m wide that extended through the melaleuca forest. At the time of the survey there were substantial areas of off-stream fish habitats were present in these areas.

Below site 1 on Halls Creek the relatively small diameter pipe culvert on the road crossing contained relatively low volumes of water flow, despite recent rainfall and a largely inundated floodplain. It is assumed that this lower portion of the site has a very low gradient that was restricting these flows from exiting.

Fish abundance and diversity was considerably higher within lower Halls Creek than all other sites surveyed within the study area (Table 1: Figure 5). This is likely due to the permanency and condition of habitats. In contrast many of the habitats within the upstream tributaries of Halls Creek were marginal and historical and current land uses have degraded and altered habitats.

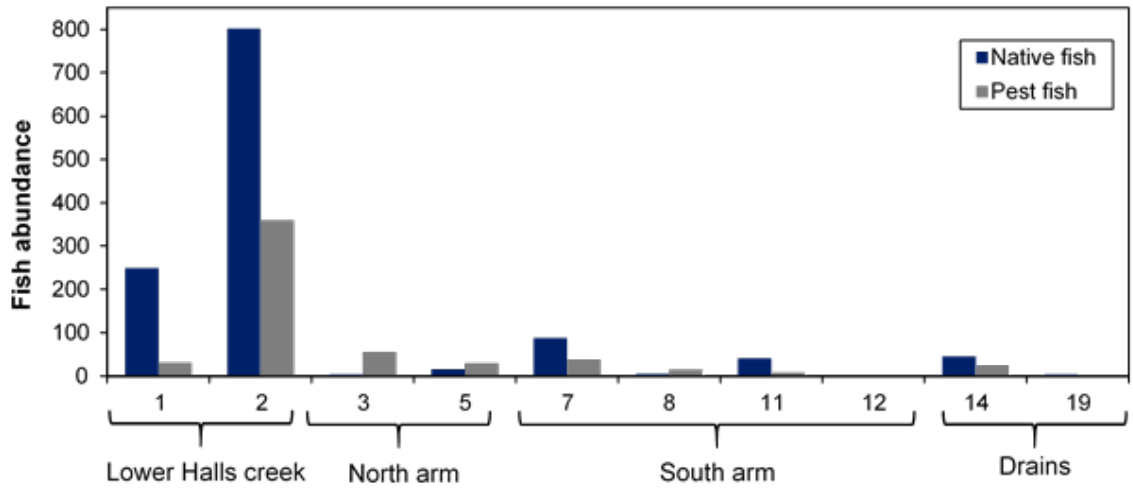


Figure 5. Native and pest fish abundance within the study sites.

The adequacy of connectivity and inflows from the north arm into the lower reaches of Halls Creek is questionable. This is due to the construction of the drain to Bells Creek that diverting flows from the north arm (discussed in section 3.1.2 and 3.1.8). This flow path is shown in Appendix C however the extent of connectivity was unable to be verified at the time of sampling. Due to the fish diversity found in the lower Halls Creek reach the risk rating for fish passage is higher than the mapping indicates.

3.3.2 Halls Creek north arm

During the initial site visit (after significant rainfall) the lower section and the upper section of this arm contained small shallow pools, while the middle section was dry (Table 2). During a second site visit two weeks later, the areas surveyed for fish within the upper portion of this arm were dry (site 5). This highlights the highly ephemeral nature of this mapped waterway and compromises the fisheries values of this upper reach.

The fish communities within the north arm of Halls Creek consisted of two fish species, including firetail gudgeons and a pest fish species (Mosquitofish). Within this arm pest fish dominated the fish catch, with mosquitofish accounting for 81% of all fish captured. Freshwater crayfish were abundant within the two sites surveyed (Table 1). A single swamp crayfish was captured within site 3, with good habitat for this species occurring in site 3 (wallum and melaleuca forest re-growth).

Firetail gudgeons have broad habitat requirements and have been found in both lentic and lotic habitats (Pursey *et. al.* 2004). Notably this species favours floodplain habitats including wetlands and billabongs preferring shallow low velocity habitats. Mass migrations of juvenile and sub-adult fish have been observed suggesting that upstream dispersal movements occur in favourable flow conditions. This was observed within this study with this species being found in most survey sites and observed readily colonising previously dry habitats.

A review of aerial imagery indicates that the northern portion of the study area has undergone significant modification. The entire north arm channel was constructed to facilitate drainage of the upper portion of the site and spoil is apparent adjacent to the channel in the 1977 aerial photo (Appendix A). It appears that the drain to Bells Creek was constructed in approximately 1977, to facilitate drainage of the Halls Creek north arm indicating that this area of the site was not draining (or not draining adequately for the intended land use) to Halls Creek, despite channels previously being cut to Halls Creek (Appendix A).

This reach does provide habitat although it is extremely limited habitat due to a small upstream catchment providing a reduced inadequate period of flow. With consideration of the long-term rainfall data, it is likely that during an average wet season (November – May) the upper reach (site 5) would provide intermittent but very limited fish habitat. However, the fish that colonise this area are likely to perish when the creek dries up. Generally, the fish habitat values of site 3 were in much better condition compared to much of the upstream reaches that have been cleared and degraded from stock access currently providing very little fish habitat value.

3.3.3 Halls Creek south arm

Fish sampling was undertaken in three sites within the south arm of the upper Halls Creek catchment. During the initial site visit the lower section of this waterway (site 7) contained good fish habitat and a relatively diverse fish community, that included five native fish species, two pest species and two species of freshwater crayfish, including three swamp crayfish. The

permanent nature of this lower portion of this mapped waterway supported much more diverse and abundant fish communities than further upstream (Table 1).

Fish survey results found that the upper section of this arm (site 12) contained no fish but did have freshwater crayfish. While the middle reaches of this arm (site 11) contained firetail gudgeons, mosquito fish and orange fingered crayfish. During the initial survey after rainfall parts of the upper south arm retained shallow sections of water (site 12). However, two weeks later the entire reach was dry. This observation indicates that much of the upper portion of this south arm is highly ephemeral and lacks adequacy of flow (Figure 6).

An area 350m above site 11 was found to be the upper limit of the waterway. Site 11 is considered a waterway despite the inadequacy of flows due to proximity to semi-permanent habitats (site 6) and the formation of natural waterway features (formed bed and banks and mesohabitat features such as pools and runs).



Figure 6. Ephemeral pool within the southern arm of Halls Creek (site 11).

3.3.4 Tributary of Halls Creek south arm

A single site was surveyed for fish within the lower reaches of this green mapped waterway (site 8). The lower portion of this site (50m) contained fish including small numbers of firetail gudgeons, a single glassfish, mosquitofish and orange fingered yabbies (Table 1). At the time of the fish survey only the bottom section of this mapped waterway had any water present, with the upper section (site 9) being dry. Consistent with the habitat features found, site 8 is considered the upper limit of this mapped waterway.

3.3.5 Coochin Creek catchment

The majority of upper and middle areas of this mapped waterway did not contain any viable fish habitat. There was insufficient habitat to undertake backpack electrofishing, although small numbers of firetail gudgeons and mosquitofish (pest fish) were captured with the dip net in the lower reaches of the channel. The majority of this drainage channel was highly degraded, with eroded banks, head cutting and a cleared riparian zone.

Despite fish being found in this channel there were no natural waterway features or attributes that were forming or had been formed. Water would not be retained in this channel and flow would likely cease immediately following rainfall.

3.3.6 Drains

During this project all drains that were present within the site were visited to assess habitat features and fisheries values. Of the six drain systems that were visited only two sites were surveyed for fish, this included sites 14 and 19. The majority of the drain systems were either dry or contained inadequate habitat to warrant fish sampling.

A site was surveyed within the southern end of drain system that flows into Bells Creek to the north of the site (site 14). This drain held water at the southern end and was dry at the northern end, where it discharges to Bells Creek. Fish community in this drain included firetail and striped gudgeons, mosquitofish (pest fish) and orange fingered crayfish (Table 1).

A site was surveyed within one of the drains that flow into the lower section of Halls Creek (site 19). Fish community in this drain included small numbers of firetail gudgeons and 22 orange fingered crayfish (Table 1). The habitat features of the lower portion of this drain within the paperbark forest were good.

No waterway features were found in any constructed drains on site other than remnant channels within the Halls Creek melaleuca wetland system. The drain to Bells Creek is not a waterway although there does appear to be some artificial connectivity to the Halls Creek north arm.

3.4 Waterway determination

The site contains four DAF mapped green ‘low risk’ waterways and single amber ‘moderate risk’ waterway. The site also appears to contain additional channels throughout the site that historical aerial imagery suggests are constructed drains (Figure 2).

A waterway investigation undertaken within the study area found the following:

- The mapped green waterway known as Halls Creek has waterway features and provides fish habitat. The upper limits of the three Halls Creek tributaries are not as extensive as currently mapped.

