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Traffic, Transport & Parking

Capability Sheet CS19

STRATEGIC ADVICE

Martens provide specialist independent and high quality traffic and transport planning, engineering and management services to clients across all industries including residential, commercial and industrial.

We offer a complete service to private developers and government from strategic transport planning and policy advice through to traffic impact assessments, traffic management plans, detailed analysis and road and intersection design.

SERVICES

Martens offer a full range of services in relation to traffic, transport and parking management:

- Community consultation – public meetings, workshops, circulars
- Construction traffic management plans
- Internal access, vehicle turning paths – cars, rigid & articulated vehicles
- Local area traffic management
- Parking – occupation and stay duration survey
- Parking - car park layout design and certification
- Pedestrian and bicycle planning
- Road design - sight distance, alignments, construction drawings
- Road safety audits, black spot analysis
- Traffic and parking modelling
- Traffic data collection - manned and automatic tube counts
  - intersection turning movement counts
  - vehicle classification counts
  - vehicle origin counts
  - bicycle, public transport and pedestrian
  - interview surveys and questionnaires
- Traffic impact assessments and appraisals
- Transport economics and financial analysis
- Transport modelling and simulation
- Transport planning

MARTENS & ASSOCIATES
A Suite 201/20 George St
Hornsby, NSW 2077
Australia
P + 61-2-9476-9999
F + 61-2-9476-8767
E mail@martens.com.au
W www.martens.com.au

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Water Supply

Capability Sheet CS22

Our world relies upon clean and reliable water supply. Water represents a vital resource for community and industry. Its supply, treatment, storage and delivery are key engineering services that Martens & Associates provide.

RESOURCE INVESTIGATION

Knowing and understanding the type, availability and limits of your water resources provides key decision making information for your development and costs of delivering a sustainable water supply. Martens & Associates undertake a range of resource investigations at all stages of the development process:

- Catchment and supply dam feasibility and design
- Groundwater abstraction and supply investigation
- Reclaimed water resource assessment
- Resource evaluation and supply optimisation
- Stream flow harvesting and abstraction
- Water balance calculation

WATER TREATMENT

Most water resources require some form of treatment prior to distribution and delivery. Martens has experience in a range of key water treatment areas:

- Economic feasibility assessment
- Existing utility improvements eg. enhanced filtration & disinfection
- Risk management and quality control
- Selection and design of water treatment facilities

DELIVERY AND STORAGE

Our Civil and Hydraulic engineers will ensure that your project will be delivered in compliance with the most current Standards and industry best practice methods. Martens provide a comprehensive range of services in relation to water delivery and storage systems including:

- Embankment and concrete dam design
- Logistical and economic feasibility assessment
- Materials specification and construction methods
- Quantity surveying
- Reticulated delivery infrastructure
- Storage structure sizing and design
- Supply pipelines

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W www.martens.com.au

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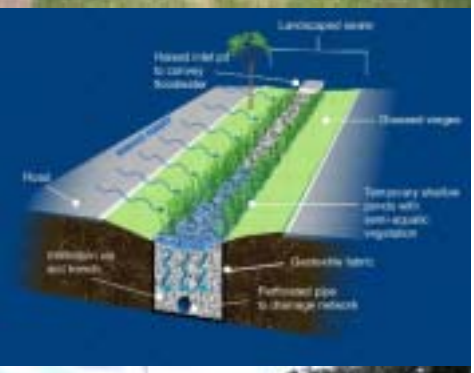
Water Sensitive Urban Design (WSUD)

Capability Sheet CS24



WHY WSUD ?

Past urban water management has focused on hard engineering solutions, such as underground piping of waterways and concrete drainage systems. Whilst this approach has been beneficial in flood control and disease prevention, it has caused detrimental impacts to the ecology of our waterways, contributed to water pollution, bank erosion and salinity and has also resulted in the wastage of valuable water resources. Water Sensitive Urban Design (WSUD) is an urban water cycle method that mimics the natural water cycle, delivering short and long-term cost savings benefits to both the environment and public amenity.

OBJECTIVES OF WSUD

The core objectives of WSUD are straightforward and make 'good sense' in terms of urban planning and environmental management. Key goals include:

- Consideration of the complete water cycle
- Mimics natural processes in the control of stormwater
- Minimise impacts of development on the natural water cycle
- Sustainable stormwater management
- Treat stormwater as a resource

OUR EXPERIENCE

Martens have an extensive record of WSUD projects. Company founder Dr Martens was one of a handful of pioneering Australian stormwater pollution control scientists during the early 1990's while at the University of Sydney. His research efforts led to the establishment of much baseline stormwater quality information throughout the Greater Sydney Basin. Martens have since developed this base-line knowledge to deliver leading WSUD advice to government and industry for more than 10 years.

CORE SERVICES

Martens provide a full range of environmental and engineering services for WSUD. We provide advice to industry and government for the entire project timeline from project inception and concept planning, through to development application documentation, detailed designs and construction certificate approvals, and construction management. Our key services include:

- Aquatic and riparian habitat restoration
- Design of structures – swales, infiltration systems, filters, basins, wetlands
- Detailed design and tender documentation
- Environmental buffers and set-backs – determination and assessment
- Establish stormwater quality targets for discharge and infiltration
- Groundwater injection systems – design, construction, monitoring
- Infrastructure life-cycle cost analysis – financial modelling
- Local Government– Section 94 contribution plans, DCPs, rezonings
- Stormwater re-use investigation, design and construction
- Water balance modelling- long-term supply-demand simulation
- Water cycle management plans and quantity control
- Water quality modelling (eg. MUSIC, RAFTS, DRAINS)

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F + 61-2-9476-8767
E mail@martens.com.au
W www.martens.com.au

Curriculum Vitae (Brief) (August 2022)

Sabindra Neupane

BEng (Hons1), DipEngPrac

Graduate Civil Engineer

Contact: Suite 201, 20 George St, Hornsby, NSW, 2077, Australia, Ph: (02) 9476 9999

Summary Statement:

Sabindra Neupane is a graduate civil engineer who has experience in civil and enviromental engineering. His experience includes undertaking hydrological and hydraulic modelling of floodplains and preparing flood emergency response plans.

Qualifications:

Bachelor of Engineering (Civil and Environmental) (Hons Class 1)

University of Technology, Sydney, 2022

Diploma in Professional Engineering Practice

University of Technology, Sydney, 2022

Employment:

Oct 2021 to date

Martens & Associates Pty Ltd

Graduate Civil Engineer

Civil engineer responsible for undertaking two dimensional flood simulations using TUFLOW and preparing flood emergency response plans. Some notable projects include:

Shanes Park Predator Free Area, NSW

Sabindra completed a flood assessment for the Shanes Park Predator Free Area for the National Park & Wildlife Services which is a NSW significant development. Sabindra prepared the hydrologic and hydraulic models, validated them against existing flood data, and worked closely with the Martens road design team to designed proposed culverts, road crossings and predator proof fencing around the perimeter of the park, iterating the design multiple times to ensure no adverse offsite flood impacts.

Truck Depot, South Windsor, NSW

Sabindra undertook a flood assessment for a development application for a truck depot at South Windsor, NSW. Sabindra prepared the hydrologic and hydraulic models, validated them against existing flood data, simulated the existing and proposed conditions, and demonstrated compliance with the relevant flooding controls.

Apr 2017 to Oct 2017

Certified Energy, Sydney

Student Engineer, Sustainability Design Engineer

Responsibities included thermal simulation of residential and commercial dwellings.

Fields of Expertise and Competency:

Flood Engineering

Flood investigations; flood forecasting and modelling; flood impact assessments; floodplain management strategies; flood risk assessments.

Sustanibility Design Engineering

Thermal comfort simulation of residential and commercial dwellings, particularly NatHERS, BASIX & Section J assessments.

Curriculum Vitae (Brief) (August 2022)

Daniel James Dhiacou

BEng (Hons1), DipEngPrac

Senior Engineer & Technical Team Leader

Contact: Suite 201, 20 George St, Hornsby, NSW, 2077, Australia, Ph: (02) 9476 9999

Summary Statement:

Mr Dhiacou has expertise in a range of interdisciplinary fields which cover both environmental science and engineering. His work has included preparation of advice to Local and State Government, as well as the private sector, on a diverse array of topics including: infrastructure, urban land release, environmental systems, and environmental impact and management. Mr Dhiacou has also acted as an engineering expert witness on a number of NSW Land and Environment Court cases.

Qualifications:

Bachelor of Engineering (Civil and Environmental) (Hons Class 1)

University of Technology, Sydney, 2014

Diploma in Engineering Practice

University of Technology, Sydney, 2014

Other Training:

Flooding	Australian Rainfall & Runoff Training, Australian Water School, 2021
	Advanced TUFLOW Training, BMT WBM, 2016, 2017, 2018 & 2019
	Advanced 2D Hydraulic Modelling with SMS and TUFLOW, Sustainable Resources Industry Training, 2014
Groundwater	Introduction to Groundwater – Practices and Principles, Sustainable Resources Industry Training, 2016
	Groundwater Modelling, Sustainable Resources Industry Training, 2016

Awards:

University Medal, Faculty of Engineering and Information Technology (FEIT), University of Technology Sydney 2014

NSW Division Medal, Institute of Public Works Engineering Australia (IPWEA) 2014

High Distinction Average Grade & First-Class Honours, University of Technology Sydney 2014

Engineering Dean's List, University of Technology Sydney 2010 – 2014

Concrete Pipe Association of Australia Prize 2012

Employment:

2013 to date

Martens & Associates Pty Ltd

Senior Engineer & Technical Team Leader

Lead engineer responsible for technical oversight of numerous flooding, traffic and hydrogeological investigations and models across Australia. Responsibilities include civil and traffic engineering, hydrology and water resources, environmental investigations and management, geotechnical investigations, GIS and mapping, environmental planning and impact assessment, hydrogeology, modelling and process simulation.

2011 to 2013

University of Technology, Sydney

Tutor & Tutoring Program Administration Assistant

Tutor for several university programs facilitating group learning in university and HSC engineering, maths and science subjects. Responsibilities included tutoring, statistical analysis, trends interpretation, program reporting, coordination and scheduling, interviewing, mentoring and training new leaders.

2010 to 2011

Marrickville Council

Student Engineer, Works Department

Responsibities included project management, cost estimation and control, safety reporting, work-as-executed drawings, and systems maintenance.

Fields of Expertise and Competency:

Flood Engineering

Including: supervision of flood investigations; flood forecasting and modelling; flood impact assessments; floodplain management strategies; flood risk assessments; and technical review of modelling undertaken by others.

Water and Stormwater Engineering

Including: mapping hydrological systems; hydrogeology and groundwater monitoring, modelling and management; estuarine system advection dispersion modelling; GIS mapping techniques; stormwater and drainage system design; and water sensitive urban design (WSUD).

Traffic Engineering

Including: traffic generation and impact assessment; design of traffic and road systems; parking assessments and car park design; intersection and network modelling; and vehicle swept path design and analysis.

Civil Engineering

Including: civil design such as, sub-division layout, roads, drainage and earthworks; geotechnical modelling and assessment; and design and planning of erosion and sediment control structures.

(July, 2020)

Curriculum Vitae

Terry Harvey, *BEng (Civil)*

PERSONAL

Postal Suite 201, 20 George St, Hornsby, NSW, 2077, Australia

Contact P (02) 9476 9999
F (02) 9476 8767
0408 007 794
Email tharvey@martens.com.au

OVERVIEW

Terry Harvey is a Project Manager and Senior Engineer at the consulting engineering firm Martens & Associates Pty Ltd. His specialist areas of expertise are in the fields of:

- Civil design in the areas of urban and rural development, including sub-division, roads and pavements, parking and driveway design, retaining and revetment structures, earthworks, drainage and flooding. Feasibility & constraints analysis, and cost assessments.
- Water engineering relating to flooding, stormwater, WSUD systems, riparian works, sedimentation and erosion control, water supply and re-use.
- Geotechnical site investigations, engineering design of retaining and revetment systems, foundation analysis, slope stability assessment and modelling, pavement investigation, design and re-instatement.

ACADEMIC

2006 Bachelor of Engineering (Civil)
University of Western Sydney

1993 Higher School Certificate, Sydney

EMPLOYMENT

2015 - present Project Manager / Senior Engineer, Martens & Associates Pty Ltd

Responsibilities include the project management, resource allocation and implementation of engineering projects including river and stream rehabilitation and improvement, geotechnical and civil engineering design and assessments. This includes providing technical reviews of civil designs and associated documentation.

2008 - 2015 Civil Engineer, Martens & Associates Pty Ltd

Design engineer of civil infrastructure works and modelling of stormwater networks (Quantity and quality) and flood modelling. Preparation of engineering reporting and certification.

1998 - 1999 Engineer, Network Development Services – RMS (Formerly Roads & Traffic Authority)

Planning of construction and costings for the upgrading of new and existing NSW road network. Road pavement, services and associated infrastructure costing for the M7 orbital. Community consultation relating to the M5 East extension prior to construction

MANAGEMENT AND COMMUNICATION EXPERIENCE

- Project management
  Designed, co-ordinated and/or managed more than 400 independent civil engineering projects.
- Co-ordination and management of sub-contractors
  Extensive experience in the co-ordination and management of sub-contractors for a range of civil and geotechnical works.
- Expert witness experience
  Appeared at many S34 conciliation conferences and supported expert witnesses for numerous NSW Land and Environment Court cases for both local government and private developers.

RECENT MAJOR PROJECTS

The following is a brief summary of a small number of recent significant projects and their scope of works. Site names may be abridged for client confidentiality purposes:

Quarry Projects

Currently involved in civil engineering design works for multiple rock and sand quarry sites in NSW for a major supplier of construction materials. Services provided for these projects include geotechnical engineering (site investigation and slope risk management assessments), earthworks specification and civil design. Mr Harvey has been involved in the design of quarry rehabilitation works required for the client to divest itself of these assets.

St Narsai School, Horsley Park

This project involved the development of this school from the inception stage. This school development site has been approved by Fairfield Council and is currently under construction. Matters considered and addressed in this project include bulk earthworks design, flood modelling and riparian zone design, stormwater control including on-site detention (OSD), road works and car park design together with general civil engineering design.

Responsibilities include managing the civil and geotechnical components of the construction phase of this development including site inspections and construction engineering certification.

North Turramurra Golf Course

Designed and supervised the civil engineering solutions for the North Turramurra golf course project for Ku-Ring-Gai Council. This project involved the development of new golf course holes on an existing landfill site. Works completed as part of this engagement include the development of civil engineering solutions for landfill capping, site drainage (including pit and pipe and open riparian zones, wetlands and dams), earthwork volume analysis and retaining solutions for previously placed unstable landfill materials.

St Justins and St Benedicts Schools, Oran Park

Civil engineering design for both schools from the inception stage through to construction. Engineering works undertaken included pavement design, bulk earthworks, stormwater network including onsite dams, modelling and design of OSD and water quality structures, roads and car parking.

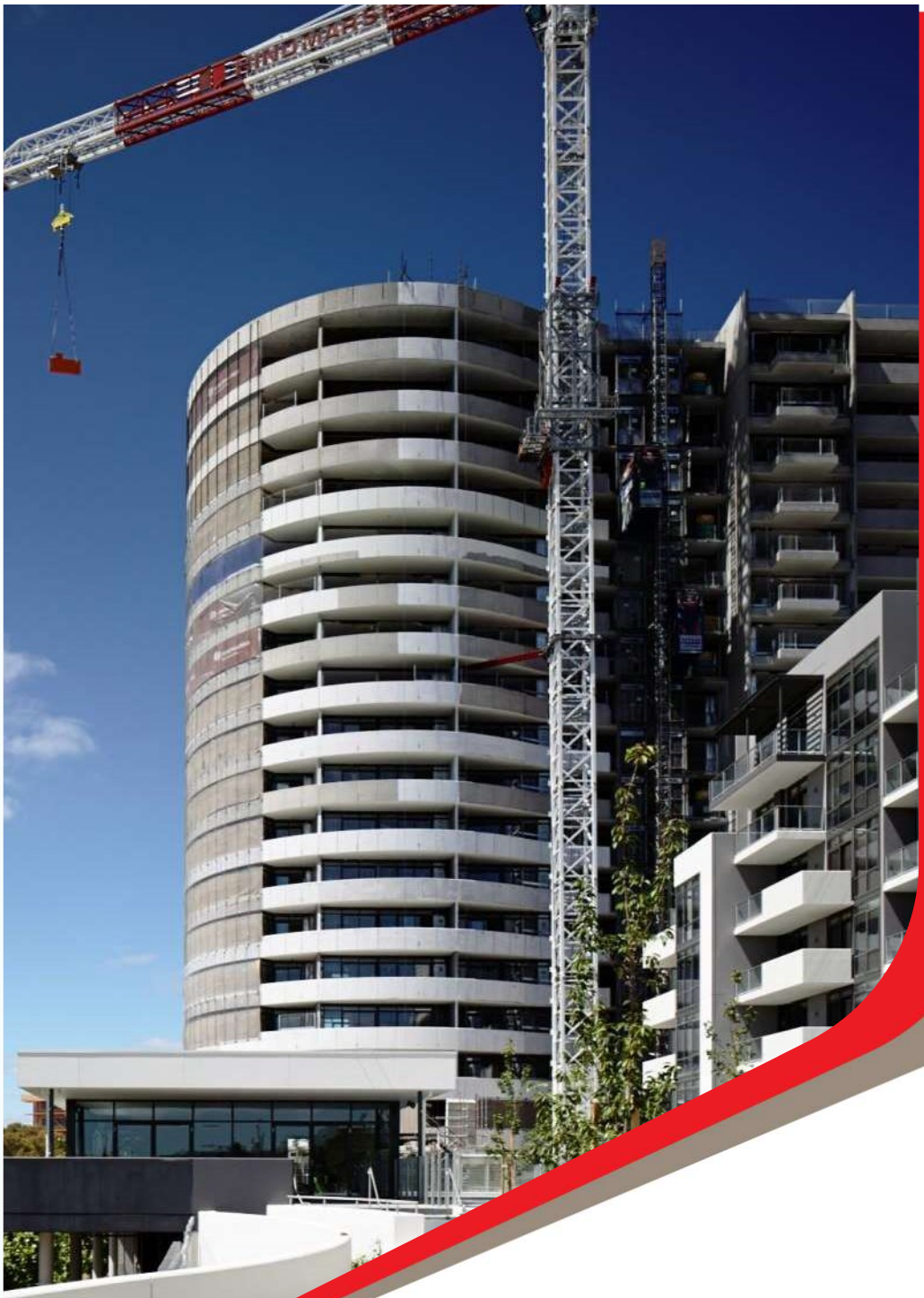
Works encompassed DA and CC documentation through to construction, including site supervision and certification of civil and geotechnical components of the construction phase.

APPENDIX G – Construction Waste Management

Attached document - JHS - Waste Management Sub-plan - Final NV 14.7.22

Appendix G - JHS Construction Waste Management Plan Rev E FINAL 8.9.22

Condition	Condition Requirement		Document / SubPlan Reference
B16	The Construction Waste Management Sub-Plan (CWMSP) must address, but not be limited to, the procedures for the management of waste including the following:		-
	(a)	the recording of quantities, classification (for materials to be removed) and validation (for materials to remain) of each type of waste generated during construction and proposed use for materials to remain;	Appendix G Section C.3 Page 17
	(b)	information regarding the recycling and disposal locations; and	CEMP Section 16.11 Page 32
	(c)	confirmation of the contamination status of the development areas of the site based on the validation results.	Appendix G Section 8 Page 10 (Page 22 - findings / conclusion of Douglas Partners 'DETAILED SITE INVESTIGATION (CONTAMINATION)' report March 2022. Any suspected contamination discovered during civil works on the site will be dealt with as highlighted below in 16.6.



New High School in Jerrabomberra
Construction Waste Management Plan

JERRABOMBERRA HIGH SCHOOL - REVISION D

THIS DOCUMENT REFLECTS THE INTENT OF THE NATIONAL AND VARIOUS STATE LEGISLATIVE AND REGULATORY COMPLIANCE (OFSC, AS4801 & ISO9001) REQUIREMENTS

Construction
Development
Retirement
Capital

HINDMARSH
Leadership at work

Table of Contents

1. Document Control

1.1 REVISION STATUS

Approved revisions to this document may be independently issued. On receipt of a revision notice, insert the issue number, revision number and date of issue in table below. Alphabetical Revisions to be utilised prior to Draft Submission.

Date Issued	Revision	Details	Section	Page
13/05/21	A	Preliminary CWMP	ALL	ALL
22/06/21	B	Combined Plan Separated for each School	ALL	ALL
26/08/22	C	Content Revisions	ALL	ALL
20/09/22	D	FINAL	ALL	Multiple

1.2 PROJECT SPECIFICS

Company Name:	Hindmarsh Construction Australia
ABN	15 126 578 176
Project:	Jerrabomberra High School (Monaro Schools Cluster)
Project No:	2045
Location:	Jerrabomberra High School 101 Environa Dr, Jerrabomberra NSW 2619
Client:	SINSW
Contract:	SINSW VECI (Very Early Contractor Involvement) leading to GC21 [D&C]
Work Description:	New Construction

1.3 APPROVAL FOR IMPLEMENTATION

This revision of the Waste Management Plan has been reviewed with due regard to compliance with the Hindmarsh Construction Business Management Systems and contractual obligations of the contract and is authorised for use. Induction information is captured electronically within Aconex, please refer to the system for approval confirmation.

1.4 INDUCTION

Where required Hindmarsh Employees have been inducted into this Waste Management Plan (WMP), as well as acknowledging that they have read and understood their roles and responsibilities of this Plan and the knowledge management elements.

