North Bradfield Zone Substation

Review of Environmental Factors

Prepared for Endeavour Energy

July 2023

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Endeavour Energy

E220571 RP1

July 2023

Version	Date	Prepared by	Approved by	Comments
1	6 December 2022	Verity Blair	Dave Kelly	Draft for Endeavour Energy
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5	27 July 2023	Daniel Nugent	Janet Krick	Revised Draft for Endeavour Energy

Approved by

Janet Krick
Associate
27 July 2023

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Executive Summary

Endeavour Energy (EE) proposes to establish a zone substation from October 2023, within Lot 1, DP1123344 (soon to be subdivided into Lot 99 DP112344), 475 Badgerys Creek Road, Badgerys Creek, NSW (the project site) as part of the broader electricity transmission and distribution network supply strategy. The project is required to meet increasing electricity demand in the Western Sydney Growth Areas, specifically Bradfield City, the Western Sydney Aerotropolis Area, Sydney Metro and surrounding supporting developments. The project is the subject of the Review of Environmental Factors (REF).

The key features of this project will involve the construction and operation of North Bradfield ZS and associated landscaping and access road. The design of the project will also include a hardstand area in the north-east of the project site for the future installation of a future Battery Energy Storage System (BESS) and distribution ducting (subject to future planning approval).

The purpose of this Review of Environmental Factors (REF) is to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment as a result of this proposal. This REF details the possible environmental impacts associated with establishment of the substation and identifies mitigating measures to be incorporated into the design, construction, and operation of the substation to minimise environmental impacts. This REF has been advised by the following technical reports which can be found in the Appendices: Archaeological Technical Report; Preliminary Site Investigation; Environmental Report; Noise Impact Assessment; Detailed Site Investigation.

The subject site is surrounded by a mix of agricultural, commercial, industrial, and rural residential land uses. Ingham and PGH Bricks are situated to the north, agricultural lands and South Creek to the east, agricultural lands and rural residences to the south, and Badgerys Creek Road, along with agricultural, commercial, industrial, and rural residential areas, and Badgerys Creek itself to the west. The subject site's historical native vegetation clearance and agricultural use have resulted in low environmental risks for the project. Very few trees, none of which are old growth, remain due to extensive clearing. The study area has also experienced moderate disturbances from building construction, vehicle access, land clearing, and pastoral land use. These factors contribute to the reduced biodiversity and ecological impact. The main environmental risks of the proposal are associated with possible unexpected aboriginal artefact finds in which case the unexpected finds procedure would be followed.

Mitigation measures identified in Chapter 8 and 9 of this REF would be included in the Construction Environmental Management Plan (CEMP) and implemented to manage any potential environmental risks associated with the proposal.

EE is the Determining Authority for the project. The project is subject to the provisions of The Code of Practice (The Code) for Authorised Network Operators (ANO), State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP) and requires assessment and approval under Part 5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

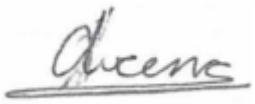
Decision Statement

The REF concludes that:

- The proposal is not likely to have a significant impact on the environment and accordingly, an Environmental Impact Statement (EIS) is not required.
- The proposal will not be carried out in an area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities or their habitats or impact biodiversity and a Species Impact Statement is not required.
- The proposal is not likely to significantly impact on a matter of national environmental significance or the environment of Commonwealth land and a referral to the Australian Government Department of Agriculture, Water and Environment is therefore not required under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Provided the mitigation measures identified in Chapter 8 and 9 of this REF are included in the EMP, the proposed activity is unlikely to significantly affect the environment.

Certification

I certify that I have reviewed and endorsed the contents of this REF document and, to the best of my knowledge, it is in accordance with the EP&A Act, the EP&A Regulation and the Guidelines for Division 5.1 Assessments approved under clause 170 of the EP&A Regulation, and the information it contains is neither false or misleading. This is a determination that the proposal as assessed in this REF meets the requirements under Part 5 of the EP&A Act.

Prepared by	Endorsed by	Determined by
Name: Janet Krick	**Name:** Mohammad Alam	**Name:** Roweena Dsouza
Title: Associate	**Title:** Environmental Specialist	**Title:** Acting Environmental Services Manager
Company: EMM Consulting	**Company:** Endeavour Energy	(Authorised Delegate of Endeavour Energy)
Date: 27 July 2023	**Date:** 28 July 2023	**Date: 28 July 2023**
Signature: 	**Signature:** 	**Signature:** 

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List of abbreviations and glossary of terms

Term	Meaning
A	amp: the unit of measure for current (or load) which is the amount
AHIMS	Aboriginal Heritage Information Management System
ANO	Authorised Network Operator under the *Electricity Networks Assets (Authorised Transactions) Act 2015*
ASP	Accredited Service Provider
CEMP	Construction Environmental Management Plan
DCCEEW	Department of Climate Change, Energy, the Environment and Water
Determining Authority	Minister or public authority by or on whose behalf the activity is or is to be carried out or any Minister or public authority whose approval is required in order to enable the activity to be carried out.
DBYD	Dial Before You Dig
DC	Direct Current
DPE	Department of Planning and Environment
DM	Demand Management
EE	Endeavour Energy
EMP	Environmental Management Plan
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW). Provides the legislative framework for land use planning and development assessment in NSW.
EP&A Regulations	Environmental Planning and Assessment Regulation 2021
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
ES Act	*Electricity Supply Act 1995*
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically sustainable development: is development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased.
EWP	Elevation Work Platform
Feeder	A set of electric conductors that distribute electricity
HDD	Horizontal Directional Drilling
HV	High Voltage
Hz	Hertz
Joint bay	Concrete bay constructed in various locations along a feeder route which is used for jointing lengths of cable together
km	Kilometre

Term	Meaning
kV	Kilovolts
LEP	Local Environmental Plan: a type of EPI made under Part 3 of the EP&A Act.
LGA	Local Government Area
m	metre
MNES	Matter of National Environmental Significance
NP	National Park
NPW Act	*National Parks and Wildlife Act 1974*
NPWS	National Parks and Wildlife Service (OEH)
OH	Overhead
POEO Act	*Protection of the Environment Operations Act 1997*
REF	Review of Environmental Factors
Road	Includes the airspace above the surface of the road, the soil beneath the surface of the road and any bridge, tunnel, causeway, road-ferry, ford or other work or structure forming part of the road. The road reserve is inclusive of the carriageway and the footpath.
SCADA	Supervisory Control and Data Acquisition
SEPP	State Environmental Planning Policy: a type of EIP made under Part 3 of the EP&A Act
SER	Summary Environmental Report
SIS	Species Impact Statement
The Code	The Code of Practice for Authorised Network Operators (ANO) designed to regulate the ANOs decision making process as to the appropriate level of environmental assessment required relative to the impacts of a proposed project.
TMP	Traffic Management Plan
UGOH	Underground to overhead construction – a structure which facilitates the transition of underground cabling to aerial (overhead) construction
V	volt: the unit of measure for voltage which is the pressure that electricity is pushed through the wire
ZS	Zone Substation

1 Introduction

1.1 Background

Endeavour Energy (EE) is a network electricity distributor operator servicing over 2.5 million people living and working across Sydney's Greater West, the Blue Mountains, the Southern Highlands, Illawarra and the South Coast of New South Wales (NSW).

EE proposes to construct a new zone substation (ZS) called North Bradfield Zone Substation in Badgerys Creek, NSW. The project is part of a broader transmission supply strategy to meet increasing electricity demand in the Western Sydney Aerotropolis Area, Bradfield City and surrounding development. The construction is proposed to commence in October 2023, aiming to complete works by December 2025. EMM Consulting Pty Ltd (EMM) has been engaged by EE to prepare a Review of Environmental Factors (REF) for the project. The project is subject to the provisions of NSW Code of Practice (the Code) for Authorised Network Operators (ANO), State Environmental Planning Policy (Transport and Infrastructure) 2021 (Transport and Infrastructure SEPP), and requires assessment and approval under Division 5.1, Section 5.5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

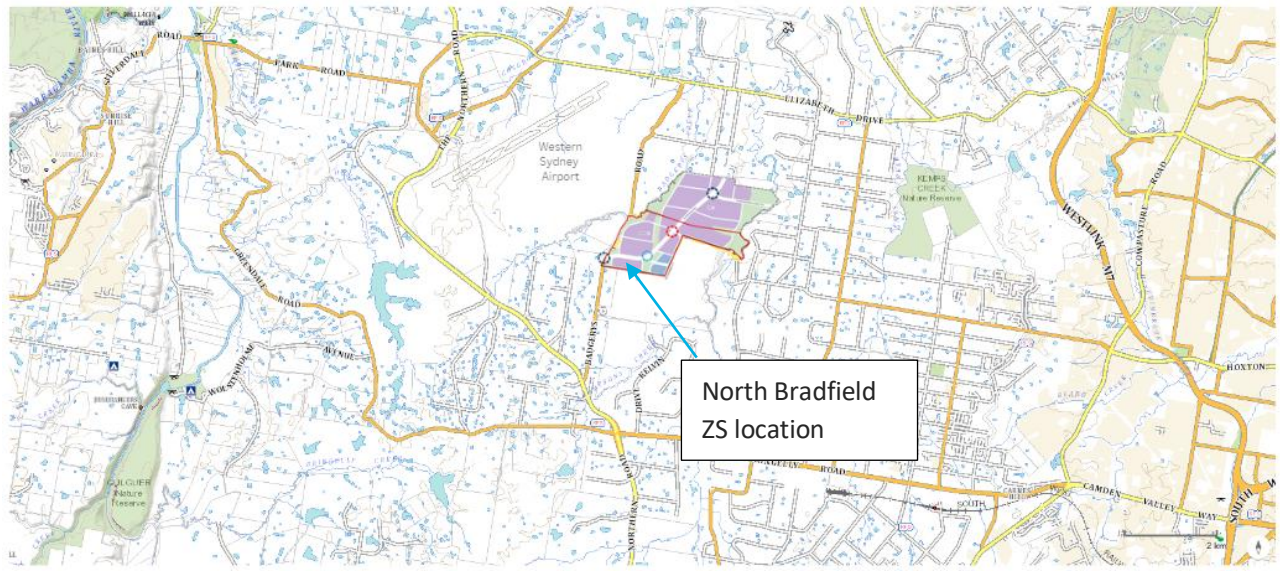
EE is the determining authority under Section 5.5 of the EP&A Act for the project. In accordance with requirements under section 5.5 of the EP&A Act, EE is also responsible for assessing all matters affecting or likely to affect the environment as a result of the proposal.

The REF has been developed in accordance with Section 171 of the NSW Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) with consideration of measures that will be implemented to avoid or minimise the potential for environmental impacts as a result of construction and operation of the project. This REF is based on a desktop review of potential environmental sensitives at the site, a site visit undertaken on 19 September 2022 by EMM's project director, technical assessment reports and other relevant project documentation provided by EE. Photographs taken during the site visit are presented in Appendix F.

1.2 Location of the study area

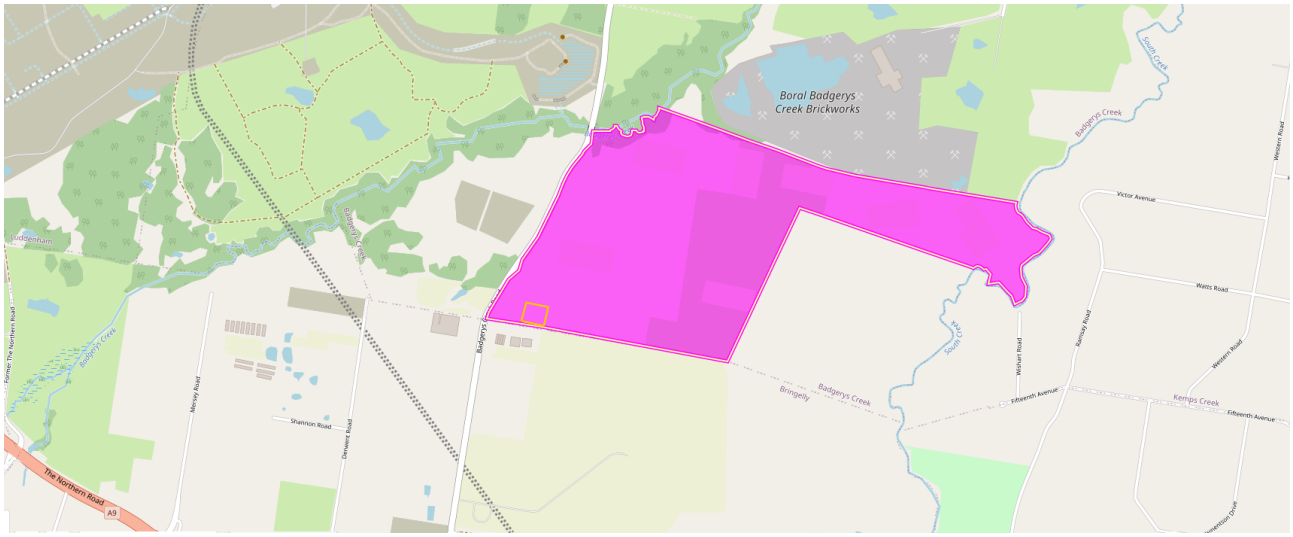
The proposed North Bradfield ZS will be constructed at 475 Badgerys Creek Road, Badgerys Creek, NSW (Lot 1 DP1123344). The subject site is described further in Chapter 6. It is noted that Lot 1 DP1123344 will be subdivided in the near future and the project site portion of Lot 1 DP1123344 will be located on Lot 99 DP112344. Lot 99 DP112344 will be referred to as the project site.

The regional and local settings of the alignment are shown in Figure 1.1 and Figure 1.2 respectively. The project layout is shown in Figure 1.3. The project is located within the Liverpool City Council (LGA) in the Sydney Basin area. The project is approximately 17 km southeast of Penrith and approximately 25 km southwest of Parramatta. More detailed project figures are provided in Chapter 6.



Source: ePlanning Spatial Viewer

Figure 1.1 **Regional setting of the approximate North Bradfield ZS location (475 Badgerys Creek Road outlined in red)**



Source: SEED portal

Figure 1.2 **Local setting of North Bradfield ZS (475 Badgerys Creek Road in pink, approximate ZS location in yellow)**

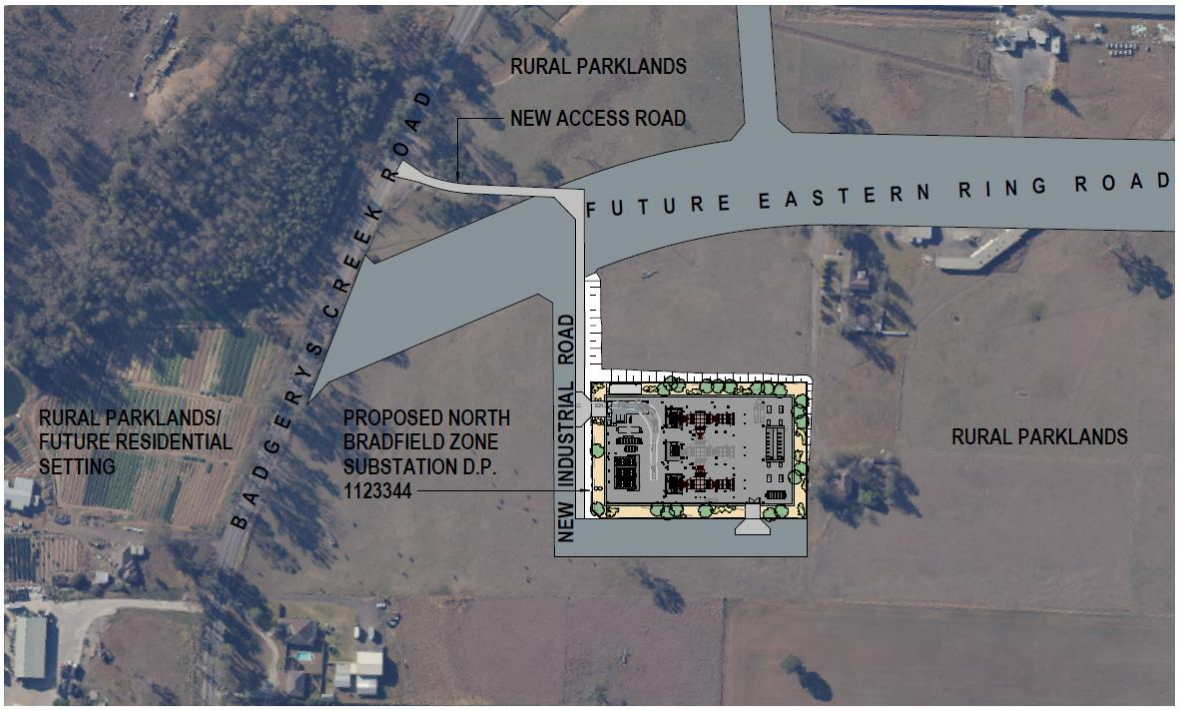


Figure 1.3 Site layout of North Bradfield ZS

1.3 Proponent

EE is the proponent of the proposal. EE operates under national electricity laws, statutory instruments and policies which government networks in the National Electricity Market. The EE network spans approximately 24,800 square kilometres and services over 2.6 million people across Sydney's Greater West, the Blue Mountains, the Southern Highlands, Illawarra and the South Coast of NSW.