- The fish assemblage in the lower reach of Halls Creek indicates that this waterway has a higher risk rating for fish passage than is currently indicated by the DAF waterway mapping. This investigation found the fish passage risk rating of the mapped waterway is moderate risk (amber).

- The mapped green waterway that is within the Coochin Creek catchment is not a waterway as it did not contain adequate flows. A maximum water depth of 7cm was recorded despite above average rainfall in the weeks prior to sampling. This mapped waterway would cease within days following rainfall.

- None of the constructed drains were waterways and had not formed natural waterway features.

4.0 Conclusion

A detailed investigation of the Aura South site included 21 sites within all mapped and un-mapped waterways.

This investigation found that, for the purposes of the *Fisheries Act 1994,* Halls Creek was a waterway providing for fish passage although the upper limits were not as extensive as currently mapped.

Appendix C of this report presents alternative waterway mapping consistent the results of this investigation and the DAF fact sheet *What is a waterway?* (DAF, 2020) and presents a risk rating consistent with that set out in O'Brien *et. al*., 2016 and DAFF, 2013.

All other channels and drains investigated within the study area are not waterways providing fish passage.

5.0 References

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6.0 Appendix

Appendix A – Aerial Imagery (Queensland Globe)

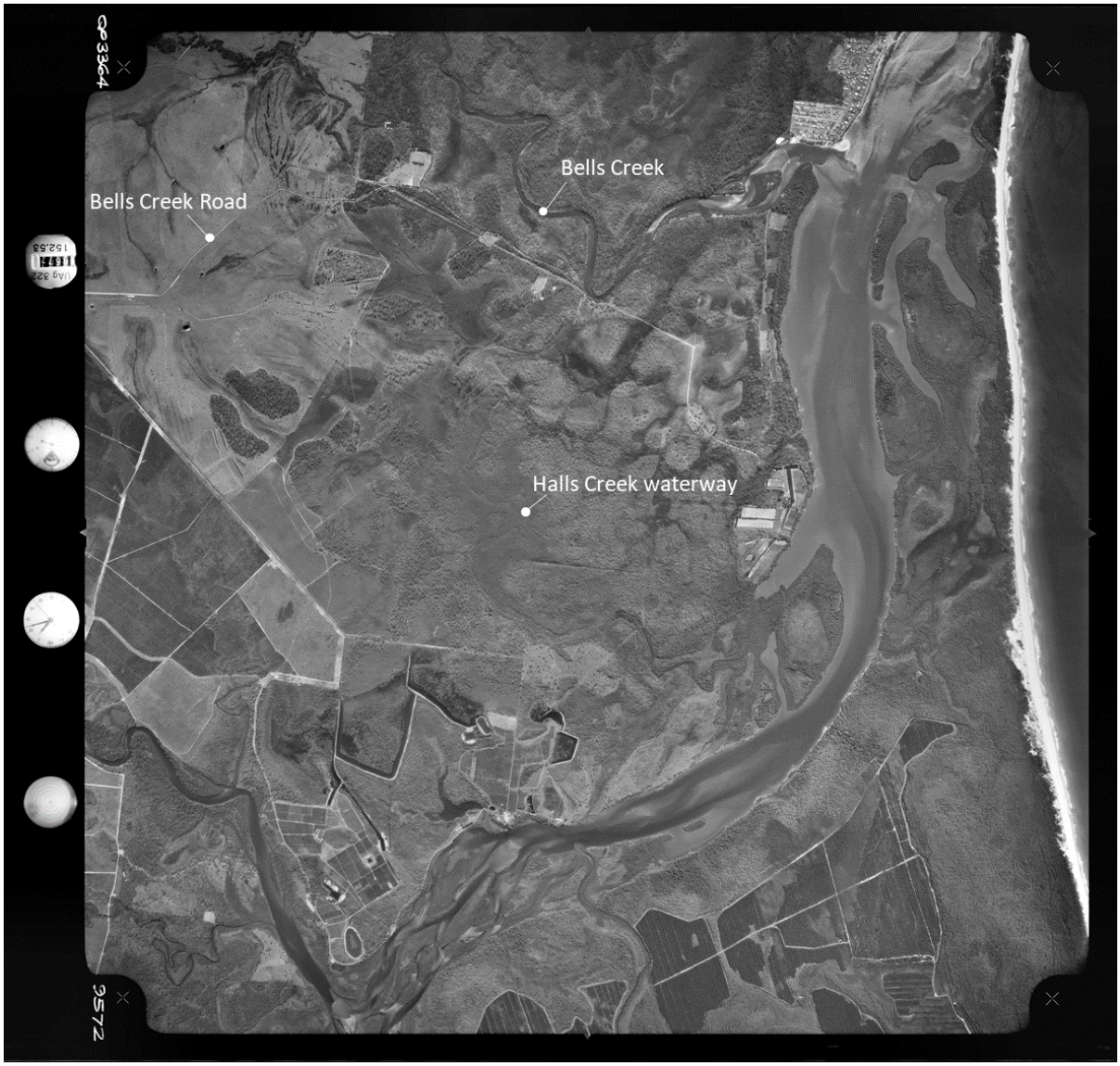
1958 – vegetated



1967 – works in surround area



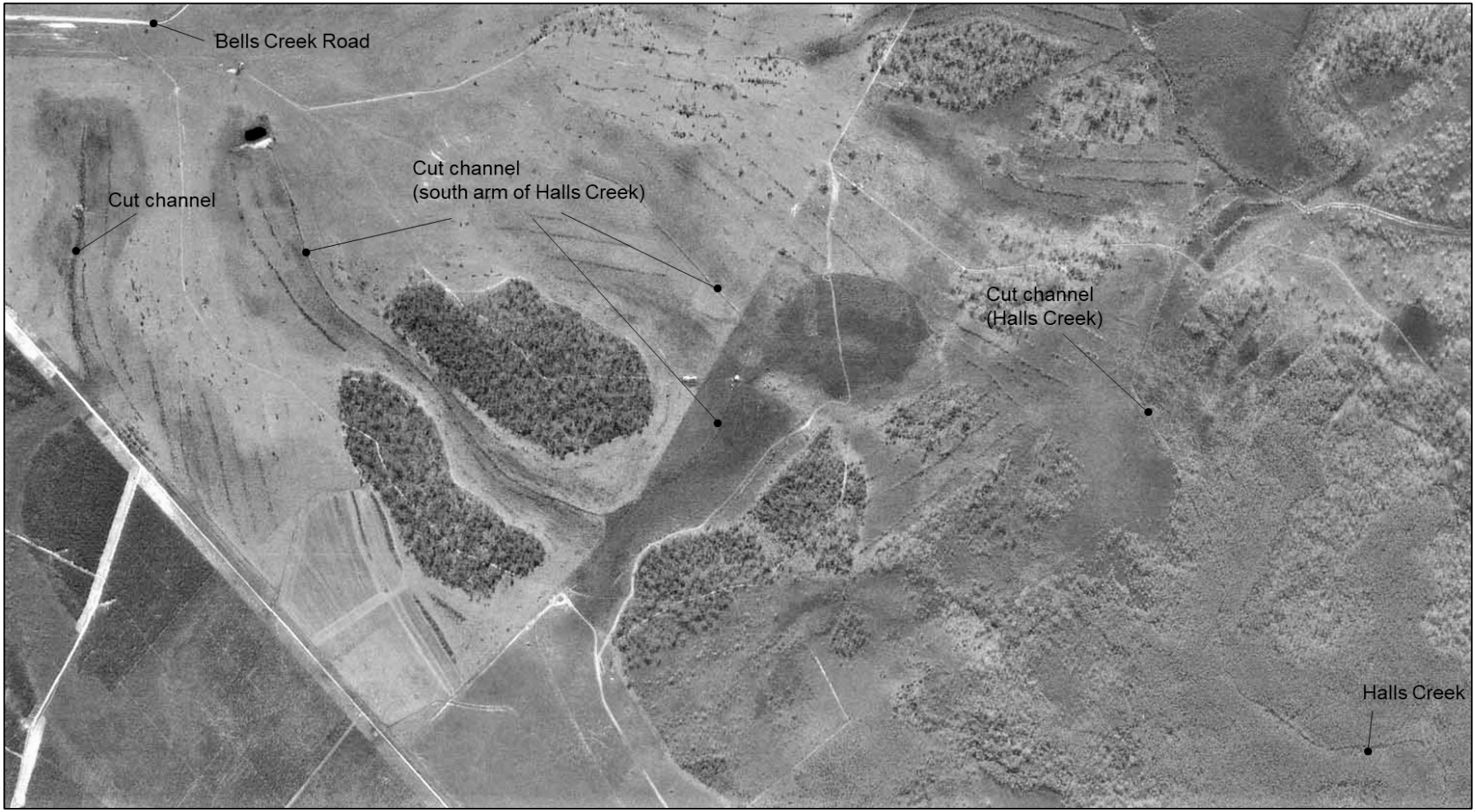
1977 – clearing and works in upper portion of site


Bells Creek Road
Bells Creek
Halls Creek waterway

Excerpt of 1977 aerial imagery showing cut channels (Queensland Globe 2021)



Excerpt of 1977 aerial imagery showing cut channels (Queensland Globe 2021)



1995 – established forestry in upper portion of site



1995 – established forestry in upper portion of site, melaleuca vegetation adjoining Halls Creek



Appendix B – Site photos within subject site



Site 1 – Lower section of Halls Creek looking upstream.



