New Grafton Correctional Centre

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CONSTRUCTION FLORA AND FAUNA MANAGEMENT PLAN

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List of acronyms

ACHMP	Aboriginal Cultural Heritage Management Plan
AMS	Activity Method Statement
APZ	Asset Protection Zone
BAR	Biodiversity Assessment Report
BFMP	Bushfire Management Plan
BOS	Biodiversity Offset Strategy
CEMP	Construction Environment Management Plan
CFFMP	Construction Flora and Fauna Management Plan
Consent Conditions	NGCC Stage 1 and 2 Development Conditions of Consent
DECC	Department of Environment and Climate Change
DEH	Department of Environment and Heritage
DoEE	Department of Environment and Energy
DPI	Department of Primary Industries
ECP	Environmental Control Plan
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EPA	Environmental Protection Authority
EPBC Act	Commonwealth *Environment Protection & Biodiversity Conservation Act 1999*
FFMP	Flora and Fauna Management Plan
IBRA	Imterium Biogeographic Region of Australia
IECA	International Erosion Control Association
IER	Independent Environmental Representative
ISO	International Standards Organisation
KTP	Key Threatening Process
LGA	Local Government Area
NSW	New South Wales

OEH	Office of Environment and Heritage
PCT	Plant Community Type
PER	Principal Environmental Representative (John Holland)
REM	Regional Environmental Manager
PM	Project Manager
RFS	Rural Fire Service
SEP	Site Environmental Plan
SOP	Standard Operating Procedure
SSD	State Significant Development
TSC	NSW *Threatened Species Conservation Act 1995*
WIRES	Wildlife Information, Rescue and Education Services
WRA	Workplace Risk Assessment

1. Introduction

Jacobs has been engaged by John Holland Group (JHG) to prepare this Construction Flora and Fauna Management Plan (CFFMP) for the New Grafton Correctional Centre (NGCC) project. This CFFMP details the measures that will be used to minimise disturbance to native vegetation and habitats during the construction phase of the Project. In particular, this plan details the mitigation measures to be used to reduce the potential impacts of the Project on flora, fauna and vegetation communities. The key objectives of this plan are to ensure that impacts to flora and fauna are minimised and are within the scope permitted by the Development Conditions of Consent.

This plan provides an overview of the legal and other requirements including the Consent Conditions, describes the existing environment (including flora, fauna and aquatic biodiversity), summarises the Project impacts, and identifies the proposed mitigation and management measures of flora and fauna during the construction phase. This plan includes specific instruction relating to clearing and grubbing, weeds and pathogens, and landscape rehabilitation, which are detailed in the following appendices:

- Appendix 1: Clearing and Grubbing Management Plan - details the requirements and specification for clearing and grubbing of vegetation to minimise harm to flora and fauna throughout construction.
- Appendix 2: Weed and Pathogen Management Plan – includes mitigation measures to be implemented to avoid the introduction of weeds and pathogens; and suppress and control the spread of existing weeds.
- Appendix 3: Vegetation Retention Plan – details the construction and operation phase requirements for retention, rehabilitation and restoration of vegetation on the Project Site.
- Appendix 4 – Fauna Rescue and Relocation Procedure – details methods for the handling of fauna requiring movement or care on site.

Operation phase management will be detailed in the Operation Flora and Fauna Management Plan.

Objectives and Goals

The key objectives and goals for the management of flora and fauna on site are to ensure:

- No clearing outside approved clearing limits.
- Minimise indirect impacts to surrounding vegetation.
- Do not exceed the clearing limits of 13.7 ha of native vegetation for the Project as defined in the Biodiversity Assessment Report and the Biodiversity Offset Strategy.
- Minimise all impacts to the aquatic ecosystems.

- Minimise injury/mortality to all fauna.
- Minimise all erosion and sedimentation during clearing operations.
- Minimise clearing for ancillary facilities. e.g. haul roads, stockpile areas, site compounds.
- Retention of fauna habitat connectivity throughout the Project Area.
- Fauna Habitats outside of approved work zone are not impacted by works.

Specific objectives relating to ecological restoration, clearing and grubbing and weed and pathogen management are with these relevant plans.

Interaction with other plans

There are interrelationships with other plans that provide associated information relevant to environmental management of flora and fauna impacts, these include:

- Construction Environmental Management Plan (CEMP) - demonstrates systems and procedures to ensure that controls are established and maintained to manage potential environmental impacts during the construction of the Project. It details the responsibilities of the Project team relating to environmental management, and all other requirements under the Environmental Management System framework under ISO 14001 including system review, audits and inspections and communication.
- Biodiversity Offset Strategy (BOS) - Developed to meet the requirements of the Consent Condition, B18. This report details the methods to guarantee long-term protection and management of biobank sites to offset impacts to the ecological communities and habitat for threatened species.
- Soil and Water Management Plan – includes mitigation measures to minimise erosion and sedimentation.
- The Aboriginal Cultural Heritage Management Plan (ACHMP).
- The health risk assessment that identifies the measures to be implemented to ameliorate the impact of biting insects and to minimise breeding areas on the site.
- Bush Fire Management Plan (BFMP).
- Traffic Management Plan.

2. Legal and Other Requirements

1.1 References				
Federal Legislation	**State legislation**	**Local Government Laws**	**Standards / Codes**	**Other Documentation**
Environmental Protection & Biodiversity Conservation Act 1999	– *Protection of the Environment and Operations Act 1997.* – *Environmental Planning and Assessment Act, 1979.* – *Threatened Species Conservation Act 1995.* – *National parks and Wildlife Act 1974.* – *Native Vegetation Act 2003.* – *Fisheries Management Act 1994.* – *Noxious Weed Act 1993 no.11.*	NA	– *Best Practise Erosion & Sediment Control*, International Erosion Control Association (IECA) (2008). – Hygiene protocol for the control of diseases in frogs (DECC, 2008). – Commonwealth threat abatement plan for the infection of amphibians with chytrid fungus (DEH, 2006). – Commonwealth threat abatement plan for dieback caused by the root-rot fungus phytophthora cinnamomi (Environment Australia 2002). – Statement of intent: Infection of native plants by Phytophthora cinnamomi. – Introduction and establishment of Exotic Rust Fungi of the order Uredinales pathogenic on plants of the family Myrtaceae - Proposed Key Threatening Process Listing (DECC). – AS 4373—2007; Australian Standard - Pruning of amenity trees. – AS 4970—2009; Australian Standard - Protection of trees on development sites.	– Construction Environmental Management Plan. – Development Consent SSD 7413 – Jacobs, Biodiversity Assessment Report, March 2017. – Jacobs, Biodiversity Offset Stragey, March 2017. – JH specifications / SOPs / standards.

3. Flora and Fauna Conditions of Approval

Approval Ref	Approval requirement	Project Phase	FFMP section/s in which issue is addressed	CEMP section/s in which issue is also addressed
Landscaping **B16**	The development application for Stage 2 must include detailed plans identifying the species to be used in the site buffer and other landscape areas (preferably species indigenous to the area).	Pre-construction	A detailed plan of vegetation rehabilitation zones, proposed vegetation structure and plant species is provided in Appendix 3.	Vegetation Restoration Plan – Appendix 3.
Bushfire Protection **B17**	The development application for Stage 2 must demonstrate that bushfire protection measures, comply with the relevant provisions of Planning for Bushfire Protection 2006 and the requirements of RFS in relation, but not limited, to: • Asset Protection Zones (APZ). • Fire-fighting vehicles access roads. • Fire-fighting water supply.	Pre-construction	Bushfire Protection requirements were considered in the identification of appropriate vegetation restoration zones (refer Appendix 3 for zones).	Bush Fire Management Plan (BFMP).
Biodiversity **B18**	The development application for Stage 2 must demonstrate that the proposal is consistent with the endorsed BAR and BOS.	Pre-clearing	All sections of this plan. All management measures of relevance to the construction phase of the Project contained in the endorsed BAR have been replicated and built upon in this CFFMP.	Vegetation Restoration Plan -Appendix 3.
Schedule 3 –Conditions of Consent for Stage 1 Works **Part A: Administrative conditions**				

Approval Ref	Approval requirement	Project Phase	FFMP section/s in which issue is addressed	CEMP section/s in which issue is also addressed
Obligation to Minimise Harm to the Environment **A11**	In addition to meeting the specific performance criteria established under this approval, the Applicant must implement all reasonable and feasible measures to prevent and/or minimise any harm to the environment from the construction or operation of the development.	Pre-clearing Construction	All sections of this plan. All management measures of relevance to impact minimisation that are contained in the endorsed BAR have been replicated and built upon in this CFFMP.	Clearing and Grubbing Plan – Appendix 1. Weed and Pathogen Management Plan – Appendix 2. Vegetation Restoration Plan -Appendix 3.
Schedule 3 –Conditions of Consent for Stage 1 Works **Part B: Prior to the commencement of works**				
Vegetation Retention Plan **B9**	A vegetation retention plan must be prepared by a suitable qualified consultant, which must: a) identify and provide details of the retention of any tress (particularly hollow bearing) and groundcover b) provides details on the maintenance and improvement of retained or planted vegetation, particularly within the buffer areas; and c) be reviewed by a suitably qualified bushfire consultant and include certification that any APZ meets the relevant standards.	Pre-clearing	Refer Appendix 3.	A Vegetation Restoration Plan has been prepared for the construction phase and operation phases of the Project, refer to Appendix 3.

Approval Ref	Approval requirement	Project Phase	FFMP section/s in which issue is addressed	CEMP section/s in which issue is also addressed
Flora and Fauna Management **B29**	A Flora and Fauna Management Plan (FFMP), prepared by a suitably qualified person, must be submitted to and approved by the Certifying Authority. The FFMP must address, but not be limited to, the following matters: a) Minimising the risk, introduction and spread of invasive species and diseases;	Pre-clearing	Appendix 1 - Weed and Pathogen Plan, and Section 10 Management and Mitigation Measures.	N/A
	b) Traffic management procedures (including signage, speed limits and help information for incidents) in regard to the protection of the Koala and Rufous Bettong;		Section 7.	Traffic Management Plan
	c) Fauna protection/relocation procedures for displaced wildlife, identifying potential release sites and timing protocols; and		Appendix 4, and Section 10 Management and Mitigation Measures.	N/A
	d) Identifying suitable receiving sites for displaced aquatic/amphibian fauna		Appendix 4, and Section 10 Management and Mitigation Measures.	N/A
B30	The Applicant must submit a copy of the approved FFMP to the Department and Council prior to the commencement of works.	Pre-clearing	N/A	N/A
Schedule 3 –Conditions of Consent for Stage 2 Works **Part B: Prior to the commencement of works**				

Approval Ref	Approval requirement	Project Phase	FFMP section/s in which issue is addressed	CEMP section/s in which issue is also addressed
Flora and Fauna Management **B35**	A Flora and Fauna Management Plan (FFMP), prepared by a suitably qualified person, must be submitted to and approved by the Certifying Authority. The FFMP must address, but not be limited to, the following matters: e) Minimising the risk, introduction and spread of invasive species and diseases;	Pre-clearing	Appendix 1 - Weed and Pathogen Plan, and Section 10 Management and Mitigation Measures.	N/A
	f) Traffic management procedures (including signage, speed limits and help information for incidents) in regard to the protection of the Koala and Rufous Bettong;		Section 7.	Traffic Management Plan
	g) Fauna protection/relocation procedures for displaced wildlife, identifying potential release sites and timing protocols; and		Appendix 4, and Section 10 Management and Mitigation Measures.	N/A
	h) Identifying suitable receiving sites for displaced aquatic/amphibian fauna		Appendix 4, and Section 10 Management and Mitigation Measures.	N/A

4. Existing Environment

The site covers an area of approximately 195 ha and is located approximately 12.5 km southeast of Grafton, within the Clarence Valley Local Government Area (LGA). The broader area (within which the site is located) has been extensively cleared and converted to grazing land, sugar cane plantations and rural residential properties with highly modified drainage and water control structures.

Flora

Scattered small patches of remnant vegetation are present on site, contiguous with similar vegetation to the west and south. Remnant vegetation patches on the western boundary are part of a large patch of native vegetation patch that extends to the south and west outside the property boundary.

The biodiversity survey (Jacobs, 2016), identified the presence of four Plant Community Types (PCTs) covering 31.8 ha (see Table 1) within the two lot and DPs that comprise the Project Site as defined in the Stage DA. The native vegetation is located within and adjacent to 163.2 ha of cleared grazing land (a grassland habitat of mixed exotic and common native species). The native vegetation communities were in moderate to good (medium) to moderate to good (poor) condition (i.e. all native communities present have been modified) (Jacobs, 2017). Figure 1 shows the distribution of PCTs on the site.

One PCT Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT 837) is part of the Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion endangered ecological community as listed under the *Threatened Species Conservation Act 1995* (TSC Act). The lagoons / wetlands are not consistent with the EEC listing under the (TSC Act) as they are artificially constructed dams and do not occur on the Coastal floodplain.

Based on habitats occurring within the Project area, 11 threatened flora species were considered moderately likely to occur within the Project area and were targeted during flora surveys (BAR, pp 38, Jacobs 2017). No threatened flora species were detected during the survey on site; however one species, Weeping Paperbark *Melaleuca irbyana* (Endangered, TSC Act), was recorded on property immediately adjacent the eastern site boundary (along Avenue Road).

Table 1 : Plant Communities of the Site

Vegetation zone No.	Vegetation Community	Corresponding PCT	Code / Condition	Total Area (ha)
1	Coastal freshwater meadows and forblands of lagoons and wetlands **(Photo 1)**	Coastal freshwater meadows and forblands of lagoons and wetlands (PCT:782)	NR150 Moderate / Good (Poor)	0.8
2	Spotted Gum – Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion **(Photo 2)**	Spotted Gum - Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1209)	NR244 Moderate/ Good (Medium)	8.2
			NR244 Moderate / Good (Poor)	8.0
Sub total				16.2
3	Spotted Gum – Grey Ironbark – Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion **(Photo 3)**	Spotted Gum – Grey Ironbark - Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1211)	NR246 Moderate/ Good (Medium)	10.6
			NR246 Moderate / Good (Poor)	4.0
Sub total				14.6
4	Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the NSW North Coast Bioregion **(Photo 4)**	Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT 837)	NR161 Moderate / Good (Poor)	0.2
Total				**31.8**

Weeds

There were 39 exotic flora species recorded, with four being noxious weeds identified by the DPI for the Clarence Valley LGA. Two species are Weeds of National Significance. These are shown in Table 2 with their control class and control requirement. These species were observed in low to moderate abundance. Lantana is listed as a KTP under the TSC Act for its ability to invade, establish and spread easily, particularly on disturbed sites associated with edge adjoining native habitats.

Table 2 : Noxious weed recorded at the Site

Species	Class	Control requirement	Weed of National Significance
Annual ragweed (*Ambrosia artemisiifolia*)	5	Restricted Plant The requirements in the NW Act for a notifiable weed must be complied with. Low abundance.	No
Groundsel bush (*Baccharis halimifolia*)	3	Regionally Controlled Weed The plant must be fully and continuously suppressed and destroyed. Low abundance.	No
Lantana (*Lantana camara*)	4	Locally Controlled Weed The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread. Low abundance in the west of the site.	Yes
Fireweed (*Senecio madagascariensis*)	4	Locally Controlled Weed The plant must not be sold, propagated or knowingly distributed. Moderate abundance and widespread.	Yes

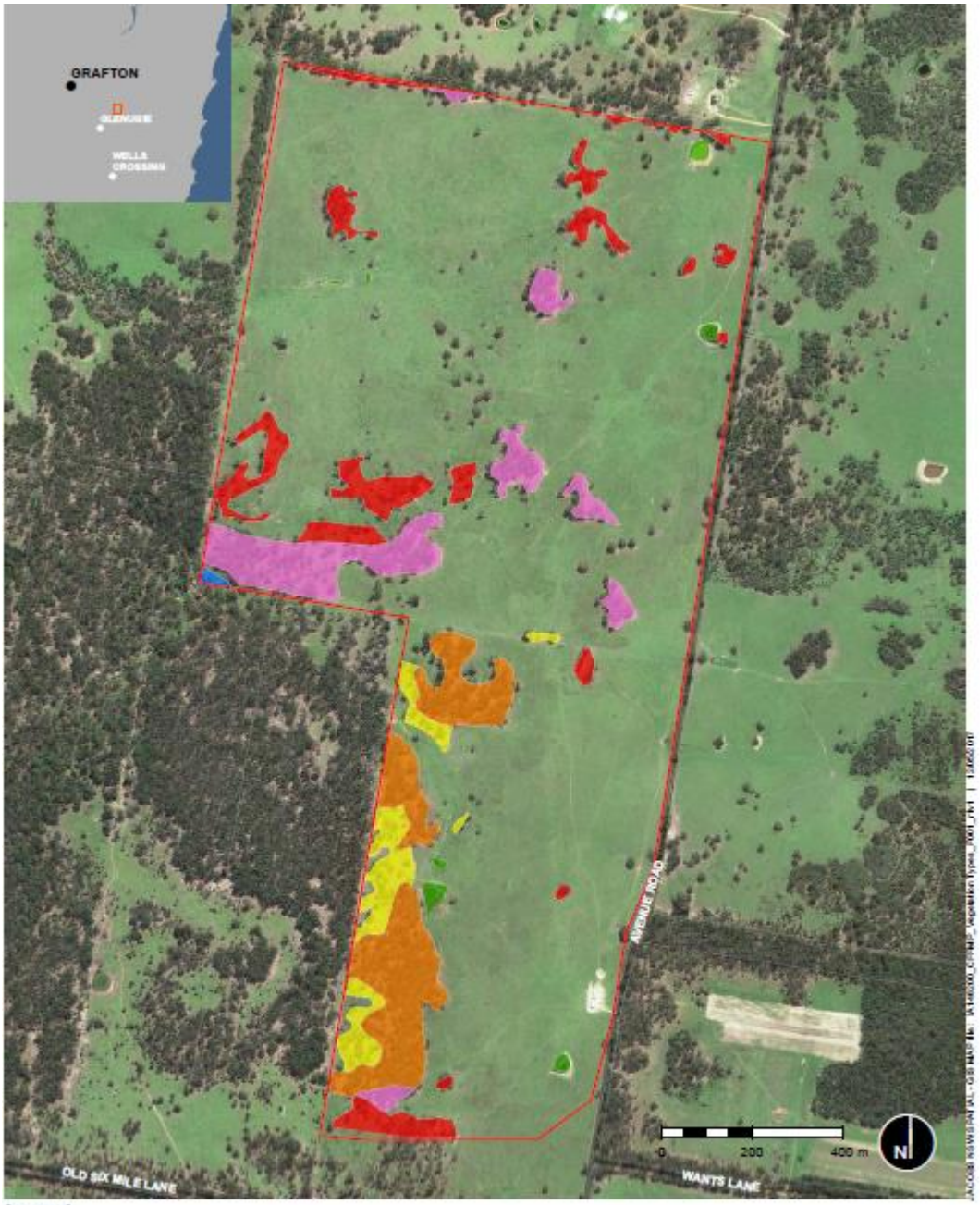

Figure 1 : Vegetation Zones and PCTs (from Jacobs, 2016)

Fauna

The Project Site, is zoned RU2 – Rural Landscape under the Clarence Valley Local Environmental Plan 2011, has been subject to extensive clearance and degradation of understorey layers from historic grazing. Remnant native habitat is fragmented on site, but is concentrated on the western boundary. The vegetation on the western boundary links into identified Dry Climate Change Corridors connecting through to regional fauna corridors and the Glenugie State Forest.

The fauna survey recorded 83 species, a relatively high fauna species richness despite the small area of forested habitat on site (Jacobs 2017). Of the 83 species, there were 8 amphibians, 6 reptiles, 9 terrestrial mammals, 4 bats, 55 bird species and 1 fish. An additional nine bats were detected but could not be positively identified. The high diversity of fauna is a result of the size and condition of contiguous habitats off the site.

