Biodiversity Management Sub-plan

The Forest High School

Allambie Road, Allambie NSW

NCA23R159183

28 November 2023

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Biodiversity Management Sub-plan

The Forest High School
Allambie Road, Allambie NSW

Kleinfelder Project: 20231163

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EXECUTIVE SUMMARY

The Forest High School (TFHS) is undertaking a redevelopment in a new location that will include new infrastructure and buildings and associated landscaping. A Biodiversity Management Sub-Plan (BMSP) is required for the TFHS. This is required under Condition B20 of the Development Consent SSD-26876801 (DC) for the TFHS. Condition B20 of the DC for the TFHS requires that the BMSP must address, but not be limited to, the conditions presented in **Table 1**.

Table 1: Compliance Table for Development Consent Condition B20

Condition	Compliance
Be prepared by a suitably qualified and experienced person/s	Prepared by Dr Howard Rogers (PhD Forest Ecology, BSc (Forestry). Howard has over 25 years of experience in ecological assessments across Australia. His CV is provided in **Appendix 1**.
Identify areas of land where impacts on biodiversity are to be avoided as outlined in the Biodiversity Development Assessment Report prepared by SLR and dated June 2023 and set out how these areas will be protected from construction impacts	Generally, any area of native vegetation that is not in the development footprint will be avoided. The PCT. PCT 1786 Sydney ironstone Bloodwood-Silvertop Ash forest requires protection by use of an exclusion zone where outside of the construction footprint. The area of this PCT that is in moderate condition in the southeast corner of the site that is outside of the construction footprint is a no go zone. Two species of planted threatened flora occur on the subject land. These are the Wallangarra White Gum *Eucalyptus scoparia* and Magenta Lilly Pilly *Syzygium paniculatum*, both of which require protection during construction. The above areas will be protected by the management measures provided in **Section 3**. References to Sections of the BDAR applicable to the BMSP are included.
Set out the measures identified in the Biodiversity Development Assessment Report to minimise, mitigate and manage impacts on biodiversity, including timing and responsibility for delivery of the measures	Measures identified in Section 9 of the BDAR have been incorporated onto **Section 3** of this BMSP.
Is consistent with the Vegetation Management Plan as detailed in Condition B22	

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1 INTRODUCTION

1.1 OVERVIEW

The Forest High School (TFHS) is undertaking a redevelopment of outdated infrastructure and buildings to modernise and increase its capacity at a new location. Kleinfelder Australia Pty Ltd was engaged by ADCO Constructions Pty Ltd (ADCO) to prepare a Biodiversity Management Sub-Plan (BMSP) for the project at TFHS. The BMSP is required under Condition B20 of the Development Consent SSD-26876801 (DC) for the TFHS.

Condition B20 States the Biodiversity Management Sub-Plan (BMSP) must address, but not be limited to, the following:

a) *Prepared by a suitably qualified and experienced person/s.*
b) *Identify areas of land where impacts on biodiversity are to be avoided as outlined in the Biodiversity Development Assessment Report prepared by SLR and dated June 2023 and set out how these areas will be protected from construction impacts.*
c) *Set out the measures identified in the Biodiversity Development Assessment Report to minimise, mitigate and manage impacts on biodiversity, including timing and responsibility for delivery of the measures.*
d) *Is consistent with the Vegetation Management Plan as detailed in Condition B22.*

The BMSP should address, but not be limited to, the following:

- Provide information and maps that define the biodiversity values across the site.
- Outline priority investment areas on-site where biodiversity will benefit from active management and restoration, if applicable.
- Map potential areas for management of threatened and significant species.
- Measures to minimise the loss of key fauna habitat, including tree hollows.
- Measures to minimise the impacts to fauna on site, including conducting fauna pre-clearance surveys prior to vegetation clearing, and building/structure demolition.
- Engagement of an appropriately qualified ecologist with experience in capturing native wildlife, to be on site for all vegetation removal activities.
- Controlling weeds and feral pests.
- An Unexpected Finds Procedure, detailing procedures and management measures to be implemented if flora and fauna is uncovered in any area not identified in the updated Biodiversity Assessment Report (BAR).
- Measures to ensure biodiversity values, not intended to be impacted, are protected, including barriers and mapping of protected/'no-go' areas.
- A program to monitor the effectiveness of the measures in the BMSP.

1.2 SITE DESCRIPTION

The Forest High School's new location is at Allambie Road, Allambie Heights, NSW on Lot 750 & 751 DP 1271174, Lot 6 & 7 DP 1280781and Lot 3 DP1280781 (Subject Land). The combined lots have a total area of 4.3 ha (**Figure 1**). The subject land is located within the Northern Beaches Council Local Government Area (LGA), approximately 12 kilometres (km) north from the Sydney central business district. The Subject Land was occupied by an abandoned building, carparks, driveways and mature landscaping in the eastern parts. The western parts of the subject land contain weedy native vegetation and a transmission line in the north, an area of open exotic grassland in the centre and a band of regrowth native vegetation which has been previously identified as Duffys Forest endangered ecological community (EEC) in the south.

1.3 PROPOSED DEVELOPMENT

The Northern Beaches Hospital Structure Plan has nominated the existing The Forest High School (TFHS) site as the location for the new Frenchs Forest Town Centre, part of the Frenchs Forest Planned Precinct (FFPP). To realise this plan and support a whole of government approach to strategic planning, the Department of Education

(DoE) is relocating the existing TFHS to a newly acquired site at 187 Allambie Road, Allambie Heights. The new school will provide capacity for the 2036 projected enrolment demand of 1,847 students. This will be achieved by catchment boundary changes to redistribute 387 students to adjacent schools and by providing a new Stream 9 high school with the following features:

- 73 GLS to allow for 1,460 student enrolments;
- Core facilities of Stream nine High School;
- New synthetic sports field.