Site 2 – Deep pool habitat within the main channel of Halls Creek.



Site 3 – Pool habitat within the northern green mapped waterway.



Site 4 – Dry section the northern green mapped waterway.



Site 5 – Small pool within northern green mapped waterway. Habitat in poor condition.



Site 6 – Lower reaches of the southern arm (unmapped) with emergent and submergent instream vegetation.



Site 7 – Emergent aquatic vegetation (frogsmouth) within site 7. Constructed bank features.



Site 7 – Ponded water and emergent vegetation.



Site 8 – Lower section of green mapped tributary with constructed bed and bank features, looking downstream.



Site 9 – Upper section of the green mapped tributary was dry after significant rainfall with no defined bed or bank or fish habitat features.



Site 10 – Degraded section of southern arm looking upstream. Channel with bed , no banks.



Site 11 – Degraded section of Halls Creek south arm showing eroded banks and bed



Site 11 – Ephemeral pool habitat within southern arm (upper Halls Creek catchment).



Site 12 – Ponded water within upper section of Halls Creek south arm.



Site 13 – Mapped green waterway in Coochin Creek catchment.



Site 14 – Upper Bells Creek drain



Site 15 – Lower Bells Creek drain immediately above road crossing.



Site 15 – Bells Creek drain road crossing.



Site 16 – Southern most drain within Halls Creek catchment.



Site 17 – Drain within Halls Creek catchment.



Site 18 – Drain within Halls Creek catchment - lower section. Showing termination of drain.



Site 18 – Drain in Halls Creek catchment – upper section.



Site 19 – Drain in Halls Creek floodplain / wetland.



Site 20 – Drain in Coochin Creek catchment. Showing discontinuous drain.

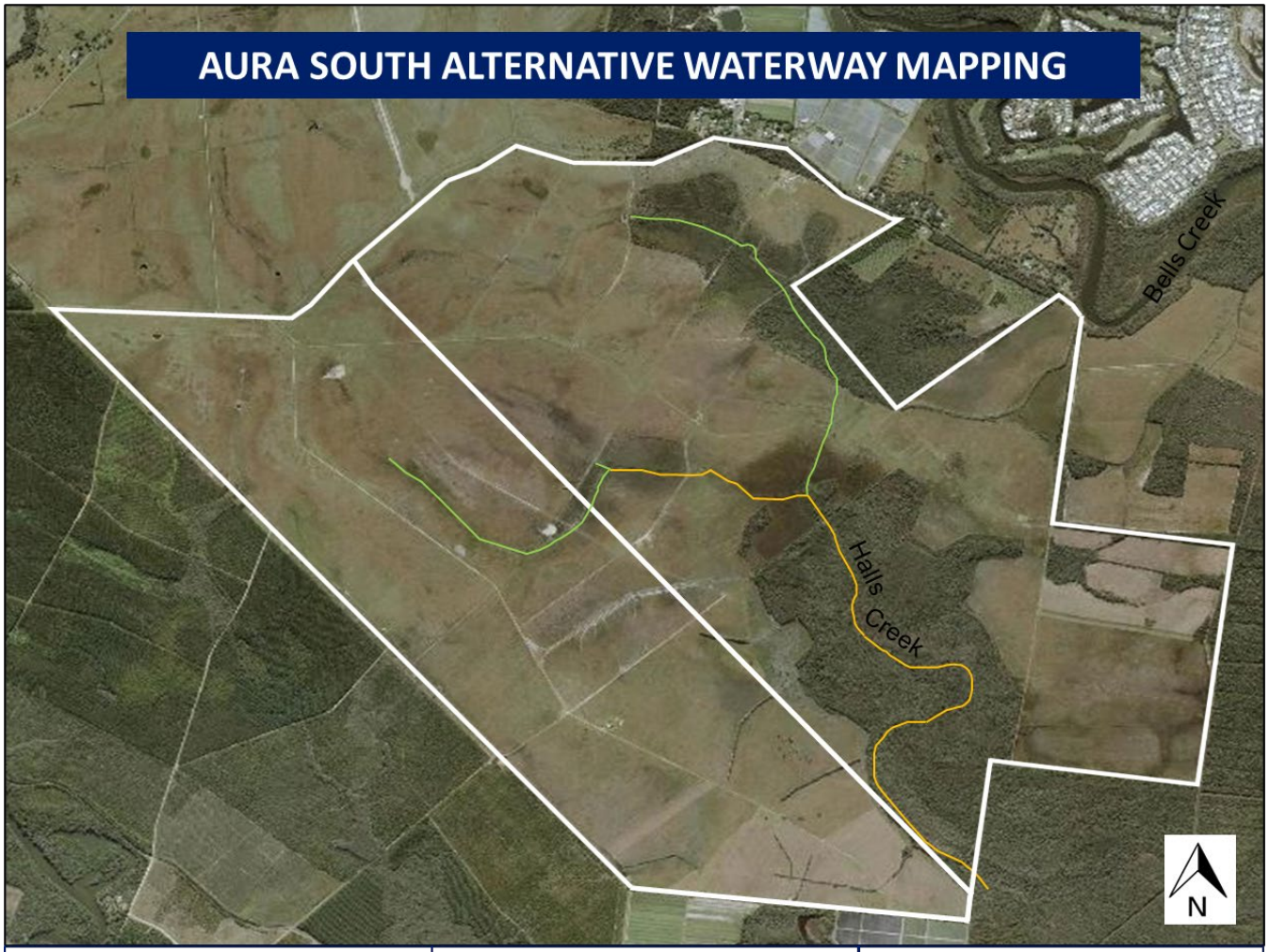


Site 21- Drain in Coochin Creek catchment.



Site 21 – Farm dam backing water up into the lower section of the drain (Coochin Creek catchment). No flow paths or channels downstream of dam.

Appendix C – Alternative waterway mapping



Attachment 2 – Waterway determination (prelodgement advice)

Queensland Government

SARA reference: 2106-23283 SPL

15 July 2021

Stockland Development Pty Ltd (Mr Mark Stephens)
16 Hodgens Street
CALOUNDRA QLD 4551
fishologyconsulting@gmail.com

Attention: Nicole McKirdy

Dear Ms Nicole McKirdy

SARA Pre-lodgement advice - Bells Creek Road, Coochin Creek

I refer to your pre-lodgement request received on 28 June 2021 in which you sought pre-lodgement advice from the State Assessment and Referral Agency (SARA) regarding the proposed development at the above address. This notice provides advice on aspects of the proposal that are of relevance to SARA.

SARA's understanding of the project

SARA understands the applicant seeks a waterway determination to confirm the extent of waterways within lots 1 and 2 on RP910848 in line with the definition provided by the *Fisheries Act 1994*.

Supporting information

The advice in this letter is based on the following documentation that was submitted with the pre-lodgement request.

Drawing/report title	Prepared by	Date
Cover letter - Aura South	Fishology Consulting	28 June 2021
Waterway investigation within Halls Creek catchment, Aura South – Final Report	Fishology Consulting	3 March 2021

Pre-lodgement advice

South East Queensland (North) regional office
Mike Ahern Building, Level 3, 12 First Avenue, Maroochydore
PO Box 1129, Maroochydore QLD 4558

The following advice outlines the aspects of the proposal that are of relevance to SARA.

Key matters and action items	
1.	The current mapping for Queensland waterways for waterway barrier works shows the site contains four mapped green waterways and a single section of an amber waterway. SARA and the Department of Agriculture and Fisheries (DAF) have reviewed the waterway investigation report and provide the following as a response. The provided material indicates that on ground waterway and fish sampling surveys were undertaken after an above-average rainfall event and again after a two-week period without rain. Based on the physical and hydrological characteristics outlined in DAF Fact Sheet What is a waterway? and the presence or absence of fish at selected sites (Figure 2), the surveys found: • lower reach of Halls Creek has a higher classification for fish passage than is currently indicated by the DAF waterway mapping • the mapped green waterway within the Coochin Creek catchment (site 13) is not a waterway as it did not contain adequate flows to sustain ecological processes • none of the constructed drains are waterways and have not formed natural waterway features. These drains are cut into wetland habitat which is connected to Halls and Bell creeks through flooding. The drains can provide habitat (as noted in the report) but exhibit poor connectivity, flow inadequacy, and lack defined bed and banks formed by natural flows and the local topography • Halls Creek is a waterway providing for fish passage although the upper limits are not as extensive as currently mapped.
2.	The provided waterway investigation report recommends the mapping layer be updated to better represent the on-ground status and extent of the waterways. Specifically, and with reference to Figure 2: • the section of Halls Creek from Site 1 to Site 7 should be mapped amber. The section form site 7 to site 8 to remain amber • the green waterway that includes Site 13 should not be mapped as a waterway for fish passage • constructed drains that include sites 14 to 21 should not be considered waterways, and • the upper reaches of Halls Creek upstream of Site 4 and Site 8 should not be mapped as waterways for fish passage. Based on a desktop assessment and a review of the survey methodology and findings, the waterway determinations, as proposed, have been adopted in line with the above and Appendix C – Alternative waterway mapping. An amendment to the Queensland waterways for waterway barrier works spatial data layer will be considered in any future updates to reflect this determination.
Lodgement material	
4.	No onsite development is currently proposed. If works are proposed it is recommended the applicant seek further pre-lodgement advice prior to submitting a development application. A copy of the waterway determination report and this advice should be included in any future accepted development notification or assessable development application over Lots 1 and 2 RP910848.

