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BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

Version R6

February 2024

CLIFTON YAMBA LAND PTY LTD

Executive summary

Manage-Design-Engineer Pty Ltd engaged Ecosure Pty Ltd on behalf of Clifton Yamba Land Pty Ltd to prepare a Biodiversity Development Assessment Report. This revision responds to a request for further information issued jointly by Clarence Valley Council and the Biodiversity Conservation Division of the NSW Department of Planning and Environment with respect to DA2023/0241.

The report is prepared in accordance with the Biodiversity Assessment Method and addresses requirements in the *Biodiversity Conservation Act 2016* for a proposed subdivision at 110-120 Carrs Drive, Yamba. A 216-lot residential land lease community is proposed, requiring earthworks to raise the site's elevation above flood levels, including significant import of clean fill and compaction prior to construction. Scour protection and vegetation restoration works will occur within the riparian zone of a 2nd order stream traversing the site's southern boundary.

The proposed development will remove 8.3 hectares of native vegetation in varying states of condition, which was assessed under part 1 of the Biodiversity Assessment Method. The assessment uses the legacy Plant Community Type classification to maintain continuity with the existing Biodiversity Development Assessment Report. Vegetation to be impacted mostly comprises regrowth swamp forest (legacy Plant Community Types 1064 and 1235), with some areas of non-native vegetation containing scattered remnant paddock trees and small stands of mature vegetation.

Plot-based vegetation surveys identified four Plant Community Types across the site, as defined under the legacy classification, three of which occur within the development footprint. Two Plant Community Types recorded within the development footprint are associated with Threatened Ecological Communities listed under the NSW *Biodiversity Conservation Act 2016* and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Impacts on vegetation comprising Paperbark swamp forest of the coastal lowlands of the NSW north coast and Sydney Basin bioregion (legacy Plant Community Type 1064) and Swamp oak swamp forest of the coastal lowlands of the NSW north coast bioregion (legacy Plant Community Type 1235) generate an offset requirement of 224 ecosystem credits.

Five candidate threatened species, comprising the squirrel glider, three microbat species and the grey-headed flying fox were detected on the site during surveys. Assessment of habitat suitability for threatened species, along with targeted flora and fauna surveys undertaken between September 2021 to January 2024, identified two threatened candidate species (squirrel glider recorded during surveys and eastern [common] planigale assumed present) generating a total offset requirement of 358 species credits. Habitat constraints were determined not to be present for the three species of microbat and the grey-headed flying fox and therefore did not generate species credit offset requirements.

The planning and design phase of the proposed development applied the avoid or minimise principle by limiting clearing to the most modified habitats on the site, retaining 7.7 ha of the most undisturbed native vegetation on the lot, restoring a naturalised tidal drainage feature following completion of works within the development footprint, and managing retained

vegetation under a Vegetation Management Plan. Mitigation actions recommended for direct impacts involve clearing protocols including engagement of a qualified ecologist during vegetation clearing works; staged clearing; and timing of clearing to avoid critical life cycle events such as breeding during late winter/spring.

This Biodiversity Development Assessment Report is certified by Ziggy Andersons, a Biodiversity Assessment Method assessor, accreditation number BAAS17103. This report has been prepared based on the requirements of, and information provided under the Biodiversity Assessment Method and submitted via the Biodiversity Offsets and Agreement Management System on 15/02/2024, case number 00030579.

Assessor: Ziggy Andersons

Assessor number: BAAS17103

Certified on: 15/02/2024

Signature: 

Glossary, acronyms and abbreviations

AHD	Australian Height Datum
ARI	Average Recurrence Interval
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016*
BCD	Biodiversity and Conservation Division
BC Reg	Biodiversity Conservation Regulation 2017
BDAR	Biodiversity Development Assessment Report
BOAMS	Biodiversity Offsets and Agreement Management System
CVC	Clarence Valley Council
DPE	Department of Planning and Environment
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
HTE	High Threat Exotic
IBRA	Interim Biogeographic Regionalisation for Australia
PCT	Plant Community Type
RFI	Request for Information
SAII	Serious and Irreversible Impact
SEPP	State Environmental Planning Policy
SVTM	State Vegetation Type Map
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
VI	Vegetation Integrity
VIS	Vegetation Information System
VMP	Vegetation Management Plan

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Limitations

This assessment makes use of the Biodiversity Assessment Method Calculator, developed and administered by the New South Wales Government. It is used to estimate the number and type of ecosystem and species credits required for offsetting at impact sites, and the offset value if paying into the Biodiversity Conservation Fund. These calculations are based on the information and output generated at the time of assessment. Version information for this assessment identifies - *App last updated 13/04/2023 (Version 1.4.0.00)*.

Please note the NSW Government provides the following terms and conditions in regard to the use of the Biodiversity Assessment Method Calculator (App):

The Office of Environment and Heritage endeavours to make sure all the information provided in this App is correct at the time of its publication or posting. To the extent legally permitted, Office of Environment and Heritage gives no warranty about and accepts no responsibility for the accuracy, completeness or suitability of information, or for advice given in this App or any linked site, or for any error or omission in that information. With respect to the biodiversity data and biodiversity credit outcomes determined using the BAM, it should be noted that some data values are subject to change (NSW Government 2023).

This assessment employs the decommissioned qualitative Plant Community Type classification consistent with VIS ID 3885 – Coastal vegetation NE NSW, in favour of the revised State Vegetation Type Map release C2.0.M2.0 and the current quantitative Plant Community Type classification v 2.0. This allows continuity with the open Biodiversity Development Assessment case previously submitted within the Biodiversity Offsets and Agreement Management System (case number 00030579).

The case was transferred from accredited assessor Anthony Jarvis (BAAS19043) to accredited assessor Ziggy Andersons (BAAS17103). In taking ownership of the case, the receiving assessor assumes responsibility for the quality of work within the Biodiversity Development Assessment Report and calculations within the Biodiversity Assessment Method Calculator.

1 Introduction

1.1 Overview

Manage-Design-Engineer Pty Ltd engaged Ecosure Pty Ltd on behalf of Clifton Yamba Land Pty Ltd to prepare a Biodiversity Development Assessment Report (BDAR) in accordance with the Biodiversity Assessment Method Order 2017. The BDAR was submitted via the Biodiversity Offsets and Agreement Management System (BOAMS) portal on 5 April 2023, under case number 00030579, by accredited assessor Anthony Jarvis (BAAS19043).

The Biodiversity and Conservation Division (BCD) of the Department of Planning and Environment (DPE) and Clarence Valley Council (CVC) jointly issued a Request for Information (RFI) (reference DA2023/0241), dated 12 July 2023 (Appendix 1), requiring a revision of the BDAR to respond to the following matters:

- application of Stage 1 of the BAM to the entirety of Lot 2 DP733057 and Lot 32 DP1280863
- inclusion of all vegetation plot field data within the BDAR
- replacement of plot 3 data for vegetation zone 1 with new plot data from an alternative location in vegetation zone 1
- refined mapping and sampling of Plant Community Types (PCTs) in vegetation zones 1-3 and associated Threatened Ecological Communities (TECs)
- revision of the likelihood of occurrence status of black-necked stork (*Ixobrychus flavicollis*) and black bittern (*Ixobrychus flavicollis*) from unlikely to likely
- inclusion of Mitchell's rainforest snail (*Thersites mitchellae*) as a candidate species
- additional threatened plant surveys for candidate threatened plant species
- assessment of likely impacts that affect water quality, water bodies and hydrological processes that sustain threatened entities
- demonstration and justification of measures taken by the proponent to avoid and minimise impacts on biodiversity values of the site in accordance with Section 6.12 of the *Biodiversity Conservation Act 2016* (BC Act).

In addition, the RFI also prompted the CVC to prepare a new flood risk management study and plan for Yamba, including a development strategy for the subject floodplain, against which CVC is to assess the BDAR and proposal. The revised model, published in the Lower Clarence Flood Model (BMT 2023), incorporates filling in the West Yamba Development area, and is discussed in Section 7 .

Subsequently, the case was revised and resubmitted to the portal on 15 February 2024, by accredited assessor Ziggy Andersons under case number 00030579.

This BDAR applies to a development site that requires consent under Part 4 of the NSW *Environment Planning and Assessment Act 1979*. Requirements under the NSW BC Act and

Biodiversity Conservation Regulation 2017 (BC Reg) have also been addressed. In addition, the BDAR specifically aims to address section 6.12 of the BC Act which states:

> "For the purposes of the Biodiversity Offsets Scheme, a biodiversity development assessment report is a report prepared by an accredited person in relation to proposed development or activity that would be authorised by a planning approval, or proposed clearing that would be authorised by a vegetation clearing approval, that –
>
> a) assesses in accordance with the biodiversity assessment method the biodiversity values of the land subject to the proposed development, activity or clearing, and
>
> b) assesses in accordance with that method the impact of proposed development, activity or clearing on the biodiversity values of that land, and
>
> c) sets out the measures that the proponent of the proposed development, activity or clearing proposes to take to avoid or minimise the impact of the proposed development, activity or clearing, and
>
> d) specifies in accordance with that method the number and class of biodiversity credits that are required to be retired to offset the residual impacts on biodiversity values of the actions to which the Biodiversity Offsets Scheme applies."

1.2 Background

The Biodiversity Assessment Method (BAM) is part of the Biodiversity Offsets Scheme. It provides a consistent approach to assess impacts on biodiversity values from a proposed development, activity, or clearing. The level of survey and assessment effort required by the BAM is scaled according to the extent and risk of impacts on biodiversity from a proposal, the availability and quality of existing information, and the area of land being assessed.

For a proposed development, the BAM outlines how to assess changes in native vegetation, threatened species and their habitats by:

- identifying the biodiversity values on the land
- determining the impacts on terrestrial biodiversity
- assessment for additional (prescribed) biodiversity impacts
- demonstrating how to avoid, minimise, and/or mitigate impacts to biodiversity
- quantifying and describing the biodiversity credits required to offset the residual impacts on biodiversity values.

There are two broad classes of biodiversity credits: ecosystem credits and species credits. Ecosystem credits apply to PCTs and to threatened species whose occurrence can generally be predicted using vegetation surrogates and/or landscape features, or that have a low probability of detection using targeted surveys. Species credits apply to threatened species where vegetation surrogates and/or landscape features cannot reliably predict the likelihood of their occurrence or components of their habitat. These species require targeted survey or an expert report to confirm their presence at a site. For a proposed development, a proponent may opt to assume a species is present.

Preparation of a BDAR must be undertaken by a person accredited under Section 6.10 of the BC Act (the assessor). Assessors apply the BAM to determine the impact on biodiversity and use the BAM Calculator, an online portal that supports application of the BAM and enables assessors to enter field data to which equations determine the number and class of biodiversity credits required (NSW Government 2020a).

1.3 Sources of information

Data and/or resources used or consulted in this assessment include:

- BOAMS
- BAM Calculator
- BioNet Atlas
- BioNet Threatened Biodiversity Data Collection (TBDC)
- BioNet Vegetation Classification
- BioNet Web Services
- Protected Matters Search Tool (Commonwealth Department of Climate Change, Energy, the Environment and Water)
- NSW Department of Planning and Environment (DPE) Data Portal
- PlantNet NSW.

Spatial data used or consulted in the assessment include:

- Cadastre (NSW Department of Finance, Services and Innovation)
- Interim Biogeographic Regionalisation for Australia (IBRA) Regions and Subregions (Department of Environment and Energy)
- NSW Mitchell Landscapes – Version 3.1 (DPE)
- Directory of Important Wetlands in Australia (Department of Climate Change, Energy, the Environment and Water)
- Coastal Management State Environmental Planning Policy (DPE)
- Fauna Corridors for North-East NSW (DPE)
- Acid Sulfate Soils Risk map (DPE)
- NSW Hydrography (NSW Spatial Services).

1.4 Biodiversity values not assessed

The following biodiversity values are not assessed under the BAM:

- marine mammals
- wandering sea birds
- biodiversity that is endemic to Lord Howe Island
- biodiversity values associated with the assessment of the impacts of any clearing of native vegetation and loss of habitat on Category 1 – exempt land (within the

meaning of Part 5A of the *Local Land Services Act 2013*), other than the additional biodiversity impacts in accordance with clause 6.1 of the BC Reg.

These values are not present on the site and therefore do not require additional assessment outside of the scope of the BDAR.

The definition of native vegetation under the BAM does not extend to marine vegetation (seagrasses, mangroves, or any other species of plant reliant on intermittent inundation in brackish or saltwater at any time of its life cycle). However, Plant Community Types (PCTs) for which the vegetation formation is classified as saline wetlands under the Vegetation Classification database are subject to assessment under the BAM and have been considered accordingly.

1.5 Matters of National Environmental Significance

A self-assessment for matters of national environmental significance listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), determined that clearing will likely result in a significant impact for two threatened ecological communities and two EPBC Act-listed threatened species on the site (Ecosure 2023), including:

- Coastal Swamp Sclerophyll Forest of New South Wales and Southeast Queensland
- Coastal Swamp Oak (*Casuarina glauca*) of New South Wales and Southeast Queensland
- koala
- grey-headed flying fox.

The self-assessment determined a significant impact was likely and a referral application was prepared and submitted for assessment by the Federal Minister for the Environment via the online portal (EPBC 2022/09340). These Matters of National Environmental Significance (MNES) are considered throughout the BDAR; however, independent preliminary documentation has been prepared and submitted for further, separate assessment under the EPBC Act.

1.6 The site

The site is located east of the confluence of Oyster Channel and Lake Channel, tributaries of the Clarence River, and is adjacent to Carrs Drive that adjoins the eastern boundary (Figure 1). The site comprises two cadastral lots (Lot 2 DP733507 and Lot 32 DP1280863) occupying approximately 17.7 ha. A watercourse classified as a 2nd order stream according to the Strahler system, runs west along the site's southern boundary, issuing from a culvert at the Carrs Drive frontage of the site and flowing into the Lake Channel / Oyster Channel estuary to the west of the site. The stream has been historically straightened and channelised, and modified with the installation of a now-defunct twin pipe floodgate which no longer effectually excludes tidal flow (Birch 2023. At its upper extent within the site, approximately 270 m from the eastern boundary, the stream vegetation is dominated by *Casuarina glauca.* The lower section of the stream has greater tidal influence and supports mangroves interspersed with

saltmarsh.

The eastern portion of the site, containing the proposed development footprint, is a mosaic of highly disturbed regrowth vegetation with a significant weed component, cleared areas, and regrowth native vegetation. Some areas of regrowth satisfy Threatened Ecological Community (TEC) diagnostic criteria for two EPBC-listed TECs, occurring as a mosaic dominated by either *Casuarina glauca* or *Melaleuca quinquenervia* (Section 3.4). The eastern portion of the site bears evidence of former land-use, with areas of fill, a concrete pad and recent deposition of domestic refuse.

The western portion of the site, intended for retention, is predominantly mature swamp sclerophyll forest dominated by *Melaleuca quinquenervia.* It also contains smaller components of *Casuarina glauca* forest, coastal saltmarsh extending from the property to the south, and a narrow channel of mangroves dominated by *Avicennia marina* that lines the tidal extent of the 2nd order stream (Figure 2). Native vegetation adjoins the site to the north and south, including remnant and regrowth swamp sclerophyll and *Casuarina glauca* forest communities, and an area of saltmarsh adjacent to the southern border. The saltmarsh to the south of the site bears evidence of past mowing.

The site is located within the CVC Local Government Area and has been designated for residential housing development within the West Yamba Urban Release Area plan under the provisions of the Clarence Valley Local Environmental Plan 2011 (LEP) and the Clarence Valley Residential Zones Development Control Plan 2011 (Residential DCP). A residential development of similar proportions is currently under construction to the immediate north of the site.

Under the LEP, the site is zoned R1 – General Residential (10.2 ha), C3 – Environmental Management (6.1 ha) and C2 – Environmental Conservation (1.4 ha). The development footprint (10.07ha) is contained within land in the R1 zoning. The R1 zone consists of a small area of mature vegetation surrounded by cleared or previously cleared land containing native regrowth in varying condition. The land in this zone has been subject to historical introduction of fill associated with rural uses (Piper and Robins 2011). The C3 and C2 zones contain mature forested vegetation with no infrastructure and minimal evidence of recent disturbance.

No Biodiversity Values, as identified on the Biodiversity Values Map which forms part of the NSW Biodiversity Offsets Scheme (BOS), are mapped within the development footprint.

The eastern portion of the site falls within a key climate change corridor and fauna habitat corridor mapped by DPE (Figure 3, Scotts 2003).

Key habitat features present on the site include:

- low shrubs, dense sedges and coarse woody debris providing shelter for fauna
- moderately dense canopy providing branches and shelter suitable for epiphytes, nesting birds and mammals
- exfoliating bark and epiphytes providing habitat suitable for reptiles, frogs and insects
- a 2nd order stream, with both freshwater and tidal influence

- basal tree hollows
- the tidal interface with Lake Channel / Oyster Channel estuaries
- mangroves and saltmarsh comprising habitat suitable for birds, fish and invertebrates
- foraging resources for mammals (e.g. nectar, fruit, leaves)
- leaf litter utilised by ground-nesting avifauna (Australian brush-turkey *Alectura lathami*)
- concrete and other anthropogenic debris providing shelter for reptiles and small mammals.

1.7 The project

The site is approximately 17.7 ha, within which a 10.07 ha development footprint is situated on the most disturbed and appropriately zoned portion of the site (Figure 1). The development layout will result in the loss of 8.3 ha of native vegetation in varying states of condition.

The proposed development includes a subdivision to create a residential land lease community comprising 216 lots within the land zoned R1 – residential, accessed via Carrs Drive. No development is planned in the parts of the site zoned C2 and C3 (Figure 1).

The proposed development is subject to an ongoing design process incorporating consultation, guidance and feedback from consultants, planners, assessment agencies and public submissions. The design process determines the final form of the development and incorporates investigations into existing site conditions such as hydrology, ecology, legacies of stormwater management and contamination, vegetation management and past land uses.

The development will require earthworks to raise the site's elevation above flood levels, requiring significant import of clean fill and compaction prior to construction. Following earthworks, a network of paved internal roads accessed from Carrs Drive will be constructed, with associated landscaping, storm water and civil utilities infrastructure. A single road crossing of a 2nd order tidal drainage line will be constructed using culverts to access the south-east section of the site. Scour protection and vegetation restoration works will occur within a 10 m riparian zone of the drainage line.

This will be followed by the construction of 216 dwellings, shared open space facilities, parking bays, a vehicle washdown facility and environmental restoration works. The retained and revegetated portions of the development will be managed under a Vegetation Management Plan (VMP) for 5 years following completion of construction of the development. The aim of the VMP is to rehabilitate and revegetate native communities and areas of biodiversity significance and enhance their preservation in retained vegetation and landscaping values within the site.

Project design plans provided by Manage-Design-Engineer are included in Appendix 3.

Figure 1: Site boundary and proposed development footprint

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Site boundary
Internal cadastral boundaries
Development footprint
Land zone boundaries

C2 - Environmental conservation zone
C3 - Environmental management zone
R1 - General residential zone

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Author: JT
Date: 02/02/2024

0 100 200 m

GDA 2020 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 2020
Units: Meter

Stage 1: Biodiversity assessment

2 Site context

2.1 Landscape features

The site falls within the south-east Queensland Interim Biogeographic Regionalisation for Australia (IBRA) bioregion and the Clarence Lowlands IBRA subregion. The Mitchells (NSW) Landscape dataset maps the majority of the lot (including the extent of the proposed development footprint) as the Clarence – Richmond Barriers and Beaches (Figure 2). This landscape is associated with beaches, dunes, swamps and lagoons on Quaternary sands up to 25 m elevation. The site occupies back barrier swamps and plains with gradational dark coloured loamy sand, peaty podzol and acid peat dominated by *Melaleuca quinquenervia* and species tolerant of intermittent inundation (NSW Government 2002).

Based on mapping available in the NSW Hydrography dataset (NSW Government 2015), a small tidal drain runs along the southern boundary of the site into Oyster Channel which is connected to the estuaries of the Clarence River (Figure 2). The Proximity Area for Coastal Wetlands is mapped adjacent to the lot within Oyster Channel (NSW Government 2018b).

Connectivity features associated with the site, as defined by DPE in the Key Habitats and Corridors dataset, include the Tyndale swamp and Iluka-Yurfay regional fauna corridors linking coastal vegetation that includes extensive coastal national parks and reserves (Scotts 2003) (Figure 3). Acid sulphate soil risk is mapped as having a low probability of occurrence across the site (NSW Government 2018a). An Aquatic Assessment discussed the risk of Acid Sulphate Soil disturbance in the context of the proposed development (Birch 2023, Appendix 2). The site is mapped as low risk; however, indicators of sulfidic elements were observed within the riparian zone by aquatic ecologist Mathew Birch and management recommendations were incorporated into the development and review of the Stormwater Management Plan and Erosion and Sediment Control Plan (Appendix 2, Appendix 14, Appendix 15).

No Areas of Outstanding Biodiversity Value as defined in the BC Act, or areas of geological significance are mapped within the site.

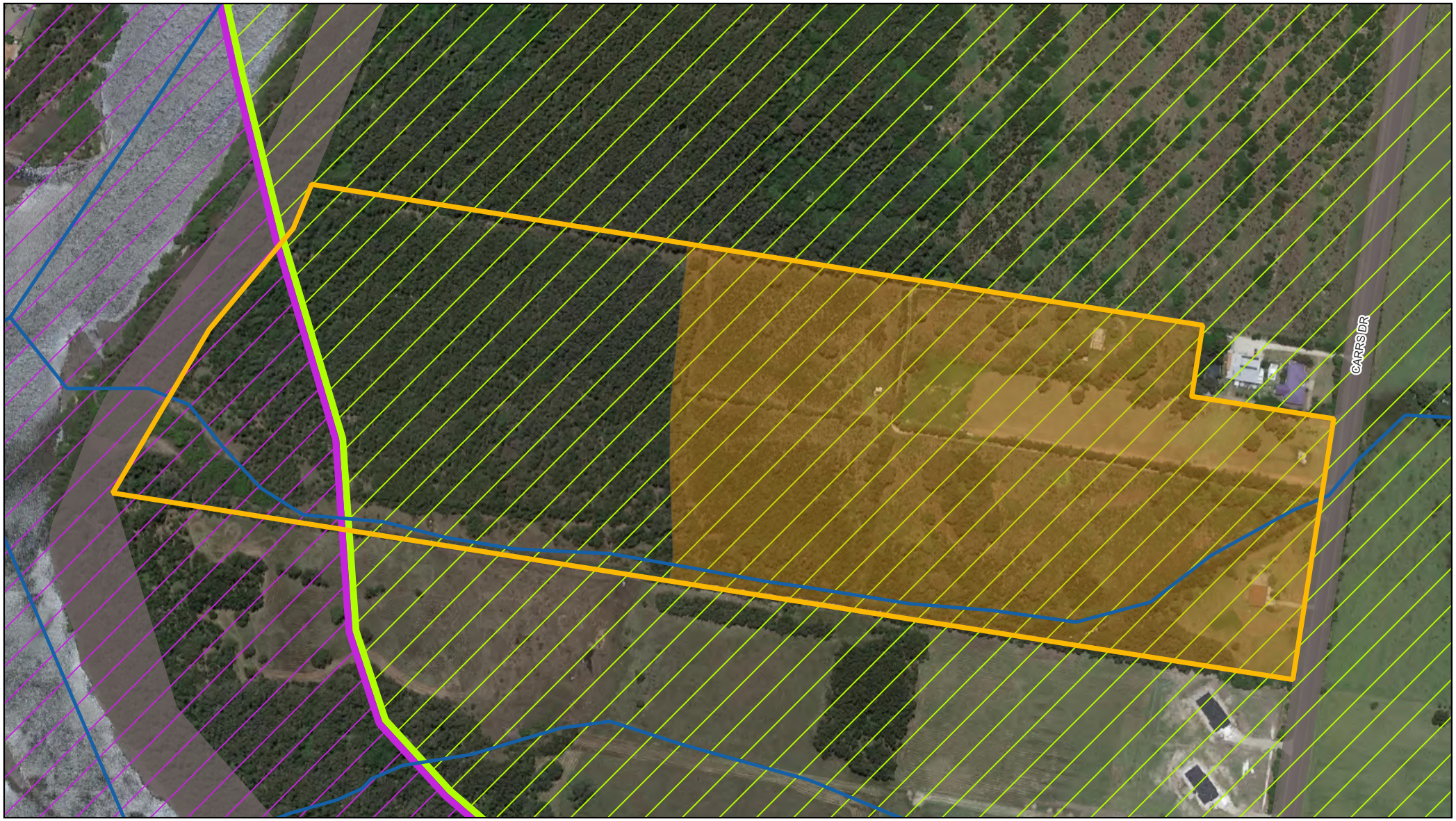

Figure 2: Mitchell's (NSW) landscape mapping

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Watercourse
Site boundary
Development footprint

Mitchell Landscapes v.31
Clarence - Richmond Barriers and Beaches
Estuary/Water Added

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0 100 200 m

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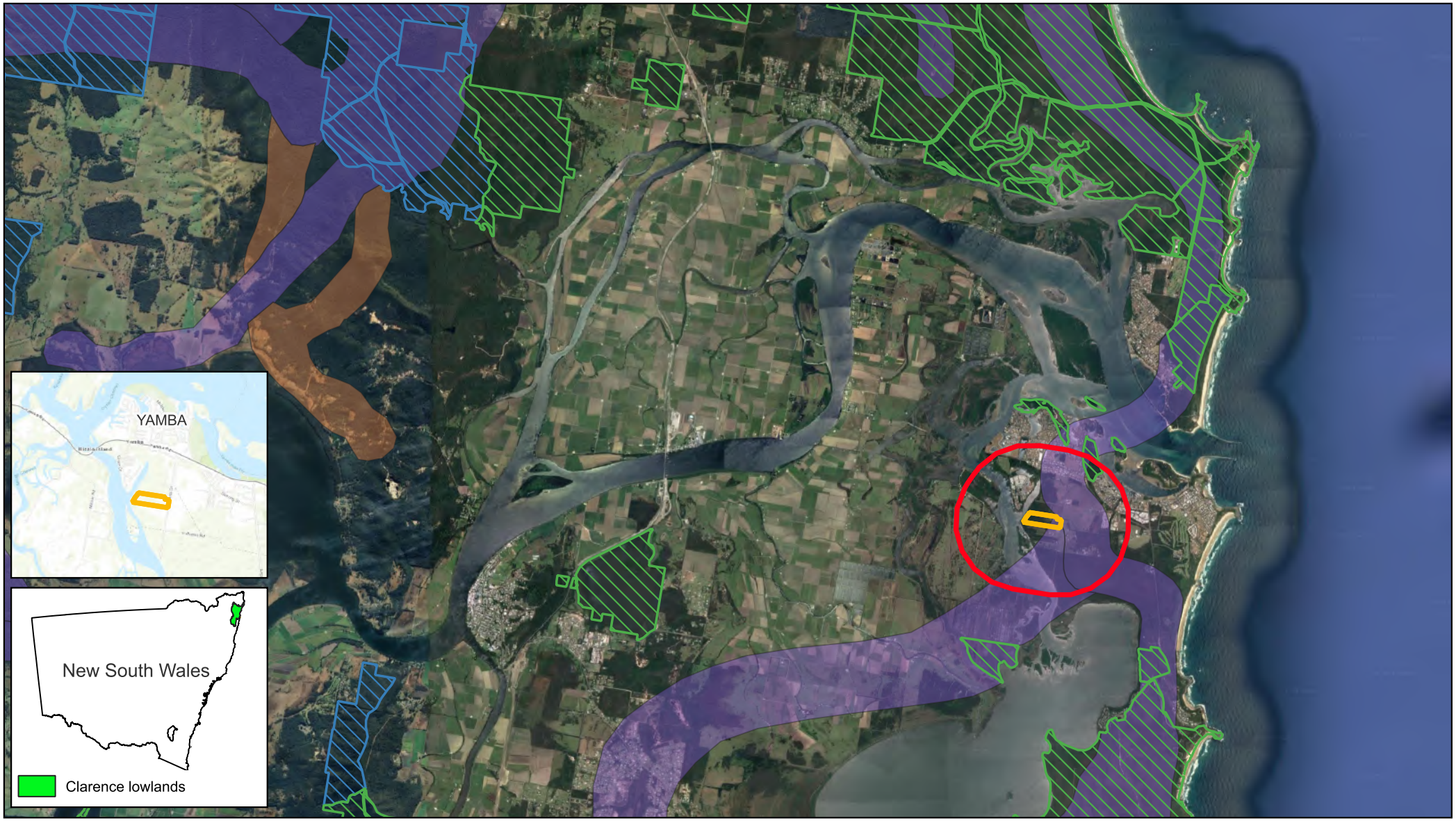

Figure 3: Location map and landscape connectivity

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Site boundary
1.5 km site buffer
NSW state
NPWS Reserve
State Forest
Fauna Corridors (Scotts 2003)
Regional
Subregional

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0 2,500 5,000 m

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3 Assessing native vegetation

3.1 Native vegetation cover

The desktop review calculated native vegetation cover within the assessment area as the area of intact vegetation within the site and a 1,500 m buffer of the site, consisting of woody and non-woody vegetation cover. Native vegetation cover within the assessment area was calculated as 33% and therefore assigned to class c) >30-70% as per BAM section 3.2 (Figure 4).

3.2 Native vegetation extent

The extent of native vegetation within the site was calculated to be approximately 15.9 ha (Figure 5). Within the development footprint, native vegetation occupies 8.3 ha. Areas of the site occupied by infrastructure and exotic pasture, lawn or dominated by introduced species have not been included in the assessment. An aerial image of the site in 2009 shows historical use of the site with native vegetation in the development footprint consisting of cleared land with retained paddock trees and small stands of vegetation (Figure 6). These remnant features are identifiable amongst the regrowth covering the majority of the site zoned R1.

3.3 Patch size assessment

For the purposes of this assessment a patch is an area of native vegetation that occurs on the subject land and includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤30 m for non-woody ecosystems). A patch may extend onto adjoining land. Gaps between native vegetation on the site and adjoining areas to the south and north do not exceed 100 m. The overall patch size associated with all vegetation zones on the site and adjoining land therefore exceeds 500 ha and has been assigned to category d) ≥100 ha, as outlined in section 4.3.2 of the BAM.

Figure 4: Native vegetation cover in assessment area

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0 0.5 1 km

GDA 2020 MGA Zone 56
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Units: Meter

Figure 5: Native vegetation extent on site

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0 75 150 m

GDA 2020 MGA Zone 56
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Figure 6: Aerial image 2009 (Six Maps- Woodburn ADS40_SC)

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Site boundary

Development footprint

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0 75 150 m

GDA 2020 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 2020
Units: Meter

3.4 Plant Community Types

3.4.1 Mapped Plant Community Types on the site

To maintain continuity with the previously submitted BDAR and the existing BOAMS case, PCTs entered into the BAM Calculator were consistent with legacy PCTs as mapped in VIS ID 3885 – Coastal vegetation NE NSW. Table 1 summarises vegetation types according to legacy and current PCT classifications (C2.0.M2.0) of the NSW State Vegetation Type Map (SVTM) to indicate equivalency with current vegetation mapping units (Table 1). Figure 7 shows current SVTM mapping of PCTs within the site.

Table 1 Mapped PCTs (SVTM C2.0.M2.0) and respective legacy PCTs

Current PCT ID	Current PCT description	Legacy PCT ID	Legacy PCT description	Vegetation formation	Vegetation class	Mapped inside development footprint
3987	Far North Floodplain Paperbark-Swamp Oak Forest	1064	Paperbark swamp forest of the coastal lowlands of the NSW north coast Bioregion and Sydney Basin Bioregion	Forested Wetlands	Coastal Swamp Forests	Yes
		1235	Swamp oak swamp forest of the coastal lowlands of the NSW north coast bioregion	Forested Wetlands	Coastal Swamp Forests	Yes
4091	Grey Mangrove-River Mangrove Forest	916	Mangrove - Grey Mangrove low closed forest of the NSW Coastal Bioregion	Saline Wetlands	Mangrove Swamps	No
4103	*Sporobolus virginicus* Saltmarsh	1125	Saltmarsh complex of the NSW North Coast Bioregion	Saline Wetlands	Saltmarshes	No

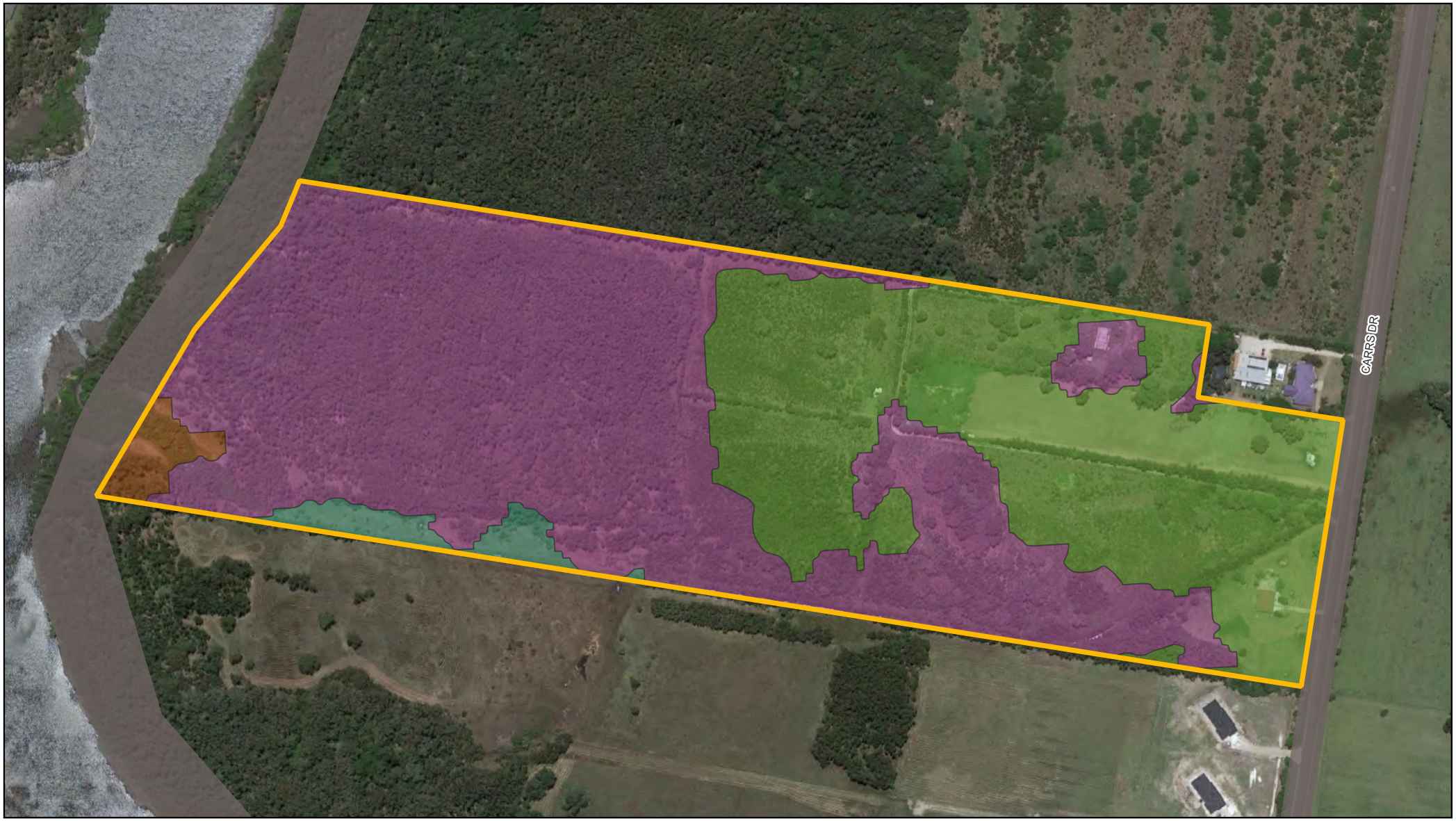

Figure 7: State Vegetation Type Mapping v 1.1.0

Clifton Yamba Land
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Plant Community Types
- 3987 - Far North Floodplain Paperbark-Swamp Oak Forest
- 4091 - Grey Mangrove-River Mangrove Forest
- 4103 - Sporobolus virginicus Saltmarsh
- 0 - Not classified
- Site boundary

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0 75 150 m

GDA 2020 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 2020
Units: Meter

3.4.2 Plot-based vegetation surveys

A field-based vegetation survey was used to strategically assess native vegetation within the development footprint and the retained vegetation between the western perimeter of the development footprint and Oyster Channel. Noticeable variation in vegetation condition across the site was used to classify distinct vegetation zones. Survey effort was undertaken in accordance with the number of plots specified in Table 3 of the BAM (NSW Government 2020a). Plots were not located in or near ecotones, vehicle tracks and their edges, or other disturbed areas that were not representative of the broad condition state of the vegetation zone.

Data was recorded on tablets using the Fulcrum™ application loaded with Geographic Information System layers to enable plot locations, plot data and observations to be recorded in the field with Geographic Positioning System coordinates. Plot survey and flora species data are presented in Appendix 4 and plot locations are mapped in Figure 8. Vegetation assessment within each BAM plot includes composition, structure and function attributes (Table 2).

Table 2 Data recorded within a BAM plot

Attribute	Description	Area
Composition	Species richness (genus and species), status (native/exotic) and growth form	400 m² (20 x 20 m)
Structure	Percent foliage cover and abundance	400 m² (20 x 20 m)
Function	Number of large trees, plant regeneration, tree stem size class, length of fallen logs, litter cover, number of hollow-bearing trees and high threat exotic vegetation cover	1,000 m² (50 x 20 m)

3.4.3 Confirmation of Plant Community Types and area of impact

The landscape position on the coastal floodplain, dominant species and floristic composition were used to compare with legacy vegetation community descriptions in the BioNet Vegetation Classification (NSW Government 2017a). Two legacy PCTs were confirmed within the development footprint (Table 3):

- **PCT 1064** – Paperbark swamp forest of the coastal lowlands of the NSW north coast Bioregion and Sydney Basin Bioregion
- **PCT 1235** – Swamp oak swamp forest of the coastal lowlands of the NSW north coast bioregion

In addition, PCT 1125 – Saltmarsh complex of the NSW North Coast Bioregion and PCT 916 – Mangrove - Grey Mangrove closed forest of the NSW Coastal Bioregion occur within the site boundary. These communities are associated with the 2nd order stream, to the west of the development footprint and will be retained.

The area of impact resulting from the proposed development is contained within the development footprint and is entirely within land zoned R1. All native vegetation within the R1 zoned land will be removed. The total area of native vegetation to be impacted is approximately 8.3 ha (Table 3).

Table 3 PCTs recorded within the site boundary, with associated TECs and extent within the development footprint

Current PCT ID	Current PCT	Legacy PCT	Legacy PCT description	Associated BC Act listed TEC	Associated EPBC Act listed TEC	Condition class	Vegetation status	Vegetation zone	Number of BAM plots	Area in clearing footprint (ha)	Area in retained vegetation (ha)
3987	Far North Floodplain Paperbark-Swamp Oak Forest	1064	Paperbark swamp forest of the coastal lowlands of the NSW north coast Bioregion and Sydney Basin Bioregion	Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions (Endangered)	Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland (Endangered)	High Condition Class A	Mature	zone 4	2	0.22	4.77
						High Condition Class B1	Regrowth	zone 2	3	3.86	0
								zone 3	1	1.28	0
		1235	Swamp oak swamp forest of the coastal lowlands of the NSW north coast bioregion	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (Endangered)	Coastal Swamp Oak (*Casuarina glauca*) of New South Wales and South East Queensland (Endangered)	High Condition Class C	Mature	zone 6	1	0	2.01
						High Condition Class C	Regrowth	zone 5	1	1.34	0.12
				Not TEC	Not TEC	N/A	Regrowth	zone 1	1	1.63	0
4103	*Sporobolus virginicus* Saltmarsh	1125	Saltmarsh complex of the NSW North Coast Bioregion	Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (Endangered)	Subtropical and Temperate Coastal Saltmarsh (Vulnerable)	N/A	Mature	zone 7	1	0	0.34
4091	Grey Mangrove-River Mangrove Forest	916	Mangrove - Grey Mangrove low closed forest of the NSW Coastal Bioregion	None	None	N/A	Mature	zone 8	0	0	0.34
0	Non-native vegetation, including cleared	None	None	None	None	N/A	Non-native	N/A	0	1.74	0
								Total	10	10.07	7.58

Diagnostic species identified in the paperbark swamp forest (legacy PCT 1064) include broad-leaved paperbark (*Melaleuca quinquenervia*) which is dominant across most of the site as either mature trees or regrowth, patches of swamp oak (*Casuarina glauca*) regrowth and scattered mature individuals of swamp box (*Lophostemon suaveolens*), prickly tea tree (*Melaleuca stypheloides*) and cheese tree (*Glochidion ferdinandi*). Ground stratum species typical of the community occur across the site in response to inundation and include bare twig-rush (*Baumea juncea*), tall saw-sedge (*Gahnia clarkei)*, *Juncus* sp. and *Carex* sp. The native climber, common silkpod (*Parsonsia straminea*) was prolific through this community.

The swamp oak swamp forest community (legacy PCT 1235) extends from the tidally influenced drainage line along the southern boundary. Mature swamp oak trees dominate the canopy, with broad leaved paperbark and swamp bottlebrush (*Callistemon salignus*) scattered sparsely in the midstorey, and swamp hibiscus (*Hibiscus diversifolius*), patches of bare twig-rush (*Baumea juncea*), and the salt tolerant *Juncus krausii* in the understorey. Common silkpod is prevalent in the midstorey and canopy. Regrowth of the swamp oak occurs as scattered patches fringing drains on the site and this community may have had a larger extent prior to clearing and modification of hydrology.