The project scope for the Forest High School Education Precinct consists of the following:

- Block A, a two storey building comprising administration, staff, library and classroom facilities;
- Block B (Comprising Blocks B1 and B2), a three storey building comprising general and specialist classroom facilities;
- Block C, a two-storey building containing a library, general classrooms and associated rooms;
- Block D (comprising Blocks D1 and D2), a two-storey building comprising classrooms, laboratories and associated facilities;
- Block E, a two-storey building comprising classroom facilities and special classrooms;
- Block F, a one-to-two-storey gymnasium building and specialist classroom facilities;
- Block G, a two-to-three-storey building containing classrooms, workshops, a theatre and a canteen, with associated facilities;
- Sporting facilities, including new sporting field and games courts;
- Car parking, including at-grade and basement parking areas; and
- Associated earthworks, tree/ stump removal, landscaping, stormwater

Construction of the proposed development will require the permanent removal of 0.43 ha of native vegetation, comprising 0.28 ha of PCT 1786 in moderate condition and 0.15 ha of PCT 1786 in low condition. The removal of the PCT 1786 in moderate condition also represents the permanent removal of 0.28 ha of Duffys Forest EEC, which is also an SAII entity. In relation to threatened species habitat, the removal of PCT 1786 represents removal of non-breeding habitat for the Large-eared Pied Bat.

The proposed development areas are detailed in **Figure 1**.

1.4 Legislation and Guidelines

The following Commonwealth and State Government legislation and policies and Local Government environment and control plans have been considered in the preparation of this BMSP:

- *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- *Environment Planning and Assessment Act 1979* (EP&A Act).
- *Biosecurity Act 2015* (Biosecurity Act).
- *Biosecurity Regulation 2017* (BR).
- *Biodiversity Conservation Act 2016* (BC Act).
- *Biodiversity Conservation Regulation 2017* (BCR).
- State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity Conservation SEPP).

1.5 Information Sources

Information sources utilised in the development of this management plan include:

- Biodiversity Development Assessment Report (BDAR – amended version - SLR Ref No: 630.30197-R01-v4.2-The Forest HS BDAR-20230616.docx, June 2023) for The Forest High School.
- Threatened Species App (Office of Environment and Heritage NSW 2023).
- Threatened Species Profile Database (Office of Environment and Heritage 2023).
- Birds of Australia Digital Edition (Pizzey and Knight 2017).
- Development Consent Conditions for The Forest High School.

- Construction Environmental Management Plan (CEMP) issue checklist.
- Generic CEMP environmental safeguards (SINSW Planning Compliance Team).

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Legend

- HollowBearingTrees
- Eucalyptus scoparia
- Syzygium paniculatum
- Observed Drainage Line
- Construction Footprint
- Operational Footprint
- TFHS_ExclZone
- Buildings and areas of hardstand surfaces
- Non-Native Vegetation
- PCT 1786 Sydney ironstone Bloodwood-Silvertop Ash forest
- Planted Native Vegetation

Scale 1:1,500 (A4) — 0 15 30 60 Metres

N

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PROJECT REFERENCE:	24002593
DATE DRAWN:	10/10/2023 Version 1
DRAWN BY:	StChan
DATA SOURCE:	MetroMap - 2023

The Forest High School Development and Vegetation Zones

ADCO Constructions Pty Ltd
BMP - The Forest High School

FIGURE:

1

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2 BIODIVERSITY VALUES

2.1 VEGETATION COMMUNITIES

A desktop assessment and a flora survey were conducted for vegetation communities and threatened plants at the TFHS in the BDAR. The field surveys determined that the vegetation within the site is characterised by a mix of native (0.76 ha) and exotic vegetation/disturbed lands (3.44).

Regional scale vegetation mapping indicated that there is one large patch of native vegetation within the west of the subject land. The vegetation on the Subject Land is mapped by as PCT 1786 Sydney ironstone Bloodwood-Silvertop Ash forest. PCT 1786 is associated with Duffys Forest Ecological Community in the Sydney Basin Bioregion, which is a threatened ecological community (TEC), listed as 'endangered' under the NSW Biodiversity Conservation Act 2016 (BC Act) (i.e. an 'EEC').

Additional vegetation types mapped nearby are not associated with any TEC and include PCT 1250 Coastal sandstone gully forest and PCT 1845 Coastal shale-sandstone forest.

Field surveys conducted by SLR in 2021 in accordance with BAM 2020 identified small patches of PCT 1786 Sydney Ironstone Bloodwood-Silvertop Ash forest within the western parts of the subject land. One patch in the southwest is in moderate condition and constitutes the Duffys Forest EEC listed under the BC Act.

A revised vegetation map showing the extent of native vegetation (i.e. PCT 1786) within the subject land is presented in **Figure 1**. The area that constitutes the Duffys Creek EEC that will not be impacted by construction is demarcated as an exclusion zone (**Figure 1**).

Direct impact of construction of the proposed development will require the permanent removal of 0.43 ha of native vegetation, comprising 0.28 ha of PCT 1786 in moderate condition and 0.15 ha of PCT 1786 in low condition. The removal of the PCT 1786 in moderate condition also represents the permanent removal of 0.28 ha of Duffys Forest EEC, which is also an SAII entity.

Proposed mitigation measures to minimise indirect impacts to vegetation are detailed in Section 9.2 of the TFHS BDAR.

2.2 FLORA SPECIES

Habitat for threatened flora species was potentially present within the FSH grounds in areas of remnant native vegetation. A total of 14 threatened plant species potentially occurred on site based on the BAM calculator.

The flora survey found two species of threatened flora on the subject land. These were the Wallangarra White Gum *Eucalyptus scoparia* and Magenta Lilly Pilly *Syzygium paniculatum*, both of which had been planted.

A total of 93 species of flora were identified during field surveys in three vegetation strata (**Appendix 2**) of which 77 species were native, and 16 species were exotic to the area or considered weed species.

The Assessment of Impacts for threatened flora undertaken in the TFHS BDAR determined that no threatened species would be significantly impacted and therefore no direct impacts will occur. Sections 8.1, 8.2, 8.3 and 8.4, of the TFHS BDAR contain full details. Proposed mitigation measures to minimise indirect impacts to other vegetation are detailed in Section 9.3 of the TFHS BDAR.