This advice outlines aspects of the proposed development that are relevant from the jurisdiction of SARA. This advice is provided in good faith and is:

- based on the material and information provided to SARA
- current at the time of issue
- not applicable if the proposal is changed from that which formed the basis of this advice.

This advice does not constitute an approval or an endorsement that SARA supports the development proposal. Additional information may be required to allow SARA to properly assess the development proposal when a formal application has been lodged.

If you require further information please contact Jarrod Clarke, Planning Officer, on (07) 3452 7649 or via email SEQNorthSARA@dsdilgp.qld.gov.au who will be pleased to assist.

Yours sincerely



Paul Gleeson
Principal Planning Officer

Development details	
Proposal:	Watercourse determination
Street address:	Bells Creek Road, Coochin Creek
Real property description:	Lots 1 and 2 on RP910848
SARA role:	Referral agency
Assessment Manager:	Sunshine Coast Regional Council
Existing use:	Agriculture

Appendix D Prelodgment Advice (SARA)

Queensland Government

SARA reference: 2106-23283 SPL

15 July 2021

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CALOUNDRA QLD 4551
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Paul Gleeson
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Street address:	Bells Creek Road, Coochin Creek
Real property description:	Lots 1 and 2 on RP910848
SARA role:	Referral agency
Assessment Manager:	Sunshine Coast Regional Council
Existing use:	Agriculture

Appendix E

Field Assessments

Quaternary 1			
Mapped Vegetation Description	Non remnant	**Ground-truthed Vegetation Description**	Non remnant grassland
Stratum T1	**Ecologically Dominant Layer (EDL) –** Whiskey grass		
Height (m)	1.5 m	**Cover (%)**	99
Species Present	Whiskey grass, South African pigeon grass, Rhodes chloris, giant rat's tail grass, kangaroo grass*, Verbena rigida*		
Comments	Heavily degraded exotic pasture, no habitat features, heard Wallum froglet calling in the distance		

Quaternary 2			
Mapped Vegetation Description	Non remnant	**Ground-truthed Vegetation Description**	Non remnant 12.3.13
Stratum TI	**EDL –** mixed assortment of Sedges, rushes and low shrubs		
Height (m)	10m	**Cover (%)**	30
Species Present	This community is dominated by an assortment of sedges and rushes such as *Cyperus* spp., *Fimbristylis* spp., *Schoenus* spp., *Chorizandra sphaerocephala*, Juncus usitatus and many others. Small shrubs common in Wallum communities such as blue tongue (*Melastoma malabathricum subsp. Malabathricum*), *Baeckea frutescens*, *Sprengelia sprengelioides*, *Eriocaulon australe*, *Woollsia pungens*, *Allocasuarina littoralis*, *Melaleuca thymifolia*, *Ludwigia octovalvis* and *Hakea actites* are also present. Generally, plant diversity is high, typical of Wallum communities.		
Comments	Regularly slashed and grazed, historic use for pine plantation. Some frog habitat present, Wallum froglet heard calling		

Appendix F Water Management Technical Memorandum

MEMORANDUM

To Mark Stephens

From Tony McAlister

Date 15 July 2025

Subject Aura South - Water Management Technical Memo

Our ref 25020397_M01v01 - Aura South Water Tech Memo

1 INTRODUCTION

This memorandum firstly introduces the flood, water quantity and water quality modelling activities conducted in preparing the Aura South Public Environment Report (PER) and then describes the management actions derived using these models as being required to enable the development to proceed with no adverse impacts.

Modelling activities are described in a broad, as opposed to detailed, manner (noting that more detailed descriptions are provided in the PER). Management actions are also described in an overarching manner, rather than in detail, as specific aspects of each action will require further assessment and refinement as project design advances.

Site topography is illustrated in Figure 1. Salient site drainage and water related attributes are as follows:

- Nearly the whole of the site drains to the wetland on the south eastern site boundary, which is a part of the Halls Creek system. Overflows from the wetland subsequently enter Pumicestone Passage some 3.5km downstream of the site boundary;
- The south western portion of the site drains via waterways and overland flow to Coochin Creek, which also subsequently enters Pumicestone Passage; and
- Site gradients are low with, as shown in Figure 1, a maximum elevation fall of the order of 20m from the top of the site to the tidal Halls Creek downstream of the site boundary.



Figure 1 Site Topography

2 MODELLING SOFTWARE AND ASSOCIATED CONSIDERATIONS

In performing the flood, water quantity and water quality investigations which informed the design and impact assessments for Aura South, several widely used modelling tools/packages were applied. Descriptions of these models and a summary of key assumptions made in their development and application are provided below.

2.1 Flooding

Flood evaluations and impact assessments were conducted using a bespoke TUFLOW HPC model of Aura South and surrounding areas (Figure 2). This model was constructed for this project based on data provided by Sunshine Coast Council (SCC). These data were extracted from a broader, regional model previously developed for SCC and included the following:

- Boundary conditions (water level and inflow timeseries);
- Material types within the model domain addressing issues such as roughness and infiltration rates; and
- Historical event and design event results within the area of interest for calibration purposes.

The model constructed by Water Technology used the data provided by Council, supplemented by more up-to-date bathymetric data in Pumicestone Passage collected for this project. Calibration comprised comparison of predicted peak water levels within the Water Technology model domain with comparable data provided by SCC.

Impact assessments were conducted using this model. Key assumptions made in these assessments were as follows:

- Bulk earthworks were simulated in the model using the most up-to-date site layout data;
- Major structures (where such details were available) were incorporated within the model, for example, major road embankments, weir structures, et cetera; and
- No ‘fine scale’ details of water management infrastructure (e.g., bioretention systems, Greenheart Lake stormwater retention, smaller culverts et cetera) were included within the flood model.

Impact assessments included all floods simulated by SCC, and additional cases assessing the expected impacts of sea level rise and climate change induced increases in rainfall intensity.

Key assumptions made in developing the model and undertaking relevant assessments were as follows:

- Simulations were conducted using existing and ultimate site configurations only. It was assumed that impact management infrastructure would be progressively implemented as the project proceeds ensuring no impacts at such times;
- Hydrological boundaries (inflow hydrographs and downstream water levels) extracted from the regional TUFLOW-FV model and provided by SCC are suitably representative of peak regional flood behaviour;
- Landform changes associated with the development do not extend into the green network precinct in the east of the site. That is, there will be no changes to landform within the wetland and no changes to the existing roads/tracks or any associated structures (culverts etc) around the eastern site perimeter;
- The Greenheart lake does not provide any significant flood storage capacity for regional floodwaters below the PMF (in which downstream flood levels exceed the proposed outlet weir level and spread across the lake); and

- Changes to site runoff (timing, runoff volume etc.) associated with increased impervious area within the development will be addressed at the detailed design stage.