Proponent details are provided in the table below.

Table 1.1 Proponent details

Specification	Details
Proponent	Endeavour Energy
Address	10 Darcy Street. Parramatta, NSW 2150
Website	https://www.endeavourenergy.com.au/
Contact	Mohammad Alam

1.4 Purpose of this REF

The purpose of this REF is to assess potential impacts that may result from the construction and operation of the project described in greater detail in Chapter 7 of this report.

The structure of this REF has been prepared in accordance with the table of contents presented on page 21 of EE's *Environmental Management Standard: Environmental impact assessment and Environmental Management Plans (EMS 0001) Amendment no. 7* (EE2019) and in accordance with requirements set out in the Code, with the exception of a small number of additional sections added for greater clarity.

2 Project justification

2.1 Overview

The project is located in the Greater Western Sydney region of NSW, forming part of a broader transmission supply strategy to meet increasing electricity demand in Bradfield City and surrounding development including the Western Sydney Aerotropolis Area. The area is also set to house State Significant Infrastructure (SSI) and State Significant Development (SSD) projects, such as the Sydney Metro, all of which put increasing demand on electricity infrastructure. The ZS will strengthen reliability and service the large-scale infrastructure development in the Bradfield region in line with NSW Department of Planning and Environment (DPIE) plans. There is also an opportunity to 'future-proof' for the installation of grid-batteries within the substation.

Establishing the North Bradfield zone substation would provide sufficient capacity to connect new customers in the precinct up until the early 2030s.

This chapter serves to describe the strategic context of the project, as well as the need, objectives, and benefits of the project.

2.2 Strategic context

2.2.1 Greater Sydney Region Plan 'A Metropolis of Three Cities' – Western Parkland City

Based on the NSW Government predictions, Sydney's population will continue to grow to nearly eight million people over the next 40 years (NSW Government 2021). For over a decade, the NSW Government has been preparing for the projected increase in population, by formalising strategies and investment that will secure jobs, infrastructure, education, health facilities and services within the different growth centres of Sydney.

One of the key growth areas has been the Western Parkland City, the location of which is shown in Figure 2.1. Government plans for Western Sydney have evolved in the last few decades, and especially with the release of the Greater Sydney Region Plan 'A Metropolis of Three Cities' (the Greater Sydney Region Plan) in 2018 which projects the following growth for the Western Parkland City (GCC 2018a):

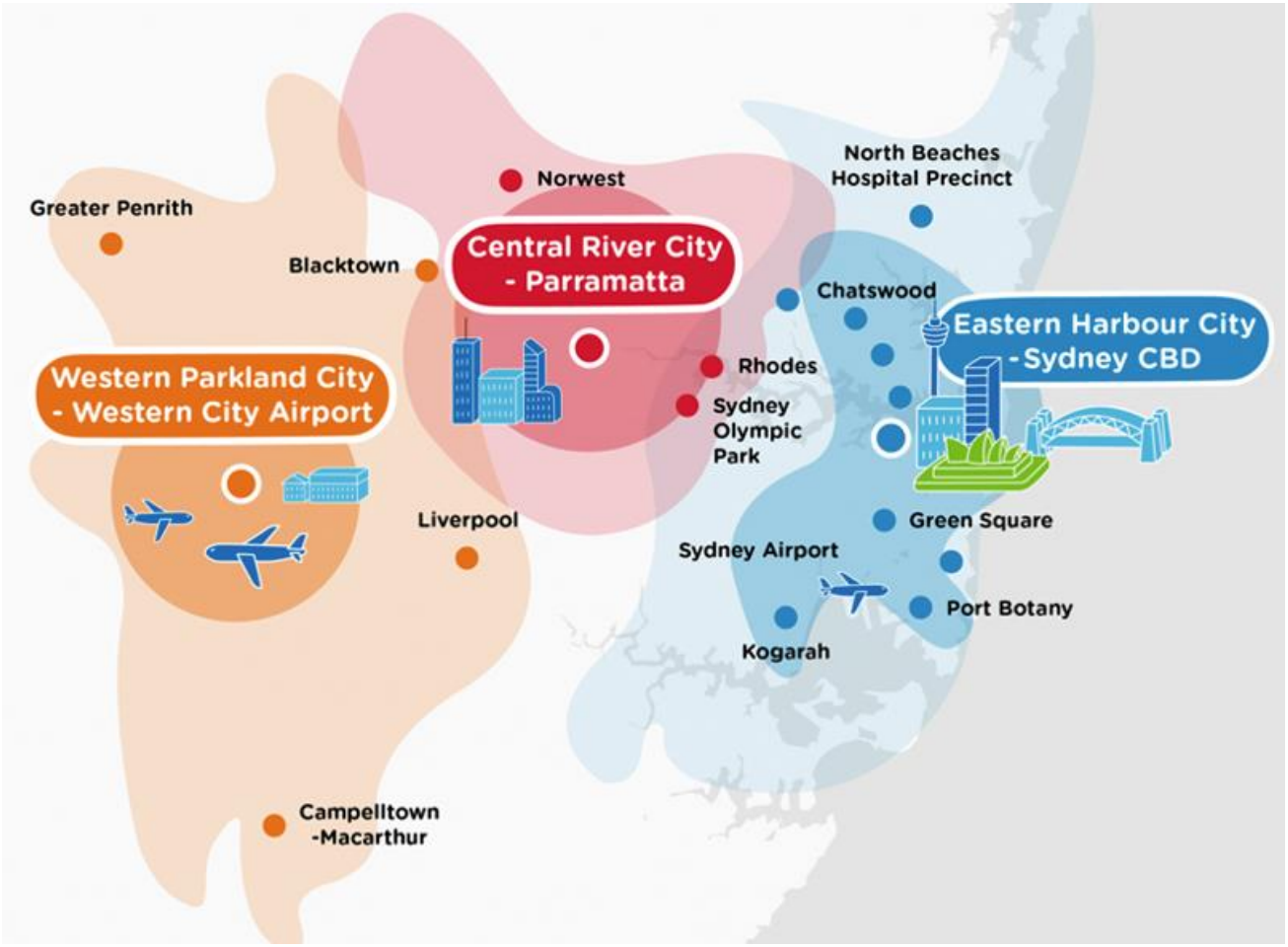
- Population increase from 740,000 in 2016 to 1,120,000 in 2036, which would include a 28% population increase in the 0–19 year-old bracket and 17% increase in +65-year-old bracket.
- Approximately 210,000 additional dwellings between 2016–2036.
- Approximately 237,000 additional jobs between 2016–2036.

These projects have impacted the land use vision of Western Sydney; in particular, with the creation of the 'three cities' concept. Since the release of the Greater Sydney Region Plan, work on infrastructure and housing provision in Sydney's greater west has accelerated with significant investment in precincts, infrastructure and development; particularly with large scale projects such as the Western Sydney Airport, the Sydney Metro, Sydney Science Park, the Bringelly Road, Elizabeth Drive and the Northern Road upgrades, and others (GCC 2022). The provision of utilities is a critical component of this growth.

Furthermore, the proposal aligns with Greater Sydney Commission's (GCC) *Our Greater Sydney 2056 Western City District Plan – connecting communities* (WSD Plan) (GCC 2018b) Planning Priority W1 Planning for a city supported by infrastructure, the objectives of which are to:

- foster infrastructure that supports the three cities
- align infrastructure with forecast growth

- adapt infrastructure to meet future needs
- optimise infrastructure use.



Source: Investment NSW 2021

Figure 2.1 A Metropolis of Three Cities concept map

2.2.2 Western Sydney Aerotropolis Precinct Plan

Since the Federal Government's announcement of Western Sydney Airport in 2014, the Government's vision of the land surrounding the airport has been detailed in several plans, policies, and environmental planning instruments (EPIs). The most recent plan for the Aerotropolis is the *Western Sydney Aerotropolis Precinct Plan* (DPE 2022a) (the Aerotropolis Plan), which was published in March 2022 to support the provisions of the State Environmental Planning Policy (Western Sydney Aerotropolis) 2020 (WSA SEPP). The WSA SEPP, however, has since been consolidated into the State Environmental Planning Policy (Precincts – Western Parkland City) 2021 (Western Parkland City SEPP), as part of the government's wider suite of reforms to deliver a better planning system for NSW (DPE 2022b). The WSA SEPP has been consolidated into Chapter 4 'Western Sydney Aerotropolis' of the Western Parkland City SEPP. However, DPE is still in the process of adding all maps within the consolidated SEPPs to the NSW Planning Portal and Spatial Viewer and thus previous maps will remain and retain their current titles (DPE 2022b).

The project is located approximately 900 m southeast of the eastern border of Western Sydney Airport, on 'enterprise' (ENT) zoned land. The project will service the growing needs of the Aerotropolis and surrounding infrastructure and development.

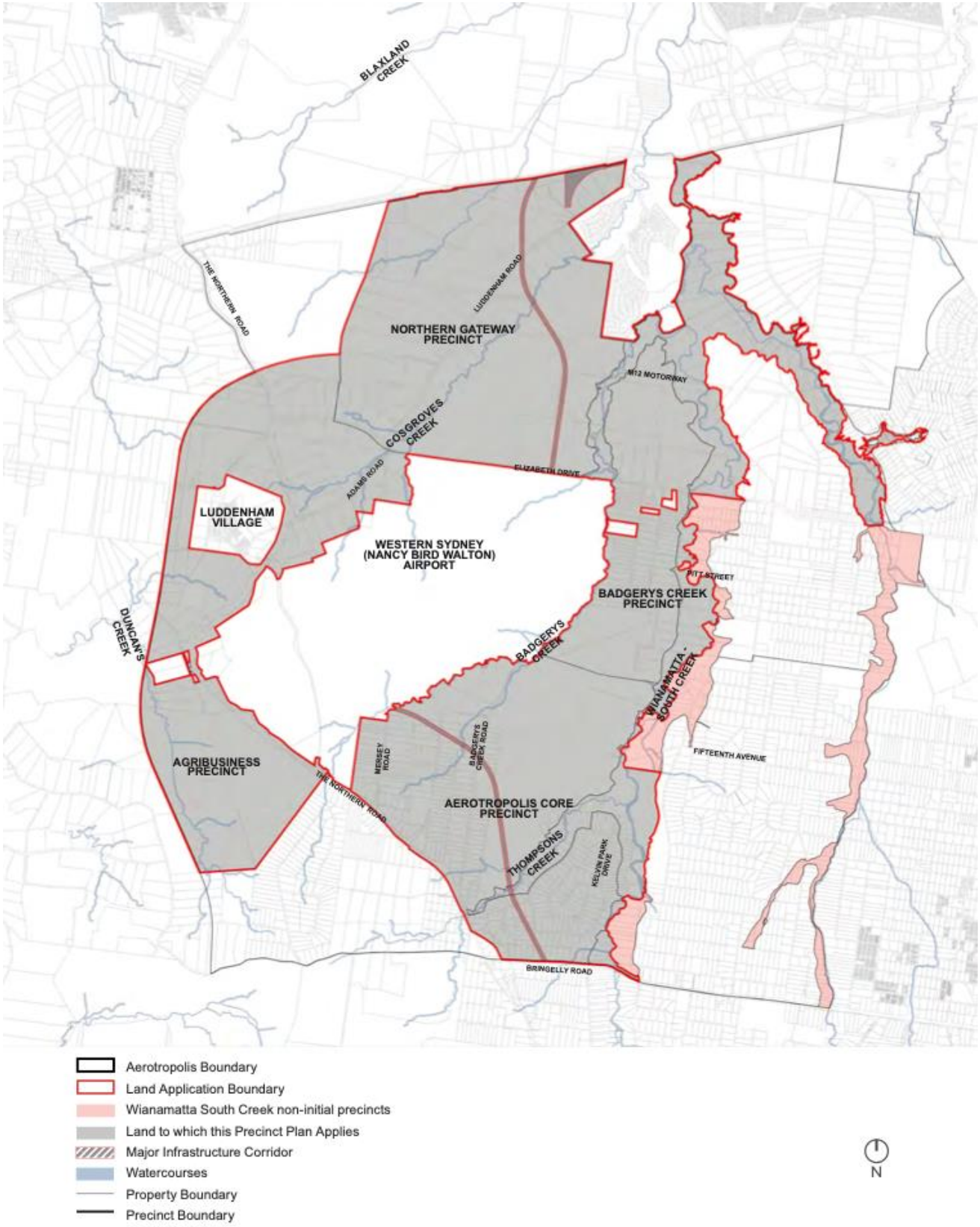
The project's close proximity to Western Sydney Airport and surrounding developments makes the project crucial in supporting and servicing development of the new growth area. The State Government plans to transform the Aerotropolis area into the following key precincts shown in the land use figure (Figure 2.2).

- Western Sydney Airport (Nancy Bird Walton).
- Aerotropolis Core Precinct.
- Agribusiness Precinct.
- Northern Gateway Precinct.
- Badgerys Creek Precinct.

The project aligns with several objectives outlined in the Aerotropolis Plan under the 'Infrastructure and development staging: infrastructure delivery' theme:

- Ensure utilities and services are planned and delivered to meet demand from development (objective IO2).
- Deliver utilities, roads infrastructure and services in a manner that is safe, efficient, and cost effective (objective IO4).
- Ensure utilities design and locations consider space for alternative future services and allow for multi-utility corridors in the future (objective IO6).

Thus, the project is crucial in servicing new infrastructure and development in the Western Sydney Aerotropolis Growth Area. The growth of the entire area is dependent on the delivery of safe, efficient, and cost-effective utilities, which EE is committed to providing as part of their broader transmission supply network in line with State Government plans, policies, and targets. The project is a key component of this broader transmission supply network, which will service the Aerotropolis and surrounding development.



Source: The Aerotropolis Precinct Plan DPE 2022a

Figure 2.2 Land application map

2.3 Project need

The project is needed to meet increasing electricity demand from development associated with the Western Sydney Growth Area including Bradfield City, Western Sydney Aerotropolis and Sydney Metro. The Western Sydney Growth Area in Sydney's south-west will provide greater opportunities for new homes, jobs, education, health, services, and infrastructure and is a priority area for the NSW Government. In the area, key developments include the new Central Business District (CBD) within the Aerotropolis Core Precinct, the residual Aerotropolis Core Precinct located north of the proposed CBD, and the southern portion of the Agribusiness Precinct. These developments collectively are expected to require approximately 140MVA of power supply by 2041 to meet the forecasted customer demand. The ZS will strengthen reliability and service the large-scale infrastructure development as well as ensuring that electricity continues to be supplied to households, while increasing capacity to service industrial, commercial and infrastructure development growth within this region of Sydney.

The project is crucial for the safe and reliable operation of the Sydney Metro and Western Sydney Airport.

2.4 Project objectives

The key objective of the project is to provide a reliable electricity supply and facilitate the electrical networks growth to the Western Sydney Growth Area, including Bradfield City, Western Sydney Aerotropolis Core Precinct, Sydney Metro, and surrounding development.

2.5 Project benefits

Residents, commercial and industrial business operators, and their customers will all benefit from safe, efficient, cost-effective, and continuous electrical supply within the Western Sydney Growth area.

The NSW Government will benefit from achieving its goals of transforming the Western Sydney Growth Area into the purposeful precincts that have been intended and planned out in the Aerotropolis Plan and the Western Parkland City SEPP, as well as numerous other strategic plans for this area.

3 Legislative framework

3.1 Overview

This chapter describes the legislative framework that applies to the project, including the approval pathway under the EP&A Act, and the land use context of the new Western Sydney Aerotropolis Area. An overview of the potential approval requirements under relevant Commonwealth and NSW legislation and environmental planning instruments (EPIs) is also provided.

3.2 Approval pathway

The EP&A Act and the EP&A Regulation provide the framework for assessing environmental impacts and determining environmental approvals for 'development' and 'activities' in NSW.

The EP&A Act also provides for State environmental planning policies (SEPPs) and local environmental plans (LEP) to regulate development.

Relevant provisions from statutory instruments are examined below.

3.2.1 NSW *Environmental Planning and Assessment Act 1979*

i Development

The EP&A Act includes a definition of 'development' (refer Section 1.5 of the EP&A Act) being:

(1) For the purposes of this Act, ***development*** is any of the following:

a) the use of land;

b) the subdivision of land;

c) the erection of a building;

d) the carrying out of a work;

e) the demolition of a building or work;

f) any other act, matter or thing that may be controlled by an environmental planning instrument.

(2) However, development does not include any act, matter or thing excluded by the regulations (either generally for the purposes of this Act or only for the purposes of specified provisions of this Act).

The proposed works are therefore considered to be development and the EP&A Act and its supporting instruments apply.

Section 3.18 further states that and environmental planning instrument may provide for specified development to be carried out without development consent, or with development consent.

Further, Section 4.2 of the EP&A Act provides that an environmental planning instrument (such as a local environmental plan or State environmental planning policy) may provide for development to be carried out with consent.