Nine (9) species recorded are listed are listed as threatened under the TSC Act and/or the EPBC Act; 3 mammals (including 2 bats) and 6 bird species:

- Grey-headed Flying Fox (*Pteropus poliocephalus*) – vulnerable under the TSC Act and EPBC Act.
- Little Bentwing Bat (*Miniopterus australis*) – vulnerable under TSC Act.
- Rufous Bettong (*Aepyprymnus rufescens*) – vulnerable under TSC Act.
- Little Lorikeet (*Glossopsitta pusilla*) – vulnerable under TSC Act.
- Grey-crowned Babbler (eastern subspecies, *Pomatostomus temporalis temporalis*) – vulnerable under TSC Act.
- Brolga (*Grus rubicunda*) – vulnerable under TSC Act.
- Glossy Black-Cockatoo (*Calyptorhynchus lathami*) – vulnerable under TSC Act.
- Brown treecreeper (*Climacteris picumnus*) – vulnerable under TSC Act.
- Black-necked Stork (*Ephippiorhynchus asiaticus*) – vulnerable under TSC Act.

In addition, two migratory bird species (as under the EPBC Act) were recorded:

- Rainbow Bee-eater (*Merops ornatus*).
- Satin Flycatcher (*Myiagra cyanoleuca*).

See Figure 2 below for the threatened fauna recorded in the Project site.

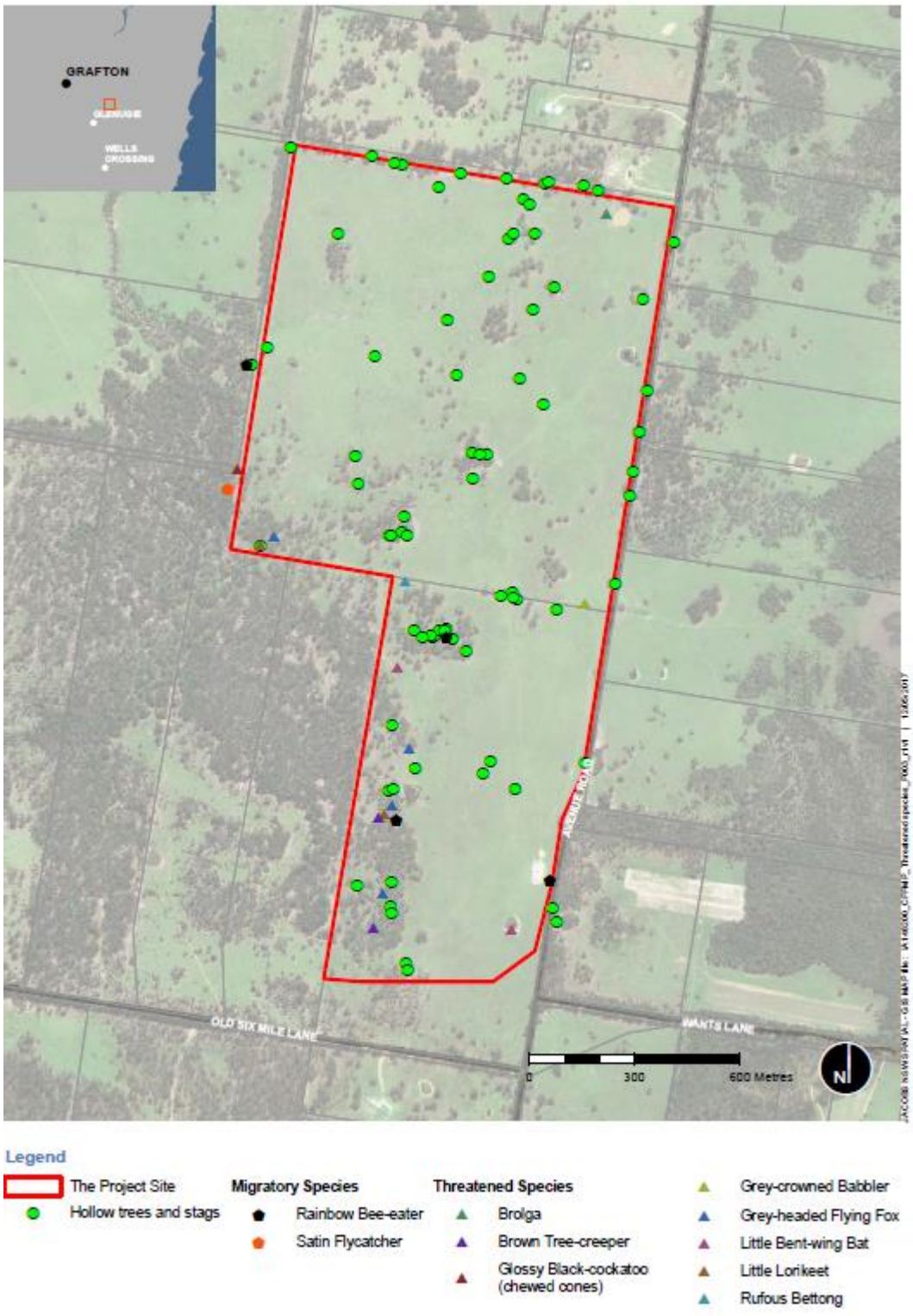

Figure 2 | Recorded threatened species, migratory species and habitat values on the Project Site

Figure 2 : Threatened fauna records and habitat features of the Project site (from Jacobs 2016)

The site is also likely to provide suitable foraging and / or breeding and sheltering habitat for additional threatened fauna species as described in the BAR (Jacobs 2017). A number of eucalypt tree species on the site are important nectar food resources for threatened fauna such as the Little Lorikeet (*Glossopsitta pusilla*), Swift Parrot (*Lathamus discolor*), Black-chinned Honeyeater (*Melithreptus gularis gularis*) and Yellow-bellied Glider (*Petaurus australis*). Although modified, the open grasslands of the site will provide important habitat for nesting and foraging Rufous Bettong and are highly likely to be used by Coastal Emu (*Dromaius novaehollandiae*). While there were no Koalas (*Phascolarctos cinereus*) reported on the site and no evidence observed of Koalas using these habitats, there are several older records within the locality and potential habitat based on present food tree proportions.

Aquatic Flora and Fauna

Minor tributaries of the Coldstream River are present as drainage lines located at the western boundary and are in poor condition with a low potential for impacts from the Project. Wetlands are limited on the Project Site to four artificially constructed farm dams in poor condition with limited macrophyte cover and moderate levels of stock pugging.

Aquatic and amphibious fauna recorded on site during the survey included:

- Plague Minnow (*Gambusia holbrooki*), a significant predator of native fish and a key threatening process under the TSC Act.
- Brown-striped Frog (*Limnodynastes peronii*).
- Spotted Grass Frog (*Limnodynastes tasmaniensis*).
- Eastern Sign-bearing Froglet (*Crinia parinsignifera*).
- Common Eastern Froglet (*Crinia signifera*).
- Green Tree Frog (*Litoria caerulea*).
- Bleating Tree Frog (*Litoria dentata*).
- Eastern Dwarf Tree Frog (*Litoria fallax*).
- Rocket Frog (*Litoria nasuta,* protected).

The degraded aquatic habitats present may add to refuge habitat present in the broader region for threatened wetland bird species such as Magpie Goose, Black-neck Stork (recorded on site) and Brolga (recorded on site). The dams may also provide foraging areas for insectivorous micro-bats.

5. Ecological Impacts

The Project would not clear more than 13.7 hectares of native vegetation identified as plant community types (PCTs) requiring offset under the *Framework for Biodiversity Assessment* (Office of Environment and Heritage 2014a), refer to Figure 3 and as defined in the BAR and the BOS compelted for the Project. The breakdown of native vegetation clearing to occur is as follows:

- Coastal freshwater meadows and forblands of lagoons and wetlands (PCT 782) – 0.8 ha.
- Spotted Gum - Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT 1209) – 8.3 ha.
- Spotted Gum - Grey Ironbark – Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT 1211) – 4.6 ha.

Proposed perimiter landscaping and rehabilitation of retained habitats will further improve the functionality and linkage of habitats on site (refer Vegetation Restoration Plan, see Appendix 3).

No significant impacts to important waterways, wetlands and / or key fish habitats are expected. There is a small potential for construction works to increase sedimentation and erosion along drainage lines which has been considered for mitigation.

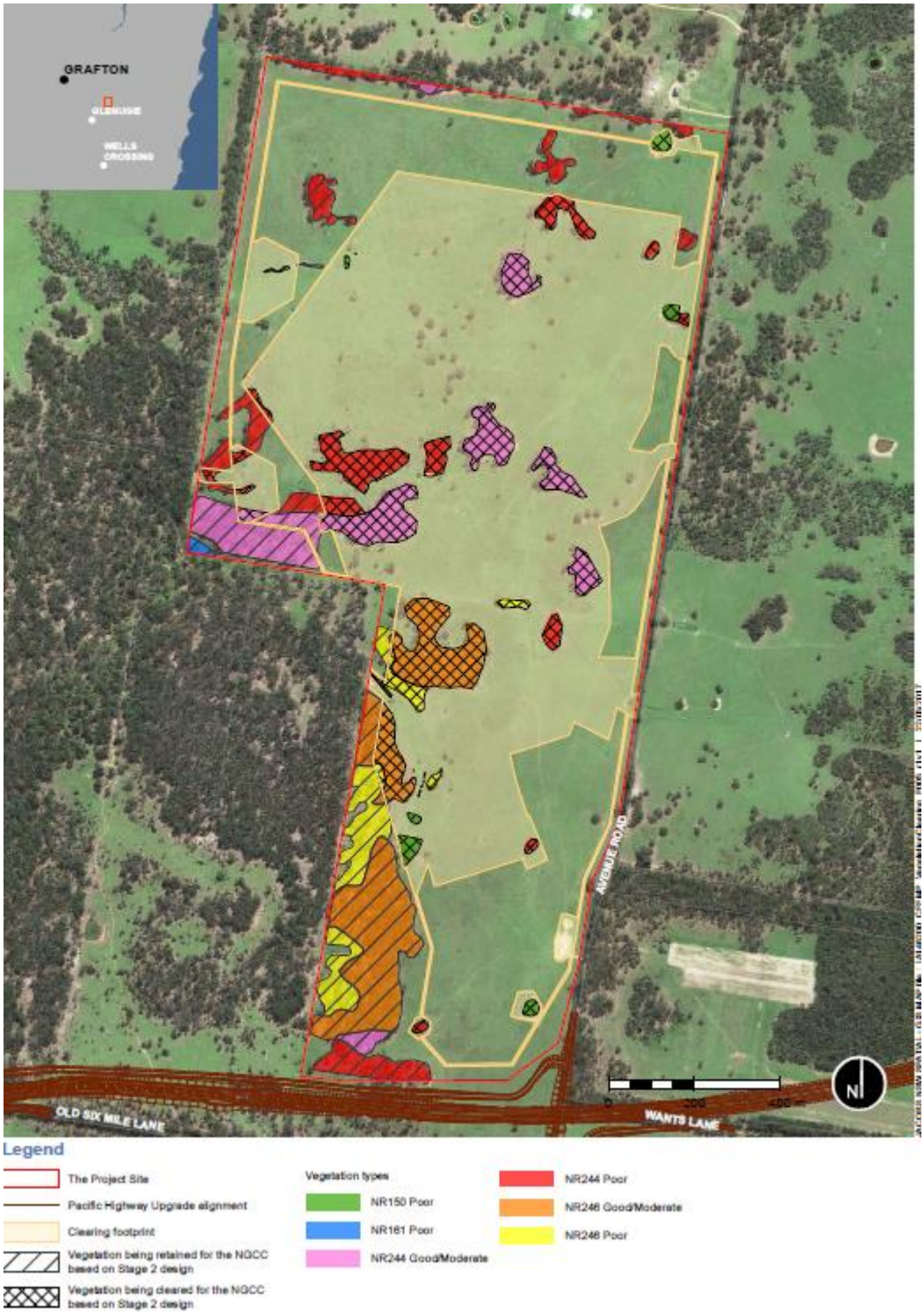

Figure 3 : Clearing footprint

6. Environmental Constraints Maps (SEPs)

John Holland brands its Environmental Constraint Maps as Site Environmental Plans (SEPs). These maps show the location of the environmentally sensitive areas to be protected, and detail environmental controls to be installed prior to the commencement of works and during construction works. They also include operational controls relevant to the areas of works covered by the SEP (e.g. working hours, discharge protocols and limits, etc.).

The John Holland Project Environmental Representative (PER) in consultation with all relevant personnel shall first establish the scope of the activities being considered to enable the 'boundaries' of SEPs to be established. The SEP shall be compiled taking into consideration the environmental 'Aspects and Impacts' as identified in the Activity Method Statements. Activity Method Statements are explained in Section 1.3 of the CEMP. The SEP must also include controls and mitigation measures outlined in the CEMP sub plans relevant to the planned Project activities described in the Activity Method Statement (AMS).

For the input of ecological constraints in the SEP the PER must consult with the Project ecologist. The information from the ecological surveys during the Environmental Assessment in 2016 by Jacobs is to provide the base for these maps. The additions from the Project ecologist will include any significant finds during the pre-clearing surveys. These should include but are not limited to:

- Additional habitat trees (hollow bearing, stags, nest trees).
- Previously unrecorded threatened fauna species or species habitat.
- Previously unrecorded threatened flora species or species habitat.

The Site Environmental Plans (SEP's) will be developed prior to work's taking place in any area. The SEPs for the clearing activities will be developed after the ecologist's pre clearing surveys and will include any identified ecological constraints detailed above. Other key information that will be detailed in all SEPs will include:

- Location of waterways, floodway's and drainage lines.
- Areas of weed infestation.
- Sensitive Community receivers (identified along the Project route).
- Approved clearing boundaries (formation and ancillary).
- Project Approval boundary.
- Details and locations of all environmental field controls except erosion and sediment controls (these will be covered in the ESCPs).
- Demarcation measures in the field.
- Locations of stockpiles, chemical storage areas, spill kits, concrete washouts.
- Threatened flora and fauna Species as well as any identified habitat.

The SEPs are to be reviewed and updated after each work activity is completed, e.g. clearing works. Also they are to be updated for any required change of control measures during activities. Since they are also used as information maps, any feature location changes must also be added to a new revision to SEP. For example, this could include the Project boundary or clearing boundary change or the location of a new fauna fence or chemical storage area.

7. Management and Mitigation Measures

This Flora and Fauna Management Plan provides detailed management measures to be implemented on the Project to ensure compliance with the Project Conditions of Approval. The management and mitigation measures are detailed below in Table 3.

Table 3 : Proposed management and mitigation measures

Management of Flora and Fauna Potential Impacts			
Actions			
Reference No.	**Actions Required**	**Staff Responsible**	**When**
Pre Clearing			
1.	All personnel taking part in construction activities shall be instructed through the site specific induction or toolbox process with regards to the importance of clearing limits and retention of remnant/individual trees of significant value. The induction or toolbox talk will cover details on: • Potential and actual significant flora and fauna species within the Project area, including Commonwealth and State listed threatened species. • Clearing procedure and boundary marking. • Habitat trees and the two stage clearing process. • Procedure for encountering native fauna onsite including injured fauna. • Potential impacts to threatened nocturnal fauna when travelling to or working at the Project Site during dusk to dawn hours (particularly during winter) and where possible to minimise light and noise impacts to fauna. • Key contacts in case of environmental emergency. • Reporting of environmental incidents involving fauna. • Potential and actual weed species that occur within the Project area. • Other pests that occur within the Project area and the management of these; includes fauna, flora and pathogens.	PER	Prior to clearing

Management of Flora and Fauna Potential Impacts			
Actions			
Reference No.	**Actions Required**	**Staff Responsible**	**When**
2.	An Activity Method Statement (AMS) will be developed for the clearing operations to assess all risks to flora and fauna and the appropriate control measures. This is to be developed with the clearing sub-contractors.	PM/PER/Engineers/ Foreman	Prior to clearing
3.	Restrict clearing of native vegetation to the minimum area necessary for construction (not exceed 13.7 hectares of native vegetation for the Project as defined in Figure 3). Clearance will be staged with each stage of the Project as required so that vegetation will be retained as a buffer area until future stages commence. Locate temporary infrastructure (plant sites and construction offices, access tracks etc.) in cleared areas away from vegetation to minimise vegetation removal. Locate and upgrade any access tracks in a manner which minimises the removal of mature trees, hollow-bearing trees and dead trees. All sediment and erosion controls are to be in place (where possible, also utilising existing degraded farm dams as temporary sediment detention basins to minimise additional potential clearance). Refer Soil and Water Management Plan	Designers/PM/PER	Prior to clearing
4.	Accurately and clearly mark out the limits of clearing (where appropriate) and the trees/vegetation to be retained outside of the construction footprint and / or used for post landscaping by fencing. The fencing marking the clearing boundaries is to remain in place for the entirety of the construction Project. Regular inspections to be undertaken by the Principal and relevant personnel to ensure all retained vegetation/fauna habitat is clearly marked and that fencing is in place (where appropriate), and immediately prior to clearing events.	PM/PER/Engineers/ Foreman	Prior to clearing
5.	The clearing limits will cover formation works and all ancillary facilities.	PM/PER/Engineers/ Foreman	Prior to clearing

Management of Flora and Fauna Potential Impacts			
Actions			
Reference No.	**Actions Required**	**Staff Responsible**	**When**
6.	A suitably qualified fauna ecologist will undertake a pre-clearing inspection to identify and physically mark hollow-bearing trees and dead standing trees (stags), and any large bird nests or fauna habitat structures within the clearing areas which may need temporary protection until fauna have left the structure or been relocated. The pre-clearing survey should also conduct a search for any koalas which may be present on the site. The survey must be undertaken with sufficient time to develop the environmental constraints map for the area proposed for clearing. The pre clearing survey is to occur after the clearing limits for the particular area to be cleared have been demarcated in the field. Follow-up inspections on the day of clearing when walking over the site with the clearing contractor and PER and during clearing will confirm that the sites subject to pre-clearance surveys remain free of fauna. Suitable receiving sites for displaced fauna (including aquatic/amphibian fauna) will be identified at this stage and marked on maps to show where the relocation site is located.	PER / ecologist	Prior to clearing
7.	Prior to the clearing any hollow-bearing trees, install nest boxes to provide replacement hollows for displaced fauna.	PER / ecologist	Prior to clearing
8.	Site Environmental Plans (SEPs) detailing all sensitive areas including habitat trees, weed management areas etc. and the associated environmental controls will be progressively developed as work commences on site. Sensitive Areas (No Go zones) are to be demarcated with a different colour bunting which is to remain through construction and site restoration, and also mapped on the SEPs. Construction works will not commence until the SEPs have been approved for each respective portion of the site.	PER	Prior to clearing

Management of Flora and Fauna Potential Impacts			
Actions			
Reference No.	**Actions Required**	**Staff Responsible**	**When**
9.	All noxious weeds which are cleared as part of the Project will be disposed of appropriately. The noxious weeds inside the clearing limits are to be controlled prior to clearing activities in accordance with the *Noxious Weeds Act 1993*. Refer the Weed and Pathogen Plan for further detail.	PER	Prior to construction
10.	Hollow bearing trees with active European bee hives should be identified during the pre-clearing survey. These trees should be felled with other hollow bearing trees accordance with the two stage clearing process outlined in the clearing and grubbing management plan. Once on the ground bee hives should be destroyed by spraying with an appropriate insecticide, and hollows re-instated as fallen timber in rehabilitation zones.	PER / ecologist	Prior to clearing
11.	Any dewatering of artificial farm dams if necessary has potential to impact on the breeding cycle of several frog species. As a precautionary measure dewatering of the structure should avoid the period late spring and summer to avoid the breeding period for most frog species. Dewatering of dams will be supervised by a suitably experienced aquatic ecologist. A suitable aquatic fauna release site (for eels, native fish, tadpoles and frogs) should be identified in proximity to the site prior to dewatering of dams. Any native fish that are found in dams as dewatering occurs, are to be relocated to water bodies outside of the design footprint by the PER or ecologist in accordance with Appendix 4 - Fauna Rescue and Relocation Procedure.	PER / ecologist	Prior to clearing
12.	Minimise the area of disturbance in and near drainage lines, clearly mark out work zones in wetland and wet meadow areas, where appropriate. Ensure all works within close proximity to aquatic habitats have adequate sediment and erosion control. Refer Soil and Water Management Plan for further detail.	PER / ecologist	Prior to clearing