2.3 FAUNA SPECIES

2.3.1 Habitat

The subject land does not contain any large nests or hollows and therefore, does not provide breeding habitat to threatened species of arboreal mammals, owls, cockatoos, or birds of prey. A few of the rough-barked Eucalypt species across the subject land contain very small, narrow fissures which may be suitable roosting habitat for some microchiropteran bats. No caves or crevices suitable for Large-eared Pied Bat were found and no exposed rocky areas suited to breeding of the Broad-headed Snake are present. In general, the subject land is highly

modified and historic evidence suggests the site has been cleared (GML 2022), and possibly used for landfill (Tetra Tech Coffey 2021), so despite the presence of areas of native vegetation habitat quality is relatively low.

2.3.2 Species

The desktop assessment determined that there were 22 species of fauna predicted to occur in the PCTs on the site and a further three species derived from the BAM calculator. The 25 species comprise 14 bird species, 4 species of non-volant mammals, 4 species of bats, 2 species of reptile and 1 species of amphibian. Additionally, the subject land contains no habitat for the listed migratory wetland species and only marginal habitat for three of the listed terrestrial migratory species predicted to occur in the locality (White-throated Needletail, Satin Flycatcher and Spectacled Monarch). Details are provided in Appendix G of the TFHS BDAR report.

One threatened species of fauna, the Grey-headed Flying-fox, was detected during surveys of the subject land. The Grey-headed Flying-fox was observed foraging within the tree canopies of planted native vegetation (in particular of the Swamp Mahogany *Eucalyptus robusta*, and Hills Weeping Fig, *Ficus hillii*) and as a fly-over during nocturnal surveys.

The Assessment of Impacts for threatened fauna determined that removal of human-made structures (i.e. various sheds, shipping containers, pipes and a bridge) could affect threatened microbats, including the Large Bent-winged Bat and Little Bent-winged Bat (if present). Removal of non-native vegetation could affect foraging and roosting behaviours of the Powerful Owl

Proposed mitigation measures to minimise direct and indirect impacts to biodiversity are detailed in Section 8.1 and 8.2 of the TFSH BDAR.

2.4 BIOSECURITY ACT

Fourteen species which require control prior to and post construction of the Project, to ensure they are not spread due to the works, include the high threat species listed in **Table 2**.

Table 2: Weed species requiring control within the Development Site

Family	Scientific Name	Common Name	Weeds of National Significance (WONS)	Priority weeds of the Greater Sydney LLS (Biosecurity Act)	High Threat Weeds (BAM)
Asteraceae	*Ageratina adenophora*	Crofton Weed	-	-	✓
Asteraceae	*Delairea odorata*	Cape Ivy			✓
Asparagaceae	*Asparagus aethiopicus*	Asparagus 'Fern'	-✓	✓	✓
Fabaceae	*Senna pendula var. glabrata*	-			✓
Lamiales	*Ligustrum lucidum*	Large-leaved Privet			✓
Lamiales	*Ligustrum sinense*	Small-leaved Privet			✓
Lauraceae	*Cinnamomum camphora*	Camphor Laurel			✓
Ochnaceae	*Ochna serrata*	Mickey Mouse Plant			✓
Oleaceae	*Olea europaea ssp. cuspidata*	African Olive			✓
Poaceae	*Andropogon virginicus*	Whisky Grass		-	✓

Family	Scientific Name	Common Name	Weeds of National Significance (WONS)	Priority weeds of the Greater Sydney LLS (Biosecurity Act)	High Threat Weeds (BAM)
Poaceae	*Cenchrus clandestinus*	Kikuyu	-	-	✓
Poaceae	*Ehrharta erecta*	Panic Veldtgrass			✓
Poaceae	*Stenotaphrum secundatum*	Buffalo Grass			✓
Verbenaceae	*Lantana camara*	Lantana	✓		✓

2.5 PRIORITY INVESTMENT AREAS

Due to the absence of threatened species and the variable habitat quality the areas of native vegetation for TFHS are not considered a priority investment area.

3 BIODIVERSITY MANAGEMENT

3.1 OVERVIEW

Management measures include the generic environmental safeguards from the SINSW Planning Compliance Team and Section 9 of the TFHS BDAR which contains the general mitigation and management measures for biodiversity values of the TFHS. In many cases the generic environmental safeguards and the BDAR management measures are aligned. These have been incorporated into this BMSP. It should also be noted that exclusion zones are present around the PCTs at TFHS.

3.2 VEGETATION AND FAUNA MANAGEMENT

There is one threatened vegetation community and two species of endangered flora in the TFHS Development Site. The PCT 1786 is present which is associated with Duffys Forest Ecological Community in the Sydney Basin Bioregion, which is a threatened ecological community (TEC), listed as 'endangered' under the NSW Biodiversity Conservation Act 2016 (BC Act) (i.e., an 'EEC').

The endangered species of flora include a planted Wallangarra White Gum *Eucalyptus scoparia* and Magenta Lilly Pilly *Syzygium paniculatum*, both of which require tree protection measures during construction. In addition to the TEC and endangered species of flora, management of other areas of native vegetation is necessary. These areas include small patches of PCT 1786 Sydney Ironstone Bloodwood-Silvertop Ash forest within the western parts of the subject land. These areas had a low integrity score that did not meet the criteria for the Duffys Forest Ecological Community TEC. The PCT areas must be fenced off with appropriate signage where not impacted by construction. Only one small area of PCT 1786 had a sufficient integrity score to meet the requirements for the TEC and is a no-go zone. This area (0.03 ha) is located in the southeast of the Subject Land (**Figure 1**).

Although no threatened fauna is likely to be impacted by the development, foraging and nesting habitat for birds, foraging habitat for insectivorous bats and general habitat for ground dwelling reptiles could be disturbed. No hollow-bearing trees were identified within the construction area or the school grounds by the FHS BDAR. Management of hollow-bearing trees will not be required. Generic and FHS BDAR environmental safeguards prior to construction are included in **Table 3**.