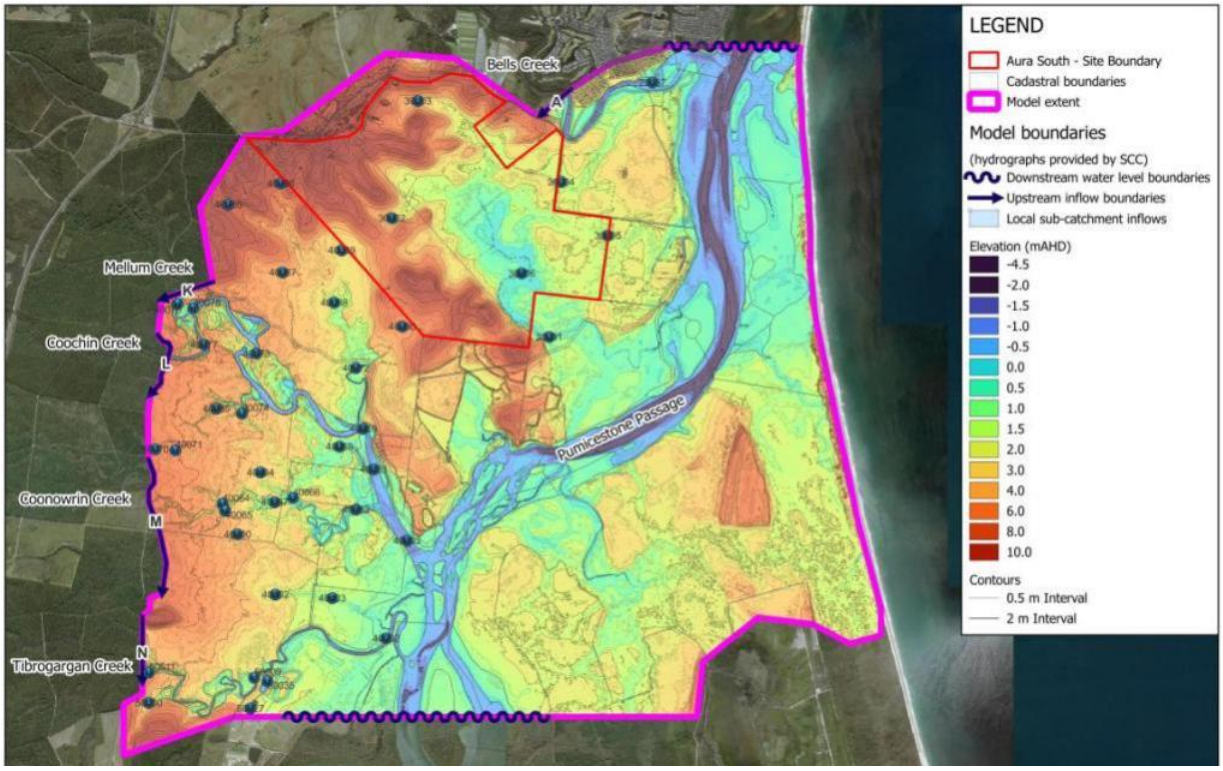


Figure 2 Flood Model Extent

2.2 Water Quantity

Water quantity evaluations and impact assessments were conducted using a bespoke TUFLOW HPC Direct Rainfall model (Figure 3), incorporating recent enhancements to the software which enable the simulation of combined surface and shallow groundwater processes. The focus of this model was on overall site, year-to-year, surface and shallow groundwater processes, as opposed to the flood model which was more event-based and only simulated surface water processes.

This model was specifically constructed, calibrated and validated for the purposes of understanding the relationship between the catchment of Aura South and the surface water and shallow groundwater dynamics of the large central wetland, being a Federally listed Threatened Ecological Community (TEC) wetland community, and other sensitive receptors of a similar nature, located within the site. The model was informed by and calibrated to a wide range of data collected within the site over an 18-month period, as follows:

- A network of conductivity/temperature/depth (CTD) loggers located within the TEC for which surface water data were collected;
- A network of shallow groundwater bores located around the site and within the TEC within which water level loggers were located and from which water samples were regularly collected for water quality constituent analysis;
- Surface water quality sampling and analysis within the TEC and in upstream and downstream waterways;
- Gauges collecting flow data in Halls Creek upstream and downstream of the TEC; and
- Local rainfall data.



Figure 3 Water Quantity Model Extent

The model was built, calibrated to collected data and used to conduct a range of impact and mitigation option configuration scenario assessments. These assessments were used to inform assessments of the performance of mitigation measures (e.g., rainwater tanks, lined and unlined bioretention systems, lake storage and reuse, etc) tested to ensure site development can occur with no adverse impact on the TEC or other sensitive areas or issues. Importantly, the results of these assessments then informed a range of impact metrics (e.g., frequency, duration and depth of inundation, etc) developed by project ecologists for the PER.

Key assumptions made in developing the model and undertaking relevant simulations were as follows:

- Simulations were conducted using existing and ultimate site configurations only. It was assumed that impact management infrastructure would be progressively implemented as the project proceeds ensuring no impacts at such times; and
- A three-layer shallow groundwater schematisation (Figure 4) was assumed to be appropriate for the site. This assumption was initially based on borehole data collected across the site and subsequently shown to be appropriate by model calibration and validation activities.

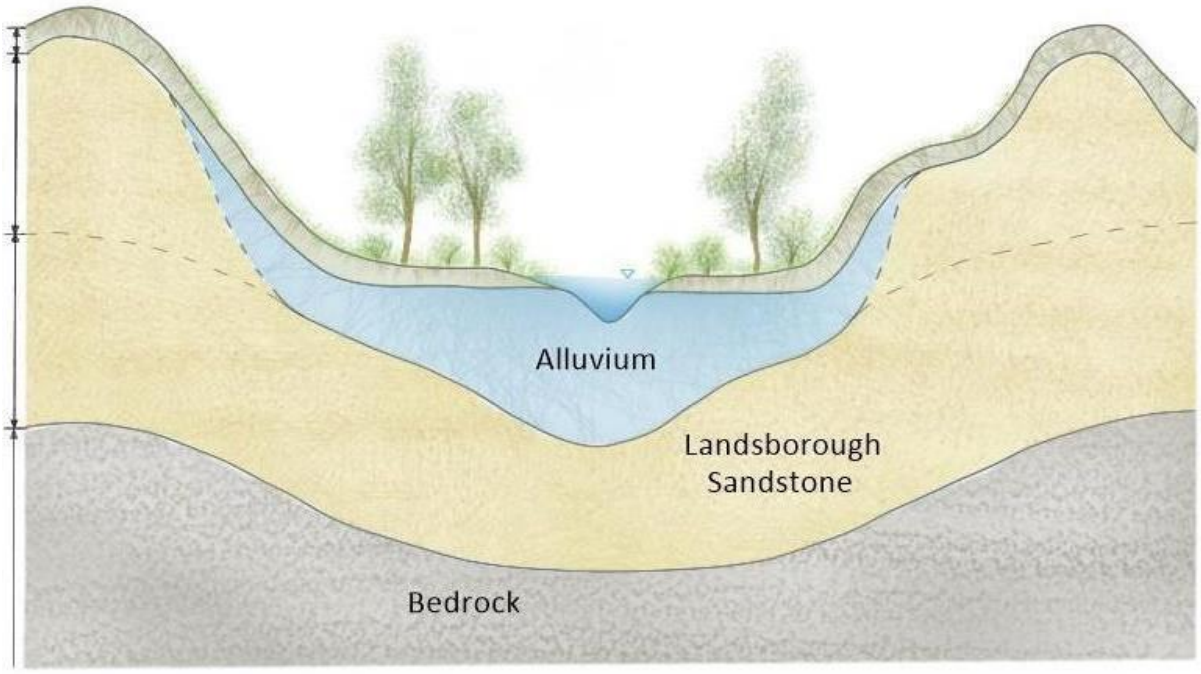


Figure 4 Assumed Regional Geological Layering

2.3 Receiving Water Quality

Receiving water quality investigations were conducted using two separate, interrelated, modelling tools. Firstly, MUSIC models were constructed to simulate diffuse load generation and management within Aura South with site development. Then, these loads were used to inform a TUFLOW FV receiving water quality model of Pumicestone Passage and all relevant downstream waterways. The models are described below.

2.3.1 Site Pollutant Export Modelling

MUSIC models were constructed of Aura South for existing (Figure 5) and developed (Figure 6) conditions. The latter model included relevant WSUD infrastructure to guide and inform impact assessments.

These models used initial parameterisations derived from extensive, independently validated, baseline data collection programs conducted at Aura over many years. These parameterisations were checked against additional baseline data collected at Aura South, which showed that there were similar diffuse load behavioural characteristics at each site, which is not surprising given their adjoining location.

Subsequent impact assessments were conducted using the coupled MUSIC-TUFLOW FV modelling system (see below) to evaluate WSUD infrastructure requirements within the site in order to ensure no adverse impacts on water quality within the TEC and in downstream waterways (Coochin and Halls Creek and Pumicestone Passage). It is noted that while Bells Creek was included in the Pumicestone Passage receiving water quality model, there were no site flows entering Bells Creek from Aura South post-development, and hence there were no potential water quality impacts in this waterway.

Key assumptions made in developing the model and undertaking relevant simulations were as follows:

- Simulations were conducted using existing and ultimate site configurations only. It was assumed that impact management infrastructure would be progressively implemented as the project proceeds ensuring no impacts at such times;

- Accepted, industry standard, WSUD infrastructure performance characteristics were assumed to be appropriate for the site;
- Infiltration from bioretention basins to the shallow groundwater table beneath the Aura South site was assumed to occur. Any nutrients associated with such flow paths were assumed to be assimilated in the soil profile and not emerge elsewhere on site; and
- Accepted, industry standard, rates of stormwater harvesting and reuse were assumed to occur from the Greenheart Lake to irrigate relevant sports fields and open space areas within the site. Receiving water quality modelling showed that should such irrigation not be possible, these flows could be discharged downstream of the TEC wetland with no adverse receiving water quality impacts.