3.4.4 Vegetation zones and vegetation integrity

Native vegetation across the site has been placed into eight vegetation zones reflecting the vegetation composition, structure and condition states observed within the impacted area (Table 4). The impacted areas within the development footprint contain five vegetation zones.

The area of PCT 1064 within the development footprint is divided into three vegetation zones broadly based on growth stage, structure and impact of weed species:

- Zone 2 – good quality regrowth dominated by native species with scattered mature trees and low weed cover
- Zone 3 – mature stand of vegetation with mixed native canopy and midstorey species exhibiting moderate cover of woody weeds
- Zone 4 – established paperbark dominated forest with good structure and canopy cover with low weed cover and diversity (only the eastern edge of this zone lies within the development footprint so most of Zone 4 will be retained).

The area of PCT 1235 within the development footprint occurs in two zones:

- Zone 1 – poor quality regrowth with sparse tree regeneration and dominated by exotic grasses and woody weeds
- Zone 5 - swamp oak dominated forest with native canopy, poor regeneration of native species in the midstorey, and containing exotic climbing, woody, and grass species.

The plot data for vegetation zone 1 was superseded with data collected during supplementary survey efforts in response to the RFI. Both the superseded plot data (Plot 3) and the revised plot data (Plot 11) are summarised in Appendix 4.

The plot-based vegetation survey data, inclusive of the revised data for vegetation zone 1, was entered into the BAM calculator to produce the current Vegetation Integrity (VI) score for each vegetation zone, reflecting the condition scores of composition, structure and function components for each vegetation zone (Table 4).

Table 4 Vegetation integrity scores for vegetation zones within impacted areas

Zone	Legacy PCT	Plot/s	PCT common name	Condition class	Area (ha)	Composition condition score	Structure condition score	Function condition score	VI score
1	1235	11	Swamp oak swamp forest of the coastal lowlands of the NSW north coast	Poor	1.63	49.1	28.8	39.3	38.2
2	1064	1,4,7	Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion	Good	3.86	62.8	88.2	42.1	61.5
3	1064	2	Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion	Moderate	1.28	59.2	39.9	73.8	55.9
4	1064	1	Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion	Very good	0.22	79.9	97	50.3	73.1
5	1235	5	Swamp oak swamp forest of the coastal lowlands of the NSW north coast bioregion	Poor	1.34	35.3	89.7	38.9	49.7
				Total	8.33				

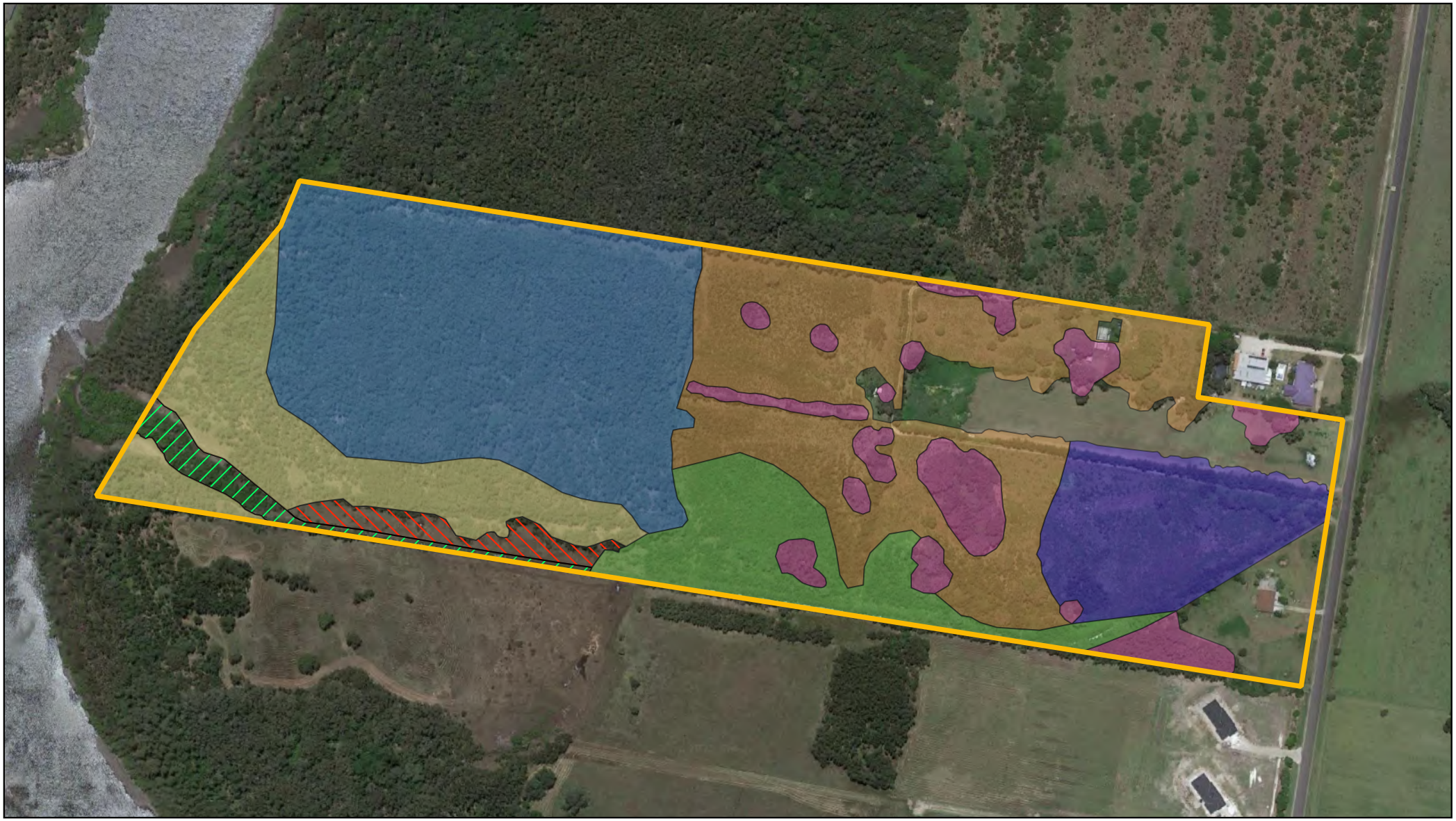

Figure 8: Vegetation zones

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0 75 150 m

GDA 2020 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 2020
Units: Meter

3.4.5 Identification of Threatened Ecological Communities

Field-verified TECs listed under the NSW BC Act within the site are shown in Figure 9. Legacy PCTs 1064 and 1235 (both subsumed into PCT 3987 under the Eastern NSW PCT Classification C2.0.M2.0) are each associated with TECs listed as endangered under the NSW BC Act and under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Table 3). All vegetation zones corresponding with PCT 1064 and 1235 within the site were consistent with the descriptive attributes of the associated BC Act listed TEC; Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions, and Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions, respectively. Most areas also met diagnostic criteria for EPBC Act listed TEC, except one area of PCT 1235, designated as zone 1, which did not meet EPBC Act listed TEC diagnostic criteria due to an overabundance of exotic species.

A 0.34 ha area of legacy PCT 1125 (now PCT 4103 - *Sporobolus virginicus* Saltmarsh) was recorded within the south-west corner of the site, outside of the development footprint (Figure 9). The narrow drainage line running along the southern property border bisects the patch; however, patch contiguity is maintained with the adjacent mangrove and saltmarsh vegetation to the south of the site. In total, the patch of saltmarsh inclusive of vegetation outside the site boundary is 3.55 ha. This community is listed as Endangered under the NSW BC Act and Vulnerable under the EPBC Act and the patch present within vegetation to be retained is consistent with the descriptive and diagnostic criteria for both BC Act and EPBC Act TEC listings.

The BC Act listed TEC status of each vegetation zone was entered into the BAM calculator, while the EPBC Act listed TECs were referred for assessment under the EPBC Act (EPBC 2022/09340).

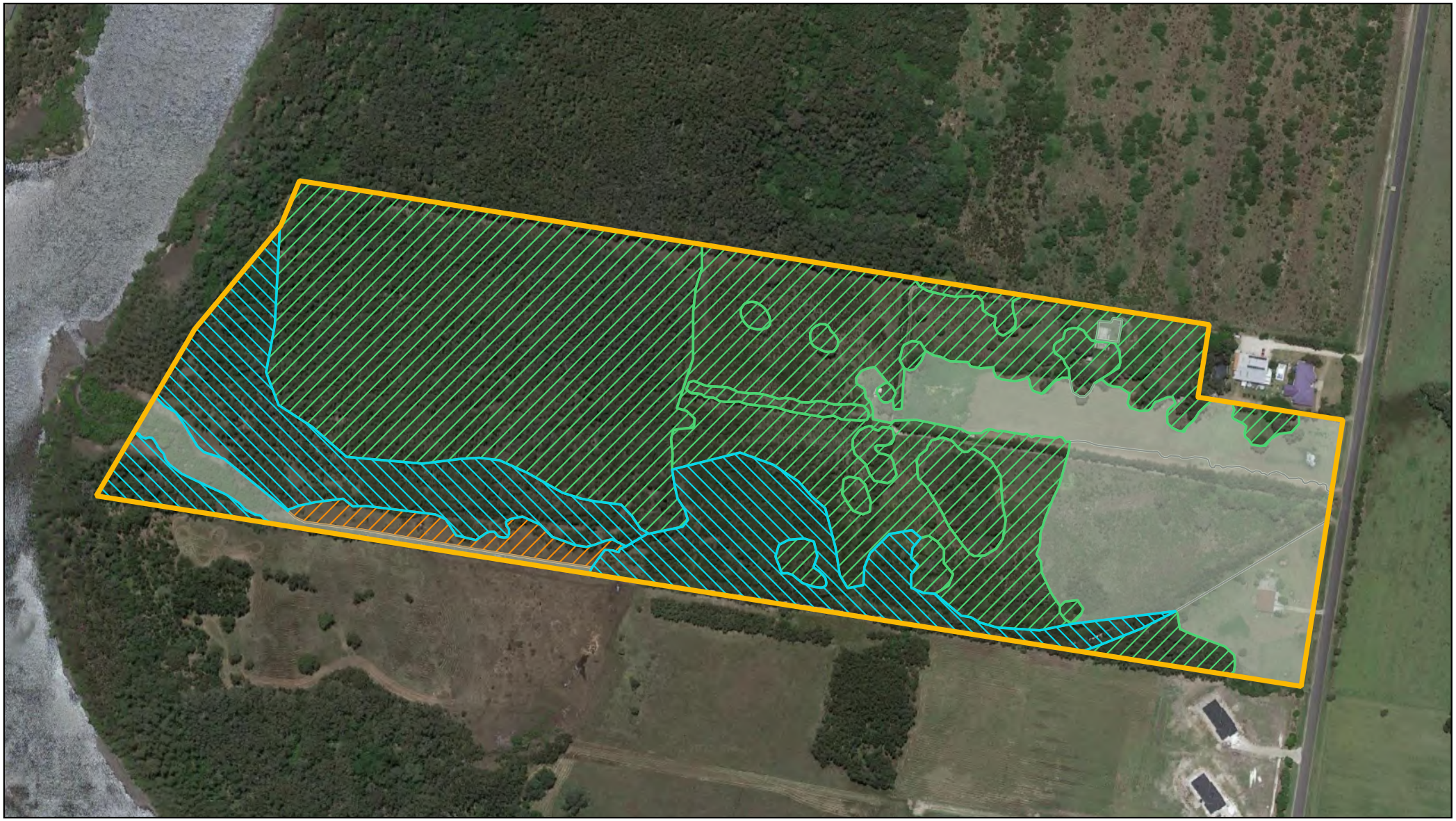

Figure 9: Threatened ecological communities on site

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4 Assessing habitat suitability for threatened species

Flora species identified during surveys are summarised in Appendix 4 and Appendix 5. Fauna species identified during surveys are summarised in Appendix 6.

4.1 Ecosystem credit and species credit threatened species

The BAM calculator generated 41 ecosystem credit (predicted) threatened species and 67 species credit (candidate) threatened species. The full list of predicted and candidate threatened species derived from the BAM calculator are presented in Appendix 7 and Appendix 8 respectively.

4.1.1 Assessment of habitat suitability for predicted ecosystem credit species

Predicted threatened species were assessed in conjunction with information collected about site context of the subject land, vegetation integrity attributes, and data from the TBDC (DPE 2023). Information on geographic limitations and habitat constraints were assessed in relation to the site to determine the likely presence of predicted threatened species.

4.1.2 Assessment of habitat suitability and habitat survey for candidate species credit species

Information from the TBDC including associated vegetation types, habitat features, geographic limitations, and habitat constraints were used to assess the potential presence of each candidate species on the site (DPE 2023). An assessment of habitat constraints and/or geographic limitations determined 15 candidate species credit species are not present and were excluded from targeted surveys (Table 5).

Notably, excluded candidate species included grey-headed flying fox (*Pteropus poliocephalus*), which spotlighting surveys determined to be utilising foraging resources within the site. Species credits only apply to this species when a breeding camp is present; however, this species is a dual credit species and ecosystem credits are therefore attributed to the foraging habitat.

The remaining 27 flora species and 25 fauna species were surveyed (Table 6, Figure 11, Figure 12, Figure 13, Figure 14, Appendix 8). Observations were carried out during field surveys to support vegetation identification and habitat assessments, and to determine suitable locations for motion-capture camera and Anabat bioacoustics recording device deployment. Additionally, fauna survey methods included searching for secondary signs and primary sightings, incorporating both daytime transects and nocturnal spotlighting. Survey effort is detailed in Table 6 and depicted in Figure 11 and Figure 13.

Table 5 Predicted and candidate threatened species assessed as not present at the site

Threatened species	Common name	Habitat / geographic constraint	Justification for exclusion	Sensitivity to gain class
Candidate				
Anthochaera phrygia	Regent honeyeater	Mapped important areas for breeding.	The proposed development site is not located within a mapped important area for this species	High
Argynnis hyperbius	Laced fritillary	Found in open swampy coastal habitat. Eggs are laid singly on a leaf of the caterpillar's food plant, the Arrowhead Violet (*Viola betonicifolia*).	Habitat degraded. Poor quality habitat and surveys determined host plant not present on site	High
Calyptorhynchus lathami	Glossy black-cockatoo	Hollow bearing trees, living or dead trees with hollows greater than 15 cm and above 8m off the ground	No hollow bearing trees in regrowth and paperbark dominated communities	High
Chalinolobus dwyeri	Large-eared pied bat	Cliffs, within two km of rocky areas containing caves, overhangs, escarpments, outcrops or crevices or within 2 km of old mines or tunnels	Habitat features such as these were not identified on the site or within 2 km of the site	Very high
Davidsonia jerseyana	Davidson's plum	North of Ballina	Site is south of Ballina	High
Diploglottis campbellii	Small-leaved tamarind	North of Ballina	Site is south of Ballina	High
Gossia fragrantissima	Sweet myrtle	North of Evans Head	Site is south of Evans Head	High
Lathamus discolor	Swift parrot	As per mapped area	The proposed development site is not located within a mapped important area for this species	High
Macadamia tetraphylla	Rough-shelled bush nut	North of Coraki	Site is south of Coraki	High
Ninox connivens	Barking owl	Hollow bearing trees, living or dead trees with hollows greater than 20 cm and above 4 m off the ground	No hollow bearing trees in regrowth and paperbark dominated communities	High
Ninox strenua	Powerful owl	Hollow bearing trees, living or dead trees with hollows greater than 20 cm	No hollow bearing trees in regrowth and paperbark dominated communities	High
Ochrosia moorei	Southern ochrosia	North of Richmond River	Site is south of Richmond River	High
Oldenlandia galioides	Sweet false galium	-	Not in known locations of Whiporie or Tweed	High
Pteropus poliocephalus	Grey-headed flying-fox	Breeding camps	Foraging habitat verified; however, no breeding camps present on site	High
Syzygium hodgkinsoniae	Red lilly pilly	North of Richmond River	Site is south of Richmond River	High

4.1.2.1 Survey effort

Three rounds of targeted surveys were undertaken within the survey windows for species requiring assessment (Table 6, Appendix 8). Round 1 was completed in September 2021, round 2 was carried out during December 2021 to February 2022 and round 3 was undertaken between June 2023 and January 2024. Round 3 surveys extended the search effort to retained habitat outside the development footprint and allowed Stage 1 of the BAM to be applied to the entire site (Lot 2 DP733057 and Lot 32 DP1280863) as requested in the RFI. Survey effort on the site is detailed in Table 6. All flora records are provided in Appendix 4 and Appendix 5, and all fauna records are provided in Appendix 6.

All survey effort was carried out in accordance with the relevant survey and assessment guidelines listed below:

- Ecosure's Scientific License (SL100075)
- Ecosure's Animal Care and Ethics Committee Certificate of Approval - Fauna Surveys Research Protocol (18/739)
- Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (NSW Government 2004)
- BAM (NSW Government 2020a)
- Koala (*Phascolarctos cinereus*) BAM Survey Guide (DPE 2022)
- The Spot Assessment Technique (SAT): A tool for determining localised levels of habitat use by Koalas *Phascolarctos cinereus* (Phillips and Callaghan 2011).
- 'Species credit' threatened bats and their habitats: NSW survey guide for the BAM (NSW Government 2018c)
- NSW Survey Guide for Threatened Frogs: A guide for the survey of threatened frogs and their habitats for the BAM (NSW Government 2020b)
- Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA 2010a)
- Surveying threatened plants and their habitats: NSW survey guide for the BAM (NSW Government 2020e)
- Survey guidelines for Australia's threatened bats: Guidelines for detecting bats listed as threatened under the EPBC Act (DEWHA 2010b)
- Survey guidelines for Australia's threatened frogs: Guidelines for detecting frogs listed as threatened under the EPBC Act (DEWHA 2010c)
- Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the EPBC Act (DSEWPAC 2011)
- Draft Survey Guidelines for Australia's Threatened Orchids (DoE 2013b).

Area values for vegetation zones and TECs reported in the initial BDAR and MNES assessment were revised to include adjacent isolated mature trees, and to more closely reflect

variation in canopy dominance by *M. quinquenervia* and *C. glauca* as requested in the joint RFI issued by CVC and the BCD of the NSW DPE (Appendix 1).

Figure 11 presents the cumulative fauna survey effort applied at the site, while Figure 12 presents the tracklogs of traverses targeting Mitchell's rainforest snail over 4 visits.

Targeted surveys were not carried out for the eastern (common) planigale due to dangers of pitfall trapping to this species (and other small fauna species) during wet weather which frequently inundated the site throughout the survey period. The eastern (common) planigale has therefore been assumed present on the site. Targeted surveys were carried out for the remainder of the 27 candidate flora species and 25 candidate fauna species associated with the site, which are listed in Appendix 8.

Figure 13 presents the cumulative threatened flora survey effort applied at the site over 8 visits. Figure 14 presents only those flora survey transects carried out in December 2023 and January 2024, targeting *Rotala tripartita*, which is known to occur on lots directly adjacent to Carrs Drive and is at risk of Serious and Irreversible Impact (SAII). This entity is discussed further in Section 4.1.2.3 and Section 8.1.

Rotala tripartita proliferates in response to rainfall and surveys are required to be carried out within 6 months of soaking rain (DPE 2023). The nearby Yamba Pilot weather station recorded over 700 mm of rainfall in 2023 (BOM 2024, Figure 10). The six months preceding the summer 2023-2024 surveys (June – November 2023) recorded 177.8mm of rainfall (BOM 2024, Figure 10, Table 6). During the summer survey period, rainfall records were 107.4 mm in November, 69.4 mm in December 2023 and 125.4 mm in January 2024.

Table 6 outlines the fauna, flora and vegetation survey effort applied across the site, targeting listed threatened flora and fauna, critical habitat features and TECs. Plot data and species lists are presented in Appendix 4, Appendix 5 and Appendix 6.

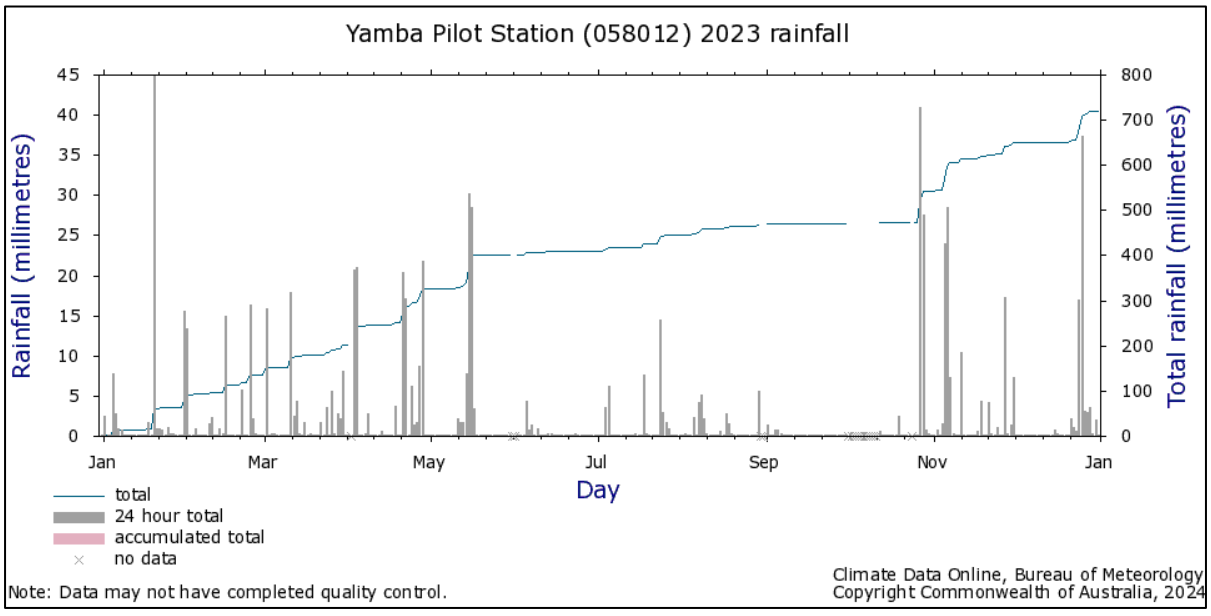

Figure 10 Yamba Pilot Station - rainfall statistics for 2023 (BOM 2024)

Table 6 Survey effort

Date	Rainfall in preceding month	Survey type	Survey requirements	Survey methods	Survey effort
Round 1 – September 2021					
22nd – 23rd September 2021	Total rainfall for August 2021: 8.8 mm Total rainfall for September 2021: 35.2 mm	Diurnal bird	Point surveys, as described in the Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA 2010a)	Systematic bird surveys (point surveys, 20 mins each) were conducted at three locations across the impacted area before 9 am. All bird species observed or heard were recorded during the survey period. Opportunistic observations were also recorded during site surveys.	Total 1 hour
21st – 23rd September 2021		Ecosystem surveys / targeted flora and fauna habitat surveys	BAM (NSW Government 2020a) Surveying threatened plants and their habitats – NSW survey guide for the BAM (DPIE 2020c) Area searches (DEWHA 2010a) SAT (Phillips and Callaghan 2011) Search for secondary signs (scats, tracks, chews, caches, diggings, scrapes, burrows)	BAM plot surveys were carried out by two surveyors to confirm vegetation communities on the site. Two surveyors conducted parallel traverses at up to 10 m intervals across the impacted area of vegetation to identify threatened flora species and important habitat components.	Total 24 hours
21st September 2021 – 15th October 2021		Motion sensor camera	Deployment of approximately 10 camera traps per ha for a minimum of 14 nights as per Survey Guidelines for Australia's Threatened Mammals (DSEWPAC 2011).	Seven (7) motion sensor cameras (white flash) were deployed at separate locations across the site to aid in the detection of threatened ground and arboreal dwelling fauna species over three weeks. Cameras were set up either 2 m above ground level in trees or between 0.5 m and 1 m above ground level and approximately 2 m from a bait station. Bait was comprised of truffle oil mixed with oats and peanut butter. Honey diluted in water was sprayed on trees or logs in the vicinity of the bait station.	Total 161 survey days
21st – 22nd September 2021		Nocturnal spotlighting	Night time survey and foraging resource surveys as per Survey guidelines for	Two surveyors used handheld 400 lumen spotlights to detect 'eye shine' and/or 'silhouette' of	Total 8 hours

Date	Rainfall in preceding month	Survey type	Survey requirements	Survey methods	Survey effort
			Australia's threatened bats (DEWHA 2010b)	nocturnal fauna. Surveyors traversed the subject land on foot for a period of two hours on two separate nights during calm weather. Species identification was conducted by experienced personnel.	
Round 2					
1st – 2nd December 2021 20th – 21st January 2022	Total rainfall for November 2021: 70.6 mm	Amphibian (nocturnal search)	Using a combination of call detection, call playback and spotlight surveys for a minimum of four nights as per Survey guidelines for Australia's threatened frogs (DEWHA 2010c)	Point call survey and nocturnal searches were carried out at a small ephemeral freshwater soak and areas of inundation on the site over two consecutive nights following heavy rainfall events, during warm weather conditions. Opportunistic frog observations were also recorded during site surveys.	Total 8 hours
1st – 2nd December 2021		Nocturnal spotlighting	Night time survey and foraging resource surveys as per Survey guidelines for Australia's threatened bats (DEWHA 2010b)	Two surveyors used handheld 400 lumen spotlights to detect 'eye shine' and/or 'silhouette' of nocturnal fauna. SurveyoAlso rs traversed the subject land on foot for a period of two hours on two separate nights during calm weather. Species identification was conducted by experienced personnel.	Total 8 hours
26th January 2022	Total rainfall for December 2021: 308.4 mm	Targeted fauna and flora surveys	Surveying threatened plants and their habitats – NSW survey guide for the BAM (DPIE 2020c)	Potential suitable habitat, particularly of the healthiest vegetation within the impact area, was searched for threatened flora species and important habitat components. Two surveyors conducted a combination of transects up to 10 m apart and random meanders based on the accessibility of the vegetation.	Total 8 hours
4th – 12th February 2022	Total rainfall for January 2022:168.8 mm	Microbat detection	'Species credit' threatened bats and their habitats: NSW survey guide for the BAM (NSW Government 2018c)	Deployment of one Anabat Swift unit in a potential flyway adjacent an ephemeral freshwater soak for eight nights.	Total 8 nights
26th January 2022 – 28th February 2022		Motion sensor camera	Deployment of approximately 10 camera traps per ha for a minimum of 14 nights as per Survey Guidelines for	Nine (9) motion sensor cameras (white flash) were deployed in habitat containing large trees at an intensity to target brush-tailed phascogale in	Total 288 survey days

Date	Rainfall in preceding month	Survey type	Survey requirements	Survey methods	Survey effort
			Australia's Threatened Mammals (DSEWPAC 2011). Methods as per Koala (*Phascolarctos cinereus*): BAM Survey Guide (DPE 2022a)	potential habitat. Cameras were set up 2 m above ground level in trees and approximately 2 m from a bait station. Cameras were deployed for 4 weeks each and rebaited after approximately 2 weeks. Bait mix of oats and peanut butter with honey diluted in water sprayed on trees or logs in the vicinity of the bait station.	
Round 3 – in response to RFI					
6th -7th June 2023	Total rainfall for May 2023: 74.4 mm	BAM floristic plots	BAM (NSW Government 2020a)	Floristics plots were established in accordance with the BAM (DPIE 2020), targeting each of the three mapped and ground-truthed vegetation communities at the rear of the site, aimed at assessing vegetation composition and integrity, assessing key diagnostic criteria and condition thresholds for TEC and extending prior survey efforts.	Three BAM plots
6th -7th June 2023		Threatened flora surveys	Surveying threatened plants and their habitats – NSW survey guide for the BAM (DPIE 2020c)	Threatened flora traverses were carried out at 10 m intervals in accordance with NSW survey guidelines for threatened plants and their habitats (NSW Government 2020e). Surveys included vegetation in the western section of the site to extend prior survey efforts.	Total 12 hours –transects at 5- 10 m intervals
6th -7th June 2023		Targeted fauna surveys	Methods as per: Koala (*Phascolarctos cinereus*): BAM Survey Guide (DPE 2022a) Survey guidelines for Australia's threatened bats (DEWHA 2010b) Mitchell's Rainforest Snail *Thersites mitchellae* recovery plan (NSW National Parks and Wildlife Service 2001) 'Species credit' threatened bats and their habitats: NSW survey guide for the	Targeted diurnal surveys were carried out to extend upon existing search efforts for evidence of koala, grey-headed flying fox, Mitchell's rainforest snail and south-eastern glossy black cockatoo: - Spot Assessment Technique (SAT) for koala - secondary sign searches for glossy-black cockatoo and grey-headed flying fox - secondary sign and primary sighting searches for Mitchell's rainforest snail - daytime searches for potentially suitable habitat resources	Total 10 hours, 116 koala habitat trees

Date	Rainfall in preceding month	Survey type	Survey requirements	Survey methods	Survey effort
			BAM (NSW Government 2018c)		
6th June 2023		Nocturnal spotlighting	Nocturnal survey and foraging resource surveys as per Survey guidelines for Australia's threatened bats (DEWHA 2010b)	Targeted nocturnal spotlighting searches were carried out to extend upon prior survey effort for grey-headed flying-fox.	Total 2 spotlighting hours
26th September 2023	Total rainfall for August 2023: 23.6 mm	Targeted flora and fauna surveys	Surveying threatened plants and their habitats – NSW survey guide for the BAM (DPIE 2020c) Methods as per: Mitchell's Rainforest Snail *Thersites mitchellae* recovery plan (NSW National Parks and Wildlife Service 2001)	Threatened flora traverses were carried out at intervals of up to 10 m in accordance with NSW survey guidelines for threatened plants and their habitats (NSW Government 2020e). Surveys included vegetation in the western section of the site to extend prior survey efforts.	Parallel transects at 5-10 m intervals
10th-11th October 2023	Total rainfall for September 2023: 2.6 mm	Targeted flora and fauna surveys and Vegetation zone mapping	Surveying threatened plants and their habitats – NSW survey guide for the BAM (DPIE 2020c) Methods as per: Mitchell's Rainforest Snail *Thersites mitchellae* recovery plan (NSW National Parks and Wildlife Service 2001)	Threatened flora traverses were carried out at intervals of up to 10 m in accordance with NSW survey guidelines for threatened plants and their habitats (NSW Government 2020e). Surveys included vegetation in the western section of the site to extend prior survey efforts.	Parallel transects at 5-10 m intervals
4th-5th December 2023	Total rainfall for November 2023: 107.4 mm	Targeted flora and fauna surveys (targeting species including *Rotala tripartita*)	Surveying threatened plants and their habitats – NSW survey guide for the BAM (DPIE 2020c) Methods as per: Mitchell's Rainforest Snail *Thersites mitchellae* recovery plan (NSW National Parks and Wildlife Service 2001)	Threatened flora traverses were carried out at intervals of up to 10 m in accordance with NSW survey guidelines for threatened plants and their habitats (NSW Government 2020e). Surveys included vegetation in the western section of the site to extend prior survey efforts.	Parallel transects at 5-10 m intervals

Date	Rainfall in preceding month	Survey type	Survey requirements	Survey methods	Survey effort
2nd-3rd January 2024	Total rainfall for December 2023: 69.4 mm	Targeted flora surveys (targeting species including *Rotala tripartita*)	Surveying threatened plants and their habitats – NSW survey guide for the BAM (DPIE 2020c) Methods as per: Mitchell's Rainforest Snail *Thersites mitchellae* recovery plan (NSW National Parks and Wildlife Service 2001)	Threatened flora traverses were carried out at intervals of up to 10 m in accordance with NSW survey guidelines for threatened plants and their habitats (NSW Government 2020e). Surveys included vegetation in the western section of the site to extend prior survey efforts.	Parallel transects at 5-10 m intervals

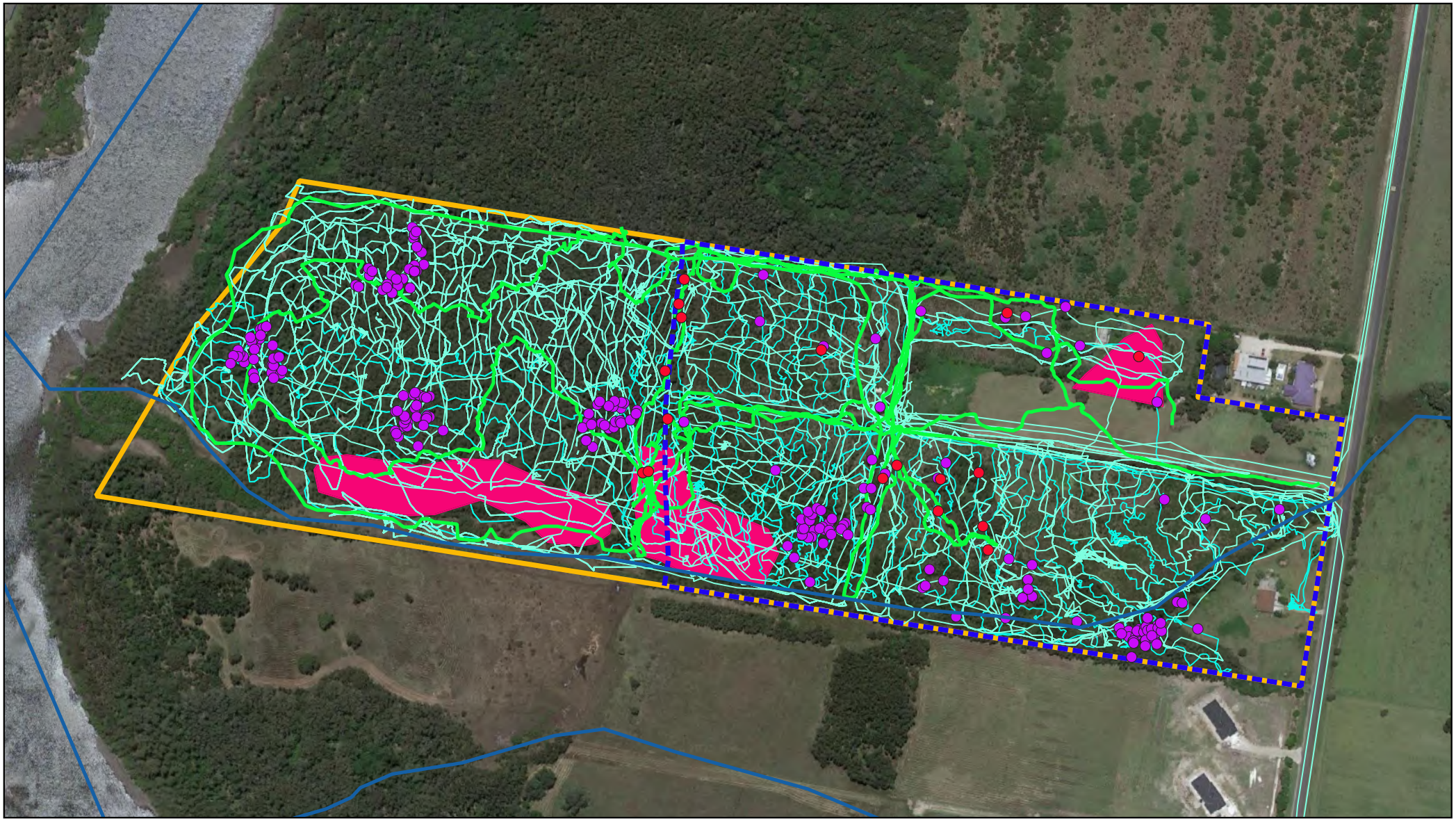

Figure 11: Cumulative fauna survey effort

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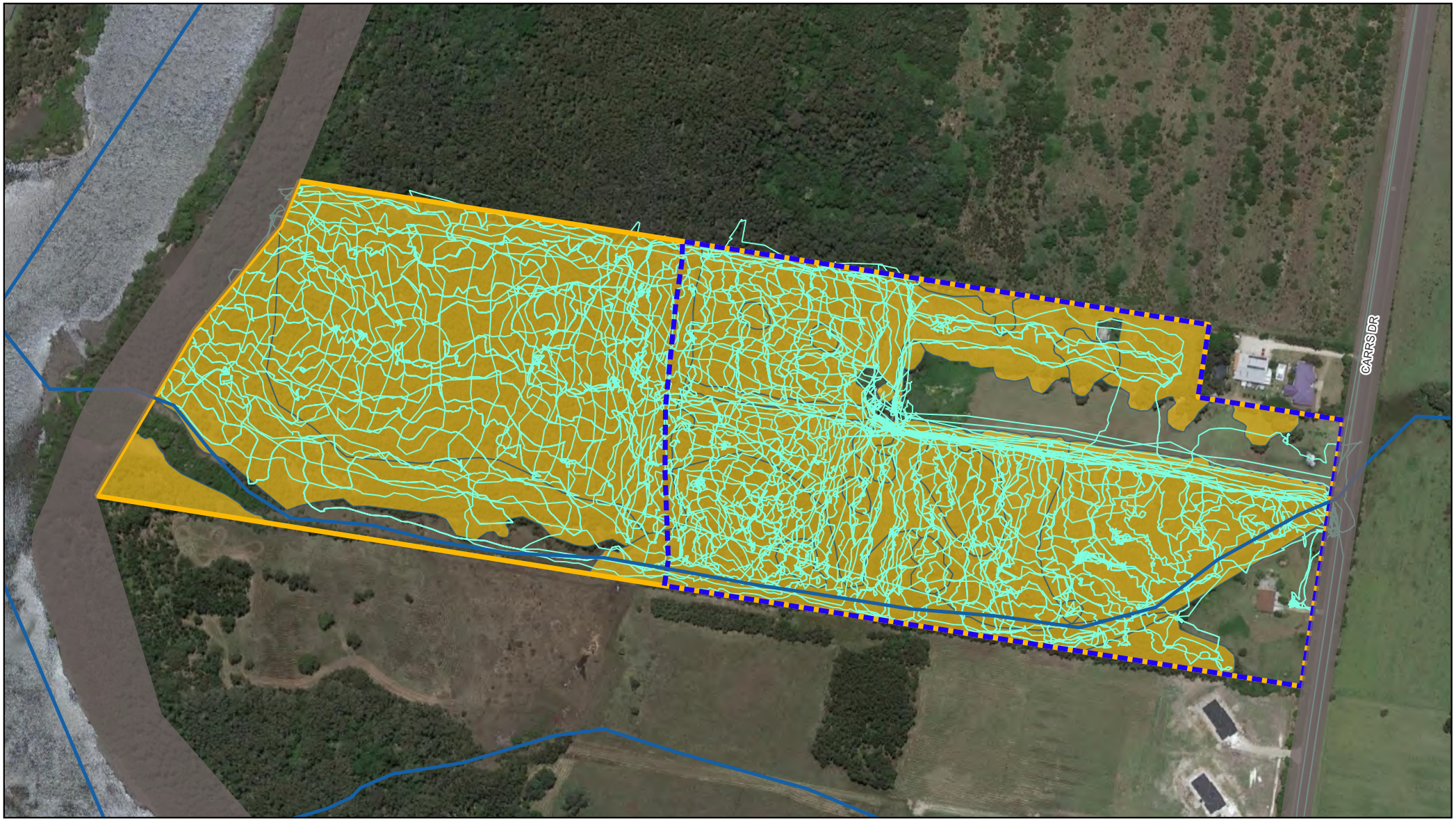

Figure 12: Mitchell's rainforest snail survey effort

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Watercourse
Mitchell's rainforest snail search transects
Associated vegetation types (PCTs 1064 and 1235)
Development footprint boundary
Site boundary

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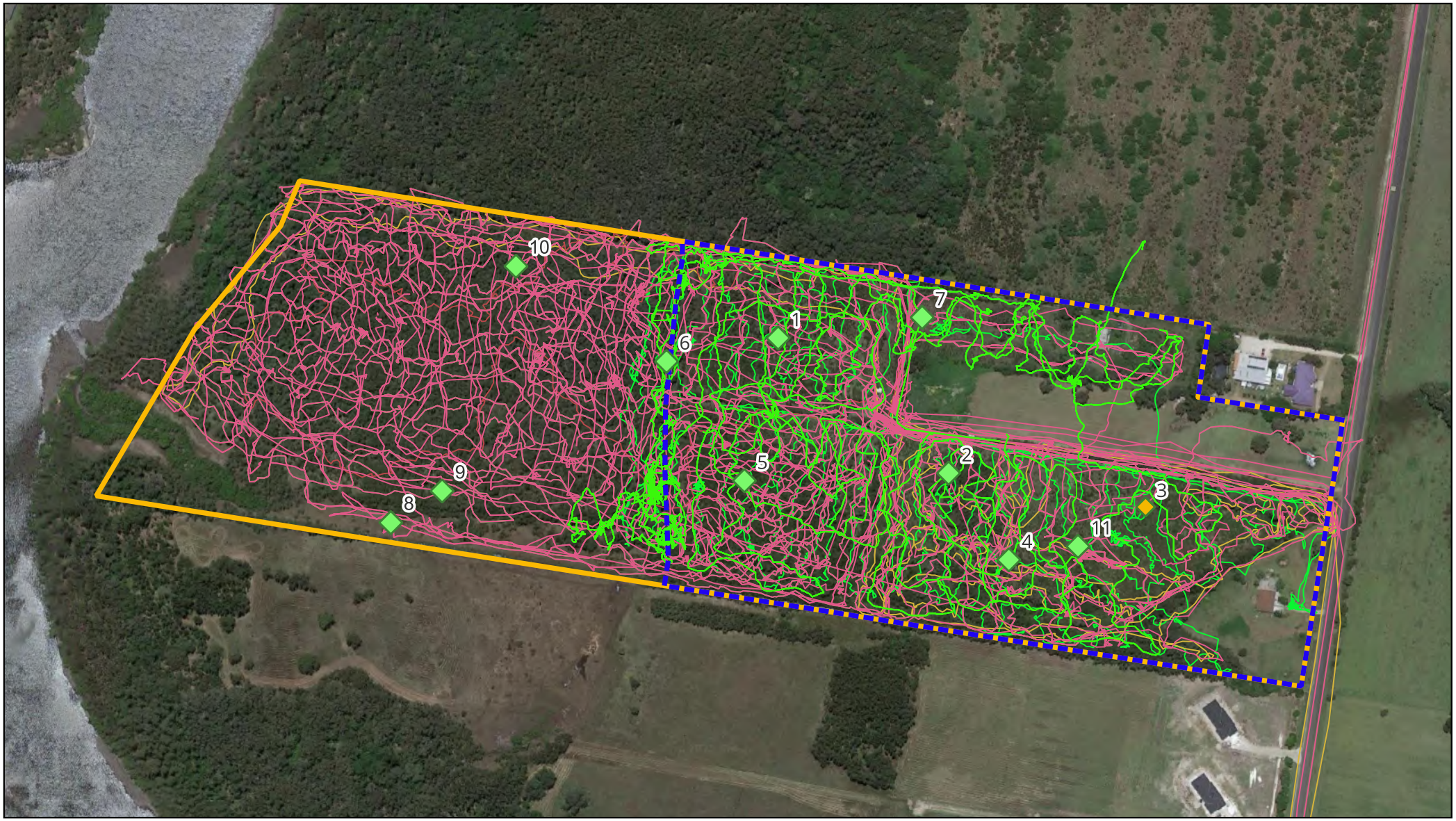

