

STAGE 2 BIODIVERSITY MANAGEMENT PLAN

September 2019
J156455-13

NSW Health Infrastructure
Tweed Valley Hospital

C107778: DL

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Document and Project Control

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Conflict of Interest Statement	Greencap warrants that as at the date of lodgement of the Stage 2 Biodiversity Management Plan, no actual, perceived or potential conflict of interest exists between it or between any one or more of Greencap’s officers, employees, consultants or agents and Health Infrastructure, or is likely to arise in relation to the Report that is submitted for this project, and if any conflict of interest arises or is likely to arise Greencap will immediately notify Health Infrastructure in writing of that actual, perceived or potential conflict of interest.	



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Stage 2 Biodiversity Management Plan

**NSW Health Infrastructure
Tweed Valley Hospital**

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Glossary, Acronyms and Abbreviations

Abbreviation	Definition
APZ	Asset Protection Zone
BC Act	<i>Biodiversity Conservation Act 2016</i>
BC Regulation	<i>Biodiversity Conservation Regulation 2016</i>
BAM	<i>Biodiversity Assessment Method Order 2017</i>
Coastal Management SEPP	State Environmental Planning Policy (Coastal Management) 2018
CKPoM	Tweed Coast Comprehensive Koala Plan of Management 2015
DPIE	NSW Government Department of Planning, Industry and Environment
EEC	Ecological communities that are listed as ‘endangered’ under the <i>Biodiversity Conservation Act 2016</i> .
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Cth)
FMP	Fauna Management Plan
LGA	Local Government Area
OEH	Office of Environment and Heritage
PCT	Plant Community Type
PMF	Probable Maximum Flood
SEARs	Secretary’s Environmental Assessment Requirements
TEC	Ecological communities that are listed as ‘threatened’ under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> and the <i>Biodiversity Conservation Act 2016</i> .
TSC	Tweed Shire Council
VI	Vegetation Integrity
VMP	Vegetation Management Plan
WM Act	NSW Water Management Act 2000
WoNS	Weeds of National Significance
WQMP	Water Quality Management Plan

1. INTRODUCTION

1.1 Overview

Greencap Pty Ltd (Greencap) was commissioned by TSA Management (TSA) on behalf of Health Infrastructure to prepare a Biodiversity Development Assessment Report (BDAR) to support the approval process for the proposed Tweed Valley Hospital (the Project). The approval process for the Project consists of a State Significant Development (SSD) application under Section 4.22 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). All projects which are classified as SSD require the preparation of a BDAR in accordance with the requirements of the NSW *Biodiversity Conservation Act 2016* (BC Act) and the *Biodiversity Assessment Method Order 2017* (BAM).

The Stage 2 BDAR (Greencap 2019b) identifies a range of measures to avoid, minimise or mitigate the potential impacts of the Project on biodiversity. This Stage 2 Biodiversity Management Plan (Stage 2 BMP) provides a plan for how these commitments will be actioned.

1.1.1 Description of the Proposal

On the 11 June 2019 the Minister for Planning and Public Spaces granted approval for the Concept Proposal and Stage 1 Early and Enabling Works for the new Tweed Valley Hospital (SSD 9575) located at 771 Cudgen Road, Cudgen (Lot 11 DP1246853). All documents relating to this consent can be found on the major project website of DPIE at <https://www.planningportal.nsw.gov.au/major-projects/project/10756>.

The Environmental Impact Statement (EIS) has been prepared to assist in the State Significant Development (SSD) Stage 2 Application for the Tweed Valley Hospital which will be assessed under Part 4 Division 4.7 of the Environmental Planning and Assessment Act 1979 (EP&A Act). This, along with supporting documentation, provides a clear outline of the Stage 2 Application.

The Tweed Valley Hospital Project broadly consists of:

- Construction of a new Level 5 major regional referral hospital to provide the health services required to meet the needs of the growing population of the Tweed-Byron region (in conjunction with the other hospitals and community health facilities across the region);
- Delivery of the supporting infrastructure required for the Tweed Valley Hospital, including green space and other amenities, roads and car parking, external road upgrades and connections, utilities connections, and other supporting infrastructure.