Table 3: Generic Safeguards for Vegetation and Fauna Prior to Construction

No.	Environmental Safeguard
Vegetation Clearing	
1*	Clearing limits will be clearly marked and all site personnel made aware of the clearing limits (**Figure 1**).
2*	Trees to be retained on site will be protected with a protective barrier (e.g., paraweb fencing) so that stockpiling, parking of vehicles and other construction activities do not occur within the dripline of trees.
3*	A tree protection zone (TPZ) will be established around trees to be retained. The TPZ will extend from the dripline of trees and be erected for the duration of works.
4*	Native vegetation cleared from the site shall be mulched and used for revegetation, erosion protection or landscaping works.
5*	Weed and exotic species shall be disposed of off-site at a nearby legally operating landfill site.
6*	Trees to be retained shall be clearly identified for preservation and temporarily protected by "paraweb" fencing placed not less than 3 metres clear of trees where possible, as some retained trees may be less than 3 metres from new and refurbished buildings. There will be no stockpiling or parking of plant/machinery 3 metres from this area.
7	No vegetation shall be burnt.
8	All trees and stumps on or within the limits of clearing which are unable to be removed by clearing methods, shall be removed by grubbing.

No.	Environmental Safeguard
9*	Vegetation, where practical shall be retained to the greatest extent.
10*	Contact shall be made with a trained wildlife handler / ecologist least 2 weeks prior to the commencement of clearing operations to allow them to prepare for the clearing and construction period.
Weed Management	
11	Areas of dense weed infestation are to be treated prior to clearing/construction activities.
12	Confirm that any proposed herbicide will not affect water quality and native flora and fauna.
Inductions	
14*	Plant operators and employees shall be informed of the above requirement through the induction process for the site.

Note: Similar safeguards that were also in the JPPS BDAR Tables 27 and28 are indicated by an *.

Generic environmental safeguards during construction for vegetation and fauna management are listed in **Table 4**.

Table 4: Generic Safeguards for Vegetation and Fauna During Construction.

No.	Environmental Safeguard
Vehicles and Equipment	
1	All vehicles used during the construction process are to stay on existing or constructed roads and tracks, where practicable.
2*	All earthmoving machinery accessing the Construction Site be cleaned of all soil and vegetable matter prior to entry.
3*	Construction vehicle reduction in speed limits to 10 km/h in areas regarded as having higher levels of fauna activity or considered to have increased safety risk.
Vegetation	
5	Monitor works and ensure the TPZ has been appropriately established and protected.
6	All trees to be cleared shall be checked for animals before and after felling.
7	All tree pruning works will be carried out in accordance with AS 4373-1996 Pruning of amenity trees and the Code of Practice Amenity Tree Industry August 1998.
8	If additional tree clearing or substantial tree pruning is required, an arborist will be consulted prior to undertaking the works.
9	In the event of fire or vandalism resulting in the loss of tags or boundary indicators, the Contractor shall re-survey and mark where appropriate.
10	Within temporary disturbance areas that will later be allowed to regenerate, trees are to be cut off at ground level to facilitate coppicing (new growth from the base).
11	The Contractor shall implement protective measures to prevent damage to TPZs and shall ensure that no mechanical damage from plant and equipment occurs to protected areas such as: ▪ fencing to restrict access in the immediate vicinity of an area or an individual tree. ▪ barriers to protect trunks and exposed surface roots. ▪ hand digging where excavation by a mechanical digger is likely to cause damage to roots and limbs. ▪ ground cultivation to restore soil within the dripline. ▪ tying back overhanging branches.
Fauna	

No.	Environmental Safeguard
12	A wildlife carer shall be promptly notified if any native fauna is inadvertently injured during the construction works
13	The taking of domestic animals, particularly dogs and cats, onto the construction site is prohibited.
14	Ensure ongoing maintenance and monitoring of any threatened species or significant trees within the Construction Site.
15	If threatened species not identified in previous surveys are found during clearing surveys, and removal of individuals of these species is necessary, liaison with Department of Planning, Industry and Environment (DPIE) and further assessment is required.
16	Appropriate wildlife handling and care equipment such as leather gloves, breathable bags, blankets, ropes/ties and buckets (as recommended by the fauna handling specialist) is to be on site and with each clearing crew prior to the commencement of any clearing.

Note: Environmental Safeguards that were also in the TFHS BDAR Table 4 are indicated by an *.

Generic environmental safeguards post construction for regeneration and landscaping in relation to vegetation management are listed in **Table 5**.

Table 5: Generic Safeguards for Vegetation and Fauna Post Construction

No.	Environmental Safeguard
1	Regeneration / Landscaping of appropriate areas to begin as soon as possible after clearing and/or construction.
2	All removed trees shall be replaced with local native species of trees, shrubs and groundcover as part of the rehabilitation / landscaping plan.
3	All exposed earthworks areas shall be revegetated as per the Landscape Plan.
4	Cover plants for the purpose of soil stabilisation will be limited to certified clean seed of non-invasive annuals.

Note: Environmental Safeguards that were also in the JPPS BDAR Table 4 are indicated by an *.

Additional environmental safeguards associated with the BDAR Table 4 are listed in **Table 6**. There was no requirement to use tree trunks and larger branches (over 10 cm diameter) to be placed within the existing gardens or new landscaping for wildlife habitat. This is due to the safety hazards and risk of injury to students and staff at TFHS from trips and falls.

Table 6: Additional Environmental Safeguards for fauna taken from the BDAR.