The SEPP (Transport and Infrastructure) 2021 (considered further below) provides at Section 2.44(1) that development for the purpose of an electricity transmission or distribution network may be carried out by or on behalf of an electricity supply authority or public authority without consent on any land (unless the land is reserved under the NSW *National Parks and Wildlife Act 1974*).

Hence the proposed development is permitted without consent.

The provisions under Part 4 of the EP&A Act therefore do not apply to this proposed development but the provisions of Part 5 of the EP&A Act are triggered because Division 5.1 of Part 5 defines 'activities' to include (amongst other things) the use of land, erection of a building and the carrying out of a work, provided that the activity is not exempt development, prohibited development or development which requires consent under Part 4.

ii Determining authority

Under Section 5.1 of the EP&A Act, the term 'determining authority' is defined as a Minister or public authority and, in relation to any activity, means the Minister or public authority by or on whose behalf the activity is or is to be carried out or any Minister or public authority whose approval is required in order to enable the activity to be carried out.

In this case, EE is the public authority by or on whose behalf the activity is to be caried out and is therefore a determining authority.

iii Environmental assessment

The EP&A Act also provides, at Section 5.5, that a determining authority in its consideration of an activity shall, notwithstanding any other provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

If the activity is found to be likely to significantly affect the environment, then Section 5.7(1) requires an environmental impact statement (EIS) to be prepared.

3.2.2 Environmental Planning and Assessment Regulation 2021

Section 171 of the EP&A Regulation stipulates that the determining authority must take into account certain prescribed environmental factors (Section 171(2)).

It is also stated (Section 171(3)) that a determining authority must prepare a review of the environmental factors that demonstrates how the environmental factors were taken into account.

Those factors are considered within the Review of Environmental Factors (REF). Table 3.2 includes an itemised list of these factors for the project.

Finally, Section 171(4) requires the REF to be published if the activity has a capital investment value of more than $5 million, it requires a permit under certain other legislation (e.g. *Heritage Act 1977*) or if considered in the public interest to do so.

3.2.3 State Environmental Planning Policy (Transport and Infrastructure) 2021

The aim of the Transport and Infrastructure SEPP is to facilitate the effective delivery of transport and infrastructure across NSW.

Section 2.7 of the Transport and Infrastructure SEPP provides that the SEPP prevails over all other Environmental Planning Instruments including LEPs and SEPPs except in the case where Section 2.7 (2) provides that the following SEPPs override all the requirements of the Transport and Infrastructure SEPP to the extent of any inconsistency:

- Clauses 10, 11 and 19 of the State Environmental Planning Policy (Coastal Management) 2018 (Coastal Management SEPP) [now clause 2.5 (1, 2) of Chapter 2 the State Environmental Planning Policy (Resilience and Hazards) 2021]

- All the provisions of State Environmental Planning Policy (State Significant Precincts) 2005 (State Significant Precincts SEPP). The State Significant Precincts SEPP has been consolidated into the State Environmental Planning Policy (Precincts- Regional) 2021 (Regional SEPP) (DPE 2022).

By virtue of an ANO's status under the Transport and Infrastructure SEPP, certain activities will be subject to Division 5, Subdivision 1 'Electricity Transmission or Distribution Networks' for the purposes of development connected with electricity transmission or distribution. Under Section 2.44 development permitted without consent:

2. Development for the purpose of an electricity transmission or distribution network may be carried out by or on behalf of an electricity supply authority or public authority without consent on any land excluding land reserved under the National Parks and Wildlife Act.

The Transport and Infrastructure SEPP's definition of an "electricity transmission or distribution network", as per Section 2.34 of the SEPP, includes the following components:

a) above or below ground electricity transmission or distribution lines (and related bridges, cables, conductors, conduits, poles, towers, trenches, tunnels, access structures, access tracks and ventilation structures) and telecommunication facilities that are related to the functioning of the network,

b) above or below ground electricity kiosks or electricity substations, feeder pillars or transformer housing, substation yards or substation buildings,

c) systems for electricity storage associated with component specified in paragraphs (a) and (b).

Given the project can be classified as an 'activity' under Part 5 of the EP&A Act, EE therefore will not be required to submit a development application to the NSW Department of Planning and Environment (DPE) or Liverpool City Council (LCC). However, LCC have been notified of the intention to carry out the proposed works and EE has considered the response received from the Council in the project design (refer Appendices G to I).

3.2.4 NSW Code of Practice for Authorised Network Operators (ANO)

i Determining authority

The Code is the approved Code under Section 198 of the EP&A Regulation. The NSW Government has leased part of NSW's transmission and distribution network to privately managed network businesses, which are referred to as ANOs by the *Electricity Network Assets (Authorised Transactions) Act 2015* (Authorised Transactions Act). ANOs include TransGrid, Ausgrid and EE.

The NSW Government has prescribed the ANOs as prescribed determining authorities for the purposes of section 5.6 of the EP&A Act and the definition of 'public authority' under Section 1.4 of the EP&A Act. This allows an ANO to be a Part 5 determining authority for development for the purposes of an electricity transmission or distribution network.

Therefore, as an ANO, EE can assess and self-determine activities that are not likely to significantly affect the environment and are conducted by or on behalf of EE for the purpose of electricity transmission or distribution.

The Code is deemed to be in force until it is revoked or varied in accordance with the EP&A Regulations.

ii Assessment class

The Code requires an ANO to classify its proposal into one of six possible assessment classes. The Code applies to Class 3, 4, 5 and 6 proposals only.

- **Class 3:** requires the preparation of a Summary Environmental Report (SER), which refers to projects which are expected on a reasonable basis to be minor and neither extensive nor complex.
- **Class 4:** requires the preparation of an REF and refers to projects which are expected on a reasonable basis to have impacts which go beyond minor, can be extensive and/or complex and at the discretion of the ANO be a project for which it is deemed appropriate to prepare, such as a project which may generate considerable public interest.
- **Class 5**: refers to projects as defined in Class 4, but also require the preparation of a Species Impact Statement (SIS).
- **Class 6**: refers to projects which are "likely to significantly affect the environment" and therefore an EIS is required.

The construction impacts of the project will be, for the most part, confined to the area shown in Appendix A which will be within the subject site. The northern side of the project will be within 100 m of the yet-to-be constructed Eastern Ring Road (refer Figure 7.2) and the project's all weather access track will align with Eastern Ring Road. A small number of trees will need to be removed within the proposed ZS portion of the subject site, however an ecological assessment determined that the works will not impact on intact native vegetation as the area was historically cleared of native vegetation apart from scattered new growth trees (refer Appendix D) and that impacts to local flora communities are expected to be minor and negligible.

Overall, the proposed work is not likely to significantly affect the environment, including critical habitat, threatened species populations or ecological communities or their habitats, therefore an EIS is not required.

In view of the above, the project is being assessed as a Class 4 proposal under the Code.

iii Assessment requirements

Section 2.4.3 of the Code specifies the requirements that must be included and addressed in an REF for a Class 4 proposal. The table below specifies the outlined assessment requirements and where they have been addressed in this REF.

Table 3.1 REF requirements specified in the NSW Code for Authorised Network Operators

Requirement	Summarised description	Addressed
The proposed activity	Clear description of the activity that is proposed, including the nature, the purpose and the sites where it will take place.	Chapter 7 Proposed works
	Sufficient detail about the proposed activity to demonstrate potential impact on the environment.	Chapter 7 Proposed works Chapter 8 Environmental assessment and mitigation
	Discuss viable alternatives and any mitigation measures to be implemented.	Chapter 5 Consideration of alternatives
Certification	Statement signed and dated by the person with principal responsibility for preparing the REF (being an employee or agent of the ANO), as per the requirement specified on page 22 of the Code.	Following the Executive Summary
The proponent, determining authorities and any required approvals	Identify the proponent and all determining authorities and required approvals for the activity.	Section 1.3 Proponent Section 3.2.4 NSW Code of Practice for Authorised Network Operators, Determining authority
The environment of the activity	A description of the environment of the site and the surrounding area, with a focus on the aspects of the environment that are of particularly high value, sensitive to impacts of the type the activity will have, or of importance to the community.	Section 3.3 *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* Chapter 6 Existing environment Section 8.3 Heritage Section 8.9 Visual amenity
	The REF must identify and describe Threatened Species Populations and Ecological Communities that are likely to occur in the area affected by the activity.	Section 8.4 Biodiversity
The impacts of the activity	The likely environmental impacts for all phases of the activity and describe their extent, size, scope, intensity and duration.	Chapter 8 Environmental assessment and mitigation
	As a minimum, the REF should document consideration of each of the factors listed in clause 171(2) of the EP&A Regulation and the document consideration of each of the factors listed in Section 5A of the EP&A Act in relation to Threatened Species, Populations and Ecological Communities (including fish and marine vegetation), and their Habitats.	Chapter 8 Environmental assessment and mitigation
	List the sources and data the ANO relied on when preparing the REF.	References Appendices
Mitigating measures that will apply to the activity	An ANO may conclude that the activity should be modified or adapted so that certain measures designed to mitigate the environmental impacts of the activity are observed. These mitigating measures should be documented.	Chapter 9 Environmental Management Chapter 8 Impact assessment and mitigation

Table 3.1 REF requirements specified in the NSW Code for Authorised Network Operators

Requirement	Summarised description	Addressed
Summary of impacts	Include a section that summarises the individual impacts of the activity and provides an overarching view of the impacts of the activity on the environment.	Chapter 10 Conclusion
Consultation	Record the consultation undertaken for the purposes of preparing the REF in accordance with Section 2.3.7 of the Code.	Chapter 4 Consultation
Conclusions regarding an EIS and/or a SIS	The REF should describe: Whether the activity is likely to significantly affect the environment, in which case an EIS is required; and Whether the activity is likely to significantly affect Threatened Species, Populations, Ecological Communities or their Habitats, in which case a SIS is required. Describe the reasons for these conclusions, referencing the more detailed assessments in the body of the REF for support.	Section 3.2.1i State Environmental Planning Policy SEPP (Transport and Infrastructure) 2021 Section 8.3 Heritage Section 8.4 Biodiversity Chapter 10 Conclusion
	In instances where the REF has been prepared by a third party it is important to note that irrespective of the conclusion of the REF, an ANO is ultimately responsible for deciding whether a proposed activity is likely to significantly affect the environment.	Chapter 10 Conclusion

3.3 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) outlines the Commonwealth Government's role regarding environmental assessment, biodiversity conservation, the management of protected species, populations and communities and heritage items.

The EPBC Act lists nine matters of national environmental significance (MNES) which must be considered when assessing the impacts of a proposal, including:

- world heritage properties
- national heritage places
- Ramsar wetlands of international importance
- nationally threatened species and ecological communities
- migratory species
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mining)

- a water resource, in relation to coal seam gas development and large coal mining development.

If an action will or is likely to have a significant impact on any of the matters of MNES, it is deemed to be a controlled action and requires approval from the Minister for the Environment and Energy or the Minister's delegate.

An assessment of the project in consideration of flora and fauna protected under the EPBC Act was completed against a search of the Protected Matters Search Tool (PMST), as summarised in Table 3.2 below.

Table 3.2 Assessment against the EPBC Act

MNES and other matters protected by the EPBC Act	Search result	Predicted impacts
MNES		
World heritage properties	There are no world heritage properties (including buffer zones) within the search area.	No significant impact predicted.
National heritage places	There are no national heritage properties (including buffer zones) within the search area.	No significant impact predicted.
Wetlands of international importance (listed under the Ramsar Convention)	There are no wetlands of international importance located within the search area.	No significant impact predicted.
Great Barrier Reef marine park	There are no Great Barrier Reef marine parks within the search area.	No significant impact predicted.
Commonwealth marine area	There are no Commonwealth marine areas within the search area.	No significant impact predicted.
Listed threatened ecological communities (TECs)	There are six listed threatened ecological communities recorded in the search area.	River-flat Eucalypt was identified in the project area; however, the small copse was identified as new growth after being historically cleared. Therefore, no assessment of significance was completed.
Listed threatened species	There are 43 listed threatened species recorded in the search area.	No threatened flora species were identified. The areas of impact are open grassed areas and do not represent habitat for threatened species. Furthermore, there will not be any impacts to waterways, or restriction of movement between waterbodies which provide habitat for species such as the Green and Golden Bellfrog.
Listed migratory species	There are 14 migratory species recorded in the search area.	As above.
Other matters protected by the EPBC Act		
Commonwealth lands	There are 7 parcels of Commonwealth land within the search area.	No impact predicted as project will be contained within the site boundaries.
Commonwealth heritage places	There are no listed Heritage Places within the search area.	No impact predicted.

Table 3.2 Assessment against the EPBC Act

MNES and other matters protected by the EPBC Act	Search result	Predicted impacts
Listed marine species	There are 20 listed marine species recorded in the search area. This includes mostly migratory bird species.	As above for 'listed threatened species'.
Whales and other crustaceans	No whales or other crustaceans have been recorded in the search area.	No significant impact predicted.
Critical habitat	There are no critical habitats in the search area.	No significant impact predicted.
Commonwealth reserves terrestrials	There are no Commonwealth reserves terrestrials within the search area.	No significant impact predicted.
Australian marine parks	There are no Australian marine parks within the search area.	No significant impact predicted.
Habitat critical to the survival of marine turtles	There is no habitat critical to the survival of marine turtles within the search area.	No significant impact predicted.

3.4 Land use and permissibility

Under Section 2.44 of the Transport and Infrastructure SEPP, development for the purpose of an electricity transmission or distribution network may be carried out by or on behalf of an electricity supply authority or public authority without consent on any land. It is noted in Section 2.43, electricity and distribution networks include electricity substations in the definition.

As such, this project is permissible. However, to assess the strategic land use compatibility, the zoning of the land and its objectives have also been reviewed, as set out below.

The subject site is zoned Enterprise (ENT) pursuant to the State Environmental Planning Policy (Precincts - Western Parkland City)) 2021 Precincts – Western Parkland City SEPP.

The Precincts – Western Parkland City SEPP stipulates the following objectives of ENT zoned land:

- To encourage employment and businesses related to professional services, high technology, aviation, logistics, food production and processing, health, education, and creative industries.
- To provide a range of employment uses (including aerospace and defence industries) that are compatible with future technology and work arrangements.
- To encourage development that promotes the efficient use of resources, through waste minimisation, recycling, and re-use.
- To ensure an appropriate transition from nonurban land uses and environmental conservation areas in surrounding areas to employment uses in the zone.
- To provide facilities and services to meet the needs of businesses and workers.

The proposal meets with the objectives of the ENT zone.

The current land use map from the NSW Government's Planning Portal and Spatial Viewer (the Planning Portal) highlights that the project zoning under the Precincts – Western Parkland City SEPP is mostly located within the ENT (Enterprise) zone, with a small portion of the southwestern corner designated ENZ (Environment and Recreation) (Figure 3.1). ZS infrastructure and the associated access road will not be constructed within the ENZ zone.

Source: Planning Portal, DPE 2022

Figure 3.1 Land zoning map for the project (Lot 99 is within black border) black border representing entire (developer's stage 1) project site

3.5 NSW Environment and Planning Assessment Regulation 2021

Table 3.3 Section 171(2) Review of environmental factors – the Act, s5.10(a)

Clause	Response
a) the environmental impact on the community,	The construction of the project will have temporary impacts on the surrounding residents adjacent to the subject site, including potential elevated noise and visual impacts. Should there be any planned electricity outages, relevant residents, educational, commercial, and industrial premises will be notified. Furthermore, notification will be provided to affected residents prior to any planned construction works. Construction will be managed in accordance with the recommendations contained in this REF to minimise impacts on affected residents as much as possible.
b) the transformation of the locality,	While visual amenity will change, the nearest residence is approximately 200m away from the proposed ZS, so visual change is negligible. However, the entire surrounding area is currently undergoing major transformation. Thus, even though the project only slightly contributes to the transformation, the locality will be transformed by other developments in the area, including the large Eastern Ring Road that will be constructed adjacent to Lot 99.
c) the environmental impact on the ecosystems of the locality,	The local ecosystems are not expected to experience any significant impacts.
d) reduction of the aesthetic, recreational, scientific, or other environmental quality or value of the locality,	The project will be constructed in such a way that it will not reduce the future environmental quality or value for the area. Moreover, it will provide a reliable electricity supply and meet the future electricity requirements of the Western Sydney Aerotropolis Area and the surrounding region.