Management of Flora and Fauna Potential Impacts			
Actions			
Reference No.	**Actions Required**	**Staff Responsible**	**When**
During Clearing / Construction			
13.	A two-staged habitat removal procedure will be adopted to firstly remove non-habitat trees (i.e. trees with no hollows) 48 hours prior to removal of habitat trees. Refer to Appendix 1 the Clearing and Grubbing Plan for further detail. This process will be managed by an experienced ecologist. Any identified hollow bearing trees to be removed can be nudged and/or knocked before felling to allow any fauna to escape. Habitat is to be removed as carefully as possible to avoid injury to any fauna still remaining in trees. If possible, the use equipment that would allow the habitat trees to be lowered to the ground will minimise potential impact (e.g. claw extension on an excavator). An experienced and licensed wildlife carer and/or ecologist will inspect habitat once it is removed e.g. after a tree is felled). Animals that emerge will be captured, inspected for injury where possible then relocated to pre-determined habitat identified for fauna release. Suitable release sites are recommended in bushland to the west of the site. Any long grass areas that contain potential habitat or refuge site for Rufous Bettong will be slashed with tractor mounted slasher prior to pre-stripping of those areas. Any uninjured nocturnal fauna encountered will be held in a dark, quiet, warm, well ventilated box or carrier for release the following night. Wildlife Information, Rescue and Education Services (WIRES) Clarence Valley (Ph: 1300 094 737) should be consulted if any injured fauna are encountered.	PER / ecologist	During clearance
14.	Provide sediment and erosion controls to manage exposed soil surfaces and stockpiles to prevent sediment discharge into waterways, vegetation and fauna habitat. Clearly identify stockpile and storage locations and provide erosion and sediment controls around stockpiles. Refer Soil and Water Management Plan for further detail.	PER	Construction
15.	Toolbox meetings will be held covering topics on fauna and flora as well as clearing procedures. Toolbox talks will be held with subcontractors to discuss details in the Environmental Constraints Maps and John Holland SEPs (Site Environmental Plans)	PER/ecologist	During Construction

Management of Flora and Fauna Potential Impacts			
Actions			
Reference No.	**Actions Required**	**Staff Responsible**	**When**
16.	NO GO zones demarcated with blue and white bunting in the field are not under any circumstance allowed to be entered by any plant or machinery without approval from the PER.	PER	At all times
17.	All personnel taking part in construction activities shall be instructed through the site specific induction process with regards to the importance of clearing limits and remnants / individual trees of significant value as well as requirements for vegetation retention and other sensitivities in the construction envelope.	PER	At all times
18.	Where possible, construction is to be confined to daylight hours only to limit disturbance to nocturnal native fauna, and to minimise travel during night hours where potential risk of vehicle collisions with fauna are high. Signage, speed limits and help information for incidents will be located along roadways to reduce the incidence of roadkill to species such as the Koala and Rufous Bettong. Motor vehicle speeds will be restricted to 40 km/h in areas near habitat for Koalas and Rufous Bettongs. Fauna crossing signs will be erected at points where animals are likely to cross any roads.	PER	At all times
19.	All Clearing and Grubbing will follow the Clearing and Grubbing plan and cannot commence without sign off of the clearing and grubbing permit	PER	At all times
20.	Native vegetation removed will be reused elsewhere in the site (e.g. retention / rehabilitation areas) and or given offsite for reuse (e.g. in offset areas). This shall include use for fauna habitat augmentation purposes onsite (as whole felled logs)	PER	At all times
21.	Trees outside of clearing boundaries that have limbs overhanging construction zones are to be pruned in accordance with AS4373.	PER	At all times

Management of Flora and Fauna Potential Impacts			
Actions			
Reference No.	**Actions Required**	**Staff Responsible**	**When**
General site requirements during construction			
22.	Appropriate natural habitat features and resources (such as hollow-logs, felled branches and bush rocks) removed from the clearance zones will be relocated to adjacent rehabilitation and retention zones to provide alternative temporary or permanent habitat for displaced fauna. The Project ecologist and PER are to decide the best habitat features and resources and the required numbers for rehabilitation.	PER/Ecologist	At all times
23.	The fencing used to flag the clearing boundaries will remain in place for the duration of the Project to prevent vehicles driving or working outside the approved working limits.	PER/PM	At all times
24.	All injured wildlife and relocation of fauna is to be dealt with in accordance with the Fauna Relocation Procedure	PER	At all times
25.	Ensure that any machinery arriving on site be inspected for any foreign soil or plant matter/weed material and be washed down before entering the site. All vehicles driving to and from site should follow a protocol to prevent the spread or introduction of Phytophthora, Myrtle Rust or Chytrid Fungus, namely vehicles should be clean and dry, including the tyres and any equipment used. Refer the Weed and Pathogen Plan for further detail.	PER	At all times
Aquatic Fauna and Flora			

Management of Flora and Fauna Potential Impacts			
Actions			
Reference No.	**Actions Required**	**Staff Responsible**	**When**
26.	The impacts of construction of waterway crossings on aquatic organisms shall be minimised by following all mitigation measures in the Soil and Water Management Plan	PM/PER	At all times
27.	Ensure that soil disturbance is minimised following clearing of trees and vegetation to reduce sediment entering the minor drainage lines as per all mitigations set out in the Soil and Water Management Plan.	PER/SV	During clearing
Rehabilitation & Demobilisation			
28.	The Landscaping and Rehabilitation Plan describes in detail the management strategies regarding rehabilitation on the Project. The Landscape Management Plan will consider a range of constraints and opportunities associated with the Project including collection and propagation of local seed, salvage and reuse of topsoil and woody debris. The Landscape Management Plan will aim to revegetate buffer lands using the same species composition and structure as currently exists on the site and includes a program for monitoring and maintenance of plantings.	PER	Prior to commencement of construction
29.	Large logs encountered within the works will be retained and scattered throughout the remaining forest habitats adjacent to the site rather than mulched. This should be conducted using the most sensitive manner possible (i.e. not piled up in a heap at the edge of the property or pushed into the forest with a bulldozer).	PER	During rehabilitation
Monitoring			
No	**Monitoring Required**	**Staff Responsible**	**When**
1.	The details on the monitoring of Clearing procedures are included in the Clearing and Grubbing Plan.	PER	Prior to commencement of construction

Management of Flora and Fauna Potential Impacts			
Actions			
Reference No.	**Actions Required**	**Staff Responsible**	**When**
2.	Ecological monitoring during construction will comprise weekly inspections of all areas of the Project, documented in the Environmental Site Inspection Checklist which will be developed in conjunction with the environmental representative (ER) prior to work commencing. The effectiveness of flora and fauna mitigation measures must be included in the inspections, including effectiveness of fauna habitat augmentation (e.g. nest boxes and woody debris), demarcated protection boundaries.	PER/ER	At all times
3.	Monitoring will include checks on the health of the site environment, including any sedimentation, impacts from exposure, die back, introduction or spread of invasive and noxious weeds etc.	PER/ER	Weekly
4.	Three monthly pictorial weed surveys will be undertaken by the PER in accordance with weed and pathogen management plan.	PER	Quarterly
5.	Bunting used to demarcate the clearing boundaries will be checked weekly to ensure any damage is repaired and that clearing is compliant.	PER	Weekly
6.	Weekly monitoring will include inspection of the site and surrounding road areas for dead fauna (native and introduced). In the instance that deceased fauna is discovered this will be reported in the weekly site inspection checklist and the reason behind the death investigated. This monitoring shall also include records of native road kill along the Project alignment.	PER	Weekly
7.	All fauna relocations will be kept on record, including details on species, location found and location released. Also, fauna deaths and injuries including road kill will be kept on record	PER, Ecologist	At all times
8.	Sediment basins will be monitored to assess use for feral pests this will be included in the weekly site inspection checklist.	PER, Ecologist	At least twice per year during Spring/summer

Management of Flora and Fauna Potential Impacts			
Actions			
Reference No.	**Actions Required**	**Staff Responsible**	**When**
Reporting			
No	**Reporting Required**	**Staff Responsible**	**When**
1.	All complaints / incidents regarding fauna / flora control shall be reported to the PER, who will notify the OEH of any incidents regarding fauna/flora.	All staff	Following complaint / incident
2.	The PER will investigate all incidents and report findings to the PM and Client. Environmental Incident reports shall be completed and forwarded to the Project Manager.	PER	All times
3.	Details of flora / fauna management including incidents will be recorded on the Weekly Environment Inspection Checklist and reported to the Client on a monthly basis.	PER	At all times
4.	Where fauna and flora impact mitigation measures are not functioning effectively the issue must reported to the PER immediately. The control must be rectified to guarantee effectiveness in giving protection to flora and fauna within 48 hours. Where the control or mitigation measure is permanent design e.g. fauna structure or vegetated median, the PER and the OEH must be consulted to ensure rectification is consistent.	PER	At all times
5.	The OEH will be informed of any threatened species finds (flora and fauna) and consulted on management measures proposed for the species. DoEE must be also notified if EPBC Act listed threatened species that were not previously identified are found. The notification to these agencies must occur before the end of shift on the day of the discovery so that the correct management strategies can be implemented.	PER	At all times
6.	A review of mitigation measures (including a checklist) should be developed to ensure that all measures proposed have been undertaken	PER	Quarterly

Table 4 : Corrective actions

Corrective Actions	
Problem	**Corrective Actions Required**
Deceased Fauna/ injured fauna	▪ Remove wildlife from site ▪ If injured contact the local WIRES representative or Ecologist and carry out relocation of fauna in accordance with the Fauna Relocation Procedure ▪ Investigate reason for injury/death ▪ If it is construction related follow the incident management procedure and notify within 24 hours ▪ Evaluate failure of any controls ▪ Report injury / death in weekly site inspection report. ▪ OEH to be informed if deceased / injured fauna is threatened species.
Discovery of a Threatened Species that is not identified in the BAR or other Project documentation	▪ Advise the Project Manager and cease all work that may affect the threatened species ▪ Notify and consult with the OEH(threatened species unit) re proposed management for the species ▪ DoEE must be also notified if EPBC Act listed threatened species that were not previously identified are found. ▪ The notification to these agencies must occur before the end of shift on the day of the discovery so that the correct management strategies can be implemented. ▪ Do not recommence work likely to affect the threatened species until the OEH have advised to ▪ PER to record the location, number, species, relocation of the threatened species. ▪ Review the Environmental Authorisation and revise/reassess impacts where applicable.
Clearing of unapproved areas / loss or degradation of native vegetation	▪ Stop Work, and notify PM and PER immediately. ▪ Review site environmental plan and location of control structures. ▪ Investigation into unapproved clearing, reasons, cause, effect ▪ Evaluate alternative or additional controls and conduct staff education. ▪ Report unapproved clearance to OEH
Invasive and/or noxious weed infestation identified	▪ Investigate and identify affected areas and reasons behind infestation ▪ Report infestation to PM and Client within 24 hours. ▪ Detail type of weeds, area, extent of infestation and likely cause in the weekly site inspection and monthly environmental report ▪ Arrange for a suitably qualified weed control officer to implement a control program ▪ The eradication of the weeds must commence, weather permitting within 30 days of the discovery

Exceedance of trigger values detailed in the surface water monitoring plan for work in waterways.	▪ Stop all work within 25m of the waterway and inform PM, PER Fisheries and OEH. ▪ Install additional controls if required ▪ Follow Soil and Water management plan and surface water monitoring plan

Appendix 1 - Clearing and Grubbing Management Plan

New Grafton Correctional Centre

CLEARING AND GRUBBING PLAN

Rev	Date	Version	Prepared by	Reviewed by	Approved by
A	12/05/2017	Draft	K Fels	L Clews	R Vazey
B	25/05/2017	Draft	R Vazey	L Clews	R Vazey
C	09/06/2017	Final	S Saunders	R Vazey	R Vazey
D	15/06/2017	Final	S Saunders	R Vazey	R Vazey

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List of Acronyms and Abbreviations

AMS	Activity Method Statement
BOS	Biodiversity Offset Strategy
DOEE	Department of Environment and Energy
ECP	Environmental Control Plan
EPA	Environmental Protection Authority
EPBC Act	Commonwealth Environment Protection & Biodiversity Conservation Act 1999
ESCP	Erosion and Sediment Control Plan
GIS	Geographic Information System
NGCC	New Grafton Correctional Centre
NSW	New South Wales
OEH	Office of Environment and Heritage
PCT	Plant Community Type
PER	Principal Environmental Representative (John Holland)
REM	Regional Environmental Manager
PM	Project Manager
SEP	Site Environmental Plan
WIRES	Wildlife Information, Rescue and Education Services
WRA	Workplace Risk Assessment

1. Introduction

Jacobs has been engaged by John Holland Group (JHG) to prepare this clearing and grubbing plan which is a sub-plan to the Construction Flora and Fauna Management Plan (CFFMP) that has been prepared for the New Grafton Correctional Centre (NGCC) project. This plan details the requirements and specification for clearing and grubbing of flora to minimise harm to flora and fauna throughout construction. Where harm cannot be avoided mitigation measures will be implemented to off-set any disturbance or destruction. There are a number of threatened species identified within the construction area. The clearing of native vegetation should be minimised with the objective of reducing impacts to threatened species to the greatest extent practicable.

2. Objectives and Goals

The key Objectives and goals for the Clearing and Grubbing Plan are the same as the Flora and Fauna Management Plan, they include:

- No indirect impacts to surrounding vegetation.
- Do not exceed the clearing limits of 13.7 ha for the project.
- Minimise all impacts to the aquatic ecosystems.
- Minimise injury/mortality to all fauna.
- Minimise all erosion and sedimentation during clearing operations.
- Minimise clearing for ancillary facilities. e.g. stockpile areas, site compounds.
- Retention of fauna connectivity throughout the provision of perimeter landscaping.
- No impact on fauna habitats outside of approved work zone.

3. Clearing Requirements

The project is not to clear more than 13.7 hectares of native vegetation across three plant community types. The breakdown of native vegetation to be cleared:

- Coastal freshwater meadows and forblands of lagoons and wetlands (PCT 782) – 0.8 ha
- Spotted Gum - Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT 1209) – 8.3 ha
- Spotted Gum - Grey Ironbark – Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT 1211) – 4.6 ha.

Figure 1 illustrated proposed clearance envelopes, as well as proposed rehabilitation and retention zones.

The proposed locations of ancillary facilities will be within the proposed clearance footprint and adjacent areas of grassland, devoid of native tree canopy thereby eliminating potential additional clearance requirements. The criteria for this condition is outlined later in this section. Ancillary areas would include stockpile areas, site compounds, laydowns and access roads.

Refer to the PDF figure that will be inserted into the final report following JHG review of the draft document

Figure 1 : NGCC Clearing Footprint

4. Specialised Roles Associated With Clearing Operations

Ecologist - A suitably qualified ecologist will supervise the clearing and grubbing process. The ecologist will carry out initial surveys of the land to be cleared and will prepare a Site Environmental Plan (SEP) showing sensitive areas, weeds, aquatic habitat, habitat trees and other features / constraints present on site. As detailed in the Flora and Fauna Management Plan there are several threatened species that occur or have the potential to occur in the project area.

Prior to clearing the ecologist will map all the environmental constraints surveyed and will flag these items in the field. All these environmental constraints are to be surveyed as well as marked in the field. No – Go zones are to be identified and demarcated in the field. Any fauna that area able to be relocated prior to clearing are to be relocated in accordance with the procedure for fauna relocation in the Flora and Fauna Management Plan.

During clearing operations that involve the clearing of habitat trees the ecologist is to be present to supervise the operations and ensure that any fauna are rescued and relocated in accordance with the clearing and grubbing procedure below and the fauna relocation procedure.

Survey team – The surveyors are to set out the clearing boundaries for both permanent and temporary (ancillary) works. They are to flag the boundary clearly with fluorescent tape so that the work teams can easily identify to erect bunting along the boundary. They are also to assist marking out any of the environmental constraints and no-go zones identified by the ecologist.

Clearing contractors – The clearing contractor will need to be inducted into this procedure and the Flora and Fauna Management Plan as well as all relevant Erosion and Sediment Control Plans (ESCPs) for clearing activities. A detailed activity method statement (AMS) will be developed with the clearing contractor, the PER, engineers, Foreman and Project Manager. This will cover all of the environmental risks and controls. The inputs will include the mapped ecological constraints and clearing boundaries, the Flora and Fauna Management Plan, Weed and pathogen Management Plan and this Plan.

5. Hold Points For Clearing And Grubbing Activities

Hold point	Prior to the commencement of vegetation clearing works a copy of the Clearing and Grubbing Plan that clearly identifies the limits of clearing and measures adopted to prevent damage to flora and fauna outside the identified limits. The ecologist report is to be included showing weed infestation areas. Required seven days prior to clearing.
Hold point	Clearing of any area of work will first require a clearing and grubbing plan to be approved. At least seven days before the start of any clearing.
Hold point	Clearing of any areas outside of the formation will require the submission of a clearing and grubbing plan with details on weed infestation areas and unsound trees. This must be received at least 7 days before any clearing.

6. Procedure For Clearing And Grubbing

6.1 Prior to commencement of clearing works:

1. All personnel taking part in construction activities shall be instructed through the site specific induction process with regards to the importance of clearing limits. The induction will cover details on:

    - Threatened flora species that may occur within the project area, including commonwealth and state listed threatened species.
    - Threatened fauna species within the project area, including commonwealth and state listed threatened species.
    - Clearing procedure and boundary marking.
    - Habitat trees and the two stage clearing process.
    - Procedure to follow if native animals are encountered on site including injured animals.
    - Reporting of environmental incidents involving native animals.
    - The weed species that occur, and may occur, within the project area.
    - Other pests that occur, and may occur, within the project area and the management of these species. Includes animals, plants and pathogens.

2. A progressive ESCP is to be developed to cover each area of clearing. The Progressive ESCP is to be developed in consultation with the Project Soil Conservation consultant in accordance with the framework outlined in the Soil and Water Management Plan.

3. A detailed activity method statement (AMS) will be developed with the clearing contractor, the PER, engineers, Foreman and Project Manager. This will cover all of the environmental risks and controls. The inputs will include the mapped ecological constraints and clearing boundaries, the Flora and Fauna Management Plan, Weed and pathogen Management Plan and this Plan.

4. All relevant personnel would be subject to a prestart meeting that will include training in the identification of known/potentially occurring threatened species; and the locations of significant habitat features within and adjacent to the construction areas.

5. The NO GO zones and clearing boundaries will be clearly marked on the SEP. On site the NO GO zones will be marked with Blue and White bunting. The SEP displaying these details must be provided to the relevant clearing personnel.

6. The clearing boundaries will be surveyed and marked with orange bunting in the field and this bunting is required to be in place for the duration of construction.

7. All infestations of noxious weeds identified within the clearing area during the pre-clearing survey are to be managed prior to clearing and grubbing. There are varying methods of weed management detailed in the Weed and Pathogen Management Plan and the control method used for each species will depend on the weed species, the size of the infestation and its location.

8. A suitably qualified Ecologist will undertake pre clearing surveys and associated clearing tasks as detailed in Section 6.2 below. Habitat trees will be marked in the field with high visibility paint.

9. The clearing and grubbing permit is be used for all forms of clearing associated with the project. The checklist is to be completed by the work team and signed off by the PER and RMS.

6.2 Ecologists assigned work tasks for the clearing and grubbing procedure

The assigned work tasks and methodology for Ecologist during clearing and grubbing is summarised in the table below.