Figure 13: Cumulative threatened flora field survey effort

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Superseded Plot 3

BAM floristic plots

Pre-RFI flora survey tracks

Post-RFI Threatened flora survey tracks

Development footprint boundary

Site boundary

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Author: JT
Date: 23/01/2024

0 75 150 m

GDA 2020 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 2020
Units: Meter

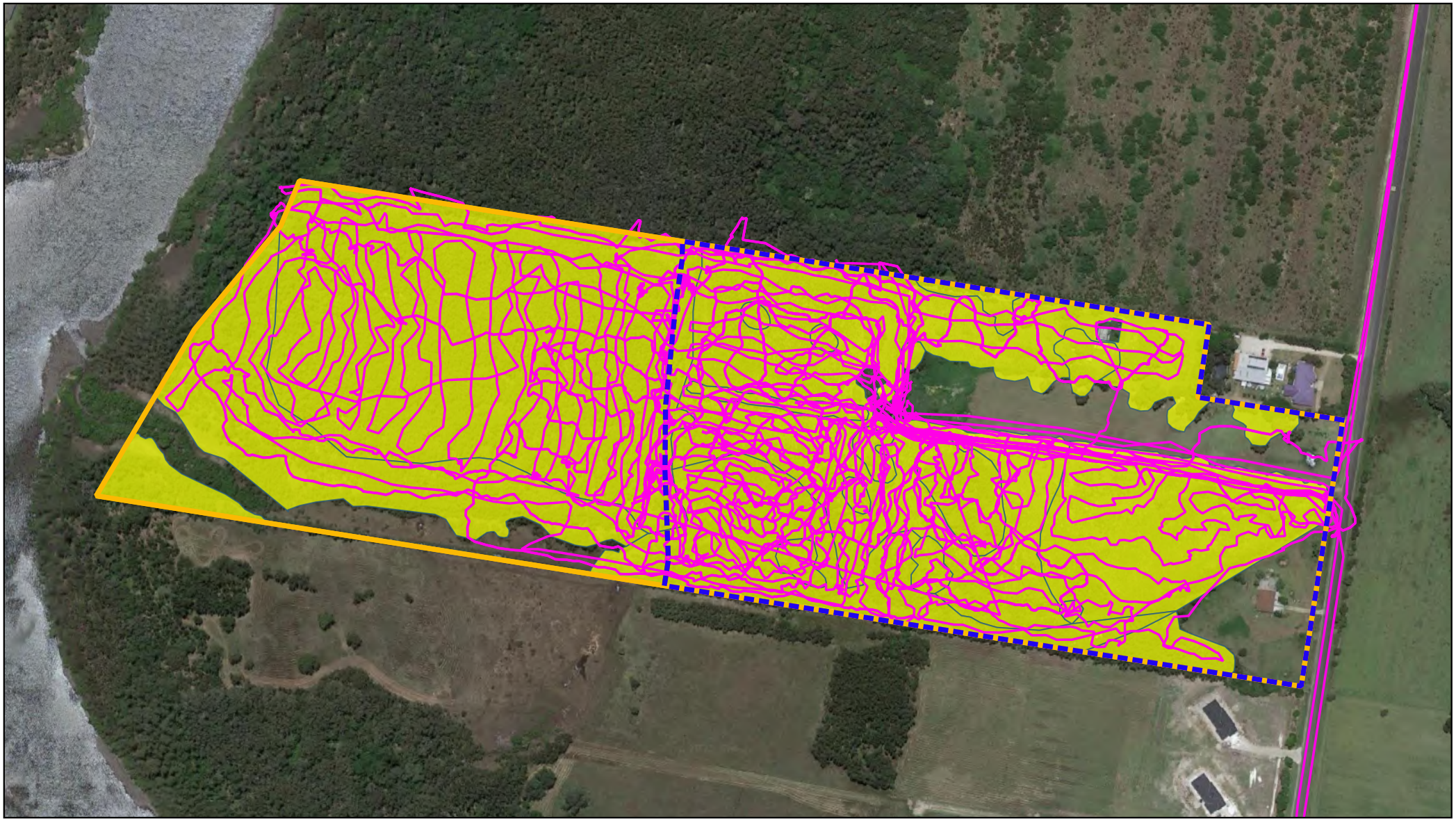

Figure 14: Rotala tripartita field survey effort

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0 75 150 m

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Units: Meter

4.1.2.2 Threatened fauna

Five candidate threatened fauna species were recorded at the site during surveys (Table 7). These include one arboreal mammal species - squirrel glider (*Petaurus norfolcensis*), one megabat species - grey-headed flying fox (*Pteropus poliocephalus*) and three microbat species - little bent-wing bat (*Miniopterus australis*), large bent-winged bat (*Miniopterus orianae oceanensis*) and southern myotis (*Myotis macropus*). One candidate threatened fauna species, the eastern (common) planigale (*Planigale maculata*) was not recorded during surveys but was assumed to be present.

Table 7 Candidate species credit species detected in surveys or assumed present on site

Scientific name	Common name	Survey window	Presence	Biodiversity risk weighting	Species Credit Offsets required
Fauna					
Miniopterus australis	little bent-winged bat	Dec-Feb	Yes (surveyed)	Very high	No
Miniopterus orianae oceanensis	large bent-winged bat	Dec-Feb	Yes (surveyed)	Very high	No
Myotis macropus	southern myotis	Oct-Mar	Yes (surveyed)	High	No
Petaurus norfolcensis	squirrel glider	All year	Yes (surveyed)	High	Yes
Planigale maculata	eastern (common) planigale	All year	Yes (not recorded but assumed present)	High	Yes
Pteropus poliocephalus	grey-headed flying fox	All year	Yes (surveyed)	High	No

Threatened species detected in surveys or assumed present on the site are discussed below. Threatened species with suitable habitat within the impacted areas of the site have been assigned species polygons to show the extent of habitat used to calculate species credits requiring offset.

Eastern (common) planigale

The eastern (common) planigale is a cryptic species difficult to detect. Targeted surveys require a pitfall trap array where substrate allows, or an expert report to confirm likely presence or absence. Planigales inhabit a range of vegetation types including swamp forest communities present on the site. They require a complex ground layer with sufficient cover together with habitat features such as fallen timber and hollow logs (NSW Government 2022). NSW BioNet records for the eastern (common) planigale are widespread along the coast from Port Macquarie to the Queensland border. This species is assumed present on the site due to known species distribution, records of sightings in the vicinity of the site and potential habitat suitability on the floodplain. Discussions with David Milledge, the species expert for the planigale in Northern NSW, confirmed that this species is highly likely to be present at the site. The species polygon for the eastern (common) planigale includes PCT 1235 (Zone 1 and 5) and PCT 1064 (zone 2, 3 and 4) totalling 8.3 ha (Figure 15).

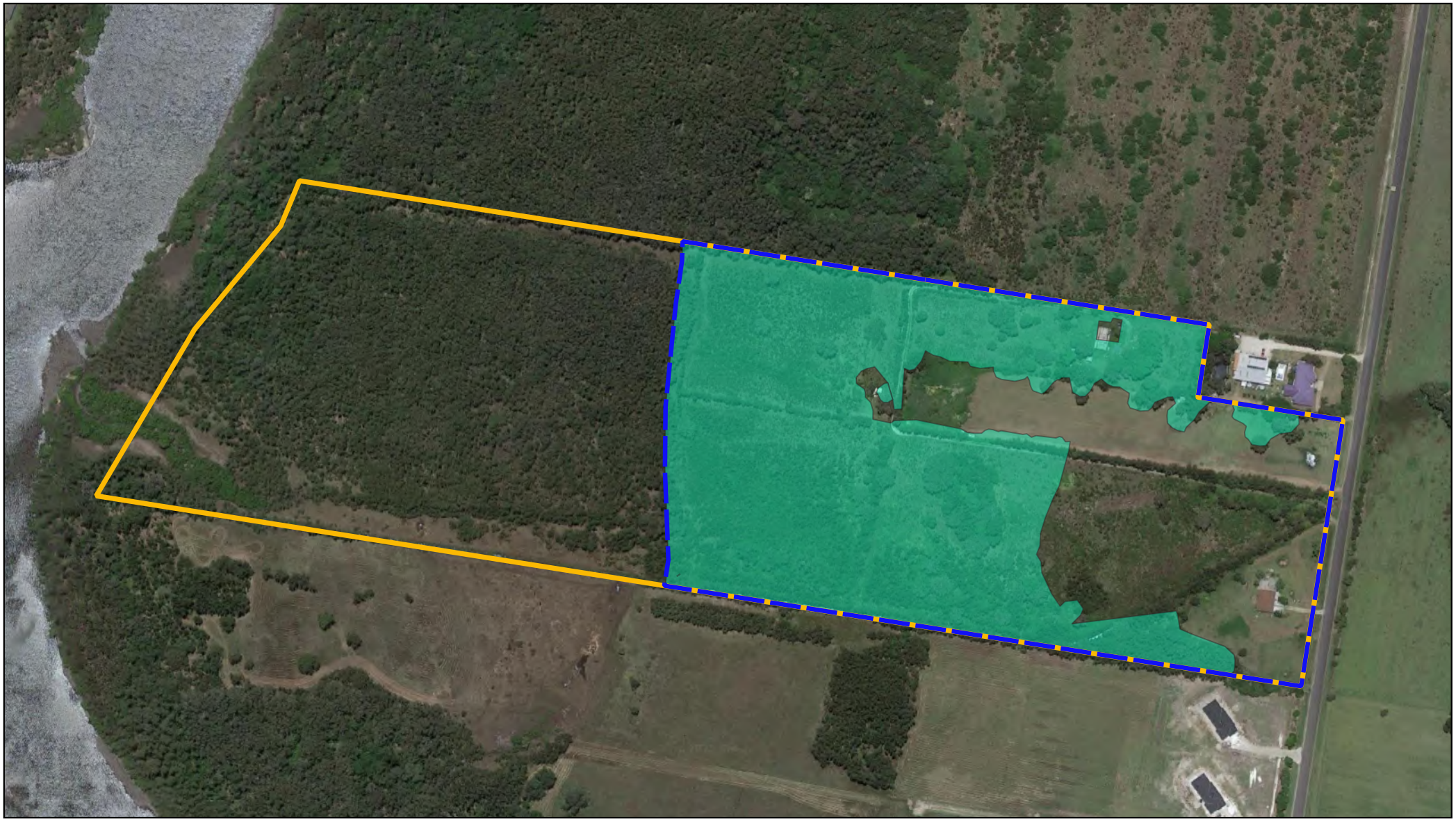

Figure 15: Species polygon for the eastern (common) planigale

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0 75 150 m

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Squirrel glider

Squirrel gliders inhabit open, mature eucalypt forest and woodland with a midstorey containing mixed stands of foraging habitat including *Banksia*, *Melaleuca* and *Acacia* species (Sharp and Goldingay 2007). Abundant hollow-bearing trees are essential habitat components for the squirrel gliders. They are hollow dependent, nesting and denning in large mature or dead eucalypts. The number of den trees used by squirrel gliders ranges from two to 13, of which they use a few frequently and the remaining infrequently, a strategy thought to reduce the risk of predation (Crane et al. 2010).

Squirrel gliders are very similar in appearance to sugar gliders (*P. breviceps*) and can be difficult to separate on appearance. A motion sensor camera deployed on the site recorded multiple images and video of a glider visiting a baited canister in Zone 3. To confirm the identity of the gliders, images were analysed by Dr. Todd Soderquist, an arboreal marsupial expert with NSW DPE and Jess Bracks, Ecosure's Principal Wildlife Biologist. The identification of squirrel gliders was confirmed based on size, facial features, tail shape and thickness. The species polygon for the squirrel glider includes PCT 1064 (zone 2, 3 and 4) totalling 5.35 ha (Figure 16).

Little and large bent-winged bat

The little bent-winged bat roosts in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and forages for small insects beneath the canopy of vegetated habitats at night (NSW Government 2020c). The large bent-winged bat primarily roosts in caves but will also use old mines, stormwater tunnels, buildings, and other man-made structures (NSW Government 2019). The large bent-winged bat forages for moths and other insects above the canopy of native vegetation at night. Both species utilise a broad range of forested vegetation types for foraging.

An anabat detector deployed in February 2022 recorded both little and large bent-winged bats on the site. Data was analysed by experienced fauna ecologist and bat call expert Peter Knock. No potential roost habitat features were located on or adjacent the site and therefore a species polygon has not been generated for breeding habitat for either bent-winged bat species. No species credits have been generated for these species.

Southern myotis

The southern myotis is a species of microbat that occurs along the NSW coast and up to 100 km inland along waterways. It has disproportionately large feet which it uses for foraging over water to catch insects and small fish. They roost in small groups of 10 to 15 individuals close to water in caves, mine shafts, storm water channels, buildings, under bridges, hollow-bearing trees and in dense foliage (NSW Government 2020d).

Anabat surveys confirmed the presence of this species utilising the site, however a suitable water body (at least 3 m width) was not identified on or within 200 m of the boundary of the impact area to generate a species polygon. No species credits have been generated for the southern myotis.

Grey-headed flying fox

The grey-headed flying fox is a megabat that occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, and swamps as well as urban vegetation (DPE 2023). Roosting camps can contain thousands of individuals and are generally located within 20 km from a food source in closed canopy vegetation (DPE 2023). Grey headed flying fox forage on plant blossoms and rainforest fruits including broad-leaved paperbark.

For grey-headed flying fox, the BAM guidelines prescribe a daytime search for breeding camps on the site, followed by a survey to identify breeding females (NSW Government 2018c). The Commonwealth Department of Climate Change, Energy, the Environment and Water requested the provision of supplementary surveys to resolve the discrepancy between State and National survey requirements for this species (Appendix 16). An assessment of nearby camps (DCCEEW 2013) determined that the site is positioned approximately equidistant between two mapped flying fox roost sites (1.9 km each to the northwest and southeast, respectively) known to support grey-headed flying foxes, with an additional three known camps within 5 km. In addition, a Nationally Important Flying-fox Camp is located approximately 12 km to the southwest in Maclean (Figure 7). A daytime roost search did not detect camps within the site; however, targeted nocturnal spotlighting surveys carried out on site in June 2023 identified grey-headed flying foxes utilising the foraging resources on site.

A species polygon was not generated for grey-headed flying fox as no camps were present within the development footprint or site boundary. Grey-headed flying fox is a dual credit species, because breeding camps occupy localised areas while foraging habitat may extend up to 20 km from a camp.

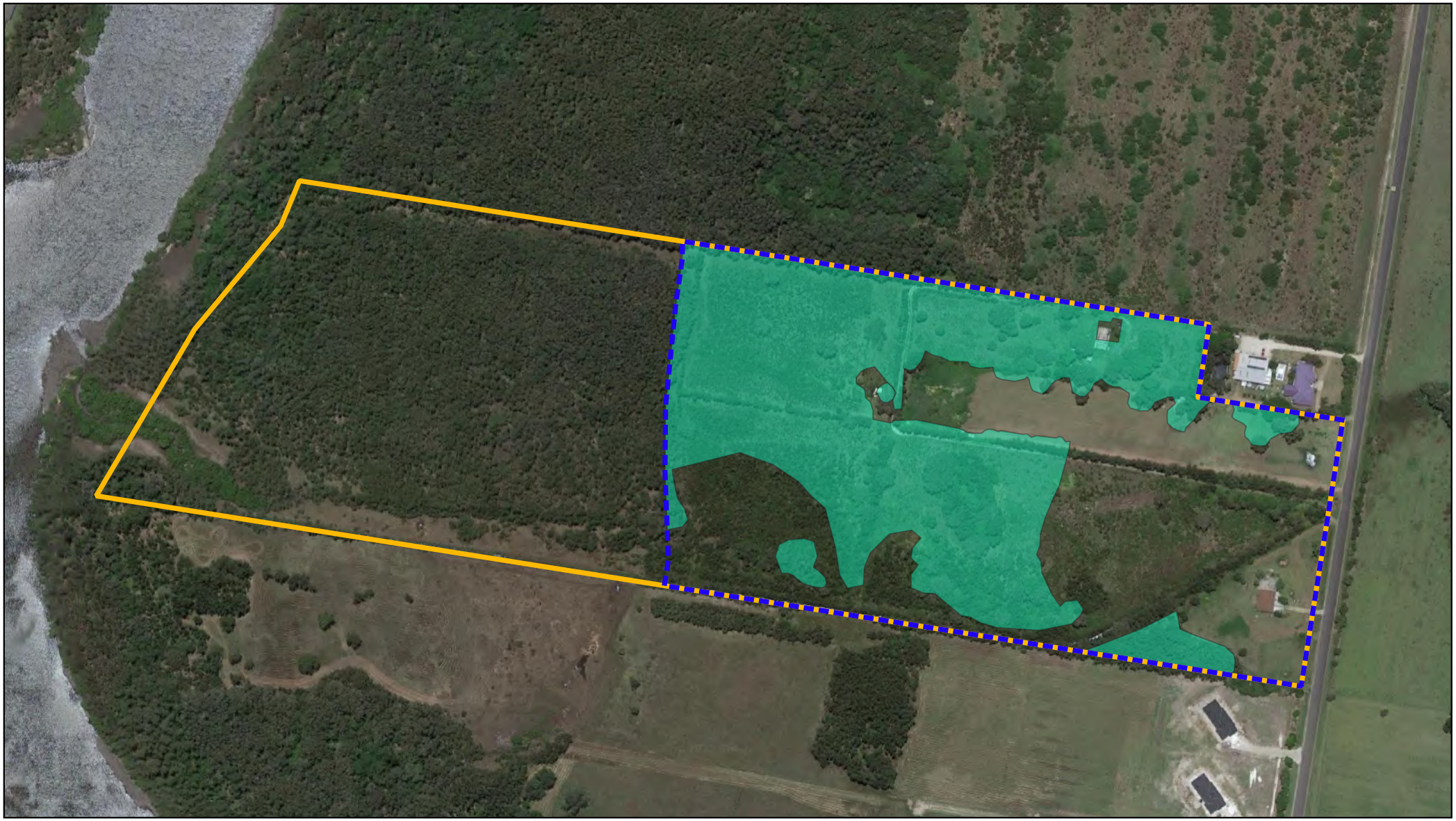

Figure 16: Species polygon for the squirrel glider

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0 75 150 m

GDA 2020 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 2020
Units: Meter

4.1.2.3 Threatened flora

Targeted flora surveys were undertaken in accordance with guidelines - surveying threatened plants and their habitats (NSW Government 2020e) to detect candidate threatened flora species. Surveyors searched parallel transects at intervals of up to 10 m across the site within suitable habitat, with intervals varied depending on the density and suitability of the habitat for the target species. No threatened flora species were detected on the site during surveys despite intensive searching within the appropriate survey periods for target species (Table 8).

In response to the RFI, a third round of surveys was completed to conduct more intensive searches for candidate threatened species from June 2023 to January 2024. These surveys included searches for the SAII species *Rotala tripartita* in December 2023 and January 2024, during suitable conditions following rainfall events (Figure 10, Figure 14, Table 6). Inspection of local reference populations to confirm presence of above ground plant material during the survey period was not possible as populations were on private land to which access was not granted. However, rainfall during the 6-month period preceding the survey had exceeded 300 mm on 7 occasions (Figure 10), which is consistent with the survey guidelines for the species, which stipulate that surveys should be conducted within 6 months of soaking rain (DPE 2023).

As this species has been recorded in near proximity to the site, including on the property across Carrs Drive and in the broader West Yamba area, it was considered to have a very high likelihood of occurrence. Survey effort extended throughout suitable habitat across the site, with particular focus on marshy areas, depressions left by vehicle tracks, and edges of depressions within the paperbark swamp habitat. Conditions on site, including dense weeds, made conformance with exact parallel transects impossible; however, GPS tracks were used to guide transects such that thorough site coverage was achieved. The midstorey and groundcover across much of the site, particularly vegetation zones 4, 6 and 7, was open, with areas of denser vegetation typically dominated in the ground and mid strata by exotic species including setaria (*Setaria sphacelata*), groundsel bush (*Baccharis halimifolia*), Singapore daisy (*Sphagneticola trilobata*), coastal morning glory (*Ipomoea cairica*) and easter cassia (*Senna pendula*) constituting degraded habitat for the species. Particular attention was exerted in isolated patches where dense undergrowth comprised species such as bungwall (*Blechnum indicum*), frogsmouth (*Philydrum lanuginosum*), cumbungi (*Typha orientalis*) and other wetland indicators.

Despite extensive and concentrated searches, no individuals were observed within the survey period.

Table 8 Candidate species not detected in surveys

Scientific name	Common name	Survey window	Presence
Flora			
Acronychia littoralis	ccented acronychia	All year	No (surveyed)
Allocasuarina defungens	dwarf heath caurarina	All year	No (surveyed)
Ancistrachne maidenii	*Ancistrachne maidenii*	Dec-Apr	No (surveyed)
Archidendron hendersonii	white lace flower	All year	No (surveyed)
Arthraxon hispidus	hairy joint grass	Nov-Apr	No (surveyed)
Callistemon linearifolius	netted bottlebrush	Oct-Jan	No (surveyed)
Centranthera cochinchinensis	swamp foxglove	Jan-Mar	No (surveyed)
Cyperus aquatilis	water nutgrass	Jan-Apr	No (surveyed)
Dendrobium melaleucaphilum	spider orchid	Aug-Sep	No (surveyed)
Desmodium acanthocladum	thorny pea	All year	No (surveyed)
Diploglottis campbellii	small-leaved tamarind	All year	No (surveyed)
Drynaria rigidula	basket fern	All year	No (surveyed)
Endiandra muelleri subsp. *bracteata*	green-leaved rose walnut	All year	No (surveyed)
Geodorum densiflorum	pink nodding orchid	Jan-Mar	No (surveyed)
Lindernia alsinoides	Noah's false chickweed	Nov-Feb	No (surveyed)
Maundia triglochinoides	maundia	Nov-Mar	No (surveyed)
Melaleuca irbyana	weeping paperbark	All year	No (surveyed)
Myrsine richmondensis	ripple-leaf muttonwood	All year	No (surveyed)
Oberonia complanata	yellow-flowered king of the fairies	All year	No (surveyed)
Oberonia titania	red-flowered king of the fairies	All year	No (surveyed)
Olax angulata	square-stemmed olax	All year	No (surveyed)
Peristeranthus hillii	brown fairy chain orchid	Sep-Oct	No (surveyed)
Persicaria elatior	tall knotweed	Dec-May	No (surveyed)
Phaius australis	southern swamp orchid	Sep-Oct	No (surveyed)
Phyllanthus microcladus	brush sauropus	All year	No (surveyed)
Polygala linariifolia	native milkwort	Oct-Feb	No (surveyed)
Rotala tripartita	rotala tripartita	Dec-Mar	No (surveyed)
Fauna			
Cacophis harriettae	white-crowned snake	Sep-April	No (surveyed)
Carterornis leucotis	white-eared monarch	All year	No (surveyed)
Cercartetus nanus	eastern pygmy-possum	Oct-Mar	No (surveyed)
Crinia tinnula	wallum froglet	All year	No (surveyed)
Dromaius novaehollandiae - endangered population	emu	All year	No (surveyed)
Haliaeetus leucogaster	white-bellied sea eagle	Jul-Dec	No (surveyed)
Hieraaetus morphnoides	little eagle	Aug-Oct	No (surveyed)
Hoplocephalus bitorquatus	pale-headed snake	Nov-Mar	No (surveyed)

Scientific name	Common name	Survey window	Presence
Lichenostomus fasciogularis	mangrove honeyeater	All year	No (surveyed)
Litoria aurea	green and golden bell frog	Nov-Mar	No (surveyed)
Litoria brevipalmata	green-thighed frog	Oct-Mar	No (surveyed)
Litoria olongburensis	olongburra frog	Aug-Mar	No (surveyed)
Lophoictinia isura	square-tailed kite	Sep-Jan	No (surveyed)
Pandion cristatus	eastern osprey	Apr-Nov	No (surveyed)
Petalura litorea	coastal petaltail	Nov-Feb	No (surveyed)
Petauroides volans	greater glider	All year	No (surveyed)
Phascogale tapoatafa	bush-tailed phascogale	Dec-Jun	No (surveyed)
Phascolarctos cinereus	koala	All year	No (surveyed)
Potorous tridactylus	long-nosed potoroo	All year	No (surveyed)
Thersites mitchelliae	Mitchell's rainforest snail	All year	No (surveyed)
Todiramphus chloris	collared kingfisher	All year	No (surveyed)

5 Prescribed impacts

5.1 Identifying prescribed additional biodiversity impacts

Prescribed biodiversity impacts are detailed in the BC Reg, Section 6.1. These relate specifically to threatened species and ecological communities and include impacts:

- on the habitat of threatened entities including:
  - karst, caves, crevices, cliffs rocks and other geological features of significance
  - human-made structures
  - non-native vegetation
- on areas connecting threatened species habitat such as movement corridors
- that affect water quality, water bodies and hydrological processes that sustain threatened entities
- on threatened and protected animals from turbine strikes from a wind farm
- vehicle strikes on threatened fauna species or fauna that are part of a TEC.

Potential prescribed impacts on biodiversity that relate to the proposed development include:

- those that affect water quality, water bodies and hydrological processes that sustain threatened entities
- the impacts of vehicle strikes on threatened fauna species or fauna that are part of a TEC.

5.1.1 Waterbodies, water quality and hydrological processes

The proposed development of the site involves earthworks at depths of between 0.5 – 3.2 m depth, to bring allotment elevation levels to 3.5 m Australian Height Datum (AHD), i.e. not less than the 100 year flood level modelled for the Lower Clarence (Appendix 13).

Each of the TECs recorded within and adjacent to the development footprint are sensitive to hydrological change, with respective listing advice statements noting hydrological change as modifying forces or threats to the survival of the communities (NSW Government 2024a, NSW Government 2024b, NSW Government 2024c, DAWE 2021, DSEWPAC 2013, DoEE 2018).

Altered hydrological regimes have the potential to impact retained ecological communities identified on the site, through:

- reduction of habitat or habitat quality due to heightened levels and duration of floodwaters
- riparian zone degradation, such as bank erosion, stream channelisation, reduced nutrient filtering capacity and increased weed dispersal
- increased habitat for invasive aquatic and riparian flora and fauna species

- exposure to sulfidic elements due to water impoundment, persistent flooding or poor drainage
- altered physical, chemical and biological soil and water conditions as a result of more persistent or frequent flooding, heightened efficiency of drainage, reduced surface infiltration, or pollutants in runoff (NSW TSSC 2021)
- changes to hydrology due to filling within the development footprint that will raise the elevation from 0.4-1.8 m to 0.5-3.2m depth, bringing allotment earthworks levels to ≥3.5 m AHD (Appendix 13)
- loss of habitat for fauna species with aquatic larval stages such as frogs and some invertebrates
- loss of habitat for fauna species that rely on nectar and pollen such as flying-foxes and arboreal marsupials (squirrel glider) due to changes to community composition or tree dieback
- loss of habitat for flora species which require periodic inundation (hydrophytes)
- loss of habitat for flora and fauna species which require habitat complexity such as a network of aquatic and terrestrial habitats, fallen timber, or submerged debris.
- changes to hydrological regimes i.e., increased and decreased periods of inundation
- pollution from herbicides, pesticides, and fertilisers, and sedimentation from run-off
- management of water (NSW Government 2021a).

The soils and vegetation of swamp sclerophyll forests play a fundamental role in the cycling of nutrients, absorbing large quantities of minerals brought in from the wider landscape. Urban expansion increases the amount of storm water run-off, raising the level of sediment and nutrient loads entering the system which leads to an increase in weed species and a decline in native flora species diversity (Thomson and Leishman 2004).

A conservation strategy for *Swamp Sclerophyll Floodplain Forest* has been developed by the NSW Government's Saving Our Species program under the BC Act. Critical actions to address key threats associated with water quality and hydrology have been adopted for this community at a site-specific level including to:

- maintain, improve or reinstate optimal hydrological regimes
- implement appropriate water sensitive design to reduce impacts of runoff and implement best practice stormwater and soil conservation principles (NSW Government 2019).

The West Yamba Urban Release Area Flood Impact Assessment addresses the risk of flood under a developed case model, assuming the inclusion of fill throughout the West Yamba Urban Release Area to 3 m above Australian height datum and above the 100-year ARI (BMT WBM 2018). Under the development model, no unprecedented flooding was predicted to occur within the vegetation to the west of the proposed development footprint (within the nominated tolerance of +/- 0.03 m). Retained vegetation was not modelled to incur flooding where flooding did not previously occur, nor to remain dry where inundation was modelled

under a baseline scenario (in the absence of development and import of fill). The more recently published Lower Clarence Flood Model (BMT 2023) assumes fill in the West Yamba Area as per the West Yamba Urban Release Area development plans (CVC 2023) and incorporates extreme flood scenarios up to 0,05% or 1 in 2000 Annual Exceedance Probability (AEP) flood levels, which are modelled to reached 3.05 m in the Yamba area. The models were successfully calibrated to the flood events of January 2013, March 2021 and February/March 2022, demonstrating accuracy. Under extreme flood scenario, the entire Yamba area would be inundated. The models provide insufficient detail of the West Yamba Area to determine specific outcomes for the site; however, as the assessment agency and publisher of the models, it is expected that Clarence Valley Council will make a determination.

An approved VMP will oversee the management of riparian vegetation comprising native local species of local provenance and will define measure to exclude disturbance from the stream bed and retained vegetation in accordance with AS4970 2009. The Erosion and Sediment Control Plan (Appendix 15) and Aquatic Assessment (Appendix 2) each discuss the risk of Acid Sulfate Soil disturbance in the context of the proposed development. The site is mapped as low risk; however, indicators of sulfidic elements were observed within the riparian zone by aquatic ecologist Mathew Birch and management recommendations were incorporated into the development and review of the ESCP and SMP (Appendix 14, Appendix 15). Accordingly, the revised Earthworks Plan excludes disturbance from the stream bed (Appendix 13).

A cultural heritage assessment for the development of the West Yamba Urban Release DCP reports the Carrs Drive area was historically drained, cleared and filled to modify low-lying swamps for agricultural purposes (Piper and Robins 2011). Evidence of past earthworks in the form of fill was recorded in the eastern portion of the site, suggesting a legacy of altered landforms and landscape adaptation.

Expert advice was sought from specialist hydrological consultants for the preparation of the SMP, which concluded that stormwater management infrastructure incorporated into the design of the development will achieve equivalence between pre-development and post-development flows adjacent to the footprint. No groundwater assessment, or detailed hydrological study specific to the retained vegetation on site, have been undertaken. Based on the information available, including the West Yamba flood models (BMT 2023) and advice of MDE hydrologists, proposed measures will successfully mitigate hydrological impacts to the retained vegetation.

5.1.2 Vehicle strikes

Reduced internal road speeds will reduce the potential risk of vehicle strike. Additionally, all roads will be contained within the development footprint and will not extend into retained vegetation. This will reduce vehicle interaction points for fauna utilising retained vegetation.

Mitigation actions recommended for these impacts are detailed in Table 10.

Stage 2: Impact assessment (biodiversity values and prescribed impacts)

6 Avoiding or minimising impacts on biodiversity values during planning

6.1 Avoid or minimise direct and indirect impacts when planning the proposal

The impacts of the proposed development have been avoided or minimised as far as possible during project planning. The following principles have been used to locate the development footprint in areas by:

- limiting clearing to the most modified habitats on the site
- retaining the highest quality and least disturbed vegetation on the lot to the west of the proposed development footprint
- excluding earthworks from the bed of the existing 2nd order stream, to reduce the risk of mobilising acid sulphate soils in accordance with advice discussed in the Aquatic Assessment (Birch 2023).

The proposed development footprint is entirely situated within the portion of the site zoned R1 – General Residential, comprising 10.1 ha (Figure 1). R1 zoned land is located at the front of the lot where biodiversity values are reduced due to modification and clearing from previous land use. These areas have been used for grazing in the past with isolated large paddock trees retained within the cleared area. Previously cleared areas now contain native regrowth of varying condition with some weed competition. The development footprint avoids the area of least modified and healthiest native vegetation on the lot which is associated with coastal swamp sclerophyll forest TEC, coastal swamp oak forest TEC and saltmarsh TEC. The clearing footprint will impact 6.48 ha of regrowth TEC and 0.22 ha of mature TEC. Approximately 7.7 ha of the healthiest native vegetation on the site will be retained in the C2 and C3 zoned land (Figure 1).

The portion of the site zoned C3, comprising 6.1 ha, is consistent with many uses that are broad scale and commercial in nature and that are complimentary and consistent with developments similar in nature to Manufactured Housing Estates. Within the C3 Environmental Management Zone the following uses are permitted with development consent:

- animal boarding or training establishments
- bed and breakfast accommodation
- camping grounds

- caravan parks
- dual occupancies (attached)
- dwelling houses
- eco-tourist facilities
- emergency services facilities
- environmental facilities
- environmental protection works
- farm buildings
- farm stay accommodation
- flood mitigation works
- forestry
- home businesses
- home industries
- oyster aquaculture
- pond-based aquaculture
- recreation areas
- roads
- tank-based aquaculture.

In addition, a number of uses are permitted without development consent:

- extensive agriculture
- home-based child care
- home occupations
- home occupations (sex services).

While the above listed permissible uses are consistent with a Manufactured Housing Estate, and would be permissible with consent, the proposed design intends to reserve the C3 zoned land outside the development footprint, conserving the habitat of the highest relative integrity. In addition, the proposed action will implement an approved VMP to manage weed encroachment, restore habitat values and monitor vegetation condition for a period of 5 years following construction.

Similarly, the C2 Zone will be retained for conservation under the proposed layout, although the following uses are permissible with consent:

- emergency services facilities
- environmental facilities

- environmental protection works
- flood mitigation works
- oyster aquaculture
- roads.

The proposed development footprint has been located at the front of the property on land that has been subject to historical disturbance, with predominantly regrowth vegetation, and is identified for residential development (CVC 2023). The design avoids clearing 7.7 ha of the highest condition intact native vegetation at the rear of the site and situates the development footprint over a 10.07 ha matrix of predominantly cleared areas, regrowth vegetation and vegetation with higher relative cover of non-native species.

The retention of vegetation at the western extent of the site will maintain and contribute to a corridor of roughly 300 m width, which provides connectivity with adjacent habitat to the north and south along the eastern banks of Lake Channel / Oyster Channel. Supplementary field surveys in June 2023 confirmed that habitat to the west of the footprint contained three TECs (Figure 9). The habitat is confirmed to be used by five threatened fauna species: grey-headed flying fox (*Pteropus poliocephalus*), squirrel glider (*Petaurus norfolcensis*) and three microbat species, little bent-wing bat (*Miniopterus australis*), large bent-winged bat (*Miniopterus orianae oceanensis*) and southern myotis (*Myotis macropus*). Although not detected during surveys, it is also assumed to provide habitat for eastern (common) planigale (*Planigale maculata*) and may also provide transient habitat and a movement corridor for koala (*Phascolarctos cinereus*). It is deemed suitable for a suite of additional non-listed native species known to occur in the local area. The proposed layout thereby retains vegetation that represents habitat in the highest condition for these entities. The retained vegetation:

- maintains good connectivity with vegetation to the north and south
- contains three TECs
- provides confirmed habitat for five threatened fauna species
- provides assumed habitat for eastern (common) planigale
- will maintain transient habitat and a movement corridor for koala
- provides habitat for numerous other native species.

The retention of habitat at the rear of the site, and its conservation in accordance with a VMP, comprises an important consideration of the proposed site layout. Recreational use of the retained habitat will be managed through the design layout to reduce indirect impacts on the C2 and C3 land through exposure to foot traffic, including:

- dwellings will be separated from retained vegetation by fauna-friendly fencing
- raised development profile
- internal recreational facilities
- activation points through the retained vegetation to be managed in accordance with an approved Landscaping Plan.

Works are proposed within the riparian zone associated with the 2nd order stream; however, works will be excluded from the streambed. The existing open 2nd order stream along the southern boundary of the site will be retained. This channel has a history of modification for drainage works and it is expected that stormwater for the broader West Yamba Urban Release Area will be managed and conveyed to the Lake Channel / Oyster Channel estuary via a reticulated stormwater system inclusive of this watercourse.

A VMP was commissioned to recommend suitable measures for the monitoring, restoration and management of vegetation in buffer zones and bio basins in concert with a Landscape Management Plan, each subject to approval conditions. Additionally, the proponent sought the advice of an aquatic ecologist specialising in management to assess the proposal and make suitable recommendations for watercourse remediation (Birch 2023).

Table 9 details strategies and actions to avoid or minimise impacts on biodiversity values during the planning, design and construction phases.

Table 9 Strategies to avoid or minimise impacts on biodiversity values during planning, design and construction

Method	Mitigation
Locate the proposal to avoid or minimise direct and indirect impacts on native vegetation, threatened species, TECs and their habitat	
Locating the proposal in areas where there are no biodiversity values	The proposed development will be located in the R1 zoned land at the front of the lot where biodiversity values are reduced due to modification and clearing from previous land use. These areas have been used for grazing in the past with large paddock trees retained within the cleared area. Previously cleared areas now include 1.74 ha of non-native vegetation, and 6.48 ha containing native regrowth of varying condition and weed competition.
Locating the proposal in areas where the native vegetation is in the poorest condition	The proposed development footprint includes all highly disturbed areas on the lot with the lowest VI scores. These include 1.74 ha of non-native vegetation, 6.48 ha containing native regrowth of varying condition and weed competition (VI score = 38.2-61.5), and only 0.22 ha of mature native vegetation (VI score = 73.1).
Locating the proposal in areas that avoid habitat for species that have a high biodiversity risk rating or native vegetation that is a TEC	The development footprint includes 3.37 ha that is not TEC and 5.36 ha of regrowth vegetation that meets TEC criteria. The development footprint contains areas with the lowest VI scores and provides the lowest quality habitat for threatened species. The development avoids the western section of the site that contains TECs with the highest VI scores.
Locating the proposal outside the buffer area around breeding habitat features	Surveys did not detect any breeding habitat features on the site for threatened species generating species credits.
Design the proposal to avoid or minimise direct and indirect impacts on native vegetation, threatened species, TECs and their habitat	
Reducing the clearing footprint of the project	The 10. 1 ha clearing footprint will impact 8.3 ha of native vegetation including 2.97 ha of poor condition regrowth, 1.28 ha of moderate condition regrowth, 3.86 ha of good condition regrowth and 0.22 ha of very good condition mature vegetation. Approximately 7.7 ha of the healthiest native vegetation on the site will be retained in the C2 and C3 zoned land.
Locating ancillary facilities in areas where there are no biodiversity values	All facilities associated with the proposed development will be contained within the proposed development footprint. Directional street lighting will be incorporated into the design, maintaining natural darkness in areas of

Method	Mitigation
Locating ancillary facilities in areas where the native vegetation or threatened species habitat is in the poorest condition	vegetation to be retained, thereby limiting potential effects of light pollution on wildlife. All ancillary facilities are contained within the proposed development footprint, which has been situated to avoid vegetation of the highest relative biodiversity value and instead utilise areas subject to historical disturbance and, consequently, degradation of extant biodiversity values. The development incorporates recreational facilities within its footprint, limiting impacts from recreational activities within retained vegetation.
Locating ancillary facilities in areas that avoid habitat for species and vegetation in high threat status categories	
Making provision for the demarcation, ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on the development site	The area of TEC with the highest VI score is retained in the western section of the site outside of the proposed development footprint. A VMP, subject to approval conditions, will be implemented to protect and restore important habitat and will include the provisions for ongoing monitoring of retained vegetation. AS4970-2009 will be implemented in accordance with an approved VMP to provide for the protection of areas identified for retention. The VMP has been prepared to ensure retained areas are protected, weeds are managed appropriately during the construction phase of the project and existing and emerging weeds in retained and restored vegetation are effectively managed for a period of at least 5 years after construction. The design layout (Appendix 3) includes provisions to divert direct pedestrian activity and recreation from the retained vegetation through the provision of internal recreational space and footpaths and the exclusion of access points to the retained vegetation.