Table 3.3 Section 171(2) Review of environmental factors – the Act, s5.10(a)

Clause	Response
e) the effects on any locality, place or building that has— i) aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, or social significance, or ii) other special value for present or future generations,	Potential impacts to Aboriginal and historic heritage are addressed in Sections 8.2 and 8.3 respectively and involve submitting an Aboriginal site impact form to AHIMS to update the Aboriginal site extent to reflect areas of moderate to high potential located along the boundary of Badgerys Creek in the north. Works are unlikely to impact historic heritage items.
f) the impact on the habitat of protected animals, within the meaning of the *Biodiversity Conservation Act 2016*,	Potential impacts to biodiversity are addressed in Section 8.4 Biodiversity. Impacts to native flora and fauna are not expected.
g) the endangering of a species of animal, plant or other form of life, whether living on land, in water or in the air,	Refer to (f).
h) long-term effects on the environment,	No long-term negative effects on the environment are expected as a result of project construction. The project is necessary to service new infrastructure and development in the Western Sydney Aerotropolis Area.
i) degradation of the quality of the environment,	No long-term negative effects on the quality of the environment are expected as a result of project construction.
j) risk to the safety of the environment,	Project components will be designed and constructed such that it will comply with all relevant Australian and EE Standards and in accordance with legislative and regulatory requirements. Any potential risks to the environment from construction of the project will be managed and mitigated in accordance with the mitigation measures outlined in this REF, as well as any approval(s) issued for the project.
k) reduction in the range of beneficial uses of the environment,	The project will not have any long-term impacts that will reduce the beneficial uses of the surrounding environment.
l) pollution of the environment,	Appropriate pollution controls including erosion and sediment pollution control measures will be in place to prevent pollution occurring during the construction of the project. Any potential risks of pollution from construction works or operation of the project will be mitigated by the works being implemented in accordance with the various requirements of this REF and EE Environmental Management standards.
m) environmental problems associated with the disposal of waste,	All wastes associated with the project construction and operation will be disposed of at an approved facility and in accordance with EE Environmental Management Standard EMS 0007 Waste Management.
n) increased demands on natural or other resources that are, or are likely to become, in short supply,	There will be no demand on resources that are in short supply. All materials required for construction of the project are readily commercially available and considered to be generally in supply.

Table 3.3 Section 171(2) Review of environmental factors – the Act, s5.10(a)

Clause	Response
o) the cumulative environmental effect with other existing or likely future activities,	As noted in Section 8.16, the entire project precinct and surrounding precincts are currently in the process of being transformed, thus there are roadworks and other developments in the process of being undertaken. These may at some stage contribute to cumulative impacts, in terms of traffic volumes or noise, however the works are largely staged based on priority.
p) the impact on coastal processes and coastal hazards, including those under projected climate change conditions,	The project is not located in a coastal environment.
q) applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1,	Refer to Chapter 2 Strategic context and Chapter 3 Legislative framework.
r) other relevant environmental factors.	Refer to Chapter 8 Environmental assessment and mitigation.

3.6 Other legislative requirements

3.6.1 NSW Electricity Supply Act 1995

The NSW *Electricity Supply Act 1995* (ES Act) defines EE's licencing requirements and provides a framework for the development and maintenance of electrical infrastructure. In summary, it allows EE to trim and remove trees, carry out works on public roads and acquire land. The ES Act also requires that works (other than routine repairs or maintenance works) must not be undertaken unless a minimum of 40 days' notice is supplied to the relevant local council. Any submission received must be considered by EE.

The consultation undertaken in accordance with these requirements is provided in Section 4.2.

3.6.2 NSW Protection of the Environment Operations Act 1997

The NSW *Protection of the Environment Operations Act 1997* (POEO Act) provides a framework for the licensing of certain activities and is administered by the DPE (formerly Office of the Environment and Heritage (OEH)). Under the POEO Act, the construction and operation of the project must be conducted in such a manner so as:

- Not to pollute the environment.
- Any waste generated must be classified, handled, transported, and disposed appropriately.
- Environmental incidents involving actual or potential harm to human health, or the environment must be reported to OEH (refer Chapters 8 and 9 for management measures).

3.6.3 Environment Operations (Waste) Regulation 2014

The Environment Operations (Waste) Regulation 2014 (Waste Regulation) is a key piece of legislation for the regulatory framework in NSW and includes strict thresholds for Environmental Protection Licences (EPLs). Under the Waste Regulation, a Resource Recovery Exemption and a Resource Recovery Order allow for the reuse of virgin excavated natural materials (VENM) or excavated natural materials (ENM) for the purpose of application to land as engineering fill or for use in earthworks. Resource recovery orders and exemptions have been developed by the NSW Environment Protection Authority (EPA) to ensure that "the use of waste must be genuine, fit-for-purpose and cause no harm to the environment or human health" (2015).

According to the EPA, all soil stockpiles for the purpose of re-use as fill must be classified as either VENM or ENM in order to be transported and used as fill. Excavated natural material is defined as:

> …natural material that:
>
> - has been excavated or quarried from areas not contaminated with manufactured chemicals or process residues, as a result of industrial. commercial, mining or agricultural activities; and
> - does not contain sulphidic ores or soils, and includes natural material that meets such criteria for virgin excavated natural material…

In addition to a range of criteria for chemical and other attributes, the material must comply with to be classified as VENM. The in-situ material at the site will be assessed for relevant contaminants of concern. Based on previous testing for The Waste Classification Report (GeoEnviro 2022b), the in-situ material is expected to be suitable for the re-use on the subject site or other commercial/industrial developments (refer to Section **Error! Reference source not found.**).

3.6.4 NSW Biodiversity Conservation Act 2016

In accordance with the NSW *Biodiversity Conservation Act 2016* (BC Act), several factors need to be considered when making a determination as to whether an action, development or activity is likely to significantly affect threatened species, populations or ecological communities or their habitats. These factors are assessed in the ecological assessment prepared for the project (Appendix D). The report identifies that there will be no impacts to threatened species.

3.6.5 Summary of legislative requirements

Table 3.4 Other legislative requirements

Legislation	Authority	Responsibility	Requirement	Comment
NSW *Contaminated Land Management Act 1997* (CLM Act)	DPE	Project manager/ Project supervisor	Notification – under s60 by a person whose activities have contaminated land or a landowner whose land has been contaminated is required to notify DPE when they become aware of the contamination.	If contamination is discovered the duty to report would be determined.
NSW *Electricity Supply Act 1995* (ES Act)	Local Council	EE	Notification – under s45, a 40 days' notice is required for proposed electricity works.	Councils will be notified as part of REF notification process.

Table 3.4 Other legislative requirements

Legislation	Authority	Responsibility	Requirement	Comment
NSW *Heritage Act 1977* (Heritage Act)	DPE/ Heritage Council	EE/Project manager	Consideration – under s139 as to whether a permit to excavate or disturb land is required.	The arhaeological technical report found no artefacts or raw materials within the study area. AHIMS 45-5-2691 is located on the boundary, outside the study area and will not be impacted by the proposed ZS works. The report concluded the majority of PAD area (AHIMS ID 45-5-5370) was assessed as not having potential.
Transport and Infrastructure SEPP	Local Council	EE	Notification – under s13 – 15, 21 days' notice of substantial impact on Council related infrastructure and local heritage works in flood liable land that will change flood patterns other than to a minor extent.	N/A
Transport and Infrastructure SEPP	Local Council	EE	Notification – under s42 of 21 days' notice for works involving new or existing feeders.	Notified as part of REF notification process.
National Greenhouse and Energy Reporting Act 2007	Clean Energy Regulator	EE	Reporting – under s19, a registered corporation is required to report information on energy production, energy consumption, and the amount of greenhouse gas emissions for the facilities under their operational control on an annual basis by 31 October following the financial year for which they are reporting.	Reporting will be undertaken each year by 31 October.
NSW *National Parks and Wildlife Act 1979* (NPW Act)	DPE	Project manager/ Project supervisor	Consideration/Approval – under s90 to harm or desecrate Aboriginal objects or places. Determining authority for works on NPWS land.	Aboriginal artefacts have been identified at 2 locations in close proximity to the study area and 2 PAD locations have been identified within the study area. A test excavation was carried out and it was determined that no further assessment is required (Appendix B).
NSW Protection of the Environment Operations Act 1997 (POEO Act)	DPE	Project manager/ Project supervisor	General – under s120 no "dirty water" discharge into stormwater drains.	Refer Section 8.5
POEO Waste Regulation	DPE	Project manager/ Project supervisor	General – under Section 24 transportation of certain waste must be tracked.	Refer Section 8.6
NSW *Roads Act 1993*	TfNSW	Project manager/ Project supervisor	Approval – under s138 for work on a classified road.	Proposed works will not affect any roads.

Table 3.4 Other legislative requirements

Legislation	Authority	Responsibility	Requirement	Comment
Rail Safety National Law (NSW) 2012		Project manager/ Project supervisor		Proposed works will not affect any railways.
NSW *Rural Fires Act 1997*	NSW Rural Fire Service	Project manager/ Project supervisor	Consideration – under s63 public authorities must take all reasonable steps to prevent the occurrence and minimise the spread of bushfires on or from lands vested in or under its control/management.	Refer Section 8.14
NSW *Biodiversity Conservation Act 2016* (BC Act)	DPE	EE	Consideration – carry out a test of significance to determine whether the proposal is likely to have a significant impact or not, which requires a species impact statement.	Refer Section 8.4
NSW *Water Act 1912*	Water NSW	Project manager/ Project supervisor	Consideration/ permit – under s113 to extract groundwater via any type of bore, well or excavation	It is not expected that a permit would be required for these works. The extraction of ground water is not part of this project.

4 Consultation

4.1 Overview

Endeavour Energy have a Stakeholder Engagement Framework that is based on the spectrum of participation developed by IAP2 (the International Association of Public Participation). The principles on which Endeavour Energy's framework is built are, that consultation must be:

- purposeful
- timely
- transparent
- inclusive
- responsive
- best practice
- collaborative
- measurable.

This is combined into Endeavour Energy's overall framework which is summarised in the figure below.

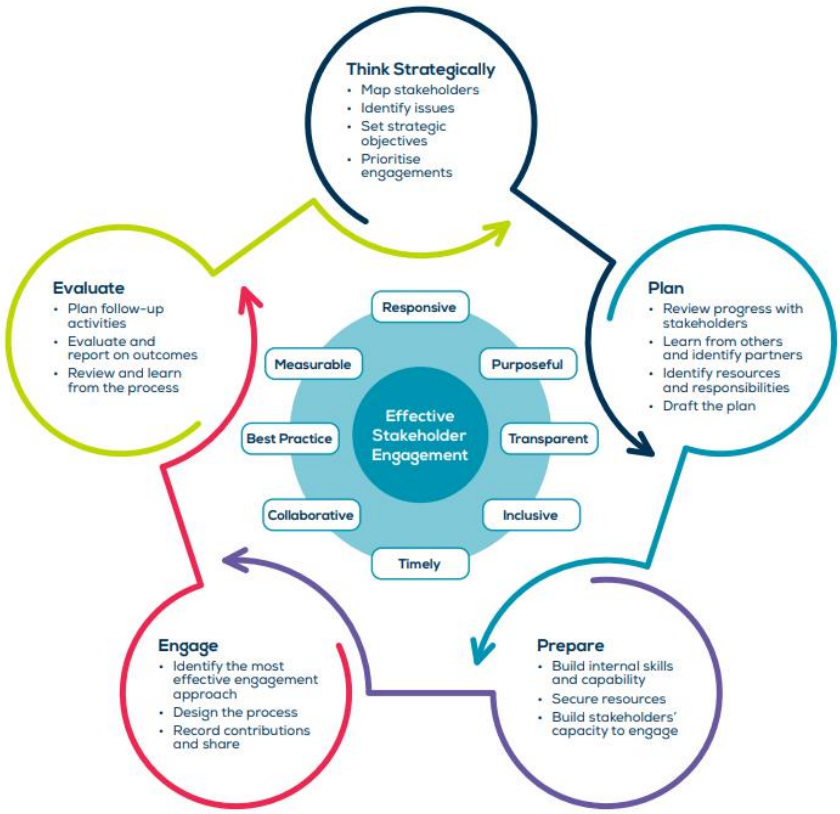


Figure 4.1 Endeavour Energy Stakeholder Engagement Framework

4.2 Project specific consultation

4.2.1 Council notification and requirements

In accordance with the NSW *Electricity Supply Act 1995*, Endeavour Energy is required to consult with the relevant councils, no less than 40 days prior to the commencement of construction. Letters providing notification of the proposal was sent to Liverpool City Council (LCC) on 18 April 2023. A formal submission was received from LCC via email on 31 May 2023, which can be found in Appendix G. LCC expressed concerns with various aspects of the proposal including inconsistency with the WSA Precinct Plan, road frontage, and lighting masts. EE provided a response to LCC's submission via email on 23 June 2023, which can be found in Appendix H. LCC replied to EE's response via email on 26 June 2023, stating EE's responses to Council's concerns were satisfactory (Appendix I).

A public notice in relation to the draft REF was published in the District Reporter on 29 April 2023. The draft REF will also be published on the EE website.

Notifications were also sent to local MP's Mrs. Melissa McIntosh and Mrs Tanya Davies on 20 April 2023.

Under Section 171(4) of the EP&A Regulations 2021 require that all REFs be published on the determining authority's website if above a particular monetary threshold. This project's capital investment value is above that threshold so, in accordance with the Regulations, will be displayed. As such. if any member of the public has questions or concerns, EE have a connection point via EE "Your Say" at https://yoursay.endeavourenergy.com.au/.

4.2.2 Notification of nearby landowners

The project is approximately 200 m away from the nearest dwelling. Direct consultation was carried out on 28 April 2023 to adjacent or nearby landowners with a letterbox drop along Badgerys Creek Road to the east. No landowners to the west were notified as the land is being developed. Should construction planning result in direct impacts to a landowner's property, Endeavour Energy will also immediately and directly engage with them.

4.2.3 Future consultation

The Construction Environmental Management Plan (CEMP) for the project will include site specific control measures as required. In addition, the Project Manager will develop a project specific complaints and grievance handling protocol to be adhered to. All potentially affected residents will be notified prior to the commencement of construction works. Details are to include the likely duration of the works and 24-hour contract details for the Project Manager and Construction Contractor. In the event any electricity supply outages are required to facilitate the safe construction of the proposal, impacted landowners will be notified in advance.

5 Consideration of alternatives

Several alternatives were considered to address the primary objectives of the project. The overarching Western Parkland City has an ultimate growth potential of around 100,000 dwellings in addition to Bradfield City, Western Sydney International Airport, the Sydney Metro-Western Sydney Airport line, Sydney Science Park, warehousing, technology, and other industry with a total projected ultimate load of between 600 and 800 MVA, up from the existing low-capacity network of 33 kV. More specifically, the Western Sydney Aerotropolis Area is comprised of approximately 11,000 hectares divided into precincts including the Aerotropolis Core Precinct, in which the proposed ZS will be situated and will supply energy to the 132 kV backbone feeder. EE's Asset Strategy and Planning division and Regulatory Investment Tests for Distribution (RIT-D) entitled 'Providing Supply to the Aerotropolis Core Precinct' to assess possible options.

5.1 Option 1 – Establish North Bradfield ZS and augment Bringelly ZS

- Establish 45 MVA firm 132/22 kV North Bradfield zone substation (ZS) in the northern area of the Aerotropolis Core Precinct.
- Supply ZS via two 132 kV, 2.8km underground feeder extensions along Badgerys Creek Road.
- Connect ZS to the Aerotropolis backbone feeder, with one feeder terminating at Bringelly ZS and the other terminating at Western Sydney Airport transmission substation.
- Install single 45 MVA transformer at Bringelly ZS in 2029/2030.
- Install second 45 MVA transformer at Bringelly ZS in 2033/2034.

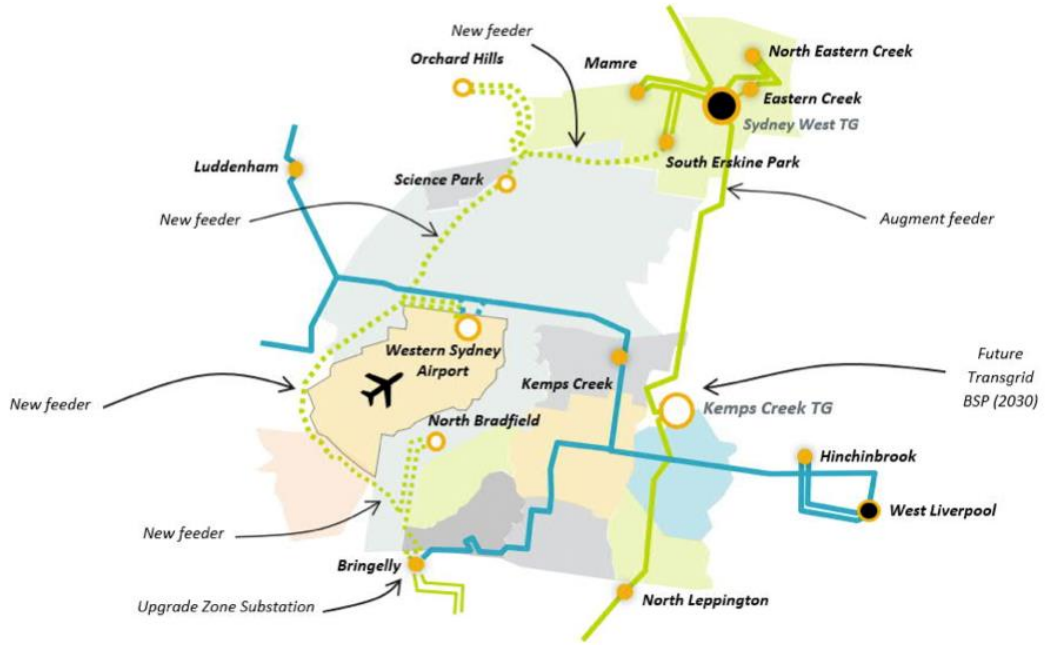
5.2 Option 2 – Augment Bringelly ZS and stage North Bradfield ZS

- Provide Bringelly ZS with 45 MVA additional capacity via installation of two 45 MVA 132/22 kV transformers.
- Stage establishment of North Bradfield ZS, to be commissioned in 2029/30 and 2033/34 in same specifications as option 1 but over two stages.