Induction information is captured electronically within Aconex, please refer to the system for Induction confirmation.

1.5 PRECEDENCE

This Construction Waste Management Plan (CWMP) does not in any way override any provisions of the Project Brief or brief issued by the Client. Where there is found to be a conflict in this CWMP with any requirements of the Project Brief, the Consultant is to refer the conflict to the Project Manager for direction.

1.6 ABBREVIATION USED

AFC	Approved for Construction	AS	Australian Standard
BCA	Building Code of Australia	CC	Construction Certificate
CCD	Competition Concept Design	CD	Contract Documentation
CWMP	Construction Waste Management Plan	D&C	Design and Construction
DA	Development Application / Approval	DD	Detailed Design
DM	Design Manager	DMP	Design Management Plan
DOS	Design Options Study	DR	Documentation Readiness (for tender)
ESD	Environmentally Sustainable Design	FDB	Functional Design Brief
FRD	Functional Relationship Diagram	PCA	Principle Certifying Authority
HCA	Hindmarsh Construction Australia	PM	Project Manager
PCG	Project Control Group	PSA	Professional Services Agreement
PDC	Principal Design Consultant	QS	Quantity Surveyor / Cost Planner
PMP	Project Management Plan	RL	Reduced Level
QA	Quality Assurance	SQE	Safety Quality and Environmental
R&O	Risk and Opportunity (Financial focus)	WOL	Whole of Life
SD	Schematic Design	Compass	Hindmarsh Management System
SoA	Schedule of Accommodation		
VM	Value Management		
ACONEX	Web-based Information Management System		

1.7 PURPOSE

This plan addresses the relevant Secretary's Environmental Assessment Requirements (SEARs), namely:

- SEARs 18

The purpose of this CWMP is to:

1. Identify, quantity and classify waste streams to be generated during construction.
2. Identify appropriate servicing arrangements (including but not limited to, waste management, loading zones, mechanical plant) for the site.
3. To ensure storage and collection of waste is designed and managed having appropriate regard to space, location, amenity and ongoing management of waste management facilities.
4. Describe measures to be implemented to manage, reuse, and recycle and safely dispose of the waste.
5. To maximise reuse and recycling of demolition and construction materials and materials from development.
6. To encourage building design techniques in general which minimise waste generation.

7. To minimise the amount of waste being deposited to landfill with targets to reuse or recycle at least 90% of construction and demolition waste as per the EFSG DG02 2.7.1 Construction and demolition waste requirements.

2.Introduction

This CWMP accompanies an Environmental Impact Statement (EIS) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) in support of an application for a State Significant Development (SSD No 24461956). The SSDA is for a new high school located at Jerrabomberra.

This report addresses the Secretary's Environmental Assessment Requirements (SEARs), notably:

Table 1 – SEARs Requirement	Response
18. Waste Identify, quantify and classify the likely waste streams to be generated during construction and operation. Provide the measures to be implemented to manage, reuse, recycle and safely dispose of this waste. Identify appropriate servicing arrangements (including but not limited to, waste management, loading zones, mechanical plant) for the site.	
Classification of the waste.	Refer to Appendix C
Estimates / details of the quantity of each classification of waste to be generated during the construction of the project, including bulk earthworks and spoil balance.	Refer to Appendix C
Handling of waste including measures to facilitate segregation and prevent cross contamination.	Refer Section 6.2 Roles & Responsibilities
Management of waste including estimated location and volume of stockpiles.	Refer to Appendix C
Waste minimisation and reuse.	Refer Section 6.2 Roles & Responsibilities
Lawful disposal or recycling locations for each type of waste.	Refer Section 6 Servicing Arrangements
Contingencies for the above, including managing unexpected waste volumes.	Refer Section 6 Servicing Arrangements

3.Proposal

The proposed development is for the construction of a new high school in Jerrabomberra. The proposal will meet community demand and to ensure new learning facilities are co-located near existing open space infrastructure. The proposal generally includes the following works:

- Site preparation;

- Construction of a series of buildings up to three storeys including administration/staff areas, library, hall and general learning spaces;
- Construction of new walkways, central plaza and outdoor games courts;
- Construction of a new at-grade car park;
- Associated site landscaping and open space.

The proposal has been designed to accommodate approximately 500 students with Stream 3 teaching spaces, however the core facilities will be future proofed to a Stream 5 to enable possible future expansion to meet projected demand.

The proposal will include site preparation works, such as clearing and levelling to accommodate the proposed buildings and play areas. The proposal will involve the construction of a series of buildings housing general learning spaces, administration and staff wings, outdoor learning areas, a library and assembly hall.

The proposal will include construction of a new driveway and hardstand with access proposed off the northern stub road east of Environa Drive. Pedestrian access is proposed off Environa Drive and the northern stub road.

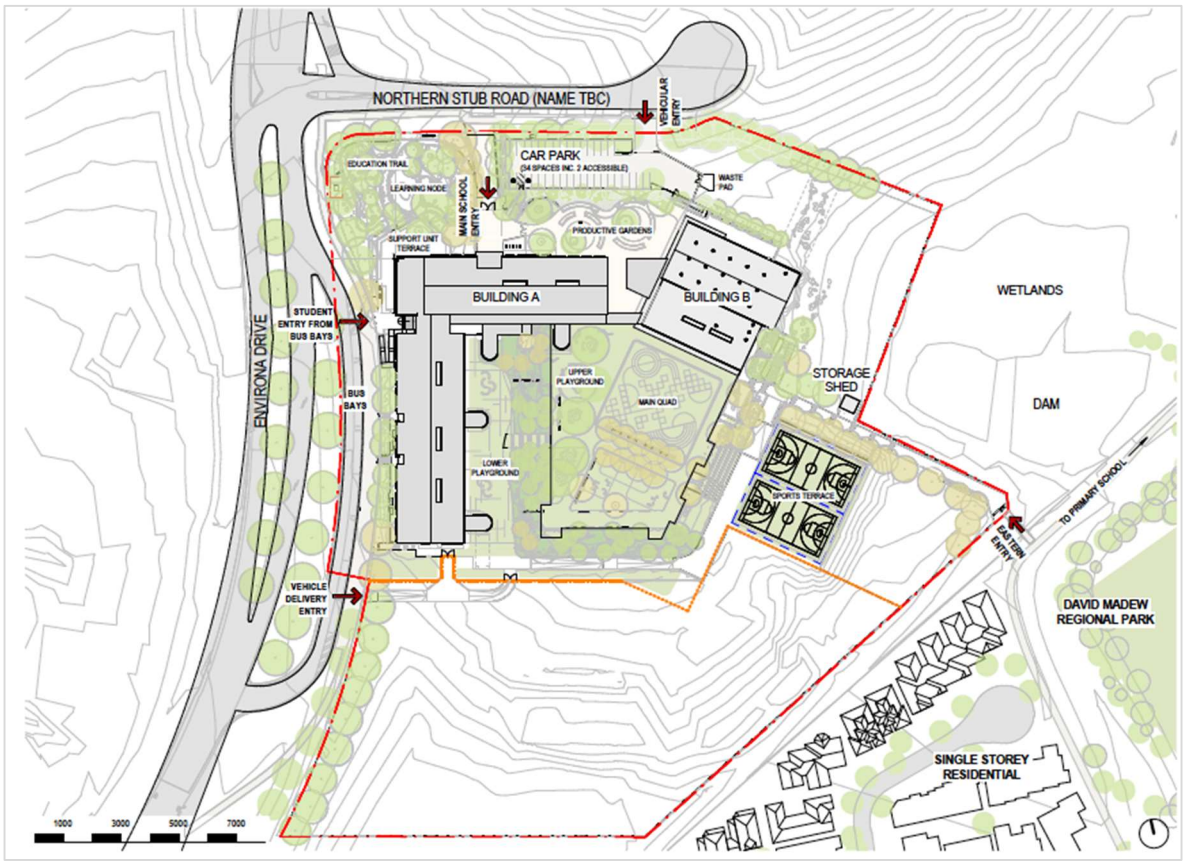


Figure 1: Proposed site plan
Source: TKD Architects

4.Site Description

The proposed development is located within the South Jerrabomberra Innovation Precinct, also referred as the Poplars Innovation Hub, in the local government area of Queanbeyan-Palerang Regional Council.

The school site- is part of an existing lot (Lot 1 in DP 1263364), which is approximately 65.49ha in area and will be characterised by a mix of business park and open space uses and a new north-south connector road named Environa Drive.

Delivery of the Precinct is underway with Environa Drive currently under construction. Most of the-lot, however, remains undeveloped.

The school site is subject to a proposed lot (Lot 2 in DP 1263364), which was approved by Council under DA332-2015 on 10 March 2021 but is not yet registered. The approved lot is irregular in shape, is largely cleared and is approximately 4.5ha in area. A small dam is located adjacent to the south eastern boundary of the site, which forms part of a broader wetland.

The site is located in excellent proximity to existing open space facilities. It adjoins David Madew Regional Park to the south east and is located 100m east of an existing recreational field associated with Jerrabomberra Public School.

A description of the site is provided in the table below.

Table 1 – New High School in Jerrabomberra Site Description

Item	Description
Site address	School address yet to be determined however, it is located within the Jerrabomberra Innovation Precinct at 101 Environa Dr, Jerrabomberra.
Legal description	Lot 1 in DP 1263364 (existing) Lot 2 in DP 1263364 (proposed, but not registered)
Total area	Lot 1 – 65.49ha Lot 2 – 4.5ha
Frontages	The site provides frontage to Environa Drive and the northern stub road, both currently under construction.
Existing use	The site is undeveloped and contains a series of small vegetation clusters scattered across the site.
Existing access	Existing access is via an informal unsealed driveway off Tompsitt Drive along the northern boundary of the existing lot. The site will be accessed via Environa Drive and a secondary access road (North Road), which is currently under construction.

Table 1 – New High School in Jerrabomberra Site Description	
Item	Description
Context	Land to the south is primarily residential in nature. Jerrabomberra Public School and David Madew Regional Park are located to the east/south-east, while land to the west is undeveloped and features Jerrabomberra Creek. The site is located within the South Jerrabomberra Innovation Precinct, which is currently under construction. The areas north and west of the site are currently undeveloped but the site is currently undergoing a transition from rural to business park uses. Development further north on the opposite side of Tompsitt Drive and along Edwin Land Parkway includes retail and commercial uses. Development immediately to the south includes existing low density residential development. Land in the south west has been identified for future low density residential, light industrial and business park uses.

Figure 2: Site aerial depicting the land subject to the proposed High School.
Source: TKD Architects

5.NSW Legislative Requirements & Guidelines

Relevant key legislation and guidelines applicable to the project include:

- Protection of the Environment Operations Act 1997
- Protection of the Environment (General) Operations Act 1998
- Waste Avoidance and Resource Recovery Act 2014
- Protection of the Environment Operations (Waste) Regulation 2014
- Waste Classification Guidelines (EPA, 2014)
- NSW Department of Planning and Environment, Secretary's Environmental Assessment
- Requirements (SEARs)

6.Servicing Arrangements

The current legislation determines that the generator of waste is the owner of the waste until the waste crosses a calibrated weighbridge into a licensed facility. Waste contractors to demolition and construction contractors are the primary transporters of waste off-site, accordingly, waste contractors are required to provide verifiable monthly reports on waste reused, reprocessed or recycled (diverted from landfill) or waste sent to landfill. These reports have a direct bearing on the generator's compliance with the relevant regulations.

This CWMP will be implemented onsite throughout including singularly or collectively the demolition, excavation, construction and fit out phases.

A Waste Data File must be maintained on-site and all entries are to include:

- The classification of the waste
- The time and date of material removed
- A description of and the volume of waste collected
- The location and name of the waste facility that the waste is transferred to
- The vehicle registration and the name of the waste contractor's company

The Waste Data File will be made available for inspection to any authorized officer at any time during the life of the site works. At the conclusion of site works, the designated person will retain all waste documentation and make this validating documentation available for inspection.

Arrangement's will be made with the Waste Contractor to increase bin supply if there is an unexpected increase in waste generation.

6.1 WASTE MANAGEMENT EQUIPMENT, BIN SIZES & COLLECTION FREQUENCY

All waste will be removed by a licensed waste contractor using 15-meter bins on site. The construction and demolition waste will be removed when bins are full and within construction site hours to reduce disturbance of the neighbours.

6.2 ROLES AND RESPONSIBILITIES

The waste management strategy for the project will operate over the design, procurement, and construction including fit out of the project, and is detailed in the following Table 3.

Table 3 – Breakdown of Tasks and responsibilities	
Management Strategies	Responsibilities
<u>Design:</u> Design for materials to standard sizes Design for operational waste minimisation Consider ways to avoid, reuse and recycle construction wastes	 Architect, Subcontractors Architect & Builder Subcontractors.
<u>Procurement:</u> Select recycled and reprocesses materials Select components that can be reused after deconstruction Prioritise suppliers that take back offcuts and unused product. Encourage contractors and subcontractors that use unneeded offcuts and unused product for use on other jobs Ordering the right quantities of materials (Purchasing Policy); Include prefabrication of materials	 Architect, Engineer, Builder & Sub Contractors Architect, Engineer & Builder Sub-Contractors Sub-Contractors
<u>Pre-construction:</u> Waste management plan to be reviewed & approved prior to construction. Contract a Waste Contractor	 Builder Waste Contractor
<u>Construction on-site:</u> Use the avoid, reuse, reduce, recycle principles Minimisation of recurring packaging materials Returning packaging to the supplier Separation of recycling of materials off site Audit & monitor the correct usage of bins Audit and monitor the Waste Contractor	 Builder & Waste Contractor Sub-contractors Builder & Sub-contractor Waste Contractor Builder & Waste Contractor
<u>Avoiding construction waste</u> Reduce extraneous packaging use reusable padding and careful packing. All packaging generated on site should be captured for reuse or recycling wherever possible. Reuse formwork; Use reuse non-returnable containers on the job site to the maximum extent possible	 Builder

7.On Site Waste Management Requirements

There will be a designated waste storage area for the disposal and storage of construction waste prior to collection. This area will be located conveniently for demolition and construction work team to use the bins as well as for waste contractors to collect. An indicative location has been provided in Appendix A. Other requirements include:

- The routes for movement of waste between work site and waste storage area are to be kept obstruction-free.
- The routes for movement of bins and waste between storage and collection points are marked in the site drawing, and will be kept obstruction-free (if waste is moved between the waste storage area(s).
- The waste bin collection point provided will be accessible for waste collection vehicles. There are no obstructions to turning or reversing, pulling up vehicles and lifting bins.
- Access for waste collection vehicles will not be compromised by construction-related activities vehicles or other consequences of construction staging.
- All waste not being reused on site will be removed during, or at the completion of, the construction stage.
- No waste will be left on site unless it is part of valid reuse on site, which is integral to and in place in the design.
- In order to manage noise levels, collection of waste from the construction site will only occur during hours approved for construction work.
- All vehicles entering or leaving the site must have their loads covered.
- All vehicles, before leaving the site, to be cleaned of dirt, sand and other materials, to avoid tracking these materials onto public roads.
- At the completion of the works, the work site is left clear of waste and debris.

8.Waste Management Plan Application

PROJECT: New High School in Jerrabomberra
ADDRESS: Refer Table 2 above
OWNERS: Schools Infrastructure NSW (SINSW)
DETAILS OF APPLICANT: Department of Education
DESCRIPTION OF BUILDINGS AND OTHER STRUCTURES CURRENTLY ON THE SITE:
This school is generally planned to be built on a brownfield site and will be a completely new school. Some reuse of existing Council buildings is proposed.
BRIEF DESCRIPTION OF PROPOSAL:
The proposed development is for construction and operation of a new high school in Jerrabomberra that will accommodate 500 students.
IF MATERIALS / WASTE IS REUSED ON SITE OR OFF SITE, HOW WILL IT BE RE-USED:
Generally excavation of ENM will be used onsite for fill and landscaping wherever possible. This material may be covered or drenched to reduce soil displacement and prevent air pollution.

	Name	Signed	Contact Number	Date
Prepared by:	Stefan Szyczew		0427 429 244	20/08/2021

9.Construction

Prior to commencement of construction, Hindmarsh will undertake a full site investigation by an appropriately qualified person and any existing hazardous materials within the site will be removed in accordance with all relevant regulatory requirements.

Other waste building materials generated from demolition or construction activities will be recycled as far as practicable.

Hindmarsh will comply with the requirements of all relevant Authorities in relation to the disposal of all waste material.

The following measures will be adopted to encourage the management and reduction of waste to minimise the loss of natural resources and landfill space:

- Emphasise the importance of recycling and waste reduction;
- Encourage the use of recycled materials where it is reasonably practical;
- Minimise the use of packaging materials and recycle packaging materials where possible;
- Waste concrete to be sent to a concrete recycling plant where possible;
- Separate removed native vegetation from general construction waste, mulch and stockpile for re-use; and
- Dispose of any non-recyclable general waste at approved waste disposal facilities.

Reference will be made to Local Council's and Department of Education (DoE) Waste Management Guidelines to comply with any specific requirements.

Dangerous goods (such as petrol, diesel, oxy-acetylene, oils, glues etc) will be stored in a lockable compound with sufficient ventilation in accordance with relevant Codes of Practice and Standards.

Copies of all relevant Material Safety Data Sheets is retained on site as required.

A project-specific resource recovery and waste management plan will be developed, detailing the following:

- Efforts to minimise waste on site by avoiding over-estimation of purchasing requirements, minimising packaging materials and buying environmentally approved and recycled content products;
- Procedures for the collection and sorting of recyclable construction materials;
- The type and quantity of materials that are to be re-used or recycled;
- Provision of containers for recyclable materials, including cardboard, glass, metal, plastic and green waste;
- The re-use of timber, glass and other materials;
- The recycling of asphalt, metal, bricks, tiles, masonry, concrete, plasterboard, plastic, batteries, cardboard, carpet and other materials;
- Provision for collection of daily rubbish from workers;
- Procedures for removal of waste (materials that cannot be re-used or recycled) from the site;
- Procedures for removal of hazardous or dangerous materials from the site; and
- Buying environmentally approved and recycled content products.

Removal of hazardous and dangerous materials from the site shall be in accordance with State and Federal legislation, including WorkSafe requirements. Asbestos / soil waste will be removed (if applicable) according to WorkSafe Guidelines and placed in double-lined bins before being disposed of at a licensed landfill by a licensed transporter.

Waste material shall be stored on site neatly, in appropriate bins or stockpiles, in such a manner that stormwater run-off does not come into contact with waste.

Waste segregation areas and temporary storage locations for skips / waste for recycling / re-use / disposal shall be selected so as to minimise safety risks to site workers and to minimise adverse impact on the visual amenity of the site. For external bins, self-closing lids shall be installed to ensure waste does not become airborne.

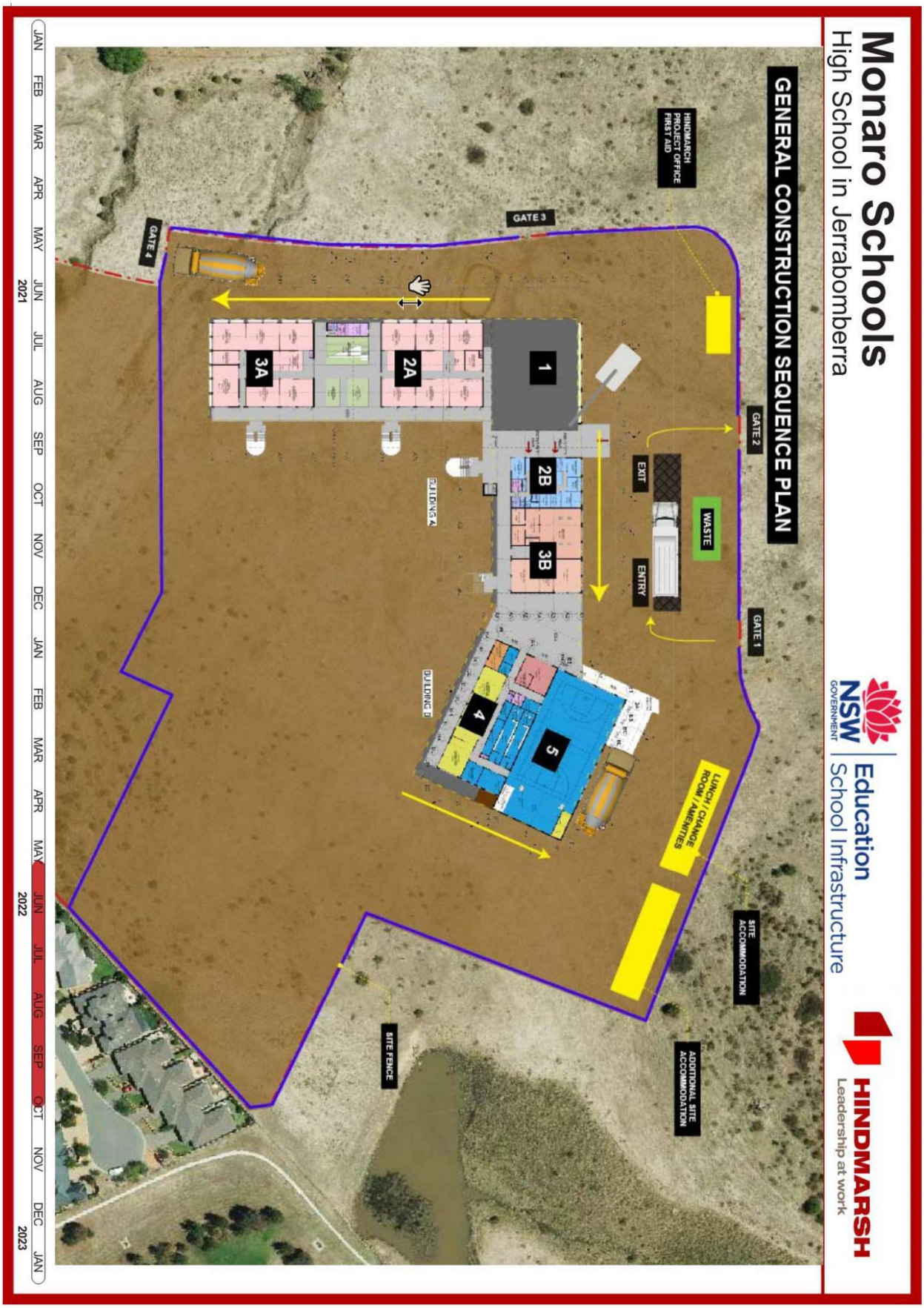
Waste collection shall only occur during permitted hours.