7 Assessing the impacts of the proposal on biodiversity values

7.1 Direct impacts

The total area of native vegetation proposed to be cleared is approximately 8.3 hectares. Direct impacts associated with vegetation clearing at the site include:

- fauna displacement
- mortality during clearing works
- vehicle strike
- reduced habitat extent (loss of 8.3 ha of native vegetation, including 6.7 ha of TEC)
- changes to hydrological processes.

Measures to mitigate and manage direct impacts on biodiversity values are detailed in Table 10. The change in VI as a result of the proposed development is outlined in Table 11.

Table 10 Mitigation measures proposed to manage direct impacts

Type of impact	Timing	Extent	Frequency / duration	Mitigation
Fauna displacement	Construction	Construction footprint	Single event	Relocation of habitat features such as fallen timber, hollow logs from the impacted area into adjacent retained vegetation. Time clearing works to avoid critical life cycle events such as general breeding activity during late winter/spring.
Mortality during clearing works	Construction	Construction footprint	Single event	Clearing protocols including pre-clearing surveys, daily surveys and staged clearing. Engagement of a trained ecologist / fauna spotter catcher during clearing works.
Reduced habitat extent	Construction / operation	Construction footprint	Ongoing	Clearing is restricted to the development footprint and will generate commensurate credit obligations under the BOS.
Vehicle strike	Construction / operation	Construction footprint and Carrs Drive	Ongoing	Vegetation to be retained will be fenced during construction, limiting heavy vehicle interactions. All internal roads will be contained within the development footprint, and reduced speed limits will be set on internal roads, mitigating risk of vehicle strike. Fauna movement corridors will be maintained alongside Oyster Channel, maintaining distance between wildlife and increased traffic movement on Carrs Drive. Appropriate speed controls and signage will reduce potential incidences.

Table 11 Change in vegetation integrity score for vegetation zones within impact area

Zone	PCT	PCT common name	Condition class	Area (ha)	Current VI	Future VI	Change in VI	Total VI loss
1	1235	Swamp oak swamp forest of the coastal lowlands of the NSW north coast bioregion	Poor regrowth	1.63	38.2	0	-38.2	38.2
2	1064	Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion	Good regrowth	3.86	61.5	0	-61.5	61.5
3	1064	Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion	Moderate regrowth	1.28	55.9	0	-55.9	55.9
4	1064	Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion	Good mature	0.22	73.1	0	-73.1	73.1
5	1235	Swamp oak swamp forest of the coastal lowlands of the NSW north coast bioregion	Poor regrowth	1.34	49.7	0	-49.7	49.7

7.2 Indirect impacts

Retained native vegetation surrounding the site may be indirectly impacted by:

- predation of native animals by domestic and/or feral cats and dogs
- increased potential of weed incursion
- damage to retained native vegetation
- reduced viability and loss of fauna habitat
- changed hydrology in surrounding native vegetation (addressed in Section 7.3).

Indirect impacts can occur during both the construction and operation phases. Measures to mitigate and manage indirect impacts on biodiversity values are detailed in Table 12.

Table 12 Mitigation measures proposed to manage indirect impacts

Type of impact	Extent	Frequency / duration	Timing	Mitigation
Predation of native wildlife by domestic / feral cats and dogs	Site extent / broader area	Ongoing	Operation	The proponent will require the keeping of domestic animals within property boundaries.
Increased potential of weed incursion	Broader area	Ongoing	Construction / Operation	A VMP will manage weeds during construction and for 5 years following construction. The VMP will address the management of all incoming vehicles and materials, including fill, plant propagules to be used in landscaping, revegetation and bioretention basins, jute mat and building materials. Weed seed hygiene procedures will be implemented to mitigate the spread of weed seeds on vehicles accessing the site during the construction. Landscape planting design will use native species of local provenance as detailed in an approved Statement of Landscape Intent. The VMP will detail hygiene protocols to prevent spread of weeds and pathogens, and ongoing weed management protocols and responsibilities. Additionally, a vehicle washdown facility is planned for the site. Wastewater from this facility will be directed into municipal sewerage services, contributing to ongoing weed hygiene for the retained vegetation. The VMP will address ongoing weed management within the retained vegetation, to ensure pest plants are managed in accordance with the Australian Weeds Strategy 2017-2027 and priorities of the CVC.
Inadvertent damage to adjacent habitat or vegetation	Site extent	Ongoing	Construction	AS4970-2009 – Protection of trees on development sites will be implemented in accordance with an approved VMP, ensuring no unapproved impacts are incurred to adjacent native vegetation.

Type of impact	Extent	Frequency / duration	Timing	Mitigation
Reduced viability and loss of breeding habitat	Site extent	Ongoing	Operation	Monitoring and maintenance of retained native vegetation adjacent to the site through the development and delivery of a VMP. Landscaping using native species of local provenance will be overseen in accordance with an approved Statement of Landscape Intent. Plantings around much of the perimeter of the site as well as in locations of stormwater management infrastructure will act as a buffer and potential movement corridor.
Timber collection, removal of understorey	Site extent	Ongoing	Operation	The site is dominated by *Melaleuca quinquenervia*, which is not a favoured timber or firewood species. The development will not facilitate pedestrian access to retained vegetation within the environmental management area of the site. An interface with retained vegetation will be incorporated via raised walkways within the development footprint as per an approved Statement of Landscape Intent, incorporating interpretive signage that will raise community appreciation for the intact habitat.
Changes to hydrological processes	Construction / operation	Site extent and downstream	Ongoing	All construction activities will be undertaken in accordance with an approved Council Plan that outlines appropriate sediment controls. A stormwater drainage system will be constructed to convey stormwater runoff into the existing stormwater system.

7.3 Assessment of prescribed impacts

Prescribed impacts on biodiversity that relate to the proposed development were identified in Section 5 and include:

- the impacts of development on water quality, water bodies and hydrological processes that sustain threatened entities
- the impacts of vehicle strike on threatened species or fauna that are part of a TEC.

This section details the ongoing or future impacts that the proposal will have on biodiversity values, particularly threatened species and TECs, considering the measures taken to avoid or minimise impacts, and the spatial and temporal extent of impacts likely to result from changes in land use arising from the proposal. Table 13 provides an assessment of identified prescribed impacts including the nature, extent, frequency, duration, and timing of impacts that may occur during construction and operation, and mitigation actions.

The West Yamba Urban Release Area Flood Impact Assessment addresses the risk of flood under a developed case model assuming the inclusion of fill throughout the West Yamba Urban Release Area to 3 m above Australian height datum and above the 100 year ARI (BMT WBM 2018). Under the model, which assumes fill to heights greater than those indicated by the proposed action, the following outcomes are expected:

- development of the West Yamba Urban Release Area within which the proposed action is located will not result in any significant peak flood level impacts under the 5 and 20 year ARI flood levels
- following mitigation (principally reliant on a floodway), development of the West Yamba Urban Release Area will result in minor residual flood level impacts to existing dwellings under 100 year ARI events, within the nominated tolerance of +/- 0.03 m.

These model outcomes pertain to the development of the entire West Yamba Urban Release Area including fill to 3 m above Australian Height Datum and are not exclusively linked to the proposed action. In accordance with recommendations made in the West Yamba Urban Release Area Flood Impact Assessment and the Yamba Floodplain Risk Management Study 2009, CVC is further refining and developing a consolidated Lower Clarence Flood Risk Management Plan, inclusive of the Yamba Floodplain Risk Management Plan 2009. This plan will include revised flood risk models which address drainage and flooding issues relevant to both the site and the broader area (Webb, McKeown & Associates Pty Ltd 2009).

While there is potential for impact by vehicle strike on threatened fauna, it is expected that interactions will be minimal, due to the small area of vegetation retained within the development footprint and the significant modifications by groundworks associated with the development. The expected speed controls and relatively low volume of traffic within the development will also limit any potential direct impact by vehicle strike. The retained vegetation adjacent to the development in the C3 zone borders house sites along the western side of the proposed development. A management buffer of approximately 5 to 15 m has been included in the clearing footprint to allow for appropriate modification works to limit incidence of wildlife injury. The location of the development footprint on the site is unlikely to interfere with connectivity for fauna movement through the broader landscape or reduce current habitat corridors.

Table 13 Assessment of prescribed impacts

Type of impact	Extent	Frequency / duration	Timing	Mitigation
Changes to hydrological processes and water quality that sustain threatened entities	Construction footprint and downstream	Ongoing	Construction / operation	A Storm Water Management Plan has been developed which incorporates best practice stormwater and soil conservation principles with a focus on reducing hydrological impacts to surrounding TECs and habitat for threatened species. Design principles include minimal alteration of the existing watercourse and associated riparian vegetation, and selection of planting schedules to buffer the interface between residential and riparian areas, manage flows, provide for fauna habitat, source from local plant stock and minimise the inputs required to fertilise, water and maintain vegetation. The ESCP (Appendix 13) and Aquatic Assessment (Appendix 8) each discuss the risk of Acid Sulfate Soil disturbance in the context of the proposed development. The site is mapped as low risk; however, indicators of sulfidic elements were observed within the riparian zone by aquatic ecologist Mathew Birch and management recommendations were incorporated into the development and review of the ESCP and SMP (Appendix 2, Appendix 13, Appendix 14). A cultural heritage assessment for the development of the West Yamba Urban Release DCP reports the Carrs Drive area was historically drained, cleared and filled to modify low-lying swamps for agricultural purposes (Piper and Robins 2011). Evidence of past earthworks in the form of fill was recorded in the eastern portion of the site, over which the development footprint is proposed to be located, suggesting a legacy of altered landforms and landscape adaptation. Expert advice was sought from specialist hydrological consultants for the preparation of the SMP, which concluded that stormwater management infrastructure incorporated into the design of the development will achieve equivalence between pre-development and post-development flows adjacent to the footprint (Appendix 13, Appendix 14). No groundwater assessment, or detailed hydrological study specific to the retained vegetation, have been undertaken. Based on the information available and advice of MDE hydrologists, proposed measures will successfully mitigate hydrological impacts to the retained vegetation.
Vehicle strike on threatened species or fauna associated with a TEC	Construction footprint	Ongoing	Operation	Install appropriate barriers at any interface of the road network and natural areas, which inhibit access but also will not trap fauna if they access the development. Vegetation to be retained will be fenced during construction, limiting heavy vehicle interactions. All internal roads will be contained within the development footprint, and reduced speed limits will be set on internal roads, mitigating risk of vehicle strike. Appropriate speed controls and signage will reduce potential incidences.

7.4 Adaptive management for uncertain biodiversity impacts

A VMP, subject to approval conditions, outlines an adaptive management strategy to monitor and respond to impacts to biodiversity values that are uncertain. Monitoring and adaptive management protocols will be implemented in accordance with an approved VMP to ensure that any deviation from expected outcomes is detected and appropriate corrective measures applied.

8 Thresholds for assessing and offsetting the impacts of development

8.1 Serious and irreversible impacts

The credit summary report and biodiversity credit reports for this assessment identify whether candidate SAII entities are associated with the site (Appendix 9, Appendix 10, Appendix 11 respectively). These reports indicate there are no SAII entities associated with the proposed development.

In response to the RFI, targeted surveys were carried out throughout the site in search of SAII species *Rotala tripartita* (Figure 14, Section 4.1.2.1). As this species has been recorded in near proximity to the site, including on the property across Carrs Drive and in the broader West Yamba area, it was considered to have a high likelihood of occurrence. Survey effort was extended throughout suitable habitat across the site, with particular focus on marshy areas, depressions left by vehicle tracks, and edges of depressions within the Melaleuca swamp habitat. Despite extensive and concentrated searches, no individuals were observed within the survey period.

9 Offset requirement

9.1 Offset requirement for direct impacts

The results of the assessment are summarised in the Credit Summary Report (Appendix 9) and like-for-like credit retirement options are outlined in the Biodiversity Credit Report (Appendix 10).

9.1.1 Ecosystem credits

The assessment generated a total of 224 ecosystem credits for impacts to two PCTs (Table 14).

Table 14 PCTs requiring offset and the number of ecosystem credits

Vegetation zone	PCT ID	PCT name	Impact area (ha)	Sensitivity to gain	Biodiversity risk rating	Ecosystem credits required
2	1064	Paperbark swamp forest of the coastal lowlands of the NSW north coast and Sydney Basin bioregion	3.86	High	2	119
3			1.28	High	2	36
4			0.22	High	2	8
1	1235	Swamp oak swamp forest of the coastal lowlands of the NSW north coast bioregion	1.63	High	2	28
5			1.34	High	2	33
					Total	**224**

9.1.2 Species credits

Two candidate threatened species detected in surveys on the site have been assessed as requiring offset with a total of 358 species credits (Table 15).

Table 15 Threatened species requiring offset and the number of species credits

Scientific name	Common name	Vegetation zone	Impact area (ha)	Species credits
Petaurus norfolcensis	squirrel glider	2,3,4	5.35	162
Planigale maculata	eastern (common) planigale	2,3,4,5	6.7	196
			Total	**358**

10 Summary

The project will avoid and minimise impacts through the following design features:

- The development will be limited to an area of 10.07 ha that contains most highly modified areas of the site. The development footprint will require clearing of 8.1 ha of regrowth vegetation and 0.2 ha of mature vegetation.
- Earthworks will be excluded from the stream bed and a 10 m riparian zone (except for installation of scour protection valves and biobasins). Disturbed areas will be revegetated on completion of groundworks, incorporating biobasin plantings in the outer 50% of the corridor.
- 7.7 hectares of mature remnant vegetation will be retained on the remainder of the site in the C2 and C3 zone and managed under a VMP.

Two vegetation communities on the proposed development site are consistent with TECs listed as endangered under the NSW BC Act and Commonwealth EPBC Act. A 'self-assessment' was carried out to determine if the 'action' (proposed development and associated vegetation clearing) is likely to have a significant impact to a matter of national environmental significance (Australian Government 2013). The outcome of the 'self-assessment' resulted in a referral to the Federal Minister for the Environment (EPBC 2022/09340). Preliminary documentation was subsequently prepared to support a determination under the EPBC Act (Ecosure 2024).

Two threatened candidate fauna species present at the site have generated species credits requiring offset. The squirrel glider was detected in surveys via motion sensor cameras and identification confirmed by species experts. The eastern (common) planigale has been assumed present on the site. Targeted surveys were not carried out for the planigale due to dangers of pitfall trapping to this species (and other small fauna species) during wet weather which frequently inundated the site throughout the survey period. The eastern (common) planigale is known to utilise degraded habitats and is highly likely to be present, given the site contains suitable habitat within the species' distribution on the floodplain.

Three species of microbat listed as vulnerable under the BC Act, were detected on the site via an Anabat bat detection device. In addition, grey-headed flying fox were recorded foraging within the site boundary. However, species credits have not been generated for these species as habitat constraints and/ or habitat features for breeding, required to generate a species polygon, were not located on or near the development footprint.

Mitigation measures recommended for the site include:

- restoration of selected areas within the watercourse riparian zone to improve habitat and facilitate habitat connectivity to retained vegetation at the western end of the lot
- adoption of clearing protocols including pre-clearing surveys, daily surveys and staged clearing
- preparation and implementation of a VMP to manage and restore retained vegetation associated with a TEC.

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Appendix 1 Joint Request for Information from Clarence Valley Council and NSW Department of Planning and Environment

clarence
VALLEY COUNCIL

12 July 2023

Reference: DA2023/0241
Contact: James Hamilton

The Trustee For Yamba Land Trust
PO Box 44
LENOX HEAD NSW 2478

Dear Sir/Madam

Additional Information Required

Application No:	DA2023/0241
Development Proposal:	216 dwelling manufactured home estate and communal facilities
Property Address:	120 Carrs Drive YAMBA NSW 2464
Legal Description:	Lot 2 DP 733507 and Lot 32 DP 1280863

Council received the abovementioned application on 4 May 2023 for which you are the applicant. Please quote the above application number on all future correspondence. Council is yet to exhibit this development application.

Biodiversity
Further to Council's previous request for additional information dated 22 June 2023, NSW Department of Planning and Environment – Biodiversity and Conservation Division have reviewed the Biodiversity Development Assessment Report and require additional information. Please address the recommendations Point 1 to 10 as outlined in the letter from Department of Planning and Environment – Biodiversity and Conservation Division dated 10 July 2023 as attached to this letter within 60 days of the date of this letter.

This information must be uploaded via the NSW Planning Portal.

This information is requested in accordance with clause 36 of the *Environmental Planning and Assessment Regulation 2021* and the time between the date of this letter and receipt of the requested information will not be included in the total number of days to process this application. Should the information not be provided within the specified period it will be taken that the information will not be provided and Council will determine the application.

You may submit a written request to Council to extend the period to provide the information if there are good reasons why further time is required. Your application is being processed by James Hamilton of Council's Development Services team. If you require further information please phone 02 6643 0233.

Yours faithfully

James Hamilton
Acting Development Services Coordinator

Department of Planning and Environment

Your ref: DA2023/0241
Our ref: DOC23/413509-7

General Manager
Clarence Valley Council
Locked Bag 23
GRAFTON NSW 2460

Attention: Mr James Hamilton

Dear Ms Black

RE: Proposed Manufactured Home Estate - 120 Carrs Drive Yamba - (DA2023/0241)

Thank you for your e-mail dated 16 May 2023 about the proposed manufactured home estate at 120 Carrs Drive Yamba seeking comments from the Biodiversity and Conservation Division (BCD) of the Biodiversity, Conservation and Science Directorate in the Environment and Heritage Group of the Department of Planning and Environment. I appreciate the opportunity to provide input.

We have reviewed the documents supplied, including the Biodiversity Development Assessment Report (BDAR) and advise that several issues are apparent with the assessments for biodiversity and flooding. These issues are discussed in detail in **Attachment 1** to this letter.

In summary, the BCD recommends that:

1. The BDAR be revised to apply Stage 1 of the BAM to the entirety of Lot 2 DP733057 and Lot 32 DP1280863.

2. The BDAR be revised to include all vegetation plot field data.

3. The plot 3 data for vegetation zone 1 be replaced in the BDAR with new plot data from an alternate location in vegetation zone 1 that more accurately captures attributes relevant to that vegetation zone.

4. The identification of Plant Community Type (PCT 1064) Vegetation Zones 1-3 of the BDAR be reviewed and additional vegetation plots undertaken where the PCT has been misidentified.

5. The identification of Threatened Ecological Communities associated with PCTs in the BDAR be revised where misidentification has occurred.

6. The BDAR be revised to remove the black-necked stork (*Ixobrychus flavicollis*) and black bittern (*Ixobrychus flavicollis*) from "*Table 7 Predicted and candidate threatened species assessed as not present at the site*", and these species be further assessed as likely to occur on the subject land.

7. Targeted survey be conducted for the Mitchell's rainforest snail (*Thersites mitchellae*), or it be assumed present, or an expert report be obtained, and if the species is detected, assumed present, or deemed present by the expert report, then it be further assessed in the BDAR, including under the section on serious and irreversible impacts.

8. Additional threatened plant surveys be undertaken for candidate threatened plant species in accordance with the "*Surveying Threatened Plants and their Habitats*" guideline, or the species be assumed present, or an expert report be obtained, and the BDAR revised accordingly.

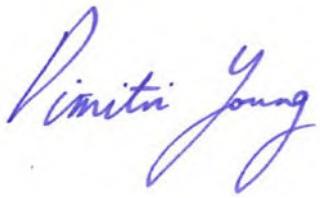
9. The BDAR be revised to include an assessment of likely impacts that affect water quality, water bodies and hydrological processes that sustain threatened entities.

10. The BDAR be revised to adequately demonstrate and justify measures taken by the proponent to avoid and minimise impacts on biodiversity values of the site in accordance with Section 6.12 of the *Biodiversity Conservation Act 2016*.

11. Prior to determining the development application, the council prepares a new flood risk management study and plan for Yamba, including a development strategy for the subject floodplain, and then assesses the subject proposal accordingly.

If you have any questions about this advice, please do not hesitate to contact Mr Gene Mason, Senior Conservation Planning Officer, at gene.mason@environment.nsw.gov.au or 8289 6315.

Yours sincerely



DIMITRI YOUNG
Senior Team Leader Planning, North East Branch
Biodiversity and Conservation

10/07/2023

Attachment 1: Detailed BCD Comments – Proposed Manufactured Home Estate - 120 Carrs Drive Yamba

The Biodiversity and Conservation Division (BCD) of the Department of Planning and Environment has reviewed the Biodiversity Development Assessment Report (BDAR) and the associated documentation for the proposed manufactured home estate at 120 Carrs Drive Yamba, and we provide the following comments.

Stage 1 Biodiversity Assessment

Stage 1 of the Biodiversity Assessment Method (BAM) 2020 requires accredited assessors to assess the biodiversity values of the subject land to inform the location and design of the proposal such that it avoids and minimises impacts on those values, before assessing the direct and indirect impacts of the proposed development in Stage 2 of the BAM 2020.

The BDAR limited the Stage 1 assessment of biodiversity values to the direct impact area (the area zoned R1 General Residential) and did not carry out any vegetation plots or threatened species surveys in the areas to the west zoned C2 Environmental Conservation and C3 Environmental Management.

We consider the Stage 1 assessment should extend further west of the direct impact area to assess the indirect impacts in these areas likely to result from the development and inform the location and design of the proposal such that it avoids and minimises impacts on biodiversity values.

BCD Recommendation

1. The BDAR be revised to apply Stage 1 of the BAM to the entirety of Lot 2 DP733057 and Lot 32 DP1280863.

Vegetation plot field data

Appendix 2 of the BDAR includes a summary of the results of the plot-based floristic vegetation survey. However, the vegetation integrity survey plot data has not been included. In accordance with section 4.3.4 and Appendix K of the BAM 2020, all plot field data must be included in the BDAR.

BCD Recommendation

2. The BDAR be revised to include all vegetation plot field data.

Vegetation plot location

In accordance with section 4.3.4(3) of the BAM 2020, the assessor must locate vegetation plots to ensure they capture function attributes relevant to that Plant Community Type (PCT) and vegetation zone. The composition data for plot 3, the only plot undertaken in vegetation zone 1, suggests the zone is dominated by exotic grasses and woody weeds.

During a site inspection carried out by the BCD on 20 June 2023, the approximate location of plot 3 was identified. The plot location appeared to be in a small clearing dominated by exotic grasses which did not reflect the condition of the broader vegetation zone which appeared to mostly comprise *Casuarina glauca* floodplain forest (see Figures 1 and 2 below).

Figure 1: Photograph of approximate location of plot 3 in vegetation zone 1 showing exotic grassy clearing surrounded by C. glauca *floodplain forest.*

Figure 2: Photographs showing more typical condition of vegetation zone 1 with tree layer dominated by C. glauca*.*

BCD Recommendation

3. The plot 3 data for vegetation zone 1 be replaced in the BDAR with new plot data from an alternate location in vegetation zone 1 that more accurately captures attributes relevant to that vegetation zone.

<u>Plant community type and threatened ecological community identification</u>

The BDAR identifies most of the site as comprising PCT 1064 *Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion*. A site inspection carried out by the BCD on 20 June 2023 indicated much of vegetation zones 1-3 identified as PCT 1064 are dominated by *Casuarina glauca* trees and therefore are floristically closer to PCT 1235 *Swamp oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion* (see Figures 2-4).

Figure 3: Photograph from Vegetation Zone 2 showing tree layer dominated by C. glauca*.*

Figure 4: Photograph of south-eastern segment of Vegetation Zone 3 showing tree layer dominated by C. glauca.

Consequently, the parts of the site that have been misidentified as PCT 1064 have also been misidentified as the TEC *Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions* and will need to be revised to the TEC *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*.

BCD Recommendations

4. The identification of PCT 1064 in Vegetation Zones 1-3 of the BDAR be reviewed and additional vegetation plots undertaken where the PCT has been misidentified.

5. The identification of TECs associated with PCTs in the BDAR be revised where misidentification has occurred.

Assessment of habitat suitability for threatened species

The assessor determined two ecosystem credit species and eighteen species credit species are unlikely to occur on the subject land based on the absence of habitat constraints. We consider some of these species have been inappropriately excluded.

The habitat constraints for the ecosystem credit species black-necked stork (*Ephippiorhynchus asiaticus*) and black bittern (*Ixobrychus flavicollis*) are swamps, shallow open freshwater or saline wetlands and areas of dense vegetation. The subject land mostly comprises coastal floodplain wetlands and swamp forest and contains a tidal drainage line that runs into Oyster Channel immediately to the west of the site. Therefore, these species should not have been excluded from further assessment.

The Threatened Biodiversity Data Collection (TBDC) does not list habitat constraints for the species credit species Mitchell's rainforest snail (*Thersites mitchellae*), so in accordance with section 5.2.2(1) of the BAM 2020 it cannot be excluded from further assessment. However, the assessor excluded the species with the following justification: "*Habitat degraded. No intact rainforest communities on site*". The subject land contains habitat features associated with the species including coastal swamp forest and areas of dense leaf litter and coarse woody debris. The species is listed as a candidate for a Serious and Irreversible Impact (SAII) in the Department's relevant guideline.

BCD Recommendations

6. The BDAR be revised to remove the black-necked stork (*Ixobrychus flavicollis*) and black bittern (*Ixobrychus flavicollis*) from "*Table 7 Predicted and candidate threatened species assessed as not present at the site*", and these species be further assessed in the BDAR as likely to occur on the subject land.

7. Targeted survey be conducted for the Mitchell's rainforest snail (*Thersites mitchellae*), or it be assumed present, or an expert report be obtained, and if the species is detected, assumed present, or deemed present by the expert report, then it be further assessed in the BDAR, including under the section on serious and irreversible impacts.

Threatened plant surveys

Section 5.3 of the BAM 2020 requires accredited assessors to survey threatened species in accordance with the Department's threatened species survey guides. Section 4.2 of the "*Surveying Threatened Plants and their Habitats*" guideline (DPIE 2020) details the width, length and area of parallel field traverses for surveying threatened plants. For example, the maximum distance between parallel field traverses to detect herbs and forbs is 10m in open vegetation and 5m in dense vegetation.

Figures 9 and 10 of the BDAR show the separation distances for the traverses undertaken for targeted flora surveys on the site were much greater than those listed in the guideline and were not undertaken in a grid pattern. Consequently, the survey effort was likely insufficient to confidently rule out the presence of cryptic plants on the site such as the candidate threatened flora species *Rotala tripartita* which is known to occur on the adjacent site to the east.

BCD Recommendation

8. Additional threatened plant surveys be undertaken for candidate threatened plant species in accordance with the "*Surveying Threatened Plants and their Habitats*" guideline, or the species be assumed present, or an expert report be obtained, and the BDAR revised accordingly.

Assessment of prescribed biodiversity impacts

Section 8.3.4 of the BAM 2020 requires accredited assessors to assess the prescribed additional impacts of the proposal on biodiversity values, including impacts that affect water quality, water bodies and hydrological processes that sustain threatened entities. The proposed development would substantially alter the existing landscape morphology, as set out in the Flood Impact Assessment Report which indicates the current elevation of the subject land ranges from 0.4-1.8m AHD and the development area is proposed to be filled to an elevation of 2.8-3.1m.

As the TECs on the subject land are heavily dependent on hydrological conditions that may change because of the development, the impact of the proposed filling on adjacent areas should be fully considered in the BDAR. This should include an assessment of the likely impacts from the change in landscape morphology, and hydrological impacts such as the quantity and quality of stormwater inflow and altered wetting and drying regimes.

BCD Recommendation

9. The BDAR be revised to include an assessment of likely impacts that affect water quality, water bodies and hydrological processes that sustain threatened entities.

Avoid and minimise impacts

The BDAR justifies avoidance of impacts to biodiversity values predominately by suggesting the proposal has been located in areas where the native vegetation is in low condition. However, the proposed development footprint appears to be more influenced by the zoning of the site, encompassing the entire area zoned R1. The proposal would clear 7.7 ha and retain 7.5 ha of native vegetation, all comprising TECs, meaning the proposal would result in the loss of over half of the extent of TECs on the site.

As per recent judgements in the NSW Land and Environment Court, the BDAR cannot rely on avoiding vegetation in the parts of the site where the development is not permissible. The BDAR must demonstrate instead, how the proposal has avoided and minimised impacts on biodiversity values on the R1 zoned land.

We consider that measures to avoid or minimise impacts of the proposed development in accordance with section 6.12 of the *Biodiversity Conservation Act 2016* have not been adequately justified.

BCD Recommendation

10. The BDAR be revised to adequately demonstrate and justify measures taken by the proponent to avoid and minimise impacts on the biodiversity values of the site in accordance with Section 6.12 of the *Biodiversity Conservation Act 2016*.

Flooding

The flood impact assessment report considered the flood impact of the proposed development in isolation, and in combination with the already approved West Yamba Urban Release Area developments, i.e., inclusive of the Yamba Parklands, Clifton Lifestyle Manufactured Home Estate, Yamba Retirement Village, Yamba Gardens and potentially others. The Clarence Valley Council's requirement to assess the cumulative impacts of filling for several major developments is sound. However, even if these impacts were assessed as being tolerable, opportunities for development in less critical areas may be lost and it does beg the question of how the council will deal with future similar development proposals in Yamba.

The current approach appears reactive, with each add-on development being weighed on its merits. There are some disadvantages associated with this approach, including the need for a hydraulic impact assessment for each development. These will become increasingly complex as more proposed developments come on board to provide an appropriate definition of the impacts.

Furthermore, the configuration of floodplain development will be determined by the earlier approved individual developments. This can result in a reduction in the total developable land if the naturally higher flood flow areas have been occupied by an approved development. It is therefore preferable to strategically determine areas which can be filled having regard to all factors, including flooding, environmental, commercial, and social. This merit-based approach would lead to a smoother process of day-to-day flood risk management.

Now that the Lower Clarence Flood Model Update has been completed, it is appropriate the council prepares a flood risk management study and plan specifically designed for Yamba. This should include a development strategy for the subject floodplain which also considers stormwater drainage issues and safe occupation of the floodplain including flood safe emergency management in the event of extreme floods. The Department supports the council in the provision of technical advice and funding through the Floodplain Management Program. The process is outlined in the NSW Floodplain Development Manual (2005).

BCD Recommendation

11. Prior to determining the development application, the council prepares a new flood risk management study and plan for Yamba, including a development strategy for the subject floodplain, and then assesses the subject proposal accordingly.

Appendix 2 110-120 Carrs Drive Yamba – In-channel works Aquatic Assessment

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ABN: 47576386408
AQUATIC SCIENCE AND MANAGEMENT

Attention: Andrew Smith
Manage-Design-Engineer Pty Ltd
PO Box 44
Lennox Head NSW 2478
Via Email

CC: Chesney Boshoff

18th October 2023

RE: 110-120 CARRS DR YAMBA – IN-CHANNEL WORKS – AQUATIC ASSESSMENT

Dear Andrew,

Thank you for engaging my services to assess the in-channel works proposed for the unnamed mapped waterway on the southern boundary of 110-120 Carrs Drive, Yamba (Lot 2 DP733507 and Lot 32 DP128863) (**Figure 1**).

Figure 1 The subject site and surrounds (Data and Imagery: NSW DCS)

The proposal includes instream works that will widen and slightly deepen some parts of the existing unnamed waterway. The unnamed waterway is a second order stream and not mapped as Key Fish habitat and the works do not require a permit for dredging and reclamation from NSW Department of Primary Industries (DPI) Fisheries. If no mangroves are removed, no DPI Fisheries permit for harm to marine vegetation will be required. However, a controlled activity approval under the *Water Management Act 2000* is required for works in the waterway and its riparian zone.

I note that the existing Development Application was met with a Request for Additional Information from NSW Department of Planning and Environment-Water (NSW Water) that included the following:

> *Based on the creek modification plans provided to date, there has been no consideration of retaining riparian values for impacted watercourses. The Department seeks a more naturalised approach that enhances riparian value and function with creek modification works.*

Following a review of relevant information and a visit to the site on 11th September 2023 to assess the unnamed mapped waterway, I am writing with the results of my field and desktop investigations and advice on riparian zone management to improve the value and function of the riparian zone and creek bed within the area of proposed works. With respect to these outcomes, I have considered:

- Controlled Activity approval requirements,
- The subject site and existing drainage,
- The future site layout and instream works requirements,
- The existing aquatic habitat and ecology of the unnamed mapped waterway,
- Relevant documentation for rehabilitation of estuarine waterways,
- Existing water quality, and
- Some recommended measures.

I have included the relevant details below.

Relevant Considerations for a Controlled Activity Approval

Controlled activities reefer to works on waterfront land as defined in the *Water Management Act 2000* (WM Act). They include removal of plants from, and deposition of fill upon, waterfront land. Waterfront land includes the bed and banks of a waterway and the land within 40 m of the highest bank of a river, high-water mark of an estuary or shore of a lake.

NSW DPE Water indicate that the design and construction of works or activities within a watercourse should protect and enhance water flow, water quality stream ecology and existing riparian vegetation. The width of the riparian corridor to be protected and enhanced is defined as 20 m on either side of the highest bank of a 2nd order stream. However, there are certain allowable uses of riparian corridors. For a 2nd order stream they include cycleways and paths, detention basins, stormwater outlet structures and road crossings.

In order to be granted a controlled activity approval, the design and construction of instream works should consider:

- The width of the riparian corridor required.
- Accommodation of fully structured native riparian vegetation.
- Identification of alternative options and justification of selected options.
- Minimisation of the design and construction footprint and the proposed extent of disturbances to soil and vegetation within the watercourse.
- Maintaining or mimicking the existing functions of the existing watercourse and demonstrating that the instream works will not negatively impact these functions.
- Maintenance of natural geomorphic processes and natural hydrological regimes.
- Protection against scour.
- Stabilisation of all disturbed areas
- Monitoring and maintaining all in-stream works until stable

Subject Site and Existing Drainage

The site under consideration includes Lot 2 DP733507 and Lot 32 DP128863. The site drains in an east to west direction generally, towards Oyster Channel and the greater Clarence River estuary via an unnamed mapped second order waterway (**Figure 2**). The waterway appears to have been constructed, or realigned and enhanced, between 1989 and 1994. There are no mapped confluences within the subject site.

The unnamed waterway has a twin pipe floodgate (At S2, **Figure 2**) that has been eroded around and no longer excludes tidal flow (see site photos at the end of this letter). As a result, the unmapped waterway is tidal up to approximately S5 (**Figure 2**). The waterway is ephemerally flowing. At the time of the site inspection the entire bed of the waterway upstream of S5 was dry. It appeared to have been a period of months since the waterway had carried any flow. The conditions prior to the site inspection were very dry, with below average rainfall for 4 months (**Figure 3**). At the upstream margin of the subject site (S9) there was a partially blocked 400mm pipe culvert under a track. At this location the bottom of the culvert was significantly more elevated than the adjacent creek bed, forming a barrier to fish passage.

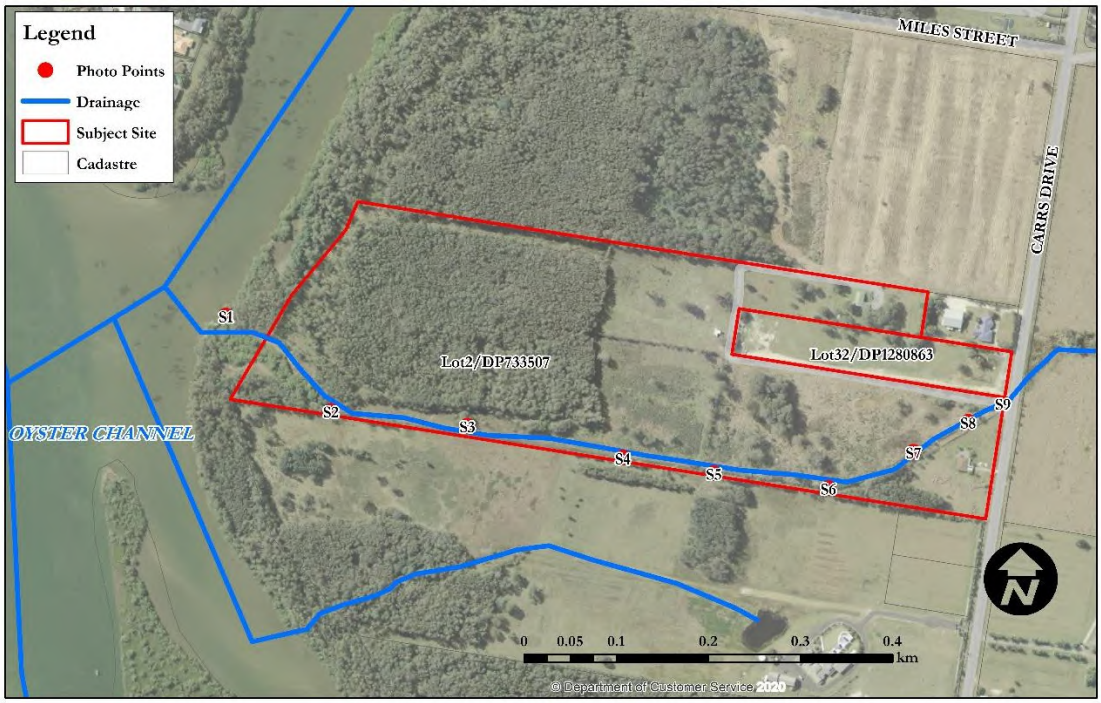


Figure 2 Lot layout and existing site drainage (Data and Imagery: NSW DCS, ASM)

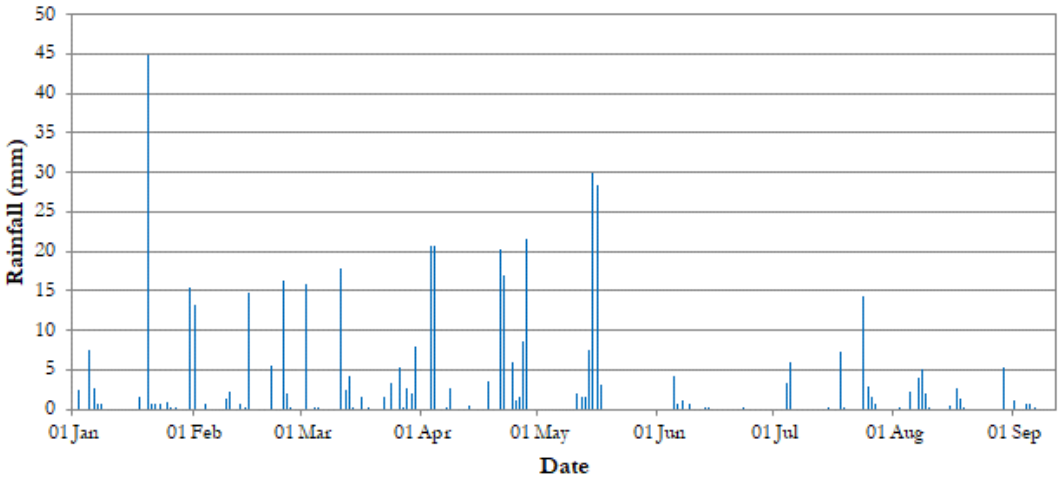


Figure 3 Rainfall in the months leading up to the site inspection (BoM 2023)

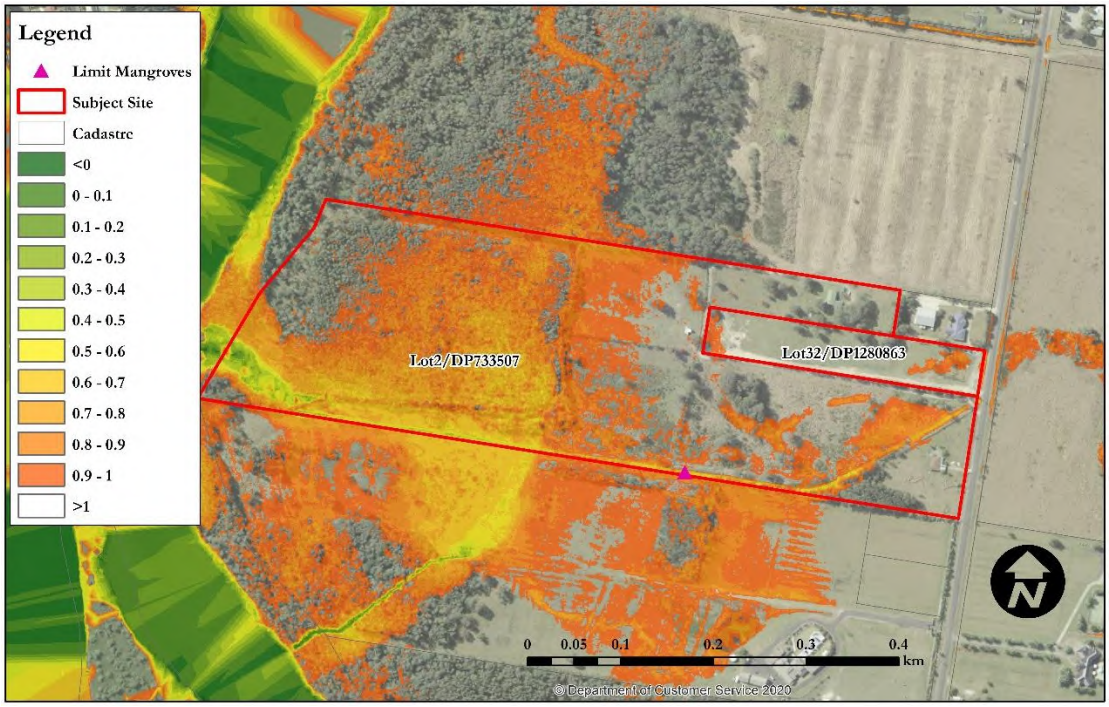


Figure 4 Existing site elevation and drainage (Data and Imagery: NSW DCS, NSW FSI, ASM)

Proposed instream and riparian zone works

The proposal includes instream and riparian zone works. The instream works include widening of the existing channel, deepening of the existing channel at the upstream end, removal of an existing 400mm pipe culvert and installation of a new culvert structure further downstream near S6. The riparian zone works include placement of fill (with batters of 1:4 and 1:3) down to the stream bed, installation of five OSD tanks and construction of eight biobasins. The proposed earthworks plan, showing areas of cut and fill is reproduced at the end of this letter.

