1.3 PROPOSED DEVELOPMENT

The proposed development seeks to upgrade Forest High School. The upgrade consists of the following alterations and additions:

- one and two storey buildings for the purposes of administration, general and specialist learning, special support unit facilities, a canteen, a library, a gymnasium and multi-purpose hall;
- outdoor sporting facilities including sporting field and games courts;
- covered outdoor learning area (COLA) and covered outdoor working area;
- underground staff car park, and bicycle and scooter parking spaces;
- associated earthworks, tree removal, landscaping, stormwater works, service upgrades, supporting infrastructure and signage; and
- use of facilities outside of school hours.
- The proposed development area is 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 MMP:

- *Biodiversity Conservation Act 2016* (BC Act).
- *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation).
- *Water Management Act 2000.*

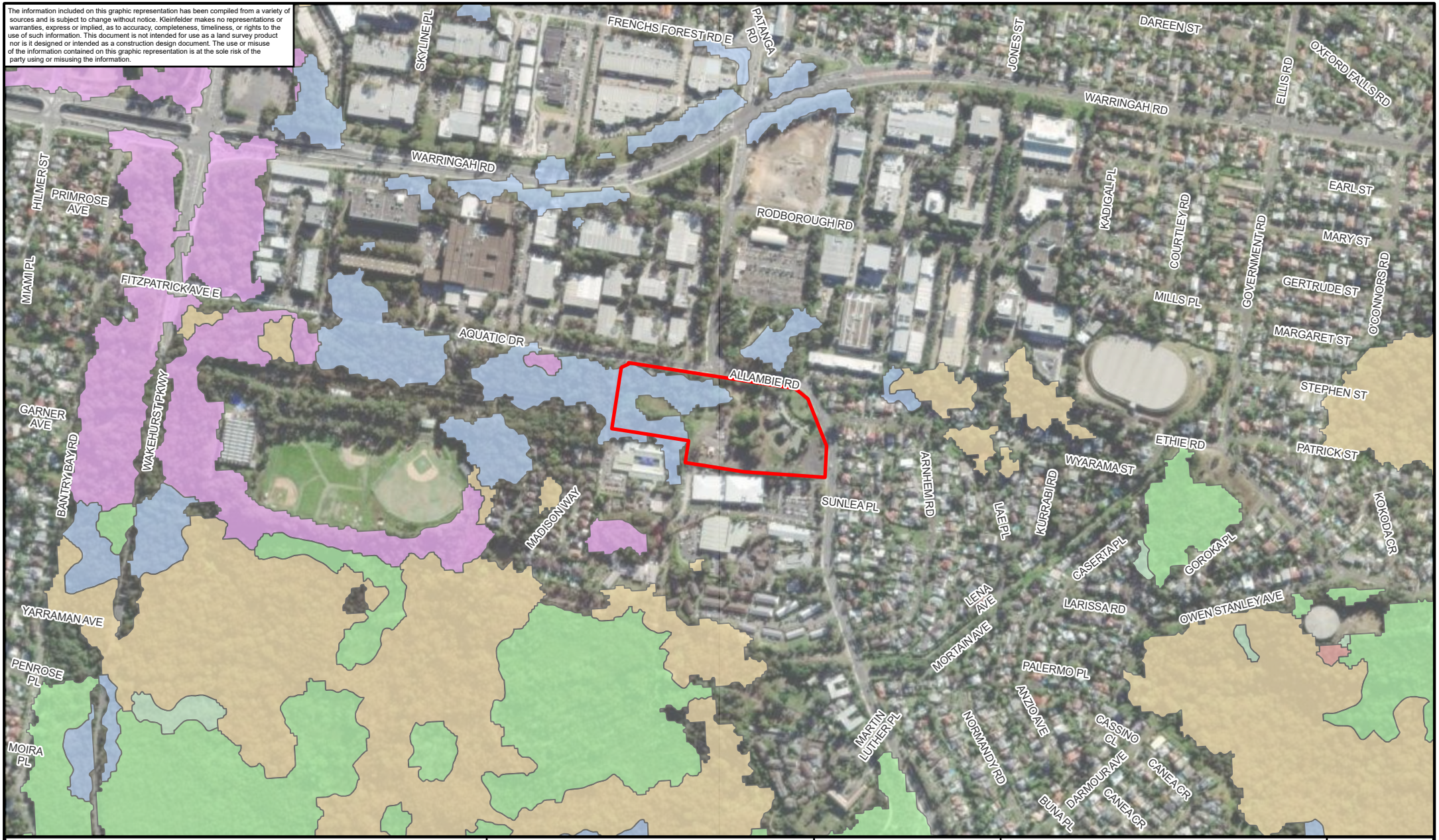
Local Environmental Planning Instruments include:

- SEPP (State and Regional Development) 2011.
- State Environmental Planning Policy (Planning Systems) 2021.
- State Environmental Planning Policy (Biodiversity and Conservation) 2021.
- *Warringah Local Environmental Plan 2011*.

1.5 INFORMATION SOURCES

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

- Biodiversity Development Assessment Report (BDAR) for the Forest High School (SLR 2023).
- Threatened Species App (Office of Environment and Heritage NSW 2023a).
- Threatened Species Profile Database (Office of Environment and Heritage NSW 2023b).
- SSD- 26876801 Development Consent for The Forest High School.
- Construction Management Plan (CMP).
- Generic CEMP environmental safeguards (SINSW Planning Compliance Team).
- Environmental Impact Statement (EIS) State Significant Development (SSD-26876801) (DFP Planning Pty Ltd 2022).



Legend

- Site Boundary

Plant Community Type (PCT)

- PCT 3038 - Sydney Coastal Coachwood Gallery Rainforest
- PCT 3259 - Sydney Coastal Shale-Sandstone Forest
- PCT 3592 - Sydney Coastal Enriched Sandstone Forest
- PCT 3593 - Sydney Coastal Sandstone Bloodwood Shrub Forest
- PCT 3595 - Sydney Coastal Sandstone Gully Forest
- PCT 3814 - Woronora Plateau Heath-Mallee

Scale 1:8,000

0 40 80 160 240 320 400 Metres

N

KLEINFELDER
Bright People. Right Solutions.
www.kleinfelder.com

PROJECT REFERENCE:	24002593
DATE DRAWN:	13/10/2023 Version 1
DRAWN BY:	RHourigan
DATA SOURCE:	ESRI - 2023

Regional Vegetation Mapping

ADCO
The Forest High School
Allambie Rd, Allambie Heights NSW

FIGURE:

2

J:\00 CLIENT FILES\125103_ADCO\24002593.001A - BMP The Forest High School\24002593_ForestHighSchool_PCT.aprx (Fig02_Veg_A4L)

2 MICROBAT

2.1 MICROBAT ECOLOGY

2.1.1 Habitat

The ecosystem credit species list derived a list of predicted species of microbats, as listed in Table 13 of FHS BDAR. These species were then further assessed to determine need for targeted species surveys, to which none of the microbats were targeted. Instead of the targeted surveys, to determine the presence of microbat species, habitat requirements such as caves, or overhangs or crevices, cliffs or escarpments, or old mines, tunnels, culverts, derelict concrete buildings and trees with bark fissures were assessed within the subject land, opportunistically while other targeted faunal species were surveyed. The subject land has rocky areas and potential cliff lines within 2km of the subject land, which may be used by Large-eared Pied Bat (*Chalinolobus dwyeri*). Surveys were not conducted for Large-eared Pied Bats, however, research into habitat requirements for the assumption of presence informed the polygon mapped in Figure 9 of the FHS BDAR. Field surveys, as a requirement of the BDAR, determined no key terrestrial habitat features identified within 100m of the subject land and assessed that the site does not represent breeding habitat of microbat species in the FHS BDAR (**Section 5.6**). The subject land is highly modified and historic evidence suggests the site has been cleared and possibly used for landfill, additionally the site is considered too degraded for many species. No threatened microbat species or habitat features required by these species were identified within the subject land during the field survey.

2.1.2 Species

BioNet search identified 26 species of microbats, nine of which are threatened species, within a 10km radius of the subject land. Additionally, the Protected Matters Search identified one threatened microbat species within a 5km radius of the subject land, Large-eared Pied Bat (*Chalinolobus dwyeri*). Table 13 of the FHS BDAR has three predicted ecosystem credit species, Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*), Little Bent-winged Bat (*Miniopterus australis*), Large Bent-winged Bat (*Miniopterus orianae oceanensis*) assumed to be present within the vicinity of the subject land.