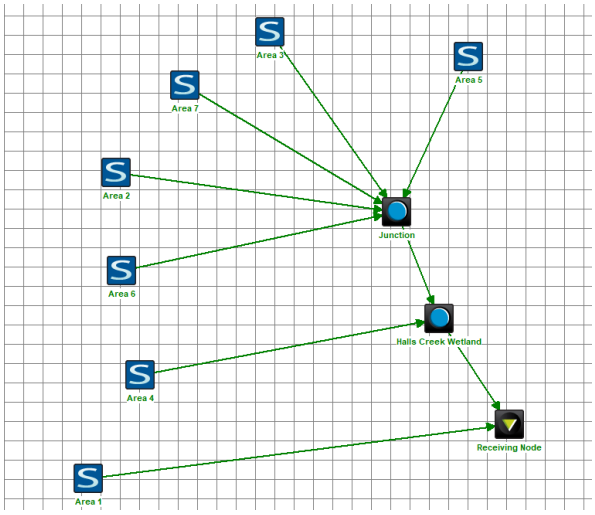


Figure 5 Existing Site MUSIC Model Configuration

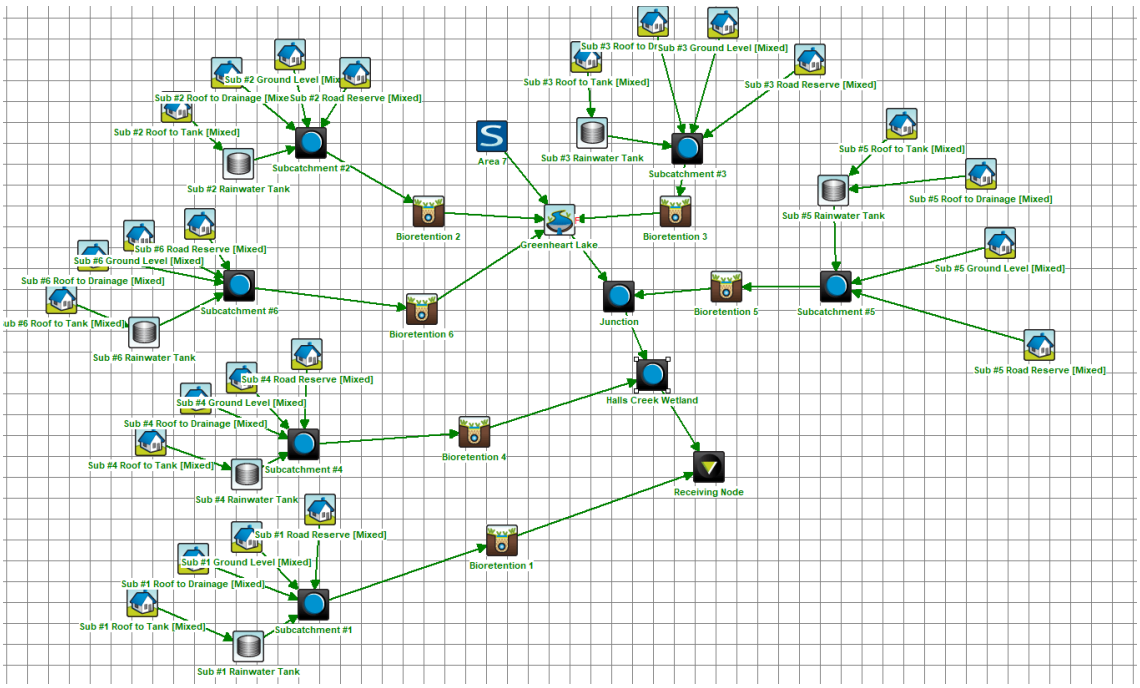


Figure 6 Developed Case MUSIC Model Configuration, including the Greenheart Lake and WSUD Infrastructure

2.3.2 Receiving Water Quality Modelling

A detailed data collection, model development and calibration/validation exercise was conducted to produce a contemporary and robust TUFLOW FV hydrodynamic and water quality model of Pumicestone Passage (Figure 7). The focus of this model, as described above, was to take site-based MUSIC diffuse load predictions and use these to force the TUFLOW FV model and then enable water quality impact assessments to be conducted. Data used in the development, calibration and validation of the model were as follows:

- A new and comprehensive bathymetric data set of the northern sections of Pumicestone Passage, including the recent Bribie Island breakthrough, was collected for this project and used in the modelling;
- A network of CTD data loggers was installed at relevant locations along the northern section of Pumicestone Passage and in relevant waterways (Pumicestone Passage, Bells, Halls and Coochin Creeks) to collect water level and conductivity data with which to calibrate and validate the model;
- Multiple Acoustic Doppler Current Profiler (ADCP) transects were conducted on spring and neap tides at several locations along Pumicestone Passage and in local waterways to collect tidal flow data with which to calibrate and validate the model; and
- Catchment run-off/diffuse loads to inform the model were defined by a Regional eWater SOURCE model obtained from Healthy Land and Water, supplemented by diffuse loads from the Aura South site derived using the previously described MUSIC model.

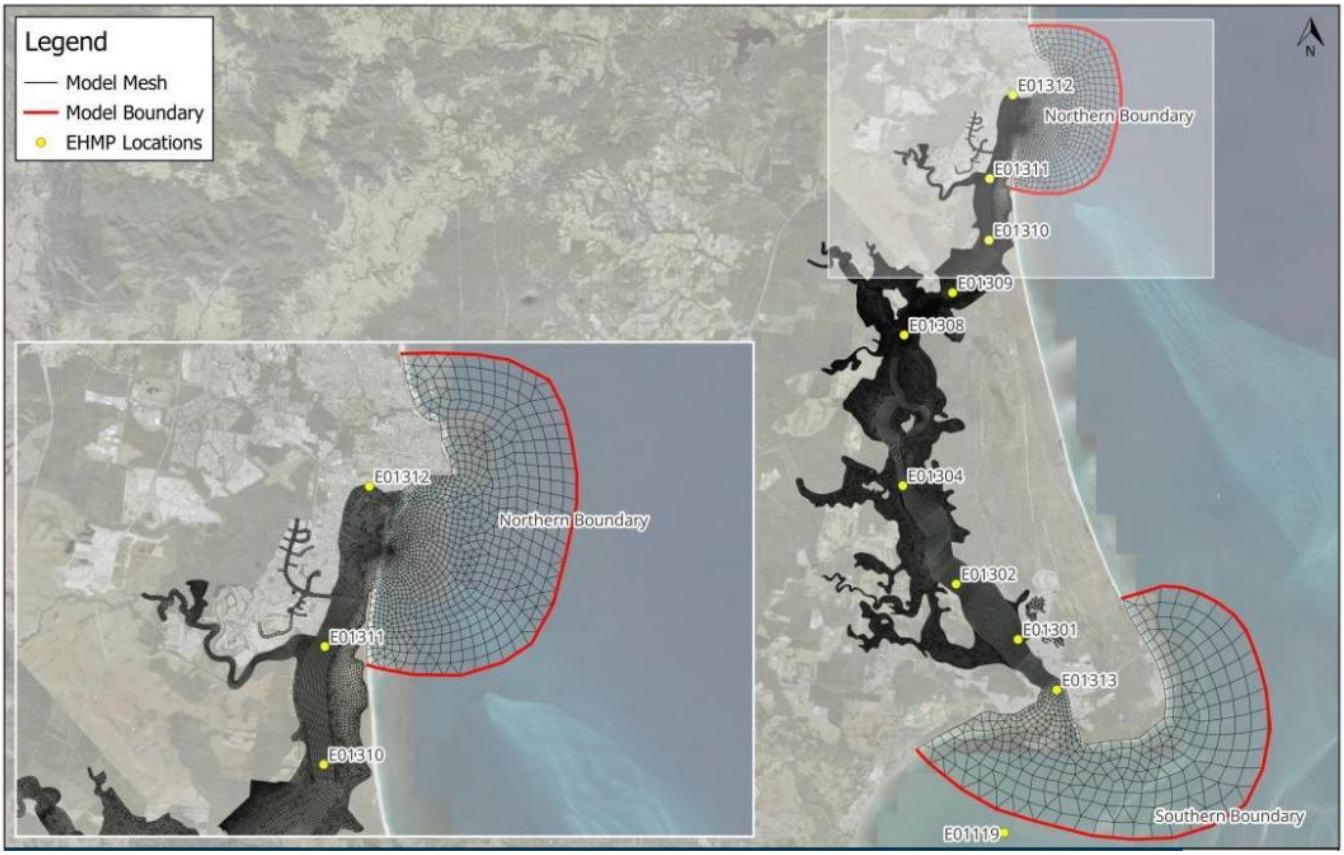


Figure 7 TUFLOW FV Receiving Water Quality Model Configuration

Key assumptions made in developing the model(s) and undertaking relevant simulations were as follows:

- Simulations were conducted using existing and ultimate site configurations only. It was assumed that impact management infrastructure would be progressively implemented as the project proceeds ensuring no impacts at such times; and
- Diffuse loads to Pumicestone Passage from the broader catchment as predicted by the eWater SOURCE and MUSIC models were assumed to be accurate. This assumption was subsequently shown by model calibration works to be relevant and applicable;
- An Event Mean Concentration (EMC) approach to simulating run-off quality, as opposed to some form of variable or stochastic approach, was assumed to be appropriate This assumption was subsequently shown by model calibration works to be relevant and applicable; and
- Modest rates of nutrient assimilation within intertidal mangrove wetlands along Pumicestone Passage route assumed to be appropriate. This assumption was subsequently shown by model calibration works to be relevant and applicable.