No.	Environmental Safeguard
1	Use noise barriers, or daily/seasonal timing of construction and operational activities to reduce impacts of noise. Install noise barriers along interface of vegetation and development where feasible. Avoid works during evening hours.
2	Using light shields, or daily/seasonal timing of construction and operational activities to reduce impacts of light spill. Artificial lighting should be reduced where possible within the subject land. Lights should be turned off at night (where not required for security) and any essential lighting should be fitted with directional shades to avoid light spill into adjoining areas
3	Use adaptive dust management and monitoring programs to control air quality. Soil/spoil stockpiles are to be covered during high winds. Truck movements monitored and kept to a minimum during high winds. Use of water spray/truck on exposed soils to supress dust where required
4	Relocating habitat features (e.g. fallen timber, hollow logs) from the development or clearing site, to adjacent retained vegetation where vegetation will be fenced off only. Ecologist to undertake a pre- clearance survey of the subject land prior to development to identify any suitable fallen (or to be felled) timber to be relocated. Ecologist to supervise relocation and placement of salvaged habitat features into retained bushland on site
5	No access to any sensitive habitat areas (Exclusion Zones). All exclusion zones to be fenced and sign posted. These include the PCT areas identified in **Figure 1**.

No.	Environmental Safeguard
6	If nesting is observed, an Exclusion Zone of at least 30 m is to be established around the nest site using an exclusion fence. The exclusion fence should allow for the non-flying chicks to move out of the nest area.
7	All site personnel are to be made aware of the location of the nest or roosting areas (if present), the extent of the exclusion zones and when the exclusion zones are in force.

Note: Safeguards that were also in the TFHS BDAR Table 4 are indicated by an *.

Table 7: Additional Environmental Safeguards for prescribed impacts taken from the BDAR.

No.	Environmental Safeguard
1	Install artificial connectivity measures (e.g. glider poles, rope crossings, habitat bridges) to re-establish connections between habitat and favoured transport corridors.
2	Replace habitat provided by human-made structures and non-native vegetation with alternative habitat.
3	Use sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment.
4	Develop control measures that regulate the types of activities that can occur in native vegetation and habitat, including prohibiting the collection of bush rocks.

Note: Safeguards that are covered in other safeguards are not repeated here.

3.3 Weeds and Pest management for Construction Phase

Generic environmental safeguards Prior to Construction are in **Table 8**.

Table 8: Generic Safeguards for Weed Management prior to Construction.

#	Environmental Safeguard
1*	Weed survey to be undertaken by suitably qualified and experienced persons prior to commencement of any construction activities, including site inspections and survey. The consultant is to advise on best practice weed management techniques.
2	Weed or exotic species shall be identified and removed from the site.
3	Fertilisers and manures to be used sparingly as they can stimulate weed growth, seed set and spread.
4	Vegetation to be cleared carefully to minimise the risk of spreading weed propagules.
5	Care must be taken that weeds are not introduced to the area in manures or as contaminants in seed of the desirable species.

Note: Safeguards that were also in the TFHS BDAR Table 4 are indicated by an *.

Generic environmental safeguards during Construction are included in **Table 9**

Table 9: Generic Safeguards for Weed Management during Construction.

#	Environmental Safeguard
1*	Where possible, vehicle movement is to proceed from areas that are relatively weed free and undisturbed to more heavily weed infested areas to ensure that weed spread is not facilitated by the movement of vehicles and machinery.

#	Environmental Safeguard
2	Ongoing monitoring of the construction areas and immediate surrounds to be undertaken to check for weed growth and implement eradication measures if required.
3	Any straw bales used for erosion and sediment control must contain no seed or be wrapped in geofabric.
4*	All weed species and spoil from heavily weed infested areas to be disposed off-site.
5	Pre-emergent herbicides registered for the application to be used to prevent the growth of weeds. As these may also inhibit the regeneration of native species, pre-emergent herbicides shall only be used in conjunction with planting and where weed growth is likely to be a problem, i.e., in areas with existing infestations of weeds that are significant problems for agriculture or the environment.
6	Selective grass herbicides to be used for grass weeds in areas re-vegetated with non-grass species.
7	Where possible, vehicle movement is to proceed from areas that are relatively weed free and undisturbed to more heavily weed infested areas to ensure that weed spread is not facilitated by the movement of vehicles and machinery.
8	Remove any weed waste material and have a reasonable period of site maintenance so that weeds do not re-establish.

Note: Safeguards that were also in the TFHS BDAR Table 4 are indicated by an *.

3.4 Unexpected Finds

Appropriate actions required for unexpected will be discussed between the construction contractor and the ecologist and include contact and reporting to the NSW Department of Environment. Unexpected finds of any threatened flora or fauna species shall be recorded with the location it was found and the location it was translocated to, recorded with a GPS. An Unexpected Finds register shall be kept by Richard Crookes Construction.

3.5 Monitoring Program

Due the nature of the vegetation and its clearing, the ecologist will assess that no excess vegetation has been removed at the completion of the project and provide the results to the Department of Education. Monitoring requirements are presented in the VMP for THFS.

4 REFERENCES

Office of Environment and Heritage (2023) Threatened Biodiversity Profile Database https://www.environment.nsw.gov.au/threatenedspeciesapp/.

Office of Environment and Heritage NSW (2023) Threatened Species App https://www.environment.nsw.gov.au/threatenedSpeciesApp/.

Pizzey G. & Knight F. (2017) *Birds of Australia Digital Edition V1.5*. 8th edn. Gibbon Multimedia (Aus) Pty Ltd, Craigieburn, Australia.

SLR (2023) *The Forest High School Biodiversity Development Assessment Report*. SLR Consulting Australia Pty Ltd, New Lambton NSW.

APPENDIX 1: HOWARD ROGERS CV

Howard Rogers

Technical Director - Ecology

Howard has 25 years' experience working as an ecologist, forest scientist and technical forestry/land use advisor. He specialises in the ecology, monitoring, management, and use of forests, with a focus on northern Australia, Papua New Guinea, and Pacific Islands. His skills include baseline flora assessments, vegetation and habitat mapping, ecosystem health monitoring (vegetation & soils) including the impacts of refinery emissions and ground water contaminants on vegetation and soil, including dry and wet deposition (acid rain), ecosystem restoration and rehabilitation including specifications, quantitative milestone and completion criteria and monitoring as applicable to progressive rehabilitation and closure plans (PRCPs). Howard has worked on extensive rehabilitation projects for LNG infrastructure, including designing rehabilitation specifications to minimise impacts on LNG pipeline infrastructure. He also has extensive experience in forest dieback assessments related to Phytophthora and mine related inundation, baseline weed/biosecurity assessments and management plans, commercial forestry assessments, and the impacts of changes in natural resource use/ecosystem services on traditional communities. His field experience includes extensive remote area operations from Papua New Guinea, the Solomon Islands, northern Australia, East Timor and Tanzania, as well as projects in New Zealand, the UK and Indonesia, which provides Howard with a level of experience and adaptability when undertaking assessments in unfamiliar locations.