Litter and debris trapped against the site fence shall be regularly cleaned away. Burning off on site will be prohibited.

All waste disposed of (whether it be for recycling / re-use or landfill disposal) will be recorded on forms which will be part of the project records. Recycler and landfill disposal dockets will be used for confirmation of tonnages and proof of lawful disposal.

Hindmarsh shall be responsible for reporting any incident which causes, or threatens to cause, material environmental harm or breaches approval requirements to relevant project stakeholders as soon as possible.

Appendix A – JHS Site Access Diagram



Appendix B – Standard EPA Signage

General recycling

Instructional

Construction and demolitions

Public place

Recycling

Garden organics and food waste

Garbage

[2] *Better Practice Guidelines For Waste Management And Recycling In Commercial And Industrial Facilities 2012*. Sydney: NSW Environment Protection Authority, Accessed on 05/01/2017.

Appendix C – Project Phase Waste Estimates

C.1 DEMOLITION PHASE

Material Type on Site	Estimated Volume (m^3) or Weight (t) (Most Favourable to Least)		ON-SITE TREATMENT	OFF-SITE TREATMENT	
	Recycling	Disposal	Proposed reuse and/or recycling collection methods	Disposal / Transport Contractor	Licensed Waste Depot, Licensed Recycling Outlet or Licensed Landfill site
Concrete Brick Block-work & Tile					Tiger Waste's waste transfer station is located in Fyshwick. The facility is EPA approved and licenced by the ACT Government Transport Canberra and City Services. Licence number L0023.
Asphalt					As above
Metals					As above
Timber off-cuts					As above
Cardboard					As above
Plasterboard					As above
General Waste					As above
Subtotal					As above
Total					

Narrative: There are no structures onsite requiring demolition

C.2 EXCAVATION PHASE

Material Type on Site	Estimated Volume (m^3) or Weight (t) (Most Favourable to Least)			ON-SITE TREATMENT	OFF-SITE TREATMENT	
	Reuse	Recycling	Disposal	Proposed reuse and/or recycling collection methods	Disposal / Transport Contractor	Waste Depot, Recycling Outlet or Landfill site
Excavated Natural Material (ENM) Greenfield site	19,600m^3	800m^3	Nil	Reuse for fill and landscaping	Tiger Waste	Tiger Waste's waste transfer station is located in Fyshwick. The facility is EPA approved and licenced by the ACT Government Transport Canberra and City Services. Licence number L0023.
Sub Total	19,600m^3	800m^3	Nil			
TOTAL	3,190m^3					

Narrative: There is minimal excavation of ENM, which will be used back on the site for landscaping. This material will be covered to reduce soil displacement and prevent air pollution.

There may be potential contaminated soils, refer to the contamination reports prior to excavation and re-use of materials on site

C.3 CONSTRUCTION PHASE

Material Type on Site	Estimated Volume (m^3) or Weight (t) (Most Favourable ⟶ Least)			ON-SITE TREATMENT	OFF-SITE TREATMENT	
	Reuse	Recycling	Disposal	Proposed reuse and/or recycling collection methods	Disposal / Transport Contractor	Waste Depot, Recycling Outlet or Landfill site
Concrete Brick Block-work & Tile		165m^3		Co-mingled Bins	Tiger Waste	Crushed for road base
Metals		85m^3		Co-mingled Bins	Tiger Waste	Scrap Metal Dealer for smelting
Timber off-cuts		175m^3		Co-mingled Bins	Tiger Waste	Recycled for chips and mulch
Cardboard		142m^3		Co-mingled Bins	Tiger Waste	Recycled into cardboard
Plasterboard		165m^3		Co-mingled Bins	Tiger Waste	Recycled as soil conditioner
Plastics, plastic packaging, paint drums*, containers		75m^3	30m^3	Co-mingled Bins	Tiger Waste	- Styrene and plastic to landfill - Paint drums nested and recycled
Pallets and Reels	65 units			Separated onsite	Tiger Waste	Returned to the supplier
Liquid Waste			20m^3	Separated onsite	Tiger Waste	Transferred to licensed landfill
General Waste			151m^3	Co-mingled Bins	Tiger Waste	Transferred to licensed landfill
Sub Total	65 units	807 m^3	201m^3			
TOTAL	1008m^3					

Narrative:

As the contracts for all contractors have not been let there are still those including the waste contractor To Be Advised (TBA).

All waste will be co-mingled and taken for off-site separation and reuse or recycling except Pallets and Reels.

APPENDIX H – Construction Noise and Vibration Management

Attached document - JHS - Construction_Noise_and_Vibration_Management_Sub-Plan_

Condition	Condition Requirement		Document / Sub-Plan Reference
B15	The Construction Noise and Vibration Management Sub-Plan must address, but not be limited to, the following:		-
	(a)	be prepared by a suitably qualified and experienced noise expert;	Appendix 1 Page 28
	(b)	describe procedures for achieving the noise management levels in EPA's Interim Construction Noise Guideline (DECC, 2009);	Section 10-13 Page 20-25
	(c)	describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers;	Section 10.4 Page 20
	(d)	include strategies that have been developed with the community for managing high noise generating works;	Section 2 (a) Page 20
	(e)	describe the community consultation undertaken to develop the strategies in condition B15(d);	Section 10.1 Page 20
	(f)	include a complaints management system that would be implemented for the duration of the construction; and	Section 10.6 Page 21
	(g)	include a program to monitor and report on the impacts and environmental performance of the development and the effectiveness of the implemented management measures in accordance with the requirements of condition B12.	Section 10.3, 10.4 Page 20

MATTHEW PALAVIDIS
VICTOR FATTORETTO
MATTHEW SHIELDS

New Jerrabomberra High School

Construction Noise and Vibration Management Sub-Plan

SYDNEY
9 Sarah St
MASCOT NSW 2020
(02) 8339 8000

ABN 98 145 324 714
www.acousticlogic.com.au

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Project ID	20210459.8
Document Title	Construction Noise and Vibration Management
Attention To	Hindmarsh Construction Australia Pty Ltd

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	4/07/2022	20210459.8/0407A/R0/GC	GC		GC

TABLE OF CONTENTS

1 INTRODUCTION

Acoustic Logic has been engaged to prepare a construction noise and vibration management plan for the proposed new high school development in Jerrabomberra.

The principal objective of this study is to undertake an evaluation of works/activities to be performed during the excavation and construction of the project and forecast the potential impacts of noise and vibration. This assessment will be used to formulate and streamline effective regulation and mitigation measures.

The principal issues which will be addressed in this report are:

Identification of the noise and vibration standards which will be applicable to this project

Identification of potentially impacted nearby development

Identify likely sources of noise and vibration generation and predicted noise levels at nearby development; and

Formulation of a strategy to comply with the standards identified and mitigation treatments in the event that compliance is not achievable.

Provided all measures outlined in this report are fully implemented, noise and vibration impacts associated with the construction of the development site will be strictly controlled, and the impact on the surrounding environment minimised.

2 CONDITION SATISFACTION

This Construction Noise and Vibration Management Sub-Plan (CNVMSP) accompanies an Construction Environmental Management Plan (CEMP)

This report addresses the CEMP Condition of Consent B15 requirements, notably:

Table 2-1- Condition Satisfaction Table

CEMP Condition Satisfaction Table		
Condition	**Condition Requirements**	**Document/Sub Plan Reference**
Condition B15	The Construction Noise and Vibration Management Sub-Plan must address, but not be limited to, the following:	
	a) be prepared by a suitably qualified and experienced noise expert;	Refer to Appendix 1: Author Curriculum Vitae CV) – Page 28
	b) describe procedures for achieving the noise management levels in EPA's Interim Construction Noise Guideline (DECC, 2009);	Section 10 to 13 – page 20-25
	c) describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers	Note:High noise activities such as piling are not required Refer Section 10 to 13 – page 20-25 for managing noise activities during construction
	d) include strategies that have been developed with the community for managing high noise generating works;	Section 10 to 13 – page 20-25
	e) describe the community consultation undertaken to develop the strategies in conditionB16(d);	Section 10 to 13 – page 20-25
	f) include a complaints management system that would be implemented for the duration of the construction; and	Section 10 to 13 – page 20-25
	g) include a program to monitor and report on the impacts and environmental performance of the development and the effectiveness of the implemented management measures in accordance with the requirements of condition B13. •	Section 10 to 13 – page 20-25
	Relevant Policies and Guidelines: ••Interim Construction Noise Guideline (DECC) •Assessing Vibration: A Technical Guideline 2006	

3 SITE DESCRIPTION

Excavation and construction works anticipated are as follows over a construction program as estimated below:

Bulk excavation and earth works – 37 Days

Use of tower cranes, and

Erection of up to 3 building structures, new walkways, central plaza and outdoor games courts and at-grade car park; (powered hand tools for formwork, concrete pump, vibrators etc).

Internal fit out.

Landscaping (front end loaders etc);

Investigation has been carried out by this office in regards to the existing properties and noise impacts surrounding the proposed development, which is detailed below:

Existing residential blocks to the east and south of the site, and

Existing public school to the north east of the site.

Existing active recreation area to the east of the site

The nearest noise receivers around the site include:

R1: Residential Receiver 1 – Residential receivers to the south along Bayside Ct and Palm Ct

R2: Residential Receiver 2 – Residential receivers to the east along Coachwood Avenue

AR1: Active Recreation Receiver 1 – David Madew Regional Park to the east, and

S1: School Receiver 1 – Existing Public School to the north east along Coachwood Avenue.

A site map, measurement description and surrounding receivers are presented in Figure 1 below

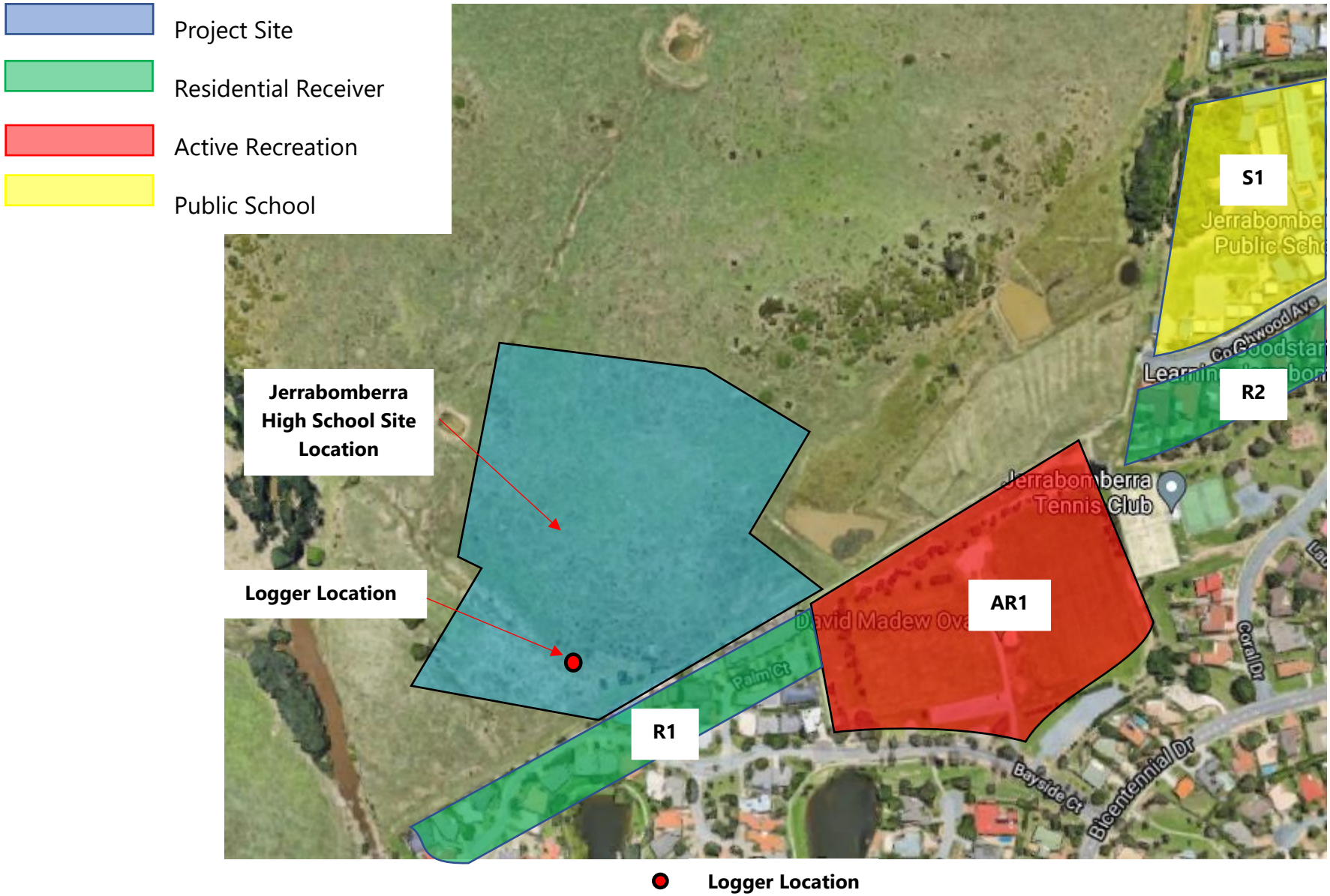


Figure 1 – Site Location and Noise Measurement Location

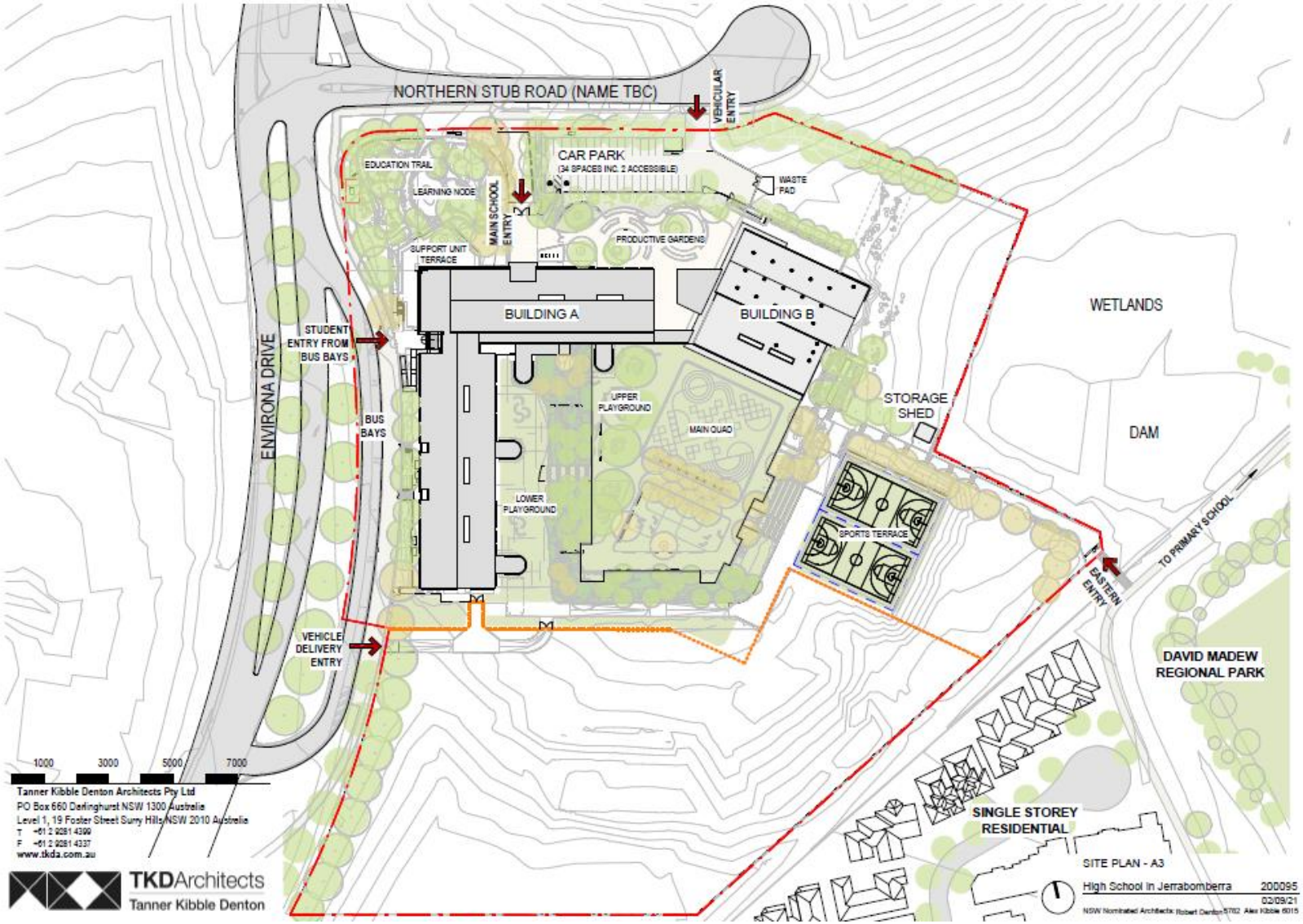


Figure 2 –Proposed Site Plan

4 NOISE DESCRIPTORS

Environmental noise constantly varies. Accordingly, it is not possible to accurately determine prevailing environmental noise conditions by measuring a single, instantaneous noise level.

To accurately determine the environmental noise a 15-minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In analysing environmental noise, three principal measurement parameters are used, namely L_{10}, L_{90} and L_{eq}. The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the 15-minute period. L_{eq} is important in the assessment of environmental noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

5 ENVIRONMENTAL NOISE SURVEY

Noise monitoring was previously conducted in the approved Acoustic Logic *Noise and Vibration Assessment* prepared for DA (*Ref: 20210459.2/0311A/R4/GC, dated 3/11/2021*).

Summarised background noise levels are as presented below.

Table 5-1 – Measured Rating Background Noise Levels

Location	Time of Day	Rating Background Noise Level – dB(A)L_{90}
Southern Side of Site - Logger Location in Figure 1	Day (7am-6pm)	35*
	Evening (6pm-10pm)	33
	Night (10pm to 7am)	30*

*Note: As per the EPA Noise Policy for Industry *"Where the rating background noise level is found to be less than 35 dB(A) for the day periods, then it is set to 35 dB(A). Where the rating background noise level is found to be less than 30 dB(A) for the night periods, then it is set to 30 dB(A)"*

6 CONSTRUCTION HOURS

In accordance with Standard Constructions Hours from DECC Interim Construction Noise Guideline (ICNG), work hours are as follows:

Table 6-1 – Standard Construction Hours

Day	Standard Construction Hours
Monday – Friday	7am – 6pm
Saturday	8am – 1pm
Sunday & Public Holidays	No Work Permitted

7 CONSTRUCTION NOISE AND VIBRATION OBJECTIVES

7.1 NOISE OBJECTIVES

Noise associated with construction activities on the site will be assessed in conjunction with the following documents and guidelines:

- NSW DECC Interim Construction Noise Guideline (2009); and
- Australian Standard 2436-2010 "*Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites*".

7.2 DECC INTERIM CONSTRUCTION NOISE GUIDELINE

The DECC Interim Construction Noise Guideline (ICNG) assessment requires:

- Determination of noise management levels (based on ambient noise monitoring).
- Review of operational noise levels at nearby development.
- If necessary, recommendation of noise controls strategies in the event that compliance with noise emission management levels is not possible.

DECC ICNG adopts differing strategies for noise control depending on the predicted noise level at the nearest residences:

- *"Noise affected" level*. Where construction noise is predicted to exceed the "noise effected" level at a nearby residence, the proponent should take reasonable/feasible work practices to ensure compliance with the "noise effected level". For residential properties, the "noise effected" level occurs when construction noise exceeds ambient levels by more than 10dB(A)$L_{eq(15min)}$.
- "*Highly noise affected level*". Where noise emissions are such that nearby properties are "highly noise effected", noise controls such as respite periods should be considered. For residential properties, the "highly noise effected" level occurs when construction noise exceeds 75dB(A)$L_{eq(15min)}$ at nearby residences.

In addition to the above management levels for residential receivers, the ICNG nominates a Management Level of RBL + 5 dB(A) for any work done outside of standard hours.

Table 7-1 – Noise Management Levels at Residential Property Boundaries

"Noise Affected" Level - dB(A)$L_{eq(15min)}$ Standard Hours	**"Highly Noise Affected" Level - dB(A)$L_{eq(15min)}$**
45 externally at façade	75

Where noise from the construction works is above the "noise affected" level, the proponent should apply any feasible and reasonable work practices to minimise noise. The "noise affected level is representative of a level where there may be some community reaction to noise.