Aquatic Habitat

Within the subject site the unnamed waterway is aquatic habitat with two distinct zones. The downstream reach, (west of S5) is tidal and habitat is dominated by dense growth of (relatively recently) recruited mangroves. In this reach the riparian zone is variably

vegetated, either by saltmarsh vegetation (dominated by *Zoysia macrantha* and including scattered individual *Juncus krausii*, *Isolepis cernua*, *Fimbristylis ferruginea* and *Sarcocornia quinqueflora*) or by Swamp Oak forest (dominated by *Casuarina glauca* and including *Juncus krausii*, *Machaerina rubiginosa*, *Melaleuca quinquenervia*, *Melaleuca styphelioides* and *Parsonsia straminea*).

The upstream reach (east of S5) is a freshwater environment characterised by reduced vegetative growth in the channel and more consistent riparian vegetation dominated by Swamp Oak forest (with the same suite of species listed above and occasional *Pittosporum undulatum*). Where it exists, the vegetation in the channel bed was dominated variably by *Schoenoplectus validus*, *Fimbristylis ferruginea*, *Machaerina rubiginosa.* and *Phragmites australis*. There were scattered weeds present in the channel around S5 and S6, mostly *Baccharis halimifolia*.

In the downstream, tidal, reach of the waterway the structural aquatic habitat was dominated by mangroves and their pneumatophores. The bed of the waterway was of a variable level but only by margins of approximately 0.2 m. Mangroves in this reach were recruiting strongly and there was a high proportional cover of mangrove seeds (*Avicennia marina*). There was also a high proportional cover of crab holes. At the time of the site inspection the width of the channel in the downstream reach varied from a maximum of approximately 8 m wide downstream of the floodgates to an average of approximately 1.5 m wide upstream of the floodgates. Depths ranged from dry to approximately 0.2 m deep. Tidal variation appeared to be approximately 0.6 m in the most downstream parts, lessening in the upstream parts and ceasing at an elevation of approximately 0.5 m AHD.

In the upstream freshwater reach the available structural aquatic habitat was dominated by occasional beds of reeds and rushes, fallen Swamp Oak snags, small woody debris and a dense, deep cover of fallen Swamp Oak needles. The channel bed ranged from approximately 1 m wide to approximately 2 m wide in this reach, which was dry at the time of the site inspection.

The fringing, marginal and aquatic vegetation contributes shade, structural habitat and significant primary production material (snags, woody debris and leaf litter) to the aquatic ecosystem. The habitat available is moderate in consideration of its utility for native aquatic fauna.

The abundant contributions of leaf litter and small woody debris contribute significantly to the ecology of the unnamed waterway. The sediment is a coarse mixture of alluvial material, organic material and marine sand in various proportions.

In general, the ecology of the unnamed waterway appears to be relatively stable and complex. Photos of all the sites in **Figure 2** are presented at the end of this letter.

Water Quality

Two physicochemical water quality measurements were collected from the unnamed waterway at S2 and S3. The results were as follows.

Site	Temp (°C)	pH	EC (mS/cm)	Turbidity (NTU)	DO (mg/L)
S2	17.22	6.66	51.5	13.0	0.50
S3	19.51	6.88	44.2	27.5	4.32

The water quality collected demonstrates that the lower section of the unnamed second order waterway is tidal and saline during dry conditions. There was no water present

upstream of S5 and no water quality results collected. The upstream margin of the tidal reach is inferred from mangrove distributions and tidal markings at the time of the site inspection.

Acid Sulfate Soil Considerations

The site is mapped as low probability of occurrence for acid sulfate soils (**Figure 5**) and class 2 (likely to be found less than 1 m below the natural ground level). Significant excavations of the creek bed could have an acid sulfate soil impact and should be avoided. There were some small areas of iron staining evident in the channel during the site inspection, possibly indicating acid sulfate soil impacts nearby, but it was not clear what the source of them was. An Acid Sulfate Soil Investgation and Acid Sulfate Soil Management Plan for the development have been completed (Precise Environmental).

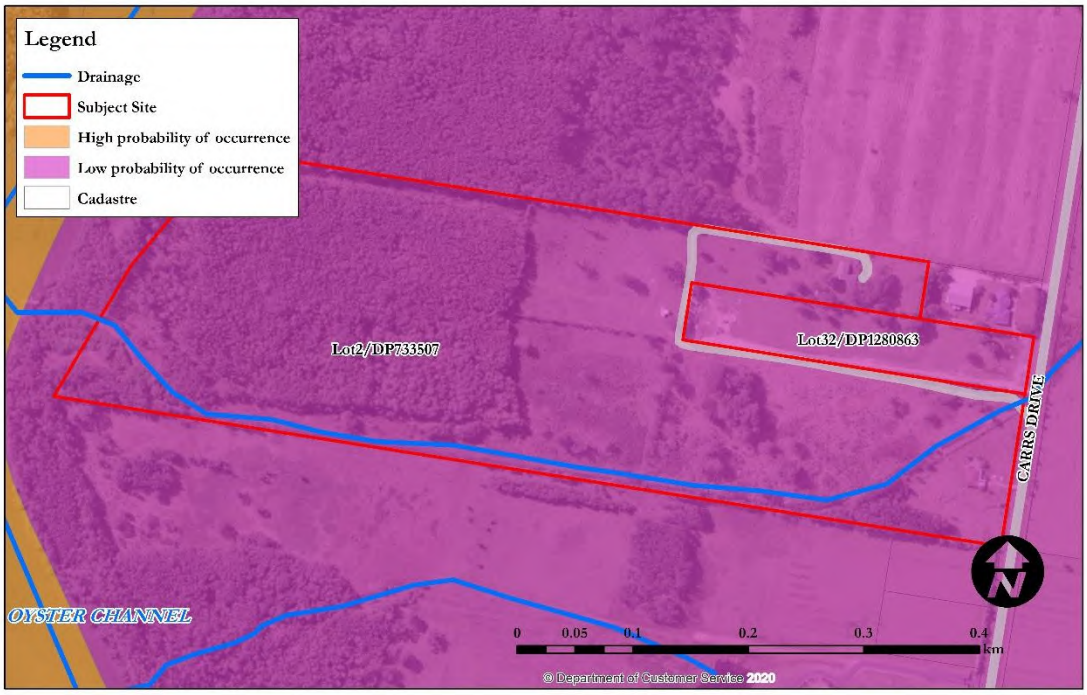


Figure 5 Acid sulfate soil risk map (Data and Imagery: NSW DCS, NSW FSI)

Conclusions and Recommendations

The unnamed second order mapped waterway on the subject site will be impacted by the proposed works.

- The proposed changes to the channel depth are minor and unlikely to have a significant impact upon flow or tidal conditions.
- There is a limited potential for an impact to acid sulfate soil materials. An Acid Sulfate Soil Investgation and Acid Sulfate Soil Management Plan for the development have been completed and implementation of the measures therein will adequately protect water quality in the unnamed second order stream and the receiving environment.
- The proposed changes to the channel width are likely to result in an increased volume carrying capacity and perhaps increase the maximum flow velocities. However, no changes are planned for the majority of the tidal reach and the tidal prism and penetration are unlikely to be altered, meaning no likely change to the saltmarsh and mangrove distributions resulting from the works.

- The clearing and fill works will result in a significant change to the in-stream and riparian zone vegetation in the freshwater reach of the study area that will require rehabilitation. These impacts will alter the ecology of the waterway by removing shade, altering flow and reducing organic inputs.
- The removal of the existing culvert near S9 will improve fish passage to the upstream waterway.

In order to restore and improve the naturalness of the in-stream and riparian zone environment after the works it is recommended that:

- Works downstream of S5 should avoid damage to mangroves growing in the channel bed.
- Works within the riparian zone should maximise the retention of any existing native vegetation. In particular, the southern bank of the waterway should be left intact where possible.
- The proposed changes to the channel depth are minor and unlikely to have a significant negative impact upon flow or tidal movements. However, incorporation of coir logs into the waterway bed and banks would help attenuate any increase in flow velocities occurring as a result of increased channel widths and provide some structural habitat features while riparian vegetation regenerates. Coir logs be installed as partially buried flow checks at approximately 15 m intervals, prior to topsoiling, to avoid erosion of the stream bed resulting from flows under incorrectly installed logs.
- The new culvert is installed with a bed level that allows fish passage during low flow conditions.
- After topsoiling, the creek bed and lower banks should be stabilised with a jute mesh. This measure will protect the creek bed and banks from erosion as revegetation works stabilise.
- The vegetation management plan should incorporate riparian, bank and bed plantings that will stabilise the channel, bed and banks and provide future shade, habitat and organic materials to the waterway ecosystem. There are guidelines available for revegetation of streams in the lower and estuarine Clarence River system.
- The existing native bed, bank and riparian vegetation is the most suitable for the site, especially up to an elevation of approximately 1.5 mAHD. The vegetation management plan should aim to replicate the existing Swamp Oak forest on the lower to middle banks and in the riparian zone at levels between approximately 0.7 and 1.5 mAHD and the existing channel bed community with plantings of *Juncus krausii* (between 0.3 and 0.5 mAHD), *Machaerina rubiginosa* and *Fimbristylis ferruginea.* (between 0.4 and 0.6 mAHD)*, Schoenoplectus validus* (between approximately 0.5 and 0.6 mAHD) and *Phragmites australis* and *Philydrum lanuginosum* (between approximately 0.6 and 0.8 mAHD)
- On the upper bank and in the riparian zones, which will be more elevated than they are currently after infill works, the vegetation management plan should incorporate plantings of species found elsewhere on the subject site that are highly suitable for riparian zone and bank stabilisation:
    - woody species such as *Melaleuca quinquenervia, Callistemon salignus, Glochidion ferdinandi var. ferdinandi, Cupaniopsis anacardioides, Lophostemon suaveolens* and *Alphitonia excelsa*; and
    - understorey species such as *Parsonsia straminea*, *Juncus usitatus*, *Dianella longifolia var. longifolia*, *Carex appressa*, *Hibiscus diversifolius*, *Parsonsia straminea* and *Pittosporum undulatum.*

- To ensure success of the riparian zone rehabilitation works, the vegetation management plan must also address maintenance of the rehabilitation plantings.

Considerations for improving naturalness that are not thought suitable include:

- Incorporating channel sinuosity – this would overly constrain the potential site uses and lead to a greater excavation footprint than the proposed works. Extensive excavations increase the risk of other environmental impacts arising from the works, such as acid sulfate soil impacts.
- Incorporating varying depths into the channel bed – this would lead to greater potential for creating acid sulfate soil risks from deeper excavation requirements and could lead to the prevalence of stagnant water adjacent to the site during dry periods.

If you require further information, please do not hesitate to contact me.

Sincerely,
Mathew Birch
Environmental Scientist
Aquatic Science and Management

Site Photos S1 (confluence with Oyster Channel)

Site Photos S2 (outflanked floodgates)

Site Photos S3 (dense mangroves)

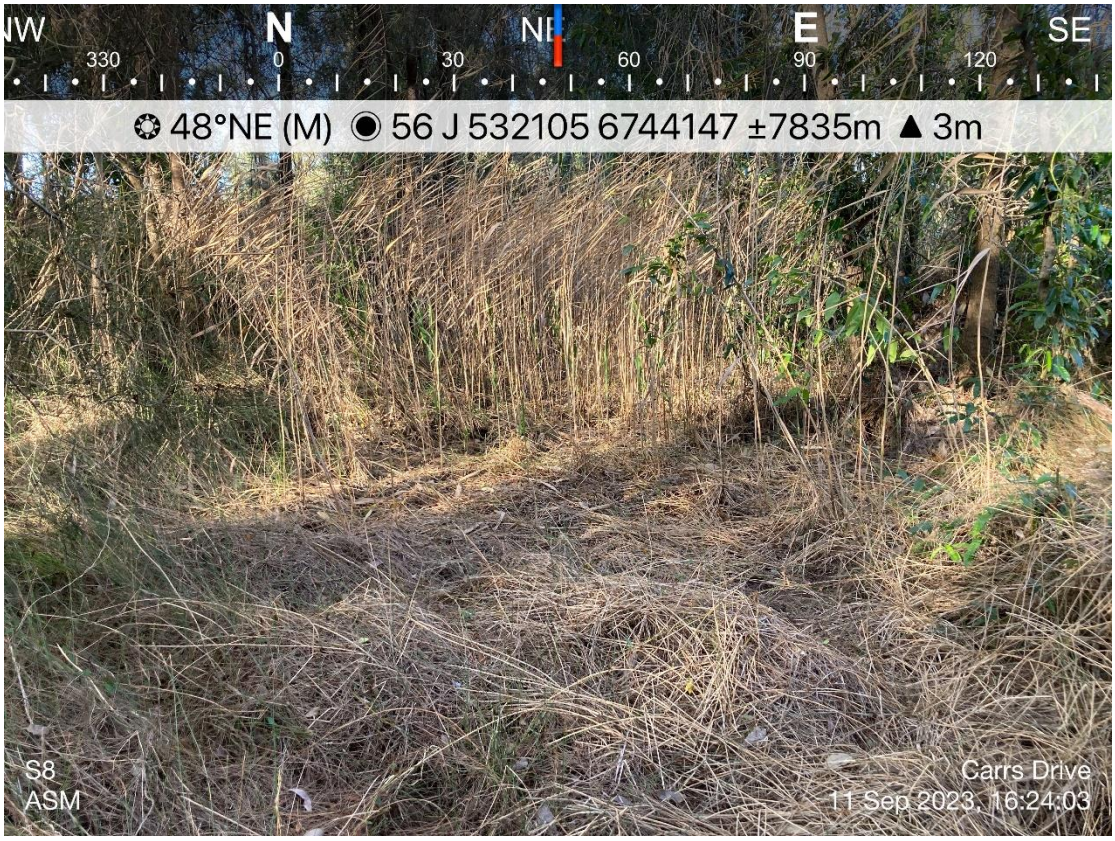
Site Photos S4 (mature mangroves)

Site Photos S5 (end mangrove zone)

Site Photos S6 (ephemeral freshwater zone)

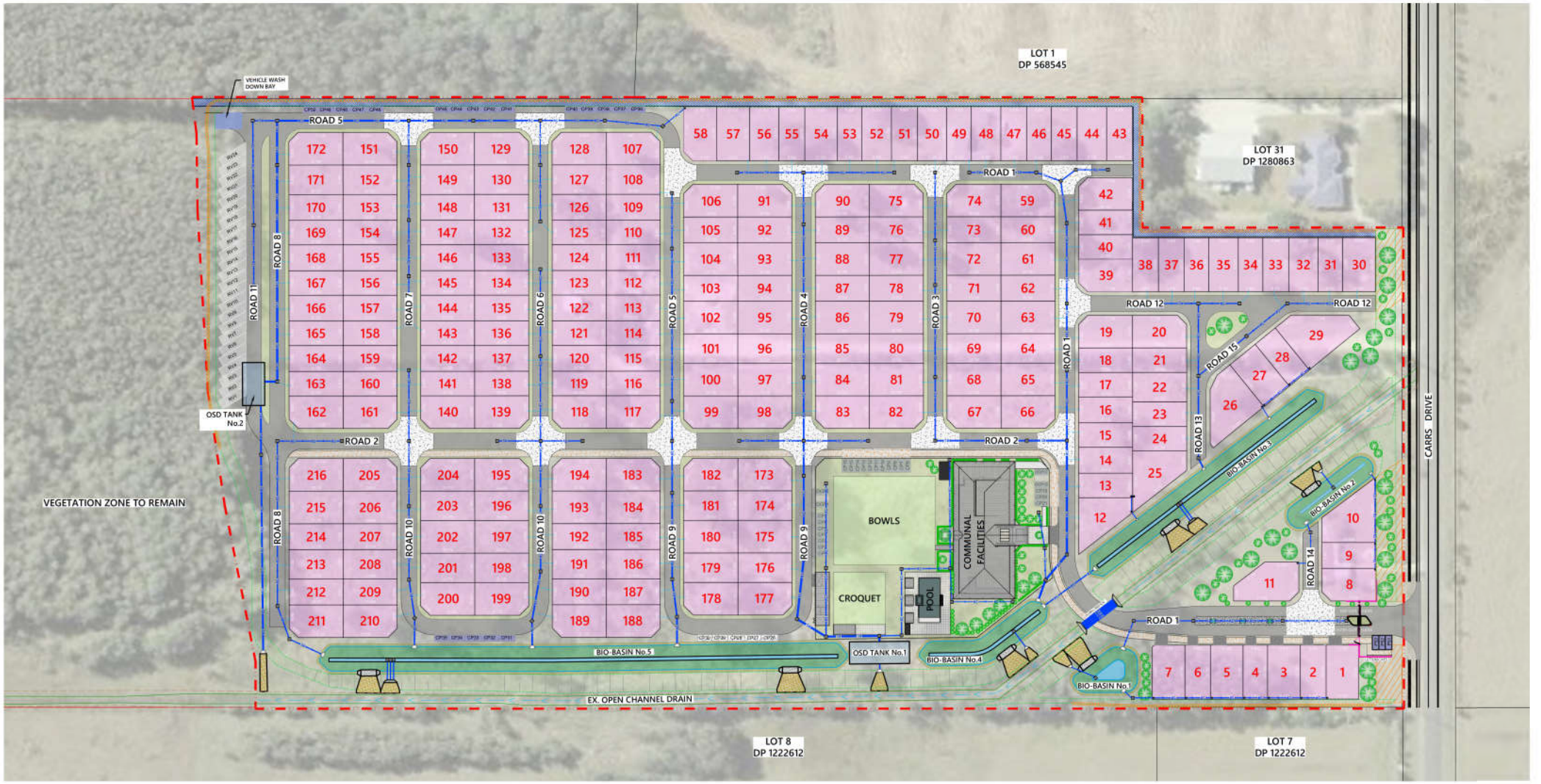
Site Photos S7 (scattered emergent macrophytes)

Site Photos S8 (bed of Common Reed in channel)



Site Photos S9 (partially blocked culvert structure at upstream margin of subject site)

Appendix 3 Design layout



SITE PLAN

SCALE 1:750

LEGEND

- DEVELOPMENT BOUNDARY
- INTERNAL LOT BOUNDARY
- BIO - BASIN TOP
- CHANNEL TOP OF BANK
- CHANNEL CENTRE LINE
- PROPOSED STORMWATER DRAINAGE
- RETAINING WALL
- STORMWATER DRAINAGE PIT
- HEADWALL
- PROPOSED MHE ALLOTMENT
- NEW INTERNAL CONCRETE ROAD PAVEMENT
- NEW INTERNAL CONCRETE INTERSECTION TREATMENTS & DRIVEWAYS
- NEW 2.5m WIDE SHARED PATH WITHIN SITE BOUNDARY
- MHE BOUNDARY SETBACK 3m WIDE 'NO BUILD ZONE'
- MHE BOUNDARY SETBACK 10m WIDE 'NO BUILD ZONE'
- VISITOR AND RECREATIONAL VEHICLE PARKING
- SCOUR PROTECTION
- BIO-BASIN BREM
- BIO-BASIN GRASSED AREA
- BIO-BASIN WEIR
- BIO-BASIN FLOOR
- GRASSED AREA

PLANS TO BE PRINTED IN COLOUR

PRELIMINARY PLANS FOR DA PURPOSES ONLY NOT FOR CONSTRUCTION

20 10 0 10 20 30 40
Horizontal Scale 1:750 (A1)
1:1500 (A3)

ISSUE	DESCRIPTION	DATE
1	ISSUED FOR DEVELOPMENT APPLICATION - AMENDED SITE FORMATION HEIGHTS	25.01.2024
0	ISSUED FOR DEVELOPMENT APPLICATION	06.09.2022

DESIGNED: T.RYDEN | DATE: JAN 2024
DRAWN: A.SCHMID | SCALE: AS SHOWN
SURVEYING: MACRO SURVEYING | SHEET SIZE: A1

ISSUED FOR DEVELOPMENT APPROVAL
NOT FOR CONSTRUCTION

MDE Manage Design Engineer

www.md-engineer.com.au

CLIENT: CLIFTON YAMBA LAND PTY LTD

TITLE: 110 & 120 CARRS DRIVE, YAMBA
DEVELOPMENT APPLICATION CIVIL WORKS PLANS

CLIFTON YAMBA

PROJECT: PROPOSED MHE DEVELOPMENT
110 & 120 CARRS DRIVE
YAMBA, NSW 2464
LOT 2 DP733507 & LOT 32 DP128863

DA CIVIL DRAWING

DRAWING TITLE: SITE PLAN

DWG No: D02 | SHEET: 02 OF 43 | REV: 1

Appendix 4 Floristic vegetation survey summary of results

Plot data summarising results of floristic survey of vegetation in development footprint, comprising plot data entered into BAM-C

Vegetation zone	4	1	2	2	2	3	5
Plot	6	11 [1]	1	4	7	2	5
Pct	1064	1235	1064	1064	1064	1064	1235
Area	0.22	1.63	3.86	3.86	3.85	1.28	1.34
Patch size	>100	>100	>100	>100	>100	>100	>100
Condition class	Forest zone4	Moderate zone 1	Regrowth zone2	Regrowth zone2	Regrowth zone2	Stand zone3	Weedy zone5
Zone	56	56	56	56	56	56	56
Easting	531715	531994	531791	531948	531889	531907	531763
Northing	6743176	6743048	6743192	6743041	6743206	6743100	6743107
Bearing	348	90	350	190	87	120	260
Composition							
Trees	5	4	4	4	6	10	2
Shrubs	5	2	1	2	2	4	3
Grasses	6	1	1	6	7	1	2
Forbs	2	5	1	4	6	1	3
Ferns	0	0	0	0	0	1	0
Other	4	3	3	3	1	6	3
Structure							
Trees	96	49.6	95.5	85.2	102.2	74.5	60
Shrubs	6.6	0.2	5	20.1	0.2	8	15.1
Grasses	101.1	5	80	22.6	58.2	2	70.1
Forbs	0.6	0.7	1	0.6	5.5	10	0.3
Ferns	0	0	0	0	0	2	0
Other	10.2	0.4	6	10.2	1	10.6	10.2
Function							
Large trees	1	0	0	1	1	3	0
Hollow trees	0	0	0	0	0	1	0
Litter cover	98.2	59	70	68	84	70	98
Length of fallen logs	10	5	0	0	0	10	0
High Threat Exotics	1.6	12.8	2	6.1	1.8	47	15.2
Tree size classes							
5-10 cm	1	1	1	1	1	1	1
10-19 cm	1	1	1	1	1	1	1
20-29 cm	1	0	0	0	0	1	0
30-39 cm	1	0	0	0	1	1	0
50-79 cm	0	0	0	0	0	1	0
Tree regeneration	1	1	1	1	1	1	1

[1] Supersedes former plot 3

Floristic data - Plot 1 (PCT 1064), zone 2

Composition

Scientific name	Common name	Growth form	Status^	Cover	Abundance
Baumea juncea	Bare Twig-rush	Grass	N	80	1000
Melaleuca quinquenervia	Broad-leaved Paperbark	Tree	N	80	400
Casuarina glauca	Swamp Oak	Tree	N	10	50
Parsonsia straminea	Common Silkpod	Other	N	5	100
Acacia melanoxylon	Blackwood	Tree	N	5	20
Melaleuca linariifolia	Flax-leaved Paperbark	Shrub	N	5	10
Baccharis halimifolia	Groundsel Bush	-	HTE	2	100
Hydrocotyle acutiloba		Forb	N	1	500
Glycine clandestina	Twining glycine	Other	N	0.5	50
Geitonoplesium cymosum	Scrambling Lily	Other	N	0.5	20
Glochidion ferdinandi var. *ferdinandi*	Cheese Tree	Tree	N	0.5	5

^ HTE=high threat exotic; N=native

Floristic data - Plot 2 (PCT 1064), zone 3

Scientific name	Common name	Growth form	Status^	Cover	Abundance
Melaleuca quinquenervia	Broad-leaved Paperbark	Tree	N	40	10
Lantana camara	Lantana	-	Manageable HTE	20	50
Paspalum dilatatum	Paspalum	-	HTE	20	500
Banksia integrifolia	Coast Banksia	Tree	N	15	15
Hydrocotyle acutiloba		Forb	N	10	1000
Parsonsia straminea	Common Silkpod	Other	N	5	50
Myrsine variabilis		Shrub	N	5	20
Acacia melanoxylon	Blackwood	Tree	N	5	20
Notelaea longifolia	Large Mock-olive	Tree	N	5	50
Cyclophyllum longipetalum	Coast Canthium	Tree	N	5	20
Pteridium esculentum	Bracken	Fern	N	2	50
Entolasia stricta	Wiry Panic	Grass	N	2	500
Trophis scandens	Burny Vine	Other	N	2	20
Morinda jasminoides	Sweet Morinda	Other	N	2	20
Lophostemon suaveolens	Swamp Mahogany	Tree	N	2	2
Senna pendula	Cassia	-	Manageable HTE	2	50
Ipomoea cairica	Morning Glory - coastal		HTE	2	100

Scientific name	Common name	Growth form	Status^	Cover	Abundance
Smilax australis	Lawyer Vine, Wait-a-while, Barbwire Vine	Other	N	1	10
Pittosporum revolutum	Rough Fruit Pittosporum	Shrub	N	1	10
Breynia oblongifolia	Coffee Bush	Shrub	N	1	10
Wikstroemia indica		Shrub	N	1	20
Alphitonia excelsa	Red Ash	Tree	N	1	5
Cinnamomum camphora	Camphor Laurel		Manageable HTE	1	5
Ochna serrulata	Ochna	-	HTE	1	10
Maclura cochinchinensis	Cockspur Thorn	Other	N	0.5	10
Passiflora suberosa	Corky Passionfruit	Other	HTE	0.5	10
Glochidion ferdinandi var. ferdinandi	Cheese Tree	Tree	N	0.5	2
Elaeocarpus obovatus	Hard Quandong	Tree	N	0.5	5
Cupaniopsis anacardioides	Tuckeroo	Tree	N	0.5	2
Asparagus aethiopicus	Ground Asparagus		HTE	0.5	20
Geitonoplesium cymosum	Scrambling Lily	Other	N	0.1	50
Archontophoenix spp.	Alexander palm	Palm & palmlike	E	0.1	10

*HTE=high threat exotic; N=native

Floristic data - Plot 3 (excluded from BAM calculator-C entry as per RFI) (PCT 1235), zone 1

Scientific name	Common name	Growth form	Status^	Cover	Abundance
Setaria sphacelata	Setaria	-	Manageable HTE	60	1000
Baccharis halimifolia	Groundsel Bush		HTE	10	20
Casuarina glauca	Swamp Oak	Tree	N	10	5
Acacia melanoxylon	Blackwood	Shrub	N	10	3
Senna pendula	Cassia	-	Manageable HTE	5	20
Lantana camara	Lantana	-	Manageable HTE	5	10
Breynia oblongifolia	Coffee Bush	Shrub	N	3	5
Paspalum dilatatum	Paspalum	-	HTE	2	50
Melaleuca quinquenervia	road-leaved pPaperbark	Tree	N	2	2
Parsonsia straminea	sCommon ilkpod	Other	N	2	20
Wikstroemia indica	-	Shrub	N	1	5
Geitonoplesium cymosum	crambling Lily	-	N	0.5	10
Pratia purpurascens	whiteroot	Forb	N	0.5	20

^ HTE=high threat exotic; N=native

Floristic data – Plot 11 (PCT 1235), zone 1

Supersedes decommissioned Plot 3, representing zone 1

Scientific name	Common name	Growth form	Status^	Cover	Abundance
Melaleuca quinquenervia	broad-leaved paperbark	Tree	N	70	100
Callistemon salignus	willow bottlebrush	Shrub	N	20	20
Casuarina glauca	swamp oak	Tree	N	15	20
Parsonsia straminea	common silkpod	Other	N	10	50
Paspalidium distans	-	Grass	N	10	500
Senna pendula	cassia	-	Manageable HTE	5	100
Entolasia marginata	bordered panic	Grass	N	5	200
Sporobolus virginicus	-	Grass	N	5	1000
Microlaena stipoides	weeping grass	Grass	N	2	100
Ipomoea cairica	morning glory - coastal		HTE	1	50
Juncus usitatus	-	Grass	N	0.5	1000
Centella asiatica	Indian pennywort	Forb	N	0.2	50
Philydrum lanuginosum	frogsmouth	Forb	N	0.2	30
Baccharis halimifolia	groundsel bush	-	HTE	0.1	10
Glochidion ferdinandi var. *ferdinandi*	cheese tree	Tree	N	0.1	5
Breynia oblongifolia	coffee bush	Shrub	N	0.1	5
Dianella longifolia var. *longifolia*	a blue flax lily	Forb	N	0.1	15
Velleia spathulata	-	Forb	N	0.1	50
Smilax australis	lawyer vine, wait-a-while, barbwire vine	Other	N	0.1	10
Acacia melanoxylon	blackwood	Tree	N	0.1	5
Carex appressa	tall sedge	Grass	N	0.1	10
Geitonoplesium cymosum	scrambling lily	Other	N	0.1	20

^ HTE=high threat exotic; N=native

Floristic data - Plot 4 (PCT 1064), zone 2

Scientific name	Common name	Growth form	Status^	Cover	Abundance
Melaleuca quinquenervia	broad-leaved paperbark	Tree	N	70	100
Callistemon salignus	willow bottlebrush	Shrub	N	20	20
Casuarina glauca	swamp oak	Tree	N	15	20
Parsonsia straminea	common silkpod	Other	N	10	50
Paspalidium distans	-	Grass	N	10	500
Senna pendula	cassia	-	Manageable HTE	5	100
Entolasia marginata	bordered panic	Grass	N	5	200
Sporobolus virginicus	-	Grass	N	5	1000
Microlaena stipoides	weeping grass	Grass	N	2	100
Ipomoea cairica	morning glory - coastal		HTE	1	50
Juncus usitatus	-	Grass	N	0.5	1000
Centella asiatica	indian pennywort	Forb	N	0.2	50
Philydrum lanuginosum	frogsmouth	Forb	N	0.2	30
Baccharis halimifolia	groundsel bush	-	HTE	0.1	10
Glochidion ferdinandi var. *ferdinandi*	cheese tree	Tree	N	0.1	5
Breynia oblongifolia	coffee bush	Shrub	N	0.1	5
Dianella longifolia var. *longifolia*	a blue flax lily	Forb	N	0.1	15
Velleia spathulata	-	Forb	N	0.1	50
Smilax australis	lawyer vine, wait-a-while, barbwire vine	Other	N	0.1	10
Acacia melanoxylon	blackwood	Tree	N	0.1	5
Carex appressa	tall sedge	Grass	N	0.1	10
Geitonoplesium cymosum	scrambling lily	Other	N	0.1	20

^ HTE=high threat exotic; N=native

Floristic data - Plot 5 (PCT 1235), zone 5

Scientific name	Common name	Growth form	Status^	Cover	Abundance
Juncus kraussii subsp. *australiensis*	sea rush	Grass	N	70	10000
Casuarina glauca	swamp oak	Tree	N	50	100
Melaleuca sieberi	-	Shrub	N	10	2
Melaleuca quinquenervia	broad-leaved paperbark	Tree	N	10	20
Parsonsia straminea	common silkpod	Other	N	10	100
Baccharis halimifolia	groundsel bush	-	HTE	10	50

Scientific name	Common name	Growth form	Status^	Cover	Abundance
Callistemon salignus	willow bottlebrush	Shrub	N	5	10
Senna pendula	cassia	-	Manageable HTE	5	-
Geitonoplesium cymosum	scrambling lily	Other	N	0.1	10
Centella asiatica	Indian pennywort	Forb	N	0.1	100
Ipomoea cairica	morning glory		HTE	0.1	100
Passiflora suberosa	corky passionfruit	#N/A	HTE	0.1	10
Dianella longifolia	a blue flax lily	Forb	N	0.1	10
Lobelia stenophylla	-	Forb	N	0.1	10
Paspalidium distans	-	Grass	N	0.1	50
Convolvulus erubescens	pink bindweed	Other	N	0.1	10
Hibiscus diversifolius	swamp hibiscus	Shrub	N	0.1	5

^ HTE=high threat exotic; N=native

Floristic data - Plot 6 (PCT 1064), zone 4

Scientific name	Common name	Growth form	Status^	Cover	Abundance
Melaleuca quinquenervia	broad-leaved paperbark	Tree	N	90	200
Juncus kraussii subsp. australiensis	sea rush	Grass	N	90	50000
Callistemon salignus	willow bottlebrush	Shrub	N	5	20
Livistona australis	cabbage palm	Other	N	5	5
Parsonsia straminea	common silkpod	Other	N	5	50
Sporobolus virginicus		Grass	N	5	100
Imperata cylindrica	-	Grass	N	5	100
Alphitonia excelsa	red ash	Tree	N	2	5
Cupaniopsis anacardioides	tuckeroo	Tree	N	2	10
Notelaea longifolia	large mock-olive	Tree	N	1	2
Glochidion ferdinandi	cheese tree	Tree	N	1	5
Baccharis halimifolia	groundsel bush	-	HTE	1	30
Melaleuca sieberi	-	Shrub	N	0.5	2
Breynia oblongifolia	coffee bush	Shrub	N	0.5	10
Ipomoea cairica	morning glory - coastal	-	HTE	0.5	50
Centella asiatica	Indian pennywort	Forb	N	0.5	200
Paspalidium distans	-	Grass	N	0.5	50
Entolasia marginata	bordered panic	Grass	N	0.5	50
Acacia sp.	wattle	Shrub	N	0.5	3
Melaleuca alternifolia	-	Shrub	N	0.1	5
Geitonoplesium cymosum	scrambling lily	Other	N	0.1	10

Scientific name	Common name	Growth form	Status^	Cover	Abundance
Baumea articulata	jointed twig-rush	Grass	N	0.1	5
Lobelia stenophylla	-	Forb	N	0.1	10
Convolvulus erubescens	pink bindweed	Other	N	0.1	10
Paspalum wettsteinii	broad-leaf paspalum		Manageable HTE	0.1	10

^ HTE=high threat exotic; N=native

Floristic data - Plot 7 (PCT 1064), zone 2

Scientific name	Common name	Growth form	Status^	Cover	Abundance
Melaleuca quinquenervia	broad-leaved paperbark	Tree	N	90	400
Paspalidium distans	-	Grass	N	40	5000
Lophostemon suaveolens	swamp mahogany	Tree	N	10	3
Sporobolus virginicus	-	Grass	N	10	1000
Philydrum lanuginosum	frogsmouth	Forb	N	5	50
Imperata cylindrica	-	Grass	N	5	100
Juncus kraussii subsp. *australiensis*	sea rush	Grass	N	2	300
Casuarina glauca	swamp oak	Tree	N	1	20
Parsonsia straminea	common silkpod	Other	N	1	10
Acacia melanoxylon	blackwood	Tree	N	1	5
Juncus usitatus		Grass	N	1	100
Paspalum dilatatum	paspalum	-	HTE	1	50
Ipomoea cairica	morning glory - coastal		HTE	0.5	20
Eucalyptus tereticornis	forest red gum	Tree	N	0.1	2
Senna pendula	cassia	-	Manageable HTE	0.1	5
Baccharis halimifolia	groundsel bush		HTE	0.1	10
Acacia spp.	wattle	Shrub	N	0.1	10
Velleia spathulata	-	Forb	N	0.1	30
Dianella longifolia	a blue flax lily	Forb	N	0.1	10
Cyperus sp.	-	Grass	N	0.1	50
Centella asiatica	indian pennywort	Forb	N	0.1	100
Cyperus haspan	-	Grass	N	0.1	20
Breynia oblongifolia	coffee bush	Shrub	N	0.1	5
Glochidion ferdinandi	cheese tree	Tree	N	0.1	1
Lantana camara	lantana	-	Manageable HTE	0.1	5
Eclipta platyglossa	yellow twin-heads	Forb	N	0.1	20
Gonocarpus spp.	raspwort	Forb	N	0.1	20

^ HTE=high threat exotic; N=native

Floristic data - Plot 8 (PCT 961916), zone 8

Outside development footprint

Scientific name	Common name	Growth form	Status^	Cover	Abundance	Stratum
Sporobolus virginicus	salt couch	Grass	N	90	2000	Ground
Juncus kraussii subsp. australiensis	sea rush	Sedge	N	3	100	Mid
Avicennia marina subsp. australasica	grey mangrove	Tree	N	5	40	Upper
Casuarina glauca	swamp oak	Tree	N	5	100	Upper
Sarcocornia quinqueflora subsp. quinqueflora	beaded glasswort	Forb	N	4	100	Ground
Schoenus brevifolius	zig-zag bog-rush	Forb	N	0.2	20	Mid
Bacopa monnieri	brahmi	Forb	N	0.2	5	Ground
Apium prostratum	sea celery	Forb	N	0.2	10	Ground
Alternanthera denticulata	lesser joyweed	Forb	N	0.1	5	Ground
Senna pendula	cassia	-	Manageable HTE	0.1	1	Mid

^ HTE=high threat exotic; N=native

Floristic data - Plot 9 (PCT 1125), zone 7

Outside development footprint

Scientific name	Common name	Growth form	Status^	Cover	Abundance	Stratum
Sporobolus virginicus	salt couch	Grass	N	70	2000	Ground
Parsonsia straminea	common silkpod	Other	N	3	20	Mid
Baccharis halimifolia	groundsel bush	Shrub	HTE	1	10	Mid
Melaleuca bracteata	river tea-tree	tree	N	2	1	Mid
Amyema gaudichaudii	melaleuca mistletoe	tree	N	0.2	2	Mid
Ipomoea cairica	morning glory - coastal	Other	HTE	0.5	20	Ground
Senna pendula	cassia	-	Manageable HTE	0.2	5	Ground
Melaleuca bracteata	river tea-tree	Tree	N	0.2	10	Ground
Viola hederacea	ivy-leaved violet	Forb	N	1	500	Ground
Schoenus brevifolius	zig-zag bog-rush	Segde	N	0.1	50	Ground
Juncus kraussii subsp. australiensis	sea rush	Segde	N	1	100	Ground
Livistona australis	cabbage palm	Shrub	N	0.2	3	Ground
Acacia sp.	wattle	Tree	N	0.4	3	Mid
Pittosporum revolutum	rough fruit pittosporum	Shrub	N	0.1	1	Ground
Asparagus aethiopicus	ground asparagus	-	HTE	0.1	2	Ground
Baumea juncea syn. Machaerina juncea	bare twig rush	Sedge	N	2	500	Ground

^ HTE=high threat exotic; N=native

Floristic data - Plot 10 (PCT 1064), zone 4

Outside development footprint

Scientific name	Common name	Growth form	Status^	Cover	Abundance	Stratum
Geitonoplesium cymosum	scrambling lily	Other	N	0.1	5	Mid
Denhamia celastroides	denhamia	Tree	N	0.3	3	Mid
Parsonsia straminea	common silkpod	Other	N	5	50	Upper
Alphitonia excelsa	red ash	Tree	N	0.3	2	Mid
Livistona australis	cabbage palm	Tree	N	1	9	Mid
Ipomoea cairica	morning glory - coastal	Other	HTE	0.5	50	Ground
Cupaniopsis anacardioides	tuckeroo	Tree	N	0.1	4	Mid
Senna pendula	cassia	-	Manageable HTE	0.2	7	Mid
Imperata cylindrica	blady grass	Grass	N	0.3	50	Ground
Paspalum dilatatum	paspalum	-	HTE	0.5	50	Ground
Baccharis halimifolia	groundsel bush	-	HTE	0.3	4	Mid
Myrsine howittiana	brush muttonwood	Tree	N	0.2	1	Mid
Cordyline stricta	narrow-leaved palm lily	Shrub	N	0.2	2	Mid
Oplismenus hirtellus	basket grass	Grass	N	0.1	5	Ground
Bursaria spinosa	native blackthorn	Shrub	N	0.1	1	Mid
Viola hederacea	ivy-leaved violet	Forb	N	0.1	2	Ground
Melaleuca quinquenervia	broad-leaved paperbark	Tree	N	15	100	Upper
Melicope elleryana	pink-flowered doughwood	Tree	N	0.1	1	Mid
Glochidion ferdinandi var. pubens	hairy cheese tree	Tree	N	0.1	7	Mid
Ripogonum album	white supplejack	Other	N	0.4	7	Mid
Acacia spp.	wattle	Tree	N	0.1	2	Mid
Casuarina glauca	swamp oak	Tree	N	0.3	1	Upper
Acacia sp.	wattle	Tree	N	0.2	1	Mid
Senna pendula	cassia	-	Manageable HTE	0.2	10	Ground
Baumea juncea	bare twig rush	Sedge	N	80	2000	Ground
Ageratum houstonianum	blue billygoat weed	-	*	2	50	Ground
Hibiscus tiliaceus	cottonwood hibiscus	Shrub	N	0.2	2	Mid
Ardisia crenata	coral berry	-	N	0.1	1	Ground
Breynia oblongifolia	coffee bush	Shrub	N	0.1	1	Ground
Cyperus haspan subsp. juncoides	dwarf papyrus	Sedge	N	5	1000	Ground
Hymenosporum flavum	native frangipani	Tree	N	0.2	2	Mid