Education

PhD

Bachelor of Science (Hons)

Recent Project Experience

Ecological Risk Assessment for ARTC, South Australia 2023

- Field assessment along 103 km of rail corridor between Adelaide and Murray Bridge to develop ecological risk mapping for flora and fauna.

Operational Area Management Plans for two Anglo American biodiversity offsets in central

- Reporting on offset management compliance to improve net biodiversity gain across the offset areas.

Ecology impact assessment for Pialba road upgrades for Transport and Main Roads, 2022

- Regulated vegetation mapping verification, protected plant flora survey, koala habitat assessment, marine plant assessment and associated advice on clearing permits.

Ecological survey of the proposed Stapylton Sewage Treatment and pipeline for the Gold Coast City Council, 2021

- Vegetation survey to verify the regional ecosystem mapping and targeted searches for rare plants and marine plants.

QAL Ground Water Dependent Ecosystem (GDE) monitoring plan, 2022

- Development of a GDE monitoring plan for coastal woodland, saltmarsh and mangroves potentially impacted by groundwater drawdown from the Wapentake Creek seepage trench.

Rio Tinto Iron Ore Hope Downs, 2023

- Development of milestone and completion criteria for the native ecosystem PMLU.

Rio Tinto Iron Ore Tom Price Mine way forward planning, 2023

- Trial development for eradication of an infestation of Athel Pine (Tamarix aphylla). Development of a trial for the eradication of Athel Pine from the tailings storage facility and the wider landscape.

Rehabilitation Monitoring at Burton Coal Mine – Peabody Energy, Qld, 2022

- Rehabilitation monitoring for progressive certification for the Post Mining Land use of Beef Cattle Grazing. Assessment of permanent monitoring transects for stem density, species richness, ground cover, non-native plant infestations, gully erosion and pasture biomass. Reporting of rehabilitation performance against EA completion criteria.

Meandu Mine revegetation plan for the Progressive Rehabilitation and Closure Plan, Qld, 2022

- Reporting on the revegetation technical specifications for the PMLU of native ecosystem, steep rocky ecosystems, and beef cattle grazing.

Rehabilitation Monitoring at Meandu Coal Mine, 2021

- Rehabilitation monitoring based on the Queensland BioCondition Assessment Methodology and associated rapid assessment methodology for one year old rehabilitation.

Kianga Creek Revegetation Trial #2 at Dawson Mine (Anglo Coal), Qld,
Rehabilitation Monitoring at Coronado Curragh Coal Mine, Qld, 2021

- Rehabilitation monitoring for progressive certification for the Post Mining Land use of Open Woodland with Light Beef Cattle Grazing. Assessment of permanent monitoring transects for canopy cover, species richness, ground cover, non-native plant infestations, gully erosion and pasture biomass. Reporting of rehabilitation performance against EA completion criteria and BioCondition reference site scores.

Rehabilitation Planning Trial for Ok Tedi Mining, Papua New Guinea, 2020

- Design and implementation of a rehabilitation trial for the Ok Tedi gold mine at a very high rainfall site requiring management of AMD and soil engineering from locally available materials.

Three species of plants, four reptiles, 21 birds and four mammals of conservation significance were listed as possibly using habitat within five km of the proposed new roadway, but most of these used habitats not found in the pathway of the new roadway. It was considered that it is highly unlikely any fauna of conservation significance will be affected by the project. However, there may be some impact on possums and gliders due to the removal of hollow-bearing trees.

Management for Biodiversity in Fenced Riparian Zones on Grazing Properties – Fitzroy Basin Association

Kevin designed, managed and reported on the project for the flora, mammals, birds and reptiles. The project assessed if the fencing of Riparian Zones enhanced biodiversity within the riparian zone and adjacent area. Forty site were established in five sub-catchment areas of the Fitzroy River Basin that contained a range of riparian and adjacent sites that had been traditionally managed or managed for biodiversity values, i.e. fenced riparian zone. There was evidence that in areas where grazing regimes had changed in conjunction with fencing for a period exceeding 5 years, vegetation structure was more complex and exotic plants were less numerous. Other factors influencing vegetation structure were sub-catchment, the land zone and level of clearing. The overall diversity of non-bird vertebrate species was positively influenced by the fencing and associated changed grazing regimes. Reptile and ground mammal diversity of native species was greater in the fenced riparian zones and their adjacent forested areas than the equivalent non-fenced riparian zones. Complexity of habitat was also a positive influence. In contrast, exotic vertebrates were negatively influenced by the grazing management associated with fencing of riparian zones. Generally, birds were not sensitive to the grazing management, although bird species richness, abundance and assemblages were influenced by landscape position and vegetation.