- Large-eared Pied Bat (*Chalinolobus dwyeri*) is distributed from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and Northwest Slopes. Large-eared Pied Bats are generally found in areas with extensive cliff crevices and caves, frequenting low to mid-elevation dry open forest and woodland close to gullies. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. During the coolest months of the year, Large-eared Pied Bats are likely to torpor. This species is listed as Vulnerable on the BC Act and EPBC Act.

- Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*) is distributed from southern Queensland to southern New South Wales. The species occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Eastern Coastal Free-tailed Bats roost mainly in tree hollows but will also roost under bark or in man-made structures (Churchill, 2008). This species is listed as Vulnerable on the BC Act.

- Little Bent-winged Bat (*Miniopterus australis*) is distributed between northern Queensland to southern New South Wales, along the Great Dividing Range. Little Bent-winged Bat are generally found in well-timbered areas utilising moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests, and banksia scrub for foraging. The species roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. Maternity colonies form in spring, when pregnant females migrate to maternity caves for birthing and raising their offspring over summer months. Males and juveniles disperse in summer. This species is listed as Vulnerable on the BC Act.

- Large Bent-winged Bat (*Miniopterus orianae oceanensis*) is distributed from southern Queensland to northern Victoria, along the Great Dividing Range. Large Bent-winged Bat are generally found in well-timbered areas utilising moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests, and banksia scrub for foraging. The species roost in caves as the primary habitat, but also use derelict mines, storm-water tunnels, buildings, culverts, and other man-made structures. Large Bent-winged Bat females migrate to specific temperature and humidity regulated limestone maternity caves in late spring/early summer and return to coastal roots in March/April. During the coolest months of the year, Large Bent-winged Bats are likely to torpor. This species is listed as Vulnerable on the BC Act.

The Impact Assessments for threatened species, Section 8 of the FHS BDAR, determined that the proposed activity would not have an expected impact on threatened microbat species. Proposed mitigation measures to minimise indirect impacts to fauna and habitat are detailed in Section 9 of the FHS BDAR.

3 KEY THREATS

3.1 VEGETATION CLEARANCE

3.1.1 Vegetation clearance impacts

Vegetation clearing can result in several direct and indirect impacts to microbats and their habitat. The proposed development will require the clearance of 0.45ha of PCT 1786. There were no hollow-bearing trees identified within the survey, however, there is potential for removal of native vegetation that may possess bark fissures suitable for Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*) roosting.

- Construction Phase:
    - Inadvertent impacts on adjacent habitat or vegetation, such as accidental clearing or damage of adjacent habitat, soil disturbance, and weed incursion.
    - Disorientation of fauna during vegetation clearing, causing fauna to head towards potential threats.
    - Increased vegetation clearance can change foraging availability of microbats.
    - Reduced viability of adjacent habitat due to edge effects, vibration and other noise, dust, or rubbish pollution affecting vegetation growth and attracting predators of microbats to the subject land.

- Operational Phase:
    - The proposed development activity may result in increased rubbish pollution within the adjacent habitat, affecting vegetation growth and attracting predators of microbats to the subject land.
    - Accidental vegetation clearing in adjacent habitat.
    - Increased open space in canopy that leave microbats vulnerable to predation.

3.2 DEMOLITION OF HUMAN-MADE STRUCTURES

3.2.1 Demolition impacts

Microbat species such as the Large Bent-winged Bat (*Miniopterus orianae oceanensis*) and Little Bent-winged Bat (*Miniopterus australis*) have been known to occupy human-made structures. There is a culvert drainage ditch on the southern end of the subject land, which constitutes as a human-made structure. Any human-made structure within the project boundary is intended to be demolished per the development plans in Appendix A of the FHS BDAR. Potential impacts of the demolition works are:

- Inadvertent impacts on adjacent habitat or vegetation, such as accidental clearing or damage of adjacent habitat, soil disturbance, and weed incursion.
- Disorientation of fauna when vegetation clearing toward potential threats.
- Increased vegetation clearance can change foraging availability of microbats.
- Reduced viability of adjacent habitat due to edge effects, vibration and other noise, dust, or rubbish pollution.
- The proposed development activity may result in increased rubbish pollution within the adjacent habitat, affecting vegetation growth and attracting predators to the area.
- Accidental vegetation clearing in adjacent habitat.
- Increased open space that leave microbats vulnerable to predation.