^ HTE=high threat exotic; N=native

Appendix 5 Additional incidental flora observations

Family	Scientific name	Common name	Native	Exotic
Amaranthaceae	*Alternanthera denticulata*	lesser joyweed	X	
Araucariaceae	*Araucaria cunninghamii*	hoop pine	X	
Blechnaceae	*Blechnum indicum*	bungwall	X	
Lauraceae	*Cassytha filiformis*	dodder laurel	X	
Euphorbiaceae	*Claoxylon australe*	brittlewood	X	
Asparagaceae	*Cordyline petiolaris*	broad leaved palm lily	X	
Asphodelaceae	*Dianella caerulea*	blue flax-lily	X	
Orchidaceae	*Dockrillia linguiformis*	tongue orchid	X	
Moraceae	*Ficus coronata*	sandpaper fig	X	
Moraceae	*Ficus obliqua*	small-leaved fig	X	
Cyperaceae	*Fimbristylis ferruginea*	*Fimbristylis ferruginea*	X	
Cyperaceae	*Gahnia aspera*	rough saw sedge	X	
Fabaceae	*Glycine clandestina*	a glycine	X	
Goodeniaceae	*Goodenia heterophylla*	variable goodenia	X	
Araliaceae	*Hydrocotyle pterocarpa*	wing pennywort	X	
Cyperaceae	*Isolepis cernua*	nodding club rush	X	
Campanulaceae	*Lobelia anceps*	angled lobelia	X	
Euphorbiaceae	*Mallotus philippensis*	red kamala	X	
Rutaceae	*Melicope elleryana*	pink Euodia	X	
Primulaceae	*Myrsine variabilis*	variable Myrsine	X	
Polygonaceae	*Persicaria decipiens*	slender knotweed	X	
Poaceae	*Phragmites australis*	common reed	X	
Pittosporaceae	*Pittosporum revolutum*	rough-fruited pittosporum	X	
Polypodiaceae	*Platycerium bifurcatum*	staghorn	X	
Polypodiaceae	*Platycerium silybum*	elkhorn	X	
Convolvulaceae	*Polymeria calycina*	slender bindweed	X	
Acanthaceae	*Pseuderanthemum variabile*	pastel flower	X	
Orchidaceae	*Spiranthes spiralis*	pink spiral orchid	X	
Menispermaceae	*Stephania japonica var. discolor*	snake vine	X	
Myrtaceae	*Syzygium luehmannii*	small-leaved lillypilly	X	
Typhaceae	*Typha orientalis*	broadleaf cumbungi	X	
Campanulaceae	*Wahlenbergia gracilis*	Australian bluebell	X	
Poaceae	*Zoysia macrantha*	prickly couch	X	
Poaceae	*Cenchrus clandestinus*	kikuyu grass		X
Gentianaceae	*Centaurium tenuiflorum*	common centaury		X
Lauraceae	*Cinnamomum camphora*	camphor laurel		X
Lythraceae	*Cuphea carthagenensis*	Colombian waxweed		X
Moraceae	*Ficus pumila*	climbing fig		X

Family	Scientific name	Common name	Native	Exotic
Iridaceae	*Gladiolus undulatus*	wild gladiolus		X
Fabaceae	*Macroptilium atropurpureum*	siratro		X
Poaceae	*Paspalum vaginatum*	paspalum		X
Poaceae	*Paspalum urvillei*	paspalum		X
Passifloraceae	*Passiflora edulis*	common passionfruit		X
Poaceae	*Setaria sphacelata*	South African pigeon grass		X
Asteraceae	*Sphagneticola trilobata*	Singapore daisy		X
Poaceae	*Stenotaphrum secundatum*	buffalo grass		X

Appendix 6 Fauna survey records

Survey type	Fauna	Scientific name	Common name	Definite	Possible
Nocturnal search	Amphibian	*Litoria gracilenta*	dainty green tree frog	x	
		Litoria nasuta	rocket frog	x	
		Litoria fallax	eastern sedge frog	x	
		Litoria caerulea	green treefrog	x	
		Limnodynastes peronii	striped marsh frog	x	
		Crinia signifera	common eastern froglet	x	
		Crinia parinsignifera	eastern sign-bearing froglet	x	
		Platyplectrum ornatus	ornate burrowing frog	x	
		Rhinella marinus	cane toad	x	
	Mammal	*Pteropus poliocephalus^*	grey-headed flying fox	x	
		Pteropus alecto	Black flying fox	x	
Motion sensor	Mammal	*Isoodon macrourus*	northern brown bandicoot	x	
		Rattus fuscipes	bush rat	x	
		Rattus rattus	black rat	x	
		Antechinus sp.	antechinus	x	
		Petaurus breviceps	sugar glider	x	
		Petaurus norfolcensis	squirrel glider	x	
	Reptile	*Varanus varius*	lace monitor	x	
Diurnal bird	Bird	*Rhipidura albiscapa*	grey fantail	x	
		Haliaeetus leucogaster	white-bellied sea eagle	x	
		Rhipidura rufifrons	rufous fantail	x	
		Neochmia temporalis	red-browed finch	x	
		Pachycephala pectoralis	golden whistler	x	
		Rhipidura albiscapa	grey fantail	x	
		Geopelia humeralis	bar-shouldered dove	x	
		Acanthiza sp.	unidentified thornbill	x	
		Myiagra inquieta	restless flycatcher	x	
		Cracticus tibicen	Australian magpie	x	
		Malurus sp.	unidentified fairy wren	x	
		Myzomela sanguinolenta	scarlet honeyeater	x	
		Pelecanus conspicillatus	Australian pelican	x	
		Eopsaltria australis	eastern yellow robin	x	
		Philemon corniculatus	noisy friarbird	x	
		Pachycephala rufiventris	rufous whistler	x	
		Todiramphus sanctus	sacred kingfisher	x	

Survey type	Fauna	Scientific name	Common name	Definite	Possible
		Strepera graculina	pied currawong	x	
		Rhipidura leucophrys	willie wagtail	x	
		Colluricincla harmonica	grey shrike thrush	x	
		Dacelo novaeguineae	laughing kookaburra	x	
		Corvus tasmanicus	forest raven	x	
		Malurus melanocephalus	red-backed fairy wren	x	
		Myiagra cyanoleuca	satin flycatcher	x	
		Merops ornatus	rainbow bee-eater	x	
		Dicaeum hirundinaceum	mistletoebird	x	
		Macropygia amboinensis	brown cuckoo-dove	x	
		Lichmera indistincta	brown honeyeater	x	
		Synoicous ypsilophora	brown quail	x	
		Chenonetta jubata	Australian wood duck	x	
		Alectura lathami	Australian brushturkey	x	
		Lichenostomus leucotis	white-eared honeyeater	x	
Anabat acoustic	Microbat	*Chalinolobus morio*	chocolate wattled bat+		x
		Falsistrellus tasmaniensis / Scotepens orion / Scoteanax rueppellii	35 - 38 khz mixed group	x	
		Miniopterus australis	little bentwing bat	x	
		Miniopterus schreibersii oceanensis	eastern bentwing bat	x	
		Myotis macropus	large-footed myotis+		x
		Myotis macropus / Nyctophilus sp.	can not separate on quality of call	x	
		Nyctophilus sp.	long-eared bat	x	
		Scotorepens orion	eastern broad-nosed bat+		x
		Vespadelus pumilus	eastern forest bat	x	x
Incidental	Reptile	*Dendrelaphis punctulatus*	green tree snake	x	
		Intellagama lesueurii	eastern water dragon	x	
		Pseudonaja textilis	eastern brown snake	x	
	Mammal	*Macropus giganteus*	eastern grey kangaroo	x	

^ Threatened species

+ Possible from signal quality

* Introduced species

Appendix 7 BAM Predicted threatened species report

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00030578/BAAS17103/22/00030579	Carrs Drive Yamba	22/06/2023
Assessor Name	Report Created	BAM Data version *
Ziggy Andersons	15/02/2024	61
Assessor Number	Assessment Type	BAM Case Status
BAAS17103	Part 4 Developments (General)	Finalised
Assessment Revision	BOS entry trigger	Date Finalised
5	BOS Threshold: Area clearing threshold	15/02/2024

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

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

Common Name	Scientific Name	Vegetation Types(s)
Australasian Bittern	Botaurus poiciloptilus	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Australian Painted Snipe	Rostratula australis	1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Barking Owl	Ninox connivens	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Barred Cuckoo-shrike	Coracina lineata	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Black Bittern	Ixobrychus flavicollis	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Black-necked Stork	Ephippiorhynchus asiaticus	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion

Black-necked Stork	Ephippiorhynchus asiaticus	1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Blue-billed Duck	Oxyura australis	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
Common Blossom-bat	Syconycteris australis	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Eastern Chestnut Mouse	Pseudomys gracilicaudatus	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Eastern False Pipistrelle	Falsistrellus tasmaniensis	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
Eastern Long-eared Bat	Nyctophilus bifax	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Eastern Osprey	Pandion cristatus	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Freckled Duck	Stictonetta naevosa	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Glossy Black-Cockatoo	Calyptorhynchus lathami	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion

Golden-tipped Bat	Phoniscus papuensis	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Greater Broad-nosed Bat	Scoteanax rueppellii	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Hoary Wattled Bat	Chalinolobus nigrogriseus	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Little Bent-winged Bat	Miniopterus australis	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Little Eagle	Hieraaetus morphnoides	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Little Lorikeet	Glossopsitta pusilla	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
New Holland Mouse	Pseudomys novaehollandiae	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Northern Free-tailed Bat	Ozimops lumsdenae	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion

Northern Free-tailed Bat	Ozimops lumsdenae	1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Powerful Owl	Ninox strenua	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Regent Honeyeater	Anthochaera phrygia	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Square-tailed Kite	Lophoictinia isura	1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Superb Fruit-Dove	Ptilinopus superbus	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
Swift Parrot	Lathamus discolor	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
Varied Sittella	Daphoenositta chrysoptera	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
White-throated Needletail	Hirundapus caudacutus	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
Yellow-bellied Glider	Petaurus australis	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion
		1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion

Threatened species Manually Added

None added

BAM Predicted Species Report

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

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

Appendix 8 BAM Candidate threatened species report

BAM Candidate Species Report

Proposal Details

Assessment Id 00030578/BAAS17103/22/00030579	Proposal Name Carrs Drive Yamba	BAM data last updated * 22/06/2023
Assessor Name Ziggy Andersons	Report Created 15/02/2024	BAM Data version * 61
Assessor Number BAAS17103	Assessment Type Part 4 Developments (General)	BAM Case Status Finalised
Assessment Revision 5	Date Finalised 15/02/2024	BOS entry trigger BOS Threshold: Area clearing threshold

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

List of Species Requiring Survey

Name	Presence	Survey Months
Acronychia littoralis Scented Acronychia	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Allocasuarina defungens Dwarf Heath Casuarina	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Ancistrachne maidenii Ancistrachne maidenii	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?

Archidendron hendersonii White Lace Flower	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Arthraxon hispidus Hairy Jointgrass	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Cacophis harriettae White-crowned Snake	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Callistemon linearifolius Netted Bottle Brush	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Carterornis leucotis White-eared Monarch	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Centranthera cochinchinensis Swamp Foxglove	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Cercartetus nanus Eastern Pygmy-possum	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Crinia tinnula Wallum Froglet	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Cyperus aquatilis Water Nutgrass	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Dendrobium melaleucaphilum Spider orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Desmodium acanthocladum Thorny Pea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Dromaius novaehollandiae - endangered population Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?

Drynaria rigidula Basket Fern	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Endiandra muelleri subsp. bracteata Green-leaved Rose Walnut	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Geodorum densiflorum Pink Nodding Orchid	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Hieraaetus morphnoides Little Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Hoplocephalus bitorquatus Pale-headed Snake	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Lichenostomus fasciogularis Mangrove Honeyeater	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Lindernia alsinoides Noah's False Chickweed	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Litoria aurea Green and Golden Bell Frog	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Litoria brevipalmata Green-thighed Frog	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Litoria olongburensis Olongburra Frog	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Lophoictinia isura Square-tailed Kite	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Maundia triglochinoides Maundia triglochinoides	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Melaleuca irbyana Weeping Paperbark	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Myrsine richmondensis Ripple-leaf Muttonwood	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Oberonia complanata Yellow-flowered King of the Fairies	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Oberonia titania Red-flowered King of the Fairies	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Olax angulata Square-stemmed Olax	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?

Pandion cristatus Eastern Osprey	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Peristeranthus hillii Brown Fairy-chain Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Persicaria elatior Tall Knotweed	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Petalura litorea Coastal Petaltail	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Petauroides volans Southern Greater Glider	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Phaius australis Southern Swamp Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascogale tapoatafa Brush-tailed Phascogale	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☑ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Phyllanthus microcladus Brush Sauropus	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Planigale maculata Common Planigale	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Polygala linariifolia Native Milkwort	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?

Potorous tridactylus Long-nosed Potoroo	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Rotala tripartita Rotala tripartita	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Thersites mitchellae Mitchell's Rainforest Snail	No (surveyed)	☑ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☑ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Todiramphus chloris Collared Kingfisher	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Barking Owl	Ninox connivens	Habitat degraded Habitat constraints
Davidson's Plum	Davidsonia jerseyana	Refer to BAR
Glossy Black-Cockatoo	Calyptorhynchus lathami	Habitat constraints
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints

Laced Fritillary	Argynnis hyperbius	Habitat degraded Habitat constraints Geographic limitations
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Large-eared Pied Bat	Chalinolobus dwyeri	Habitat constraints
Little Bent-winged Bat	Miniopterus australis	Habitat constraints
Powerful Owl	Ninox strenua	Habitat degraded Habitat constraints
Red Lilly Pilly	Syzygium hodgkinsoniae	Refer to BAR
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Rough-shelled Bush Nut	Macadamia tetraphylla	Refer to BAR
Small-leaved Tamarind	Diploglottis campbellii	Refer to BAR
Southern Myotis	Myotis macropus	Refer to BAR
Southern Ochrosia	Ochrosia moorei	Refer to BAR
Sweet False Galium	Oldenlandia galioides	Habitat degraded
Sweet Myrtle	Gossia fragrantissima	Refer to BAR
Swift Parrot	Lathamus discolor	Habitat constraints

Appendix 9 Credit Summary Report

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00030578/BAAS17103/22/00030579	Carrs Drive Yamba	22/06/2023
Assessor Name	Report Created	BAM Data version *
Ziggy Andersons	15/02/2024	61
Assessor Number	BAM Case Status	Date Finalised
BAAS17103	Finalised	15/02/2024
Assessment Revision	Assessment Type	BOS entry trigger
5	Part 4 Developments (General)	BOS Threshold: Area clearing threshold

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

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

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

Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion												
1	1064_Remnant_Zone 4	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	73.1	73.1	0.22	PCT Cleared - 75%	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		8
3	1064_Regrowth_zone 2	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	61.5	61.5	3.9	PCT Cleared - 75%	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		119

4	1064_Stands_Zone3	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	55.9	55.9	1.3	PCT Cleared - 75%	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		36
											Subtotal	**163**
Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion												
2	1235_Regrowth_Zone1	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	34.7	34.7	1.6	PCT Cleared - 75%	High Sensitivity to Gain	Endangered Ecological Community	Endangered	2.00		28

5	1235_Regrowth_Zone5	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	49.7	49.7	1.3	PCT Cleared - 75%	High Sensitivity to Gain	Endangered Ecological Community	Endangered	2.00	33
										Subtotal	**61**
										Total	**224**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Petaurus norfolcensis / Squirrel Glider (Fauna)									
1064_Regrowth_zone2	61.5	61.5	3.8			Vulnerable	Not Listed	False	118
1064_Remnant_Zone4	73.1	73.1	0.22			Vulnerable	Not Listed	False	8
1064_Stands_Zone3	55.9	55.9	1.3			Vulnerable	Not Listed	False	36
								Subtotal	**162**

Planigale maculata / Common Planigale (Fauna)									
1064_Regrowth_zone2	61.5	61.5	3.9			Vulnerable	Not Listed	False	119
1064_Remnant_Zone4	73.1	73.1	0.22			Vulnerable	Not Listed	False	8
1064_Stands_Zone3	55.9	55.9	1.3			Vulnerable	Not Listed	False	36
1235_Regrowth_Zone5	49.7	49.7	1.3			Vulnerable	Not Listed	False	33
								Subtotal	**196**

Appendix 10 Biodiversity Credit Report (like for like)

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00030578/BAAS17103/22/00030579

Proposal Name
Carrs Drive Yamba

BAM data last updated *
22/06/2023

Assessor Name
Ziggy Andersons

Assessor Number
BAAS17103

BAM Data version *
61

Proponent Names
Richard Volpe

Report Created
15/02/2024

BAM Case Status
Finalised

Assessment Revision
5

Assessment Type
Part 4 Developments (General)

Date Finalised
15/02/2024

BOS entry trigger
BOS Threshold: Area clearing threshold

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

Potential Serious and Irreversible Impacts

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

Species
Nil

Additional Information for Approval

BAM Biodiversity Credit Report (Like for like)

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	5.4	36	127	163
1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	3.0	0	61	61

BAM Biodiversity Credit Report (Like for like)

1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 837, 839, 926, 971, 1064, 1092, 1227, 1230, 1231, 1232, 1235, 1649, 1715, 1716, 1717, 1718, 1719, 1721, 1722, 1723, 1724, 1725, 1730, 1795, 1798, 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	1064_Remnant_Zone4	No	8	Clarence Lowlands, Clarence Sandstones, Scenic Rim, Woodenbong and Yuraygir. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 837, 839, 926, 971, 1064, 1092, 1227, 1230, 1231, 1232, 1235, 1649, 1715, 1716, 1717, 1718, 1719, 1721, 1722, 1723, 1724, 1725, 1730, 1795, 1798, 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	1064_Regrowth_zone2	No	119	Clarence Lowlands, Clarence Sandstones, Scenic Rim, Woodenbong and Yuraygir. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 837, 839, 926, 971, 1064, 1092, 1227, 1230, 1231, 1232, 1235, 1649, 1715, 1716, 1717, 1718, 1719, 1721, 1722, 1723, 1724, 1725, 1730, 1795, 1798, 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	1064_Stands_Zone3	Yes	36	Clarence Lowlands, Clarence Sandstones, Scenic Rim, Woodenbong and Yuraygir. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 915, 916, 917, 918, 919, 1125, 1230, 1232, 1234, 1235, 1236, 1726, 1727, 1728, 1729, 1731, 1800, 1808, 3962, 3963, 3985, 3987, 3993, 4016, 4023, 4026, 4027, 4028, 4030, 4035, 4038, 4040, 4048, 4049, 4050, 4056	-	1235_Regrowth_Zone1	No	28	Clarence Lowlands, Clarence Sandstones, Scenic Rim, Woodenbong and Yuraygir. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 915, 916, 917, 918, 919, 1125, 1230, 1232, 1234, 1235, 1236, 1726, 1727, 1728, 1729, 1731, 1800, 1808, 3962, 3963, 3985, 3987, 3993, 4016, 4023, 4026, 4027, 4028, 4030, 4035, 4038, 4040, 4048, 4049, 4050, 4056	-	1235_Regrowth_Zone5	No	33	Clarence Lowlands, Clarence Sandstones, Scenic Rim, Woodenbong and Yuraygir. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Petaurus norfolcensis / Squirrel Glider	**1064_Regrowth_zone2, 1064_Remnant_Zone4, 1064_Stands_Zone3**	5.4	162.00

Planigale maculata / Common Planigale	**1064_Regrowth_zone2, 1064_Remnant_Zone4, 1064_Stands_Zone3, 1235_Regrowth_Zone5**	6.7	196.00

Credit Retirement Options

Like-for-like credit retirement options

Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW
Planigale maculata / Common Planigale	Spp	IBRA subregion
	Planigale maculata / Common Planigale	Any in NSW

Appendix 11 Biodiversity Credit Report (variation options)

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00030578/BAAS17103/22/00030579

Proposal Name
Carrs Drive Yamba

BAM data last updated *
22/06/2023

Assessor Name
Ziggy Andersons

Assessor Number
BAAS17103

BAM Data version *
61

Proponent Name(s)
Richard Volpe

Report Created
15/02/2024

BAM Case Status
Finalised

Assessment Revision
5

Assessment Type
Part 4 Developments (General)

Date Finalised
15/02/2024

BOS entry trigger
BOS Threshold: Area clearing threshold

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

Potential Serious and Irreversible Impacts

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

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

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

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	5.4	36	127	163.00
1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	3.0	0	61	61.00

1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region

Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 837, 839, 926, 971, 1064, 1092, 1227, 1230, 1231, 1232, 1235, 1649, 1715, 1716, 1717, 1718, 1719, 1721, 1722, 1723, 1724, 1725, 1730, 1795, 1798, 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	1064_Remnant_Zone 4	No	8	Clarence Lowlands,Clarence Sandstones, Scenic Rim, Woodenbong and Yuraygir. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 837, 839, 926, 971, 1064, 1092, 1227, 1230, 1231, 1232, 1235, 1649, 1715, 1716, 1717, 1718, 1719, 1721, 1722, 1723, 1724, 1725, 1730, 1795, 1798, 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	1064_Regrowth_zone 2	No	119	Clarence Lowlands,Clarence Sandstones, Scenic Rim, Woodenbong and Yuraygir. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 837, 839, 926, 971, 1064, 1092, 1227, 1230, 1231, 1232, 1235, 1649, 1715, 1716, 1717, 1718, 1719, 1721, 1722, 1723, 1724, 1725, 1730, 1795, 1798, 3272, 3906, 3983, 3985, 3986, 3988, 3989, 3990, 3995, 3997, 3998, 4000, 4001, 4004, 4006, 4009, 4013, 4019, 4020, 4021, 4044, 4047, 4057	-	1064_Stands_Zone3	Yes	36	Clarence Lowlands,Clarence Sandstones, Scenic Rim, Woodenbong and Yuraygir. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
Forested Wetlands	Tier 3 or higher threat status	1064_Remnant_Zone4	No	8	IBRA Region: South Eastern Queensland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Forested Wetlands	Tier 3 or higher threat status	1064_Regrowth_zone2	No	119	IBRA Region: South Eastern Queensland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Forested Wetlands	Tier 3 or higher threat status	1064_Stands_Zone3	Yes (including artificial)	36	IBRA Region: South Eastern Queensland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 915, 916, 917, 918, 919, 1125, 1230, 1232, 1234, 1235, 1236, 1726, 1727, 1728, 1729, 1731, 1800, 1808, 3962, 3963, 3985, 3987, 3993, 4016, 4023, 4026, 4027, 4028, 4030, 4035, 4038, 4040, 4048, 4049, 4050, 4056	-	1235_Regrowth_Zone1	No	28	Clarence Lowlands,Clarence Sandstones, Scenic Rim, Woodenbong and Yuraygir. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions This includes PCT's: 915, 916, 917, 918, 919, 1125, 1230, 1232, 1234, 1235, 1236, 1726, 1727, 1728, 1729, 1731, 1800, 1808, 3962, 3963, 3985, 3987, 3993, 4016, 4023, 4026, 4027, 4028, 4030, 4035, 4038, 4040, 4048, 4049, 4050, 4056	-	1235_Regrowth_Zone 5	No	33	Clarence Lowlands,Clarence Sandstones, Scenic Rim, Woodenbong and Yuraygir. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Forested Wetlands	Tier 3 or higher threat status	1235_Regrowth_Zone 1	No	28	IBRA Region: South Eastern Queensland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Forested Wetlands	Tier 3 or higher threat status	1235_Regrowth_Zone 5	No	33	IBRA Region: South Eastern Queensland, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Petaurus norfolcensis / Squirrel Glider	**1064_Regrowth_zone2, 1064_Remnant_Zone4, 1064_Stands_Zone3**	5.4	162.00
Planigale maculata / Common Planigale	**1064_Regrowth_zone2, 1064_Remnant_Zone4, 1064_Stands_Zone3, 1235_Regrowth_Zone5**	6.7	196.00

Credit Retirement Options

Like-for-like options

Petaurus norfolcensis/ Squirrel Glider	Spp		IBRA region
	Petaurus norfolcensis/Squirrel Glider		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Clarence Lowlands, Clarence Sandstones, Scenic Rim, Woodenbong and Yuraygir. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Planigale maculata/ Common Planigale	Spp		IBRA region

	Planigale maculata/Common Planigale		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Clarence Lowlands, Clarence Sandstones, Scenic Rim, Woodenbong and Yuraygir. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Appendix 12 Vegetation Zones Report

BAM Vegetation Zones Report

Proposal Details

Assessment Id	Assessment name	BAM data last updated *
00030578/BAAS17103/22/00030579	Carrs Drive Yamba	22/06/2023
Assessor Name	**Report Created**	**BAM Data version ***
Ziggy Andersons	15/02/2024	61
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS17103	Part 4 Developments (General)	Finalised
Assessment Revision	**Date Finalised**	**BOS entry trigger**
5	15/02/2024	BOS Threshold: Area clearing threshold

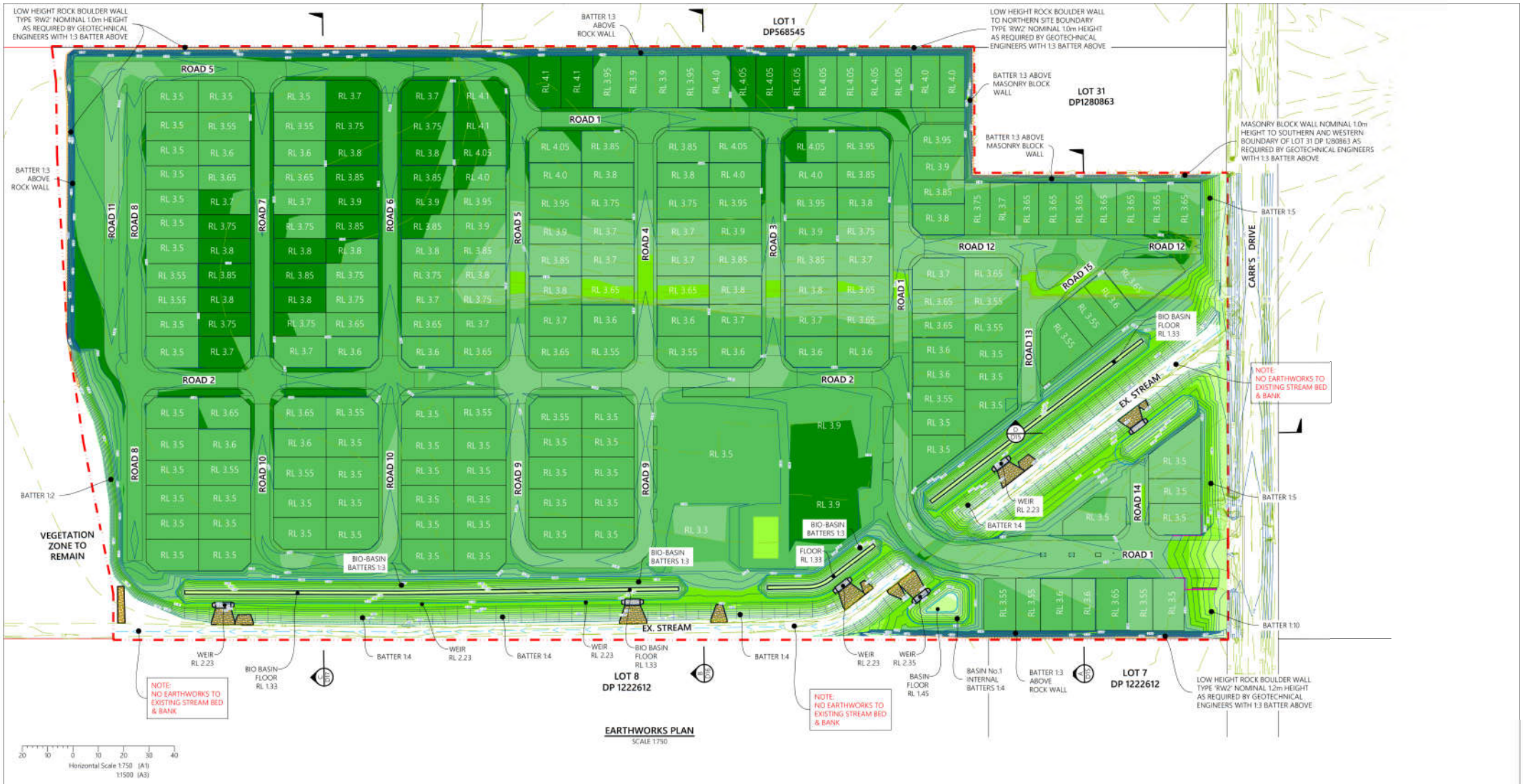
* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones

1	1064_Remnant_Zone4	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion	Remnant_Zone4	0.22	1	
2	1235_Regrowth_Zone1	1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion	Regrowth_Zone1	1.63	1	
3	1064_Regrowth_zone2	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion	Regrowth_zone2	3.86	2	
4	1064_Stands_Zone3	1064-Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion	Stands_Zone3	1.28	1	
5	1235_Regrowth_Zone5	1235-Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion	Regrowth_Zone5	1.34	1	

Appendix 13 Earthworks Plan



EARTHWORKS PLAN
SCALE 1:750

LEGEND

- FILL 0.0 - 0.5m DEPTH
- FILL 0.5 - 1.0m DEPTH
- FILL 1.0 - 1.5m DEPTH
- FILL 1.5 - 2.0m DEPTH
- FILL 2.0 - 2.5m DEPTH
- FILL 2.5 - 3.0m DEPTH
- FILL 3.0- 3.2m DEPTH
- EXISTING SITE CONTOURS 0.1m INTERVAL
- PROPOSED RE-GRADING CONTOURS 0.2m INTERVAL

PRELIMINARY EARTHWORKS ESTIMATE

EARTHWORKS CUT TO FILL FROM NOMINAL 100mm DEEP STRIPPED SURFACE TOPSOIL DEPTH TO BE CONFIRMED AT DETAILED DESIGN STAGE.

VOLUMES INCLUDING NOMINAL INTERNAL ROADWAY BOXING 320mm DEEP

AREA OF EARTHWORKS =9.67Hb (EXCL. CARRS DRIVE RECONSTRUCTION)
TOPSOIL STRIPPED TO STOCKPILE = 9,670m³

GENERAL BULK EARTHWORKS
TOTAL CUT = 0m³
TOTAL FILL = 239,700m³ (IMPORTED FROM APPROVED SOURCE or QUARRY)

NOTES:
* AMENDED LOWER CLARENCE FLOOD MODEL 2022 WITH 1% AEP FLOOD LEVEL RL=3.5m AHD

ALLOTMENT EARTHWORKS LEVELS TO BE NO LESS THAN THE 100 YEAR (1% AEP) FLOOD LEVEL RL=3.5m AHD

PLANS TO BE PRINTED IN COLOUR

PRELIMINARY PLANS FOR DA PURPOSES ONLY NOT FOR CONSTRUCTION

ISSUE	DESCRIPTION	DATE
1	ISSUED FOR DEVELOPMENT APPLICATION - AMENDED SITE FORMATION HEIGHTS	25.01.2024
0	ISSUED FOR DEVELOPMENT APPLICATION	06.09.2022

DESIGNED: T.RYDEN | DATE: JAN 2024
DRAWN: A.SCHMID | SCALE: AS SHOWN
SURVEYING: MACRO SURVEYING | SHEET SIZE: A1

ISSUED FOR DEVELOPMENT APPROVAL
NOT FOR CONSTRUCTION

MDE Manage Design Engineer

www.md-engineer.com.au

CLIENT: CLIFTON YAMBA LAND PTY LTD

TITLE: 110 & 120 CARRS DRIVE, YAMBA
DEVELOPMENT APPLICATION CIVIL WORKS PLANS

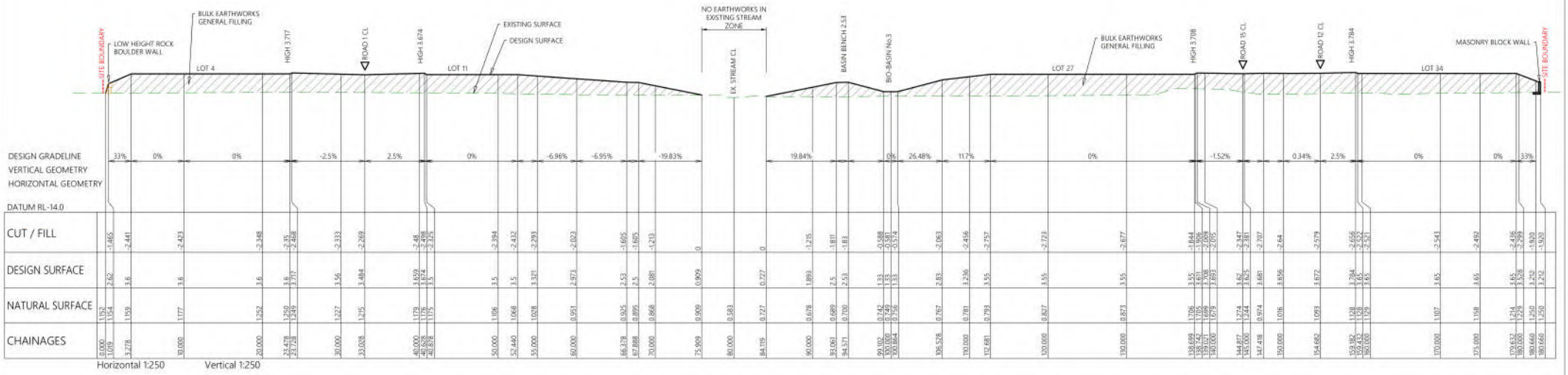
CLIFTON YAMBA

PROJECT: PROPOSED MHE DEVELOPMENT
110 & 120 CARRS DRIVE
YAMBA, NSW 2464
LOT 2 DP733507 & LOT 32 DP128863

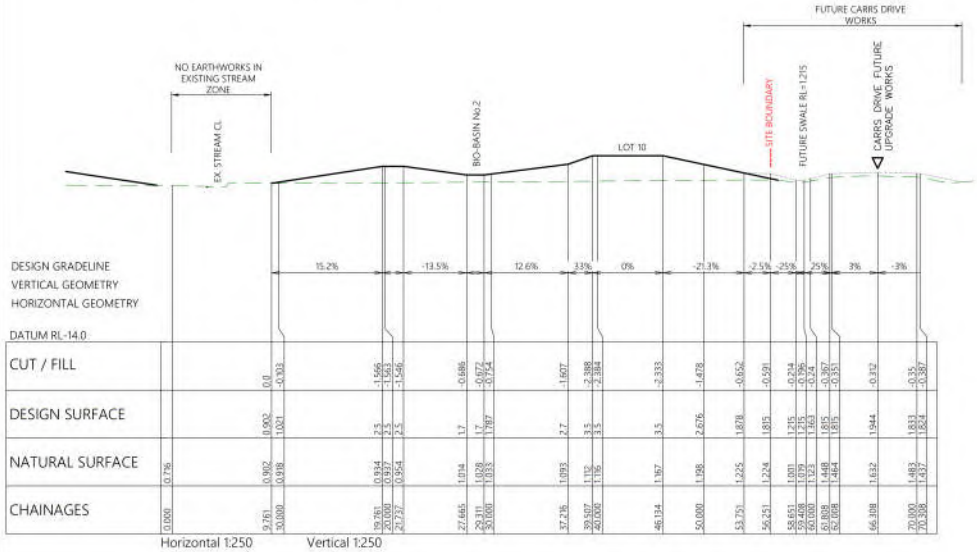
DA CIVIL DRAWING

DRAWING TITLE: EARTHWORKS PLAN

DWG No: D14 | SHEET: 14 OF 43 | REV: 1



BULK EARTHWORKS SECTION - A



BULK EARTHWORKS SECTION - D

ISSUE	DESCRIPTION	DATE
1	ISSUED FOR DEVELOPMENT APPLICATION - AMENDED SITE FORMATION HEIGHTS	23.01.2024
0	ISSUED FOR DEVELOPMENT APPLICATION	06.09.2022

DESIGNED: T.RYDEN | DATE: JAN 2024
DRAWN: A.SCHMID | SCALE: AS SHOWN
SURVEYING: MACRO SURVEYING | SHEET SIZE: A1

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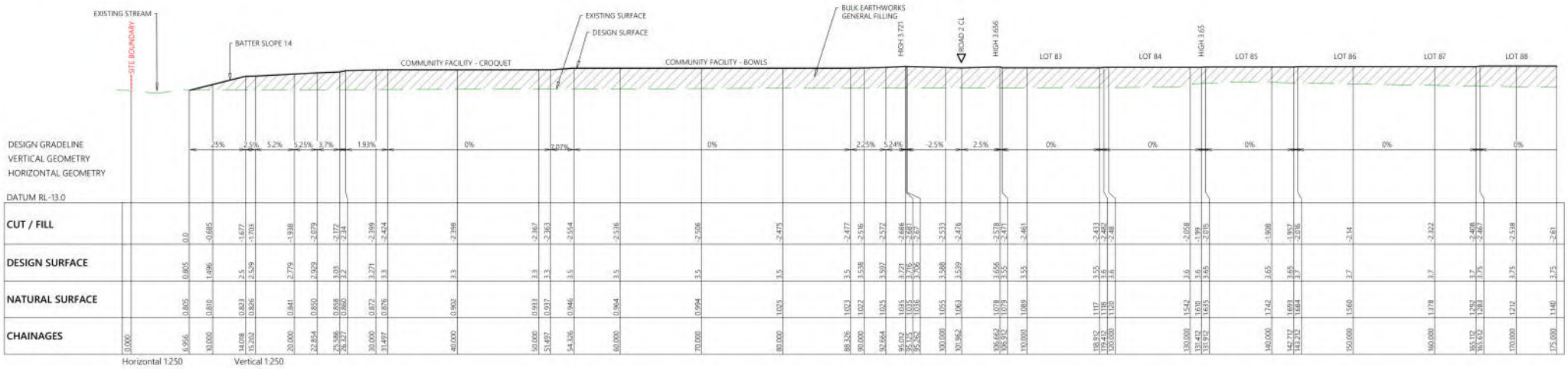
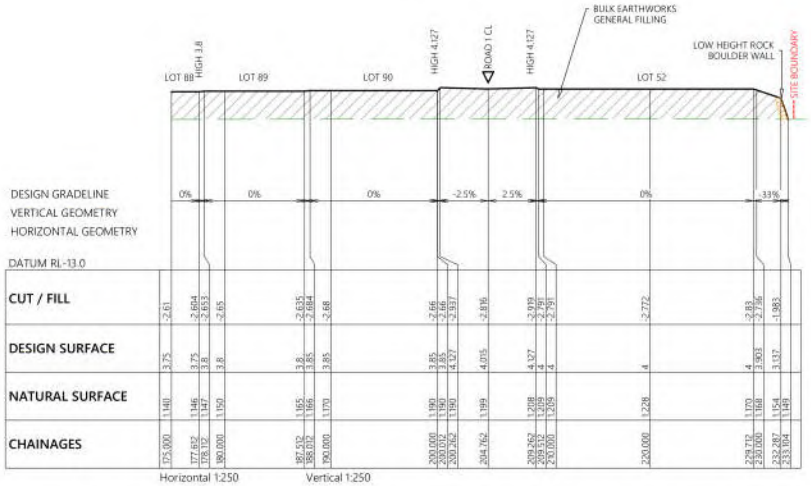
DA CIVIL DRAWING

DRAWING TITLE: EARTHWORKS SECTIONS - SHEET 1 OF 3

DWG No: D15 | SHEET: 15 OF 43 | REV: 1



BULK EARTHWORKS SECTION - B



CONTINUATION SECTION - B

ISSUE	DESCRIPTION	DATE
1	ISSUED FOR DEVELOPMENT APPLICATION - AMENDED SITE FORMATION HEIGHTS	23.01.2024
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DESIGNED: T.RYDEN | DATE: JAN 2024
DRAWN: A.SCHMID | SCALE: AS SHOWN
SURVEYING: MACRO SURVEYING | SHEET SIZE: A1