If noise emissions are likely to exceed 75 dB(A)$L_{eq(15min)\ "highly\ noise\ affected"}$ at the boundary of surrounding affected residential receivers, the receiver is deemed to be "highly noise affected". The "highly noise affected" level is representative of a level where strong community reaction to noise is expected. Introduction of management controls such as scheduling of noisy periods, or respite periods is then recommended. Refer to Section 9 for specific recommendations.

Section 4.1.2 and 4.1.3 of the EPA Interim Construction Noise Guideline also nominates management levels for other sensitive land uses (other than residences). Criteria relevant to this assessment is detailed below.

Table 7-2 – Noise Management Levels at Commercial/Sensitive Property Boundaries

Location	"Noise Affected" Level – dB(A)$L_{eq(15min)}$ Standard Hours
Active Recreation Area	65 externally
Classrooms at Schools and other educational institutions	45 internally

7.2.1 Australian Standard AS2436:2010 "*Guide to Noise Control on Construction, Maintenance and Demolition Sites*"

The Australian Standard AS2436 states that where all reasonable and available measures have been taken to reduce construction noise, mitigation strategies may be put in place to reduce levels noise levels to within a reasonable and acceptable level.

For the control and regulation of noise from construction sites, AS2436:1981 nominates the following:

a. That reasonable suitable noise criterion is established,

b. That all practicable measures be taken on the building site to regulate noise emissions, including the siting of noisy static processes to locations of the site where they can be shielded, selecting less noisy processes, and if required regulating construction hours, and

c. The undertaking of noise monitoring where non-compliance occurs to assist in the management and control of noise emission from the construction site.

The guideline reflects on feasible and reasonable mitigation strategies, management controls and public liaising in the effort to reach realistic comprises between construction sites and potential noise affected receivers.

Based on these criteria the following procedure will be used to assess noise emissions:

- Predict noise levels produced by typical construction activities at the sensitive receivers.
- Adopt management conditions as per AS2436 in the event of a non-compliance.

7.3 VIBRATION OBJECTIVES

Vibration caused by construction at any residence or structure outside the subject site will be assessed with reference to:

- For structural damage vibration, German Standard DIN 4150-3 *Structural Vibration: Effects of Vibration on Structures*; and
- For human exposure to vibration, Department of Environment and Conservation NSW "Assessing Vibration: A Technical Guideline" (Feb 2006) is based on the guidelines contained in BS 6472:1992 *Guide to Evaluate Human Exposure to Vibration in Buildings (1Hz to 80Hz)* for low probability of adverse comment.

The criteria and the application of this standard are discussed in separate sections below.

7.3.1 Structure Borne Vibrations

German Standard DIN 4150-3 (1999-02) provides a guideline for acceptable levels of vibration velocity in building foundations, to assess the effects of vibration on structures. The table give guidance on the maximum accepted values of velocity at the foundation and in the plane of the highest floor of various types of buildings, to prevent any structural damage.

The table below lists the peak particle velocity, which is the maximum absolute value of the velocity signals for the three orthogonal components. This is measured as a maximum value of any of the three orthogonal component particle velocities when measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

Table 7-3 – DIN 4150-3 (1999-02) Safe Limits for Building Vibration

TYPE OF STRUCTURE		PEAK PARTICLE VELOCITY (mms^{-1})			
		At Foundation at a Frequency of			Plane of Floor of Uppermost Storey
		< 10Hz	10Hz to 50Hz	50Hz to 100Hz	All Frequencies
1	Buildings used in commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g., buildings that are under a preservation order)	3	3 to 8	8 to 10	8

7.3.2 Assessing Amenity

The NSW EPA's *Assessing Vibration – a technical guideline* is based on the guidelines contained in British Standard BS 6472-1992 '*Guide to Evaluate Human Exposure to Vibration Buildings (1Hz to 80Hz*'. This guideline provides procedures for assessing tactile vibration and regenerated noise within potentially affected buildings.

The recommendations of this guideline should be adopted to assess and manage vibration from the site. Where vibration exceeds, or is likely to exceed, the recommended levels then an assessment of reasonable and feasible methods for the management of vibration should be undertaken.

Table 7-4 – BS 6472 Vibration Criteria

		RMS acceleration (m/s^2)		RMS velocity (mm/s)		Peak velocity (mm/s)	
Place	**Time**	**Preferred**	**Maximum**	**Preferred**	**Maximum**	**Preferred**	**Maximum**
Continuous Vibration							
Residences	Daytime	0.01	0.02	0.2	0.4	0.28	0.56
Offices	Day or night-time	0.02	0.04	0.4	0.8	0.56	1.1
Workshops		0.04	0.08	0.8	1.6	1.1	2.2
Impulsive Vibration							
Residences	Daytime	0.3	0.6	6.0	12.0	8.6	17.0
Offices	Day or night-time	0.64	1.28	13	26	18	36
Workshops		0.64	1.23	13	26	18	36

Note 1: Continuous vibration relates to vibration that continues uninterrupted for a defined period (usually throughout the daytime or night-time), e.g., continuous construction or maintenance activity. (DECC, 2006).

Note 2: Impulsive vibration relate to vibration that builds up rapidly to a peak followed by a damped decay and that may or may not involve several cycles of vibration (depending on frequency and damping), with up to three occurrences in an assessment period, e.g., occasional loading and unloading, or dropping of heavy equipment. (DECC, 2006).

8 PROPOSED CONSTRUCTION ACTIVITIES

We have been advised of the typical equipment/processes anticipated to be used for the construction of the subject development. Noise impacts from these activities on the amenity of the surrounding identified sensitive receivers, will be predicted in this section. Typically, the most significant sources of noise or vibration generated during a construction project will be demolition, excavation, civil works (compaction, asphalting) and piling.

The A-weighted sound power levels for the expected loudest equipment/processes for each stage of development are outlined in the table below.

Table 8-1 – Proposed Construction Activities and Associated Typical Sound Power Levels

Construction Stage	Equipment /Process	Typical Sound Power Level dB(A)
Excavation	Dozer/Excavator	112
	Trucks	100
	Crane (Electric)	85
	Powered Hand Tools (Electric)	100
	Bobcat	105
Construction	Concrete Pump Truck	110
	Trucks	100
	Crane (Electric)	85
	Powered Hand Tools (Electric)	100
	Bobcat	105

The noise levels presented in the above table are derived from the following sources:

1. On-site measurements
2. Table A1 of Australian Standard 2436-2010, and
3. *Data held by this office from other similar studies.

Noise levels take into account correction factors (for tonality, intermittency where necessary).

9 NOISE AND VIBRATION ASSESSMENT

9.1 NOISE IMPACT ASSESMENT

The predicted noise levels during excavation and construction will depend on:

- The activity undertaken.
- The distance between the work site and the receiver. For many of the work areas, the distance between the noise source and the receiver will vary depending on which end of the site the work is undertaken. For this reason, the predicted noise levels will be presented as a range.

Predicted noise levels are presented below. Predictions take into account the following:

- Noise reduction as a result of distance.
- Barrier effects resulting from shielding of the surrounding buildings (where applicable).

The following predictions represent a worst-case scenario for each respective item. The highest predicted noise levels assume direct line of sight with no barrier effects (such as second storey receivers with direct line of sight to the operating construction machinery). It is also noted that due to the steep elevation of the site, barrier effects have not been modelled for, however is likely to have a noise mitigating effect. See Section 0.

Table 9-1 – Predicted Noise Generation to R1 Residential Receiver

Activity	Predicted Level – dB(A) $L_{eq(15min)}$ (External Areas)	Comment
Dozer/Excavator (Excavation only)	49-61	Will generally exceed NML
Concrete Pump (Construction)	47-59	Will generally exceed NML
Trucks	37-49	Will generally exceed NML when at southern boundary of site
Bobcat	42.54	Will generally exceed NML when at southern boundary of site
Crane (electric)	22.34	Generally Within NML
Powered Hand Tools (Electric)	37-49 – external 17-29 - assumes loss from building shell when constructed	Will generally exceed NML when at southern boundary of site Complies when building shell is constructed and works are generally internal.

Table 9-2 – Predicted Noise Generation to R2 Residential Receiver

Activity	Predicted Level – dB(A) $L_{eq(15min)}$ (External Areas)	Comment
Dozer/Excavator (Excavation only)	44-49	Will generally exceed NML when at north-eastern boundary of site
Concrete Pump (Construction)	42-47	Will marginally exceed NML when at north-eastern boundary of site
Trucks	32-37	Generally Within NML
Bobcat	37-42	Generally Within NML
Crane (electric)	17-22	Generally Within NML
Powered Hand Tools (Electric)	32-37 – external 12-17 - assumes loss from building shell when constructed	Generally Within NML

Table 9-3 – Predicted Noise Generation to AR1 David Madew Regional Park Receiver

Activity	Predicted Level – dB(A) $L_{eq(15min)}$ (External Areas)	Comment
Dozer/Excavator (Excavation only)	49-61	Generally Within NML
Concrete Pump (Construction)	47-59	
Trucks	37-49	
Bobcat	42.54	
Crane (electric)	22-34	
Powered Hand Tools (Electric)	37-49 – external 17-29 - assumes loss from building shell when constructed	

Table 9-4 – Predicted Noise Generation to S1 School Classroom Receiver

Activity	Predicted Level – dB(A) $L_{eq(15min)}$ (Internal Areas)	Comment
Dozer/Excavator (Excavation only)	32-36	Generally Within NML
Concrete Pump (Construction)	30-34	
Trucks	20-24	
Bobcat	25-29	
Crane (electric)	5-9	
Powered Hand Tools (Electric)	20-24	

Note: Internally in Classroom with windows and assumes full view of the construction site of western facing buildings. Assuming 10 dB(A) external to internal reduction with windows open. Further noise attenuation will occur to classrooms with partial view, barrier effects from other buildings as well as distance noise attenuation.

9.2 GENERAL DISCUSSION

Noise

The greatest noise impact will be at the residences immediately to the south of the site and some to the north east of the site. Noise levels will generally exceed the NML but will be less than the HNAL. Therefore, "reasonable and feasible" mitigation should be applied in accordance with the "Control of Construction Noise and Vibration – Procedural Steps" outlined below.

Primarily, the use of excavators and dozers during excavation are predicted to be the highest noise generating equipment. All noise predictions have been presented as external noise levels for all receivers. Internal noise levels at all locations are expected to be 10-20 dB(A) lower dependant on the façade of each receiver.

It is also noted that all high noise generation equipment are only expected to be used during specific portions of the excavation stage and will not be continuous throughout the entire excavation stage. Notifications shall be provided to surrounding residents when excavation is planned to occur.

External noise level predictions to all receivers are presented as worst-case scenarios where the closest receiver has direct line of sight to construction plant operating at the closest point of the site with respect to each individual receiver. It is noted that many residents are shielded by other residential development which would lead to much lower noise levels than those predicted in the previous section. The predicted noise levels are to the worst-affected residential receiver in the residential blocks.

It is also noted that hoarding is unlikely to reduce the construction noise level except when working close to the hoarding due to the elevation surrounding the site. However, the development will be built with a staged approach, with any building structures that are built first providing a barrier effect to residents behind the building. With this barrier effect, it is likely that all construction stage noise levels will fall under the noise affected level if the building structure is erected between the receiver and ongoing construction works. Excavation stage activities will still approach the highly noise affected management level.

Truck access routes have also been assessed to operate and provide the easiest access routes whilst also taking full advantage of barrier effects of surrounding buildings once the structure is erected.

It is noted that noise management levels to school classroom and the David Madew Regional Park do not exceed the NML.

Treatment processes are recommended as per Section 10 for concerns with noise levels that are predicted to be over the respective noise management level. Further recommendations in Sections 11, 12 & 13. With the implementation of the aforementioned sections, the Client demonstrates that all reasonable and feasible vibration and noise mitigation measures have been taken.

Vibration

There are no significant sources of vibration envisaged. Given the distance from nearby receivers, vibration impacts on all receivers is expected to be within the recommended levels detailed in Section 7.3.

10 RECOMMENDATIONS

1. **Community Consultation/Notification:** Notification (leaflet or similar) of all residents, and any local receivers surrounding the site as identified in the site map of Figure 1 shall be undertaken prior to commencement of works. Notification should advise of anticipate date and duration of excavation.
2. **Respite Periods:** To protect the amenity of nearby residential receivers to the south, operation of large earthmoving equipment (bulldozers and excavators) within 30m of the southern, eastern site boundary. In the event that respite periods are to be imposed

   It is also recommended to consider respite hours as follows:

   a. In respect of pneumatic/hydraulic hammering (if required) noise impacts should be addressed via the imposition of respite periods, typically limiting operation to:

      - 8am – 6pm, Monday to Friday
      - 8am to 5pm, Saturday
      - In any case maximum 3 hours operation with 1 hour uninterrupted respite.
      - It is noted that respite periods will extend the length of works and may provide heavier loss of amenity compared to non-imposed works.

3. **Vibration monitoring**: No vibration monitoring is required for standard excavation and construction works. In the event of any continuous complaint, vibration monitoring is to be implemented along the property boundary closest to the vibration receiver who issued the complaint. This localised vibration monitoring is to be conducted for a period of 2 weeks to ensure the appropriate criteria is achieved.
4. **Noise monitoring:** No noise monitoring is required for standard excavation and construction works. In the event of continuous complaint, noise monitoring is to be implemented along the property boundary closest to the noise receiver who issued the complaint. This localised noise monitoring is to be conducted for a period of 2 weeks for documentation.
5. **Quiet Work Methods/Technologies:**

   a. The primary noise generating activity at the site will be the ground work period. As much as practicable, use of quieter demolition methods is to be adopted

      i. Excavation is conducted initially using excavator with bucket (quietest excavation method). Use of the loudest excavation equipment is used only when other options are not available.

      ii. Rubber tracks for excavators and associated equipment shall be used provided the equipment manufacturer has such options.

   b. Concrete pump trucks should be located within the bounds of the site (rather than on nearby roads at the perimeter of the site) where possible.

   c. Materials handling/vehicles:

      i. Trucks and bobcats to use a non-tonal reversing beacon (subject to OH&S requirements) to minimise potential disturbance of neighbours.

      ii. Avoid careless dropping of construction materials into empty trucks.

      iii. Trucks, trailers and concrete trucks (if feasible) should turn off their engines during idling to reduce noise impacts (unless truck ignition needs to remain on during concrete pumping).

   d. Noisy activities (exceeding the RBL by more than 5 dB(A)) should not be carried out after 1pm Saturdays. This would generally limit the activities to "quiet" trades such as internal fitout and maintenance activities.

6. **Complaints Handling:** In the event of complaint, the procedures outlined in Section 13 should be adopted.

   A detailed noise management plan will be be developed by the main contractor that describes in detail the construction phases, programme, processes and equipment used, noise impact assessment and proposed mitigation and management.

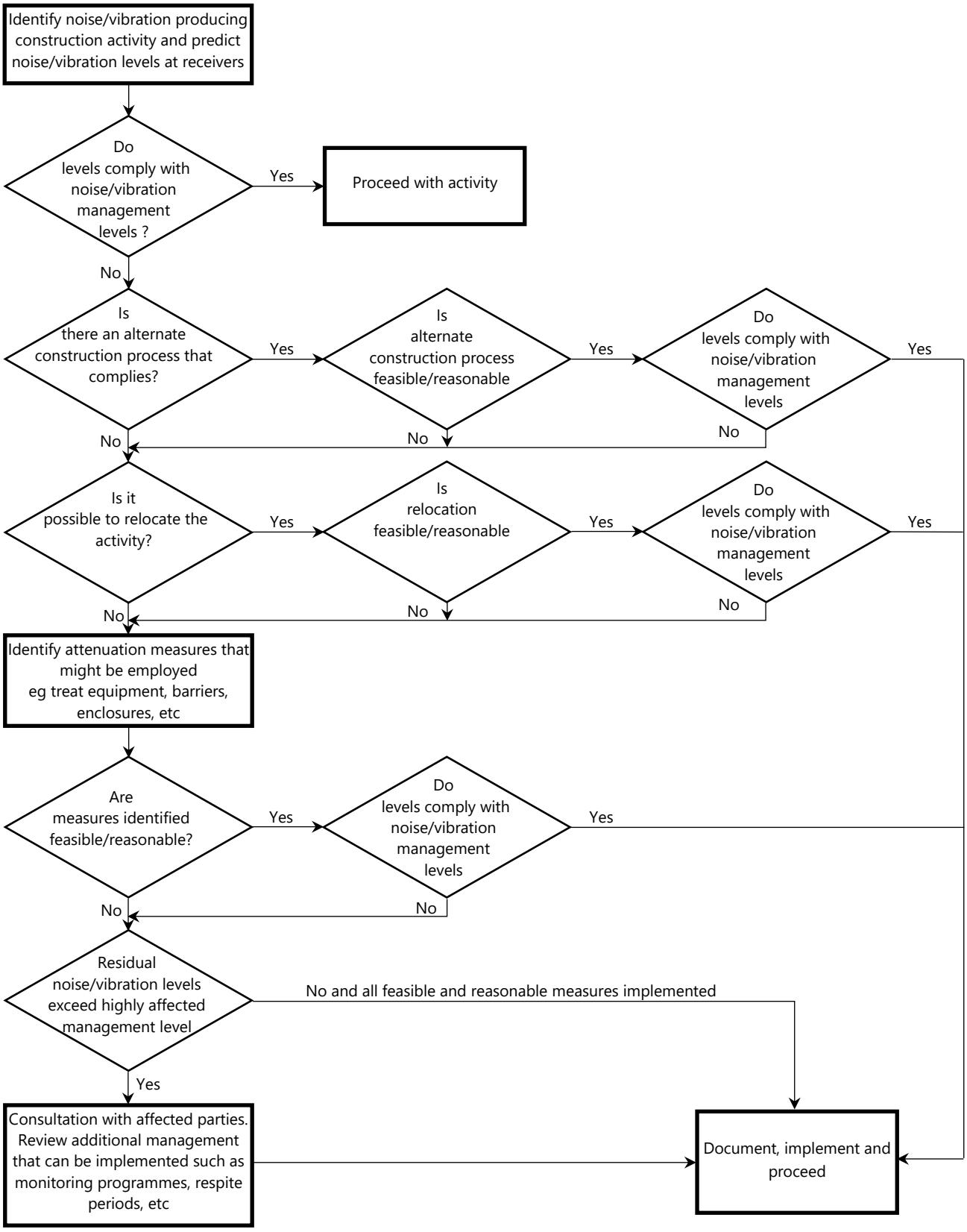
7. **Site Induction:**

   a. A copy of the Construction Noise and Vibration Management Sub Plan is to be available to contractors. The location of the CNVMSP should be advised in any site induction.

Site induction should also detail the site contact in the event of noise complaint

11 CONTROL OF CONSTRUCTION NOISE AND VIBRATION – PROCEDURAL STEPS

The flow chart presented below illustrates the process that will be followed in assessing construction activities.



12 ADDITIONAL NOISE AND VIBRATION CONTROL METHODS

In the event of complaints, there are a number of noise mitigation strategies available which can be considered. The determination of appropriate noise control measures will be dependent on the particular activities and construction appliances. This section provides an outline of available methods.

12.1 SELECTION OF ALTERNATE APPLIANCE OR PROCESS

Where a particular activity or construction appliance is found to generate excessive noise levels, it may be possible to select an alternative approach or appliance. For example, the use of a hydraulic hammer on certain areas of the site may potentially generate high levels of noise. Undertaking this activity using bulldozers, ripping and/or milling machines will result in lower noise levels. Noting this, the Builder has already taken steps in the design process to redesign the structure to reduce the number of bored piers within the RHI building and install pad footings rather than drilling piers, mitigating vibration impacts through the design process. In tandem with concrete saw cutting to allow for cut and lift operation, further process optimisation can be considered through consultation with the Builder and the subcontractors.

12.2 ACOUSTIC BARRIER

Given the position of adjacent development, it is unlikely that noise screens will provide significant acoustic benefit for residential receivers but will provide noticeable improvement for local commercial receivers at ground level.

The placement of barriers at the source is generally only effective for static plant. Equipment which is on the move or working in rough or undulating terrain cannot be effectively attenuated by placing barriers at the source. Barriers can also be placed between the source and the receiver. A portable barrier system can be setup when saw cutting is conducted externally.

The degree of noise reduction provided by barriers is dependent on the amount by which line of sight can be blocked by the barrier. If the receiver is totally shielded from the noise source reductions of up to 15dB(A) can be affected. Where only partial obstruction of line of sight occurs, noise reductions of 5 to 8dB(A) may be achieved. Where no line of sight is obstructed by the barrier, generally no noise reduction will occur.

As barriers are used to provide shielding and do not act as an enclosure, the material they are constructed from should have a noise reduction performance that is approximately 10dB(A) greater than the maximum reduction provided by the barrier. In this case the use of a material such as 10mm or 15mm thick plywood (radiata plywood) would be acceptable for the barriers. It is also noted that the current wall to Errol Flynn Boulevard is to be demolished and replaced with a 2.4m high class A hoarding. This will maximise the amenity of the local receivers close to the development site.

12.3 MATERIAL HANDLING

The installation of rubber matting over material handling areas can reduce the sound of impacts due to material being dropped by up to 20dB(A). Noting that the proposed material handling areas are mostly shielded by hoarding or the existing structures of the site, therefore rubber matting shall only be considered if complaint is raised by local receivers.

12.4 ESTABLISHMENT OF SITE PRACTICES

This involves the formulation of work practices to reduce noise generation. A more detailed management plan will be developed for this project in accordance with the construction methodology outlining work procedures and methods for minimising noise.

12.5 COMBINATION OF METHODS

In some cases, it may be necessary that two or more control measures be implemented to minimise noise.