Mitigation measures to minimize impacts to and implement exclusion zones for the microbats that may potentially occupy human-made structures are outlined in **Section 4.2.1** of this report.

3.3 LIGHTING POLLUTION

3.3.1 Light pollution impacts

Urban developments can result in several indirect impacts pertaining to microbats and their habitat including increased lighting (light pollution) and quality. Light pollution impacts, pertaining to the proposed development, include the following:

- Construction Phase:
    - Inadvertent impacts such as light pollution and frequency of light pollution on adjacent habitat or vegetation.
    - Increased lighting in construction activities or security at night can change microbat foraging behaviour.
    - Reduced viability of adjacent habitat due to edge effects, noise, dust, or light spill.

- Operational Phase:
    - The proposed development activity may result in increased/inappropriate lighting within the adjacent habitat.
    - Increased noise, vibration, and light pollution from vehicle movements/machinery.

Mitigation measures to address the impacts from light pollution are addressed in **Section 4.2** of this report.

4 MICROBAT MANAGEMENT

4.1 OVERVIEW

Management measures include the generic environmental safeguards from the SINSW Planning Compliance Team and Section 9 of the FHS BDAR which contains the general mitigation and management measures for microbat and their habitat prior to, and during, construction of the FHS. In many cases the generic environmental safeguards and the BDAR management measures are aligned. These have been incorporated into this MMP.

4.2 MICROBAT MANAGEMENT PLAN

4.2.1 Exclusion zoning

Exclusion zoning was recommended by EHG to prevent microbats from potential habitat that could be used for roosting, breeding or torpor prior to works/construction commencing. There are human-made structures to which microbats may use as a site for roosting or torpor. The human-made structures, such as a culvert drainage ditch on the southern end of the subject land boundary, are intended to be demolished. Recommendations for exclusion of these human-made structures are:

- Pre-clearance survey of any human-made structure, including the culvert in the drainage ditch by an experienced ecologist, to determine presence of microbats.
    - Emergence surveys, per Biodiversity Assessment Methods (DPIE 2020b), are performed 30 minutes prior to sunset and 1 hour after sunset.
    - Pre-dawn surveys are conducted 90 minutes prior to sunrise to determine whether microbats have returned to their roost site.

- If bats are present, additional surveying and exclusion procedures may be required at night, after bats have flown out of the building or culvert openings. Exclusion procedures include:
    - Blocking crevices, gaps, and other exterior openings with gap-filler, plywood, one-way valves, and plastic sheeting
    - Monitoring if there is any activity such as fly-ins or breaching of gap-fills
    - Ongoing inspections of the exclusion zones prior to demolition to ensure no bats have entered the exclusion zone.
    - Exclusion devices should be installed at least 2 weeks prior to commencement of works to ensure microbats are not continuing to try to return.

- If bats are not present, implement exclusion procedures to the openings of the culvert. These include:
    - Blocking crevices, gaps, and other exterior openings with gap-filler, plywood, one-way valves, and plastic sheeting during the day.
    - Monitoring if there is any activity such as fly-ins or breaching of gap-fills
    - Ongoing inspections of the exclusion zones prior to demolition to ensure no bats have entered the exclusion zone.
    - Exclusion devices should be installed at least 2 weeks prior to commencement of works to ensure microbats are not continuing to try to return to the human-made structures.

- Due to the presence of historic BioNet Atlas records on the Subject land and due to rocky areas and cliffs in the locality surrounding the Subject land, the Large-eared Pied Bat (*Chalinolobus dwyeri*) has been assumed present and mapped as a polygon in Figure 9 of the FHS BDAR. Ensuring all foraging habitat is monitored for Large-eared Pied Bat presence and appropriate measures are taken prior to vegetation clearing and construction. These measures are outlined in **Table 3**.