5.3 Option 3 – Stage North Bradfield ZS and stage Bringelly ZS augmentation

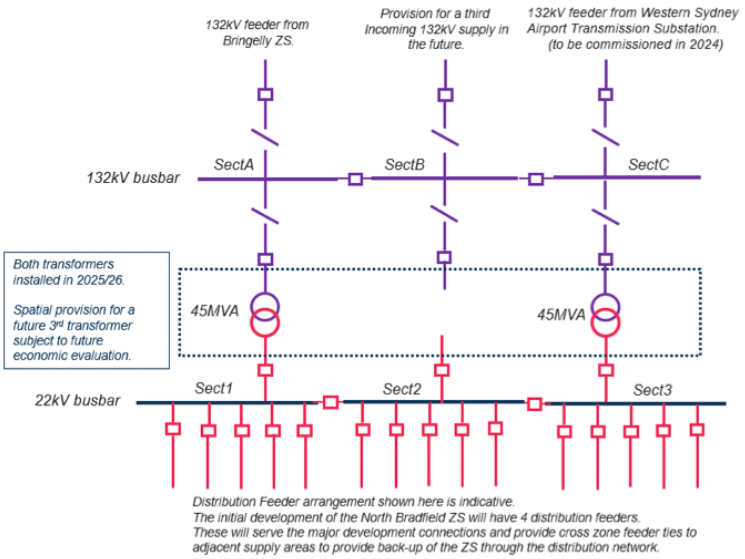
- Establish North Bradfield ZS in stages.
- Stage 1 – install single 45 MVA transformer in 2024/2025.
- Stage 2 – install second transformer 2029/2030.
- Rely on 6 MVA of firm capacity from autotransformers and use adjacent ZS distribution network until 2029/2030.
- Install 45 MVA transformer at Bringelly ZS in 2029/2030.
- Install 45 MVA transformer at Bringelly ZS in 2033/2034.

Although options were similar in price and ranking, Option 1 was selected as the preferred option for practical reasons, including: proximity to connection loads; lowering cost connection for customers; key route cable congestion minimisation; avoidance of later transport disruptions.



Source: Providing Supply to the Aerotropolis Core Precinct, EE 2022

Figure 5.1 Proposed and existing network infrastructure



Source: Providing Supply to the Aerotropolis Core Precinct, EE 2022

Figure 5.2 Simplified line drawing of Option 1

6 Existing environment

6.1 General context

The subject site is within the suburb of Badgerys Creek, with the southern property boundary serving as the border between Badgerys Creek and Bringelly. The subject site is located within Liverpool City Council Local Government Area (LGA) in the Cumberland subregion of the Sydney Basin area. The site is situated on Gandangara Local Aboriginal Land Council land. The area is characterised by rural landscape with gentle sloping landforms and mountain views.

The subject site is within a land lot in the southwestern corner of Lot 1 DP112344 at 475 Badgerys Creek Road (Figure 6.1 and Plate 6.1) and is referred to as future Lot 99 DP112344. The site is accessible from Badgerys Creek Road however, the future Eastern Ring Road is set to border part of the lot and the project includes an all-weather access track which takes into account the alignment of the future ring road.

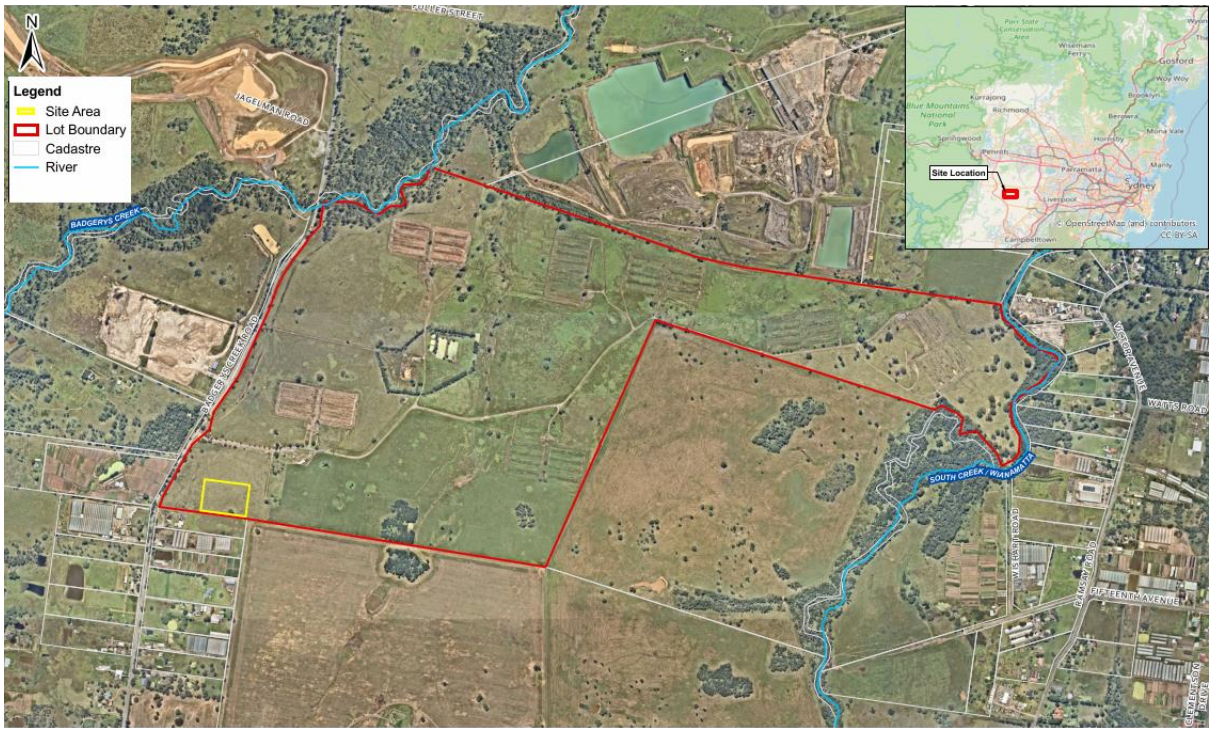


Figure 6.1 **475 Badgerys Creek Road (outlined in red) with approximate zone substation location (outlined in yellow)**

The subject site mostly consists of gentle sloping landforms with a relatively flat area associated with an unnamed drainage line at the western end of the site. Lot 99 covers approximately 1.27 ha bound to the north partially by access roads, to the east by minor drainage lines of Badgerys Creek, to the south by 475 Badgerys Creek Road's property line and to the west by fencing along Badgerys Creek Road.

The entire subject property is set within a rural setting, on an extensively cleared lot used previously as a poultry farm. The whole site was cleared of vegetation prior to 1961 (Plate 6.1), possibly for pastoral activities. By 1965, agricultural infrastructure including residences, sheds, access roads and a dam were constructed. Infrastructure for agricultural irrigation has also been buried around the site (Eco Logical Australia 2022).

The subject site is located approximately 1.8 km to the west of South Creek, a high order system which runs south to north, feeding into the Hawkesbury River. Badgerys Creek, a tributary of South Creek, is 800 m north of the subject site, generally running southwest to northeast. Two heavily modified, likely seasonal, unnamed drainage

lines of Badgerys Creek run through Lot 1, DP1123344 one near the eastern border, the other along the western border (Eco Logical Australia 2022). The drainage lines do not run through Lot 99.

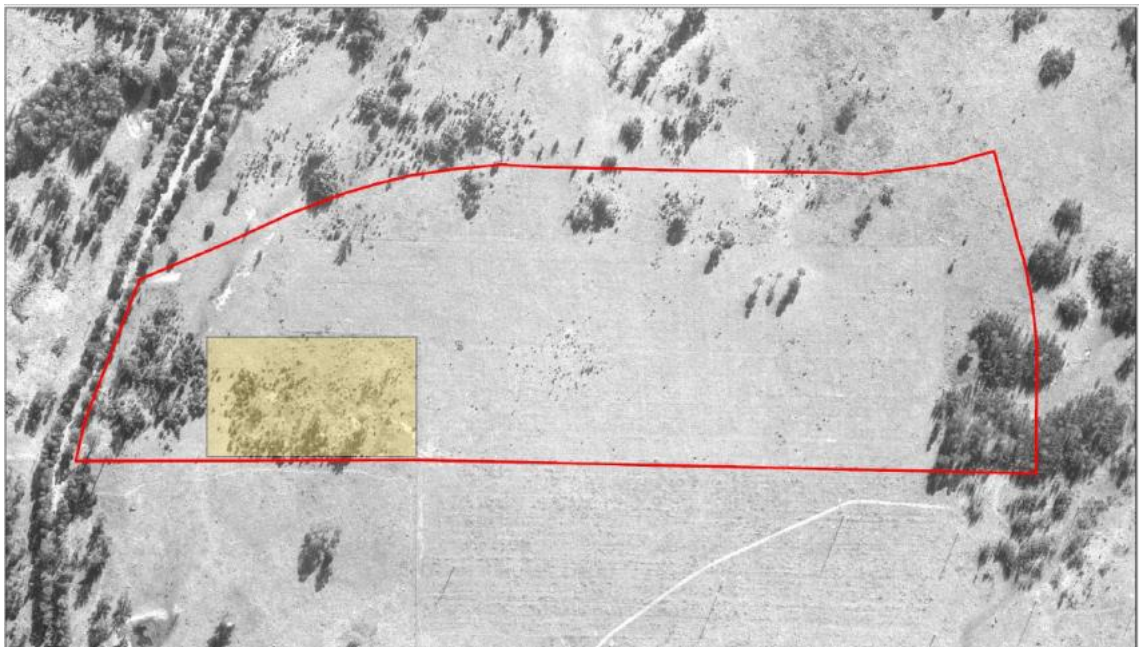
Most of the subject property has been cleared of native vegetation as previously mentioned, though a few small sections remain, with some new tree growth near the unnamed drainage line on the eastern edge of the site. Dense grass covers much of the subject site (Plate 6.2).

The western side of the property, along Badgerys Creek Road, and two small areas on the eastern side of the property are sparsely populated with Cumberland Plain Woodland in the Sydney Basin Bioregion, and River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and Southeast Corner Bioregions (Plate 6.3). However, these areas are outside the planned location of the zone substation.

Surrounding rural lots are sparsely populated, with no residential dwellings in the vicinity to the north, and to the east. The closest residential premises are situated to the south and the west of the subject sit at:

- 355a Badgerys Creek Road borders subject site to the south. Proposed works for the substation are approximately 200 m northeast of the dwelling.
- 260 Badgerys Creek Road is located to the northeast of the subject site and works for the substation are approximately 355 m northeast of the dwelling.
- 270 Badgerys Creek Road (dwelling approximately 58 m west of site and approximately 270 m southwest of proposed works on site).

As previously noted, the area is expected to transform with the development of the Aerotropolis Core Precinct.



Source: Eco Logical 2022

Plate 6.1 1961 aerial image of the site with approximate ZS location in yellow

fsite 

Source: Eco Logical 2022

Plate 6.2 View southeast of gently sloping land formation with dense grass cover and sparse new growth tree stands

Source: Google Maps streetview

Plate 6.3 View of sparse tree vegetation along Badgerys Creek Road facing north-east

6.2 Physical context

The project is located within Cumberland subregion of the Sydney Basin. Native trees remaining in the area are characteristic of the open woodland with dry sclerophyll forest that once used to dominate the area and includes species such as: Grey box (*E. moluccana*), Forest red gum (*E. tereticornis*) Broad-leaved ironbark, Narrow-leaved ironbark, Woollybutt and less commonly, forest oak. Many various grass and shrub species would have grown in the understorey.

The Cumberland landscape unit is underlain by Triassic Wianamatta Group of sediments, predominantly shales with some areas of sandstone and interbedded claystones and ironstones. The study area contains Blacktown (residual) Soil with shallow to moderately deep friable greyish brown loam and hard setting brown clay loam overlying strongly pedal mottled brown light clay as the dominant soil types (Eco Logical Australia 2022).

6.3 Cultural setting

The area surrounding the project has been subject to agricultural land use for about 200 years, until more recent times when subdivisions have changed the dominant land use in the area.

The area surrounding the project is sparsely populated with only a few dwellings in the vicinity of the project site. According to the 2016 census, Badgerys Creek population was only 225, with 74 private dwellings (ABS 2016).

61.8% of the population is working age (aged 15–64 years) with outdoor vegetable growing the most common industry of employment at 33%, followed by Road Freight Transport at 18.5%.

Aboriginal and European history is further discussed in Section 8.2 and Section 8.3 respectively.

7 Proposed works

7.1 Overview

The new ZS at North Bradfield (refer Figure 7.1) will be connected to the Aerotropolis backbone feeder with one feeder terminating at Western Sydney Airport Transmission substation and the other at the Bringelly ZS. These connection works are not included in this REF and will be subject to a separate assessment. This section describes the construction works proposed as part of the project, further outlined in Appendix A.

It is expected that the project will be commissioned by late 2025 to early 2026.

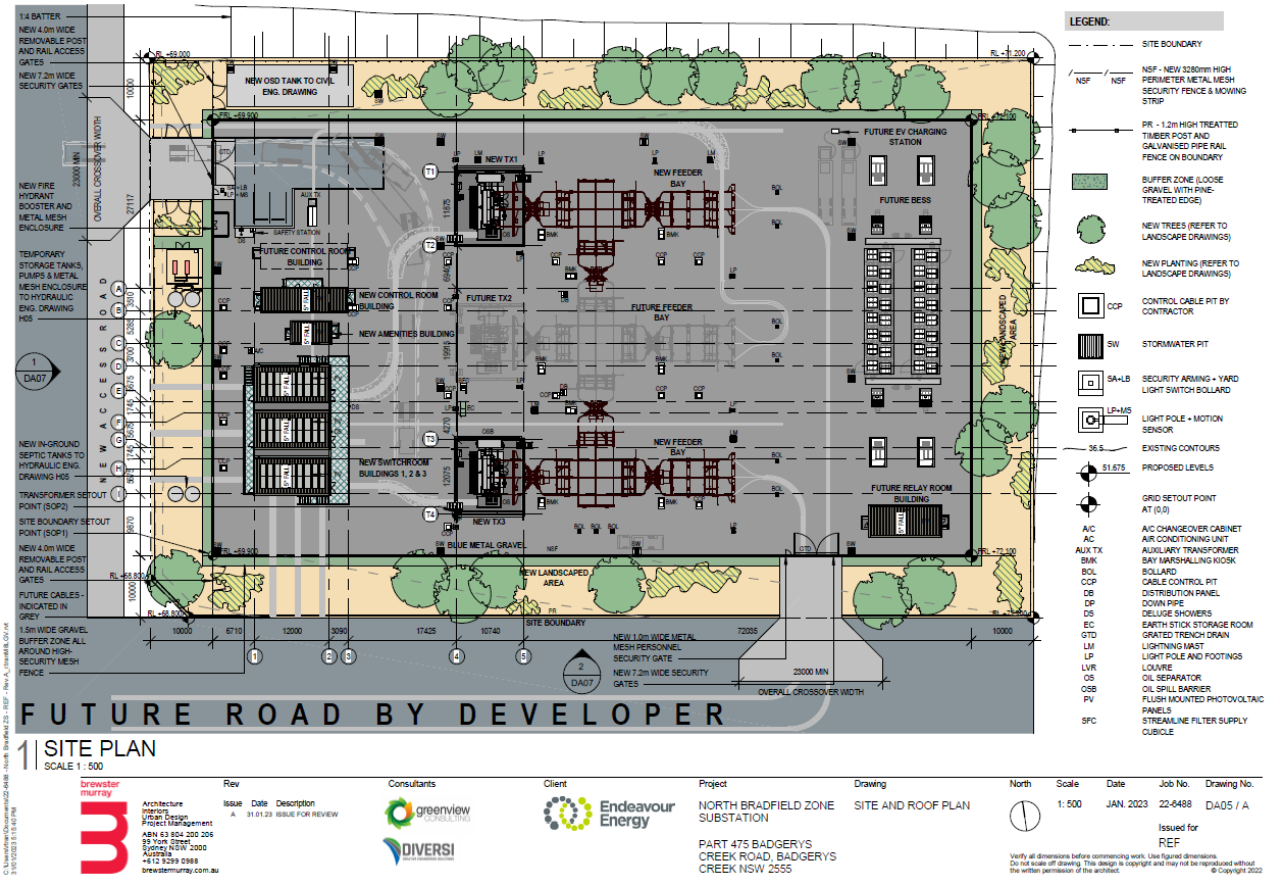


Figure 7.1 Design of North Bradfield Zone Substation (Source: Brewster Murray Architects)

7.2 Future development

Once subdivided, the surrounding subject property (Lot 1 DP 1123344) is proposed for redevelopment including the development of Eastern Ring Road (refer Figure 7.1), part of the Fifteenth Avenue SMART Transit Corridor, enterprise and light industry, a small area of business and enterprise, plus areas of open space (Figure 7.2).