13 COMMUNITY INTERACTION AND COMPLAINTS HANDLING

13.1 ESTABLISHMENT OF DIRECT COMMUNICATION WITH AFFECTED PARTIES

In order for any construction noise management programme to work effectively, continuous communication is required between all parties, which may be potentially impacted upon, the builder and the regulatory authority. This establishes a dynamic response process which allows for the adjustment of control methods and criteria for the benefit of all parties.

The objective in undertaking a consultation process is to:

- Inform and educate the groups about the project and the noise controls being implemented
- Increase understanding of all acoustic issues related to the project and options available
- Identify group concerns generated by the project, so that they can be addressed, and
- Ensure that concerned individuals or groups are aware of and have access to a Constructions Complaints Register which will be used to address any construction noise related problems should they arise.

Community consultation is required prior to any works commencing on site, with letterbox notifications to all identified surrounding sensitive receivers (refer Section 2). This will include high level detail of the construction plan detailing the proposed works on site and duration of each stage.

13.2 DEALING WITH COMPLAINTS

Should ongoing complaints of excessive noise or vibration criteria occur immediate measures shall be undertaken to investigate the complaint, the cause of the exceedances and identify the required changes to work practices. In the case of exceedances of the vibration limits all work potentially producing vibration shall cease until the exceedance is investigated.

The effectiveness of any changes shall be verified before continuing. Documentation and training of site staff shall occur to ensure the practices that produced the exceedances are not repeated.

If a noise complaint is received the complaint should be recorded on a Noise Complaint Form. The complaint form should list:

- The name and address of the complainant (if provided)
- The time and date the complaint was received
- The nature of the complaint and the time and date the noise was heard
- The name of the employee who received the complaint
- Actions taken to investigate the complaint, and a summary of the results of the investigation
- Required remedial action, if required
- Validation of the remedial action, and
- Summary of feedback to the complainant.

A permanent register of complaints should be held. All complaints received should be fully investigated and reported to management. The complainant should also be notified of the results and actions arising from the investigation.

The investigation of a complaint shall involve where applicable:

- Noise measurements at the affected receiver
- An investigation of the activities occurring at the time of the incident
- Inspection of the activity to determine whether any undue noise is being emitted by equipment, and
- Whether work practices were being carried out either within established guidelines or outside these guidelines.

Where an item of plant is found to be emitting excessive noise, the cause is to be rectified as soon as possible. Where work practices within established guidelines are found to result in excessive noise being generated then the guidelines should be modified so as to reduce noise emissions to acceptable levels. Where guidelines are not being followed, the additional training and counselling of employees should be carried out.

Measurement or other methods shall validate the results of any corrective actions arising from a complaint where applicable.

13.3 REPORTING REQUIREMENTS

The following shall be kept on site:

1. A register of complaints received/communication with the local community shall be maintained and kept on site with information as detailed in this report.
2. Where noise/vibration complaints require noise/vibration monitoring, results from monitoring shall be retained on site at all times.
3. Any noise exceedances occurring including the actions taken and results of follow up monitoring.
4. A report detailing complaints received and actions taken shall be presented to the construction liaison committee.

13.4 CONTINGENCY PLANS

Where non-compliances or noise complaints are raised the following methodology will be implemented.

1. Determine the offending plant/equipment/process.
2. Locate the plant/equipment/process further away from the affected receiver(s) if possible.
3. Implement additional acoustic treatment in the form of localised barriers, silencers etc where practical.
4. Selecting alternative equipment/processes where practical.

14 CONCLUSION

A construction noise and vibration management sub-plan has been undertaken of the proposed construction works to be undertaken for New Jerrabomberra High School. Potential noise and vibration impacts on nearby developments have been assessed.

Provided that the mitigation techniques and vibration monitoring recommended in Sections 11, 12, 12 & 13 of this report are adopted, noise and vibration impacts on the adjacent buildings are expected to be acceptable.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

Acoustic Logic Pty Ltd
Glen Campbell

APPENDIX 1

Author CV

GLEN CAMPBELL
SENIOR ENGINEER - ACOUSTIC CONSULTANT

Qualifications

Master of Design Science (Audio & Acoustics) Sydney University 2009

July 2010 – September 2017	Project Engineer, Acoustic Logic Consultancy
September 2017 -February 2019	Senior Project Engineer, Acoustic Logic Consultancy
February 2019 - Current	Senior Engineer, Acoustic Logic Consultancy

Outline of Experience

Glen is a senior engineer (Acoustics) with over 9 years experience in the building sector, including experienced gained during his degree. He has been involved in many acoustic research projects. Since commencing work in the acoustic industry he has been responsible for noise assessments for many projects.

Projects involved all aspects of acoustic design including room modelling investigations of traffic, train and aircraft noise, design of relevant building systems for compliance with BCA and Council requirements, the assessment of mechanical plant, providing the appropriate treatment for compliance. Other relevant areas included vibration isolation for hard floor systems and railway vibration.

Glen's areas of expertise include:

- Building acoustics and building services noise control;
- Review of external noise impacts (traffic, rail helicopters/helipads and aircraft noise);
- Testing and assessment of walls/floors/glazing/building services;
- Acoustic control of mechanical systems (ventilation systems, air-conditioning etc);
- Spatial planning of development (room layouts, wall design etc);
- NSW Liquor and Gaming Noise assessments for licensed premises

Project Experience

Australian National University - Union Square Redevelopment
Australian National University Student Accommodation 5 building-
St Pauls College – West Wing and Graduate House Buildings
Australian National University – The Commons
University of Canberra Public Hospital, Bruce, ACT
St George Hospital Acute Services Building Redevelopment, Kogarah, NSW
Liverpool Hospital Milestone 2, Liverpool, NSW
Australian National University Student Accommodation 4 building
University of Sydney, Child Behaviour Research Clinic, Bldg M02K, Camperdown
Star Hotel Project, Star City Casino, Pyrmont, NSW
Orange Hospital Development, Orange, NSW
RACF Seven Hills Road, Baulkham Hills, NSW
Lot 11, 1-5 Pine Ave, Little Bay, NSW
Child Care Centre, Top Ryde Shopping Centre, Ryde, NSW
UWS Bankstown Campus Teaching Facility, Milperra, NSW
20 Gadigal Avenue, Zetland
Dominion, Forbes Street, Darlinghurst
34 Walker Street, Rhodes, NSW
Wilara, Easty St, Woden Green, Phillip, ACT
1-7 Second Avenue, Blacktown, NSW
Lakes Neighbourhood Centre, The Ponds, NSW
Eclipse Apartments, Braybrooke St, Bruce ACT

APPENDIX I – EMP Preparation checklist

Attached document - Checklist from EMP Guideline - NV - 07.07.22

Appendix A. EMP preparation checklist

Use the checklist below to help develop an EMP that contains all the required information. The checklist should be completed and supplied to the Department with the EMP. One checklist should be submitted for each EMP.

Requirement	Plan reference	Yes/No/Not applicable
Document preparation and endorsement		
Has the EMP been prepared in consultation with all relevant stakeholders as per the requirements of the conditions of consent? (Section 4.1)	10.3	Yes
Have the views of the relevant stakeholders been taken into consideration? Have appropriate amendments been made to the EMP and does the EMP clearly identify the location of any changes? (Section 4.1)	10.5	Yes
Has the EMP been internally approved by an authorised representative of the proponent or contractor? (Section 4.2)	1.1	Yes
Version and content		
Does the EMP describe the proponent's Environmental Management System (EMS) (if any), and identify how the EMP relates to other documents required by the conditions of consent? (Section 3.5.1)	2.2	Yes
Does the EMP include the required general content and version control information? (Section 3.1)	1.1	Yes
Does the EMP have an introduction that describes the project, scope of works, site location and any staging or timing considerations? (Section 3.2)	3.1	Yes
Does the EMP reference the project description? (Section 3.3)	3.1	Yes
Does the EMP reference a Community and Stakeholder Engagement Plan (or similar) or include community and stakeholder engagement actions (if required)? (Section 3.4)	10.3	SINSW to provide
Have all other relevant approvals been identified? Has appropriate information been provided regarding how each approval is relevant? (Section 4)		SSD conditions
Has the environmental management structure and responsibilities been included? (Section 3.5.2)	5.1	Yes
Does the EMP include processes for training of project personnel and identify how training and awareness needs will be identified? (Section 3.5.3)	5.1	Yes
Does the EMP clearly identify the relevant legal and compliance requirements that relate to the EMP? (Section 3.5.3)	6	Yes
Does the EMP include all the conditions of consent to be addressed by the EMP and identify where in the EMP each requirement has been addressed? (Section 3.5.13)	1.2	Yes
Have all relevant guidelines, policies and standards been identified, including details of how they are relevant? (Section 3.5)	4	Yes
Is the process that will be adopted to identify and analyse the environmental risks included? (Section 3.5.5)	7.3	Yes
Have all the environmental management measures in the EIA been directly reproduced into the EMP? (Section 3.5.7)	ALL	Yes, Refer EIS recommendations
Have any additional environmental management measures been included in the EMP? (Section 3.5.7)		No

Requirement	Plan reference	Yes/No/Not applicable
Have environmental management measures been written in committed language? (Section 3.5.7)	Refer CEMP	Yes
Have project environmental management measures, including hold points, been identified and included? (Section 3.5.6)	7.3	Yes
Are relevant details of environmental monitoring that will be carried out included? (Section 3.5.8)	7.2	Yes
Have the components of any environmental monitoring programs been incorporated? (Section 3.5.8)	12	Yes
Are environmental inspections included? (Section 3.5.9)	12.4	Yes
Does the EMP document all relevant compliance monitoring and reporting requirements for the project? (Section 3.5.12 and 3.5.13)	13	Yes
Does the EMP describe the types of plans or maps (such as environmental control maps) that will be used to assist with the management of environmental matters on site? (Section 3.5.10)	2	Yes
Does the EMP list environmental management documents? (Section 3.5.11)	7.3	Yes
Is an auditing program referenced? (Section 3.5.13)	12.3	Yes
Does the EMP include the incident notification and reporting protocols that comply with the relevant conditions of consent? (Section 3.5.15)	9.1	Yes
Does the EMP identify the project role/position that is responsible for deciding whether an occurrence is an incident? (Section 3.5.15)	14	Yes
Does the EMP describe a corrective and preventative action process that addresses the requirements? (Section 3.5.16)	12.2	Yes
Does the EMP include details of a review and revision process that complies with the requirements? (Section 3.6)	13	Yes

APPENDIX J – Poplars EPBC Management Plan

Attached document - Appendix J - JHS - Poplars EPBC ACT- Construction Environmental Management Plan V2.2

- This document has been made available for review to all contractors inducted at Jerrabomberra Highschool and a physical copy is kept in the HCA site office to quick reference. Workers are invited to review the document at induction per Section 4.3 of the EPBC. Relevant Sensitive ecological components that form part of the HCA site are included in the induction slides for all workers.

- This document is not specific to the construction of the Jerrabomberra Highschool.

POPLARS EPBC ACT
CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

EPBC No.: 2020/8801

Project Name: The Poplars, Jerrabomberra, NSW

Proponent/Approval Holder: Poplars Developments Pty Ltd

ACN 128 465 887

Approved Action: Mixed-use commercial development

OCTOBER 2021

PROJECT TITLE: *POPLARS EPBC ACT CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN*

PROJECT NUMBER: *7486*

Prepared by:	D. Rae	Date:	23/09/2021
Reviewed by:	N. Turnbull	Date:	24/09/2021
Approved by:	N. Turnbull	Date:	24/09/2021

Base Template:	Version B June 2020

External Issue

Revision Control Register			
Version No:	**Issue Date:**	**Issued To:**	**Name:**
1.0	25/08/2021	BMCA	C. Daly
2.1	28/09/2021	BMCA	C. Daly
2.2	17/10/2021	BMCA	C. Daly

TABLE OF CONTENTS

1. PURPOSE & SCOPE

Indesco Pty Ltd has developed this Construction Environmental Management Plan (CEMP) in conjunction with the Project Managers (Black Mountain Construction Assurance) and Ecologists (Capital Ecology). The plan provides a framework for managing potential environmental impacts associated with the construction of the remaining stages of the Poplars development on adjacent land that is known to support significant ecological values.

The primary purpose of this CEMP is to describe the potential risks and proposed controls that will be implemented to protect the adjacent ecological values. This CEMP is the overarching project document for environmental management throughout the Poplars development's construction phase(s). It will be included as an attachment to each stage-specific CEMP.

2. PROJECT OVERVIEW

The remaining stages of the Poplars development, defined in Figure A by the 'Proposed Action Area – Development Footprint', are located in Lot 1 DP1243031 and portions of Lot 6 DP1246134 and Lot 1 DP1263364, Jerrabomberra, NSW.

As part of the environmental approvals processes, the Poplars development was referred (Referral No. 2020/8801) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to the Commonwealth Department of Agriculture, Water and the Environment (DAWE). The Poplars development was determined to be a controlled action to be assessed by preliminary documentation. On 13 September 2021, the Poplars development received EPBC Act approval to implement the staged development of the project (included here as Appendix A). Attached to the EPBC Act approval are 27 conditions, including the following three conditions of specific relevance to this CEMP (refer to Part C of Appendix A for text definitions in **bold**).

To assist the reader the relevant section of the CEMP which addresses the condition of approval are also listed below.

4. *For the protection of the **protected matters** in areas adjacent to the **development footprint**, the approval holder must submit, before the **commencement of the action**, a Construction Environmental Management Plan (CEMP) for the **Minister's** written approval. The approval holder must not **commence the action** unless the CEMP has been approved in writing by the **Minister**. (Refer Section 4.1.1 Approval Holder)*
5. *The approval holder must implement the CEMP approved by the **Minister** within the **development footprint**. (Refer Section 4.1.1 Approval Holder)*
6. *For the protection of the **protected matters** in areas adjacent to the **development footprint**, the CEMP must prevent **impacts** of the action on adjacent areas and be consistent with the **Department's** Environmental Management Plan Guidelines 2014, and must specify full details of:*
    a. *Signage, consistent with signage for the **North Poplars BioBanking Agreement**, including to be placed in or adjacent to the **White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area** to prohibit public access and inform the public of the presence of the **protected matters** (Refer Section 4.8 Signage);*
    b. *Methods, effort, timing and reporting of pre-clearance surveys (Refer Section 4.9 Pre-Clearance Surveys);*
    c. *Procedures to report and address unexpected finds of **protected matters** including a procedure to determine if **credits** should be **retired** in respect of the **protected matter(s)**, if so how many **credits**, and how the **Department** will be assured that this has happened (Refer Section 4.12 Unexpected Protected Matters Finds);*
    d. *Proposed management methods, effort and timing to exclude, control or eliminate **weeds** and pathogens (Refer Section 4.11 Weed and Pathogen Management);*
    e. *Proposed management methods, effort and timing to prevent and address existing erosion and prevent sediments entering watercourses (Refer Section 4.5 Sediment and Erosion Control Plan);*

f. *Proposed management methods, effort and timing to prevent surface water flows enabling the spread of harmful pollutants, and excessive ponding of water in the **White Box-Yellow Box- Blakely's Red Gum Woodland and Derived Native Grassland retained area** (Refer Section 4.4 Waterway Works (Surrounding Catchment Area);*

g. *The site induction program ensures that all persons implementing the action or on the site of the action are aware of the need and how to avoid and protect the **protected matters** (Refer Section 4.3 Site Induction).*

3. SITE OVERVIEW

The adjacent land that supports significant ecological values is defined in Figure A by the 'Poplars North BioBanking Site', 'Poplars South BioBanking Site', and 'Open Space Area'. The primary purpose of this CEMP is to protect those areas from impacts associated with the Poplars development.

3.1 POPLARS NORTH AND POPLARS SOUTH BIOBANKING SITES

The Poplars North and Poplars South BioBanking Sites have been established under BioBanking Agreements (Figure A). These agreements provide a formal, legally binding, and audited conservation-focused management regime for the portions of "The Poplars" property recognised as supporting significant biodiversity values. The Poplars North and Poplars South BioBanking Sites protect approximately 50% of "The Poplars" property, including the vast majority of the identified significant biodiversity values. Protected values include:

- 87.42 ha of grassland vegetation, 57.35 ha of which meets the listing criteria for EPBC Act listed *Natural Temperate Grassland of the South Eastern Highlands* (EPBC Act critically endangered);
- 10.65 ha of woodland vegetation, 8.48 ha of which meets the listing criteria for EPBC Act listed *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (EPBC Act critically endangered);
- 83.48 ha of Golden Sun Moth *Synemon plana* (EPBC Act critically endangered) habitat;
- 61.86 ha of Grassland Earless Dragon *Tympanocryptis pinguicolla* (EPBC Act endangered) habitat;
- 18.63 ha of Pink-tailed Worm-lizard *Aprasia parapulchella* (EPBC Act vulnerable) habitat;
- approximately 4,000 Button Wrinklewort *Rutidosis leptorrhynchoides* (EPBC Act endangered) plants; and
- approximately 3,500 Hoary Sunray *Leucochrysum albicans* var. *tricolor* (EPBC Act endangered) plants.

In addition, the BioBanking Sites protect habitat for NSW *Biodiversity Conservation Act 2016* (BC Act) listed threatened birds (i.e. Dusky Woodswallow *Artamus cyanopterus*, Gang-gang Cockatoo *Callocephalon fimbriatum*, Varied Sitella *Daphoenositta chrysoptera*, Little Eagle *Hieraaetus morphnoides*, Scarlet Robin *Petroica boodang*, Flame Robin *Petroica phoenicea*, Speckled Warbler *Pyrrholaemus sagittatus*, Diamond Firetail *Stagonopleura guttata*, and the migratory White-throated Needletail *Hirundapus caudacutus* and Rainbow Bee-eater *Merops ornatus*), ACT listed species (i.e. Perunga Grasshopper *Perunga ochracea*), and species considered 'rare and uncommon in the region, (i.e. Canberra Raspy Cricket *Cooraboorama canberrae* and Key's Matchstick Grasshopper *Keyacris scurra*).

3.2 OPEN SPACE AREA

The Poplars development includes a 0.52 ha Open Space Area (Figure A). This Open Space Area, which supports 0.18 ha of EPBC Act Box-Gum Woodland, 0.18 of Golden Sun Moth habitat, and approximately 130 Hoary Sunray plants, will be protected and managed in a manner consistent with the Poplars North BioBanking Agreement.