1.1.2 Stage 2 Hospital Main Works and Operation

The Stage 2 SSD component seeks consent for the Main Works and Operation of the Tweed Valley Hospital, including:

- **Construction of Main Hospital Building**

- Main entry and retail area
- Administration
- Community health
- In-Patient units
- Outpatient clinics and day only units
- Child and Adolescent Services
- Intensive Care Unit
- Mental Health Unit
- Maternity Unit and Birthing Suites
- Renal Dialysis
- Pathology
- Pharmacy
- Radiation Oncology as part of integrated Cancer Care
- Emergency Department
- Perioperative Services
- Interventional Cardiology
- Medical Imaging
- Mortuary
- Education, Training, Research
- Back of House services
- Rooftop Helipad

- **Construction of Support Buildings, referred to as the ‘Health Hub’, containing:**

- Oral Health
- Community Health
- Aboriginal Health
- Administration
- Education, Training and Research

- **Internal Roads and carparking, including multi-deck parking for staff, patients and visitors;**

- **Construction of a temporary building for the ‘Tweed Valley Skills Centre’**

- **External road infrastructure upgrades and main site access**

- **Environmental and wetland rehabilitation, including rehabilitation of existing farm dam as outlined in the Biodiversity Development Assessment**

Report (BDAR) prepared for the Concept Proposal and Stage 1 works

- **Site landscaping**

- **Signage**

- **Utility and service works**

The works outlined above comprise five key components, which are subject to various funding allocations and may be delivered independently to each other. Stage 2 has therefore been defined in the following sub-stages (stages are not listed in chronological order and may be delivered independently to each other):

- Stage 2A – Main Hospital Building complete with supporting roads, services infrastructure and landscaping
- Stage 2B – Main Hospital Building incremental expansion areas
- Stage 2C – Health Hub
- Stage 2D – Tweed Valley Skills Centre
- Stage 2E – Multi-deck car park.

Development consent is sought for the all 5 components of Stage 2 under this SSDA.

Plans for Stage 2 Main Works and Operation are attached in Appendix B of the EIS. Approval of Stage 2 will enable the new Tweed Valley Hospital to be built which will provide a much-needed contemporary health service facilities for the surrounding region.

1.1.3 Potential Future Expansions

Any subsequent stages or modifications to the proposal would be subject to separate applications as required including the potential future expansion of the facility.

1.2 BMP Version History

This BMP addresses the impacts of the Stage 2 Stage Significant Development (SSD) application. It is a revision of and extension to the Stage 1 BMP (Greencap 2019a). It has been updated to include the detailed design plans and an assessment of any potential additional biodiversity impacts for the Project. This revision for Stage 2 has not removed all information pertaining specifically to Stage 1 works in order to demonstrate consistency with the Stage 1 BMP.

1.3 Purpose, aim and objectives

The aim of this Stage 2 BMP is to identify the activities that will be undertaken to avoid, minimise and/or mitigate impact on biodiversity during the construction and operation of the Project. The purpose of this Stage 2 BMP is to provide an implementation plan for what, when, how and by whom these activities will be undertaken during construction and operational phases. The objectives of the Stage 2 BMP are to:

- Avoid, minimise and mitigate the impact of the project on threatened species and ecological communities;
- Enhance existing flora and fauna habitats and corridors that are proposed to be retained; and
- Control the movement of weeds on and off the Project site in accordance with the general biosecurity duty.

This Stage 2 BMP is comprised of three sub-plans, namely:

- Vegetation Management Plan (VMP) in Section 2;
- Fauna Management Plan (FMP) in Section 3; and
- Water Quality Management Plan (WQMP) in Section 4.

The three sub-plans are to be implemented during the Stage 2 construction and operation phases of the Project and include adaptive management measures for impacts on biodiversity that are uncertain.

1.4 Related plans

This Stage 2 BMP has been prepared based on the Project information made available for Stage 2.

This Stage 2 BMP was prepared in alignment with the *Stormwater Management Plan* (SWMP; RBG 2019), the *Erosion and Sediment Control Plan* (ESCP; RBG 2019) and the *Project Construction Environmental, Health & Safety Management Plan- Main Works Rev 05* (CEMP; LLB 2019), developed

as per the SSD 9575 Conditions and SSD 10353 Secretary's Environmental Assessment Requirements (SEARs) dated 18 July 2019.

The CEMP outlines measures to mitigate environmental impacts during the Stage 2 construction phase. The CEMP addresses a range of indirect impacts on biodiversity that were identified in the BDAR (Greencap 2019b).

Whilst not strictly relating to impacts on biodiversity, the Landscape Zonal Concept Plan (Turf 2019) has been developed with consideration of the existing landscape context and ecology with plant selection that relates to the local climate and landscape character. It is intended that this Stage 2 BMP informs the development of implementation plans subsequent to the LMR.

Consultant reports or advice informing or referenced in this stage 2 BMP (including those in draft form) are provided in **Table 1**.