APPENDIX 2: FLORA SPECIES LIST

No.	Family	Species Name	Common Name	BAM Growth Form	Duffys Forest sp. (Yes/No)	PCT 1786 sp. (Yes/No)	Status
1	Amaryllidaceae	*Agapanthus* sp.	-	Exotic	No	No	-
2	Apiaceae	*Centella asiatica*	Indian Pennywort	Forb	No	No	-
3	Apiaceae	*Platysace linearifolia*	-	Shrub	Yes	Yes	-
4	Apiaceae	*Xanthosia tridentata*	Rock Xanthosia	Shrub	Yes	Yes	-
5	Apocynaceae	*Gomphocarpus fruticosus*	Narrow-leaved Cotton Bush	Non-HTW	No	No	-
6	Apocynaceae	*Marsdenia suaveolens*	Scented Marsdenia	Vine	No	No	-
7	Apocynaceae	*Vinca major*	Greater Periwinkle	HTW	No	No	-
8	Araliaceae	*Hydrocotyle sibthorpioides*	-	Forb	No	No	-
9	Asparagaceae	*Asparagus aethiopicus*	Asparagus 'Fern'	HTW	No	No	-
10	Asparagaceae	*Lomandra longifolia*	Spiny-headed Mat-rush	Rush	Yes	No	-
11	Asparagaceae	*Lomandra obliqua*	-	Rush	Yes	Yes	-
12	Asphodelaceae	*Dianella caerulea* var. *caerulea*	Blue Flax Lily	Rush	Yes	No	-
13	Asteraceae	*Ageratina adenophora*	Crofton Weed	Forb	No	No	-
14	Asteraceae	*Cirsium vulgare*	Spear Thistle	Non-HTW	No	No	-
15	Asteraceae	*Delairea odorata*	Cape Ivy	HTW	No	No	-
16	Asteraceae	*Ozothamnus diosmifolius*	White Dogwood	Shrub	No	No	-
17	Berberidaceae	*Nandina domestica*	Japanese Sacred Bamboo	Non-HTW	No	No	-
18	Casuarinaceae	*Allocasuarina littoralis*	Black She-oak	Tree	Yes	Yes	-
19	Commelinaceae	*Commelina cyanea*	-	Forb	No	No	-
20	Convolvulaceae	*Dichondra repens*	Kidney Weed	Forb	No	No	-
21	Cyatheaceae	*Cyathea australis*	Rough Tree-fern	Tree fern	No	No	-
22	Cyperaceae	*Gahnia aspera*	Rough Saw-sedge	Sedge	No	No	-
23	Cyperaceae	*Gahnia clarkei*	Tall Saw-sedge	Sedge	No	No	-

No.	Family	Species Name	Common Name	BAM Growth Form	Duffys Forest sp. (Yes/No)	PCT 1786 sp. (Yes/No)	Status
24	Cyperaceae	*Lepidosperma laterale*	-	N	Yes	Yes	-
25	Cyperaceae	*Schoenus melanostachys*	Black Bog-rush	Rush	No	No	-
26	Dennstaedtiaceae	*Pteridium esculentum*	Common Bracken	Fern	Yes	No	-
27	Dilleniaceae	*Hibbertia aspera*	Rough Guinea Flower	Shrub	No	No	-
28	Droseraceae	*Drosera auriculata*	-	Forb	No	No	-
29	Ericaceae	*Epacris pulchella*	Wallum Heath	Heath shrub	Yes	Yes	-
30	Ericaceae	*Leucopogon juniperinus*	Prickly Beard-heath	Heath shrub	No	No	-
31	Euphorbiaceae	*Homalanthus populifolius*	Bleeding Heart	Tree	No	No	-
32	Fabaceae	*Acacia binervia*	Coastal Myall	Tree	No	No	-
33	Fabaceae	*Acacia longifolia* ssp. *longifolia*	Sydney Golden Wattle	Tree	No	No	-
34	Fabaceae	*Acacia myrtifolia*	Red-stemmed Wattle	Tree	Yes	Yes	-
35	Fabaceae	*Acacia parramattensis*	Parramatta Wattle	Tree	No	No	-
36	Fabaceae	*Acacia saligna*^	Golden Wreath Wattle	Non-HTW	No	No	-
37	Fabaceae	*Dillwynia retorta*	-	Shrub	Yes	Yes	-
38	Fabaceae	*Glycine tabacina*	-	Vine	No	No	-
39	Fabaceae	*Senna pendula* var. *glabrata*^	-	HTW	No	No	-
40	Gleichenaceae	*Gleichenia dicarpa*	Pouched Coral Fern	Fern	No	No	-
41	Goodeniaceae	*Dampiera stricta*	-	Forb	Yes	Yes	-
42	Halogaraceae	*Gonocarpus teucrioides*	Raspwort	Forb	Yes	No	-
43	Iridaceae	*Patersonia sericea*	Silky Purple-flag	Herb	Yes	No	-
44	Lamiaceae	*Westringia eremicola*	Slender Westringia	Shrub	No	No	-
45	Lauraceae	*Cinnamomum camphora*^	Camphor Laurel	HTW	No	No	-
46	Lindsaeaceae	*Lindsaea linearis*	Screw Fern	Fern	Yes	Yes	-
47	Lindsaeaceae	*Lindsaea microphylla*	Lacy Wedge Fern	Fern	Yes	No	-

No.	Family	Species Name	Common Name	BAM Growth Form	Duffys Forest sp. (Yes/No)	PCT 1786 sp. (Yes/No)	Status
48	Malvaceae	*Sida rhombifolia*^	Paddy's Lucerne	Non-HTW	No	No	-
49	Moraceae	*Ficus hillii*^	Hills Weeping Fig	Non-HTW	No	No	-
50	Myrtaceae	*Callistemon linearis*	Narrow-leaved Bottlebrush	Shrub	No	No	-
51	Myrtaceae	*Elaeocarpus reticulatus*	Blueberry Ash	Tree	No	No	-
52	Myrtaceae	*Eucalyptus scoparia*	Wallangarra White Gum	Tree	No	No	-
53	Myrtaceae	*Kunzea ambigua*	Tick Bush	Shrub	No	No	-
54	Myrtaceae	*Leptospermum polygalifolium*	Tantoon	Shrub	No	No	-
55	Myrtaceae	*Melaleuca armillaris*	Bracelet Honey-myrtle	Tree	No	No	-
56	Myrtaceae	*Melaleuca hypericifolia*	Hillock Bush	Shrub	No	No	-
57	Nephrolepidaceae	*Nephrolepis exaltata*^	Boston Fern	Non-HTW	No	No	-
58	Ochnaceae	*Ochna serrata*^	Mickey Mouse Plant	HTW	No	No	-
59	Oleaceae	*Ligustrum lucidum*^	Large-leaved Privet	HTW	No	No	-
60	Oleaceae	*Ligustrum sinense*^	Small-leaved Privet	HTW	No	No	-
61	Oleaceae	*Olea europaea* ssp. *Cuspidate*^	African Olive	HTW	No	No	-
62	Orchidaceae	*Acianthus fornicatus*	Pixie Caps	Forb	No	No	-
63	Passifloraceae	*Passiflora edulis*^	Common Passionfruit	Non-HTW	No	No	-
64	Phyllanthaceae	*Glochidion ferdinandi*	Cheese Tree	Tree	No	No	-
65	Picrodendraceae	*Micrantheum ericoides*	-	Heath shrub	Yes	Yes	-
66	Picrodendraceae	*Opercularia hispida*	Hairy Stinkweed	Forb	No	No	-
67	Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum	Tree	No	No	-
68	Plantaginaceae	*Veronica plebeia*	Trailing Speedwell	Forb	No	No	-
69	Poaceae	*Andropogon virginicus*^	Whisky Grass	HTW	No	No	-
70	Poaceae	*Anisopogon avenaceus*	Oat Speargrass	Grass & grass-like	Yes	No	-
71	Poaceae	*Cenchrus clandestinus*^	Kikuyu	HTW	No	No	-