Task	Work Components	Comments Regarding Methodology
Pre-clearing tasks for Ecologist During Clearing for the ecologist	Preliminary ground-truthing surveys, field marking and mapping of environmentally sensitive areas, fauna habitat structures and weeds. Pre-clearing survey report. Assist in determining locations of "no-go" fencing.	▪ Exhaustive preliminary ground-truthing surveys have been completed, mapping and describing all environmentally sensitive areas, significant species and or habitat, habitat trees, and weeds during the initial stage of the project, to maximise efficiency in the field and allow for comprehensive planning of clearing. ▪ Fauna Habitat Structures include: hollow bearing trees, foraging trees, nesting trees, roosting trees, high use fauna trees, ground habitat features including hollow logs, boulders, drainage depressions for frog species. ▪ Detailed GIS maps and layers would be developed and provided to the Contractor to assist with the development of SEPs for the clearing activities. ▪ Verification of no-go fencing within relevant clearing zone. ▪ Liaison regarding the location of environmentally sensitive and "no-go" areas. ▪ Assist with preparation of "procedure of entry" if access to the "no-go" zone is required.

Task	Work Components	Comments Regarding Methodology
	Walk clearing area with Clearing Contractor on first day of clearing a new area. Supervision of stage clearing works (clearing of habitat trees, feed trees, nesting trees)	▪ Technical advice on flora/fauna related matters and the clearing process. Indicate to the clearing contractor all the sensitive areas as per the SEP and explain the demarcation in the field as per the SEP. ▪ Assist with sign off of clearing permit (section 7 of this plan) ▪ Clearing supervision during clearing and fauna rescue including liaison with the local Wildlife Care and Rescue group (WIRES Northern Rivers). ▪ Searches during clearing to include the inspection of felled trees for nests and all fauna, inspection of hollow logs and burrow, and inspection of hollow bearing trees after clearing.

6.3 Sequence of Clearing

Once all the items in Section 6.1 have been completed during the pre-clearing process, the clearing and grubbing activities will follow the sequence below:

1. Boundary is walked on the day of clearing with PER, RMS, Ecologist, Plant operator and all other relevant personnel.

2. Boundary clearing will occur first to establish a clear delineation for the boundary. A spotter will be used to direct machinery to ensure the boundary is cleared in the correct location.

3. If necessary to clear certain areas for establishment of erosion and sediment controls this should be done early around the same time as boundary clearing. The Erosion and sediment controls must be installed in accordance with the progressive ESCP for the area.

4. The clearing will first involve removal of shrubs and any small trees (non habitat trees <30cm diameter at breast height) whilst avoiding removal all marked habitat trees, no go zones (delineated) and drainage lines. All trees will be felled in a manner that ensures the trees will fall within the clearing boundary.

5. Large trees/logs encountered within the works will be retained and scattered throughout the remaining forest habitats adjacent to the site rather than mulched. This should be conducted using the most sensitive manner possible (i.e. not piled up in a heap at the edge of the property or pushed into the forest with a bulldozer).

6. Seeds will be gathered from the clearing area prior to clearance, where feasible, to grow seedlings for use in revegetation works.

7. If fauna habitat structures were present they cannot be cleared until 24hrs after clearing of the shrub layer and small trees and the ecologist is to be present during this second stage clearing for fauna relocation. Fauna habitat structures include but are not limited to; hollow bearing trees, foraging trees, nesting trees, roosting

trees, high use fauna trees, ground habitat features including hollow logs, boulders, drainage depressions for frog species.

8. Grubbing of any remaining tree stumps can occur and the holes left behind are to be backfilled and compacted to prevent erosion and ponding.

9. Once all the trees and shrubs are cleared, ground cover and topsoil stripping can occur.

10. The topsoil stripping is to occur as a staged process and must observe any areas identified on the maps for weed infestation. Weed control is to occur prior to stripping these areas unless otherwise advised by ER.

11. The topsoil is to be carted to the designated stockpile areas making sure that topsoil from areas where weed infestation occurred is stored separately and disposed of according to the Weed and Pathogen Management Plan procedure.

6.4 For removal of vegetation without fauna habitat structures

- NOTE : fauna habitat structures include but are not limited to; hollow bearing trees, foraging trees, nesting trees, roosting trees, high use fauna trees, ground habitat features including hollow logs, boulders, drainage depressions for frog species.

1. The Contractor would designate a supervisor and the plant operator for undertaking the pre-clearing inspections with the PER in accordance with the clearing and grubbing permit prior to any vegetation clearing events.

2. A suitably qualified ecologist would undertake the initial pre-clearing survey, mark out the environmental constraints in the field and provide the contractor and PER with the information for the SEP.

3. Erosion and sediment controls must be installed in accordance with the progressive ESCP for the area.

4. Completing the Pre- clearing Checklist and getting it approved by the PER.

5. Stopping work and notifying the PER if any potential heritage discoveries occur during the clearing operations. The procedure that must be followed is the unexpected finds procedure in the heritage management plan.

6. Clearly marking clearing buffers when fauna or potential heritage items are detected. Buffers would be a minimum of 50 m for threatened fauna / flora species discoveries and 100 m for potential heritage finds.

7. Stop work and notify the PER any fauna detected in the clearing area.

8. On notification of the discovery of any fauna, previously undetected threatened fauna / flora species the PER is to follow the Fauna Relocation Procedure in the Flora and Fauna Management Plan.

9. Buffers for fauna must be installed and maintained until the detected fauna voluntarily moves on, or until a suitably qualified and licensed person (e.g. Ecologist or WIRES member) captures and relocates the fauna in accordance with the Fauna Relocation Procedure

10. If threatened species are discovered the PER must notify the OEH (threatened species unit) and consult with OEH on proposed Management strategies for the species. DOEE must be also notified if EPBC Act listed threatened species that were not previously identified are found.

11. Record all fauna losses, relocations or injuries during clearing.

6.5 For removal of vegetation with fauna habitat structures

-
- NOTE : fauna habitat features include but are not limited to; hollow bearing trees, foraging trees, nesting trees, roosting trees, high use fauna trees, ground habitat features including hollow logs, boulders, drainage depressions for frog species.

1. Fauna habitat structures are to be identified and marked in the field by the Ecologist, there are also to appear on the SEP. Hollow bearing trees will be surveyed and will be provided on a map to be attached to this plan (Appendix 1). These must re-identified and clearly marked by the ecologist in the pre clearing survey as with any previously unidentified habitat trees (including hollow bearing).

2. Fauna Habitat Structures may be removed no less than 24 hours after the removal of adjacent non-habitat trees and structures.

3. Fauna Habitat Structures may only be removed when a suitably qualified ecologist is present. They are to be cleared using the following procedures where possible and in accordance with all Occupational Health and Safety requirements:

    - The subject habitat tree should be gently “bumped ” three times over a minimum 5 minute period (minimum 1 minute pause between bumps). The aim of this procedure is to encourage nesting/denning/roosting hollow dependant fauna to disperse.

    - At least 1 minute after the final bump, the subject tree may be felled. Where possible the tree should be felled using an excavator with a “claw” attachment to gently lower the tree.

    - Once fallen the suitably qualified ecologist would inspect the hollows and capture and relocate any detected fauna in accordance with the Fauna Relocation Procedure. All fauna relocations as well as any detected fauna mortality or injury are to be recorded.

    - The tree would be left on the ground at the felled site for at least 24 hours prior to relocating.

4. If threatened species are discovered the PER must notify the OEH (threatened species unit) and consult with OEH on proposed Management strategies for the species. DoEE must be also notified if EPBC Act listed threatened species that were not previously identified are found.

5. Hollow bearing trees with active European bee hives should be identified during the pre-clearing survey. These trees should be felled with other hollow bearing trees accordance with the two stage clearing process outlined in the clearing and grubbing management plan. Once on the ground bee hives should be destroyed by spraying with an appropriate insecticide, and hollows re-instated as fallen timber in rehabilitation zones.

6. The Pre-Clearing Checklist is part of the Clearing and Grubbing Permit and should be completed and approved by the PER prior to all clearing.

7. Large and or hollow bearing trees and logs removed will be recycled as a habitat logs for restoration works. The project ecologist and PER will determine the valuable hollow bearing trees and logs to be retained for ground fauna habitat. They are to be carefully relocated via earthmoving machinery to adjacent stockpile areas and later established in rehabilitation or retention areas.

7. Clearing and Grubbing Permit

Clearing Permit Number:	
Permission is requested to disturb the following area: (*Site, Description, Position)*	
Drawings Indicating Area to be disturbed/cleared:	
Site Environmental Plan (SEP) number:	
Does this clearing area fall outside of the design footprint? ***If yes sign off is required for this permit***	
Expiry Date:	
Purpose of clearing: *(Clear description)*	
Dimension of area to be cleared for ancillary areas: **(m2)**	**Chainage and surveyed location:**
Date clearing is to commence:	**How long Is it expected that the area will remain un-rehabilitated?**
Method and machinery to be used : **NO WORK outside this scope may be performed under this Approval**	

A tick (✓) should be placed in the **Yes/No** box. If an item is not applicable, write **N/A**.

If an action is identified and fixed immediately, details are to be recorded in the **Comments and Actions** column.

If an item cannot be actioned immediately, then it will be recorded in the **Action Plan**, to be signed off and dated once actions are complete.

All actions should be addressed prior to any pre-clearing works commencing, unless otherwise approved by the Environmental Representative.

The Site Environmental Plan and Activity Method Statement (AMS) should be referred to confirm environmental constraints and controls required in the area.

No	Control Measure	Yes	No	Comments & Actions	Close Out Date
1st Stage Clearing					
1	Have the limits of clearing been delineated by orange bunting?				
3	If the clearing is outside of the approved clearance zone, has approval been obtained to release the Hold Point for Clearing outside of approved clearance areas?				
4	Has a pre-clearance survey been completed by an experienced ecologist in the area to be cleared?				
5	Has the ecologist identified; weeds threatened flora species, and any trees outside of clearing limits that are likely to fall on roadway or private property?				

6	Has the ecologist provided a map of the environmentally sensitive areas and does this information appear in the SEP?				
7	Have all habitat trees been identified and flagged off with a buffer of at least 5 m				
9	For boundary clearing has a spotter been appointed?				
11	Has the SEP and ESCP for area been developed and with the operator?				
12	Have habitat trees to be avoided been appropriately marked with blue and white bunting?				
14	Have machinery operators read and understood the clearing and grubbing procedure?				
15	Are the drainage lines from culverts to be left with vegetation and only cleared immediately prior to construction in that area				
16	Have protocols to prevent introduction or spread of weeds been prepared and followed?				
17	Has weed control been completed?				
18	Are there effective sediment and erosion control measures in place in accordance with the ESCP (e.g. clean water diversions, sediment fence, sediment basins, hay bales etc.).				

If all the above are Yes then 1st stage clearing can proceed with sign off from the PER, Plant Operator and supervisor below (OEH sign off required for clearing outside of formation).

If any are any No's then put a corrective action in the action plan to do prior to clearing.

Plant Operator to sign in the presence with the PER.

I understand and accept all conditions stated in this permit. I have completed the following pre-clearing checklist on the 1st day of and before commencing the clearing task:

Tick ✓

□ Over clearing has been included on the TRA and discussed with plant operator(s)
□ SEP and ESCP with the plant operator and supervisor
□ All required flagging of the clearing boundaries and No – Go Zones are in place
□ Physical walk around of the clearing boundary has been conducted with each plant operator (and spotter if required)
□ All hold points and other special conditions have been identified and discussed with the plant operator(s)
□ Current drawings of the approved SEP showing ecologically sensitive areas has been given to the plant operator

I have walked the clearing boundary with my Supervisor on the 1st day of and before commencing the clearing task. I clearly understand the limits of the approved clearing and any other special conditions before commencing work

Plant Operator Signature: .....Name..... Date: .....

Contractor Supervisor Signature: ..... Name..... Date: .....

PER Signature:…… Name..... Date: .....

Sign off for clearing habitat trees

Nominated representative signiture:……Name.....Date.....

2nd Stage of Clearing					
No	**Control Measure**	**Yes**	**No**	**Comments & Actions**	**Close Out Date**
1	Have the habitat trees been left for a minimum of 24 hrs prior to the first stage of clearing				
2	Is the Ecologist present for the felling of the habitat trees?				
3	Has trees marked as containing hollows or nests been checked for the presence of any fauna by the wildlife handler?				
4	Have trees containing fauna been carefully nudged to encourage fauna to vacate the tree before removal (pushing over) of the tree?				
5	Has any fauna identified been appropriately relocated with assistance from the wildlife handler or WIRES (if required) in accordance with the Fauna Relocation Procedure?				

If all the above are answered Yes then 2nd stage clearing can proceed with sign off from the PER and Plant Operator.

If any are any No's then put a corrective action in the action plan to do prior to clearing

Plant Operator to sign in the presence with the PER.

I understand and accept all conditions stated in this permit. I have completed the following pre-clearing checklist on the 1st day of and before commencing the clearing task:

Tick ✓

- □ Over clearing has been included on the TRA and discussed with plant operator(s)
- □ SEP and ESCP with the plant operator and supervisor
- □ All required flagging of the clearing boundaries and No – Go Zones are in place
- □ Physical walk around of the clearing boundary has been conducted with each plant operator (and spotter if required)
- □ All RMS hold points and other special conditions have been identified and discussed with the plant operator(s)
- □ Current drawings of the approved SEP showing ecologically sensitive areas has been given to the plant operator

I have walked the clearing boundary with my Supervisor on the 1st day of and before commencing the clearing task. I clearly understand the limits of the approved clearing and any other special conditions before commencing work

Plant Operator Signature: .....Name..... Date: .....
Contractor Supervisor Signature: ..... Name..... Date: .....
PER Signature:…… Name..... Date: .....

Post clearing					
No	**Control Measure**	**Yes**	**No**	**Comments & Actions**	**Close Out Date**
1	Have habitat trees been stockpiled in an approved area and have seeds been added to the seed bank as necessary for reuse in rehabilitation?				
2	Have habitat elements i.e. logs or branches been stockpiled for later use in rehabilitation?				
3	Have all trees and stumps on or within the limits of clearing been removed by grubbing and holes backfilled and compacted?				

Action Plan

Date: ……..

Inspected by: ……..

Item No.	Required Corrective Action	Person Responsible	Completed – Date / Initials

Refer to the PDF figure that will be inserted into the final report following JHG review of the draft document

Appendix 1 – Plan showing previously surveyed hollow bearing trees

Appendix 2 - Weed and Pathogen Management Plan

No changes from Stage 1 previous issue

New Grafton Correctional Centre

WEED AND PATHOGEN MANAGEMENT PLAN

Rev	Version	Date	Prepared by	Reviewed by	Approved by
A	Draft	12/05/2017	K Fels	L Clews, P Rossington	Rachel Vazey
B	Draft	26/05/2017	R Vazey	L Clews, P Rossington	Rachel Vazey
C	Final	09/06/2017	Sarah Saunders	Rachel Vazey	Rachel Vazey

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List of Acronyms and Abbreviations

AMS	Activity Method Statement
BAR	Biodiversity Assessment Report
CEMP	Construction Environment Management Plan
DOEE	Department of Environment and Energy
DPI	Department of Primary Industries
ECP	Environmental Control Plan
EPA	Environmental Protection Authority
ER	Independent Environmental Representative
KTP	Key Threatening Process
LGA	Local Government Area
OEH	Office of Environment and Heritage
PER	Principal Environmental Representative (John Holland)
PM	Project manager
REM	Regional Environmental Manager
SEP	Site Environmental Plan
TSC Act	NSW Threatened Species Conservation Act 1995
WRA	Workplace Risk Assessment

1. Introduction

This Weed and Pathogen Management Plan details the procedure to identify, manage and control the spread of weeds and pathogens during the construction of the New Grafton Correctional Centre project.

Objectives and Goals

The key objectives and goals for the management of weeds and pathogens across the site are that:

- New weeds and pathogens are not introduced to the site
- Class 1, Class 2 and Class 3 three noxious weeds that already exist within the project area are eradicated.
- Reduction in the abundance and potential to spread of Class 4 and Class 5 noxious weeds.
- No increase in the level, abundance or presence of weeds and pathogens onsite or adjacent to the site.
- Ensure that noxious weeds are not spread across the project or into adjacent land.
- Ensure that sensitive frog habitat areas are protected from the potential introduction of chytrid fungus.
- Ensure that the risk of myrtle rust and Phytophthora introduction and spread are reduced throughout the construction.

2. Weeds on site

A survey of the site identified 39 exotic flora species (Refer to Appendix C). Four (4) of the 39 species are considered noxious weeds by the DPI for the Clarence Valley LGA and two are also Weeds of National Significance (WoNS), shown in **Table 1** with their class and control requirement. Lantana is listed as a Key Threatening Process (KTP) under the TSC Act for its ability to invade, establish and spread easily, particularly on disturbed sites associated with edge adjoining native habitats. Noxious weeds were not found to be present as thickets or patches, but rather are distributed throughout the site as individuals or small groupings.

Table 1 : Noxious weeds and control requirements

Species	Class	Control Requirement	Weeds of National Significance	Abundance
Annual ragweed *Ambrosia artemisiifolia*	5	Restricted Plant. The requirements in the NW Act for a notifiable weed must be complied with. There are no requirements to control	No	Low

Species	Class	Control Requirement	Weeds of National Significance	Abundance
		existing plants of Class 5 weeds. However, the weeds are "notifiable" and a range of restrictions on their sale and movement exists.		
Groundsel bush *Baccharis halimifolia*	3	Regionally Controlled Weed. The plant must be fully and continuously suppressed and destroyed.	No	Low
Lantana *Lantana camara*	4	Locally Controlled Weed. The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread.	Yes	Low abundance in the west of the site.
Fireweed *Senecio madagascariensis*	4	Locally Controlled Weed. The plant must not be sold, propagated or knowingly distributed.	Yes	Moderate abundance and widespread.

Noxious weeds will be controlled prior to clearing and grubbing and throughout the construction phase of the project. Other introduced plant species occurring within native vegetation communities will be treated/removed where this can be undertaken with minimal off-target impact on native species.

3. Pathogens

There are no previous investigations or surveys to suggest that the pathogens listed below occur on site. The Biodiversity Assessment Report (BAR) (Jacobs 2016) notes that there is a moderate likelihood for the potential risk of pathogens on the Project Site during construction given the requirements to excavate and transport soil. There is a particular risk for site access routes near waterways or floodplain habitats.

John Holland recognises this risk and as a precaution, will implement pathogen management throughout all stages of construction. The management practices include hygiene procedures for construction plant and surveillance of the site for indicators of the presence of these pathogens. The construction environmental management plan will address the following potential disease pathogens:

Phytophthora – Die Back

Phytophthora cinnamomi is a soil borne pathogen that spreads in plant roots in warm, moist conditions. The pathogen appears to be widespread in coastal forests but may also occur at higher elevations. *Phytophthora cinnamomi* infects a large range of species. Susceptible species display a range of symptoms; some are killed, some are damaged but endure, and some show no apparent symptoms. In some circumstances, *P. cinnamomi* may contribute to plant death where there are other stresses present (e.g. waterlogging, drought, and wildfire).

The pathogen lives in soil and plant material therefore it is possible to be spread throughout the project area by construction machinery, boots and drainage waters.

Chytrid Fungus

The Chytrid fungus is a fungus that attacks the parts of a frog's skin that have keratin in them. Since frogs use their skin in respiration, this makes it difficult for the frog to breathe. The fungus also damages the nervous system, affecting the frog's behaviour. A sick frog may:

- Have discoloured skin.
- Be sloughing, or peeling, on the outside layers of its skin - this can vary from obvious peeling of skin (particularly on the feet), to a roughness of the frog's skin that you can barely see.
- Sit out in the open, not protecting itself by hiding.
- Be sluggish, and have no appetite.
- Have its legs spread slightly away from itself, rather than keeping them tucked close to its body. In more extreme cases, the frog's body will be rigid, and its back legs will trail behind it.

Chytrid fungus is probably transferred by direct contact between frogs and tadpoles or through exposure to infected water. The disease may not kill frogs immediately, and they can swim or hop to other areas before they die, spreading fungal spores to new ponds and streams. This means it is very important not to move frogs from one area to another. Wet or muddy boots and tyres, may also contribute to the spread of the disease.