Table 1 Related Plans and consultant Reports

Report	Author	Version
Tweed Valley Hospital Proposed Site Plan – STB-AR-SKE-PRW-1000015A[1]	STH Batesmart	Rev 1, 6 th September 2019
Auxiliary Lane and Roundabout Tree Clearance Plans Drawing numbers: RBG-CV-DWG-RIE-83-151 and RBG-CV-DWG-RIE-81-101	Robert Bird Group	Rev 2, 26 th August 2019
Main Entrance General Arrangement Plans Drawing numbers: RBG-CV-DWG-RIE-87-300,301 & 302	Robert Bird Group	Rev 1, 16 th August 2019
Tweed Valley Hospital Development Zonal Plan – LS_DWG-10-003	Turf Design Studios	Rev 8, 6 th September 2019
Tree Removal and Preservation Plan LS-DWG-02-001	Turf Design Studios	Rev 5, 27 th August 2019
Aviation State Significant Development Report; Tweed Valley Hospital SSD-9575	AviPro	14 th August 2019
Bushfire Hazard Assessment Tweed Valley Hospital	GeoLINK	Version 3, 14 th August 2019
External Lighting Strategy Report Tweed Valley Hospital	LCI	15 th August 2019
Groundwater and soil investigation report 771 Cudgen Rd, Cudgen, NSW	Cavvanba	19038 R02, August 2019
Noise & Vibration Impact Assessment for SSDA – Tweed Valley Hospital Stage 2	JHA	Rev C, 15 th August 2019
Preliminary and Detailed Site Investigation	Octief	6 th September 2018
Stormwater Management Plan – Tweed Valley Hospital, Prepared for Stage 2 SSD Application	Robert Bird Group	Issue C, 16 th August 2019
Tweed Valley Hospital Construction & Environmental Management Plan – Main Works (CEMP)	Lendlease Building	Rev 05, 16 th August 2019
Tweed Valley Hospital – Stage 2 Conservation and Habitat Management Sub-plan (CHMSP)	Lendlease Building	Revision 2.2, 12 th July 2019

Report	Author	Version
Tweed Valley Hospital – Stage 2 Heritage and Archaeological Management Sub-plan (CHAMSP)	Lendlease Building	Revision 2.2, 12 th July 2019
Tweed Valley Hospital – Stage 2 Construction Air Quality Management and Dust Management Sub-plan (CAQMADM)	Lendlease Building	Rev 3.0, 9 th July 2019
Tweed Valley Hospital – Stage 2 Construction Soil & Water Management Sub-plan (CSWMSP)	Lendlease Building	Rev 3.1, 12 th July 2019
Tweed Valley Hospital – Stage 2 Construction Noise & Vibration Management Sub-plan (CNVMP)	Lendlease Building	Rev 2.2, 12 th July 2019
Tweed Valley Hospital – Stage 2 Preliminary Construction Traffic Management Plan (CTPMSP)	Lendlease Building	Rev 3, 16 th August 2019
Tweed Valley Hospital – Stage 2 Construction Waste Management Sub-Plan (CWMSP)	Lendlease Building	Rev 4, 19 th August 2019
Tweed Valley Hospital – Stage 2 Sediment and Erosion Control Management Sub-plan	Lendlease Building	Rev 3.1, 12 th July 2019
Tweed Valley Hospital Hydrology Assessment (Draft Final)	SMEC	Rev 2, 15 th August 2019
Management Plan for the Mitchell's Rainforest Snail <i>Thersites mitchellae</i> (Cox, 1864) at 771 Cudgen Rd, Cudgen, New South Wales	Invertebrate Identification Australasia	Draft, June 2019
Pre-construction baseline survey of <i>Thersites mitchellae</i> (Cox, 1864) (Mitchell's Rainforest Snail) at 771 Cudgen Rd, Cudgen, New South Wales	Invertebrate Identification Australasia	Draft, 3 rd June 2019
Tweed Valley Hospital Project Traffic Impact Assessment	Bitzios Consulting	16 th August 2019

1.5 Legal requirements

1.5.1 Related environmental legislation

The following legislation is applicable to the management of biodiversity on this site:

- *Biodiversity Conservation Act 2016*
- *Environmental Planning and Assessment Act 1979* and related instruments, including:
 - SEPP Coastal Management 2018
 - SEPP 44 Koala Habitat Protection
- *Coastal Management Act 2016*
- *Biosecurity Act 2015*; and
- *Environmental Protection and Biodiversity Conservation Act, 1999 (Cth)*

1.5.2 Conditions of approval

The State Significant Development (SSD 9575) Final Conditions of Development Consent dated 11 June 2019 Conditions B20 and B21 as per Schedule 2 Part B – Conditions to be satisfied in future development application(s) as listed below in **Table 2** are addressed in this Stage 2 BMP.