- 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. A pre-clearance observation and clearance supervision by an experienced ecologist of the tree bark fissures is recommended. If microbats have been detected in the tree bark fissures, manual removal may be required, particularly for individuals in

torpor, during vegetation clearing. Manual removal methods are described in **Sections 4.2.2** and **4.3** and must be performed by an experienced ecologist.

4.2.2 Management measures

Although no microbats have been detected in the area or are likely to be impacted by the development, foraging habitat for threatened microbats could be disturbed. There were no hollow-bearing trees 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 2**.

Table 2: Generic Safeguards for Microbats and Habitat Prior to Construction

No.	Environmental Safeguard
Microbat Habitat	
1*	Areas of vegetation outside the development footprint are to be clearly demarcated with temporary chain mesh fencing to prevent accidental clearing during the construction phase.
2	The initial Pre-clearing survey is the major detailed survey and includes the identification and marking of those threatened species, habitat trees, weeds, limitations of clearing and protected areas as indicated previously.
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	Clearing limits will be clearly marked and all site personnel made aware of exclusion zones.
5	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.
6*	All vehicles, equipment, footwear, and clothing should be clean and free of weed propagules prior to entering the subject land.
Microbats	
7*	Scheduling the timing of construction activities to avoid critical life cycle events (e.g., timing demolition and construction activities to avoid Bent-winged Bat breeding season, December to February, on site or using the site)
8*	Instigating clearing protocols, including pre-clearing surveys, daily surveys, and staged clearing, and using a trained ecologist or licensed wildlife handler during clearing events
9*	Relocating habitat features (e.g., fallen timber, hollow logs) from the development or clearing site, to adjacent retained vegetation
10*	Erecting temporary fencing to protect significant environmental features, such as karst, caves, rock outcrops and water bodies and excluding microbats from impacts prior to construction.
Inductions	
11*	Training staff and conducting site briefings to communicate environmental features to be protected and the measures implemented to protect them.

Note: * denotes FHS BDAR Section 9 safeguards.

Generic environmental safeguards during construction for microbats and habitat management are listed in **Table 3**.

Table 3: Generic Safeguards for Microbats and Habitat During Construction.

No.	Environmental Safeguard
Vehicles, Lights, and Equipment	
1*	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.
2*	Avoid works during evening hours.

No.	Environmental Safeguard
3*	Artificial lighting should be reduced where possible within the subject land.
4*	Install noise and light barriers along interface of vegetation and development where feasible.
5*	Truck movements monitored team and kept to a minimum during high winds.
Microbat Habitat	
6	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.
7	Monitor works and ensure the TPZ has been appropriately established and protected.
8	Roads, tracks, and easement in the vicinity of threatened plants are to be located no less than 5 m from threatened plants as far as practicable.
9*	Sensitive environmental areas are to be identified and communicated in all onsite briefings, for all staff prior to conducting work on the site.
10*	Areas of vegetation outside the development footprint are to be clearly demarcated with temporary chain mesh fencing to prevent accidental clearing during the construction phase.
11*	Any weeds that are removed during the construction phase should be disposed of appropriately.
12*	Providing for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on, or adjacent to, the development or clearing site.
13	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.
14	Locating ancillary facilities in areas where there are no biodiversity values.
15*	All vehicles, equipment, footwear, and clothing should be clean and free of weed propagules prior to entering the subject land.
Microbats	
16	WIRES shall be promptly notified if any native fauna is inadvertently injured during the construction works
17	The taking of domestic animals, particularly dogs and cats, onto the construction site is prohibited.
18*	Ensure ongoing maintenance and monitoring of any threatened species or significant trees within the Construction Site.
19	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.
20	Contact shall be made with WIRES representatives at least 2 weeks prior to the commencement of clearing operations to allow them to prepare for the clearing and construction period and to make arrangements for financial recompense, donations, etc. to cover the cost of WIRES establishing the necessary facilities and caring for any fauna injured as a result of construction-related activities.
21*	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.
22*	Daily timing of construction activities is recommended in accordance with Table 1 of Interim Noise Guidelines (2009)

Note: * denotes FHS BDAR Section 9 safeguards.

4.3 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 ADCO Construction.