No.	Family	Species Name	Common Name	BAM Growth Form	Duffys Forest sp. (Yes/No)	PCT 1786 sp. (Yes/No)	Status
72	Poaceae	*Ehrharta erecta*^	Panic Veldtgrass	HTW	No	No	-
73	Poaceae	*Entolasia stricta*	Wiry Panic	Grass & grass-like	Yes	Yes	-
74	Poaceae	*Paspalum urville*^*i*	Vasey Grass	Non-HTW	No	No	-
75	Poaceae	*Setaria parviflora*^	-	Non-HTW	No	No	-
76	Poaceae	*Stenotaphrum secundatum*^	Buffalo Grass	HTW	No	No	-
77	Poaceae	*Tetrarrhena juncea*	Wiry Ricegrass	Grass & grass-like	Yes	No	-
78	Poaceae	*Themeda triandra*	Kangaroo Grass	Grass & grass-like	No	No	-
79	Polypodiaceae	*Platycerium bifurcatum*	Elkhorn Fern	Fern	No	No	-
80	Proteaceae	*Grevillea linearifolia*	Linear-leaf Grevillea	Shrub	Yes	No	-
81	Proteaceae	*Hakea dactyloides*	Finger Hakea	Shrub	Yes	Yes	-
82	Proteaceae	*Hakea salicifolia*	Willow-leaved Hakea	Shrub	No	No	-
83	Proteaceae	*Hakea sericea*	Needlebush	Shrub	Yes	No	-
84	Proteaceae	*Hakea teretifolia*	Needlebush	Shrub	Yes	No	-
85	Proteaecea	*Banksia ericifolia* ssp. *ericifolia*	Heath-leaved Banksia	Heath shrub	No	No	-
86	Proteaecea	*Banksia integrifolia* ssp. *integrifolia*	Coast Banksia	Shrub	No	No	-
87	Proteaecea	*Banksia serrata*	Old-man Banksia	Shrub	Yes	Yes	-
88	Rosaceae	*Cotoneaster glaucophyllus*^	Glaucous Cotoneaster	Non-HTW	No	No	-
89	Schizaeaceae	*Schizaea bifida*	Forked Comb Fern	Fern	No	No	-
90	Smilacaceae	*Smilax glyciphylla*	Sweet Sarsaparilla	Vine	No	No	-
91	Verbenaceae	*Lantana camara*^	Lantana	HTW	No	No	-
92	Verbenaceae	*Verbena bonariensis*^	Purpletop	Non-HTW	No	No	-
93	Zingiberaceae	*Hedychium gardnerianum*^	Ginger Lily	Non-HTW	No	No	-

^ Denotes introduced species or species not native to the local area

APPENDIX 3: FAUNA LIST

No.	Scientific Name	Common Name	Status		Observation Type*
			BC Act	EPBC Act	
1	*Alectura lathami*	Australian Brush-turkey	-	-	IR camera
2	*Anthochaera carunculata*	Red Wattlebird	-	-	Sighted
3	*Anthochaera chrysoptera*	Little Wattlebird	-	-	Sighted
4	*Crinia signifera*	Common Eastern Froglet	-	-	Calling
5	*Dacelo novaeguineae*	Laughing Kookaburra	-	-	Sighted
6	*Gymnorhina tibicen*	Australian Magpie	-	-	Sighted
7	*Hirundo neoxena*	Welcome Swallow	-	-	Sighted
8	*Manorina melanocephala*	Noisy Miner	-	-	Sighted, IR camera
9	*Microeca fascinans*	Jacky Winter	-	-	Sighted
10	*Psophodes olivaceus*	Eastern Whipbird	-	-	Calling
11	*Rhipidura albiscapa*	Grey Fantail	-	-	Sighted
12	*Sphecotheres vieilloti*	Australasian Figbird	-	-	Sighted
13	*Strepera graculina*	Pied Currawong	-	-	Sighted
14	*Trichoglossus haematodus*	Rainbow Lorikeet	-	-	Sighted
15	*Oryctolagus cuniculus*^	Rabbit	-	-	Sighted, IR camera
16	*Perameles nasuta*	Long-nosed Bandicoot	-	-	Spotlight, IR camera
17	*Pseudocheirus peregrinus*	Common Ringtail Possum	-	-	Sighted, IR camera
18	*Pteropus poliocephalus*	Grey-headed Flying-fox	VU	VU	Spotlighted
19	*Rattus rattus*^	Black Rat		-	Spotlight, IR camera
20	*Trichosurus vulpecula*	Common Brushtail Possum	-	-	Spotlight, IR camera
21	*Vulpes vulpes*^	Fox	-	-	IR camera
22	*Wallabia bicolor*	Swamp Wallaby	-	-	Spotlight, IR camera
23	*Varanus varius*	Lace Monitor	-	-	IR camera

No.	Scientific Name	Common Name	Status		Observation Type*
24	*Tachyglossus aculeatus*	Short-beaked Echidna	-	-	IR camera

^ Denotes introduced species.