Source: EE 2022

Figure 7.2 Planning proposal for 475 Badgerys Creek Road (Lot 1 DP 1123344 outlined in red)

7.3 Description of work

7.3.1 Site layout components

The proposed digital substation is comprised of:

- 132kV outdoor switchyard.
- Prefabricated buildings to accommodate 22kV switchgear, protection and control panels, SCADA, communications and batteries.
- Amenities building for staff working at the site.
- Installation 22kV ducts from the cable marshalling area to the indicative location of the future BESS within the project site (noting the BESS is subject to separate planning approval).
- Installation of fencing and associated landscaping.
- Construction of a temporary all weather access road off Badgerys Creek Road

7.4 Construction details

7.4.1 Site preparation

Earthworks to level ground surface in preparation for ZS:

- Stripping and removal of vegetation.
- Scraping of land.
- Installation of drainage.

7.4.2 Platform preparation

The site will be benched and prepared by the developer and hand over to EE for the ZS construction. EE proposes to construct a level concrete pad that will support the ZS and ancillary infrastructure.

All footings for the proposed structures will be supported on pier footings with piers taken through the proposed fill, natural clay and founded on the shale/siltstone bedrock. Construction of footings and piles will ensure piers are founded on adequate foundation material.

7.4.3 Access road

The developer (Ingham Property Group) will be responsible for constructing a temporary all-weather access road, which will be 6 meters wide, specifically designed to accommodate heavy construction vehicles. This access road will remain in place until the permanent public road is developed. The design of the permanent road will be:

- designed by Chartered Civil Engineer
- in accordance was AS 2890.2 to suit a low loader
- designed to suit a design traffic loading of a 5 x 105 ESA's (Equivalent Standard Axles) for flexible pavements.

The design shall take into account the future public road levels and provide these levels on the design.

7.4.4 Timing, duration, hours of work

The project is scheduled to occur from October 2023, taking approximately 12 to 24 months to complete. Impacted landowners will be notified about proposed construction activities in a timely manner.

Construction works will be undertaken during standard working hours:

- 7:00 am to 6:00 pm Monday to Friday
- 8:00 am to 1:00 pm on Saturdays
- no works on Sundays or public holidays.

Should out of hours works be required, the process for undertaking out of hours works as described in EE's Environmental Handbook will be followed. Appropriate internal and external approvals shall be obtained where required prior to any out-of-hours- works being carried out.

Should any longer than two nights of out of hours work be required, the construction manager would apply to EE Environmental Services Team to progress approval for those works.

7.5 Equipment and materials required

The general plant and equipment required for the works includes (but is not limited to):

- earthworks:
  - excavators
  - tippers
  - agitators
  - flatbed trucks
  - crew/tool truck
  - vac truck
  - crane
- construction:
  - crane
  - EWP (elevated work platform)
  - winch
  - cable trailers
  - drum stand
  - crew/tool truck.

7.6 Stockpiling of materials

7.6.1 Virgin excavated natural material

VENM may be used as general fill and/or as backfill. Stockpiles will be located in designated areas, away from tree trunks, buildings, and fences. Stockpiles will be placed away from free-flowing surface waters such as away from gutters and drainage lines.

Contractors will be made aware of required documentation including the Geotechnical Investigation Report and the Waste Classification Report, which will assist with VENM classification and management. For example, soil sampling will be carried out by the Contractor's suitably qualified Geotechnical Engineer to classify the soil in accordance with the categories prescribed by the Department of Environment & Climate Change (DECC).

i Fill material

All fill material brought to site will comply with AS 3798 including inorganic, non-perishable material suitably graded and capable of compaction to the documented density. Shale or similar loose and friable material will not be used as fill to graded or built-up banks. Filling sand will be clean, grey river sand, and aggregate will be clean 20 mm aggregate.

The same stockpiling principles to be applied to VENM stockpiles will also apply to fill material stockpiles.

All VENM and any other excess material that is excess to backfilling requirements will be disposed off-site to a suitable licensed waste facility.

7.7 Workforce

The construction workforce numbers would include:

- 15–20 workers during excavation/site preparation.
- 15–20 workers during building construction.
- No permanent staff on site during operation.

8 Environmental assessment and mitigation

8.1 Overview

The following environmental factors were assessed in detail to determine the environmental impacts associated with the project:

- Aboriginal culture heritage
- historic heritage
- biodiversity
- contamination
- waste associated with earthworks and construction activities.

Assessment reports are provided in Appendix B to Appendix D respectively and summarised in the following sections. Lower risk environmental factors for the project that are required to be considered under Clause 171 of the EP&A Regulation and the Code addressed in this section include: water, utilities and services, roads, traffic and access, land use, landscape and visual, socio-economic impacts, noise, air quality and dust suppression, safety and hazards, bushfire, waste generation storage, contamination, and cumulative impacts.

Prior to the commencement of construction, a construction contractor will develop a CEMP with the approval of EE, which will capture the management and mitigation measures presented in this REF, providing further site-specific detail where appropriate and responsibilities and timing for their implementation.

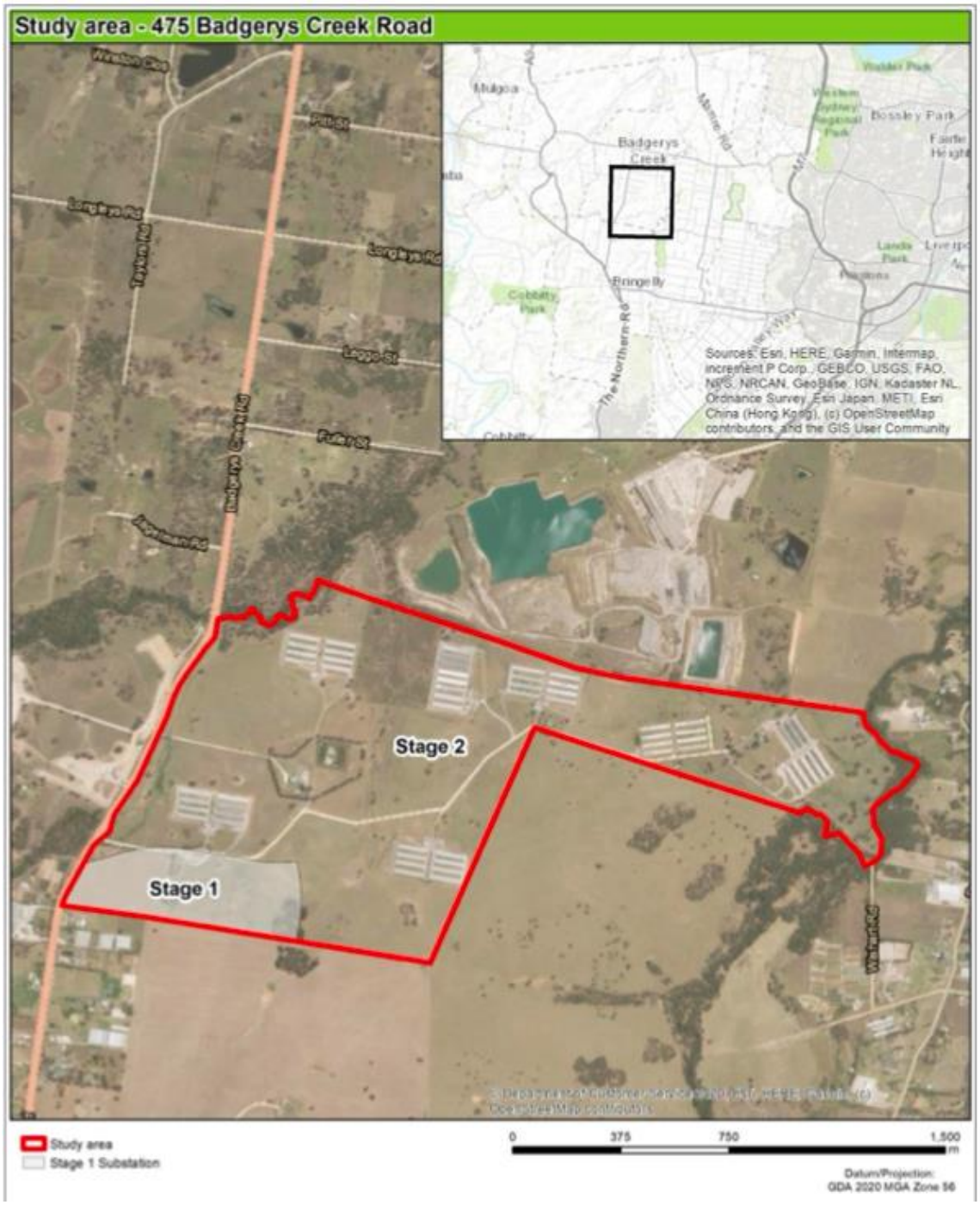
8.2 Aboriginal heritage

8.2.1 Overview

An Archaeological Technical Report, including aboriginal context was prepared to assess part Lot 1 DP 1123344 (stage 1 works specifically future part Lot 99) by Eco Logical Australia. Information from the report has been used to determine the Aboriginal heritage impacts associated exclusively with the construction of North Bradfield ZS and associated access track (Figure 8.1). The report is provided in full in Appendix B.

Potential impacts on Aboriginal heritage from the project were assessed in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (due diligence guidelines) (DECCW 2010). The objectives of the assessment were to:

- Identify if registered Aboriginal objects, Aboriginal places or potential Aboriginal archaeological deposits are likely to occur in the areas of the project.
- Determine if the project is likely to harm Aboriginal objects, Aboriginal places, or potential Aboriginal archaeological deposits (if present).
- Determine if further archaeological investigation is required.



Source: Eco Logical Australia 2022

Figure 8.1 Location of the relevant study area (shown as Stage 1)

8.2.2 Existing environment

i Aboriginal history of the locality

Traditional Aboriginal tribal boundaries within Australia have been reconstructed, primarily, based on surviving linguistic evidence and are, therefore, only approximations. Social interaction, tribal boundaries and linguistic evidence may not always correlate, and it is likely boundaries and interaction levels varied and fluctuated over time. Multiple language groups were present within Badgerys Creek including the Darug, Dharawal, and Gundungurra as the area is within a transitional space between tribal boundaries. However, it is thought the study area was inhabited by Darug clans (Eco Logical Australia 2022).

Aboriginal people have lived in the Sydney region for up to 30,000 years, as indicated by radiocarbon dating undertaken on a sample from a site in Parramatta. Interactions with Aboriginal people across Sydney and surrounds are documented from early 1800s, from which point their population declined. Descendants of the Dharug and Dharawal groups continue to live across the region.

ii Previous archaeological investigations and research

Section 3.2.1 of the Aboriginal Archaeological Technical Report (Appendix B) provides details of previous archaeological assessments undertaken near the project site. Section 3.2.2 provides details of previous archaeological investigations within the study area. Additionally, an archaeological survey was undertaken by Eco Logical Australia (2022) for Ingham Rural Property Group Pty Limited (November 2021). These assessments have contributed to an understanding of the locations where artefacts are most likely to be found.

Archaeological investigations across the Cumberland Plain over the past 30 years have been comprehensive due to the increasing population growth and demand in the western Sydney area. Studies have concluded that artefact densities are most likely to be greater on terraces and lower slopes within 100 m of freshwater resources. Investigations and predictive models identified that ridgelines and crests located between drainage lines are likely to contain archaeological evidence.

Furthermore, previous documentary and archaeological research indicates that archaeological evidence is likely to be found with certain landforms, largely because of the resources that were associated with these landforms. The Heritage NSW due diligence guidelines list five such landforms:

- within 200 m of waters
- within a sand dune system
- on a ridge top, ridge line or headland
- within 200 m below or above a cliff face
- within 20 m of or in a cave, rock shelter, or a cave mouth.

Registered PAD, AHIMS ID 45-5-5371 sits adjacent to the eastern boundary of the study site, covering one of the two ephemeral drainage lines on the property. This area potentially holds further Aboriginal objects due to minimal disturbance as indicated in aerial imagery. However, test excavation was undertaken for the Archaeological Technical Report which found no evidence of Aboriginal occupation or utilisation within the Lot 99 portion of 475 Badgerys Creek Road. Furthermore, test excavations did not uncover any raw materials, artefacts, stone tool technology, hearths, heating ovens, knapping floors, or other activity areas. It is noted that the area could have only supported a seasonal water source rather than a permanent water source.

The report concluded most of the site has suffered significant disturbance due to previous land use and is a low lying, waterlogged area, of which, the western portion was also impacted by the construction of Badgerys Creek Road. Therefore, the registered PAD area (AHIMS ID 45-5-5370), was assessed as not having potential and that "there will be no impacts to Aboriginal cultural heritage values by the proposed substation works within the study area".

iii Aboriginal Heritage Information System (AHIMS) database search

As part of the Archaeological Technical Report (ATR), the Aboriginal Heritage Information Management System (AHIMS) was searched on 26 July 2023 (Search ID 803914) to determine the location of Aboriginal sites surrounding the project.

A total of 81 Aboriginal sites were identified within the search area (Figure 8.2). Of those, four recorded Aboriginal sites are in proximity to the proposed North Bradfield Zone Substation: 45-5-2691, just outside the southern property border; 45-5-2674, just outside the northern project site's border; and 45-5-2662, just outside the project site's eastern border (Figure 8.3). 45-5-2691 was recorded in 1997 using the old AGD system and has the incorrect coordinates. The actual location is outside the study area, past the southern fence boundary. Eco Logical Australia and a previous site survey by GML in 2020 were both unable to identify this object. 45-5-2674 is a PAD identified in 1996 and 45-5-2662 is an isolated artefact located in an exposed section of turned earth on a valley floor, also identified in 1996. PAD 45-5-537 covers a large portion of the western end of the project site, along Badgerys Creek Road, however test excavations of the PAD by Eco Logical Australia (2022) did not find any objects, artefacts, or cultural values.

iv Site inspection

A site inspection of the study area was carried out on 18 November 2021 as part of the ATR by Eco Logical Australia and Cubbitch Barta Native Title Claimants Aboriginal Corporation representatives in addition to the test excavations. This included an inspection of areas previously identified Aboriginal sites registered on the AHIMS database in vicinity of those locations.

Eco Logical Australia found most of the study area cleared of native vegetation and covered in dense grasses, with a few copses of new growth native trees. Moderate disturbance from irrigation, pastoral activities and drainage mitigation was found. High disturbance was found along the northern border of Lot 99 due to the construction of access roads, property tracks, outbuildings, and a former residence. As noted above, excavations of PAD 45-5-537 did not find any objects, artefacts, or cultural values.

8.2.3 Management and mitigation measures

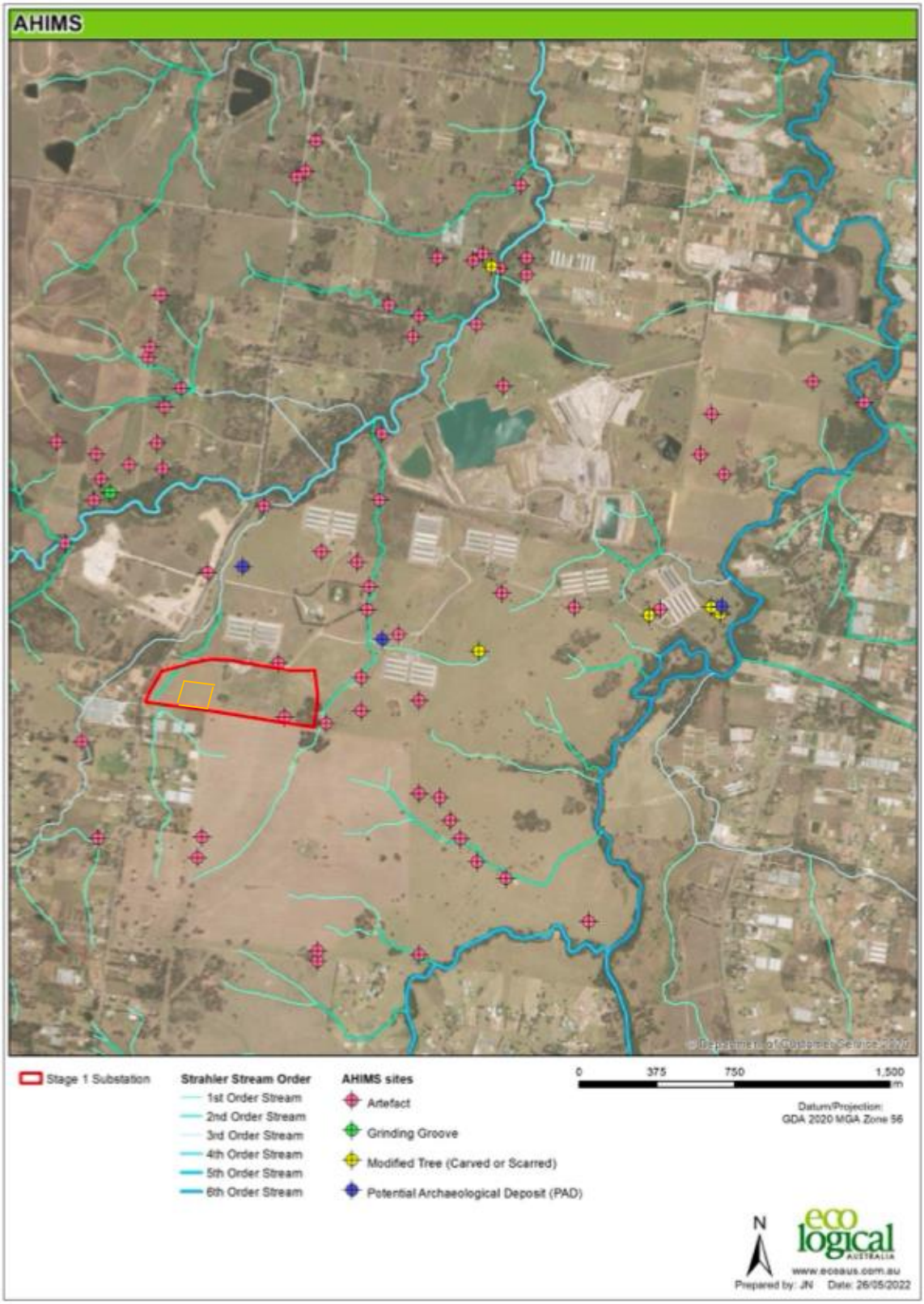
No AHIMS sites are present within the project site or designated construction access, ensuring that both areas avoid any impact to identified Aboriginal sites.