If microbats are unexpectedly found in the human-made structures and tree bark fissures listed during works where microbats have not been properly excluded, an ecologist would need to be present to assess the situation. All handling of microbats must be undertaken by a qualified and vaccinated ecologist experienced in handling bats. The ecologist must hold an Animal Care and Ethics Committee approval and a NPWS Scientific Licence for handling native flora and fauna. Bats of the same species would be housed together with no more than three in any one cloth bag. The bag would be tied off at the entrance and hung in a cool, shaded sheltered location. The ecologist is responsible for releasing the bats in the evening at the site of capture. Bats should not be held for longer than 24 hours.

If bats are unexpectedly injured or found dead during works, the construction contractor and ecologist must be notified immediately. The ecologist would carefully remove the bat with a cloth bag. With a gloved hand encased within the cloth bag, gently pick up the bat and then turn the bag inside out to free the gloved hand and capture the bat. The bag would be tied off at the entrance and hung in a cool, shaded sheltered location. WIRES would be contacted immediately for collection of any injured bat/s captured, options for treatment and future release would be decided at the WIRES recommendation. Any costs for treatment would be the responsibility of the contractor. All dead microbats would be collected and retained for the Project Ecologist to consult with the Australian Museum for further research.

5 REFERENCES

Churchill, S. (2009). Australian Bats (2nd ed.). Australia: Allen and Unwin.

DFP Planning Pty. Ltd (2022). Environmental Impact Statement (EIS) State Significant Development (SSD 26876801) Relocation of The Forest High School Allambie Road, Allambie Heights.

Department of Planning and Environment (DPE; 2023). Attachment 1 – EHG comments on New The Forest High School RtS (SSD-26876801).

Department of Planning, Industry and Environment (DPIE; 2020a). Threatened Species Database (5 km radius search). OEH Sydney, NSW.

DPIE (2020b). Biodiversity Assessment Method. Published by the Environment, Energy and Science, Department of Planning, Industry and Environment, Parramatta, NSW.

DPIE. (2023). BioNet Atlas of NSW Wildlife. Retrieved from https://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx

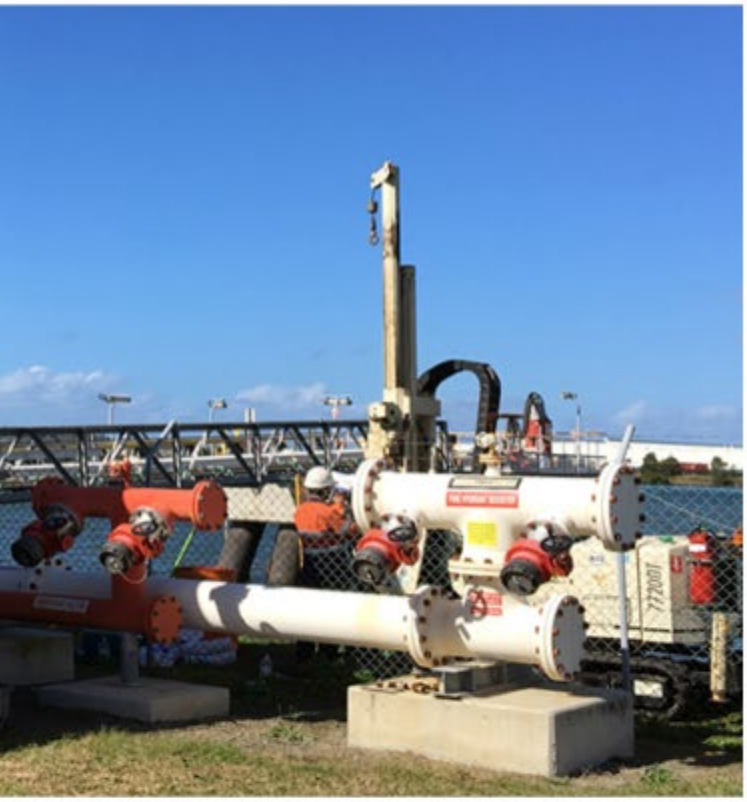
DPIE. (2015). State Vegetation Type Map – NSW_Extant_PCT. Retrieved from https://geo.seed.nsw.gov.au/