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Table 2 Final conditions

Condition	BMP Reference(s)
B20. The Stage 2 application must demonstrate that the proposal is consistent with the endorsed <i>Biodiversity Development Assessment Report</i> prepared by Greencap dated January 2019 (BDAR) and the <i>Matters of National Environmental Significance Report</i> (MNES) prepared by Greencap dated February 2019 and all recommendations to mitigate the direct, indirect and prescribed impacts in the BDAR and the MNES.	Section 1.11
B21. The Stage 2 application must be supported by a long-term Biodiversity Management Plan (BMP) including the following:	
(a) details of long term measures to protect and maintain the vegetation on the northern part of the Site, specifically the coastal wetlands mapped under the Coastal Management SEPP;	VMP Section 2.3
(b) details of measures to protect the retained vegetation in the Tweed Coast Road / Cudgen Road intersection upgrade site;	VMP Section 2.3 Table 5 (Items 1 and 2) Figure 7
(c) details of measures to protect the identified trees for retention in the Preliminary Arboricultural Report prepared by Arbor safe dated 17 October 2018;	VMP Section 2.3 Table 5 (Items 1 and 2)
(d) a Vegetation Management Sub-Plan (VMP) for the Site that incorporates revegetation of the exotic grassland in Zone 9 with rainforest species, regeneration and weed management of retained remnant vegetation in the north of the Site;	VMP Section 2
(e) installation of the identified 'stepping-stone' habitats and rain gardens within the Site to improve threatened species connectivity;	VMP Section 2 FMP Section 3.3.2 Figure 6
(f) identify suitable wildlife friendly fencing that would not impede the movement of fauna in the future with no fencing on the northern boundary of the Site;	FMP Section 3.3.1 Figure 7
(g) details of how the VMP links to the Landscape Masterplan for the Site which is focused on the regeneration of retained windrows, as well as native landscape plantings;	Section 1.4 VMP Section 2.3 Table 4
(h) details of a lighting strategy to mitigate impacts on light sensitive fauna (if relevant) due to light spill from the development;	FMP Section 3.9.1
(i) a water quality management plan including the water quality monitoring techniques to be adopted to ensure that the water quality targets to be achieved for the Site are always maintained (except large flood events);	WQMP Section 4.4
(j) a Habitat Management Sub-Plan (HMP) for the identified threatened species, ecological endangered communities (EEC) and threatened ecological communities (TEC);	Section 1.10 VMP Section 2 FMP Section 3 and WQMP Section 4
(k) proposed measures contributing to the recovery of the Mitchell's rainforest snail (<i>Thersites mitchellae</i>), consistent with the published recovery plan (NPWS 2011);	VMP Section 2.4.4 FMP Section 3.2.2



Condition	BMP Reference(s)
(l) proposed measures of rehabilitating the existing dam at the north-western corner of the Site to prevent the growth of salvinia (<i>Salvinia molesta</i>) in the dam and agricultural drain;	VMP Section 2.3.2.7 WQMP Section 4.1.3
(m) A Fauna Management Sub-Plan (FMP) for the Site including details of impacts and proposed mitigation measures due to loss of connectivity, impact on movement, details of fencing to allow movement, restricting developments in identified areas, light spill and operational noise; and	FMP Section 3
(n) evidence of consultation with the Office of Environment and Heritage (OEH) in the preparation of the BMP. ¹	Section 1.9

¹Now the NSW Department of Planning, Industry and Environment (DPIE) (formerly the NSW Office of Environment and Heritage (OEH))

1.6 Guidelines and standards

A range of guidelines and industry standards have been referenced throughout this plan including:

- *AS 4970-2009 Protection of trees on development sites* (Standards Australia 2009)
- *Byron Shire Council: Excluding cane toads from water bodies* (BSC 2013)
- *National Standards for the Practice of Ecological Restoration in Australia* (SERA 2018)
- *New South Wales Weed Control Handbook: A guide to weed control in non-crop, aquatic and bushland situations, NSW DPI Management Guide* (DPI 2018)
- *Planning for Bushfire Protection* (RFS 2006) , *Addendum 3 to PBP and PBP Pre-release 2018*
- *Standards for Asset Protection Zones* (RFS 2007)
- *Subtropical Rainforest Restoration: A practical manual and data source for landcare groups, land managers and rainforest regenerators* (BSRLG 2005)
- *Tweed Shire Council: Native Species Planting Guide* (TSC 2019)
- *Tweed Shire Council: Development Design Specification D7 Stormwater quality* (TSC 2016)
- *Water Sensitive Urban Design: Technical design guidelines for south east Queensland* (Healthy Waterways 2006).

The full citation the above and other references are detailed in **Section 6**.

1.7 The Site

The Project site is located at 771 Cudgen Road, Cudgen (Lot 11 DP 1246853) within the Tweed Shire Council LGA (**Figure 1** and **Figure 2**) (the 'Site'). The 19.4 ha Site is located between the existing residential areas of Kingscliff and Cudgen, situated opposite Kingscliff TAFE. Approximately 16.4 ha of the Site is above the Probable Maximum Flood (PMF), a legislated requirement for hospital developments.