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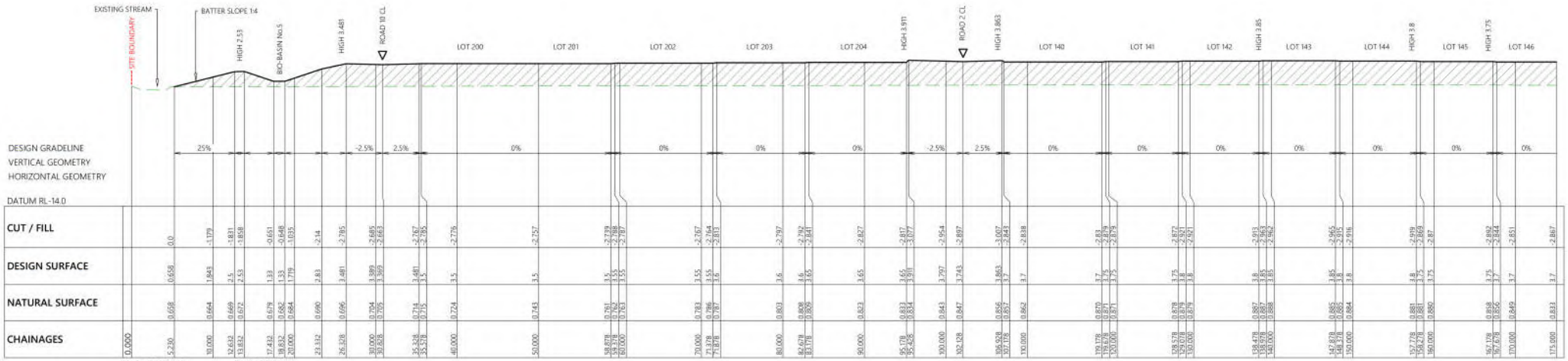
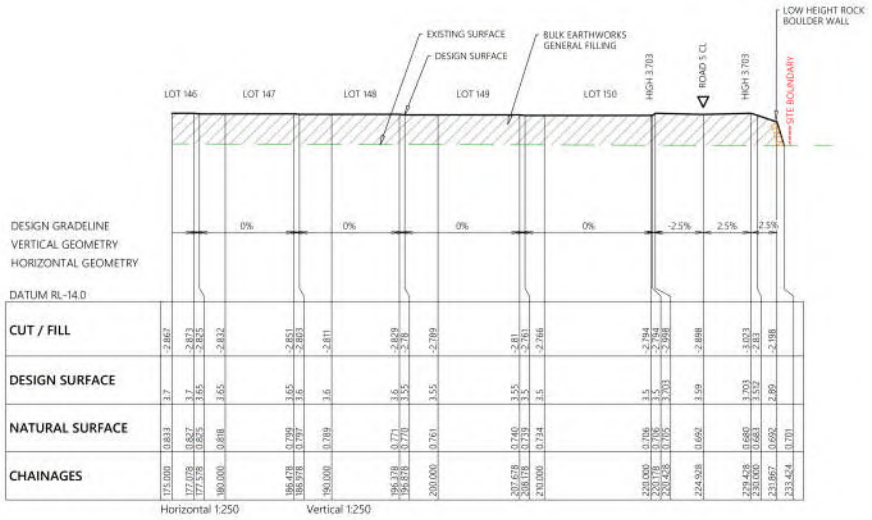
DA CIVIL DRAWING

DRAWING TITLE: EARTHWORKS SECTIONS - SHEET 2 OF 3

DWG No: D16 | SHEET: 16 OF 43 | REV: 1



BULK EARTHWORKS SECTION - C



CONTINUATION SECTION - C

ISSUE	DESCRIPTION	DATE
1	ISSUED FOR DEVELOPMENT APPLICATION - AMENDED SITE FORMATION HEIGHTS	23.01.2024
0	ISSUED FOR DEVELOPMENT APPLICATION	06.09.2022

DESIGNED: T.RYDEN | DATE: JAN 2024
DRAWN: A.SCHWAB | SCALE: AS SHOWN
SURVEYING: MACRO SURVEYING | SHEET SIZE: A1

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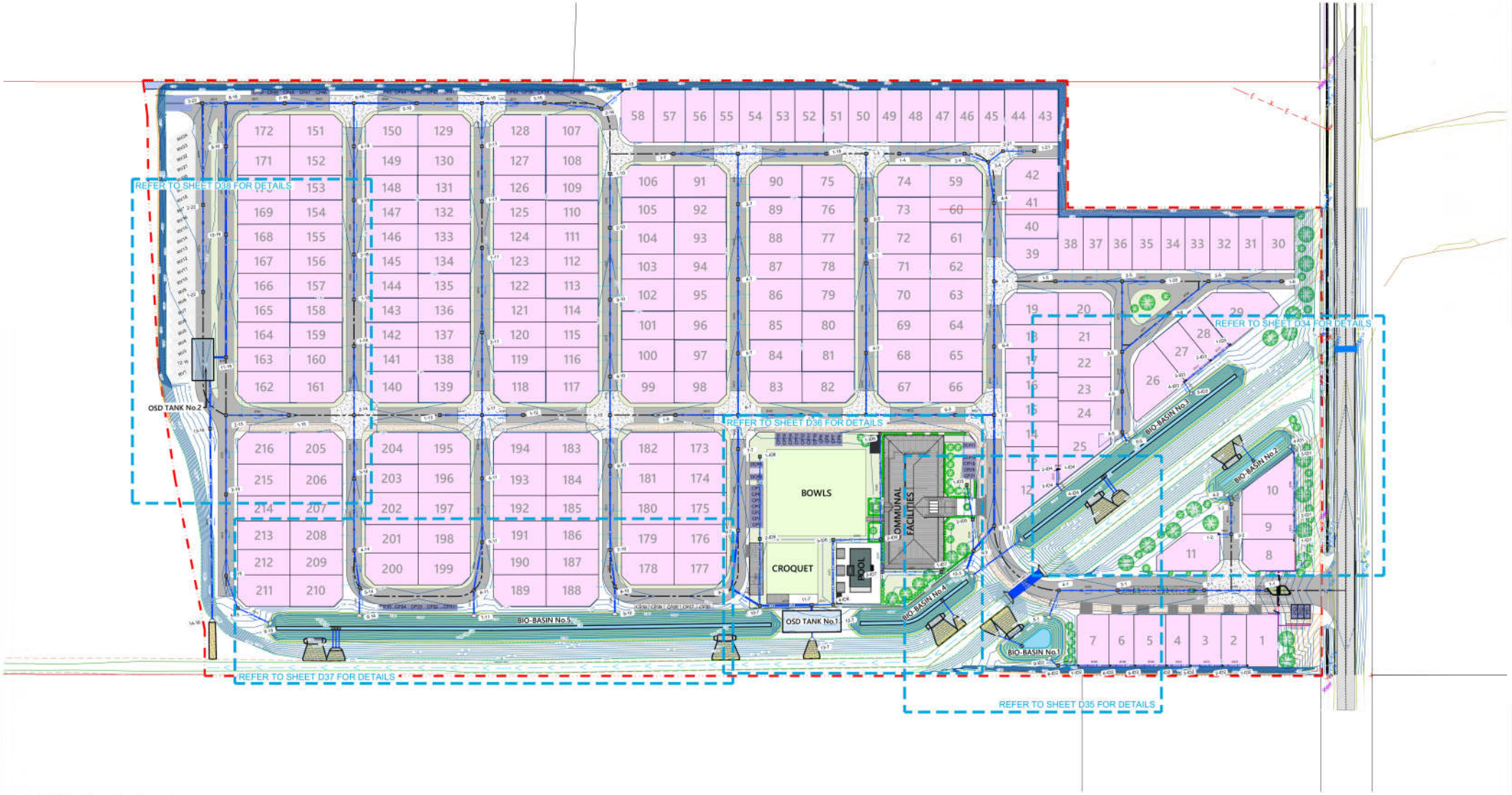
DA CIVIL DRAWING

DRAWING TITLE: EARTHWORKS SECTIONS - SHEET 3 OF 3

DWG No: D17 | SHEET: 17 OF 43 | REV: 1

Appendix 14 Stormwater Management Plan



20 10 0 10 20 30 40
Horizontal Scale 1:750 (A1)
1:1500 (A3)

STORMWATER MANAGEMENT PLAN
SCALE 1:750

PLANS TO BE PRINTED IN COLOUR

PRELIMINARY PLANS FOR DA PURPOSES ONLY NOT FOR CONSTRUCTION

ARCHITECTURAL INFORMATION FOR CLUB HOUSE SUPPLIED BY MARK SHAPIRO ARCHITECTS DRAWING NUMBER DA1002WIP REV 2

LEGEND

- DEVELOPMENT BOUNDARY
- INTERNAL LOT BOUNDARY
- BIO - BASIN TOP
- CHANNEL TOP OF BANK
- CHANNEL CENTRE LINE
- PROPOSED STORMWATER DRAINAGE
- RETAINING WALL
- STORMWATER DRAINAGE PIT
- HEADWALL
- PROPOSED MHE ALLOTMENT
- NEW INTERNAL CONCRETE ROAD PAVEMENT
- NEW INTERNAL CONCRETE INTERSECTION TREATMENTS & DRIVEWAYS
- NEW 2.5m WIDE SHARED PATH WITHIN SITE BOUNDARY
- MHE BOUNDARY SETBACK 3m WIDE 'NO BUILD ZONE'
- MHE BOUNDARY SETBACK 10m WIDE 'NO BUILD ZONE'
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- SCOUR PROTECTION
- BIO-BASIN BREM
- BIO-BASIN GRASSED AREA
- BIO-BASIN WEIR
- BIO-BASIN FLOOR
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DRAWN: A.SCHMID | SCALE: AS SHOWN
SURVEYING: MACRO SURVEYING | SHEET SIZE: A1

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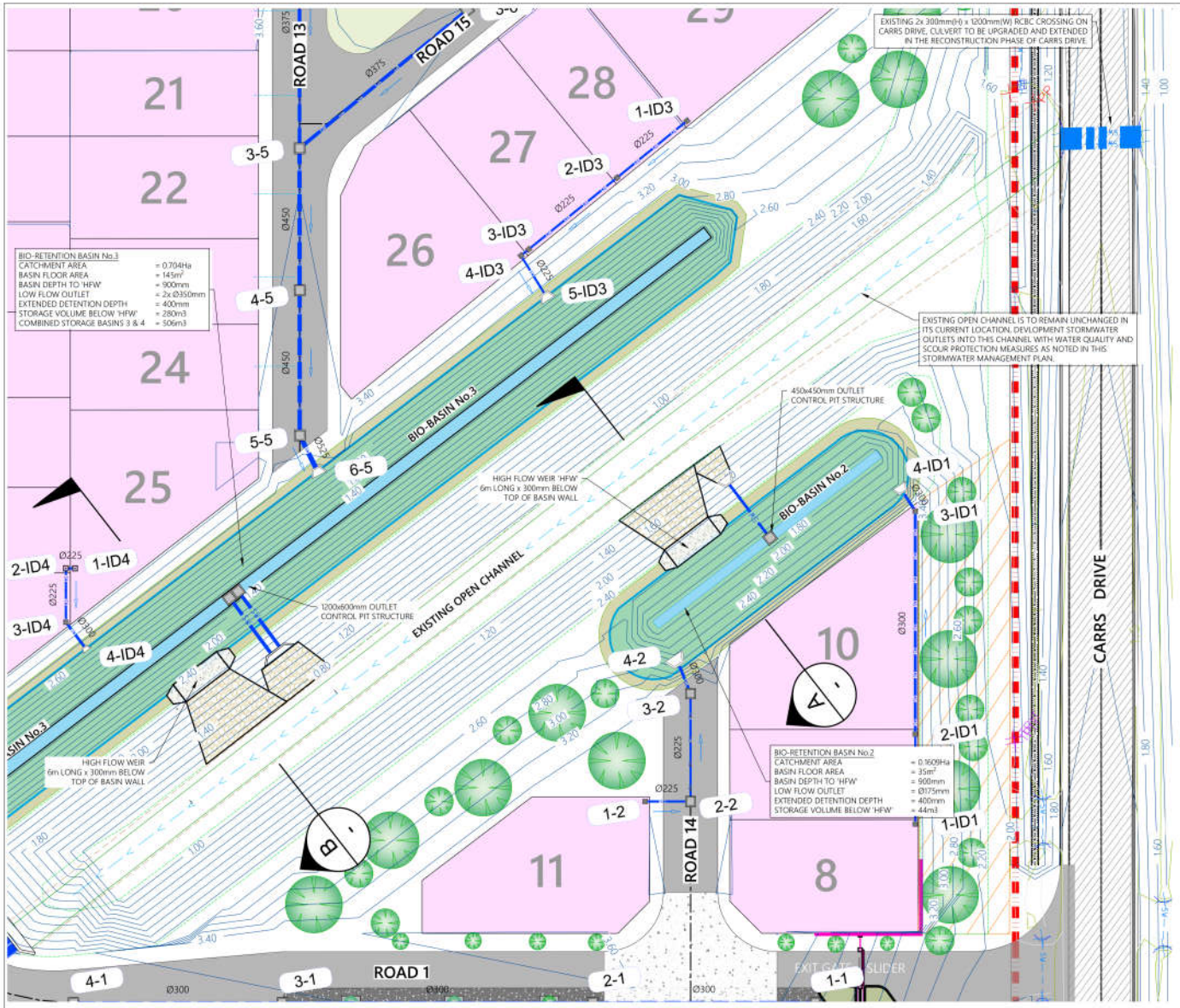
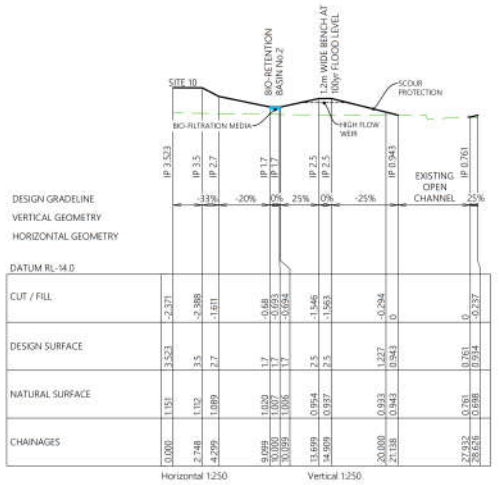
DA CIVIL DRAWING

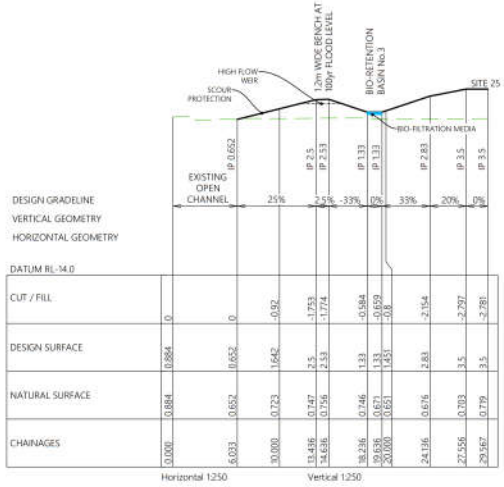
DRAWING TITLE: STORMWATER MANAGEMENT PLAN

DWG No: D33 | SHEET: 33 OF 43 | REV: 1

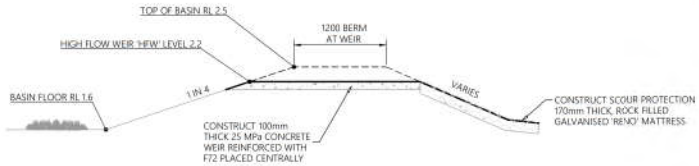




SECTION-A (BIO-BASIN No.2)



SECTION-B (BIO-BASIN No.3)



TYPICAL - HIGH FLOW WEIR DETAIL
N.T.S

Horizontal Scale 1:250 (A1) 1:500 (A3)

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ARCHITECTURAL INFORMATION FOR CLUB HOUSE SUPPLIED BY MARK SHAPIRO ARCHITECTS DRAWING NUMBER DA1002WIP REV 2

LEGEND

- DEVELOPMENT BOUNDARY
- INTERNAL LOT BOUNDARY
- BIO - BASIN TOP
- CHANNEL TOP OF BANK
- CHANNEL CENTRE LINE
- PROPOSED STORMWATER DRAINAGE
- RETAINING WALL
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- HEADWALL
- PROPOSED MHE ALLOTMENT
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DRAWN: A.SCHMID | SCALE: AS SHOWN
SURVEYING: MACRO SURVEYING | SHEET SIZE: A1

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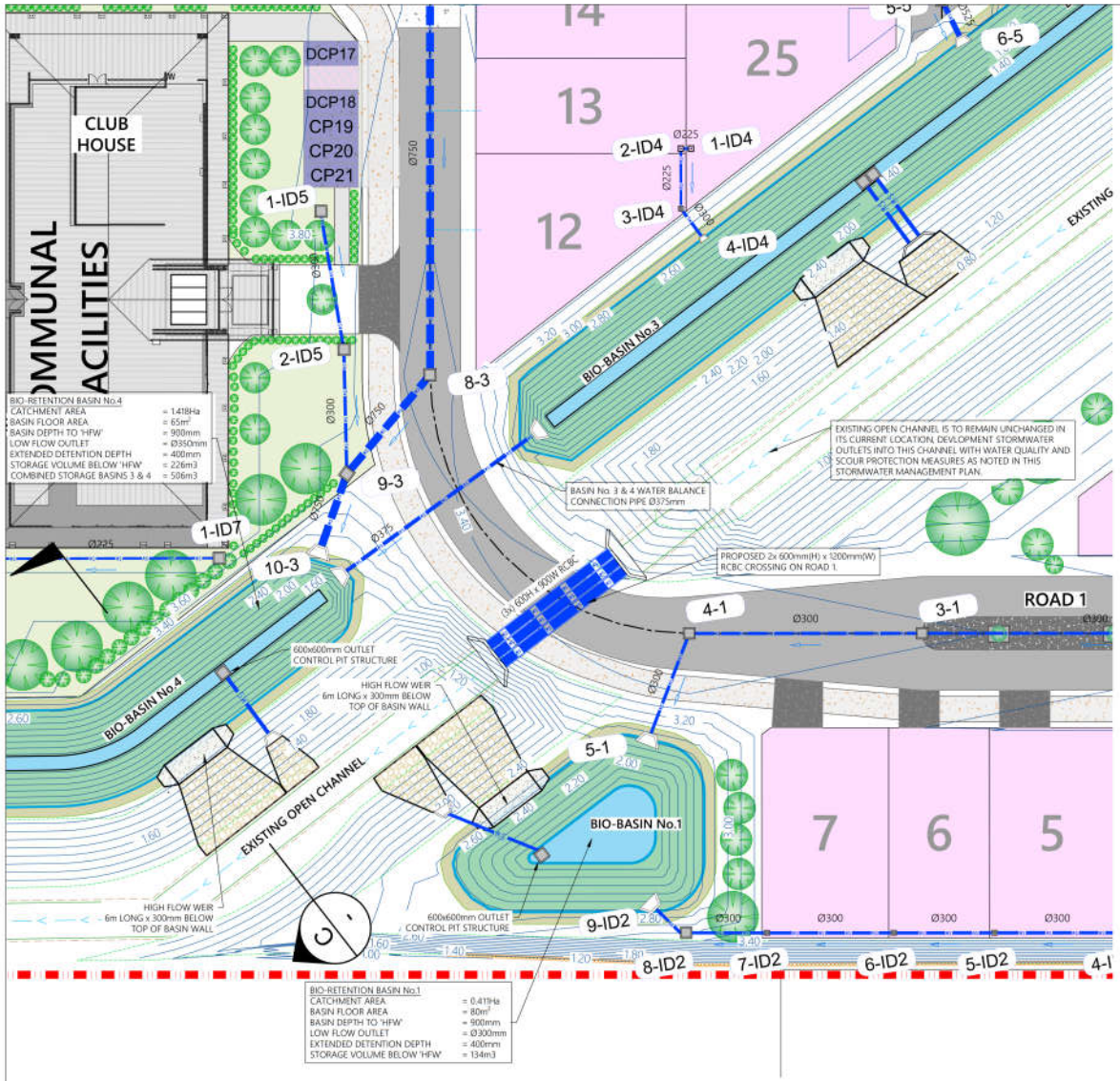
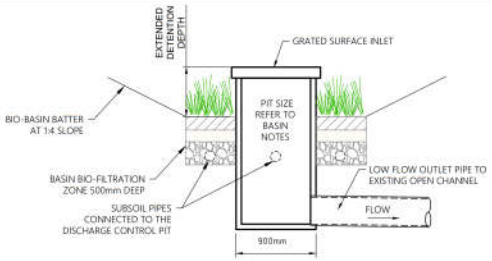
DA CIVIL DRAWING

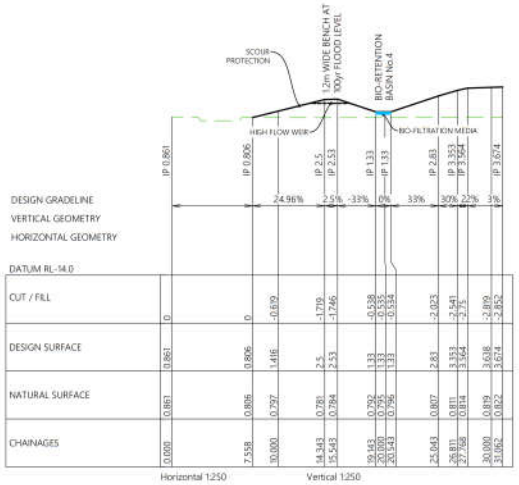
DRAWING TITLE: STORMWATER MANAGEMENT PLAN - SHEET 1

DWG No: D34 | SHEET: 34 OF 43 | REV: 1

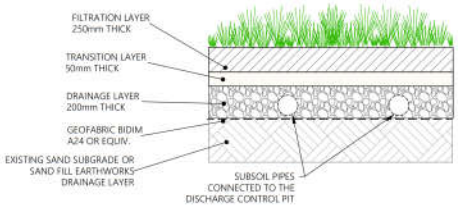




TYPICAL - BIO-RETENTION DISCHARGE CONTROL PIT
N.T.S



SECTION-C (BIO-BASIN No.4)



TYPICAL BIO-FILTRATION ZONE PROFILE (400mm THICK)
N.T.S

FILTER MEDIA - GENERAL DESCRIPTION

THE MATERIAL CAN BE OF SILICEOUS OR CALCAREOUS ORIGIN.
THE MATERIAL MUST BE TESTED FOR DESIRED HYDRAULIC CONDUCTIVITY USING THE AUSTRALIAN STANDARD (AS4419-2003).

REFER TYPICAL SPECIFICATION BELOW.

SPECIFICATION FOR BIORETENTION FILTER MEDIA:

BIORETENTION FILTER MEDIA SHALL COMPRISE OF TWO LAYERS

1. THE FILTRATION LAYER IS TO BE 250mm THICK AND CONFORM TO THE FOLLOWING SOIL SPECIFICATIONS.

pH	5.5 - 7.5	(pH 1:5 IN WATER)
ELECTRICAL CONDUCTIVITY (dS/cm)	< 1.2	
TOTAL SALTS (ppm)	< 600	
CLAY	2 - 4%	(<0.002mm)
SILT	4 - 8%	(0.002 - 0.05mm)
VERY FINE SAND	5 - 10%	(0.05 - 0.15mm)
FINE SAND	10 - 25%	(0.15 - 0.25mm)
MEDIUM TO COARSE SAND	60 - 70%	(0.25 - 1.0mm)
COARSE SAND	7 - 10%	(1.0 - 2.0mm)
FINE GRAVEL	< 3%	(2.0 - 3.4mm)
HYDRAULIC CONDUCTIVITY (mm/hr)	200 (+/- 28%)	

THE FILTRATION LAYER WILL BE AMELIORATED TO PROVIDE ADEQUATE INITIAL GROWTH. THIS LAYER IS TO CONSIST OF PREMIXED ZEOLITE 20% BY VOLUME PRIOR TO DELIVERY AND PLACEMENT. PRIOR TO PLANTING THE FOLLOWING SHALL BE PLACED INTO THE TOP 75MM:

AGRICULTURAL LIME - RATE TO BE DETERMINED DEPENDING ON SELECTED FILTER MATERIAL

	10-30 kg/100sq.m INDICATIVE RANGE
SUPERPHOSPHATE AT	2 kg/100sq.m
MAGNESIUM SULPHATE AT	3 kg/100sq.m
POTASSIUM SULPHATE AT	2 kg/sq.m
TRACE ELEMENTS MIX	1 kg/100sq.m
FERTILISER NPK16.4.14 AT	4 kg/100sq.m

2. TRANSITION LAYER IS TO BE 50mm THICK WELL GRADED COARSE SAND

3. THE DRAINAGE LAYER IS TO BE 200mm THICK WITH 5-7mm WASHED AGGREGATE

* THERE SHOULD BE NO GEOFABRIC INTERFACE BETWEEN THE TWO LAYERS, ONLY AT THE INTERFACE WITH THE SAND SUBGRADE

PLANS TO BE PRINTED IN COLOUR

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ARCHITECTURAL INFORMATION FOR CLUB HOUSE SUPPLIED BY MARK SHAPIRO ARCHITECTS DRAWING NUMBER DA1002WIP REV 2

LEGEND

- DEVELOPMENT BOUNDARY
- INTERNAL LOT BOUNDARY
- BIO - BASIN TOP
- CHANNEL TOP OF BANK
- CHANNEL CENTRE LINE
- PROPOSED STORMWATER DRAINAGE
- RETAINING WALL
- STORMWATER DRAINAGE PIT
- HEADWALL
- PROPOSED MHE ALLOTMENT
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- NEW INTERNAL CONCRETE INTERSECTION TREATMENTS & DRIVEWAYS
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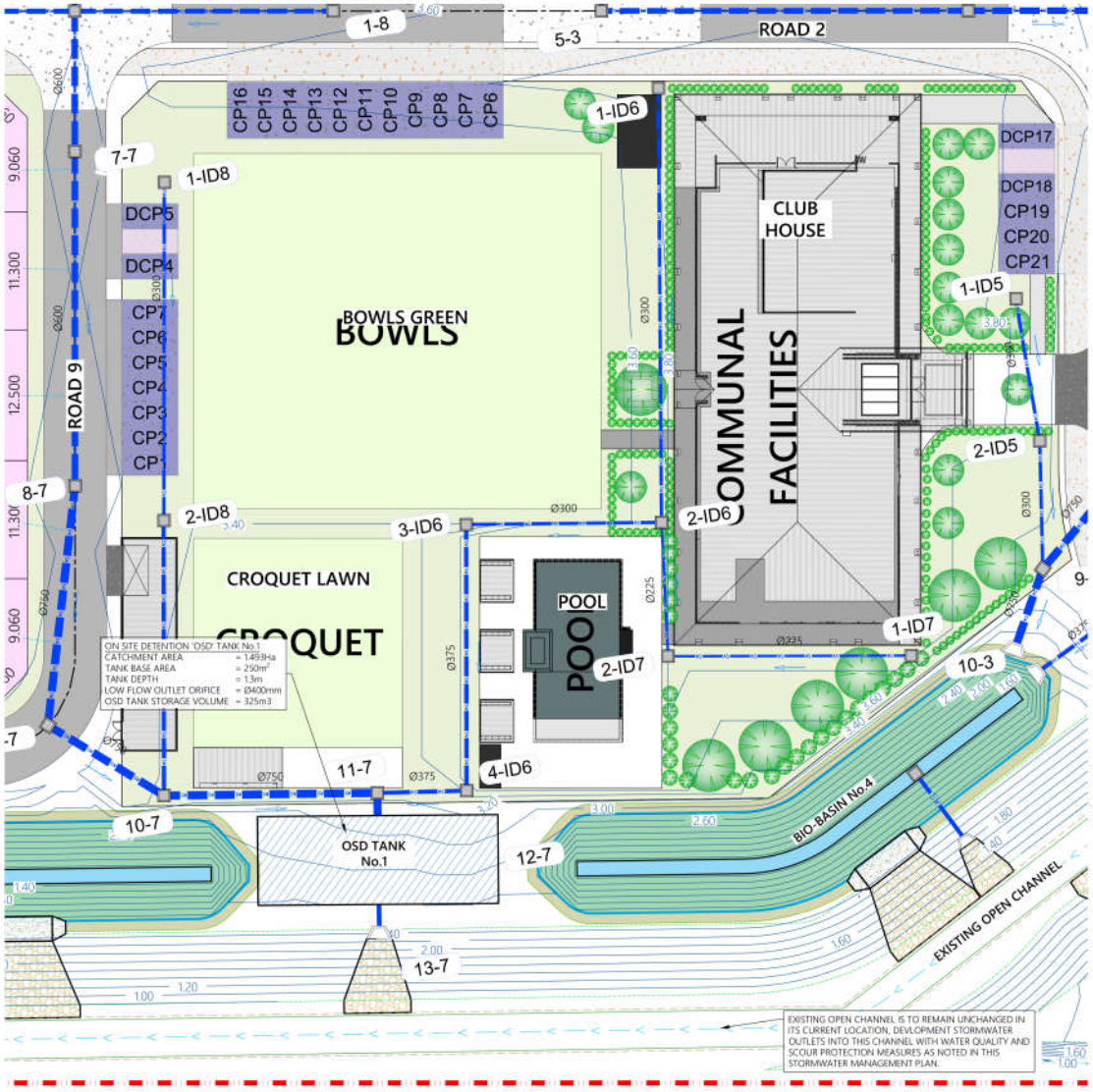
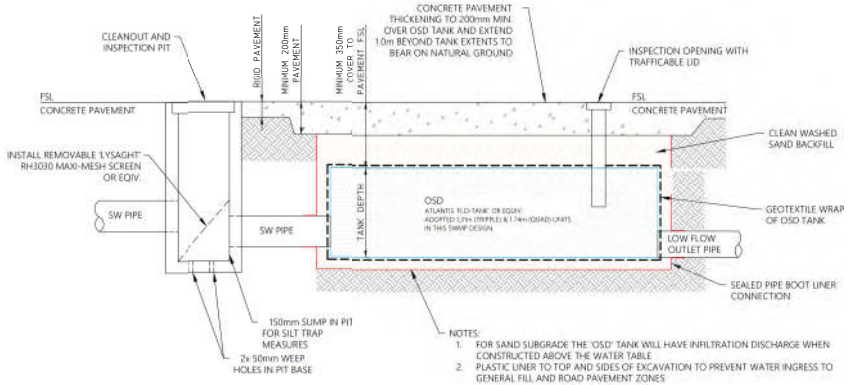
DA CIVIL DRAWING

DRAWING TITLE: STORMWATER MANAGEMENT PLAN - SHEET 2

DWG No: D35 | SHEET: 35 OF 43 | REV: 1



Horizontal Scale 1:250 (A1)
1:500 (A3)



TYPICAL DETAIL - SECTION VIEW
OSD ATLANTIS 'FLO-TANK'
N.T.S

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LEGEND

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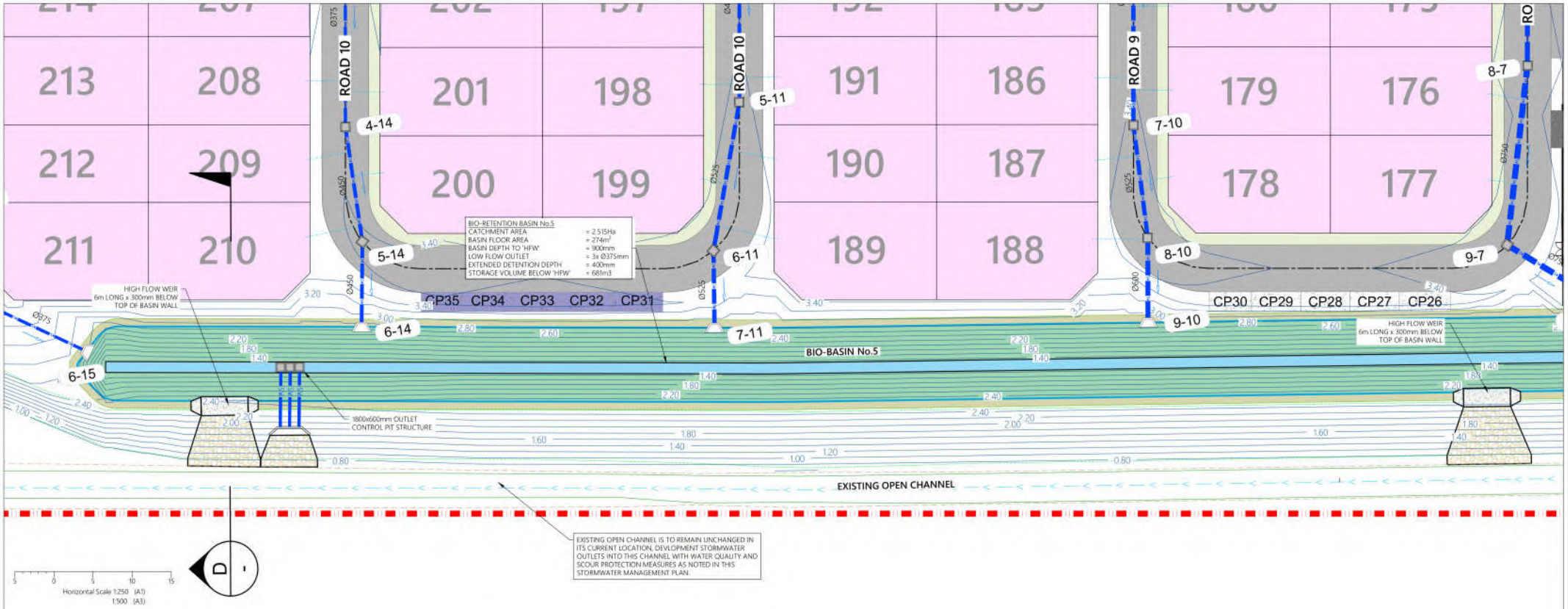
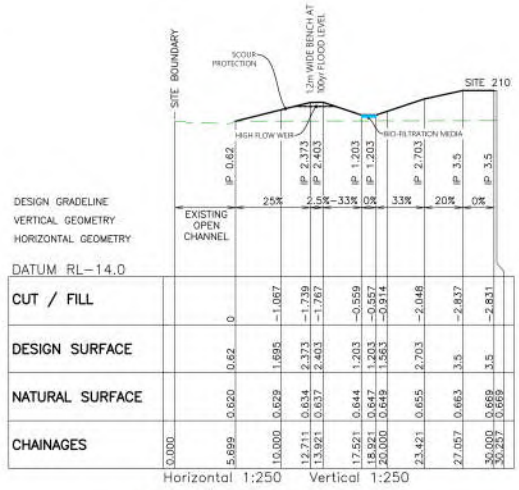
DA CIVIL DRAWING

DRAWING TITLE: STORMWATER MANAGEMENT PLAN - SHEET 3

DWG No: D36 | SHEET: 36 OF 43 | REV: 1





SECTION-D (BIO-BASIN No.5)

LEGEND

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- INTERNAL LOT BOUNDARY
- BIO - BASIN TOP
- CHANNEL TOP OF BANK
- CHANNEL CENTRE LINE
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TITLE: 110 & 120 CARRS DRIVE, YAMBA
DEVELOPMENT APPLICATION CIVIL WORKS PLANS

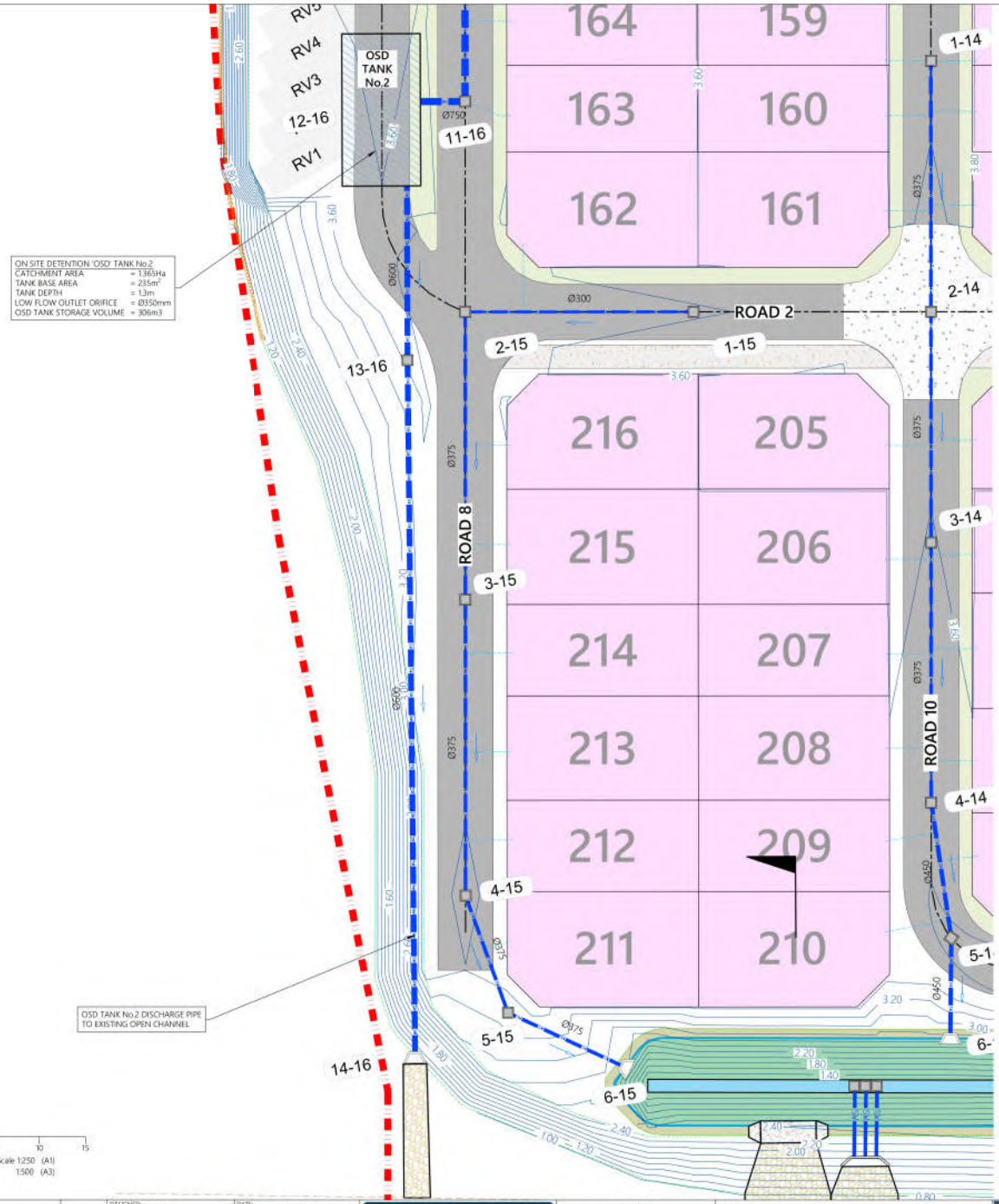
CLIFTON YAMBA

PROJECT: PROPOSED MHE DEVELOPMENT
110 & 120 CARRS DRIVE
YAMBA, NSW 2464
LOT 2 DP733507 & LOT 32 DP128863

DA CIVIL DRAWING

DRAWING TITLE: STORMWATER MANAGEMENT PLAN - SHEET 4

DWG No: D37 | SHEET: 37 OF 43 | REV: 1



PLANS TO BE PRINTED IN COLOUR

PRELIMINARY PLANS FOR DA PURPOSES ONLY NOT FOR CONSTRUCTION

ISSUE	DESCRIPTION	DATE
1	ISSUED FOR DEVELOPMENT APPLICATION - AMENDED LITE FORMATION HEIGHTS	23.01.2024
0	ISSUED FOR DEVELOPMENT APPLICATION	06.09.2022

DESIGNED: T.RYDEN | DATE: JAN 2024
DRAWN: A.SCHMID | SCALE: AS SHOWN
SURVEYING: MACRO SURVEYING | SHEET SIZE: A1

ISSUED FOR DEVELOPMENT APPROVAL
NOT FOR CONSTRUCTION

MDE Manage Design Engineer

www.md-engineer.com.au

CLIENT: CLIFTON YAMBA LAND PTY LTD

TITLE: 110 & 120 CARRS DRIVE, YAMBA
DEVELOPMENT APPLICATION CIVIL WORKS PLANS

CLIFTON YAMBA

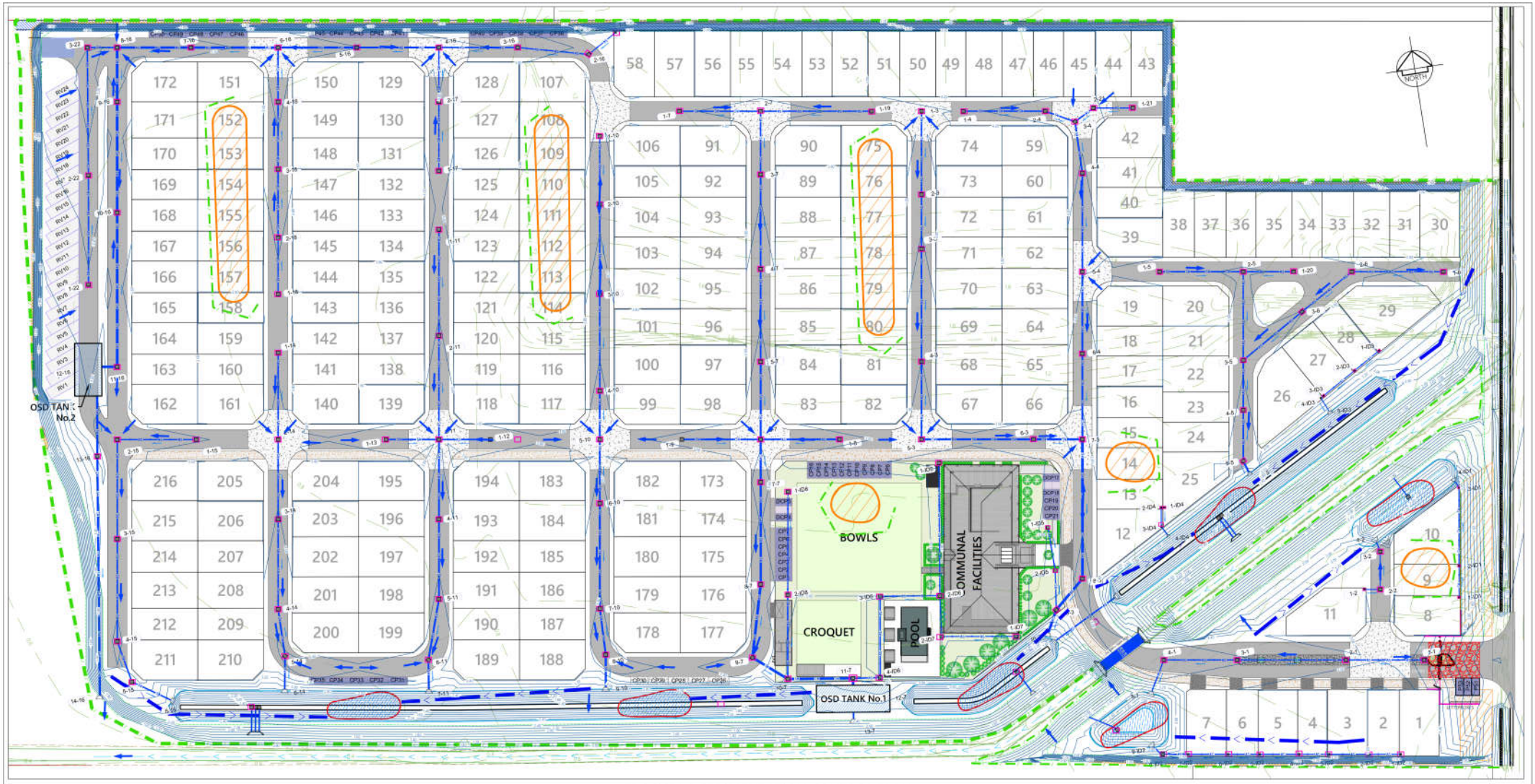
PROJECT: PROPOSED MHE DEVELOPMENT
110 & 120 CARRS DRIVE
YAMBA, NSW 2464
LOT 2 DP733507 & LOT 32 DP128863

DA CIVIL DRAWING

DRAWING TITLE: STORMWATER MANAGEMENT PLAN - SHEET 5

DWG No: D38 | SHEET: 38 OF 43 | REV: 1

Appendix 15 Erosion and Sediment Control Plan



Horizontal Scale 1:600 (A1)
1:1200 (A3)

EROSION & SEDIMENTATION CONTROL PLAN

SCALE 1:600

LEGEND

- GEOTEXTILE INLET FILTER FOR FIELD INLET PIT
- SEDIMENT FENCE – REFER TO SED 6-8 & 01.01 DETAILS SHEET D42
- HAY BALE SEDIMENT TRAP
- TOPSOIL WINDROW & DESIGN SWALE
- FLOW DIRECTION
- SUGGESTED STOCKPILE SITE - REFER TO SED 4-1 ON DETAILS SHEET D42
- STABILISED SITE ACCESS - REFER TO SED 09.01 ON DETAILS SHEET D42
- TEMPORARY SEDIMENT BASIN

LEGEND

- INTERNAL LOT BOUNDARY
- BIO - BASIN TOP
- CHANNEL TOP OF BANK
- CHANNEL CENTRE LINE
- PROPOSED STORMWATER DRAINAGE
- RETAINING WALL
- NATURAL SURFACE CONTOURS
- STORMWATER DRAINAGE PIT
- HEADWALL
- VISITOR AND RECREATIONAL VEHICLE PARKING
- NEW INTERNAL CONCRETE ROAD PAVEMENT
- NEW INTERNAL CONCRETE INTERSECTION TREATMENTS & DRIVEWAYS
- NEW 2.5m WIDE SHARED PATH WITHIN SITE BOUNDARY
- MHE BOUNDARY SETBACK 3m WIDE 'NO BUILD ZONE'
- MHE BOUNDARY SETBACK 10m WIDE 'NO BUILD ZONE'

EROSION & SEDIMENT CONTROL NOTES:

1. SOIL STOCKPILES TO BE NO HIGHER THAN 2.0 METRES (1.0m PREFERABLE) IN LOCATIONS DIRECTED BY THE SUPERINTENDENT.
2. CONSTRUCT SEDIMENT FENCE AT LOCATIONS SHOWN AND AS DIRECTED BY SITE SUPERINTENDENT. SEDIMENT FENCE OR EQUIVALENT TO BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH COUNCILS ENGINEERING REQUIREMENTS.
3. UPON COMPLETION OF FINAL EARTHWORKS OR AFTER WRITTEN DIRECTION OF COUNCIL, IMMEDIATE SOIL CONSERVATION TREATMENTS SHALL BE APPLIED SO AS TO RENDER AREAS THAT HAVE BEEN DISTURBED, EROSION PROOF IN 14 DAYS.
4. ALL PERIMETER AND SILTATION CONTROL MEASURES ARE TO BE THE FIRST STEP IN CLEARING OR EARTHWORKS.
6. TEMPORARY SEDIMENTATION BASIN TO BE FLOCCULATED AND PUMPED OUT AFTER EVERY STORM EVENT. ALL FLOCCULATED SEDIMENT TO BE REMOVED FROM THE BASIN AT THE CONCLUSION OF THE CONTRACT PERIOD.
7. ALL TEMPORARY EARTH BERMS AND DIVERSION BANKS ARE TO BE TRACK ROLLED AND SEEDED OR MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.
8. PROVIDE FILTER SAUSAGE KERB INLET SEDIMENT TRAPS OR EQUIVALENT (TO THE SATISFACTION OF THE SUPERINTENDENT) TO ALL CONSTRUCTED INLET PITS AND STORMWATER PIPING.
9. ALL TOPSOIL IS TO BE STOCKPILED ON SITE FOR RE-USE (AWAY FROM TREES AND DRAINAGE LINES). MEASURES SHALL BE APPLIED TO PREVENT EROSION FROM THE STOCKPILES.
10. SOIL/GRASS - TOPSOIL 100mm THICK SHALL BE APPLIED TO ALL DISTURBED AREAS. ALL REMAINING EXPOSED TOPSOIL SHALL BE SEEDED IMMEDIATELY UPON COMPLETION OF THE SOIL SPREADING OPERATION.