Chytrid fungus may be spread on footwear and vehicle tyres and could be spread by construction activities. The likelihood that Chytrid fungus would be spread during construction is reduced by the ephemeral nature of waterbodies. However, the risk of spread would increase during and after storm events if staff or vehicles move between drainage lines and wetlands over a short period of time.

Myrtle Rust

Myrtle Rust (*Puccinia psidii* s.l.) is a newly described fungus that is closely related to the Eucalyptus/Guava rusts. These rusts are serious pathogens which affect plants

belonging to the family Myrtaceae (e.g. *Callistemon* spp., *Melaleuca* spp. and eucalypts)

Myrtle Rust is distinctive in that it produces masses of powdery bright yellow or orange-yellow spores on infected plant parts. It infects leaves of susceptible plants producing spore-filled lesions on young actively growing leaves, shoots, flower buds and fruits. Leaves may become buckled or twisted and may die as a result of infection. Sometimes these infected spots are surrounded by a purple ring. Older lesions may contain dark brown spores. Infection on highly susceptible plants may result in plant death.

4. Management and Mitigation Measures

Pesticide and Herbicide Application

Use of pesticides must be in accordance with the *Pesticides Act 1999,* other relevant legislation, label directions and any relevant industry codes of practice. A record sheet (Appendix A) must be completed for all pesticide applications. The following measures should be implemented whenever pesticides are intended to be used adjacent to sensitive areas such as patches of retained vegetation and water bodies:

- Use of mechanical means of pest control (such as slashing or mowing) where feasible.
- Use of hand-held application of pesticides where mechanical means of pesticides are not feasible.

Avoid applying pesticides:

- On hot days and when plants are water stressed.
- After seed has set for annual weeds.
- Within 24 hours of heavy rain or when rain is predicted within the following six hours.
- When winds will cause drift of pesticides into non target areas.

The following precautions will be taken whilst on-site to avoid spread of Chytrid:

- Only touch frogs when absolutely necessary. Remember to use disposable gloves, sample bags and sterile equipment.
- Clean and dry all equipment and wet or muddy footwear before and between visiting frog sites. This may include cleaning the tyres of your vehicle before visiting known high-risk sites where threatened frog species may live.
- Never move a frog from one area to another.
- Carry cleaning utensils and a disinfectant for use between sites.

Management of Weed and Pathogens			
Actions			
No	**Actions Required**	**Staff Responsible**	**When**
1.	A weed survey identifying the noxious and/or invasive weeds on-site will be undertaken by the PER. Class 1, Class 2 and Class 3 noxious weeds that occur within proposed work areas are to be eradicated prior to clearing operations.	PER	Prior to construction
2.	Site Environmental Plans (SEPs) detailing all environmental controls to be installed across the site will be progressively developed as work commences on-site. Construction works will not commence until the SEPs have been approved for each respective portion of the site by the PER. These will include measures to limit soil disturbance, weed management areas and controls	PER	Prior to construction and progressive
3.	Identification of noxious weeds (Annual Ragweed, Fireweed, Groundsel Bush, Lantana) and proposed management measures will be included in the site induction given to all onsite staff.	PER	At all times
4.	Annual Ragweed, Fireweed, Groundsel Bush, Lantana where identified will be treated/ removed prior to construction.	PER/SV	Prior to construction
5.	Risk of root rot (*P. Cinnamomi)* and Myrtle Rust spread will be managed and minimised by having construction equipment washed down before entering the project area. Should root rot be detected in or nearby the project area, it is proposed that a root-rot Fungus Management Plan be prepared and implemented.	PER	At all times
6.	Pre-clearing and Environmental Inspections will include a visual inspection for symptoms of Root Rot (*P. cinnamomi*) and Myrtle Rust. Symptoms as described in Section 3 of this management plan.	PER	At all times
7.	A brief summary of Chytrid fungus and Myrtle Rust and how it is spread and the management practices required to prevent its spread will be included in the site induction given to all onsite staff.	PER	At all times
8.	All noxious weeds shall be managed in accordance with the Noxious Weeds Act, including preventing the spread of noxious weeds through movement of contaminated plant and equipment into uninfected areas.	PER	At all times
9.	Herbicide use must comply with the *Pesticides Act 1999*	PER	At all times

Management of Weed and Pathogens			
10.	Where noxious weed infestation is present: • For those species listed by the relevant local government authority as noxious categories Class 1, Class 2, Class 3 or Class 4 under the *Noxious Weeds Act 1993*, take action as required by the Act and the local government authority.	PER	At all times
11.	A biodegradable red dye is to be included with the herbicide spray. The dye content used must be sufficient to ensure that the treated areas can be identified.	PER	At all times
12.	Areas sprayed with herbicide must remain undisturbed for the period recommended by the herbicide manufacturer.	PER/PM	At all times
13.	Do not spray herbicide in windy conditions (>10km/h) or within such distance of a watercourse which would permit the herbicide to enter the water (noting the closest watercourse is located approximately 2km north-east of the site).	PER	At all times
14.	Alternative measures such as physical removal will be the preferred option for areas of frog habitat such as in close proximity to minor drainage lines and farm dams. Areas of frog habitat will be clearly identified and communicated to personnel undertaking weed control measures.	PER	At all times
15.	Herbicide must be currently registered for the treatment of weeds by the Australian Pesticides and Veterinary Medicines authority and must be frog friendly herbicide given the detection of frog species on site (Jacobs, 2017)..	PER	At all times
16.	Management controls and staff awareness processes will be implemented to pro-actively control the spread of weeds and pests (e.g.; root rot and chytrid fungus).	PER	At all times
17.	All ground engaging plant is to be clean before entering the site; this is to be covered in the John Holland plant hazard assessment form and in accordance with the Washdown Procedure. The John Holland plant hazard assessment form will be signed off by a John Holland representative before the plant is used on site.	PM/PER	At all times
18.	Complete a pesticide application sheet within 24 hours of applying pesticide and supply a copy to the PM. Submission of a pesticide application sheet is exempt when complying with the following; • the pesticide is only applied by hand or using hand-held equipment; and • if applied outdoor on any single occasion in quantities of no more than 5 litre/5 kilograms of concentrated product or 20 litres/20 kilograms of ready-to-use product, or if applied indoors in quantities no more than 1 litre/kilogram of	PER	During Construction

Management of Weed and Pathogens			
	concentrate or 5 litres/kilograms of ready-to-use product.		
19.	All persons using pesticides will be appropriately trained in their use.	PER	At all times
20.	Noxious-weed (Class 1 to 3) contaminated topsoil will not be used in the works.	PM/SV	At all times
21.	Noxious-weed (Class 1 to 3) contaminated topsoil will be stockpiled and disposed of offsite or buried onsite to prevent weed seed germination.	SV	At all times
22.	Weed contaminated topsoil can be buried away from any pavement, structure, watercourse or drainage path and covered with fill (free of noxious weeds) of a minimum 500 mm compacted thickness. The fill must be: • From the specified earthworks or when authorised by the Principle from borrow. • Suitable for the re-establishment of native groundcover vegetation is located outside of areas proposed for infrastructure.	SV/PM/PER	At all times
23.	Cleared native vegetation, excluding hollow trees and large woody debris, will be mulched and re-used for landscaping and native vegetation restoration where practical	SV/PER	During Construction
Aquatic Habitat			
24.	All foot wear must be thoroughly cleaned and dried before entering and when leaving an aquatic zone		
25.	Frogs should not be transported from one water body to another at any time	PER	At all times
Monitoring			
No	**Monitoring Required**	**Staff Responsible**	**When**
1.	Ground engaging plant will be inspected upon entry to the site to check for the presence mud / dirt from other areas. There is a sign off on the Plant hazard Assessment (Appendix D) to ensure weed and seed hygiene of ground engaging plant before entering site. Ground engaging plants include; drill rigs, loaders, excavators, tracked vehicles, piling rigs. Any of these plants that arrive on site with signs of soil will not be allowed entry to site before first cleaning the plant at an approved wash-down facility.	PER/	When first entering site
2.	All access to water bodies will be monitored by the PER/ environmental team.	PER	At all times
3.	Weekly monitoring of weed levels, frog health (visual inspection for dead frogs in water bodies) and native vegetation health (indicators of myrtle rust, chytrid fungus and	PER	Weekly

Management of Weed and Pathogens			
	phytophthora) will occur and will be included in the site environmental inspection checklist.		
4.	Three monthly photographic and qualitative weed monitoring surveys will be undertaken by the PER at sites where weeds have been identified by the ecologist during pre-clearing surveys, or where weeds have been identified as a result of the action and provided in the next monthly environmental report.	PER	Three Monthly
5.	Long term monitoring of weed management post completion will occur in accordance with the Operational phase Flora and Fauna Management Plan.	RMS	Post completion
Reporting			
No	**Reporting Required**	**Staff Responsible**	**When**
6.	All complaints / incidents regarding fauna/flora control shall be reported to the PER.	All staff	Following complaint / incident
7.	The three monthly weed monitoring survey results will be lodged in the John Holland Monthly Environmental Report which is sent to the PM and the John Holland REM.	PER	All times
8.	The PER will investigate all incidents and report findings to the PM the incidents are to be classified in accordance with the JH Environmental Classification Matrix.	PER	All times
9.	Environmental Incident reports shall be completed and forwarded to the Project Manager and the John Holland REM within 24hrs as per the procedure detailed in the CEMP.	PER	All times
10.	Flora and fauna monitoring will be reported in the weekly environmental checklist and evidence of these inspections and the associated corrective actions will be lodged in the John Holland Monthly Environmental Report.	PER	Weekly

Corrective Actions	
Problem	**Corrective Action**
Outbreak of flora or fauna disease	▪ Notify PM immediately and the Client, the ER, OEH and Fisheries within 24hrs. Notify DoEE if it poses potential risk to any Commonwealth threatened species ▪ Investigate reasons behind the outbreak. ▪ Implement a containment and control management plan, developed in conjunction with relevant government stakeholders. ▪ Complete the incident notification form with corrective and preventative actions and submit to all those included in the notification within 7 days.
New, highly invasive and/or noxious weed infestation identified	▪ Notify PM within 24hrs. ▪ Investigate reasons behind infestation. ▪ Detail type of weeds, area, extent of infestation and likely cause in the weekly site inspection and monthly environmental report. ▪ Arrange for a suitably qualified weed control officer to implement a control program ▪ The eradication of the weeds must commence, weather permitting within 30 days of the discovery

Appendix A – Pesticide Application Records Sheet

Information to be recorded	Brief Description	Enter Data Here
Date and Time	Start and finish date and time:	
Who applied the pesticide	Full operator name and contact details:	
Who owns/occupies the land	Full owner name and contact details:	
Boundaries of treated area and order of treatment	List areas treated and order treated. Include a map:	
Problem Treated	Identify the pest or problem treated:	
Product Used	Record full name or product code:	
Equipment Used	Describe:	
Quantity applied and dilution	Total amount used and mix ratio:	
Area covered by application	In square meters or hectares:	
Wind speed and direction	Estimate and write down any changes during application:	
Other weather details	Temp, humidity, rainfall:	

Appendix B – Wash down / Disinfectant Procedure

This document is intended to be read in conjunction with the Weed and Pathogen Management Plan. The purpose of this procedure is to detail the method to be used in order to mitigate the risk of Chytrid Fungus and pathogens, specifically:

- Chytrid fungus.
- Phytophthora.
- Myrtle Rust.
- Various noxious weeds.

Methodology

ON ENTERING SITE	
Step 1	Ensure that all mobile plant is clean and dry upon arrival to site. If they are not, use an approved wash down facility to clean wheels, attachments and tracks of vehicles thoroughly to ensure all mud, dirt, weeds and seeds have been removed. Particular attention is to be paid to the undercarriage where seeds, mud and dirt can become trapped.
If working in a water way, proceed to Step 2.	
WORKING IN A WATERWAY	
Step 2	Notify PER of intent to work in waterway. No works to occur in Waterway without approval.
Step 3	Repeat Step 1.
Step 4	Stand in disinfection solution (Benzalkonium Chloride) to disinfect soles of boots and spray remainder of boots with disinfection solution.
Step 5	Spray the wheels/ tracks of vehicles/plant with disinfection solution
Step 6	Complete the disinfection register.
Step 7	Date and attach the disinfection sticker to the vehicle.

Appendix C - List of identified Weed Species

Order/Family	Scientific Name	Common name
Amaranthaceae	*Alternanthera pungens*	Khaki Weed
Apiaceae	*Cyclospermum leptophyllum*	Slender Celery
Apocynaceae	*Gomphocarpus fruticosus*	Narrow-leaved Cotton Bush
Apocynaceae	*Gomphocarpus physocarpus*	Balloon Cotton Bush
Asclepiadaceae	*Gomphocarpus fruticosus*	Swan Plant
Asclepiadaceae	*Gomphocarpus physocarpus*	Ballon Cotton Bush
Asteracea	*Ambrosia artemisiifolia*	Annual Ragweed[1]
Asteracea	*Aster subulatus*	Wild Aster
Asteracea	*Bacharis halmifolia*	Groundsel Bush[1]
Asteracea	*Bidens pilosa*	Cobblers Pegs
Asteaceae	*Cirsium vulgare*	Spearthistle
Asteracea	*Conyza* sp.	Fleabane
Asteaceae	*Gamochaeta purpurea*	Cudweed
Asteracea	*Hypochaeris radicata*	Catsear
Asteracea	*Senecio madagascariensis*	Fire Weed[1]
Asteracea	*Sonchus oleraceus*	Common Sowthistle
Fabaceae-Faboideae	*Aeschynomene villosa*	Villose Jointvetch
Fabaceae-Faboideae	*Lespedeza striata*	Japanese Clover
Fabaceae-Faboideae	*Lupinis* sp.	Lupin
Fabaceae-Faboideae	*Trifolium repens*	White Clover
Gentianaceae	*Centaurium erythraea*	Common Centaury
Lauraceae	*Cinnamomum camphora*	Camphor Laurel
Malvaceae	*Sida rhobifolia*	Paddy's Lucerne
Nymphaeaceae	*Nymphaea capensis*	Cape Waterlily
Poaceae	*Andropogon virginicus*	Whisky Grass
Poaceae	*Axonopus compressus*	Broad-leaved Carpet Grass
Poaceae	*Axonopus fissifolius*	Narrow-leaved Carpet Grass
Poaceae	*Chloris gayana*	Rhodes Grass
Poaceae	*Eragrostis curvula*	African Lovegrass
Poaceae	*Paspalum dilatatum*	Paspalum

Order/Family	Scientific Name	Common name
Poaceae	*Paspalum urvillei*	Vasy Grass
Poaceae	*Setaria Sphacelata*	South African Pigeon Grass
Poaceae	*Sporobolus africanus*	Parramatta Grass
Poaceae	*Sporobolus fertilis*	Giant Parramatta Grass
Poaceae	*Stenotaphrum secundatum*	Buffalo Grass
Plantaginaceae	*Plantago lanceolata*	Plantain
Rubiaceae	*Richardia stellaris*	
Solanaceae	*Solanum chenopodioides*	Whitetip Nightshade
Verbenaceae	*Lantana camara*	Lantana[1]
Verbenaceae	*Verbena bonariensis*	Purple Top
Verbenaceae	*Verbena rigidus*	Creeping Verbena

Note: 1 = Noxious Weed under the *Noxious Weeds Act 1993*

Appendix D – Extract from Plant Hazard Assessment

PLANT HAZARD AND RISK ASSESSMENT WORKSHEET (PHA)

Potential Hazards	Hazard			Describe Hazard	Controls Currently In Place on Plant	Current Risk Level	New or Additional Controls Required on Plant	Final Risk Level	New or Additional Controls Action By: (Name and Date)	Action Verified as Complete: (Name and Date)
	Y	N	N/A							
1. Weeds, foreign seeds, plant diseases and pests like cane toads. Is the plant free of all foreign soil / gravel and debris? ▪ For ground engaging plant check tracks, buckets, blades, drill strings, piling rigs. ▪ Plant is not to be unloaded for site access if not clean as it potentially poses a risk for weed and pathogen introduction										
1. Are there any specific warnings or conditions (manufactures or other) relating to potential hazards from the operation of the item of plant? ▪ Refer to technical or operating manuals, SOPs, safe use instructions ▪ List any relevant safety warning hazards & controls										

Appendix 3 – Vegetation Retention Plan

No changes from Stage 1 previous issue

New Grafton Correctional Centre
Document No: JHG-NGCC-PLN-VRP-027

Vegetation Retention Plan

Rev	Version	Date	Prepared by	Reviewed by	Approved by
A	Draft	25/05/2017	Paul Rossington	Lukas Clews	Rachel Vazey
B	Final	16/06/2017	Paul Rossington	Rachel Vazey	Rachel Vazey

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1. Introduction

Jacobs has been engaged by John Holland Group (JHG) to prepare this Vegetation Retention Plan for the New Grafton Correctional Centre (NGCC) project. This plan details the measures that will be used to manage and rehabilitate vegetation on site during the construction and operation phases of the Project. This plan is an attachment to the Construction Flora and Fauna Management Plan (CFFMP) and the Operation Flora and Fauna Management Plan (OFFMP) and should be read in conjunction with both these report.

This Vegetation Retention Plan details the requirements to ensure that vegetation is retained and restored during the construction phase of the project and maintained throughout the operation of the correctional centre. The key aim of the retention and restoration of vegetation on the site is to ensure that the biodiversity values of these areas are maintained and/or improved over time, to reach a condition that requires a low intensity of ongoing maintenance.

This Vegetation Retention Plan has been developed to meet the relevant Conditions of Approval for the project (see Table 1.1 below).
This Vegetation Retention Plan outlines the approach and management measures designed to:

- Retain native vegetation (trees, shrubs and groundcover), and
- Establish and maintain additional areas of native vegetation (particularly within the buffer areas).

This Vegetation Retention Plan has been reviewed by a suitably qualified bushfire consultant.

There are interrelationships between this plan and other documents that provide additional information on environmental management relating to landscape and vegetation restoration. These documents include:

- Soil and Water Management Plan – Includes details on soil management techniques that minimise erosion including during rehabilitation. It details the staging of decommissioning sediment controls during rehabilitation works and the stabilisation and minimal disturbance practices associated with works in waterways and riparian zones.
- Landscape plan – details the plant species and locations for all proposed landscape plantings; including the Vegetation Buffer area, interior of the facility and other plantings within the Boundary fence.
- Weed and Pathogen Management Plan – Details mitigation measures to reduce the chance of weeds or pathogen spread across site. These mitigations are to be implemented from initial clearing right through rehabilitation works.
- Flora and Fauna Management Plan (main body of plan) – includes rehabilitation of land from a fauna habitat perspective. Rehabilitation is to reinstate fauna structures (e.g. large woody debris) that were harvested during clearing operations and build new fauna structures (nest boxes).
- Bushfire Management Plan (BFMP) – details the management requirements to reduce bushfire hazard to people and property; requires vegetation to be regularly mown/slashed within the site Asset Protection Zone (APZ) (however, the BFMP does not require any management of vegetation outside of the APZ).
- Construction Environmental Management Plan (CEMP) - demonstrates systems and procedures to ensure that controls are established and maintained to manage potential environmental impacts during the construction of the Project. It details the responsibilities of the project team relating to environmental management, and all other requirements under the Environmental Management System framework under ISO 14001 including system review, audits and inspections and communication.