The northern section of the Site is located on the Tweed River floodplain and is part of an important forested wetland that has been mapped under *State Environmental Planning Policy (Coastal Management) 2018* (Coastal Management SEPP). The wetland is part of a mapped regional fauna corridor (Department of Environment, Climate Change and Water [DECCW], 2010;) and is a significant stepping-stone habitat to the Cudgen Creek estuary located approximately 800 m to the south-east of the Site.

The southern section of the Site was a working farm under cultivation (approximately 11.24 ha) and apart from the self-sown windrows along the Site boundary, most of the southern section has been cleared of native vegetation.

The northern section of the Site has high biodiversity value and is part of a mapped fauna corridor that affords connectivity and enables the movement of threatened species. At a local scale this forested wetland with associated rainforest components blends eastward into a coastal floodplain wetland (Keith, 2004) that extends to within 200 m of the coast. This area of remnant vegetation has been avoided by the development footprint and therefore avoids directly impacting threatened species and Threatened Ecological Communities (TECs). Direct impacts on several other windrows located along the western, southern and eastern boundaries of the site have also been avoided.

The only areas of native vegetation proposed to be cleared are parts of the self-sown windrows in the southern section of the Site. These windrows are composed of self-sown early regrowth rainforest species as well as High Threat Exotic woody weeds including mature planted slash pine *Pinus elliottii* with an understory predominately consisting of camphor laurel *Cinnamomum camphora*, small leaved privet *Ligustrum sinense* and umbrella tree *Schefflera actinophylla*.

1.8 Stage 2 Project Phases

In order to achieve objectives of the VMP, FMP, WQMP and address the SSD 9575 Final Conditions of Development Consent, several activities will be undertaken at different phases (i.e. construction or operation) of the Project during Stage 2. Certain vegetation management measures commence during Stage 1 early works upon Stage 1 SSD approval as identified in the Stage 1 BMP (Greencap 2019c) and will continue throughout Stage 2. Therefore, this Stage 2 BMP also includes some Stage 1 components which are carried over into Stage 2.

The timing of the Stage 2 BMP activities has been described as per the following two Project phases:

- Construction (C); and
- Operations (O).

1.9 Consultation

In accordance with Schedule 2 condition B21 n, this Stage 2 BMP will be prepared in consultation with the NSW Department of Planning, Industry and Environment (DPIE) (formerly the NSW Office of Environment and Heritage (OEH)) and will be submitted to the Planning Secretary for approval prior to the commencement of any works on the Site, approved under Stage 2 of this consent.

Consultation with DPIE for this Stage 2 BMP has commenced and is planned to continue until final lodgement of the EIS. Comments were received from the Biodiversity and Conservation Division (BCD) of DPIE on Monday 16 September 2019 noting that the BCD will be provided with an opportunity to review the complete exhibition documentation and provide comments and advice as requested by the Planning and Assessment Group of the Department. .