The following recommendations are made in the ATR (Eco Logical Australia 2022):

- Recommendation 1 – no further assessment required, works may proceed with caution.

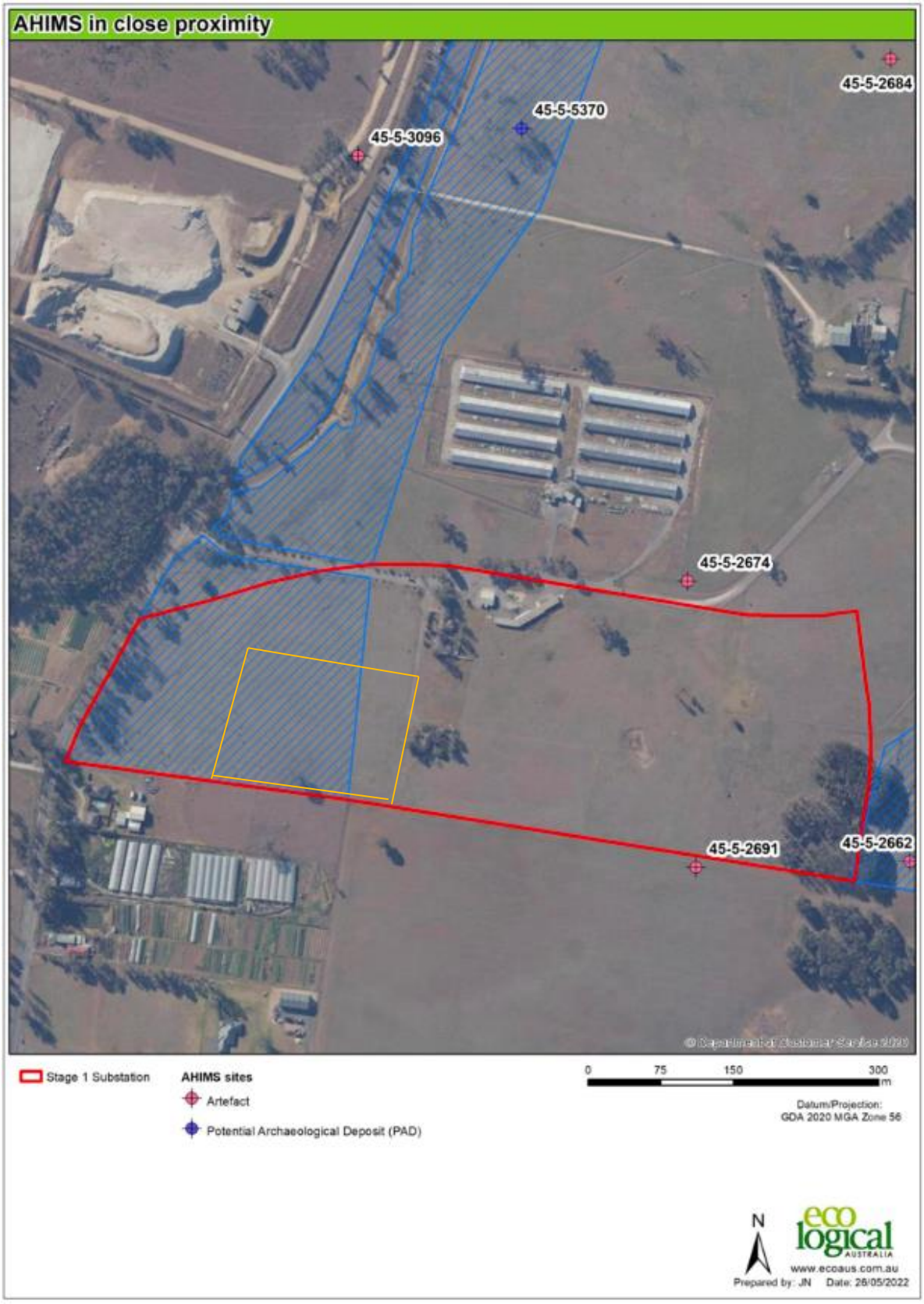
No further archaeological assessment is required for the study area. Although general measures will need to be undertaken. These general measures include:

- AHIMS ID 45-5-2691 – update the registered information to reflect the actual location of the Aboriginal site.
- AHIMS ID 45-5-5370 – submit an Aboriginal site impact form to AHIMS to update the Aboriginal site extent based on this assessment. The potential archaeological deposit site boundary will be updated to reflect the areas of moderate to high potential located along the boundary of Badgerys Creek in the north.



Source: Eco Logical Australia 2022

Figure 8.2 AHIMS site register search results (approximate ZS location outlined in yellow)



Source: Eco Logical Australia 2022

Figure 8.3 AHIMS sites near study area (approximate ZS location outlined in yellow)

8.3 Historic heritage

8.3.1 Overview

A historical Heritage Impact Assessment was commissioned by Extent Heritage Pty Ltd in 2020 by the Western Sydney Planning Partnership to prepare a non-aboriginal and Aboriginal Cultural Heritage Assessment for the Western Sydney Aerotropolis precincts, including 475 Badgerys Creek Road (Extent 2020).

The HIA was prepared in accordance with the guidelines outlined by the NSW Heritage Office (now Heritage NSW) including the NSW Heritage Manual: Assessing Heritage Significance, NSW Heritage Manual: Statement of Heritage Impact, Assessing Significance for Historical Archaeological Sites and 'Relics' and the Australian International Council on Monuments and Sites (ICOMOS)'s Charter for Places of Cultural Significance.

This section provides a summary of the HIA sections that are relevant to the project.

8.3.2 Existing environment

i Non-statutory heritage items

The Register of the National Estate (RNE) was searched for any non-statutory heritage items and identified that there are no non-statutory heritage items within the study area or within 200 m of the study area that are listed on the RNE. The closest non-statutory heritage item of local significance is the former Overseas Telecommunications Commission site group, including radio receiving station, item 5, asset number 403, which is approximately 500 m southeast of Lot 99.

ii Listed heritage items

A search of the State and local heritage registers identified no items within a 200 m buffer of the study area, as shown in Figure 8.8. The closest item, Kelvin, item 00046, asset number 401, is located approximately 1.3 km from the project site's boundary.

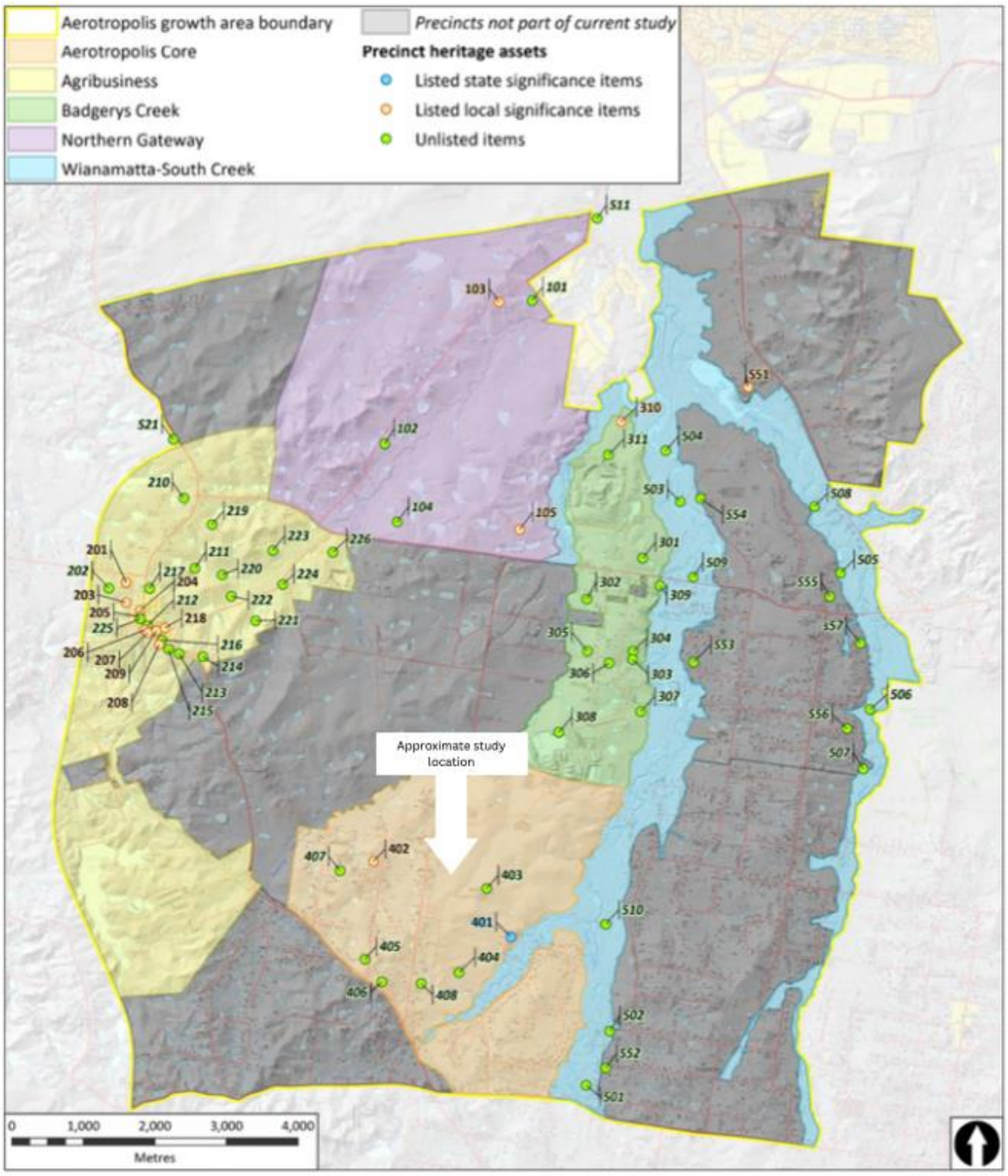


Figure 8.4 Location of historic heritage items near the study area

iii History of the locality

Prior to colonial settlement, it is thought the Darug speaking aboriginal clans inhabited the area. European colonists brought with them deadly smallpox which devastated local Aboriginals, with over half succumbing to the disease. Additionally, colonist livestock grazing encroached on Aboriginal land, disrupting and pushing out Aboriginals from their traditional lands.

iv European history of the locality

Land grants around the Badgerys Creek area began in 1809, bringing European settlement to the area for the purpose of cropping and raising livestock to help support the growing colony. The suburb's namesake, James Badgery, was given 804 acres at South Creek in 1809. The land grants were extremely successful, producing horses, sheep, wheat, and cattle, until a severe drought from 1838-1840 caused crop failure.

After a rust outbreak in wheat crops shortly after the drought, the area wheat industry collapsed and farmers left to find better land, resulting in subdivision of the initial large land grants into smaller allotments. The 1859–1864 subdivision on one such land grant, the 6,710 acre Luddenham Estate has been identified as "the beginning of the next phase of the area" (Department of Infrastructure, Transport, Regional Development, Communications and the Arts 2016).

In the 1960s, poultry farming, dairy, market gardens, beekeeping and timber operations were established in and around Badgerys Creek. In 1963, John Horace Ingham and Robert Walter Ingham, both poultry farmers, purchased land including the study area and wider 475 Badgerys Creek Road property for the purpose of poultry farming. They constructed chicken sheds and an administration building. In 1966, the property was purchased by Inghams Enterprises Pty Limited, who cleared some trees and constructed chicken sheds in the western portion of the site. In 2012, the property was purchased by Ingham Property Development Pty Limited, and finally in 2013, by Ingham Rural Property Group Pty Limited, who still owns the land today (Senversa 2022).

8.3.3 Impact assessment

i Archaeological assessment

Eco Logical Australia (2022) assessed archaeological potential and significance, based on analysis of available historical plans, secondary sources, an understanding of previous impacts within the study area, and test excavations.

Prior to 1955, the site was sparsely wooded, vacant pastureland. The earliest land title, which includes more land than the current title, is from 1891–1911, owned by The Honourable Philip Gidley King, a member of the legislative council. William Henry Wheatley, a stock and station agent purchased the land in 1912, likely using it for cattle grazing. The land changed hands many times, mostly between graziers until 1963, when John Horace and Robert Walter Ingham purchased the property for poultry farming.

Overall, the study area is unlikely to contain a significant archaeological resource associated with this historical phase. The archaeological potential of the study are is nil-low.

ii Impacts to archaeological items

The study area has been surveyed on 18 November 2021 and was assessed as having generally nil to low potential to contain archaeological 'relics' as defined in the 2009 Relics Provisions of the *NSW Heritage Act* 1977. The proposed works are unlikely to result in impact to significant archaeological resources and/or significant archaeological 'relics'.

iii Impacts to heritage items

As there are no known heritage items in the project area, works are unlikely to impact heritage items.

8.3.4 Management and mitigation measures

The following management and mitigation measures are recommended:

- Unexpected finds procedure: An unexpected finds procedure should be implemented for all excavation works not subject to archaeological monitoring. All relevant construction staff, contractors and subcontractors must be made aware of their statutory obligations for heritage to ensure no archaeological remains or heritage fabric are impacted during the proposed works without appropriate mitigation measures in place.

8.4 Biodiversity

8.4.1 Overview

A desktop search using the Protected Matters Search Tool (PMST) was completed for the project area on 19 October 2022, to assess whether the project area may support any flora and fauna species listed under the EPBC Act. Potential threatened species that may or are known to occur in the project area were identified. Threatened Ecological Communities were also identified.

An ecological assessment of the area was prepared by Senversa (2022) for Ingham Rural Property Group Pty Limited as part of a preliminary site investigation. The report is provided in appendix D.

8.4.2 Existing environment

The study area is within the Hawkesbury Nepean catchment and is within the Cumberland Plain landscape unit of the Sydney Basin bioregion of NSW. The Cumberland Plain Landscape Unit is characterised by the Wianamatta Group, Ashfield Shale, Bringelly Shale, Hawkesbury sandstone and Tertiary alluvial/colluvial formations. Intrusive site works between 8 July and 21 July 2020 confirmed that the Bringelly Shale is present to depths in excess of 15 m bl (metres below ground level). Furthermore, concentrations are considered indicative of naturally occurring background concentrations typical of connate waters found in the Wianamatta Shales. Across a majority of the study area, native vegetation has been cleared for agricultural land use with a few small stands of vegetation remaining. The landscape would have been open woodland with dry sclerophyll forest, the native vegetation would have been dominated by tree species including Grey box (E. moluccana) and Forest red gum (E. tereticornis) Broad-leaved ironbark, narrow-leaved ironbark, Woollybutt and forest oak would have been less common. Photographs of the site can be found in Appendix F.

i Desktop searches

A search of the PMST found potential listed threatened species in or near the project area. The results are presented in Table 8.1 and Table 8.2.