1.1 Relevant Conditions of Approval (CoA) Stage 1

Table 1.1: Relevant Conditions of Approval (CoA) Stage 1

Approval Reference	Approval requirements	Section/s in which issue is addressed	Other documents in which issue is also addressed
Schedule 2 - Conditions of Consent for concept approval **Part B - Conditions to be satisfied in future development applications**			
B16 (Landscaping)	The development application for Stage 2 must include detailed plans identifying the species to be used in the site buffer and other landscape areas (preferably species indigenous to the area).	Appendix A includes a list of native species that may be used for restoration.	Landscape Report for the NGCC Stage 2 EIS (Lorna Harrison Landscape Architects, 2017) which includes proposed planting species for all landscape plantings; including the vegetation buffer area, interior of the facility and other plantings within the new boundary fence.
B18 (Biodiversity)	The development application for Stage 2 must demonstrate that the proposal is consisted with the endorsed BAR and BOS. Relevant landscape and rehabilitation elements from the BAR and BOS include: • A Landscape Management Plan is to be developed as part of the CEMP for the NGCC Stage 2 which provides specific details for the re-establishment of native vegetation (shrubs and groundcovers) in areas to be identified in the Stage 2 DA. The Landscape Management Plan will need to consider a range of constraints and opportunities associated with the project including collection and propagation of local seed, salvage and reuse of topsoil and woody debris. The Landscape Management Plan should aim to revegetate buffer lands using the same species composition and structure as currently exists on the site and include a program for monitoring and maintenance of plantings.	This plan includes the following: • A map of existing vegetation to be retained, including a vegetation buffer area. • Guidelines for construction-phase vegetation restoration techniques. • A list of native species which may be used for restoration.	Refer to the Landscape Report for the NGCC Stage 2 EIS (Lorna Harrison Landscape Architects, 2017) which includes proposed planting of indigenous species in the vegetation buffer area and other plantings between the APZ and the new boundary fence.

Approval Reference	Approval requirements	Section/s in which issue is addressed	Other documents in which issue is also addressed
Schedule 2 - Conditions of Consent for concept approval **Part B – Prior to the Commencement of Works**			
B9 (Biodiversity)	A vegetation retention plan must be prepared by a suitably qualified consultant, which must: a) Identify and provide details of the retention of trees (particularly hollow bearing) and groundcover; b) Provides details on the maintenance and improvement of retained or planted vegetation, particularly within the buffer areas; and c) Be reviewed by a suitable qualified bushfire consultant and include certification that any vegetation retained within an APZ meets the relevant standards.	Figure 1 shows the areas if vegetation being retained and Figure 2 shows the restoration areas. Restoration and management measures to be implemented during the construction phase of the project are detained in Section 2.1. Maintenance and improvement of retained vegetation beyond the construction phase is included in Section 3.1. Retained vegetation within the APZ for the site will consist only of grasses and other groundcover vegetation that will be maintained in accordance with the BFMP.	Refer to the Landscape Report for the NGCC Stage 2 EIS (Lorna Harrison Landscape Architects, 2017) which includes proposed planting of indigenous species in the vegetation buffer area and other plantings between the APZ and the new boundary fence.

Figure 1 Mapped areas of retained vegetation

Refer to the PDF map that will be inserted into the final PDF copy of the report

Figure 2 Restoration and management zones

Insert Figure 2 here

1.2 Legal and Other Requirements

References				
Federal Legislation	**State legislation**	**Local Government Laws**	**Standards / Codes**	**Other Documentation**
• *Environmental Protection and Biodiversity Conservation Act 1999.*	• *Protection of the Environment and Operations Act 1997.* • *Environmental Planning and Assessment Act, 1979.* • *Threatened Species Conservation Act 1995.* • *National Parks and Wildlife Act 1974.* • *Native Vegetation Act 2003.* • *Noxious Weeds Act 1993.* • *Forestry Act 1916.*	• N / A	• JH Standards.	• Construction Environmental Management Plan. • Development Consent SSD 7413. • Jacobs, Biodiversity Assessment Report, March 2017. • Jacobs, Biodiversity Offset Strategy, March 2017. • JH specifications / SOPs / standards.

2. Construction phase vegetation retention, management and restoration

The site includes 31.8 ha of native vegetation communities present as patches of varying types and condition classes (i.e. the 'vegetation zones' as described in the BAR). The four different vegetation communities present are bordered by a further 163.2 ha of previously cleared native habitat that has been modified by stock grazing, and now presents as a grassland habitat of mixed exotic and common native species. Vegetation communities on the western boundaries form part of a larger patch of vegetation extending west and north of the site.

Native vegetation communities were found to be in moderate to good (medium) degrading to low condition as shown by Table 2.1 (i.e. all native communities present have been modified). As described in the Biodiversity Assessment Report and Biodiversity Offset Strategy for the Stage 2 NGCC Project a total of 13.7 hectares of native vegetation identified as plant community types under the OEH F*ramework for Biodiversity* would be cleared for the NGCC project.

Table 2.1: Native Vegetation Communities of the Site

Vegetation Community	Corresponding PCT	Code / Condition	Total Area (ha)	Clearing Area (ha)	Area to be retained (ha)
Coastal freshwater meadows and forblands of lagoons and wetlands **(Photo 1)**	Coastal freshwater meadows and forblands of lagoons and wetlands (PCT:782)	NR150 Moderate / Good (Poor)	0.8	0.8	0
	PCT:782 Total		0.8	0.8	0
		NR244 Moderate/ Good (Medium)	8.2	4.6	3.6
		NR244 Moderate / Good (Poor)	8.0	3.7	4.3
	PCT:1209 Total		16.2	8.3	7.9
		NR246 Moderate/ Good (Medium)	10.6	3.9	6.7
		NR246 Moderate / Good (Poor)	4	0.7	3.3
	PCT:1211 Sub-total		14.6	4.6	10
Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the NSW North Coast Bioregion **(Photo 6)**	Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT 837)	NR161 Moderate / Good (Poor)	0.2	0	0.2
	PCT:837 Sub-total		0.2	0	0.2
		Total	31.8	13.7	18.1

With the exception of the very small area of PCT 837, which will not be affected by the project, the vegetation types on the site are not endangered ecological communities (EEC). Figure 1 shows vegetation being retained, Figure 3 shows vegetation being cleared and photos 1-6 are indicative of vegetation condition prior to the commencement of construction.

Photo 1: Coastal freshwater meadows and forblands of lagoons and wetlands, in poor condition

Photo 2 and 3: Spotted Gum – Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion, in Medium (left) and Poor (right) condition

Photo 4 and 5: Spotted Gum – Grey Ironbark – Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion, in Medium (left) and Poor (right) condition

Photo 6: Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the NSW North Coast Bioregion

Figure 3 : Vegetation being cleared

Refer to the PDF map that will be inserted into the final PDF copy of the report

The native vegetation area to be retained is concentrated on the south-west site boundary with small fragments also retained within a largely cleared area in the north. Connection between the retained vegetation and other landscape patches to the north and east of the site will be achieved via a landscaped vegetation buffer (to be rehabilitated).

Specific categories of vegetation retention and restoration are described in Table 2.2 and the management zones in which they will be undertaken are shown in Figure 2.

Table 2.2: Vegetation retention, restoration and management zones

Flora and Fauna Management Zone	Description and	Proposed restoration/management approach
1. Primary Conservation Area A	Existing areas of native forest (PCT's 1209, 1211 and 837) outside of the new boundary fence which are contiguous with the large vegetation patch outside of the Project Site to the west.	These areas will be allowed to regenerate naturally with the aid of weed control and the addition of fauna habitat structures (assisted natural regeneration). Weed control in accordance with the Weed and Pathogen Management Plan attachment to the CFFMP.
2. Primary Conservation Area B	Other areas of mixed native and exotic grassland within the site, outside of the new boundary fence.	Existing forest within these areas will be allowed to regenerate naturally with the aid of weed control (assisted natural regeneration). Areas devoid of native canopy cover will receive topsoil stripped from vegetation clearing areas within the development footprint. Addition of fauna habitat structures as described in the body of the CFFMP. Weed control in accordance with the Weed and Pathogen Management Plan attachment to the CFFMP.
3. Vegetation Buffer Zone	The vegetation buffer area is currently largely clear of native vegetation with the exception of some areas of forest on the northern and southern boundaries of the site and isolated trees.	Retention of all existing native forest patches and isolated native trees. Mass screen planting of indigenous canopy and mid-storey trees, shrubs and grasses. May also include topsoil translocation recipient sites. Weed control in accordance with the Weed and Pathogen Management Plan attachment to the CFFMP.
4. Secondary Conservation Area	Small patches and peripheral areas of native forest (PCT1209 and 837) with low canopy cover within the new boundary fence.	These areas will be allowed to regenerate naturally with the aid of weed control only (assisted natural regeneration). Weed control in accordance with the Weed and Pathogen Management Plan attachment to the CFFMP.

Flora and Fauna Management Zone	Description and	Proposed restoration/management approach
5. Stormwater Zone	Land utilised for stormwater infrastructure including overland drainage structures and vegetated detention basins.	Management will be primarily for the purposes of water quality. Planting of native indigenous aquatic plants in accordance with the Landscape Plan. *Baumea* spp., *Carex* spp., *Cyperus* spp., *Eleocharis* spp., *Philydrum lanuginosum*, *Schoenoplectus mucronata*, *Juncus* spp. and, if available, other native aquatic and semi-aquatic species from the list in Appendix A. Weed control in accordance with the Weed and Pathogen Management Plan attachment to the CFFMP.
6. Grassland Zone	Areas of mixed native and exotic grassland within the site, inside the Boundary fence.	Mowing/slashing in accordance with the Bushfire Management Strategy. Weed control in accordance with the Weed and Pathogen Management Plan attachment to the CFFMP.
7. Landscape Zone	Landscape tree planting areas between the APZ and the Boundary Fence.	Planting of indigenous canopy and mid-storey trees. Mowing/slashing of grass between trees in accordance with the Bushfire Management Strategy. Weed control in accordance with the Weed and Pathogen Management Plan attachment to the CFFMP.
8. Centre Operation Zone	The buildings, roads, playing fields, asset protection zone, parking and other infrastructure areas associated with the NGCC.	All woody vegetation and much of the groundcover vegetation will be removed from this zone during construction. Management of vegetation associated with buildings, roads, playing fields etc in accordance with the Landscape Report. Mowing/slashing of APZ and other cleared grassland areas in accordance with the Bushfire Management Strategy. Weed control in accordance with the Weed and Pathogen Management Plan attachment to the CFFMP.
9. Perimeter Fence Zone	Area extending 5 metres to the inside of the new boundary fence, required for fence construction and maintenance and vegetation management.	Mowing/slashing of understory to maintain informal vehicle access. Pruning of overhanging branches of trees to maintain 2-5 metre canopy separation between trees on the inside and trees on the outside of the fence in accordance with the Bushfire Management Plan.

Other areas of the site, including grassland areas cleared by John Holland, outside of the areas described in Table 3.1, or infrastructure locations (e.g. asset protection areas), will be stabilised with appropriate low maintenance covers (i.e. grassland with low invasive potential) consistent with the existing species found on site.

2.1 Construction phase management measures for vegetation retention, restoration and management

Management measures for landscape management and restoration during the construction phase of the project are detailed in Table 2.3.

Table 2.3: Construction phase management measures for vegetation retention, restoration and management

Management Actions				
No	**Actions To Be Undertaken**	**Applicable zones**	**Staff Responsible**	**When**
1.	A new boundary fence will be installed in the location shown in Figure 1. Land between the new boundary fence and the Lot and DP Boundary, that is outside of the vegetation buffer, will be designated as a conservation area to be managed by assisted natural regeneration as described under Action 2. Gates would be installed in this fence to allow access for management purposes.	Zone 9 - Perimeter Fence Zone 1 - Primary Conservation Area A Zone 2 - Primary Conservation Area B	PM/PER	Prior to the commencement of clearing and grubbing
2.	Assisted natural regeneration during the construction phase would involve: • Topsoil translocation as described under Action 2 (Zone 2 only). • Weed control as described in the Weed and Pathogen Management Plan attachment to the CFFMP. • Augmentation with habitat structures as described in Table 3, Action 23 of the body of the CFFMP.	Zone 1 - Primary Conservation Area A Zone 2 - Primary Conservation Area B	PM/PER	Throughout construction

3.	Topsoil translocation would involve: • Identification and marking of soil translocation donor and recipient sites, by an ecologist, during pre-clearing inspections. • Recipient sites would be areas currently devoid of native forest and with low native ground layer diversity/abundance within zone 2 and zone 3 (areas adjacent to zones 1 and 2). • Donor sites would be higher condition (moderate/good -medium) areas of forest within the clearing footprint (refer Figure 1). • Recipient sites would be stripped of existing topsoil to a depth of approximately 100mm and the resulting spoil would be spread in adjacent areas of cleared land (Zone 6 and Zone 7) • Removal of topsoil (to a depth of approximately 100 mm depth) from donor sites. • Spreading of topsoil in recipient sites to a depth of approximately 100 mm.	Zone 8 - Centre Operation Zone (donor sites). Zone 2 - Primary Conservation Area B (main recipient sites). Zone 3 - Vegetation Buffer (secondary recipient sites). Zone 6 – Grassland and Zone 7 – Landscape (receiving of topsoil stripped from recipient sites).	PM/PER/Project ecologist.	Preparation of recipient sites at commencement of vegetation clearing works. Soil translocation to occur immediately after woody vegetation is cleared from donor sites.
4.	Areas of existing native forest within Vegetation Buffer will: • Be retained, allowed to regenerate naturally, and where necessary augmented with additional planting of indigenous trees and shrubs • Be subject to weed control as described in the weed and pathogen management plan attachment to the CFFMP.	Zone 3 - Vegetation Buffer.	PM/PER/Project ecologist.	Throughout construction.
5.	Areas within the Vegetation Buffer which are currently devoid of native forest will be restored to a forest structure through a combination of: • Assisted Natural Regeneration in areas adjacent to existing native forest and subject to soil translocation. • Planting of indigenous trees and shrubs. • Weed control as described in the Weed and Pathogen Management Plan attachment to the CFFMP.	Zone 3 - Vegetation Buffer.	PM/PER/Project ecologist.	Completed prior to the end of construction.
6.	Species planted in the Landscape Buffer, will comprise native locally indigenous plants and seed from local suppliers and or from seed / cuttings collected during clearing works.	Zone 3 - Vegetation Buffer.	PM/PER.	Completed prior to the end of construction.

7.	Any fertilisers used for landscaping must be of an organic type and the principal is to be notified 2 days prior to the intended day of application	Zone 3 - Vegetation Buffer. Zone 8 - Centre Operation Zone. Zone 7 - Landscape	PM/PER.	Throughout construction.
8.	Establishment of forest in the Vegetation Buffer will include; ripping and topsoiling of any areas that are compacted or lacking topsoil; weed control; seeding/planting; watering; monitoring; and preplacement planting if necessary.	Zone 3 - Vegetation Buffer.	PM/PER.	Completed prior to the end of construction.
9.	All disturbed areas outside of vegetation restoration areas (including storage areas, haul roads etc.) must be restored to a condition at least similar to the existing condition before disturbance at completion of construction. Restoration includes ripping, topsoiling, weed control and seeding, planting, watering and maintenance. Ripping, topsoiling, seeding and planting should occur within 6 months of demobilisation/ completion of the disturbed areas.	Zone 8 - Centre Operation Zone. Zone 6 – Grassland. Zone 7 – Landscape.	PM/PER.	Completed prior to the end of construction.
10.	Minor tributary watercourses affected by the project shall, where feasible and reasonable, be rehabilitated to emulate a natural stream system. The rehabilitation of watercourses shall be consistent with the Guidelines for Controlled Activities: In-stream works and stream armouring should be minimised to the greatest extent practicable.	Zone 7 – Landscape. Zone 5 – Stormwater.	PM/PER.	Completed prior to the end of construction.
11.	Temporary vegetation may be used to stabilize stockpiles; in such cases, a non-invasive cover crop will be applied.	Zone 8 - Centre Operation Zone. Zone 6 – Grassland. Zone 7 – Landscape.	PM/PER.	Throughout construction.
12.	Possibilities for the use of native seed sourced from the site will be explored; given the history of grazing, and sparse shrub layer on the site, additional; sources of seeds and plant material from outside the site are likely to be required.	Zone 3 - Vegetation Buffer Zone 7 - Landscape	PM/PER/Project ecologist	Prior to vegetation clearing.
13.	Any nursery from which plant of the family Myrtaceae plants are obtained will be asked for certification that they are Myrtle Rust free.	Zone 3 - Vegetation Buffer. Zone 7 – Landscape.	PM/PER.	Throughout construction.

Monitoring				
No	**Monitoring Required**		**Staff Responsible**	**When**
1.	Vegetation restoration areas will be monitored weekly by the PER and monthly by the Project ecologist, until the end of the construction phase of the project. Monitoring will include: • Health of plants in Zone 3 and Zone 7. • Native species regeneration in topsoil recipient sites. • Weed infestations in planted and topsoiled areas.	Zone 2 - Primary Conservation Area B (topsoil recipient sites). Zone 3 - Vegetation Buffer. Zone 7 - Landscape	PER/PM/Project ecologist.	Weekly/Monthly.
2.	Weed monitoring throughout the areas disturbed by construction phase activities.	Zone 2 - Primary Conservation Area B (topsoil recipient sites). Zone 3 - Vegetation Buffer. Zone 5 – Stormwater. Zone 6 – Grassland. Zone 7 – Landscape. Zone 8 - Centre Operation Zone. Zone 9 - Perimeter Fence.	PER/PM/Project ecologist.	Minimum weekly.

3.	Weed monitoring in areas within the project site that have not been disturbed by construction phase activities, targeting the interface with adjacent zones.	Zone 1 - Primary Conservation Area A Zone 4 - Secondary Conservation Area	PER/PM/Project ecologist	Minimum monthly

Suggested Corrective Actions		
Problem	**Suggested Corrective Action**	**Staff Responsible**
▪ Management/restoration works not progressing as planned	▪ Investigate reasons behind lack of works progress. ▪ Review and if necessary modify communication and works planning procedures related to vegetation clearing and restoration. ▪ Retrain staff on site regarding the restoration requirements of this plan. ▪ Continue weekly monitoring to ensure that corrective actions have been successful and restoration works are progressing as planned. ▪ Repeat the above steps until works are being progressed to a satisfactory standard.	PER/PM.

3 Operation phase vegetation retention areas and management approach

At the completion of the construction phase, native vegetation on the site will consist of:

- Remnant areas of native forest (PCTs 1209, 1211 and 837) (refer Figure 1 and Photos 1-6).
- Recent mass screen planting of indigenous canopy and mid-storey trees, shrubs and grasses in the Vegetation Buffer (Zone 3 in Figure 2).
- Recent plantings of indigenous canopy and mid-storey trees in landscape planting areas (Zone 7 in Figure 2).
- Immature forest regrowth from topsoil translocation and natural regeneration, primarily in Zone 2 but also within Zones 1 and 3 (refer Figure 2).

The flora and fauna management zones that are to be used to guide maintenance works during operation of the site and the associated vegetation retention approaches are shown in Table 3.1.

Table 3.1: Operation phase vegetation retention approach for each management zone

Flora and Fauna Management Zone	Description	Proposed retention / maintenance approach
1. Primary Conservation Area A	Remnant areas of native forest (PCTs 1209, 1211 and 837), outside of the new boundary fence, which are contiguous with the large vegetation patch outside of the Project Site to the west. Other small areas of mixed native and exotic grassland within forest patches.	These areas will be allowed to regenerate naturally with the aid of weed control (assisted natural regeneration). Monitoring to detect and plan responses to any significant weed proliferation.
2. Primary Conservation Area B	Immature forest regrowth from topsoil translocation and natural regeneration. Other areas of mixed native and exotic grassland within the site, outside of the new boundary fence.	These areas will be allowed to regenerate naturally with the aid of weed control (assisted natural regeneration). Monitoring to detect and plan responses to any significant weed proliferation.
3. Vegetation Buffer Zone	The vegetation buffer area is currently largely clear of native vegetation with the exception of some areas of forest on the northern and southern boundaries of the site and isolated trees.	Monitoring to detect and plan responses to weed proliferation and poor health of plantings. Weed control. Any watering, plant protection and replacement planting requirements determined through monitoring.
4. Secondary Conservation Area	Small patches and peripheral areas of native forest (PCT1209 and 837) with low canopy cover within the new boundary fence.	These areas will be allowed to regenerate naturally with the aid of weed control only (assisted natural regeneration). Monitoring to detect and plan responses to any significant weed proliferation.