3 FLOOD MANAGEMENT

The approach proposed for flood management at Aura South, and as demonstrated by the modelling system described in Section 2.1 as being appropriate, is straightforward and rather conventional, as outlined below:

- Low-lying, flood prone, portions of the site will not be developed. These areas are where environmental enhancement and revegetation activities included within site master planning will occur;
- For the majority of the site - where there currently, or in the future (with consideration of appropriate climate change induced increases in rainfall intensity and sea level rise) is no flood inundation - development will occur; and
- For those portions of the site where minimal flood inundation occurs currently and in the future, appropriate earthworks (i.e. fill placement) are proposed to ensure these areas are not flooded prior to development.

Relevant images showing the relationship between the Aura South site and flooding processes are presented in Figure 8 and Figure 9.

4 WATER QUANTITY MANAGEMENT

Water quantity management at Aura South is a key consideration with respect to the protection of the TEC wetland located at the south-eastern corner of the site. Given this, assessments were conducted using the modelling tool described in Section 2.2 to derive the following suite of actions which are proposed to be applied within Aura South:

- Rainwater tanks – these will be installed on all appropriate dwellings and plumbed internally for suitable water reuse actions (e.g. external garden use, toilet flushing, et cetera);
- Bioretention systems – these systems (being sized at between 2.5 and 3.5% of their contributing catchments, with the size varying with the nature of the receiving waterway) which be installed primarily for water quality management will also be configured to enable infiltration into the local shallow groundwater system, reducing the volumes of surface water runoff and assisting in maintaining the current balance of runoff and shallow groundwater infiltration from the catchment; and
- Stormwater harvesting and reuse from the Greenheart Lake (see Figure 12) – a system to harvest water from the Greenheart Lake and reuse this water for playing field, sports field and open space irrigation within Aura South is proposed. Such harvested water could also be directed downstream of the TEC freshwater wetland referred to above if required.

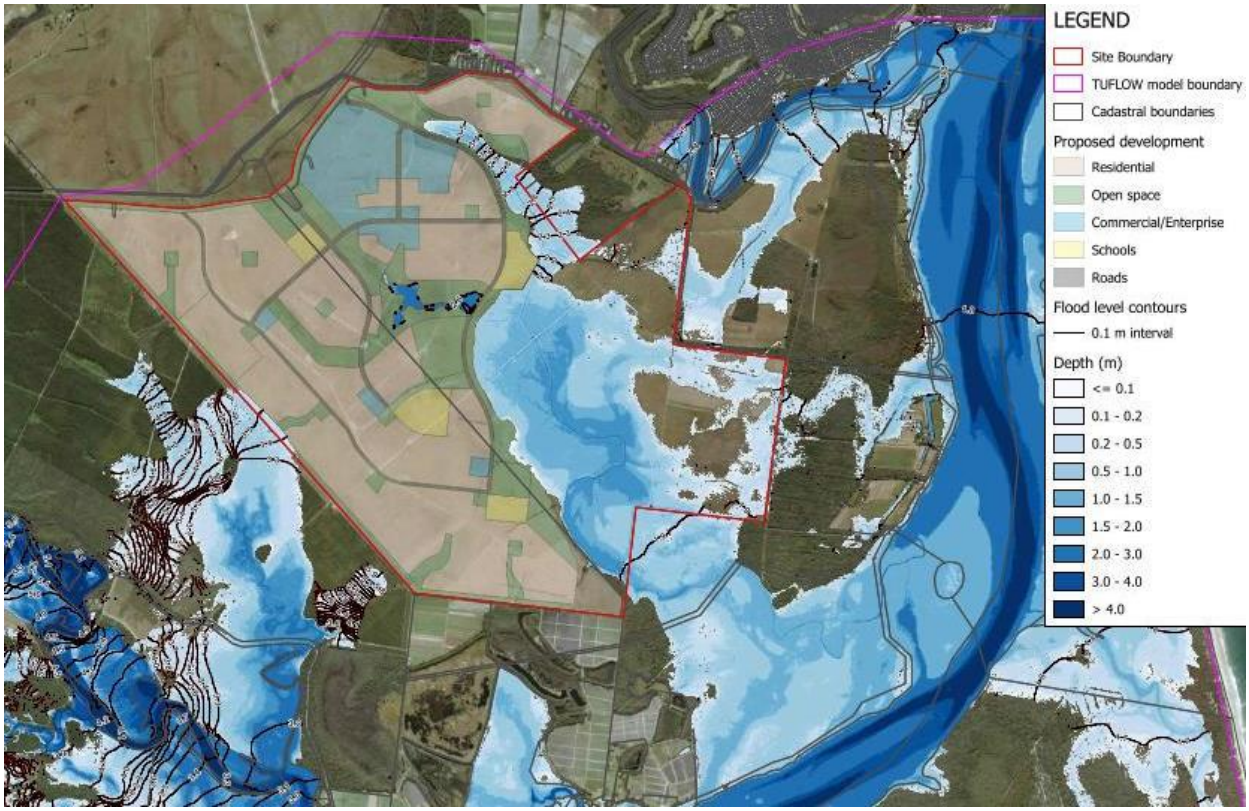


Figure 8 Developed Case 1% Flood Inundation

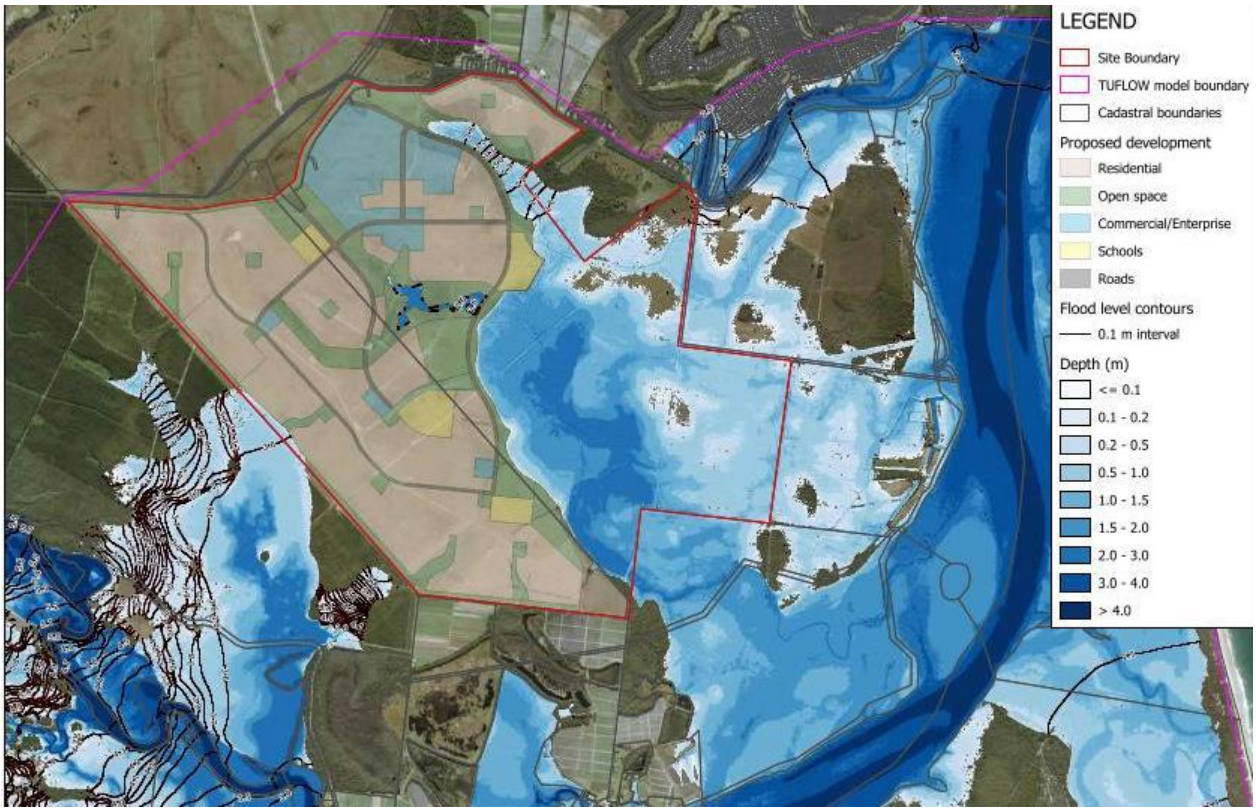


Figure 9 Developed Case + Climate Change 1% Flood Inundation

5 WATER QUALITY MANAGEMENT

5.1 Construction Stage

Water quality management during the construction stage of the project will primarily be related to sediment control. As per equivalent actions at Aura, these works will focus on high-efficiency sedimentation (HES) basins (see inset), together with overall site sediment and erosion control actions.