1.10 Habitat Management Plan

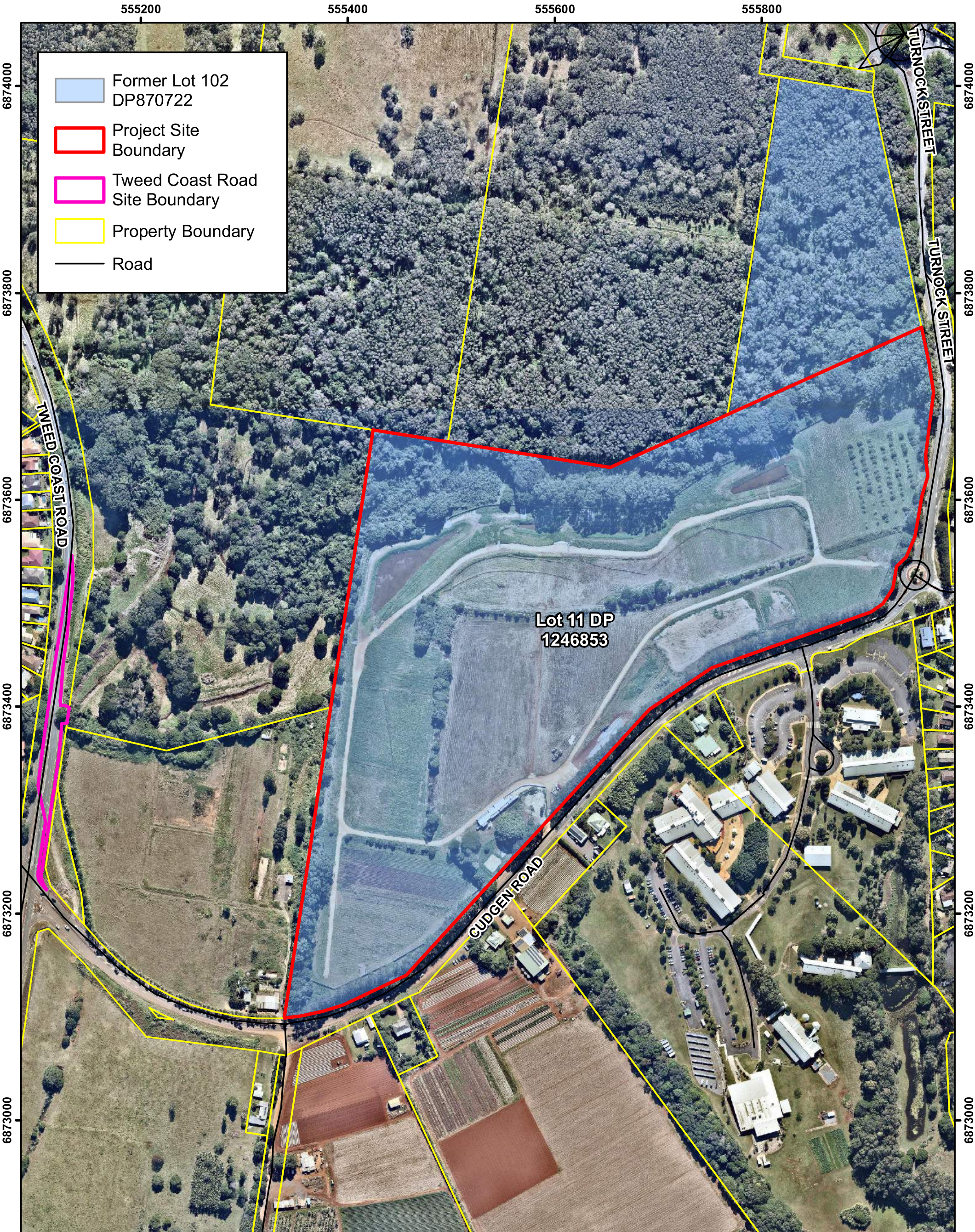
In accordance with Condition 2 B21 (j), the Stage 2 BMP must include a Habitat Management Sub-Plan (HMP) for the identified threatened species, ecological endangered communities (EEC) and threatened ecological communities (TEC) including the koala food trees Zone 6. Although a standalone HMP is not included in this BMP, the mitigation and management measures for the identified threatened species, EEC's and koala food trees identified on or directly adjacent to the Site are



addressed within the VMP (**Section 2**), FMP (**Section 3**) and WQMP (**Section 4**) sub-sections and therefore collectively these sub-plans address the requirements for a HMP.

1.11 Mitigation measures

This Stage 2 BMP addresses all recommendations to mitigate the direct, indirect and prescribed impacts for Stage 2 works contained in the endorsed BDAR, the MNES Report and the management and mitigation measures in Appendix 2 of the conditions.

Mitigation measures and where they are addressed in this Stage 2 BMP is shown in **Attachment 1**.



Client: C107778	 <div>050100</div> m	Scale (@A4): 1:4,750	Site Map – Stage 2	
Job #: J156455-13				
Author: D. Correa	Coordinate System: GDA 1994 MGA Zone 56		Tweed Valley Hospital BMP 771 Cudgen Road Cudgen NSW	
Checked: C. Maloney	<i>Note: All data is approx only & subject to survey. Imagery 15th July 2019 (7.5 cm) @ Nearmap 2019 Cadastre © NSW Department of Finance, Services and Innovation 2018</i>			
Date: 1/08/2019				
			Figure 1	
No warranty is given in relation to the data (including accuracy, reliability, completeness or suitability) and accept no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of or reliance upon the data. Data must not be used for direct marketing or be used in breach of privacy laws.				



Client: C107778	<div><div>N</div><div>0350700</div><div>m</div></div>	Scale (@A4): 1:25,000	Location Map – Stage 2	
Job #: J156455-13				
Author: D. Correa	Coordinate System: GDA 1994 MGA Zone 56		Tweed Valley Hospital BMP 771 Cudgen Road Cudgen NSW	
Checked: C. Maloney	<i>Note: All data is approx only & subject to survey. Imagery 15th July 2019 (1.2 m) © Nearmap 2019</i>			
Date: 1/08/2019				
<div>GREENCAP</div>	<i>No warranty is given in relation to the data (including accuracy, reliability, completeness or suitability) and accept no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of or reliance upon the data. Data must not be used for direct marketing or be used in breach of privacy laws.</i>		Figure 2	

2. VEGETATION MANAGEMENT PLAN

2.1 Vegetation management aims and objectives

The objective of this Vegetation Management Plan (VMP) is to contribute to the conservation and enhancement of biodiversity values on the Site and avoid and mitigate any potential impacts on threatened species, in particular the Mitchell's rainforest snail *Thersites mitchellae* which have been identified adjacent to this site, Threatened Ecological Communities (TEC), koala food trees and the coastal wetlands mapped under the Coastal Management SEPP. These measures will mitigate the residual impacts of the Project as outlined in the BDAR [Appendix I and J] (Greencap 2019b). This Vegetation Management Plan refers to the Vegetation Management Zones as shown in **Figure 6**.