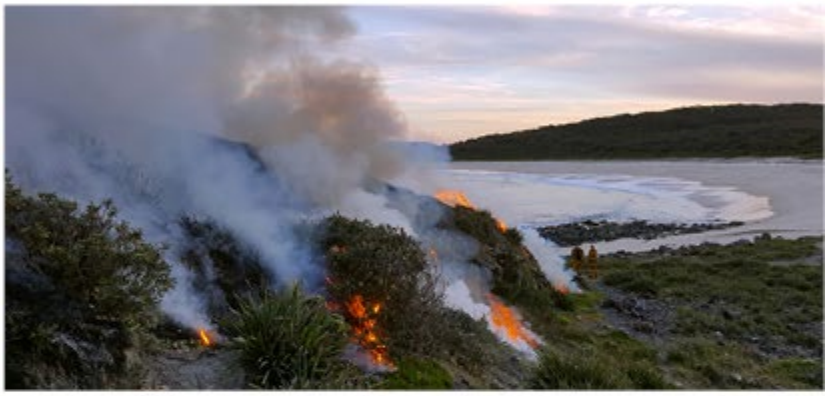
Office of Environment and Heritage NSW (2023a). Threatened Species App https://www.environment.nsw.gov.au/threatenedSpeciesApp/.

Office of Environment and Heritage NSW (2023b). Threatened Species Profile Database: https://www.environment.nsw.gov.au/threatenedSpeciesApp/SpeciesByType.aspx.

SLR Consulting Australia Pty Ltd (June 2023). The Forest High School, Allambie Road, Allambie, NSW, Proposed New School Biodiversity Development Assessment Report.

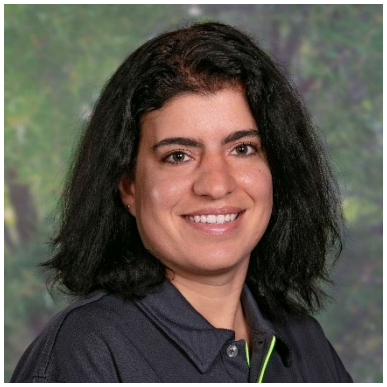
APPENDIX A – PCT DESCRIPTION





PCT 1786: Sydney Ironstone Bloodwood-Silvertop Ash Forest	
Vegetation Formation and Class	Dry Sclerophyll Forests (Shrubby sub-formation) Sydney Coastal Dry Sclerophyll Forests
Floristic description	Hawkesbury River Escarpment Dry Forest occurs on the steep sandstone slopes that overlook the Hawkesbury River and its tributaries. It is a low to moderately tall eucalypt forest with an open sclerophyllous shrub layer and prominent cover of small grass trees. The canopy is characterised by smooth-barked apple (*Angophora costata*), broad-leaved white mahogany (*Eucalyptus umbra*), red bloodwood (*Corymbia gummifera*) and grey gum (*Eucalyptus punctata*) in the Cowan catchment between West Head and Jerusalem Bay in Ku-ring-gai Chase NP. Around Brooklyn yellow bloodwood (*Corymbia eximia*) dominates the canopy and is prevalent west of Hawkesbury River bridge. Casuarinas (*Allocasuarina spp*.) form a sparse to open small tree layer above a mixed shrubby understorey including prickly moses (*Acacia ulicifolia*), *Grevillea sericea*, Sydney boronia (*Boronia ledifolia*) and *Astrotricha floccosa*. Clumps of the low-growing grass tree *Xanthorrhoea arborea* are conspicuous on the broken rocky ground. The exposed slopes are underlain by Hawkesbury sandstone, perhaps enriched by thin shale lenses within the bedrock that are only revealed in the deeply dissected valley. Mean annual rainfall is between 1000 and 1200 millimetres. The forest is extensively distributed westwards along the river as far as Warragamba dam near Penrith and the junction with both the Colo and Macdonald rivers.
Condition within the Subject land	The vegetation in the northwest of the subject land is not identified as the Duffys Forest EEC due to its history of extensive clearing, earthworks and the resultant highly modified structure and floristics of the vegetation. Very little natural regeneration has occurred within this area and a there is a very dense cover of high threat exotic weeds, such as Privet.
Justification for PCT selection	The species of PCT 1786 detected in the southwest of the subject land were present in moderate-high abundance (57% cover in BAM plot 1) and included the following 13 species: *Acacia myrtifolia, Allocasuarina littoralis, Dampiera stricta, Dillwynia retorta, Entolasia stricta, Epacris pulchella, Hakea dactyloides, Lepidosperma laterale, Lindsaea linearis, Lomandra obliqua, Micrantheum ericoides, Platysace linearifolia* and *Xanthosia tridentata*. The species of PCT 1786 detected in the northwest of the subject land were present in low abundance (2.4% in BAM plot 2) and included the following five species: *Allocasuarina littoralis, Banksia serrata, Entolasia stricta, Lepidosperma laterale* and *Lomandra obliqua*.(FHS BDAR)
Status	**BC Act:** ▪ *Duffys Forest Ecological Community in the Sydney Basin Bioregion* **EPBC Act:** ▪ Not listed
SAII	No
PCT % Cleared	71 %