Flora and Fauna Management Zone	Description	Proposed retention / maintenance approach
5. Stormwater Zone	Land utilised for stormwater infrastructure including overland drainage structures and vegetated detention basins.	Management will be primarily for the purposes of water quality. Weed control.
6. Grassland Zone	Areas of mixed native and exotic grassland within the site, inside the new boundary fence.	Mowing/slashing between plantings to limit the risk of loss due to grass fire. Weed control.
7. Landscape Zone	Landscape tree planting areas between the APZ and the new boundary fence.	Monitoring to detect and plan responses to weed proliferation and poor health of plantings. Mowing/slashing between plantings to limit the risk of loss due to grass fire. Weed control. Any watering, plant protection and replacement planting requirements determined through monitoring.
8. Centre Operation Zone	The buildings, roads, playing fields, asset protection zone, parking and other infrastructure areas associated with the NGCC.	Outside of the scope of this vegetation retention plan. Refer to the body of the OFFMP.
9. Perimeter Fence Zone	Area extending 5 metres to the inside of the new boundary fence, required for fence construction and maintenance and vegetation management.	Mowing/slashing of understory to maintain informal vehicle access for other activities. Pruning of trees overhanging the fence to maintain a canopy separation of 5 metres from surrounding bushland areas. Weed control.

3.1 Operation phase management measures for vegetation retention, restoration and management

Management measures for vegetation retention, landscape management and restoration during the operation phase of the project are detailed in Table 3.2.

Table 3.2: Operation phase management actions, monitoring and corrective actions

Management Actions				
No	**Actions To Be Undertaken**	**Applicable zones**	**Staff Responsible**	**When**
1.	Assisted natural regeneration during the operation phase would involve the following weed control measures: • Slashing of annual weeds in early spring to limit seed; in areas in which native plants dominate the ground layer vegetation. • Spot-spraying of perennial weeds ground layer weeds, in areas in which native plants dominate the ground layer vegetation. • Small patch spraying of weeds with herbicide; in areas in which exotic plants dominate the ground layer vegetation • Cutting and applying undiluted herbicide to the stems of woody weeds. • Other measures recommended in Clarence Valley Council publications. Weed control would, as a minimum, include: • Species declared under the *Noxious Weeds Act 1993* (or equivalent legislation) for the Local Control Authority area of Clarence Valley Council (refer Appendix B for species recoded on site to date). • High threat weeds identified in the OEH draft Biodiversity assessment Methodology (refer Appendix A for species recoded on site to date and Appendix C for all high threat Weeds).	Zone 1 - Primary Conservation Area A. Zone 2 - Primary Conservation Area B. Zone 3 - Vegetation Buffer (any topsoil recipient sites). Zone 4 - Secondary Conservation Area.	Site operation / maintenance manager. Weed and Pest Control Contractor.	Monthly as a minimum for the first year of operation. Quarterly as a minimum during the second and third years of operation. Annually as a minimum throughout the operation of the centre. Actual frequency and intensity of weed control will be as necessary to supress weed proliferation throughout operation in response to monitoring results.

Monitoring				
2.	Monitoring remnant native forest would include: • Distribution and abundance of noxious and high threat weeds. • Signs of damage to vegetation as a result of exotic animals. • Vegetation structure in terms of native canopy, mid-storey and ground layer foliage cover benchmarks for associated Plant Community Type. • Mapping the extent of the remnant native forest to ensure that the sizes of vegetation patches are not decreasing (will provide evidence that the size of patches are being retained or increased).	Zone 1 - Primary Conservation Area A Zone 4 - Secondary Conservation Area.	Site operation / maintenance manager. Independent Environmental Monitoring Contractor.	Twice a year as a minimum during the first and second years of operation. Annually as a minimum throughout the remainder of the operation of the centre.
3.	Monitoring soil translocation sites and natural regrowth areas would include: • Distribution and abundance of noxious and high threat weeds. • Signs of damage to vegetation as a result of exotic animals. • Native plant species composition in terms of dominant native species in the canopy, mid-storey and ground layer. • Vegetation structure in terms of native canopy, mid-storey and ground layer foliage cover benchmarks for associated Plant Community Type.	Zone 2 - Primary Conservation Area B. Zone 3 - Vegetation Buffer (any topsoil recipient sites).	Site operation / maintenance manager. Independent Environmental Monitoring Contractor.	Quarterly as a minimum during the first and second years of operation. Annually as a minimum throughout the remainder of the operation of the centre.
4.	Monitoring the vegetation buffer would include: • Distribution and abundance of noxious and high threat weeds. • Signs of damage to vegetation as a result of exotic animals. • Vegetation structure in terms of native canopy, mid-storey and ground layer foliage cover. • Tree and shrub health including vigour, foliage density, dieback, weeping sap, fungal infection, wilting.	Zone 3 - Vegetation Buffer.	Site operation / maintenance manager. Independent Environmental Monitoring Contractor.	Quarterly as a minimum during the first and second years of operation. Annually as a minimum throughout the remainder of the operation of the centre.

5.	Monitoring the landscaped areas would include: • Distribution and abundance of noxious and high threat weeds. • Signs of damage to trees as a result of exotic animals. • Tree heath including vigour, foliage density, dieback, weeping sap, fungal infection, wilting.	Zone 7 – Landscape.	Site operation / maintenance manager. Independent Environmental Monitoring Contractor.	Quarterly as a minimum during the first and second years of operation. Annually as a minimum throughout the remainder of the operation of the centre.
6.	Monitoring the other areas would include: • Distribution and abundance of noxious and high threat weeds	Zone 6 – Grassland. Zone 5 – Stormwater. Zone 8 – Centre Operation Zone. Zone 9 – Perimeter Fence.	Site operation / maintenance manager. Independent Environmental Monitoring Contractor.	Quarterly as a minimum during the first and second years of operation. Annually as a minimum throughout the remainder of the operation of the centre.

Suggested Corrective Actions		
Problem	**Suggested Corrective Action**	**Staff Responsible**
Increase in the distribution and/or abundance of noxious and high threat weeds.	Increase frequency of monitoring and weed control until weed distribution and/or abundance has declined between each of three monitoring events over the course of at least six months.	Site operation / maintenance manager. Independent Environmental Monitoring Contractor. Weed and Pest Control Contractor.
Signs of significant damage to vegetation as a result of exotic animals.	Increase the frequency of monitoring and exotic animal control until signs of damage have declined between each of three monitoring events over the course of at least six months.	Site operation / maintenance manager. Independent Environmental Monitoring Contractor. Weed and Pest Control Contractor.
Tree and/or shrub cover in any of Zones 1, 2 and 4 is significantly higher than cover benchmarks for associated Plant Community Type, potentially affecting the value of habitat for threatened species and overall biodiversity.	Areas of vegetation significantly above benchmarks should be thinned through selective removal of individuals and small stands of trees and shrubs to ensure that these areas are structurally complex and able to provide habitat for a variety of species which utilise denser and more open areas.	Site operation / maintenance manager. Independent Environmental Monitoring Contractor. Weed and Pest Control Contractor.
Tree and/or shrub cover in any of Zones 1, 2 and 4 is significantly lower than cover benchmarks for associated Plant Community Type and does not appear to be increasing, potentially affecting the value of habitat for threatened species and overall biodiversity.	Areas of vegetation significantly below benchmarks should be supplemented through selective planting of individuals and small stands of trees and shrubs (see Appendix A for a species list) to ensure that these areas are structurally complex and able to provide habitat for a variety of species which utilise denser and more open areas.	Site operation / maintenance manager. Independent Environmental Monitoring Contractor. Weed and Pest Control Contractor.

Suggested Corrective Actions		
Problem	**Suggested Corrective Action**	**Staff Responsible**
The health of planted trees and shrubs in the vegetation buffer and landscaped area is poor.	Recommence watering of plantings if low rainfall is suspected cause. Replace any dead or very sick plants, using the species that seem to be growing more vigorously on the site (i.e. plant species that are better suited to the conditions).	Site operation / maintenance manager. Independent Environmental Monitoring Contractor. Weed and Pest Control Contractor.
The physical size of the remnant native forest patches in Zone 1 and/or Zone 4 have decreased in size during the operational phase indicating vegetation is not being retained.	The cause of the decreased vegetation patch size must be determined and suitable corrective actions undertaken. If the reduced patch size is the result of accidental tree removal from maintenance works then maintenance methods must be corrected to ensure no further tree removal occurs. To rectify any loss in the physical size of the remnant native forest patches, revegetation works will be undertaken to reinstate the area lost.	Site operation / maintenance manager. Grounds maintenance staff. Independent Environmental Monitoring Contractor

Appendix A - List of indigenous plant species recorded on the site in each vegetation type which may be suitable for landscaping and restoration

Growth form / stratum	Family	Scientific name	Common name	Coastal freshwater meadows and forblands of lagoons and wetlands (PCT:782)	Spotted Gum - Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1209)	Spotted Gum - Grey Ironbark - Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1211)
Aquatic - emergent	CYPERACEAE	*Eleocharis dietrichiana*	Spike-rush	x		
Aquatic - emergent	CYPERACEAE	*Schoenoplectiella mucronata*	Angled Club-rush	x		
Aquatic - emergent	MENYANTHACEAE	*Villarsia reniformis*		x		
Aquatic - emergent	CYPERACEAE	*Eleocharis equisetina*	Spike-rush	x		
Aquatic - emergent	PHILYDRACEAE	*Philydrum lanuginosum*	Frogsmouth	x		
Aquatic - emergent	CYPERACEAE	*Eleocharis acuta*	Common Spike-rush			
Aquatic - emergent	CYPERACEAE	*Eleocharis sphacelata*	Tall Spike-rush			
Aquatic emergent	CYPERACEAE	*Eleocharis gracilis*	Slender Spike-rush	x		
Aquatic herb - submerged/floating	HALORAGACEAE	*Myriophyllum latifolium*	Water-milfoil			
Aquatic herb - submerged/floating	LENTIBULARIACEAE	*Utricularia gibba*	Floating Bladderwort			
Aquatic herb - submerged/floating	MENYANTHACEAE	*Nymphoides indica*	White Marshwort			

Growth form / stratum	Family	Scientific name	Common name	Coastal freshwater meadows and forblands of lagoons and wetlands (PCT:782)	Spotted Gum - Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1209)	Spotted Gum - Grey Ironbark - Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1211)
Aquatic herb - submerged/floating	ONAGRACEAE	*Ludwigia peploides* subsp. *montevidensis*	Water Primrose			
Aquatic(semi) - edge	CYPERACEAE	*Cyperus polystachyos*	Bunchy Flat-sedge	x		x
Aquatic(semi) - edge	CYPERACEAE	*Cyperus fulvus*	Sticky Sedge		x	
Aquatic(semi) - edge	JUNCACEAE	*Juncus usitatus*	Common Rush		x	
Aquatic(semi) - edge	JUNCACEAE	*Juncus polyanthemus*	Many-flowered Rush		x	
Aquatic(semi) - edge	CYPERACEAE	*Cyperus flaccidus*	Lax Flat-sedge	x		
Aquatic(semi) - edge	POACEAE	*Paspalum distichum*	Water Couch	x		
Aquatic(semi) - edge	CYPERACEAE	*Cyperus haspan*		x		
Aquatic(semi) - edge	JUNCACEAE	*Juncus prismatocarpus*	Branching Rush	x		
Aquatic(semi) - edge	APIACEAE	*Hydrocotyle laxiflora*	Stinking Pennywort	x		
Aquatic(semi) - edge	GOODENIACEAE	*Goodenia paniculata*	Panicled Goodenia	x		
Aquatic(semi) - edge	LOBELIACEAE	*Lobelia alata*	Angled Lobelia	x		
Aquatic(semi) - edge	SCROPHULARIACEAE	*Gratiola pedunculata*		x		

Growth form / stratum	Family	Scientific name	Common name	Coastal freshwater meadows and forblands of lagoons and wetlands (PCT:782)	Spotted Gum - Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1209)	Spotted Gum - Grey Ironbark - Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1211)
Aquatic(semi) - edge	CYPERACEAE	*Cyperus difformis*	Dirty Dora			
Aquatic(semi) - edge	CYPERACEAE	*Cyperus trinervis*				
Aquatic(semi) - edge	POLYGONACEAE	*Persicaria decipiens*	Slender Knotweed			
Aquatic(semi) - edge	POLYGONACEAE	*Persicaria hydropiper*	Water Pepper			
Aquatic(semi) - edge	POLYGONACEAE	*Persicaria strigosa*	Spotted Knotweed			
Aquatic(semi) - edge	MARSILEACEAE	*Marsilea mutica*	Nardoo			
Grass	POACEAE	*Bothriochloa macra*	Red-leg Grass		x	x
Grass	POACEAE	*Dichelachne micrantha*	Short-hair Plume Grass		x	x
Grass	POACEAE	*Paspalidium criniforme*	Paspalidium	x	x	x
Grass	POACEAE	*Oplismenus imbecillis*	Narrow-leaf Beard-grass		x	x
Grass	POACEAE	*Microlaena stipoides* var. *stipoides*	Weeping Grass		x	x
Grass	POACEAE	*Capillipedium spicigerum*	Scented-top Grass			x
Grass	POACEAE	*Panicum decompositum*	Native Millet			x
Grass	POACEAE	*Panicum simile*	Two-colour panic			x

Growth form / stratum	Family	Scientific name	Common name	Coastal freshwater meadows and forblands of lagoons and wetlands (PCT:782)	Spotted Gum - Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1209)	Spotted Gum - Grey Ironbark - Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1211)
Grass	POACEAE	*Digitaria diffusa*	Open Summer-grass		x	x
Grass	POACEAE	*Oplismenus aemulus*	Broad-leaf Beard-grass		x	x
Grass	POACEAE	*Sporobolus creber*	Slender Rats Tail Grass		x	x
Grass	POACEAE	*Eragrostis leptostachya*	Paddock Lovegrass		x	x
Grass	POACEAE	*Eragrostis brownii*	Brown's Lovegrass		x	x
Grass	POACEAE	*Themeda australis*	Kangaroo Grass		x	x
Grass	POACEAE	*Paspalum orbiculare*	Ditch Millet			x
Grass	POACEAE	*Entolasia stricta*	Wiry Panic			x
Grass	POACEAE	*Echinopogon caespitosus*	Hedgehog Grass		x	x
Grass	POACEAE	*Aristida vagans*	Three-awned Spear Grass		x	x
Grass	POACEAE	*Cymbopogon refractus*	Barbed Wire Grass		x	x
Grass	POACEAE	*Aristida ramosa*	Three-awned Spear Grass		x	x
Grass	POACEAE	*Imperata cylindrica*	Blady Grass		x	x
Grass	POACEAE	*Digitaria parviflora*	Small-flower Finger Grass		x	
Grass	POACEAE	*Cynodon dactylon*	Common Couch		x	

Growth form / stratum	Family	Scientific name	Common name	Coastal freshwater meadows and forblands of lagoons and wetlands (PCT:782)	Spotted Gum - Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1209)	Spotted Gum - Grey Ironbark - Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1211)
Grass	POACEAE	*Alloteropsis semialata*	Cockatoo Grass		x	
Grass	POACEAE	*Chloris ventricosa*	Tall Windmill Grass		x	
Grass	POACEAE	*Aristida benthamii*	Three-awned spear grass		x	
Grass	POACEAE	*Digitaria didactyla*	Queensland Blue Couch		x	
Grass	POACEAE	*Deyeuxia quadriseta*	Reed Bent-grass			
Grass	POACEAE	*Echinopogon ovatus*	Hedgehog Grass			
Grass	POACEAE	*Entolasia marginata*	Margined Panic			
Grass	POACEAE	*Eragrostis elongata*	Narrow Lovegrass			
Grass	POACEAE	*Lachnagrostis filiformis*	Blown Grass			
Grass	POACEAE	*Panicum effusum*	Hairy Panic			
Grass	POACEAE	*Paspalidium distans*	Paspalidium			
Grass	POACEAE	*Sporobolus elongatus*	Slender Rats Tail Grass			
Groundcover	ACANTHACEAE	*Pseuderanthemum variable*	Pseuderanthemum		x	x
Groundcover	ACANTHACEAE	*Brunoniella australis*	Blue Trumpet		x	x
Groundcover	ANTHERICACEAE	*Tricoryne elatior*	Yellow Rush-lily		x	x

Growth form / stratum	Family	Scientific name	Common name	Coastal freshwater meadows and forblands of lagoons and wetlands (PCT:782)	Spotted Gum - Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1209)	Spotted Gum - Grey Ironbark - Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1211)
Groundcover	ANTHERICACEAE	*Arthropodium milleflorum*	Vanilla Lily		x	x
Groundcover	ANTHERICACEAE	*Laxmannia gracilis*	Grass Wire-lily		x	x
Groundcover	ANTHERICACEAE	*Dichopogon strictus*	Chocolate Lily		x	x
Groundcover	CAMPANULACEAE	*Wahlenbergia gracilis*	Sprawling Bluebell		x	x
Groundcover	COMMELINACEAE	*Commelina cyanea*	Scurvy Weed		x	x
Groundcover	CYPERACEAE	*Scleria mackaviensis*			x	x
Groundcover	CYPERACEAE	*Cyperus brevifolius*	Mullumbimby Couch		x	x
Groundcover	FABACEAE-FABOIDEAE	*Desmodium gunnii*	Slender Tick Trefoil		x	x
Groundcover	FABACEAE-FABOIDEAE	*Glycine clandestina*	Twining Glycine		x	x
Groundcover	GOODENIACEAE	*Velleia paradoxa*	Spur Velleia		x	x
Groundcover	LAMIACEAE	*Ajuga australis*	Austral Bugle		x	x
Groundcover	LOBELIACEAE	*Pratia purpurascens*	White Root		x	x
Groundcover	LOMANDRACEAE	*Lomandra filiformis* subsp. *coriacea*	Wattle Mat-rush		x	x
Groundcover	MYOPORACEAE	*Eremophila debilis*	Winter Apple		x	x
Groundcover	OXALIDACEAE	*Oxalis perennans*			x	x
Groundcover	PHORMIACEAE	*Dianella longifolia* var. *longifolia*	Long-leaf Flax Lily		x	x

Growth form / stratum	Family	Scientific name	Common name	Coastal freshwater meadows and forblands of lagoons and wetlands (PCT:782)	Spotted Gum - Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1209)	Spotted Gum - Grey Ironbark - Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1211)
Groundcover	PHYLLANTHACEAE	*Phyllanthus virgatus*	Small-leaf Spurge		x	x
Groundcover	PLANTAGINACEAE	*Plantago debilis*	Slender Plantain		x	x
Groundcover	POLYGALACEAE	*Polygala japonica*	Dwarf Milkwort		x	x
Groundcover	SOLANACEAE	*Solanum prinophyllum*	Forest Nightshade		x	x
Groundcover	VIOLACEAE	*Hybanthus stellarioides*			x	x
Groundcover	CYPERACEAE	*Fimbristylis dichotoma*	Common Fringe-rush		x	x
Groundcover	FABACEAE-FABOIDEAE	*Desmodium varians*	Slender Tick-trefoil		x	x
Groundcover	FABACEAE-FABOIDEAE	*Glycine tabacina*			x	x
Groundcover	ADIANTACEAE	*Cheilanthes sieberi* subsp. *sieberi*	Slender Cloak-fern			x
Groundcover	APIACEAE	*Hydrocotyle peduncularis*	Hairy Pennywort			x
Groundcover	ASTERACEAE	*Chrysocephalum apiculatum*	Yellow Buttons			x
Groundcover	ASTERACEAE	*Epaltes australis*	Spreading Nut-heads			x
Groundcover	CLUSIACEAE	*Hypericum gramineum*	Narrow-leaf St. John's Wort			x