2.2 Existing vegetation on the Site

Observations from field surveys indicated the presence of two distinct areas of vegetation (Greencap 2019). The northern section of the Site that is located on the floodplain is substantially remnant native vegetation. The southern section of the Site that is located on a ridge is land that has been substantially cleared of native vegetation.

The remnant native vegetation is classified as forested wetland and rainforest formations (Keith 2004; **Table 3**). Adjoining the remnant vegetation is a large patch of exotic vegetation near the north-west corner and planted eucalypt windrows classified as wet sclerophyll forest shrubby sub-formation. Along the southern edge of this vegetation and extending roughly west to east across the Site, rocks that have been cleared from the cultivated fields have formed a steep slope and, in some areas, have been fashioned into a dry-stone wall up to 3 m high.

Most of the southern section of the Site is cleared land under cultivation. Rocks that have been cleared from the cultivated fields have been piled into linear mounds composed of loosely consolidated rock and soil throughout the Site. Early regrowth rainforest species and woody weeds that are classified as High Threat Exotics (HTE) under the BAM have self-sown in these areas to form windrows classified as rainforest. Along the Cudgen Road/Turnock Street boundary there is a planted slash pine *Pinus elliottii* windrow with an understory also composed of self-sown early regrowth rainforest species and woody weeds. There is also a planted eucalypt windrow in the south-west corner of the Site classified as wet sclerophyll forest shrubby sub-formation. On the eastern boundary of the Site there is a planted casuarina windrow classified as a forested wetland.

Plant community types (PCT), TECs and BDAR vegetation zones were identified using plot-based vegetation surveys undertaken as part of development of the BDAR (Greencap 2019b). A combination of the quantitative data recorded in the plot-based floristic vegetation surveys, mapping data and Site observations was used to identify PCTs and Vegetation Zones (**Table 3, Figure 3**). In addition to the data and information above, the Final Determinations of the former NSW Scientific Committee were then employed to confirm TECs that are located on the Site. It was assessed that two TECs are located on the Site, namely; Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions EEC and Lowland rainforest on floodplain in the NSW North Coast Bioregion EEC, comprising of a total 1.8 ha (**Figure 3**).

A total of 63 native and 51 exotic plant species were recorded in vegetation surveys. All plant species recorded during the plot-based floristic surveys are presented in **Appendix A**. Given that the vegetation surveys were undertaken using a plot-based methodology this represents an indicative list of the plant species recorded on the Site, not a comprehensive inventory. Targeted flora species surveys were also undertaken to addresses the requirements set out in the BAM (Greencap 2019).

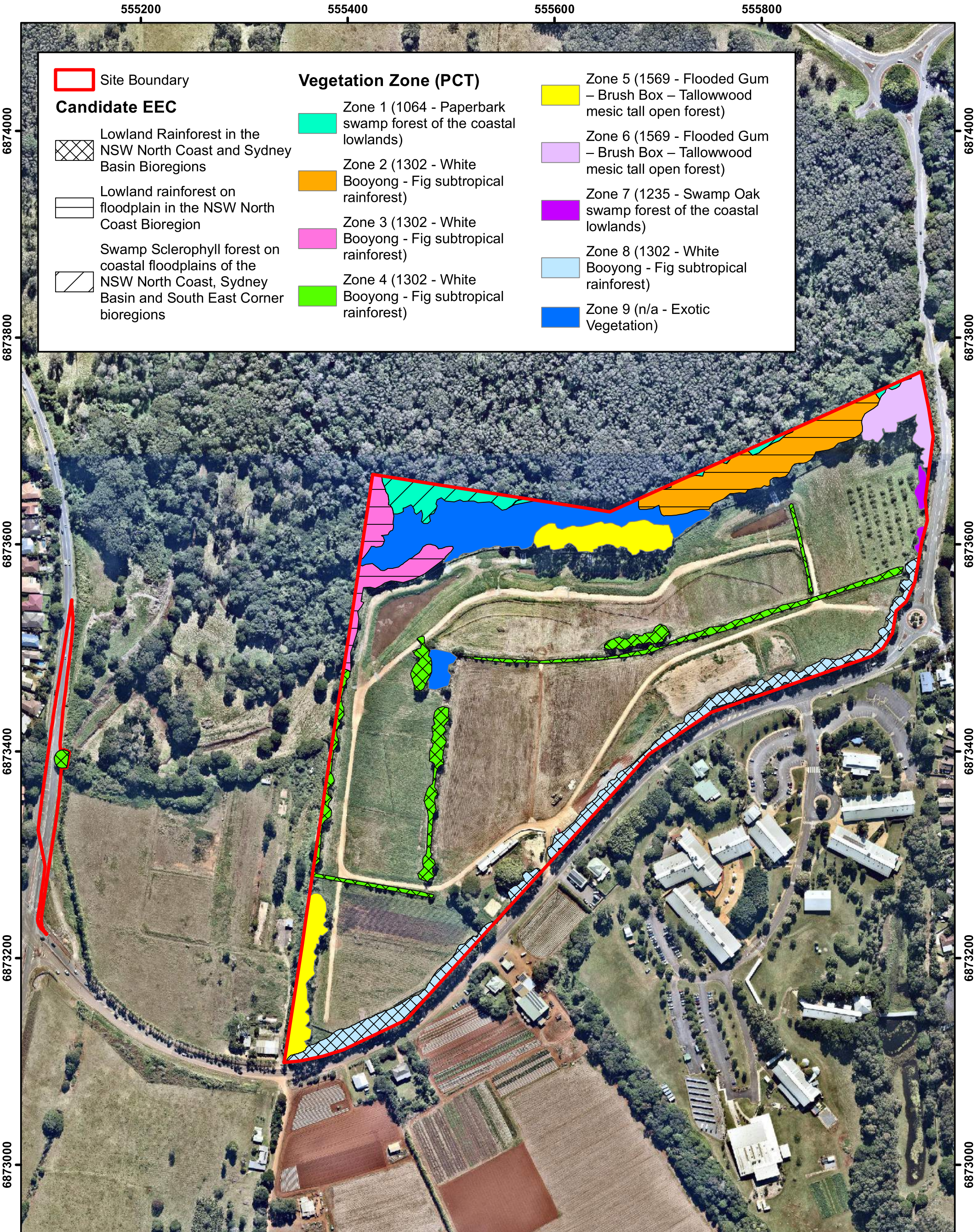
Except for an observation of three, stinking *Cryptocarya* *Cryptocarya foetida* plants there were no threatened flora species recorded during the targeted surveys (**Figure 4**).