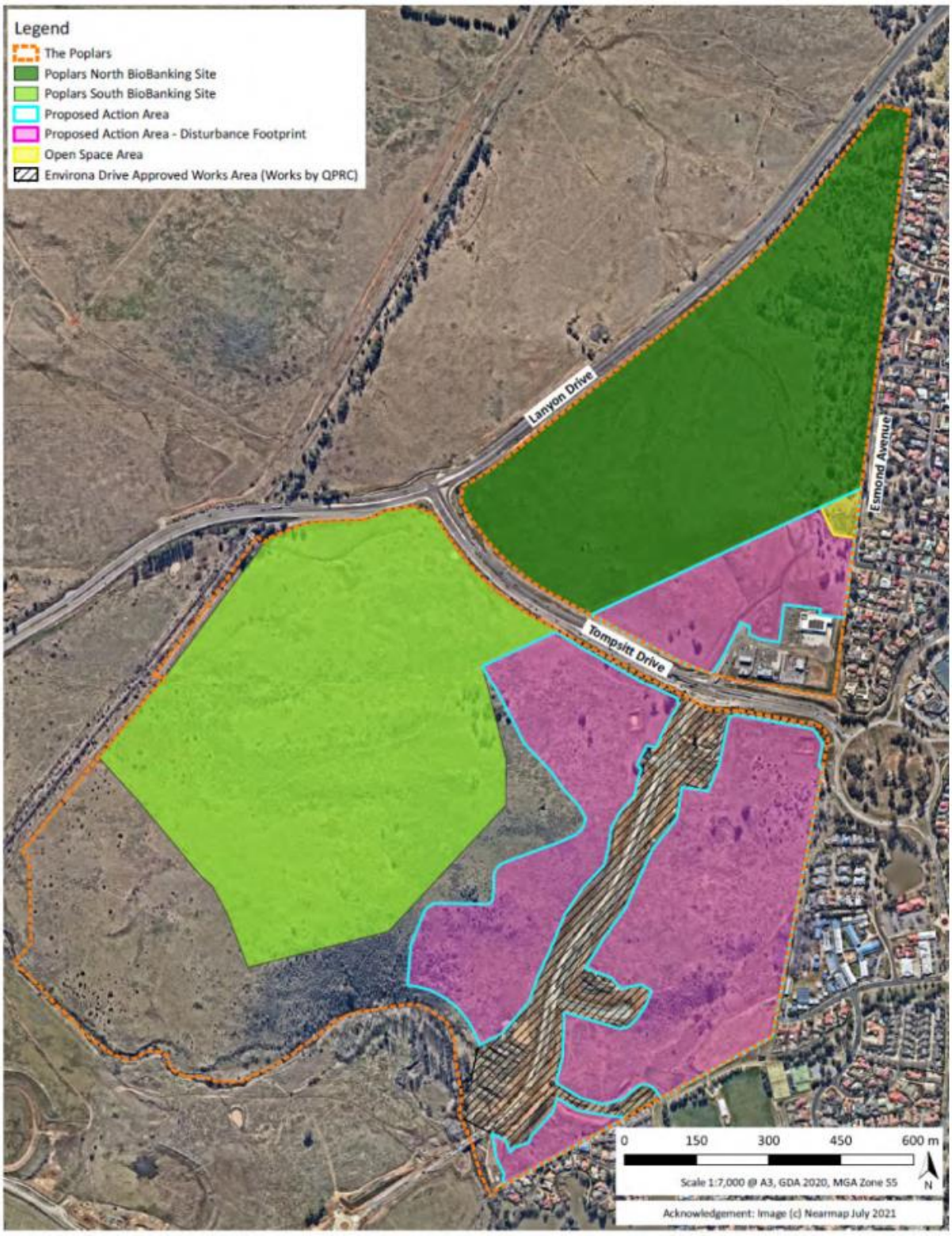


Figure A - Location Map

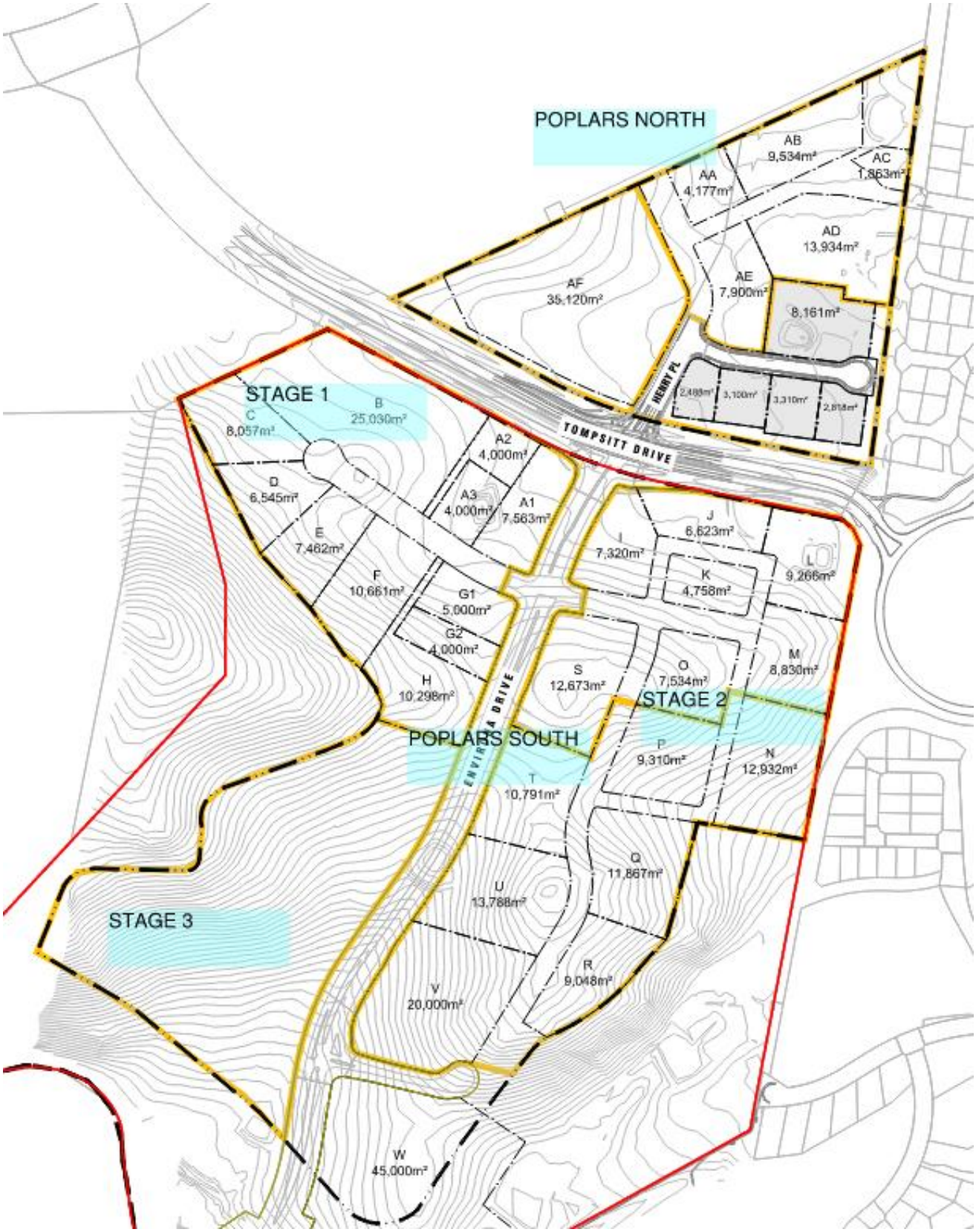


Figure B - Proposed Lot Plan

4. ENVIRONMENTAL IMPACTS AND CONTROL MEASURES

4.1 ROLES AND RESPONSIBILITIES

Unless noted otherwise in the sections below, the following roles and responsibilities apply:

4.1.1 Approval Holder

The Approval Holder is Poplars Developments Pty Ltd (ACN 128 465 887).

The Approval Holder is responsible for:

- the preparation of this CEMP and obtaining approval in writing of the plan by the Minister prior to commencing the action.
- implementing the CEMP approved by the Minister within the development footprint.
- notify DAWE in writing of any incident or non-compliance with this plan.
- advising DAWE of any unexpected finds of protected matters and arranging a suitable number of credits to be retired to offset impacts.

4.1.2 Site Developer

The Site Developer is to engage the following parties to deliver the development and monitor compliance of this CEMP:

- Project Manager;
- Superintendent;
- Principal Contractor; and
- Ecologist

Only suitably experienced parties are to be selected to undertake these roles. It is acknowledged that the development will be delivered in stages with different entities engaged to manage and deliver the works. Regardless of the contracted entities, the roles and responsibilities for the various parties remain as detailed below.

The Site Developer is also responsible for informing the Approval Holder of any non-conformances or Unexpected Protected Matters Finds associated with this plan.

4.1.3 Project Manager

The Project Manager is to attend construction site meetings, review monthly reports and advise the Developer of any non-conformances or unexpected protected matters associated with this CEMP. The Project Manager shall also coordinate the required inputs from the Ecologist to address unexpected protected matters.

4.1.4 Superintendent

The Superintendent shall undertake the following:

- Monitoring on-site construction activities by way of regular inspections by a surveillance officer and report any CEMP non-conformances.
- Meet fortnightly with the Principal Contractor during construction (or at other times as agreed) and review compliance with the CEMP
- The Superintendent shall provide a monthly report to the Developer, which reports on this CEMP and highlights any non-compliances.
- Notify the Project Manager of any non-conformance or the discovery of an unexpected protected matter

4.1.5 Principal Contractor

The Principal Contractor is responsible for the following:

- All site inductions for the Principal contractor site staff and subcontractors;
- Implementation and monitoring of controls listed in this CEMP; and
- Notifying the Superintendent of any non-conformances to this plan.

4.1.6 Ecologist

The Ecologist shall attend the site and provide advice to the Project Manager for the following events:

- Pre-clearance Surveys
- Weed inspections, and
- In the event of finding an unexpected protected matter

4.2 PRINCIPAL CONTRACTOR'S CEMP

Before commencing on-site work, the Principal Contractor shall prepare a site-specific CEMP that details environmental management plans for the particular stage being developed.

The plan shall incorporate all controls detailed in this document. The Superintendent shall review the Contractor's CEMP and confirm that it addresses all controls before granting possession of the site.

A copy of the Contractor's CEMP and this document shall be available on-site at all times during construction.

4.3 SITE INDUCTION

The Principal Contractor is to explain the adjacent ecological values and requirements for protection and exclusion during the construction period as part of the standard site induction.

All on-site staff are to be briefed on the contents of this CEMP.

All on-site staff must be provided with copies of site plans identifying environmentally sensitive areas, approved development areas, and access routes.

Written records are to be kept documenting that site workers have been advised of these requirements.

4.4 WATERWAY WORKS (SURROUNDING CATCHMENT AREA)

Run-off from some of the development areas will continue to discharge into the existing bio-banked areas. To avoid impacts from harmful pollutants on these environmentally sensitive areas, the following measures shall be implemented:

- The Project Manager shall ensure that the Principal Certifying Authority (Queanbeyan Palerang Regional Council) approves permanent stormwater management measures for each stage before commencing work on a stage.
- The Principal Contractor shall install cut-off drains/clearwater diversions before general stripping of topsoil.
- At North Poplars, the existing pond will be retained and upgraded to treat run-off from the developed areas.
- The Principal Contractor shall manage discharges from ponds during construction per the NSW Landcom publication Managing Urban Stormwater - Soils and Construction (4th Edition 2004- "Blue Book"). Where necessary, this shall include dosing the ponds before discharging water.

Stormwater management measures shall be designed and constructed to ensure that excessive ponding of water in the White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area does not occur.

During the development of a stage, the Principal Contractor shall check controls immediately following a significant rainfall event.

4.5 SEDIMENT AND EROSION CONTROL PLAN

The Principal Contractor shall prepare a Sediment and Erosion Control Plan (S&ECP) for all site works associated with each stage of development, including road works and access. The plan is to be submitted to the Superintendent for endorsement before lodging with the Principal Certifying Authority (Queanbeyan Palerang Regional Council) for approval. No works shall commence until the Principal Certifying Authority approves the plan.

The plan covers all measures to control erosion and sediment transport per the NSW Landcom publication Managing Urban Stormwater - Soils and Construction (4th Edition 2004- "Blue Book").

Erosion and sediment controls are to be installed by the Principal Contractor before the disturbance of any soils on the site and are to be maintained during the works and for as long as necessary after the completion to prevent sediment and dirty water leaving the site and entering the surface water system outside of the site. Controls shall address the following:

- Identify any existing causes of erosion and stabilise those areas;
- Divert uncontaminated run-off around cleared or disturbed areas;
- Erect a silt fence to prevent debris escaping into drainage systems or waterways;
- Prevent tracking of sediment by vehicles on roads; and
- Stockpile topsoil, excavated material, construction and landscaping supplies and debris within site.

Where appropriate the following controls shall be implemented:

- Clean water diversion drains – These shall be installed upstream of areas to be disturbed to channel clean water around or through a site
- Silt fences – To be installed downstream of disturbed areas and stockpiles
- Check dams – Check dams shall be installed at uintervals within drainage lines to reduce the erosive energy of the flow.
- Sediment ponds – Ponds are to be used where large areas are disturbed and the flow is concentrated to a single location. Prior to discharging from ponds the turbidity should be checked and where required pond dosed to settle sediments.
- Re-vegetation – As the work proceeds, areas should be re-vegetated as soon as practical thereby minimising the potential for wind or water erosion

The S&ECP shall nominate the location(s) for stabilised entries to construction sites. These entrances can either be established with crushed concrete or shaker/cattle grids.

All controls are to be regularly checked and maintained/repaired as appropriate by the Principal Contractor. Controls will be checked immediately following a significant rainfall event. Records of inspections shall be kept on-site.

4.6 DUST MANAGEMENT

The Principal Contractor shall detail measures to control dust within the works area and obtain an endorsement of these measures from the Superintendent.

The plan shall specify measures to monitor and manage dust emissions, including dust from stockpiles, blasting, traffic on-site and materials tracking from construction sites onto a public road. Measures shall include:

- All major access tracks to the corridor would be topped with aggregate to minimise erosion and dust potential;
- Water captured in sediment basins and other areas will be reused for dust suppression, compaction, etc. in preference to potable water;
- Controlling dust through progressive revegetation techniques;
- Water truck on-site for dust suppression as required; and
- During periods of high wind, activities that have the potential to cause shall cease.

4.7 SITE FENCING

No site access is permitted through the Poplars North BioBanking Site, Poplars South BioBanking Site, or Open Space Area.

To prevent unauthorised access to environmentally sensitive areas, the following shall apply:

- North Poplars Biobanking Site – A man-proof fence has been installed between the development area and the North Poplars Biobanking site. This fence shall be maintained and the gate between the two areas locked at all times;
- South Poplars Biobanking Site – An existing stock fence separates the development area from the adjacent South Poplars Biobanking site. As development progresses, the Principal Contractor shall replace the stockproof fence with a man-proof fence. During fence replacement, the Head Contractor shall install a temporary fence to prevent unauthorised access;
- North Poplars Retained Area (Hoary Sunray / PCT1334 Conservation Area - Refer Figure C) – To prevent impacts to this area, the Project Manager shall arrange for this area to be fenced off from the remaining lot before commencing works.

4.8 SIGNAGE

The Project Manager shall arrange signage, consistent with the North Poplars Bio-Banking Agreement, to be erected in or adjacent to the Retained Area (Refer Figure C) to prohibit public access and inform the public of the presence of the protected matters. Signage must:

- be the Bio-Banking / Biodiversity Stewardship Site signs available from the NSW Biodiversity Conservation Trust, or contain the same information.
- be installed and maintained along the boundary adjacent to Jerrabomberra suburbs.
- be replaced if the writing or the images on the sign are no longer clearly visible or are illegible.

Figure C – North Poplars: Hoary Sunray / PCT1334 Retained Area

4.9 PRE-CLEARANCE SURVEYS

4.9.1 Methods

Prior to clearance the Ecologist will survey all trees identified for removal for fauna habitat features (e.g. functional hollows, fissures, stick nests, etc.). Each tree that supports fauna habitat features will be clearly marked with fluorescent paint and recorded via hand-held GPS. The results of this survey will be recorded in a Pre-clearance Statement.

Each tree identified for removal that supports fauna habitat features will be cleared in the following manner.

- Hollow-bearing limbs will be removed and lowered to the ground. They will be inspected by the Ecologist for fauna. Any fauna present will be removed by the Ecologist and temporally cared for. The Ecologist will contact WIRES on 1300 094 737 for further instruction and assistance.
- The remainder of the tree will be felled by a chainsaw. The fallen tree will be inspected by The Ecologist for any previously undetected hollows. If present, these hollows will be inspected by the Ecologist for fauna. Any fauna present will be removed by the Ecologist and temporally cared for. The Ecologist will contact WIRES on 1300 094 737 for further instruction and assistance.
- Any other encountered wildlife in the tree will be temporally cared for by the Ecologist. The Ecologist will contact WIRES on 1300 094 737 for further instruction and assistance.

4.9.2 Timing

All practicable efforts will be made to schedule clearance of remnant trees to occur outside of the primary breeding season of most locally occurring native birds and other fauna (i.e. August to December). If a tree or trees must be removed during the primary breeding season, then each subject tree will be thoroughly inspected by the Ecologist to determine whether it is currently utilised by native fauna for nesting/breeding purposes. The Ecologist will provide the results of this inspection and the resulting determination in the Pre-clearance Statement. Based on this determination, the allowable action will be the applicable of the following three options.

1. Determination = the subject tree does not currently support native fauna nesting/breeding activity.

   ↓

   Action = proceed with removal in accordance with the methods outlined above.

2. Determination = the subject tree currently supports nesting/breeding activity limited to common native fauna species (e.g. Rosella, Magpie, Brushtail Possum).

   ↓

   Action = proceed with removal under close supervision by the Ecologist who will facilitate appropriate care for the fauna (i.e. relocation to nearby retained tree, transfer to WIRES etc.).

3. Determination = the subject tree currently supports nesting/breeding activity of species listed under the EPBC Act (i.e. MNES), BC Act, or otherwise considered regionally rare or uncommon.

   ↓

   Action = postpone tree removal and leave the tree undisturbed until the Ecologist confirms that the fauna have finished nesting/breeding activity and left under their own volition.

The results of tree removal activities will be recorded in a Post-clearance Statement.

4.9.3 Record Keeping and Reporting

In accordance with Condition 11 of the EPBC Act approval, the Pre-clearance Statements and Post-clearance Statements will be kept on file by the Approval Holder and Site Developer. In accordance with Condition 12, these statements will be provided to the Department upon request.

4.10 ENTRAPMENT OF FLORA AND FAUNA

The Principal Contractor shall mitigate any potential fauna entrapment in open trenches by adopting the following measures:

a) Open trenches will be kept to a minimum and constructed only when necessary; and
b) Open trenches will be checked and monitored, particularly after rain events and before backfilling.

In the unlikely event the Principal Contractor discovers fauna entrapped in an open trench, the Principal Contractor will immediately stop construction activities near the trench and contact WIRES on 1300 094 737 for further instruction and assistance.

4.11 WEED AND PATHOGEN MANAGEMENT

Before construction works commence within a stage of the development, a survey of existing vegetation will be undertaken by the Ecologist to identify any weed infestations. The Superintendent and Project Manager will be informed to identify if the Principal Contractor requires any controls before stripping and stockpiling topsoil.

During construction, the site perimeter will be inspected monthly to check that new weeds are not establishing in adjacent or retained areas of environmental value. The inspection will also include checking for weeds in tree protection zones or land not disturbed by earthworks and regrading.

The Principal Contractor will manage weeds in stockpiles by covering, seeding with a sterile cover crop, or undertaking weed control.

During the spreading of topsoiling and landscaping, the Principal Contractor's landscape sub-contractor must submit a consolidation program outlining weed management before completing soft landscape works and handover.

Appropriate vehicle hygiene will be maintained. Vehicles and machinery entering the proposed action area will be clean of weed seed or propagules.

Only sterile materials such as hessian/jute or rice straw will be used for soil stabilisation or similar purposes.

4.12 UNEXPECTED PROTECTED MATTERS FINDS

The following procedures will be implemented to address and report on any unexpected finds of protected matters. Protected matters include the EPBC Act listed species and ecological communities identified in Section 3.1 of this CEMP.

In the event of the unexpected find of a protected matter during a pre-clearance inspection by the Ecologist:

- The Site Supervisor shall be notified;
- Works shall cease in the affected area, and an exclusion zone will be set up;
- The Site Supervisor shall notify the Superintendent and Project Manager;
- The Ecologist shall advise the Site Supervisor, and Project Manager on the potential risk associated with the unexpected find and the need to undertake a further assessment and remedial and validation works;

- The Ecologist shall prepare a report detailing the unexpected find, which will be submitted to the Commonwealth DAWE;
- If required, the report will identify the number and class of NSW Biodiversity Offset Scheme credits that should be retired;
- Depending on the nature of the unexpected find and associated impact, approval from DAWE may be required before works can recommence;
- Works are not to recommence without the approval of the Ecologist and DAWE.

APPENDIX A. EPBC ACT APPROVAL

Australian Government
Department of Agriculture, Water and the Environment

APPROVAL

The Poplars, Jerrabomberra, NSW (EPBC 2020/8801)

This decision is made under sections 130(1) and 133(1) of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (the EPBC Act). Note that section 134(1A) of the EPBC Act applies to this approval, which provides in general terms that if the approval holder authorises another person to undertake any part of the action, the approval holder must take all reasonable steps to ensure that the other person is informed of any conditions attached to this approval, and that the other person complies with any such condition.

Details

Person to whom the approval is granted (approval holder)	Poplars Developments Pty Ltd
ACN of approval holder	128 465 887
Action	A mixed-use commercial development at The Poplars Jerrabomberra, NSW [See EPBC Act referral 2020/8801, subject to the variation request accepted on 19 November 2020]

Approval decision

My decision on whether or not to approve the taking of the action for the purposes of the controlling provision for the action is as follows.

Controlling Provisions

Listed Threatened Species and Communities	
Section 18	Approve
Section 18A	Approve

Period for which the approval has effect

This approval has effect until 31 December 2060

Decision-maker

Name and position	Kate Gowland, Acting Assistant Secretary, Environment Assessments (NSW, ACT) Branch
Signature	
Date of decision	13/9/2021

Conditions of approval

This approval is subject to the conditions under the EPBC Act as set out in ANNEXURE A.

ANNEXURE A – CONDITIONS OF APPROVAL

Part A – Conditions specific to the action

1. The approval holder must not **clear** outside the **development footprint.**

2. The approval holder must not **clear** inside the **White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area**.

3. Within the **development footprint**, the approval holder must not **clear** more than:

    a. 13.51 hectares of **Golden Sun Moth habitat**; and

    b. 0.42 hectares of **White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland**.

Mitigation and management measures

4. For the protection of the **protected matters** in areas adjacent to the **development footprint**, the approval holder must submit, prior to the **commencement of the action**, a Construction Environmental Management Plan (CEMP) for the **Minister's** written approval. The approval holder must not **commence the action** unless the CEMP has been approved in writing by the **Minister**.

5. The approval holder must implement the CEMP approved by the **Minister** within the **development footprint**.

6. For the protection of the **protected matters** in areas adjacent to the **development footprint**, the CEMP must prevent **impacts** of the action on adjacent areas and be consistent with the **Department's** *Environmental Management Plan Guidelines 2014*, and must specify full details of:

    a. Signage, consistent with signage for the **North Poplars BioBanking Agreement**, including to be placed in or adjacent to the **White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area** to prohibit public access and inform the public of the presence of the **protected matters**;

    b. Methods, effort, timing and reporting of pre-clearance surveys;

    c. Procedures to report and address unexpected finds of **protected matters** including a procedure to determine if **credits** should be **retired** in respect of the **protected matter(s)**, if so how many **credits**, and how the **Department** will be assured that this has happened;

    d. Proposed management methods, effort and timing to exclude, control or eliminate **weeds** and pathogens;

    e. Proposed management methods, effort and timing to prevent and address existing erosion and prevent sediments entering watercourses;

    f. Proposed management methods, effort and timing to prevent surface water flows enabling the spread of harmful pollutants and excessive ponding of water in the **White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area**;

    g. The site induction program to ensure that all persons implementing the action or on the site of the action are aware of the need and how to avoid and protect the **protected matters**.