APPENDIX B – ECOLOGIST CV



Cassandra Bugir, PhD

Ecologist

Cassandra Bugir is a new Ecologist at Kleinfelder with over five years' previous experience in flora and fauna research- predominantly surrounding micro- and mega- bats, as well as wetlands. Previous projects have involved a variety of technical disciplines including surveying methods- anabat and echolocation call recognition, camera trapping, capture-mark-release, visual surveys, and auditory surveys, reporting, and fauna handling. Prior to the research experience, Cassandra worked internationally in conservation, animal husbandry, and public outreach/education for six years. Her career emphasizes threatened terrestrial and aquatic fauna, focusing on bats, birds, reptiles, and amphibians, and their habitat requirements.

Education

PhD in Conservation Science

MSc in Anthrozoology

BSc in Ecology and Evolutionary Biology

Training & Certifications

NSW White Card

First Aid/CPR Certification

Project Experience

Fulton Hogan

- Flora and fauna surveying methods using random data points, transects, nestbox monitoring, visual, photographic recognition, auditory, and scat/pellet surveys to determine the presence of threatened species for post-disturbance monitoring. The data from these surveys is used for writing the subsequent reports.

Cessnock City Council

- Flora and fauna surveying methods using visual, photographic recognition, auditory, floristic, and scat surveys to determine the presence of threatened species for road stabilization works. The data from these surveys is used for writing the subsequent Flora and Fauna reports.
- Flora and fauna survey implementing anabat microbat call recognition, camera trap surveillance as well as walking transects (diurnally and nocturnally) of visual encounter surveys (VES) determining the impacts of environmental remediation.

Kingfisher consultancy

- Prior to development clearing in Sydney, Cardiff, and Rankin Park, flora and fauna surveying methods were implemented using visual, spotlighting, aquatic invertebrate, photographic recognition, auditory, floristic, and scat surveys to determine the assemblage of species on site, including bats. The data collected from each survey was used to compile EIS, Flora and Fauna reports, and BDARs for each project.

University of Newcastle

- Flora and fauna survey implementing anabat microbat call recognition, walking VES transects through wetlands, auditory and visual bird surveys for ecological restoration work at Warabrook Station.
- Supportive teaching role for ENVS 3001- Environmental Conservation in Watagans and Barrington Tops, teaching 50+ students how to trap fauna in survey efforts using Harp Traps (microbats), Elliot traps, aquatic nets, and Pipe traps. Taught students how to properly install and bait camera traps and sand plots, they were also shown how to interpret anabat microbat call recognition data and ID species in spotlighting surveys. Out of the trapping survey efforts, we showed students how to handle Antechinus sp., bandicoots, rat sp., various frog species, skinks/lizards including Goanna, Gliders, and Quolls.
- Research assistant for Kooragang and Ash Island wetland study- captured and handled various species of frogs (in various developmental stages- from tadpole to adult) for surveys, Chytrid swabbing, microchipping (capture/recapture data), and biobanking (hormonal induction of genetic material and web punches). The main target was threatened species, Green and Golden Bell Frog (*Litoria aurea*). Other survey methods were installing audio moths, anabats, and camera traps set up for feral species, bats, birds, and frog calls for species diversity within this former BHP site. Vegetation surveys, weather conditions, watercourse ephemerality, and water quality tests were also conducted for habitat conditions. Data collected from these survey methods were used for report and publication writing. Some of the data collected was used to create ponds for environmental restoration works and implement frog exclusion fences for construction work on the island.