Growth form / stratum	Family	Scientific name	Common name	Coastal freshwater meadows and forblands of lagoons and wetlands (PCT:782)	Spotted Gum - Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1209)	Spotted Gum - Grey Ironbark - Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1211)
Groundcover	PHORMIACEAE	*Dianella caerulea* var. *caerulea*	Leafy Blue Flax Lily			x
Groundcover	PHYLLANTHACEAE	*Sauropus hirtellus*				x
Groundcover	ASTERACEAE	*Euchiton gymnocephalus*			x	x
Groundcover	CONVOLVULACEAE	*Polymeria calycina*	Woodland Bindweed		x	x
Groundcover	CYPERACEAE	*Cyperus gracilis*	Slender Flat Sedge		x	x
Groundcover	GOODENIACEAE	*Goodenia heterophylla*	Variable-leaf Goodenia		x	x
Groundcover	SCROPHULARIACEAE	*Veronica plebeia*	Trailing Speedwell		x	x
Groundcover	APIACEAE	*Centella asiatica*	Swamp Pennywort		x	x
Groundcover	ASTERACEAE	*Vernonia cinerea* var. *cinerea*	Vernonia		x	x
Groundcover	FABACEAE-FABOIDEAE	*Podolobium scandens*	Netted Shaggy-pea			x
Groundcover	CONVOLVULACEAE	*Dichondra repens*	Kidney Weed		x	x
Groundcover	AMARANTHACEAE	*Alternanthera denticulata*	Lesser Joyweed		x	
Groundcover	ASTERACEAE	*Eclipta platyglossa*	Eclipta		x	
Groundcover	ASTERACEAE	*Lagenophora stipitata*	Bottle-daisy		x	
Groundcover	COMMELINACEAE	*Murdannia graminea*	Grass Lily		x	

Growth form / stratum	Family	Scientific name	Common name	Coastal freshwater meadows and forblands of lagoons and wetlands (PCT:782)	Spotted Gum - Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1209)	Spotted Gum - Grey Ironbark - Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1211)
Groundcover	FABACEAE-FABOIDEAE	*Glycine tomentella*	Woolly Glycine		x	
Groundcover	LOMANDRACEAE	*Lomandra multiflora* subsp. *multiflora*	Many-flowered Mat-rush		x	
Groundcover	RUBIACEAE	*Asperula gemella*	Twin-leaved Bedstraw		x	
Groundcover	VIOLACEAE	*Viola betonicifolia*	Showy Violet		x	
Groundcover	CYPERACEAE	*Carex inversa*	Knob Tassel-sedge		x	
Groundcover	FABACEAE-FABOIDEAE	*Vigna vexillata var. angustifolia*	Wild Cow Pea		x	
Groundcover	LAMIACEAE	*Plectranthus parviflorus*	Cockspur Flower		x	
Groundcover	APIACEAE	*Hydrocotyle tripartita*	Tre-foil Pennywort			
Groundcover	ASTERACEAE	*Centipeda minima* subsp. *minima*	Spreading Sneeze Weed			
Groundcover	ASTERACEAE	*Ozothamnus diosmifolius*	Tall Paperdaisy			
Groundcover	FABACEAE-FABOIDEAE	*Desmodium rhytidophyllum*	Rusty Tick-trefoil			
Groundcover	FABACEAE-FABOIDEAE	*Galactia tenuiflora var. lucida*				
Groundcover	HALORAGACEAE	*Haloragis heterophylla*	Variable Raspwort			
Groundcover	HYPOXIDACEAE	*Hypoxis hygrometrica* var. *villosisepala*	Yellow Weather-grass			

Growth form / stratum	Family	Scientific name	Common name	Coastal freshwater meadows and forblands of lagoons and wetlands (PCT:782)	Spotted Gum - Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1209)	Spotted Gum - Grey Ironbark - Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1211)
Groundcover	LAMIACEAE	*Mentha satureioides*	Creeping Mint			
Groundcover	LOGANIACEAE	*Mitrasacme alsinoides*				
Groundcover	LOMANDRACEAE	*Lomandra filiformis* subsp. *filiformis*	Wattle Mat-rush			
Groundcover	LOMANDRACEAE	*Lomandra longifolia* subsp. *longifolia*	Spiny Mat-rush			
Groundcover	ORCHIDACEAE	*Spiranthes sinensis* var. *australis*	Austral Ladies Tresses			
Groundcover	PHORMIACEAE	*Dianella revoluta* var. *revoluta*	Black-anther Flax Lily			
Groundcover	PHYLLANTHACEAE	*Poranthera microphylla*	Small Poranthera			
Groundcover	RANUNCULACEAE	*Ranunculus lappaceus*	Common Buttercup			
Groundcover	RUBIACEAE	*Opercularia diphylla*	Stinkweed			
Shrub	DILLENIACEAE	*Hibbertia vestita*	Hairy Guinea-flower			x
Shrub	FABACEAE-FABOIDEAE	*Daviesia ulicifolia*	Gorse Bitter-pea			x
Shrub	FABACEAE-MIMOSOIDEAE	*Acacia concurrens*	Curracabah			x
Shrub	PHYLLANTHACEAE	*Breynia oblongifolia*	Breynia		x	
Shrub	THYMELEACEAE	*Pimelea linifolia* subsp. *linifolia*	Slender Rice Flower		x	

Growth form / stratum	Family	Scientific name	Common name	Coastal freshwater meadows and forblands of lagoons and wetlands (PCT:782)	Spotted Gum - Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1209)	Spotted Gum - Grey Ironbark - Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1211)
Shrub	FABACEAE-FABOIDEAE	*Lespedeza juncea*			x	
Shrub	MORACEAE	*Maclura cochinchinensis*	Cockspur Thorn			
Tree - large	MYRTACEAE	*Eucalyptus tereticornis*	Forest Red Gum		x	x
Tree - large	MYRTACEAE	*Eucalyptus siderophloia*	Northern Grey Ironbark		x	x
Tree - large	MYRTACEAE	*Eucalyptus fibrosa*	Broad-leaf Ironbark			x
Tree - large	MYRTACEAE	*Eucalyptus eugenioides*	Thin-leaved Stringybark		x	x
Tree - large	MYRTACEAE	*Corymbia intermedia*	Pink Bloodwood		x	x
Tree - large	MYRTACEAE	*Eucalyptus moluccana*	Grey Box		x	x
Tree - large	MYRTACEAE	*Corymbia henryi*	Spotted Gum		x	x
Tree - large	MYRTACEAE	*Eucalyptus propinqua*	Small-fruited Grey Gum			x
Tree - large	MYRTACEAE	*Angophora subvelutina*	Broad-leaved Apple			
Tree - large	MYRTACEAE	*Eucalyptus seeana*	Narrow-leaved Red Gum			
Tree - medium	RHAMNACEAE	*Alphitonia excelsa*	Red Ash		x	x
Tree - medium	MYRTACEAE	*Lophostemon suaveolens*	Swamp Turpentine			x

Growth form / stratum	Family	Scientific name	Common name	Coastal freshwater meadows and forblands of lagoons and wetlands (PCT:782)	Spotted Gum - Grey Box - Grey Ironbark dry open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1209)	Spotted Gum - Grey Ironbark - Pink Bloodwood open forest of the Clarence Valley lowlands of the NSW North Coast Bioregion (PCT:1211)
Tree - medium	CASUARINACEAE	*Allocasuarina littoralis*	Black She-oak			
Tree - medium	CASUARINACEAE	*Casuarina glauca*	Swamp Oak			
Vine	LUZURIAGACEAE	*Eustrephus latifolius*	Wombat Berry		x	x
Vine	APOCYNACEAE	*Parsonsia straminea*	Common Silkpod		x	
Vine	LUZURIAGACEAE	*Geitonoplesium cymosum*	Scrambling Lily			
Vine	OLEACEAE	*Jasminum suavissimum*				

Appendix B - Weed Species identified on site

Scientific Name	Order/Family	Common name
Aeschynomene villosa	Fabaceae-Faboideae	Villose Jointvetch
Alternanthera pungens	**Amaranthaceae**	**Khaki Weed[2]**
Ambrosia artemisiifolia	**Asteraceae**	**Annual Ragweed[1]**
Andropogon virginicus	**Poaceae**	**Whisky Grass[2]**
Aster subulatus	Asteraceae	Wild Aster
Axonopus compressus	Poaceae	Broad-leaved Carpet Grass
Axonopus fissifolius	**Poaceae**	**Narrow-leaved Carpet Grass[2]**
Baccharis halimifolia	**Asteraceae**	**Groundsel Bush[1, 2]**
Bidens pilosa	Asteraceae	Cobblers Pegs
Centaurium erythraea	Gentianaceae	Common Centaury
Chloris gayana	**Poaceae**	**Rhodes Grass[2]**
Cinnamomum camphora	**Lauraceae**	**Camphor Laurel[2]**
Cirsium vulgare	Asteraceae	Spearthistle
Conyza sp.	Asteraceae	Fleabane
Cyclospermum leptophyllum	Apiaceae	Slender Celery
Eragrostis curvula	**Poaceae**	**African Lovegrass[2]**
Gamochaeta purpurea	Asteraceae	Cudweed
Gomphocarpus fruticosus	Apocynaceae	Narrow-leaved Cotton Bush
Gomphocarpus fruticosus	Asclepiadaceae	Swan Plant
Gomphocarpus physocarpus	Apocynaceae	Balloon Cotton Bush
Gomphocarpus physocarpus	Asclepiadaceae	Balloon Cotton Bush
Hypochaeris radicata	Asteraceae	Catsear
Lantana camara	**Verbenaceae**	**Lantana[1, 2]**
Lespedeza striata	Fabaceae-Faboideae	Japanese Clover
Lupinus sp.	Fabaceae-Faboideae	Lupin

Scientific Name	Order/Family	Common name
Nymphaea capensis	Nymphaeaceae	Cape Waterlily
Paspalum dilatatum	**Poaceae**	**Paspalum[2]**
Paspalum urvillei	Poaceae	Vasey Grass
Plantago lanceolata	Plantaginaceae	Plantain
Richardia stellaris	Rubiaceae	Richardia
Senecio madagascariensis	**Asteraceae**	**Fire Weed[1]**
Setaria Sphacelata	Poaceae	South African Pigeon Grass
Sida rhombifolia	Malvaceae	Paddy's Lucerne
Solanum chenopodioides	Solanaceae	Whitetip Nightshade
Sonchus oleraceus	Asteraceae	Common Sowthistle
Sporobolus africanus	Poaceae	Parramatta Grass
Sporobolus fertilis	**Poaceae**	**Giant Parramatta Grass[2]**
Stenotaphrum secundatum	**Poaceae**	**Buffalo Grass[2]**
Trifolium repens	Fabaceae-Faboideae	White Clover
Verbena bonariensis	Verbenaceae	Purple Top
Verbena rigidus	Verbenaceae	Creeping Verbena

Note: 1 = Noxious Weed under the *Noxious Weeds Act 1993, 2 = High Threat Weed as identified under the draft Biodiversity Assessment methodology (OEH, 2017)*

Appendix C - High Threat Weeds

Species name		
Acacia karroo	*Baccharis halimifolia*	*Chlorophytum comosum*
Acacia nilotica	*Bidens spp. (B. aurea, B. bipinnata, B. pilosa, B. subalternans & B. tripartita)*	*Chrysanthemoides monilifera ssp. monilifera*
Acer negundo	*Brassica tournefortii*	*Chrysanthemoides monilifera subsp. rotundata*
Acetosa sagittata	*Briza subaristata*	*Cinnamomum camphora*
Acetosella vulgaris	*Bromus diandrus*	*Colocasia esculenta*
Achillea millefolium	*Brugmansia x candida*	*Cortaderia jubata*
Rhaponticum repens (syn. Acroptilon repens)	*Bryophyllum delagoense*	*Cortaderia richardii*
Ageratina adenophora	*Cabomba caroliniana*	*Cortaderia selloana*
Ageratina riparia	*Caesalpinia decapetala*	*Corymbia torelliana*
Agrostis capillaris	*Canna indica*	*Cotoneaster spp.*
Ailanthus altissima	*Cardiospermum grandiflorum*	*Crataegus monogyna*
Alternanthera philoxeroides	*Carrichtera annua*	*Crocosmia crocosmiiflora*
Alternanthera pungens	*Carthamus lanatus*	*Cryptostegia grandiflora*
Amelichloa brachychaeta	*Caulerpa taxifolia*	*Cuscuta campestris*
Andropogon virginicus	*Cenchrus ciliaris*	*Cylindropuntia spp (C. fulgida, C. imbricata, C. kleiniae, C. leptocaulis, C. prolifera, C. rosea and C. spinosior)*
Anredera cordifolia	*Cenchrus clandestinum*	*Cyperus eragrostis*
Araujia sericifera	*Cenchrus echinatus*	*Cyperus teneristolon*
Aristolochia elegans (syn. Aristolochia littoralis)	*Cenchrus longisetus*	*Cytisus scoparius*
Arundo donax	*Cenchrus pennisetiformis*	*Delairea odorata*

Species name		
Asparagus aethiopicus	*Cenchrus setaceus*	*Dolichandra unguis-cati (Syn. Macfadyena unguis-cati)*
Asparagus africanus	*Cenchrus setiger*	*Egeria densa*
Asparagus asparagoides	*Cenchrus spinifex (syn. Cenchrus incertus)*	*Ehrharta calycina*
Asparagus plumosus	*Cestrum parqui*	*Ehrharta erecta*
Eichhornia azurea	*Hypoestes phyllostachya*	*Olea europaea*
Eichornia crassipes	*Ipomoea alba*	*Opuntia spp.*
Equisetum arvense	*Ipomoea cairica*	*Parkinsonia aculeata*
Eragrostis curvula	*Ipomoea indica*	*Parthenium hysterophorus*
Erythrina crista-galli	*Ipomoea purpurea*	*Paspalum dilatatum*
Erythrina sykesii	*Juncus acutus*	*Paspalum quadrifarium*
Fraxinus angustifolia	*Juncus articulatus*	*Paspalum wettsteinii*
Galenia pubescens	*Koelreuteria formosana*	*Pereskia aculeata*
Gazania rigens	*Lagarosiphon major*	*Phoenix canariensis*
Genista linifolia	*Lantana camara*	*Phyla canescens*
Genista monspessulana	*Leucanthemum vulgare*	*Phyla nodiflora*
Gleditsia triacanthos	*Ligustrum lucidum*	*Phyllostachys spp. (P. aurea and P. nigra)*
Gloriosa superba	*Ligustrum sinense*	*Pinus spp.*
Gymnocoronis spilanthoides	*Limnobium laevigatum*	*Pistacia chinensis*
Handroanthus chrysotrichus	*Limnobium spongia*	*Pistia stratiotes*
Harrisia martinii	*Limnocharis flava*	*Polygala myrtifolia*
Hedera helix	*Lonicera japonica*	*Polygala virgata*
Heliotropium amplexicaule	*Ludwigia peruviana*	*Populus spp. (P. alba and P. nigra cv. Italica)*
Heteranthera dubia	*Lycium ferocissimum*	*Prosopis glandulosa*
Heteranthera reniformis	*Maclura pomifera*	*Prosopis juliflora*

Species name		
Hieracium aurantiacum	*Megathyrsus maximus*	*Triadica sebifera*
Hydrocotyle ranunculoides	*Melinis minutiflora*	*Ulex europaeus*
Hygrophila costata	*Moraea flaccida*	*Urochloa mutica*
Hygrophila polysperma	*Moraea miniata*	*Vachellia farnesiana*
Hymenachne amplexicaulis	*Myriophyllum spicatum*	*Vinca major*
Hyparrhenia hirta	*Nassella spp.*	*Watsonia meriana*
Hyparrhenia rufa	*Nymphaea mexicana*	*Xanthium occidentale*
Hypericum perforatum	*Ochna serrulata*	*Xanthium spinosum*
Robinia pseudoacacia	*Prosopis pallida*	
Romulea rosea	*Prosopis velutina*	
Rubus fruticosus agg.	*Psidium littorale/cattleianum*	
Sagittaria montevidensis subsp. calycina	*Psilocaulon granulicaule (Psilocaulon tenue)*	
Salix spp.	*Pueraria lobata*	
Salvinia molesta	*Pyracantha spp.*	
Schefflera actinophylla	*Ranunculus repens*	
Schinus terebinthifolius	*Ricinus communis*	
Senecio crassiflorus	*Sporobolus fertilis*	
Senecio glastifolius	*Sporobolus natalensis*	
Senecio jacobaea	*Stenotaphrum secundatum*	
Senecio madagascarensis	*Tamarix spp. (T. aphylla and T. ramosissima)*	
Senna pendula	*Tecoma stans*	
Solanum elaeagnifolium	*Tipuana tipu*	
Solanum seaforthianum	*Tradescantia fluminensis*	
Sorghum halepense	*Trapa natans*	

Appendix 4 - Fauna Rescue and Relocation Procedure

SCOPE

This procedure is applicable to all native and introduced fauna species that are found in the Project site.

PURPOSE

This procedure outlines the correct process to follow for the interaction with any fauna on site during construction activities. In particular the clearing operations. This procedure will cover instances where fauna is shocked, trapped, injured, or if eggs or juvenile fauna are discovered.

TRAINING

This procedure will be communicated during the site induction, during toolboxes and during development of the Activity Method Statements (AMS).

RESPONSIBILITIES

The Principal Environmental Representative for John Holland (PER) in conjunction with the consultant ecologist will have the responsibility of ensuring this procedure is followed.

PROCEDURE

1. Stop work if encountering any Fauna within work area
    - If fauna is not injured allow it to move out of work area. If fauna will not move out of work area due to injury or other reasons contact the PER. The PER is to contact the ecologist or WIRES.

2. For Injured Fauna – to be handled by a person licensed to handle fauna
    - Minimise stress to fauna – cover fauna with large blanket or towel and place in a cotton bag and contain the animal inside a pet carrier
    - Retain the animal in a quiet, warm location that is well ventilated
    - The PER will contact the relevant fauna rescue service and /or local veterinary surgery Contacts are;

WIRES (Rescue Hotline)	**1300 094 737**
WIRES (Northern Rivers – Lismore)	**02 6628 1898**
RSPCA (Tweed Heads)	**07 5536 5135**
Ballina Veterinary Hospital	**02 6686 4889**
Grafton Veterinary Clinic	**02 6642 3681**
Koala Rescue	**02 6622 1233**
Project Ecologist – TBA	**TBA**

    - Once the rescue agency arrives at the site, they are responsible for the animal. Any decisions regarding the care of the animal will be made by the rescue agency2

- In the event the rescue service and/or local veterinary service cannot be contacted, the PER and/or the Ecologist will deliver the injured/captured animal to the rescue agency within 24hrs.

3. For Threatened Fauna Species
    - Advise the Project Manager and cease all work that may affect the threatened species
    - Notify the OEH (threatened species unit) and consult with OEH on proposed Management strategies for the species. DoEE must be also notified if EPBC Act listed threatened species that were not previously identified are found.
    - Do not recommence work likely to affect the threatened species until the OEH have given advice to do so.
    - Relocation of fauna species of conservation significance will be undertaken by WIRES or a suitably qualified fauna specialist in consultation with OEH.
    - PER to record the location, number, species, relocation of the threatened species.

4. For Native Fish
    - Only use a fish friendly landing net to capture the fish
    - Use the water from the pond to 2/3 fill a double plastic bag.
    - Seal tightly, before being placing in a polystyrene container for stability during relocation
    - Identify the species as a native common to the area and if so relocate to a section of water in the same drainage line that is outside of the footprint of construction.

5. For Noxious Fish
    - Noxious fish are to be euthanized using an ice-slurry and disposed of to landfill.

6. For Cane Toads
    - Evidence of the use of sediment basins by Cane toads will be reported to OEH.
    - Cane toads are to be euthanised by using ice slurry until no more movement is detected, then placing in a freezer and disposed of to landfill.

7. For Venomous reptiles, or raptors, etc.
    - Only to be handled by an appropriately trained and registered handler.
    - If the animal cannot be handled (i.e. venomous reptiles), the exact location of the animal is to be recorded and provided to the appropriate rescue agency and all workers to be excluded from the vicinity.

8. Release Process

    If the animal is not injured or stressed it may be released nearby, in accordance with the following:

    - If the species is nocturnal, release will be carried out at dusk.
    - The release area will be as close to the original habitat as possible in an area that is not to be disturbed by the construction.
    - No release would take place during periods of heavy rainfall, unless WIRES or the ecologist determines that the animal is too stressed to be held any longer.
    - PER is to record the details of the release in a Register for relocation of native fauna. This register is also to be used for all Fauna deaths and injuries on site.