7. For the protection of the **White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area** the approval holder must undertake on-ground management activities throughout the **White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area** consistent with those specified in the **North Poplars BioBanking Agreement.**

Compensation measures

8. To compensate for the clearance of **White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland** and **Golden Sun Moth habitat**, prior to the **commencement** of each **development stage** the approval holder must provide the **Department** with written **evidence** that it has **retired** the number of **credits** below in respect of that **development stage**:

    a. 34 species **credits** for **Golden Sun Moth** for **Stage 1 of the Innovation Precinct**;

    b. 9 species **credits** for **Golden Sun Moth** for the **Jerrabomberra High School**;

    c. 33 species **credits** for **Golden Sun Moth** for the **remainder of the North Poplars development footprint**;

    d. 26 species **credits** for **Golden Sun Moth** for the **remainder of the South Poplars development footprint**; and

    e. 10 ecosystem **credits** for **White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland** for the **remainder of the North Poplars development footprint**.

Part B – Standard administrative conditions

Notification of date of commencement of the action

9. The approval holder must notify the **Department** in writing of the date of **commencement of the action** within 10 **business days** after the date of **commencement of the action**. The approval holder must notify the **Department** in writing of the date of **commencement** of each **development stage** within 10 **business days** after the date of **commencement** of each commenced **development stage**.

10. If the **commencement of the action** does not occur within 5 years from the date of this approval, then the approval holder must not **commence the action** without the prior written agreement of the **Minister**.

Compliance records

11. The approval holder must maintain accurate and complete **compliance records**.

12. If the **Department** makes a request in writing, the approval holder must provide electronic copies of **compliance records** to the **Department** within the timeframe specified in the request.

Note: **Compliance records** may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, and or used to verify compliance with the conditions. Summaries of the result of an audit may be published on the **Department's** website or through the general media.

Submission and publication of plans

13. The approval holder must:

    a. submit **plans** electronically to the **Department** for approval by the **Minister**;

    b. publish each **plan** on the **website** within 20 **business days** of the date the **plan** is approved by the **Minister** or of the date a revised action management plan is submitted to the **Minister** or the **Department**, unless otherwise agreed to in writing by the **Minister**;

c. exclude or redact **sensitive ecological data** from **plans** published on the **website** or provided to a member of the public; and

d. keep **plans** published on the **website** until the end date of this approval.

14. The approval holder must ensure that any **monitoring data** (including **sensitive ecological data**), surveys, maps, and other spatial and metadata required under conditions of this approval, is prepared in accordance with the **Department's** *Guidelines for biological survey and mapped data* (2018) and submitted electronically to the **Department**.

Annual compliance reporting

15. The approval holder must prepare a **compliance report** for each 12 month period following the date of **commencement of the action**, or otherwise in accordance with an annual date that has been agreed to in writing by the **Minister**. The approval holder must:

    a. publish each **compliance report** on the **website** within 60 **business days** following the relevant 12 month period;

    b. notify the **Department** by email that a **compliance report** has been published on the **website** and provide the weblink for the **compliance report** within 5 **business days** of the date of publication;

    c. keep all **compliance reports** publicly available on the **website** until this approval expires;

    d. exclude or redact **sensitive ecological data** from **compliance reports** published on the **website;**

    e. where any **sensitive ecological data** has been excluded from the version published, submit the full **compliance report** to the **Department** within 5 **business days** of publication.

Note: **Compliance reports** may be published on the **Department's** website.

Reporting non-compliance

16. The approval holder must notify the **Department** in writing of any: **incident**; non-compliance with the conditions; or non-compliance with the commitments made in **plans**. The notification must be given as soon as practicable, and no later than two **business days** after becoming aware of the **incident** or non-compliance. The notification must specify:

    a. any condition which is or may be in breach;

    b. a short description of the **incident** and/or non-compliance; and

    c. the location (including co-ordinates), date, and time of the **incident** and/or non-compliance. In the event the exact information cannot be provided, provide the best information available.

17. The approval holder must provide to the **Department** the details of any **incident** or non-compliance with the conditions or commitments made in **plans** as soon as practicable and no later than 10 **business days** after becoming aware of the **incident** or non-compliance, specifying:

    a. any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future;

    b. the potential impacts of the **incident** or non-compliance; and

    c. the method and timing of any remedial action that will be undertaken by the approval holder.

Independent audit

18. The approval holder must ensure that **independent audits** of compliance with the conditions are conducted as requested in writing by the **Minister**.

19. For each **independent audit**, the approval holder must:

a. provide the name and qualifications of the independent auditor and the draft audit criteria to the **Department**;

b. only commence the **independent audit** once the audit criteria have been approved in writing by the **Department**; and

c. submit an audit report to the **Department** within the timeframe specified in the approved audit criteria.

20. The approval holder must publish the audit report on the **website** within 10 **business days** of receiving the **Department's** approval of the audit report and keep the audit report published on the **website** until the end date of this approval, or an earlier date agreed to by the **Department** in writing.

Revision of action management plans

21. The approval holder may, at any time, apply to the **Minister** for a variation to an action management plan approved by the **Minister** under condition 4, or as subsequently revised in accordance with these conditions, by submitting an application in accordance with the requirements of section 143A of the **EPBC Act**. If the **Minister** approves a revised action management plan (RAMP) then, from the date specified, the approval holder must implement the RAMP in place of the previous action management plan.
22. The approval holder may choose to revise an action management plan approved by the **Minister** under condition 4, or as subsequently revised in accordance with these conditions, without submitting it for approval under section 143A of the **EPBC Act**, if the taking of the action in accordance with the RAMP would not be likely to have a **new or increased impact**.
23. If the approval holder makes the choice under condition 22 to revise an action management plan without submitting it for approval, the approval holder must:

    a. notify the **Department** in writing that the approved action management plan has been revised and provide the **Department** with:

        i. an electronic copy of the RAMP;

        ii. an electronic copy of the RAMP marked up with track changes to show the differences between the approved action management plan and the RAMP;

        iii. an explanation of the differences between the approved action management plan and the RAMP;

        iv. the reasons the approval holder considers that taking the action in accordance with the RAMP would not be likely to have a **new or increased impact**; and

        v. written notice of the date on which the approval holder will implement the RAMP (RAMP implementation date), being at least 20 **business days** after the date of providing notice of the revision of the action management plan, or a date agreed to in writing with the **Department**.

    b. subject to condition 25, implement the RAMP from the RAMP implementation date.

24. The approval holder may revoke their choice to implement a RAMP under condition 22 at any time by giving written notice to the **Department**. If the approval holder revokes the choice under condition 22, the approval holder must implement the action management plan in force immediately prior to the revision undertaken under condition 22.
25. If the **Minister** gives a notice to the approval holder that the **Minister** is satisfied that the taking of the action in accordance with the RAMP would be likely to have a **new or increased impact**, then:

    a. condition 22 does not apply, or ceases to apply, in relation to the RAMP; and

    b. the approval holder must implement the action management plan specified by the **Minister** in the notice.

26. At the time of giving the notice under condition 25, the **Minister** may also notify that for a specified period of time, condition 22 does not apply for one or more specified action management plans.

Note: conditions 22, 23, 24 and 25 are not intended to limit the operation of section 143A of the **EPBC Act** which allows the approval holder to submit a revised action management plan, at any time, to the **Minister** for approval.

Completion of the action

27. Within 20 **business days** after the **completion of the action**, the approval holder must notify the **Department** in writing and provide **completion data**.

Part C - Definitions

In these conditions, except where contrary intention is expressed, the following definitions are used:

Business day means a day that is not a Saturday, a Sunday or a public holiday in the state or territory of the action.

Clear/Clearing/Cleared means the cutting down, felling, thinning, logging, removing, killing, destroying, poisoning, ringbarking, uprooting or burning of vegetation (but not including **weeds**).

Commencement in relation to commencement of a **development stage**, means the first instance of any specified activity associated with the action, and including **clearing** and **construction**, undertaken within that **development stage**. **Commencement**, in relation to commencement of a **development stage**, does not include minor physical disturbance necessary to:

i. undertake pre-clearance surveys or monitoring programs in that **development stage**;

ii. undertake geotechnical investigations or similar tests in that **development stage**;

iii. install signage and /or temporary fencing to prevent unapproved use of that **development stage**;

iv. protect environmental and property assets within that **development stage** from fire, **weeds** and feral animals, including installation of temporary fencing, and use of existing surface access tracks;

v. install temporary site facilities for persons undertaking pre-commencement activities within that **development stage** so long as these are located where they have no impact on the **protected matters**.

Commencement of the action means the first instance of any specified activity associated with the action, and including **clearing** and **construction.**

Commencement of the action does not include minor physical disturbance necessary to:

i. undertake pre-clearance surveys or monitoring programs;

ii. undertake geotechnical investigations or similar tests;

iii. install signage and /or temporary fencing to prevent unapproved use of the **development footprint**;

iv. protect environmental and property assets from fire, **weeds** and feral animals, including installation of temporary fencing, and use of existing surface access tracks;

v. install temporary site facilities for persons undertaking pre-commencement activities so long as these are located where they have no impact on the **protected matters**.

Commencement of the development stage for the remainder of the North Poplars development footprint means the first instance of any specified activity associated with the **remainder of the North Poplars development footprint**, including **clearing** and **construction**, and does not include minor physical disturbances as described in the definition for **Commencement of the action**.

Completion data means an environmental report and spatial data clearly detailing how the conditions of this approval have been met. The **Department**'s preferred spatial data format is **shapefile**.

Completion of the action means the date on which all specified activities associated with the action have permanently ceased.

Compliance records means all documentation or other material in whatever form required to demonstrate compliance with the conditions of approval in the approval holder's possession or that are within the approval holder's power to obtain lawfully.

Compliance reports means written reports:

i. providing accurate and complete details of compliance, **incidents**, and non-compliance with the conditions and the **plans**;

ii. consistent with the **Department's** *Annual Compliance Report Guidelines* (2014);

iii. include a **shapefile** of any clearance of any **protected matters**, or their habitat, undertaken within the relevant 12 month period; and

iv. annexing a schedule of all **plans** prepared and in existence in relation to the conditions during the relevant 12 month period.

Credits means biodiversity credits under the *Biodiversity Conservation Act 2016 (NSW).*

Construction means the erection of a building or structure that is or is to be fixed to the ground and wholly or partially fabricated on-site; the alteration, maintenance, repair or demolition of any building or structure; preliminary site preparation work which involves breaking of the ground (including pile driving); the laying of pipes and other prefabricated materials in the ground, and any associated excavation work; but excluding the installation of temporary fences and signage.

Department means the Australian Government agency responsible for administering the **EPBC Act**.

Development footprint means the 52.77 hectare area represented as the solid pink area and defined as the 'Proposed Action Area - Disturbance Footprint' in the legend of Attachment 1. The **development footprint** also includes the area within the yellow boundary line and defined as the 'Open Space Area' in the legend of Attachment 3 but with the exclusion of the **White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area**.

Development stage means any work associated with one of the following specified stages of the action that will be undertaken sequentially, or concurrently: **Stage 1 of the Innovation Precinct**, the **Jerrabomberra High School,** the **remainder of the North Poplars development footprint** and the **remainder of the South Poplars development footprint**.

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Evidence means written certified documentation from the relevant authority.

Golden Sun Moth means the Golden Sun Moth (*Synemon plana*) listed as critically endangered under the **EPBC Act.**

Golden Sun Moth habitat means the areas represented by the shapes with yellow hatching in Attachment 4, described in the legend as 'Golden Sun Moth habitat'.

Hoary Sunray habitat means the 700m^2 area covering the area represented by star shapes and described in the legend as 'Hoary Sunray' in Attachment 3.

Impact means any measurable direct or indirect disturbance or harmful change as a result of any activity associated with the action.

Incident(s) means any event which has the potential to, or does, impact on one or more **protected matter(s)** other than as authorised under this approval.

Independent audit: means an audit conducted by an independent and **suitably qualified person** as detailed in the *Environment Protection and Biodiversity Conservation Act 1999 Independent Audit and Audit Report Guidelines* (2019).

Jerrabomberra High School means the 3.25 hectare area within the **development footprint** where the Jerrabomberra High School will be built, enclosed by the light blue line in Attachment 2, identified in the legend as 'Jerrabomberra High School'.

Monitoring data means the data required to be recorded under the conditions of this approval.

Minister means the Australian Government Minister administering the **EPBC Act** including any delegate thereof.

New or increased impact means a new or increased environmental impact or risk relating to any **protected matter**, when compared to the likely impact of implementing the action management plan that has been approved by the **Minister** under condition 4, including any subsequent revisions approved by the **Minister,** as outlined in the *Guidance on 'New or Increased Impact' relating to changes to approved management plans under EPBC Act environmental approvals (2017).*

North Poplars BioBanking Agreement means the BioBanking Agreement ID number BA 310 for Poplars North BioBanking Site, for Robin Pty Ltd, made with the NSW Office of Environment and Heritage.

North Poplars Biobanking Site means the area coloured dark green in Attachment 1 and identified in the legend as 'North Poplars BioBanking Site'.

Plan(s) means any of the documents required to be prepared, approved by the **Minister**, implemented by the approval holder and/or published on the **website** in accordance with these conditions (includes action management plans).

Protected matter(s) means a matter protected under a controlling provision in Part 3 of the **EPBC Act** for which this approval has effect. Protected matters include **White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland** ecological community, Hoary Sunray (*Leucochrysum albicans* subsp. *tricolor*), and **Golden Sun Moth***.*

Remainder of the North Poplars development footprint means the 8.71 hectare area of land in North Poplars represented by the solid blue shaded area in Attachment 2 described in the legend as 'Remainder of Development Footprint - North Poplars'.

Remainder of the South Poplars development footprint means the 31.56 hectare area in South Poplars represented by the pink shaded area in Attachment 2 described in the legend as the 'Remainder of Development Footprint - South Poplars'.

Retired means retirement of biodiversity credits under the *Biodiversity Conservation Act 2016 (NSW)*.

Sensitive ecological data means data as defined in the Australian Government Department of the Environment (2016) *Sensitive Ecological Data – Access and Management Policy V1.0.*

Shapefile means location and attribute information of the action provided in an Esri shapefile format. Shapefiles must contain '.shp', '.shx', '.dbf' files and a '.prj' file that specifies the projection/geographic coordinate system used. Shapefiles must also include an '.xml' metadata file that describes the shapefile for discovery and identification purposes.

South Poplars BioBanking Agreement means the BioBanking Agreement ID number BA 309 for Poplars South BioBanking Site, for Robin Pty Ltd, made with the NSW Office of Environment and Heritage.

South Poplars BioBanking Site means the area coloured light green in Attachment 1 identified in the legend as 'Poplars South BioBanking Site'.

Stage 1 of the Innovation Precinct means the 8.91 ha area enclosed by the yellow line identified in the legend as 'Stage 1 of the Innovation Precinct' in Attachment 2.

Suitably qualified person means a person who has professional qualifications, training, skills and/or experience related to the nominated subject matter and can give authoritative independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods and/or literature.

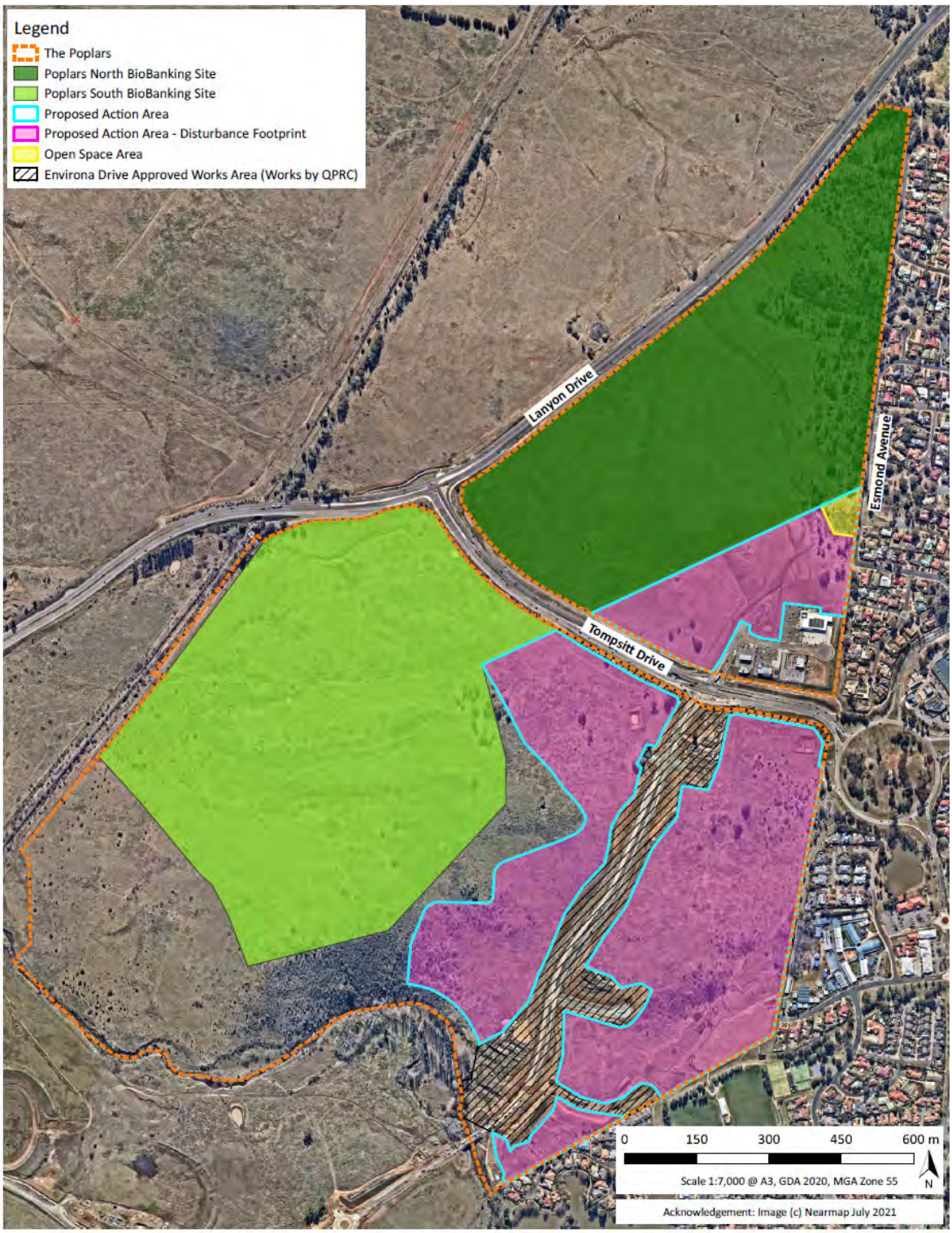
Website means a set of related web pages located under a single domain name attributed to the approval holder and available to the public.

Weed(s) means weed as defined in the *Australian weeds strategy 2017 to 2027.*

White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland is the critically endangered threatened ecological community of that name listed under the **EPBC Act** as represented by the two patches of blue hatching shown in Attachment 5 and described in the legend as 'EPBC Act Box-Gum Woodland'.

White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area means the 0.18 hectares of land containing **White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland**, **Hoary Sunray habitat** and **Golden Sun Moth habitat** represented by the area north of the existing dam with blue hatching and green shading shown in Attachment 3, and described in the legend as 'PCT1334 Zone1 - Canopy - Regen - NativeDom - Mod-HighDiversity (EPBC Act BGW)', 'Golden Sun Moth Habitat' and 'Hoary Sunray'.

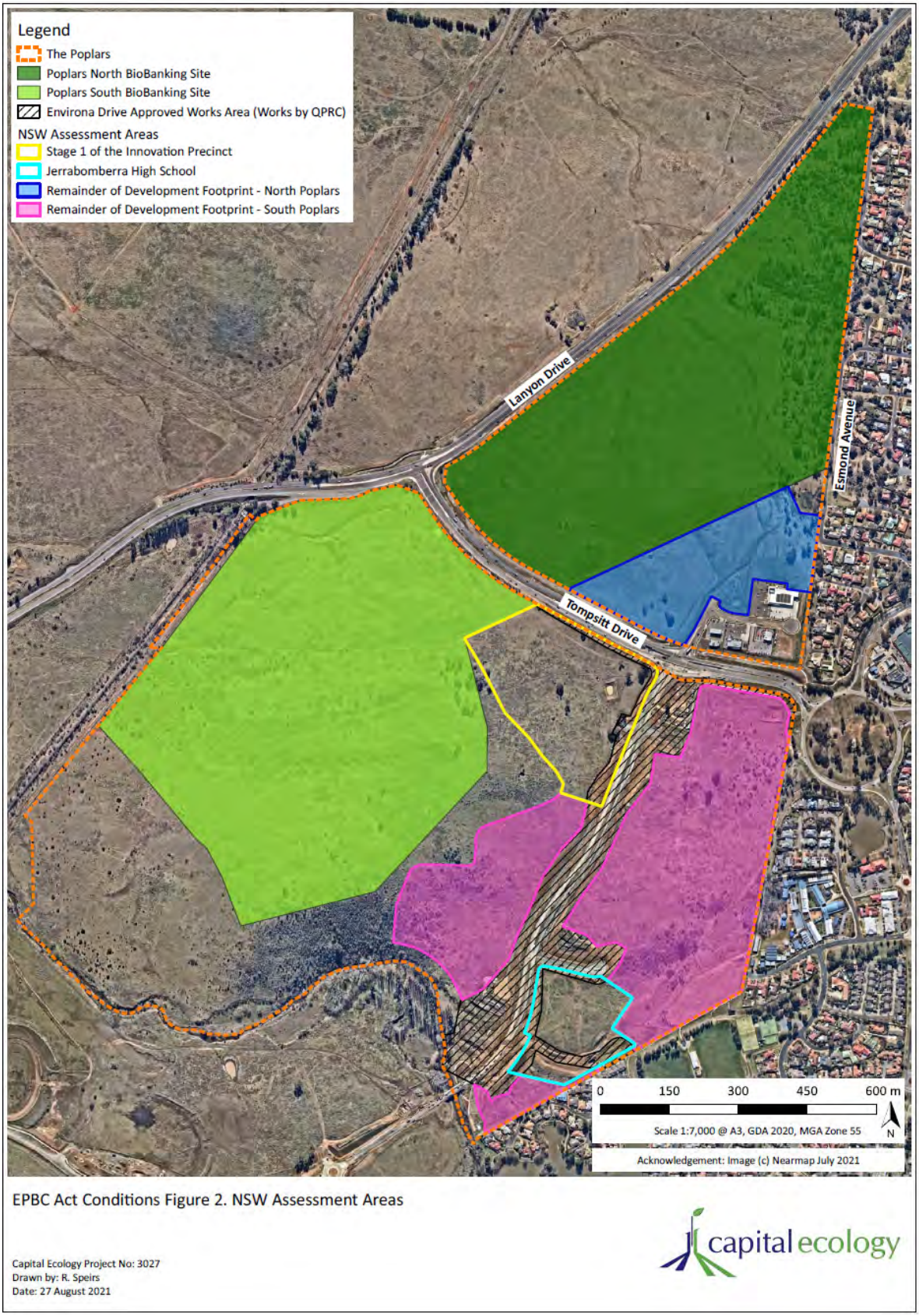
<u>Attachment 1</u>. The Poplars action area/development footprint, the White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area, biobanking sites, and surrounds.