While construction is occurring in the to be developed portions of the site, rehabilitation and revegetation works will occur within the portions of the site not being developed for urban purposes. Water quality management in these areas at these times will primarily comprise mulching of planted areas and the management of run-off from unsealed roads.

5.2 Operational Stage

Water quality management during the operational stage of the project will adopt a holistic, whole of catchment, approach which was developed iteratively using the modelling tools described in Section 2.3. The following suite of actions will be incorporated within the site;

- Rainwater tanks will be installed on all appropriate dwellings and plumbed internally for suitable water reuse actions (e.g. external garden use, toilet flushing, et cetera);
- Bioretention systems (Figure 10) will be constructed within the site. Figure 11 presents an illustration of where these devices will be located, noting that this configuration will change as detailed design of the project advances. These bioretention basins will be sized at between 2.5% and 3.5% of their contributing catchments, depending on where flow from the basin will be directed. The basins will be configured such that treated stormwater both discharges to downstream waterways and infiltrates into the local shallow groundwater system;
- A large (circa 8 ha) lake (referred to as the ‘Greenheart Lake’ - Figure 12) will be constructed which will assist with water quantity and water quality management; and
- Considerable revegetation and stabilisation works will be undertaken in the extensive (circa 50m to retained waterways) buffers planned around all major site waterways, and also (as mentioned earlier) across much of the lower lying, flood prone portions of site. Both of these actions will benefit downstream waterways from a water quality perspective.

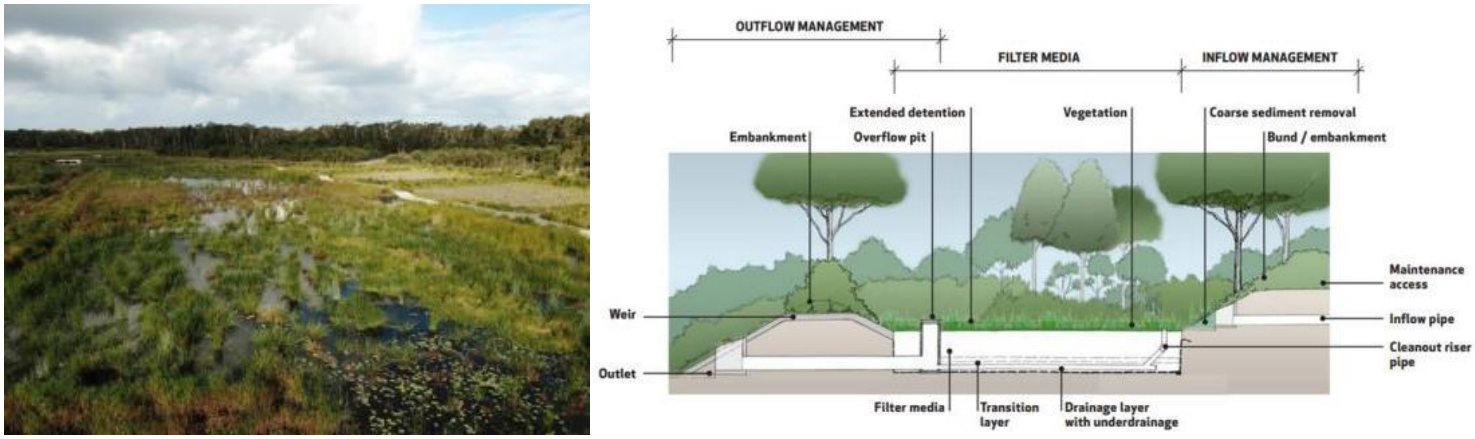


Figure 10 Bioretention System

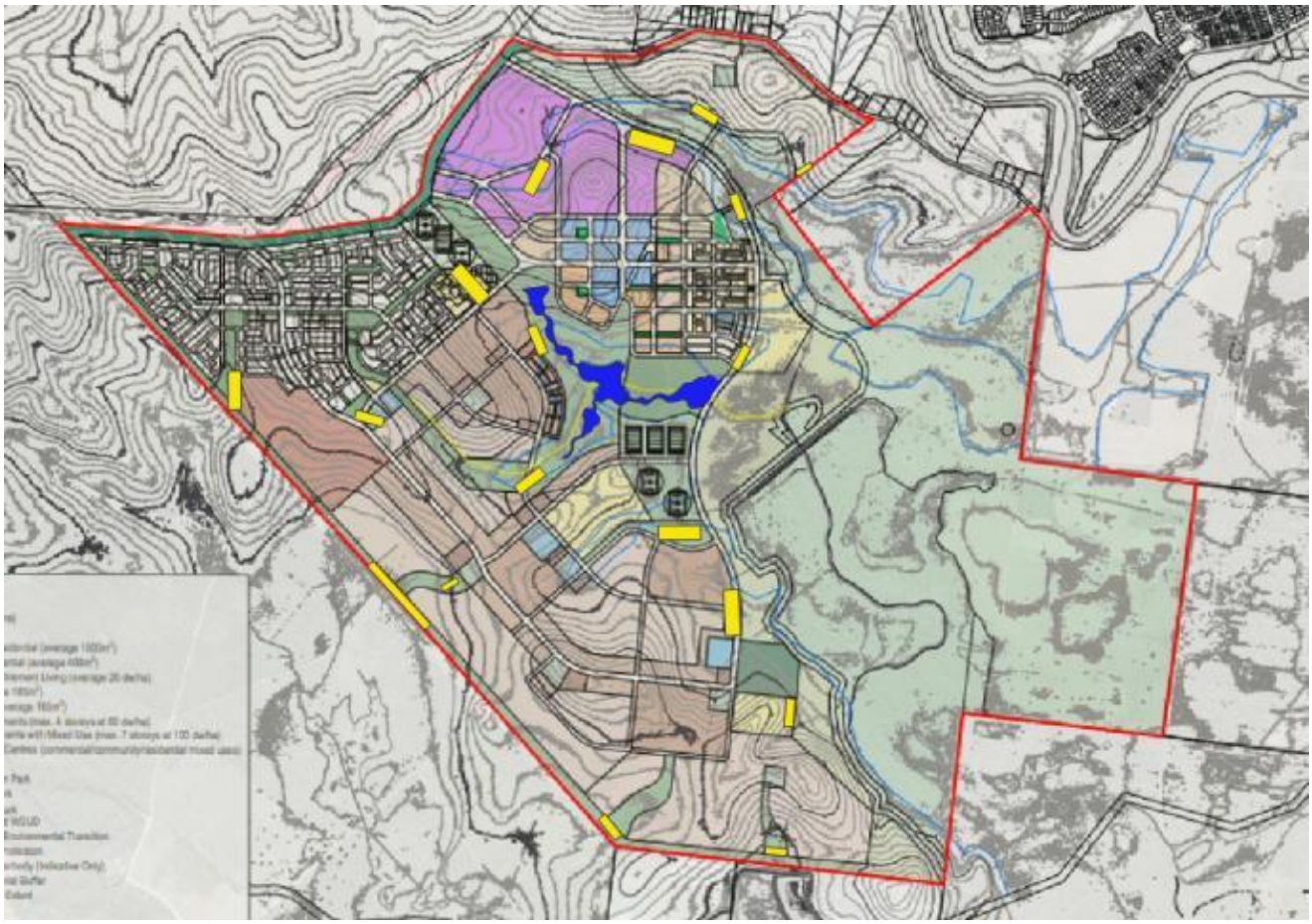


Figure 11 Indicative Locations of Greenheart Lake (dark blue) and Bioretention Basins (yellow rectangles)



Figure 12 Greenheart Lake

6 MONITORING/MANAGEMENT

Given the significance of the environmental values of the TEC wetland and downstream waterways (Halls and Coochin Creeks and Pumicestone Passage), the performance of the flood, water quantity and water quality systems referred to above through the construction and operational stages of the project will be overseen via a comprehensive, integrated water quantity and quality monitoring and management framework. This framework will include real-time and campaign monitoring and web-based presentation of the following information:

- Surface and shallow groundwater level and quality data within and around the TEC wetland and at other key locations within the site;
- Rainfall data within the catchment;
- Flows from the catchment into and out of the TEC, and water quality of these flow streams; and
- Water quality in downstream receiving waterways (with appropriate consideration of ‘control’ and ‘impact’ sites such that changes in water quality due to works on Aura South, if any, can be identified).

Also on relevance, appropriate baseline/pre-construction data will be collected in regard to all of above so that, once construction commences, there is sufficient data to enable changes to be detected.

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