ISSUE	DESCRIPTION	DATE
1	ISSUED FOR DEVELOPMENT APPLICATION - AMENDED SITE FORMATION HEIGHTS	25.01.2024
0	ISSUED FOR DEVELOPMENT APPLICATION	06.09.2022

DESIGNED: T.RYDEN | DATE: JAN 2024
DRAWN: A.SCHMID | SCALE: AS SHOWN
SURVEYING: MACRO SURVEYING | SHEET SIZE: A1

ISSUED FOR DEVELOPMENT APPROVAL
NOT FOR CONSTRUCTION

MDE Manage Design Engineer

www.md-engineer.com.au

CLIENT: CLIFTON YAMBA LAND PTY LTD

TITLE: 110 & 120 CARRS DRIVE, YAMBA
DEVELOPMENT APPLICATION CIVIL WORKS PLANS

CLIFTON YAMBA

PROJECT:
PROPOSED MHE DEVELOPMENT
110 & 120 CARRS DRIVE
YAMBA, NSW 2464
LOT 2 DP733507 & LOT 32 DP128863

DA CIVIL DRAWING

DRAWING TITLE: EROSION & SEDIMENTATION CONTROL PLAN

DWG No: D41 | SHEET: 41 OF 43 | REV: 1

Appendix 16 DCCEEW Request for Information

Australian Government

Department of Climate Change, Energy, the Environment and Water

EPBC ref: 2022/09340

Mr Richard Volpe
Director
Clifton Yamba Land Pty Limited ATF Yamba Land Trust
Suite 10, Level 1
401-407 New South Head Road
Double Bay NSW 2028

richard@cliftonlifestyle.com.au

Further information required for preliminary documentation for Manufactured Housing Estate, Carrs Drive, Yamba, NSW

Dear Mr Volpe

I am writing to you about your proposal to develop and maintain a 216-lot manufactured housing estate and associated infrastructure on Carrs Drive, Yamba, NSW.

On 6 March 2023, a delegate of the Minister for the Environment and Water decided that the proposed action is a controlled action and that it will be assessed by preliminary documentation. Further information is required to assess the relevant impacts of the proposed action.

I now request, under s95A(2) of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), further information as outlined in the attached.

Details on the assessment process for the project and the responsibilities of the proponent are set out in the EPBC Act — Environment Assessment process fact sheet. Further information on the referral and assessment process can be found on the department's website.

If you have any questions about the assessment process or the further information required, please contact the project manager Johnette Peters, by email to Johnette.Peters@dcceew.gov.au, or telephone (02) 5156 3095 and quote the EPBC reference number shown at the beginning of this letter.

Yours sincerely

Jennifer Pearson
Director
Northern NSW Assessments

6 April 2023

Preliminary documentation additional information request - Manufactured Housing Estate, Carrs Drive, Yamba, NSW (EPBC 2022/09340)

On 6 March 2023, the proposed action, to develop and maintain a 216-lot manufactured housing estate and associated infrastructure on Carrs Drive, Yamba, NSW, was determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), due to likely significant impacts to the following controlling provisions:

- Listed threatened species and communities (s18 & s18A)

It has been determined that your proposed action will be assessed by preliminary documentation. This document specifies the information required by the Minister under section 95A of the EPBC Act to adequately assess the impacts of your proposed action (the 'preliminary documentation').

It is important that you read this document carefully and make sure that you understand the requirements. Please contact the project manager, Johnette Peters, at Johnette.Peters@dcceew.gov.au as early as possible if you have any questions or concerns.

Overview, Formatting and project description

1. Overview

Your preliminary documentation **must include all the information provided in your referral** documentation (updated or corrected as necessary), **as well as the additional information requested** in this document. It may be useful to include the original referral itself as an appendix to the main document.

Your preliminary documentation should enable the Minister (or delegate) and any other interested stakeholders to understand the impacts of the proposed action on relevant protected matters. **The preliminary documentation must be able to be read as a stand-alone document.**

Any assumptions made in the assessment must be clearly explained and justified. The extent to which the limitations, if any, of available information may influence the conclusions of the environmental assessment should be clearly stated.

Names, roles, and qualifications (where relevant) of all persons involved in preparing the preliminary documentation must be provided.

If it is necessary to rely on any confidential material, you should consult the department on the handling of that material before submitting your preliminary documentation for publication.

1.1 Relevant policies

Your preliminary documentation must **refer to all relevant standards, policies and other guidance material published by the department**. Any instances where published guidance is not followed must be justified. Where no Commonwealth standards exist, state government and/or industry standards may be useful.

EPBC Act policy statements are located at http://www.environment.gov.au/epbc/policy-statements.

Other EPBC Act publications and resources that may be relevant to your assessment are located at http://www.environment.gov.au/epbc/publications.

The *Matters of National Environmental Significance Significant impact guidelines 1.1* (DoE, 2013) contain details on the significant impact criteria for each controlling provision discussed in this document. It is recommended to refer to these criteria when assessing the impacts of the proposed action on the controlling provision.

More specific guidance documents are referenced within the relevant sections of this document.

2. Formatting and Style

The preliminary documentation must be published by the proponent and made available for comment. It is therefore important to the integrity of the assessment process that your preliminary documentation **can be read as a standalone document** and is presented in a way that is **intelligible to the general public**, who may not be familiar with the history of your proposed action or with the technical aspects of its assessment. **Table 1** provides a checklist for appropriate formatting and style.

Table 1 Formatting and style checklist

Present in a **standard format** – the document(s) will be published in hardcopy (e.g., A4 / A3 hardcopies) and electronic formats (e.g., PDF or MS Word files)	☐
Presented and readable as a standalone document and is presented in a way that is intelligible to the general public	☐
Include all key claims, findings, proposals, and undertakings in the **main document** – supporting documents may be appended (e.g., BDARs, technical reports), however all relevant information must be presented and adequately explained within the main document	☐
If information requested has already been provided in the referral or supporting documentation, it should be consolidated with the additional required information and presented cohesively in the Preliminary Documentation	☐
Include key supporting documents (e.g., referral, survey data, technical reports) as **appendices**, however ensure that the key information contained within the appendices is presented within the main document	☐
Explain (or avoid) **technical jargon** and acronyms	☐
Use **maps and/or diagrams** where appropriate to support textual information. Maps are preferred over textual descriptions of cadastre boundaries, proposed infrastructure layouts, etc.	☐
Present all maps and diagrams at an **appropriate size and scale**	☐
Reference all supporting documentation (including websites) clearly and consistently	☐

Ensure that other **supporting documents** (e.g., academic studies, regulatory standards) **are publicly accessible**[1], with electronic links provided where possible	☐

3. Description of the proposed action

3.1 Textual descriptions

The preliminary documentation must provide a detailed description of the proposed action, including the location and nature of all activities associated with the proposed action. **Table 2** provides a checklist for descriptions of the proposed action.

Table 2 Proposed action description checklist

Descriptions of any proposed **clearing, earthworks and construction activities** or other elements proposed to be taken within the construction footprint.	☐
Descriptions of the **preconstruction, construction, and operational phases** of the proposed action.	☐
The anticipated **timing and duration** (including start and completion dates) for each known activity, stage, or element of the proposed action.	☐
Feasible alternatives to the proposed action or elements of the proposed action, and **justification for the preferred option**.	☐
Consultation about the proposed action that is planned or has been completed, including any documented results or responses.	☐
Requirements for assessment and approval under **state legislation**, including any conditions that apply (or will apply) to the proposed action, in addition to any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action.	☐
Details of any **local or State government planning scheme**, or plan or policy under any local or State government planning system that deals with the proposed action.	☐
How the action **relates to any other action** (of which the proponent is aware) that is currently being or will be undertaken in the region.	☐

[1] Supporting documents should be publicly available to allow the Minister, or delegate, assessment officer and the general public have access to all information used to inform your assessment. If any information is not publicly available, it should be attached to the preliminary documentation.

3.2 Maps and diagrams

The preliminary documentation **must include maps, plans, and/or diagrams** of the proposed action. **Table 3** provides a checklist for the maps or diagrams to be provided. The Department also recommends the *Guide to providing maps and boundary data for EPBC Act projects* (DAWE, 2021a) is reviewed in the preparation of the preliminary documentation maps. Include **as many maps as necessary** to provide sufficient clarity on the detail of the proposed action.

Note that possible errors were identified in the maps provided with the referral. Updated maps must clearly identify the area of the site that is zoned for environmental management (C3) and environmental conservation (C2) and ensure it aligns with the provided text.

Table 3 Proposed action maps, plans, and/or diagrams checklist

Clearly show the proposed action location within the **wider area.**	☐
Clearly delineate the **construction/clearing footprint boundary**, and any wider boundaries (e.g., study area) where relevant.	☐
Clearly show the **precise layout of all works to be undertaken**, including building structures or other infrastructure, number and location of lot subdivisions where relevant, proposed land use, or other elements of the action that may have relevant impacts.	☐
Clearly identify any **open spaces** and **buffer zones** (see Appendix D), where relevant.	☐
Clearly identify any **avoidance areas, retained vegetation, habitat corridors** etc. (in particular, for matters of national environmental significance (MNES)), and **conservation areas**, where relevant.	☐
Clearly identify any areas adjoining the construction footprint which may be affected by **indirect or offsite impacts** as a result of the proposed action, where relevant.	☐

Controlling provisions

4. Listed threatened species and ecological communities (s18 & s18A)

Under this controlling provision, **any** listed threatened species or community is potentially relevant to this assessment. However, based on the information provided in your referral, the department requires additional information in relation to the threatened species and ecological communities listed in section(s) 4.1 and 4.2 below.

Relevant guidance material (in particular survey guidelines, conservation advices, recovery plans, threat abatement plans and policy statements) is available through the department's Species Profile

and Threats (SPRAT) database[2]. **It is your responsibility to ensure that you have identified the relevant documents.**

Additional information is required on the likelihood and extent of **occurrence**, assessment of **direct and indirect impacts** against the significant impact criteria in the *Matters of National Environmental Significance Significant impact guidelines 1.1*, proposed **avoidance and mitigation measures**, and if applicable, proposed **compensation (offset) measures**.

4.1 Listed threatened species and communities likely to be significantly impacted

Based on the information provided in the referral documentation, the department considers the following listed threatened ecological community (TEC) is **likely to be significantly impacted** by the proposed action:

- Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland – Endangered
  - Further clarification is required for this TEC according to the criteria listed in section 4.3.1 to 4.3.4. Particular additional information includes:
    - Justify the difference in the area of each zone stated in the 2021 Environmental Assessment (Ecosure, 2021) compared to the final BDAR (Ecosure, 2023).
    - Clearly identify the area of this TEC that aligns with the key diagnostic characteristics and condition thresholds identified in the *Conservation Advice for the Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland* (DAWE, 2021b) and why 'zones' have been discounted if they are a connected patch.
    - A 5 to 15 m management buffer has been proposed in the areas adjacent to retained vegetation, please include details on this management buffer and if a vegetated buffer will be included to allow for potential impacts on water run-off.

4.2 Listed threatened species and communities that may be impacted

The department considers that the proposed action has the **potential to significantly impact** the listed threatened species and threatened ecological communities below, based on the referral information. Justification is provided for why additional information for these species is requested.

Addressed in referral by additional information required:

- Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community – Endangered

[2] Species Profile and Threats Database Species Profiles (SPRAT) (environment.gov.au)

- According to the referral information, there is an amount of this TEC that meets key diagnostic criteria and minimum condition thresholds that would be directly impacted through the proposed action. There are discrepancies between the amount of this TEC that will be cleared, with references to 1.3 ha of clearance and 0.8 ha of clearance throughout the referral documents.
- The referral also mentions that a buffer of vegetation will be retained along the tidal drain that travels through the site. The size and composition of this buffer is not clear. If the tidal drain buffer it to consist solely of the listed TEC, no information is provided one whether a buffer for the TEC will be put in place. The *Conservation advice (incorporating listing advice) for the Coastal Swamp Oak* (Casuarina glauca) *Forest of New South Wales and South East Queensland ecological community* (DoEE, 2018) recommends a minimum buffer of 30 m from the outer edge of a patch. If a buffer zone is to be included and is less than 30 m, justification would be required as to why a smaller buffer zone is being used and justify how it could be considered sufficient.
- According to the criteria listed in section 4.3, your preliminary documentation should clarify the extent of the community in the proposed action area, and the total area of the community in hectares (ha), and if the community occurs in multiple distinct areas within the site, provide the area (ha) for each occurrence.
- Further assessment against criteria listed in Section 4.3.1 to 4.3.4 is required including an assessment of significant impact.

- Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable

  - Impacts to Grey-headed Flying-fox (GHFF) are discounted in the referral as no camp was found onsite and therefore could not be classified as breeding habitat. The referral acknowledges the likelihood of occurrence for this species is likely as the site contains suitable foraging habitat and there are existing records of the species within 1.5 km of the site.
  - The referral documentation states 6.4 ha of Coastal Swamp Sclerophyll Forest will be cleared. This TEC contains important winter and spring foraging species for the GHFF. Ground surveys confirmed the presence of these key foraging plants, including mature individuals of Broad-leaved Paperbark (*Melaleuca quinquenervia*), Forest Red Gum (*Eucalyptus tereticornis*) and Coast Banksia (*Banksia integrifolia*). In addition to containing suitable foraging habitat, the site is within the vicinity of a Nationally Important Flying-fox Camp located approximately 12km to the southwest in Maclean. Due to this, the habitat in the proposed action area is considered important habitat according to the *National Recovery Plan for the Grey-headed Flying-fox* (DAWE, 2021c).
  - Further assessment against criteria listed in Section 4.3.1 to 4.3.4 is required, including an assessment of significant impact.

- Koala (*Phascolarctos cinereus*) (combined populations of Queensland, New South Wales, and the Australian Capital Territory) – Endangered

  - Assessment of occurrence in the referral concluded the site does not contain habitat or the presence of the food plants for Koala and no records of the species exist within 1.5 km of the site. The referral does mention the presence of food trees and the NSW BioNet database shows a record of Koala within 1.5 km of the proposed action site. The

presence of feed trees and evidence of Koala was not assessed outside of the development footprint.

- The ecological assessment examined the koala feed trees in the development footprint, including two large eucalypt trees (one forest red gum and one swamp mahogany) and Broad-leaved Paperbarks. These trees were observed for evidence of Koala including scratches and scats and no evidence was found. The assessment concluded the likely absence of Koalas due to the thick understorey and grass vegetation that would hinder movement through the site. The department notes that section 25 of the *National Recovery Plan for the Koala* Phascolarctos cinereus *(combined populations of Queensland, New South Wales and the Australian Capital Territory)* (DAWE, 2022a) provides guidance on habitat critical for survival and identifies a range of habitat that is critical for the species survival, including habitat used by Koalas for feeding, resting, dispersing, commuting, refuging during extreme events. The *Conservation Advice for* Phascolarctos cinereus *(Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory* (DAWE, 2022b) identifies habitat critical as habitat that is occupied and habitat currently unoccupied, areas necessary for population processes and maintenance of genetic diversity and evolutionary potential, and areas required to accommodate future population increase, recolonisation, reintroduction, or as climate refugia.
- The department considers that there could be indirect impacts to the Koala through possible degradation of suitable Koala habitat in the vegetation retained outside the proposed development footprint from altered hydrological regimes as well as an increased risk mortality from vehicle strike or dog attack during construction and operation of the estate. Noting that both threats are listed in the Koala Recovery Plan (DAWE, 2022a).
- Include details of the indirect impacts of the proposed action to adjacent Koala habitat and what management measures will be included to mitigate those indirect impacts.

4.3 Information Required

4.3.1 Occurrence

Threatened species

For each threatened species, provide information about the species' occurrence within the proposed action area and surrounds (see **Table 4** checklist), and details of the survey methodologies used for each species (see **Table 5** checklist).

Table 4 Threatened species occurrence checklist

Provide the **known records** of the species within and adjacent to the proposed action area, presented as a **map**, including:	
• records from **surveys** undertaken for this proposed action	☐
• any **historical database records** in and around the proposed action area	☐

Provide the **number of individuals** of the species occurring in the proposed action area.	☐
Detail the **survey methodology** used for each species (see **Table 5** below for more detail).	☐
Provide data on likely **population size and extent** (including populations that extend beyond the proposed action area), where available.	☐
If relevant, provide information that identifies **important populations**	☐
Provide information on the **extent of habitat** for the species in the proposed action area:	
• Refer to **habitat requirements** detailed in the species' listing advice, conservation advice, and/or recovery plan.	☐
• Specify the **type(s)** of habitat available (e.g., whether the habitat value is related to foraging, breeding, dispersal, etc.).	☐
• Describe the **quality** of the habitat.	☐
• Describe key habitat **features** (e.g., hollow bearing trees).	☐
• Any other relevant information describing the species habitat (for example, whether the habitat is considered critical to the survival of the species).	☐
Consider **occupancy trends** relating to season and time of day. Longer term trends including climate change may also be relevant.	☐

Table 5 Threatened species survey checklist

Describe the **survey methodology** in detail.	☐
Surveys should follow **appropriate survey standards**, e.g.: • The department's survey guidelines, if available for the species • The NSW Biodiversity Assessment Method (BAM), endorsed by the department • Best practice survey methodology for the species detailed in scientific literature, where the above are not available for the species Identify which methodology has been used for each species and provide justification where methodology differs from the standard.	☐
Identify where **Commonwealth methodologies differ** from those required or recommended by State government agencies. Ensuring that Commonwealth survey and identification requirements are incorporated into surveys at the earliest opportunity will reduce the likelihood of additional surveys being required.	☐
If **no surveys** were undertaken for a species, **provide justification**	☐

Append **survey results** to main document	☐
If the proposed action is being assessed under the NSW BAM, **append all relevant BAM documentation** to the preliminary documentation (i.e., the Biodiversity Development Assessment Report (BDAR)).	☐

Threatened ecological communities

For each TEC, provide information about the TEC's occurrence within the proposed action area and surrounds (see **Table 6** checklist).

Table 6 Threatened ecological community occurrence checklist

On a **map**, identify:	
• The **extent of the community** within the proposed action area	☐
• Any **connected areas** of the community extending beyond the proposed action area	☐
Provide the **total area of the community** in hectares (ha), and if the community occurs in multiple distinct areas within the site[3], provide the area (ha) for each occurrence	☐
Explain how the mapped areas of the community meet the key **diagnostic characteristics**, **condition thresholds** or criteria, or **patch definitions** as set out in the relevant EPBC Act conservation advices, listing advices and/or recovery plans.	☐
If the proposed action is being assessed under the NSW BAM:	
• clearly identify the Plant Community Types and Vegetation Zones in the proposed action area that are associated with the species	☐
• clearly identify the Plant Community Types and Vegetation Zones that align with the EPBC listed community in the proposed action area.	☐

4.3.2 Impact Assessment

The preliminary documentation must include an assessment of all potential impacts (including direct, indirect, facilitated, and cumulative impacts) that may occur as a result of all project phases and elements of the proposed action on each threatened species and ecological community listed in

[3] It is recommended that the term 'patch' only be used in the preliminary documentation when referring to the EPBC Act definition for a patch of community, as defined by the relevant conservation advice (see also Appendix C)

section 4.2 above. You must also consider the potential of the proposed action to impact on adjacent areas likely to contain threatened species and ecological communities (see **Table 7** checklist of general impacts).

Table 7 Impact assessment checklist

Identify the **nature and extent** of the likely short-term and long-term impacts from the activities, elements, or stages of the proposed action. When identifying impacts, refer to the **significant impact criteria** for threatened species and ecological communities in the *Matters of National Environmental Significance Significant impact guidelines 1.1*, noting that the impact criteria differ among threatened ecological communities and threatened species with different listing statuses.	☐
Quantify the area of direct and indirect impacts for each species and community including the total area of impact in hectares, and the **number of individuals impacted**, if known (most likely to be relevant for threatened plants identified during survey)	☐
Provide an analysis of the **likely impacts** and the **long-term viability** of the species/community if the proposed action was to proceed, at a:	☐
• **Local** (site level) **scale** – discuss impacts to connectivity	☐
• **Regional scale** – discuss impacts to connectivity, potential cumulative impacts within the broader region	☐
Provide details on whether any impacts are likely to **be unknown, unpredictable or irreversible** and what confidence is placed on the predictions or relevant impacts.	☐
Provide **justification for any conclusions** regarding potential impacts in relation to specific needs and characteristics of each species and/or community, including references to conservation advices, listing advices, recovery plans, and any other technical data or information. If these are not applicable, a brief statement to this effect must be included.	☐

The department has identified the **following impacts as being particularly relevant** to your proposed action, which should be considered when preparing the preliminary documentation:

<u>Impacts to hydrology</u>

During the referral stage, it was considered that potential changes to **surface water and the existing hydrological regime** were likely. As a result, there are potential associated impacts to two of the MNES known to occur within the study area that are **sensitive to hydrological change**, namely:

- Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland – Endangered
- Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community – Endangered.

According to the conservation advices (DAWE, 2021b; DoEE, 2018), changes to hydrology and the hydrological regime, including disrupting natural drainage and altering surface runoff patterns, are primary, ongoing threats for both TECs.

As recommended in the BDAR, a Storm Water Management Plan (SWMP) will be developed to incorporate best practice stormwater and soil conservation principles. Provide a copy of the SWMP or detailed management measures to be included in the SWMP. The SWMP should thoroughly investigate how the changes to hydrology in the development footprint is likely to impact on the ecological values and longevity of Coastal Swamp Sclerophyll Forest and Coastal Swamp Oak Forest that is retained in the project area and the forest that surrounds the project area. Mitigation measures should be provided and include timeframes and effectiveness.

The BDAR also recommended the implementation of appropriate water sensitive urban design. Provide details on the water sensitive urban design that will be implemented in the estate to reduce runoff.

4.3.3 Avoidance, mitigation and management measures

The preliminary documentation must provide information on specific measures proposed to avoid, mitigate and manage each identified impact from the proposed action on the relevant threatened species or community. The measures must address all project phases (pre-construction, construction, operation, and post operational and rehabilitation phases, if relevant) of the proposed action (see **Table 8** checklist).

If it is necessary to rely on any confidential material, you should consult the department on the handling of that material before submitting your preliminary documentation for publication.

For this project specifically, the **department notes that some avoidance and measures for the proposed project have been outlined** in the referral documentation:

- Design of proposed development would be restricted to areas where vegetation has previously been highly modified allowing development to result in the removal of predominantly regrowth vegetation.
- Vehicle strikes will be mitigated by manipulating site hydrology to eliminate the possibility of the land being able to support the existing vegetation and the associated threatened species they support.
- According to the BDAR, the design of the housing estate would allow for a 5 to 15 metre management buffer between house sites and adjacent vegetation in the C3 zone to allow for appropriate modification works to limit wildlife incidence to the housing estate.
- A Weed Management Plan (WMP) has been prepared to ensure weeds are managed appropriately during the construction phase of the project.
- A Vegetation Management Plan (VMP) will be prepared and implemented to manage vegetation for a period of at least 5 years.

The referral supporting Figure 1 (see below) delineates the proposed study area and surrounding native vegetation cover. The department seeks justification for why the proposed development

footprint was not suitable for the alternative adjacent lots with a lower proportion of native vegetation cover shown in Figure 1, further avoiding and minimising impacts to native vegetation and the threatened species it supports. Noting the 'Avoid, Mitigate, Offset' hierarchy for environmental protection, it's important to demonstrate that all feasible avoidance measures have been taken, before offsetting.

Figure 1. Native vegetation cover 1.5 km around proposed action area (subject lot)

Table 8 Avoidance, mitigation, and management checklist

Provide a **consolidated list of all avoidance and mitigation measures** proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action.	☐
For each of the mitigation measures proposed:	
• Discuss the likely **cost effectiveness** of proposed measures	☐
• Provide an assessment of the **predictive effectiveness** for each protected matter	☐
• Discuss any **statutory or policy basis** for the measures	☐
• Discuss the relationship, if any, with measures identified in the department's **conservation advices**, **recovery plans** and **threat abatement plans**	☐

• Discuss the relationship, if any, with **measures proposed by state and/or local governments** relevant to minimising the impacts of the action on protected matters	☐
• Identify the **roles and responsibilities** associated with implementation	☐
Provide conclusions about the **likely residual significant impacts** to each threatened species and/or community after proposed avoidance and/or mitigation measures are considered	☐
Provide proposed **environmental management plans** if available. If not available, at minimum set out the framework for ongoing management, mitigation, and monitoring programs for the relevant impacts of the action	☐
Clearly state and discuss and **variables or assumptions** made in the assessment	☐
Discuss the extent to which **limited availability of relevant information** has the potential to influence the conclusions of the assessment	☐

4.3.4 Compensation measures (offsets)

Significant residual impacts are impacts to a threatened species or community that remain **after any avoidance and mitigation measures have been considered**. Significant residual impacts must be offset in accordance with the department's *EPBC Act Environmental Offsets Policy 2012*[4] and Offsets assessment guide (OAG)[5], or other endorsed offset framework (for example, the NSW Biodiversity Offset Scheme).

As mentioned above, **offsets should only be used if there are no other feasible measures for avoidance or mitigation.**

The preliminary documentation must describe the proposed offset strategy, outlining how the offsets will be achieved for each protected matter, demonstrating that the offset liability can be satisfied by the mechanisms, and specifying the expected timeframe for legal security of the offsets. Offsets will need to be underway prior to commencement of the proposed action.

While offsets do not need to be secured before the decision on whether to approve the proposed action, should the proposed action be approved, conditions of an approval are likely to require that

[4] Department of Sustainability, Environment, Water, Population and Communities (2012). Environment Protection and Biodiversity Conservation Act 1999 *Environmental Offsets Policy.* Commonwealth of Australia, Canberra. Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (dcceew.gov.au).

[5] The Offsets assessment guide is a tool developed for users in the department to assess the suitability of offset proposals, but is also available to proponents to assist with planning and estimating future offset requirements. Offsets assessment guide - DCCEEW

offsets are secured, and management measures are in place, before commencement of the proposed action.

EPBC Act Environmental Offsets

If offsets are to be secured in accordance with the EPBC Act Environmental Offsets Policy, the preliminary documentation must demonstrate that the proposed Offset Strategy meets the criteria outlined in **Table 9** below.

Table 9 EPBC Act Environmental Offsets checklist

The offset strategy must:	
• Meet the principles specified in the EPBC Act Environmental Offsets Policy;	☐
• Directly contribute to the ongoing viability of the relevant protected matters to deliver an overall conservation outcome that improves or maintains the viability of the protected matter in the region, as compared to what is likely to have occurred under the status quo, i.e., if neither the action nor the offset had taken place; and	☐
• Compensate for the impacts over the entire duration of the proposed action (should impacts be in perpetuity, the offsets must also be delivered in perpetuity).	☐
• The preliminary documentation must also provide and clearly justify the scores entered into the Offset assessment guide.	☐

Other endorsed offset frameworks

If using an endorsed framework, the report detailing the outcomes (including credit report) prepared in accordance with the state requirements must be submitted with the preliminary documentation. For more information see Appendix B: Endorsed offsetting frameworks.

The NSW Biodiversity Assessment Method (BAM) and Biodiversity Offset Scheme (BOS) have been endorsed by the Commonwealth. This means that offsetting outcomes achieved through the BAM will be accepted for the purposes of the EPBC Act, provided that they are 'like-for-like' in relation to listed threatened species and communities as defined for the purposes of the EPBC Act. Payment into the Biodiversity Conservation Fund is also considered acceptable. If you are proposing offsets developed using the BAM, you should append all relevant BAM documentation to your preliminary documentation; this would generally include a Biodiversity Development Assessment Report (BDAR).

Please note that entities that are listed under the EPBC Act but are not listed under state legislation may not be able to be offset using the BAM. If any such species or communities are present on site and are likely to require an offset, please discuss with the department.

Other considerations

5. Economic and social matters

The preliminary documentation must provide information about the expected long- and short-term economic and social impacts of the proposed action, both positive and negative. This must include, but not necessarily be limited to, the points outlined in **Table 10**.

Table 10 Economic and social matters checklist

Consideration of **negative impacts** (e.g., disruption to existing community infrastructure, environmental features, and/or cultural and traditional activities)	☐
Consideration of **positive impacts** (e.g., increased housing, employment, or social amenity)	☐
Consideration of different **scales of impact** (e.g., local, regional, and national; short (e.g., during construction), long (e.g., ongoing following completion of construction))	☐
Estimated **capital value and ongoing economic value**, using specific dollar or other numerical values where relevant	☐
Discussion of relevant **public consultation** undertaken, including any issues raised in objection or support of the proposed action	☐
Discussion of any **contributions** (for example, government funding, or 'gifting' of land to the NSW Government under a voluntary planning agreement, as discussed in the referral information)	☐

6. Environmental history of the person proposing to take the action

The preliminary documentation must provide details of any proceedings under a Commonwealth, state or territory law for the protection of the environment, or the conservation and sustainable use of natural resources, against the person proposing to take the action (and if the person is a corporation, its executive officers).

If the person proposing to take the action is a corporation, details of the corporation's environmental policy and planning framework must be provided.

7. Outcomes based conditions

Outcomes-based conditions can provide approval holders with greater flexibility and autonomy while still holding them accountable for achieving sound environmental outcomes. The department

promotes the use of outcomes-based conditions where possible, in accordance with its Outcomes-based Conditions Policy 2016[6].

However, outcomes-based conditions are generally only appropriate where the person proposing to take the action has a good environmental record and the baseline condition of a site is well understood and documented.

Please advise the assessment officer if you would like to pursue this approach. **Table 11** provides a checklist for the information required if taking this approach.

Table 11 Outcomes based conditions checklist

Thoroughly document the baseline condition of the relevant impacted matter(s).	☐
Identify conservation objectives (outcomes) for the relevant impacted matters, preferably with reference to any applicable conservation advices, recovery plans and threat abatement plans.	☐
Outline how performance against specified objectives will be measured and reported.	☐

8. Conclusion

The preliminary documentation must **summarise the key impacts on protected matters, proposed avoidance and mitigation measures, and offsets proposed for any unavoidable impacts**. Provide an overall conclusion on the environmental acceptability of the proposed action, and whether proposed avoidance, mitigation and offset measures are sufficient to manage the additional impacts to the environment arising from the proposed action.

Include a discussion on the consistency of the proposal with principles of ecologically sustainable development of the EPBC Act (see Appendix A).

[6] See Outcomes-based conditions policy and guidance: Outcomes-based conditions policy and guidance - DCCEEW

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Appendix A. *Environment Protection and Biodiversity Conservation Act 1999* Principles of ecologically sustainable development

Section 3A Principles of Ecologically Sustainable Development

The following principles are ***principles of ecologically sustainable development***:

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

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

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

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

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

Appendix B. Endorsed offsetting frameworks

In the interests of streamlining regulatory requirements for proponents, the Commonwealth has endorsed some state government policies, as reflected in the department's EPBC Act Condition-setting Policy 2016 at http://www.environment.gov.au/epbc/publications/condition-setting-policy.

The Department of Climate Change, Energy, the Environment and Water has endorsed the NSW Biodiversity Offsets Scheme (BOS), which includes the BAM, the biodiversity credit system, and the offset rules set out in the Biodiversity Conservation Regulation.

Where a project demonstrates compliance with an endorsed state or territory policy, the proponent will not be required to simultaneously comply with the corresponding Australian Government policy. This means, if you are using the BOS you will not be required to use the EPBC Act offset assessment guide.

If you are proposing offsets developed and delivered using the BOS, you must append all relevant BAM documentation to your preliminary documentation – this would generally include a BDAR.

Appendix C. Assessing patches of an ecological community

A patch is a discrete and mostly continuous area of an ecological community (or species habitat). It can include small-scale variations, gaps and disturbances, such as tracks, paths or breaks (including exposed soil, leaf litter, cryptogams and watercourses/ drainage lines), or localised changes in vegetation that do not significantly alter the overall functionality of the ecological community. Permanent man-made structures, such as roads and buildings, are typically excluded from a patch.

The Key Diagnostic Characteristics for each community are the primary definition of what the ecological community is (how to identify it). National listing focuses legal protection on the remaining patches of an ecological community that are most functional, relatively natural and in relatively good condition. Patches/occurrences that do not meet minimum condition thresholds (for example, very degraded or modified) can be excluded from national protection.

A condition class describes a range of conditions that are thought to be of similar ecological value; i.e. a range of conditions that meet or exceed a particular condition threshold. A condition class may also contain different condition categories and thresholds, where different variables are used to indicate the same condition class. Patches that do not meet minimum condition thresholds may still be considered critical, as a buffer, to protect patches that do meet minimum condition thresholds. The importance of such patches requires assessment on a case-by-case basis.

Appendix D. Buffer zone

A buffer zone is an area adjacent to an area of ecological community that is important for protecting the integrity of the ecological community. The purpose of a buffer zone is to minimise the risk of indirect impacts by physically separating the ecological community from direct impacts and by identifying it to land managers. For instance, a buffer zone will help protect the root zone of edge trees and other components of the ecological community from spray drift (fertiliser, pesticide or herbicide sprayed in adjacent land), weed invasion, polluted water runoff and other damage. Typically, the most effective buffer zones are comprised of native vegetation.

The department may not consider that a retained patch of an ecological community has been effectively avoided if the design of a development does not include a buffer zone. In these cases, the department will generally consider the outer edge of the patch (typically up to 30 m) to have been impacted or partially impacted, requiring an appropriate offset. Buffer zones can be similarly applied to species habitat.

Glossary and abbreviations

Term	Definition
BAM	Biodiversity Assessment Method
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offset Scheme (NSW)
Construction	The erection of a building or structure that is, or is to be, fixed to the ground and wholly or partially fabricated on-site; the alteration, maintenance, repair or demolition of any building or structure; any work which involves breaking of the ground (including pile driving) or bulk earthworks; the laying of pipes and other prefabricated materials in the ground, and any associated excavation work; but excluding the installation of temporary fences and signage.
Department	The Australian Government agency responsible for administering the EPBC Act
ECD	Ecological Character Description
EPBC Act Environmental Offsets Policy	The *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (October 2012), including the Offsets Assessment Guide, or any subsequent official version.
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPBC Regulations	*Environment Protection and Biodiversity Conservation Regulations 2000*
ha	hectares
Minister	The Australian Government Minister administering the EPBC Act, including any delegate thereof
MNES	Matters of National Environmental Significance
OAG	Offsets assessment guide
Protected matter	a matter protected under a controlling provision in Part 3 of the EPBC Act for which this approval has effect
RIS	Ramsar Information Sheet

Acknowledgement of Country

We acknowledge the Traditional Custodians of Australia and their continuing connection to land and sea, waters, environment and community. We pay our respects to the Traditional Custodians of the lands we live and work on, their culture, and their Elders past and present.

Revision History

Revision No.	Revision date	Details	Prepared by	Reviewed by	Approved by
00	05/05/2022	Carrs Drive BDAR	Anthony Jarvis Ecologist	Vanessa Cain Environmental scientist	Julie Whelan, Senior Environmental Scientist
01	06/07/2022	Carrs Drive BDAR – updated with changes to number of lots	Trudy Thompson Senior Environmental Scientist	Vanessa Cain Environmental scientist	Julie Whelan, Senior Environmental Scientist
02	17/01/2023	Carrs Drive BDAR – updated to reflect revised impact area	Vanessa Cain Environmental Scientist Anthony Jarvis BAAS19043	Trudy Thompson Senior Environmental Scientist	Julie Whelan Principal Environmental Scientist
03	06/04/2023	Carrs Drive BDAR – updated with finalised BOAMS reports	Rachel McBride Senior Ecologist Anthony Jarvis BAAS19043	Julie Whelan, Principal Environmental Scientist	
04	05/02/2024	Carrs Drive BDAR – updated following BCD review	Jennifer Timbs, Ecologist	Ziggy Andersons, Senior Ecologist BAAS17103	Con Lokkers, Principal Ecologist
05	15/02/2024	Carrs Drive BDAR – updated following MDE comments	Jennifer Timbs, Ecologist	Ziggy Andersons, Senior Ecologist BAAS17103	Con Lokkers, Principal Ecologist
06	23/02/2024	Carrs Drive BDAR – credit yield updated to reflect revised BAM-C reports	Jennifer Timbs, Ecologist	Ziggy Andersons, Senior Ecologist BAAS17103	Con Lokkers, Principal Ecologist

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