EPBC Act Conditions Figure 1. "The Poplars", Proposed Action Area, and BioBanking Sites

Capital Ecology Project No: 3027
Drawn by: R. speirs
Date: 27 August 2021

Attachment 2. Location of the development stages; Jerrabomberra High School, Stage 1 of Innovation Precinct, the remainder of the North Poplars development footprint, the remainder of the South Poplars development footprint.



EPBC Act Conditions Figure 2. NSW Assessment Areas

Capital Ecology Project No: 3027
Drawn by: R. Speirs
Date: 27 August 2021

capital ecology

Attachment 3. Location of the White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area, Hoary Sunray, Golden Sun Moth habitat and the White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland.

Attachment 4. Golden Sun Moth Habitat in the Development Footprint, and the White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area.

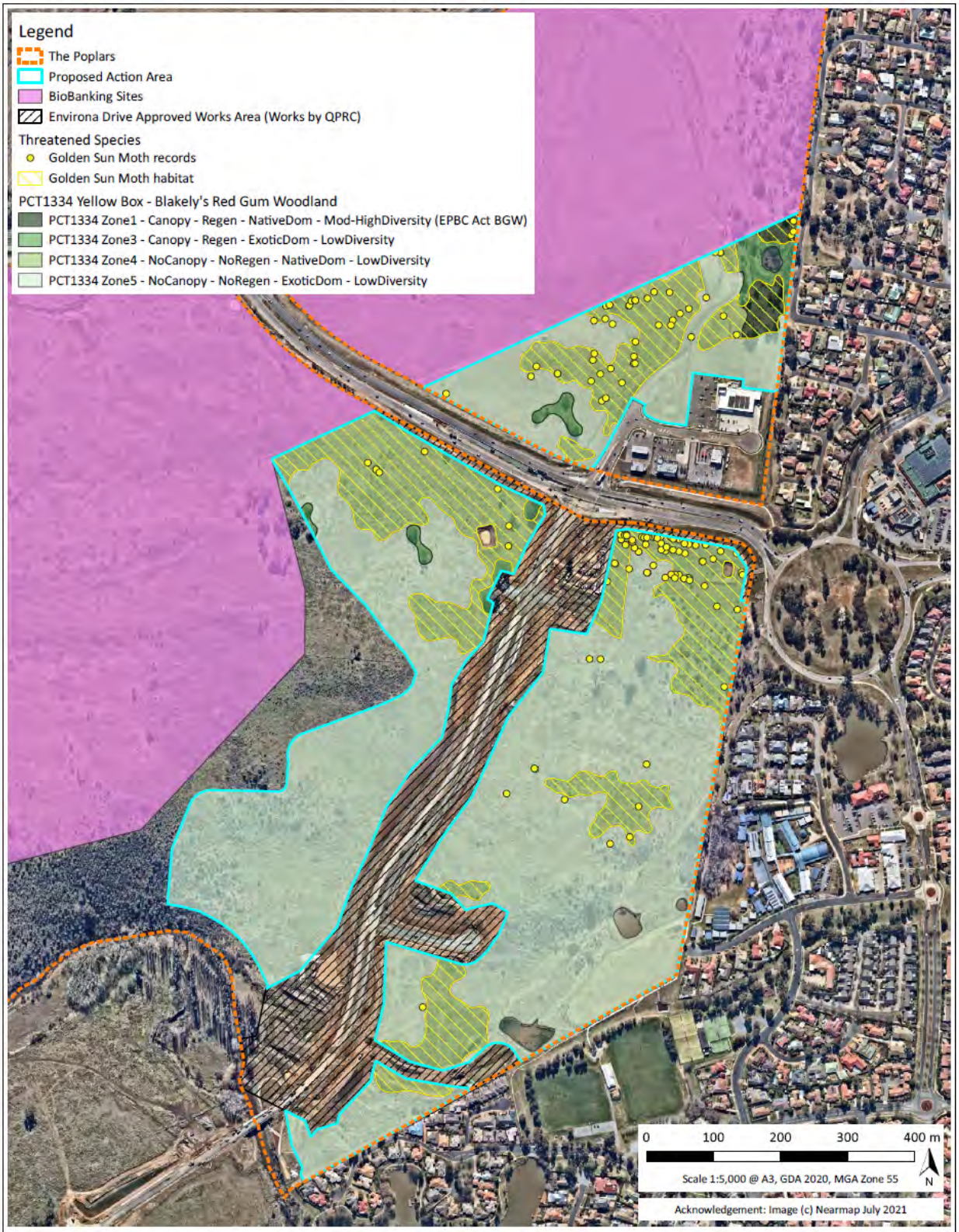


Figure 8. Golden Sun Moth Habitat in the Proposed Action Area

Capital Ecology Project No: 3027
Drawn by: R. Speirs
Date: 27 August 2021

capital ecology

<u>Attachment 5</u>. White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland in the Development Footprint, and the White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland retained area.

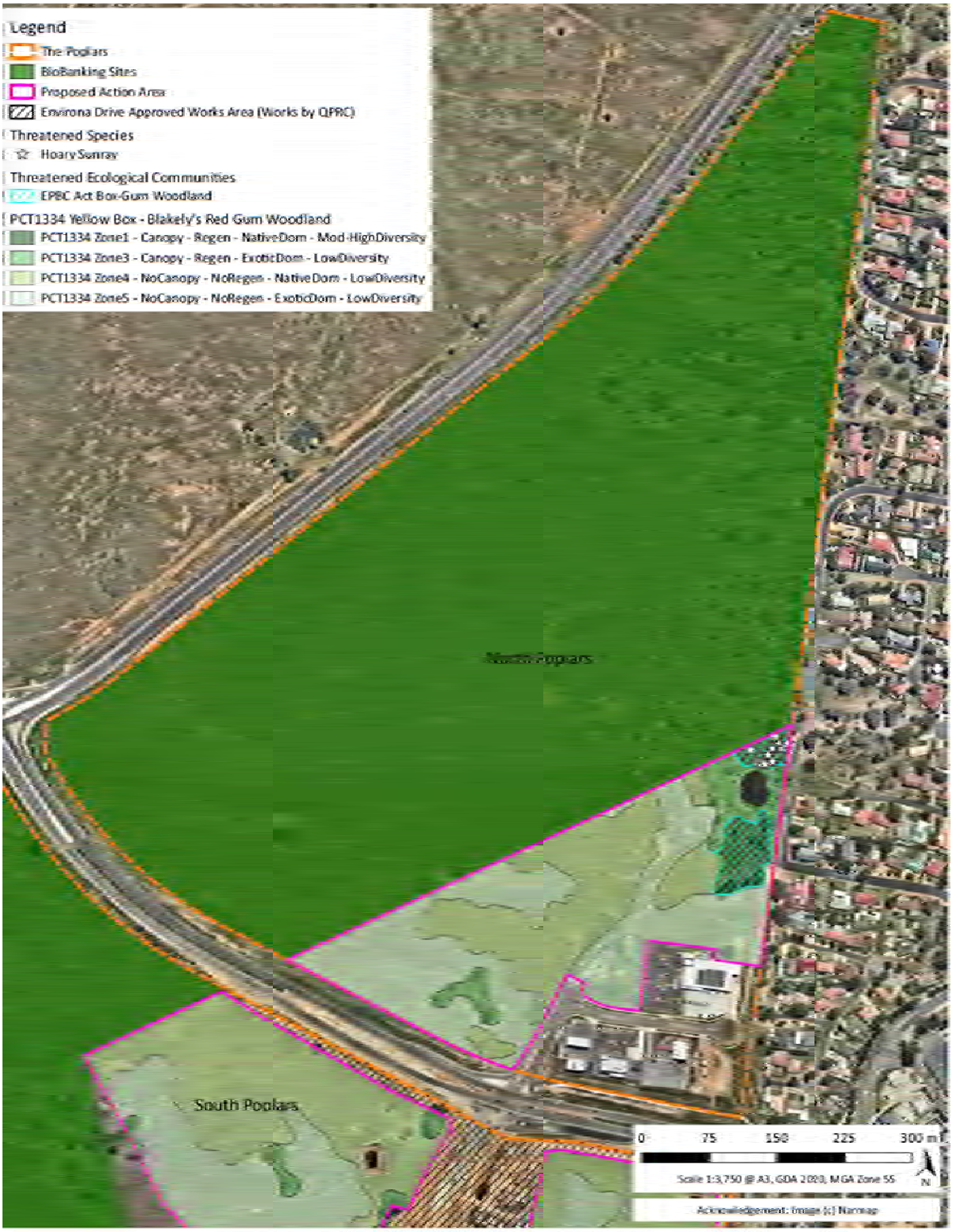


Figure 8. EPBC Act Box-Gum Woodland and Hoary Sunray Habitat in the Proposed Action Area

Capital Ecology Project No: 3027
Drawn by: S. Reid
Date: 26 March 2021

capital ecology

APPENDIX B. DECLARATION OF ACCURACY

DECLARATION OF ACCURACY

I declare that:

1. To the best of my knowledge, all the information contained in, or accompanying the *Poplars EPBC Act Construction Environmental Management Plan, V2.2, October 2021* is complete, current and correct.

2. I am duly authorised to sign this declaration on behalf of the approval holder.

3. I am aware that:

   a. Section 490 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading.

   b. Section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) where the person knows the information or document is false or misleading.

   c. The above offences are punishable on conviction by imprisonment, a fine or both.

Signed

Full name

Christopher William Daly

Organisation

Project Manager, Black Mountain Construction Assurance Pty Ltd

Date

17 October 2021

APPENDIX K – Aviation Wildlife Assessment

Appendix K - JHS Aviation wildlife hazard assessment

Jerrabomberra High School

Aviation wildlife hazard assessment

Alison Rowell
BIOLOGIST AND ENVIRONMENTAL CONSULTANT
PO BOX 777 DICKSON ACT 2602
FEBRUARY 2022

Contents

Jerrabomberra High School aviation wildlife hazard assessment

Summary

The area surrounding the new Jerrabomberra High School site contains wildlife species that may pose a hazard to aircraft on the flight path south of Canberra Airport.

The construction of the school could result in the temporary attraction of small numbers of hazardous species. The finished school site should provide habitat for fewer hazardous species than the original and construction phases while providing minor potential attractions for other species. Mitigation measures are suggested to manage the above risks.

1. Project background

An Environmental Impact Statement (EIS) has been prepared for the development of the new Jerrabomberra High School (JHS) in NSW (Mecone 2021). Following submissions in response to the EIS, the Department of Planning, Industry and Environment (DPIE) requested the Department of Education to address the concern raised by Canberra Airport that the Aviation Assessment needs to be updated to address *'Guideline C – Managing Wildlife Strike Risk'* of the National Airports Safeguarding Framework (NASF), either through a wildlife assessment or by engaging a qualified Ornithologist to review/monitor potential bird attracting activities/plantings.

The NASF provides guidance on planning requirements for development that affects aviation operations, including building activity around airports that might penetrate operational airspace and/or affect navigational procedures for aircraft. Guideline C allows State/Territory and local government decision makers to manage the risk of collisions between wildlife and aircraft at or near airports where that risk may be increased by the presence of wildlife-attracting land uses by providing a risk ranking and mitigation advice for land uses within specified distances from airports. Schools are not specifically covered but associated features such as sports facilities and playgrounds have a wildlife attraction risk of moderate, with a requirement for this to be mitigated when new developments are proposed.

The current report is an aviation wildlife assessment with recommendations for reducing the risk of attracting wildlife potentially hazardous to aircraft during the construction and operation of the new high school.

2. The site and the development

The site set aside for JHS is about 4.5 ha, with housing and Lake Jerrabomberra to the south, playing fields to the south-east, and woodland, grassland and pasture to the east, north and west. Jerrabomberra Creek is west of the site and there are farm dams to the east and north-east (Figure 1).

The Architectural Design Report (Appendix 3 of the EIS, Tanner Kibble Denton 2021) shows that most of the undeveloped land to the north of the site is marked for future development (Innovation Precincts) with some land further west being incorporated into a grassland reserve.

The Biodiversity Development Assessment Report (BDAR, Appendix 9 of the EIS Capital Ecology 2021) shows that the vegetation on the JHS site included the remnant ground layer of a threatened native woodland community and exotic grassland with pasture species and weeds. At the time of the current field survey (February 2022) the site had been fenced from grazing for some time, although previously grazed by cattle and sheep. Some of the vegetation had been cleared and the rest was dominated by tall dense Phalaris (a pasture grass) with scattered native grasses and broad-leaved weeds.

The steeply sloping land in the east and south of the site which will not be built on under the current plan may be regenerated and re-established with native grassland plant species (Landscape Design Report, Appendix 4 of the EIS, CONTEXT Landscape Architecture 2021). The rest of the site will be contain buildings, paved sports/play areas, artificial grass, terracing, paths and a 'productive garden'. Landscaping will include native and deciduous exotic trees.

Figure 1. Jerrabomberra High School location

Shows developed suburbs, Lake Jerrabomberra south of site, playing fields to the east, chain of ponds/wetlands to the north-east, Jerrabomberra Creek and Environa Drive to the west and pasture/grassland to the north.

3. Wildlife hazard assessment framework

The NASF Guideline C ranks the risks of particular land uses within radial distances of 3, 8 and 13 km of airport runways. Figure 2 shows these radial distances in relation to Canberra Airport, with the JHS site being 7.5 km south of the southern end of the main runway, within the 3-8 km annulus. Guideline C does not specifically cover schools but associated features such as sports facilities and playgrounds have a wildlife attraction risk of Moderate, with a requirement for the risk at existing sites to be monitored and to be mitigated when new developments are proposed.

Canberra Airport has a Bird and Wildlife Hazard Management Plan (Capital Airport Group 2021) containing a Risk Assessment Matrix that ranks local wildlife species according to the risk they pose to aircraft. Canberra Airport has provided these documents and access to their extensive birdstrike and bird count data to assist in this assessment. The Risk Assessment Matrix provides a risk rating for hazardous species by assessing the **probability** of a species being struck by aircraft and the potential **consequences** of the strike.

The **probability** of being struck depends on past strike records, the numbers and time that the animals frequent or cross the Airport and approaches, and their behaviour (e.g. soaring/hunting over the runway or feeding on the ground/staying close to cover).

The **consequence** of an aircraft striking a species depends mainly on the weight of the animal and whether it occurs in groups and includes:

- aircraft destroyed/ lives lost
- substantial damage/injuries
- minor damage/flight affected
- negligible damage/no effect on flight
- no damage/effect on flight).

Serious strikes causing aircraft damage that have occurred on the southern approach to Canberra Airport include Black Swans and a Great (Black) Cormorant ingested into aircraft engines, and several strikes involving Wedge-tailed Eagles. Wood Ducks and Masked Lapwings are also often struck when they move onto the airport at night. There is little habitat to attract flying-foxes to the airport itself but they have been seen moving east through the southern approach after sunset and are occasionally struck.

Nearby areas which may provide habitat for some hazardous wildlife include Lake Jerrabomberra, the David Madew playing fields, surrounding suburbs (with parks and ponds), nearby pastures, native grasslands and woodlands and the ACT Mugga Lane waste facility (which services Queanbeyan-Palerang). More distant waterbird habitats include the Molonglo River Corridor and associated wetlands to the north-west and Googong Reservoir to the south-east.

Any changes at the JHS site that may increase the numbers or movement of hazardous wildlife require mitigation during the construction and operation of the school.

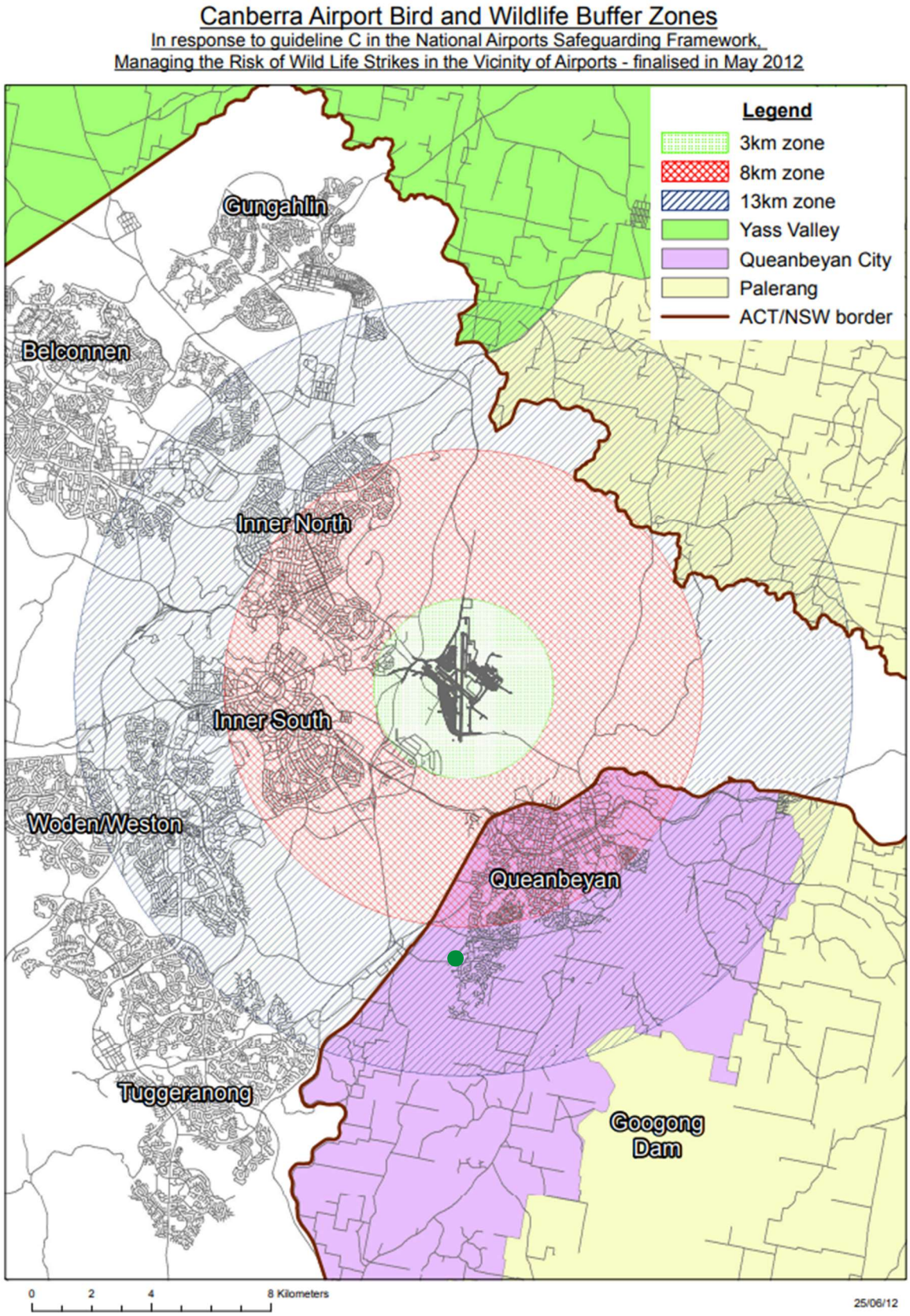


Figure 1. Wildlife risk zones near Canberra Airport.

Jerrabomberra High School site

4. Wildlife survey methods

The desktop survey included:

- eBird online data - eBird documents the presence or absence of species, as well as bird abundance through checklist data submitted by members. Data submitted in the last 10 years for species of concern in areas south of Canberra Airport and within 10 km of the JHS site were examined.
- Atlas of Living Australia (ALA) online data - ALA is a collaborative digital project that collates Australian biodiversity data from multiple sources. Occurrences of selected species within 5-10km of the JHS site were examined.
- publications of the Canberra Ornithologists Group (COG) and their chatline archive.
- data provided by Canberra Airport including wildlife hazard assessments and their wildlife strike database.
- National Capital Authority data on the Grey-headed Flying-fox camp at Commonwealth Park (Ecosure 2019).

The above sources were consulted to assess the existing wildlife hazard to aircraft in the area south of Canberra Airport, and to show the potential for any increased hazard due to wildlife in the vicinity being attracted to the JHS site and through the southern approach to Canberra Airport during and after development.

The JHS site and the surrounding area was surveyed on foot for six hours on 8 February 2022, searching for wildlife and potential habitats. Surveys carried out by this consultant in December 2021 for another project west of Environa Drive provided additional wildlife records.