All native vegetation on the Site will be retained with the exception of 0.95 ha of native White Booyong - Fig Subtropical Rainforest vegetation in self-sown windrows (Zones 4 and 8) which will be cleared during Stage 1 works (**Figure 5**). The majority of windrow vegetation on the southern site boundary along Cudgen Road was cleared as documented in the Stage 1 BDAR (Greencap 2019b). However, native vegetation in the windrow marked as 'vegetation to be removed' in the Stage 1 BDAR Figure 21, which will eventually form part of the MZ 7 vegetation buffer during Stage 2 works, may be retained where possible.

Table 3 Plant Community Types, Threatened Ecological Communities and BDAR Vegetation Zones identified on the Site

PCT	PCT Common Name	Vegetation formation	Vegetation class	Threatened Ecological Community	BDAR Vegetation Zone	Condition class	Area (ha)
1064	Paperbark swamp forest	Forested Wetland	Coastal Swamp Forest	Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions EEC	1	Moderate	0.29
1302	White Booyong – Fig subtropical rainforest	Rainforest	Subtropical Rainforest	Lowland rainforest on floodplain in the NSW North Coast Bioregion EEC	2	Moderate	0.73
					3	Low	0.36
				Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	4	Self-sown windrow	0.61 (0.55 to be cleared) ¹
1569	Flooded Gum – Brush Box – Tallowwood mesic tall open forest	Wet Sclerophyll Forests (Shrubby sub-formation)	North Coast Wet Sclerophyll Forest	This PCT is not a TEC	5	Planted windrow	0.57
				This PCT is not a TEC	6	Planted windrow	0.29
1235	Swamp Oak swamp forest	Forested Wetland	Coastal Floodplain Wetlands	This PCT is not a TEC. Did not conform to Final Determination.	7	Planted windrow	0.05
1302	White Booyong – Fig subtropical rainforest	Rainforest	Subtropical Rainforest	Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	8	Self-sown windrow	0.75 (0.40 to be cleared) ¹
N/A	Barner Grass – Camphor Laurel – Small-leaf Privet exotic vegetation	N/A	N/A	N/A	9	Exotic	1.02

¹ The areas of direct impacts on native vegetation are consistent with the Stage 1 BDAR.



Client: C107778

Job #: J156455-13

Author: D. Correa

Checked: C. Maloney

Date: 1/08/2019

GREENCAP



0 50 100
m

Scale (@A4): 1:4,750

Coordinate System: GDA 1994 MGA Zone 56

Imagery 15th July 2019 (7.5 cm) @ Nearmap 2019
Vegetation mapping: Greencap (2018)

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**BDAR Vegetation Zone (PCT) and
Threatened Ecological Community –
Stage 2**

Tweed Valley Hospital BMP
771 Cudgen Road
Cudgen NSW

**Figure
3**