Table 8.1 Threatened flora desktop search results

Scientific name	Common name	Threatened category
Acacia bynoeana	Bynoe's Wattle	Vulnerable
Acacia pubescens	Downy Wattle	Vulnerable
Allocasuarina glaericola		Endangered
Cynanchum elegans	White-flowered Wax Plant	Endangered
Genoplesium baueri	Yellow Gnat-orchid	Endangered

Table 8.1 Threatened flora desktop search results

Scientific name	Common name	Threatened category
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	Vulnerable
Haloragis exalata subsp. exalata	Wingless Raspwort	Vulnerable
Melaleuca deanei	Deane's Melaleuca	Vulnerable
Persicaria elatior	Knotweed	Vulnerable
Persoonia hirsuta	Hairy Geebung	Endangered
Persoonia nutans	Nodding Geebung	Endangered
Pimelea spicata	Spiked Rice-flower	Endangered
Pomaderris brunnea	Rufous Pomaderris	Vulnerable
Pterostylis saxicola	Sydney Plains Greenhood	Endangered
Pultenaea parviflora		Vulnerable
Rhizanthella slateri	Eastern Underground Orchid	Endangered
Syzgium paniculatum	Magenta Lilly Pilly	Vulnerable
Thesium australe	Austral Toadflax	Vulnerable

Notes: sp. – species, subsp. – subspecies, var. - variety

Table 8.2 Threatened fauna desktop search results

Scientific name	Common Name	Threatened Category
Birds		
Anthochaera phrygia	Regent Honeyeater	Critically Endangered
Botaurus poiciloptilus	Australasian Bittern	Endangered
Calidris ferruginea	Curlew Sandpiper	Critically Endangered
Callocephalon fimbriatum	Gang-gang Cockatoo	Endangered
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	Vulnerable
Erythrotiorchis radiatus	Red Goshawk	Vulnerable
Falco hypoleucos	Grey Falcon	Vulnerable
Grantiella picta	Painted Honeyeater	Vulnerable
Hirundapus caudacutus	White-throated Needletail	Vulnerable
Lathamus discolor	Swift Parrot	Critically Endangered
Numenius madagascariensis	Eastern Curlew	Critically Endangered
Pycnoptilus floccosus	Pilotbird	Vulnerable

Table 8.2 Threatened fauna desktop search results

Scientific name	Common Name	Threatened Category
Rostratula australis	Australian Painted Snipe	Endangered
Mammals		
Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable
Dasyurus maculatus maculatus (SE mainland population)	Spotted-tailed Quoll	Endangered
Petauroides volans	Greater Glider	Endangered
Petaurus australis	Yellow-bellied Glider	Vulnerable
Phascolarctos cinereus	Koala	Endangered
Pseudomys novaehollandiae	New Holland Mouse	Vulnerable
Pteropus poliocephalus	Grey-headed Flying Fox	Vulnerable
Insect		
Austrocordulia leonardi	Sydney Hawk Dragonfly	Endangered
Fish		
Macquaria australasica	Macquarie Perch	Endangered
Prototroctes maraena	Australian Grayling	Vulnerable
Frogs		
Heleioporus australiacus	Giant Burrowing Frog	Vulnerable
Litoria aurea	Green and Golden Bell Frog	Vulnerable
Reptile		
Delma impar	Striped Legless Lizard	Vulnerable

8.4.3 Impact assessment

The areas of impact are open grassed areas and do not represent habitat for threatened species. Furthermore, there will not be any impacts to waterways, or restriction of movement between waterbodies which provide habitat for species such as the Green and Golden Bellfrog. The works will be undertaken on a previously cleared portion of land. However, a copse of endangered River-Flat Eucalypt Forest on coastal floodplains of the NSW North Coast, Sydney Basin and Southeast Corner bioregions sits within future Lot 99 (Figure 8.5) and should be avoided. It is thus concluded that none of the EPBC Act listed threatened flora are likely to be affected by the proposed activity.

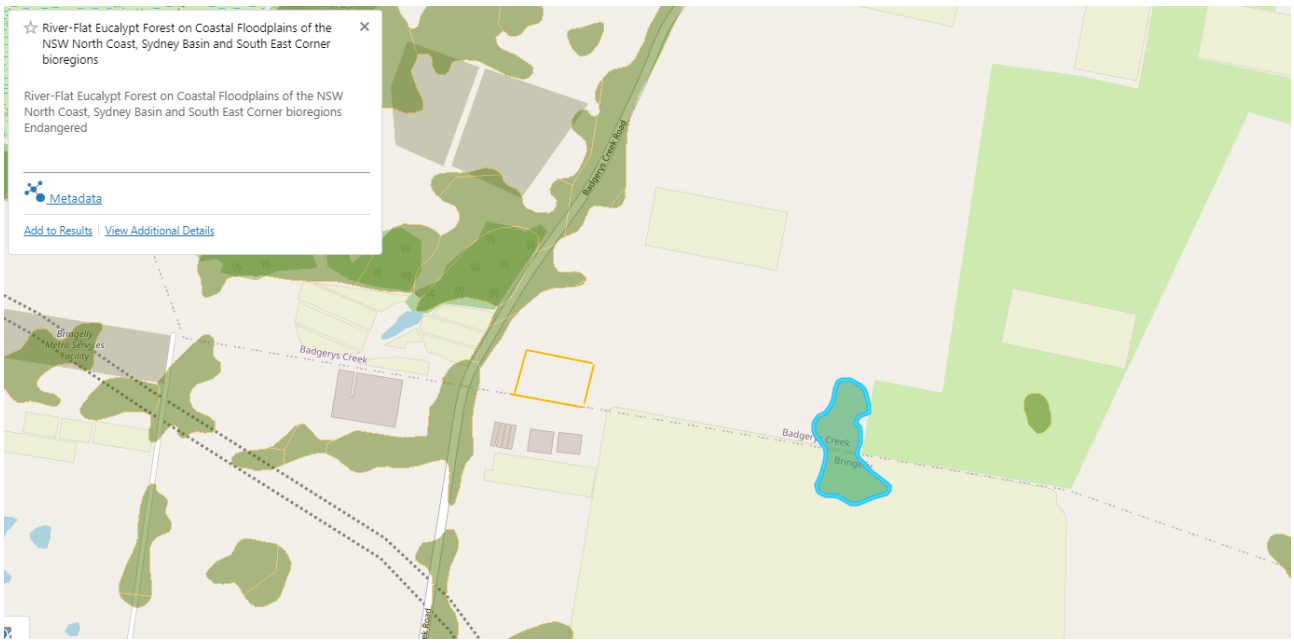


Figure 8.5 Threatened ecological community within Lot 99, showing approximate ZS location outlined in yellow

The nature of the proposed works is not of a scale or nature which would warrant EPBC Act referral.

Works will not impact on intact native vegetation as the area was historically cleared of native vegetation apart from scattered new growth trees.

8.4.4 Management and mitigation measures

The following general management and mitigation measures are recommended in relation to biodiversity:

- Consideration should be given to minimising the impact upon vegetation during construction wherever possible.
- The minimal feasible amount of vegetation clearing should be undertaken for construction purposes.
- Where feasible, dead wood, fallen branches and logs should be retained as habitat. Where removal of dead logs or wood is required, these should be relocated (not removed from the site) into adjacent areas that will not be disturbed by construction workers.
- Weed control measures (e.g. herbicide spraying) should be undertaken prior to construction commencing in areas where high densities or infestations of weeds occur. This will help to reduce the risk of weeds being spread as a result of the proposed project.
- To reduce the likelihood of spreading weeds, tyres and undercarriages of vehicles are to be washed and cleaned out/ or sprayed after working with weed infested areas, and prior to entering.

8.5 Water

8.5.1 Overview

This section assesses the potential hydrology, flooding, water quality, soil erosion and sedimentation aspects and impacts of the project. An Environmental Report prepared by Senversa Pty Ltd (Senversa 2022) summarises the geological and soil features encountered at the site during geotechnical site investigation works and provides recommendations and management and mitigation measures that should be undertaken during the design and construction stages of the project. The full report is provided in Appendix D.

8.5.2 Existing environment

i Hydrology and water quality

The study area is within the Hawkesbury-Nepean catchment, 1.8 km west of South Creek and 800 m north of Badgerys Creek. South Creek starts in Narellan, has 17 tributaries including Badgerys Creek and joins the Hawkesbury-Nepean River system at Windsor. As previously mentioned, two unnamed ephemeral drainage lines pass through the study area, one near the western boundary, the other on the eastern boundary. Eco Logical Australia (2022) observed the drainage lines during their site visit, however, Senversa (2022) notes no dams, creeks or ephemeral creek lines were observed on Lot 99 during their site visit. It is worth noting, there had been heavy rain conditions prior to Eco Logical Australia's site visit. Eco Logical Australia (2022) highlighted a lack of drainage, combined with a slight slope created swamp like conditions.

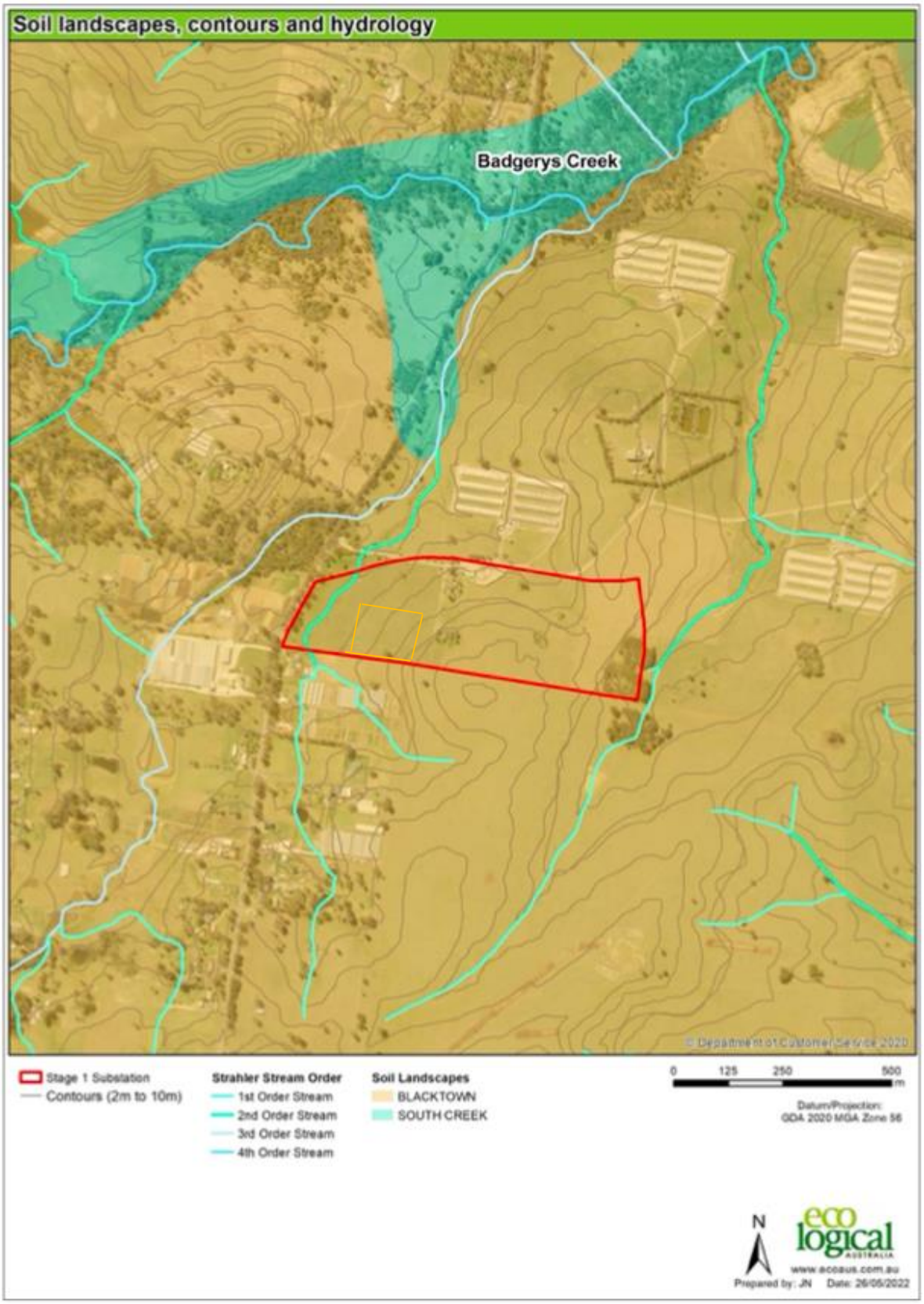
Senversa (2022a) tested groundwater of the wider 475 Badgerys Creek Road property, finding most groundwater wells exceeded ecological criteria for heavy metals (chromium, nickel, and zinc). However, the levels were considered indicative of naturally occurring background concentrations typical of connate waters found in the Wianamatta Shales. These concentrations are also unlikely to pose a risk to ecological receptors based on the attenuation and dilution factors which will take place between the property and Badgerys Creek.

It is important to note the existing flow paths and runoff of the surrounding waterways will likely be altered by the construction of the proposed surrounding development, including the Sydney Metro with works expected to commence in December 2022 and to be completed in late 2026, and the new precincts associated Aerotropolis. This alteration is due to the introduction of hard stand areas, levelling of existing topography and introduction of water management infrastructure such as detention basis or culverts (Sydney Metro 2020). The subject site is immediately adjacent to the Sydney Metro alignment, approximately 500 m north of the Aerotropolis precincts, and within the Greater Penrith to Eastern Creek Urban Investigation Area which is also likely to experience a significant transformation in the coming years.

Numerous surface water and groundwater studies have been undertaken for the infrastructure and development currently being built or planned in the Western Sydney Growth Area, thus the impacts of large-scale urban growth and cumulative development would have been considered in greater detail in the assessment documentation for the various projects. Studies undertaken over the last few years have shown the existing water quality of some of the local creeks, including the South Creek and Cosgrove Creek, is generally poor and does not meet the Australian Water Quality Guidelines for Fresh and Marine Waters (NSW Government 2020). Previous studies have identified that South Creek is one of the most degraded catchments in the wider Hawkesbury-Nepean catchment (Sydney Metro 2020). The high nutrient concentrations and subsequent algal and aquatic weed growth are a result of the following pollution sources (Sydney Metro 2020):

- Effluent released from five sewage treatment plants in the lower parts of the catchment.
- Urban and agricultural runoff from market gardens, cattle and sheep grazing and intensive agriculture such as poultry farming.

Further potential impacts to water quality within the catchment can be managed through adequate management and mitigation measures and erosion and sediment controls.



Source: Eco Logical 2022

Figure 8.6 Watercourses in the vicinity of the project (approximate ZS location outlined in yellow)

ii Flooding

The study area is not within a flood planning area, nor is it mapped as flood prone land (ePlanning Spatial Viewer 2023), however, Eco Logical (2022) noted the site suffered from a lack of drainage which created swamp like conditions in some areas after significant rainfall events.

iii Geology and soils

The project is located within the Sydney Basin which traverses several geographic formations. The Sydney Basin is a major sedimentary basin, some 60,000 km² in size. Initially formed on Palaeozoic (541–250 ma) metamorphosed rocks, the basin is primarily a series of Permian (300–250 ma) and Triassic (250–200 ma) sandstones and siltstones that were formed by a massive delta, then subject to a range of uplift and subsidence (see Gale 2020 for a comprehensive overview). This resulted in a series of smaller plateaus and basins surrounded by elevated dissected sandstone uplands on its periphery (e.g. the Great Dividing Range to the west). Over-laying these basal sandstone and siltstones are Wianamatta shales (also of Triassic age), and then more recent Quaternary alluvium and other pedogenetic units.

The study area contains Blacktown Residual soil landscape (Bt). Bt is characterised by Wianamatta Group Shales (Ashfield Shale, consisting of laminite and dark grey siltstone; Bringelly Shale consisting of shale with occasional calcareous claystone, laminite and infrequent coal; and Minchinbury Sandstone consisting of fine to medium-grained quartz lithic sandstone) with local relief of 10–30 m and slopes generally no more than 5% gradient, occasionally reaching 10%.

The Atlas of Australian Acid Sulfate Soils and Salinity shows an extremely low, 1–5% probability of acid sulphate soils present on site, though there is a moderate to high salinity potential.

Senversa (2022a) found previous asbestos contamination on chicken shed areas of 475 Badgerys Creek Road had been removed and disposed of appropriately. However, the Lot 99 portion of 475 Badgerys Creek Road did not contain chicken sheds or asbestos. A detailed report can be found in Appendix D, and the EPA search can be found in Appendix F.

The Waste Classification Report (GeoEnviro 2022b) (soils at the subject site were tested for several contaminants of concern including a range of heavy metals, organochlorine pesticides (OCP), polychlorinated biphenyls (PCB), total recoverable hydrocarbons (TRH), benzene, toluene, ethyl benzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAH) and asbestos (GeoEnviro 2022b). Heavy metals analysed in the soil samples include Copper (Cu), Lead (Pb), Zinc (Zn), Cadmium (Cd), Chromium (Cr), Nickel (Ni), Arsenic (As) and Mercury (Hg)) concluded the following:

- Laboratory test results indicated all concentrations of heavy metals analysed do not exceed the assessment criteria.
- Concentrations below laboratory detection limits of PCT, TRH, BEX and PAH were found in the collected samples, none of which exceeded the assessment criteria.
- Asbestos was not encountered in any of the samples.

The in-situ material was found to have concentrations of contaminants of concern within the site criteria for the most sensitive land use, that being residential. Based on these results the in-situ silty clay, sandy clay, and interbedded shale and clay and shaley/siltstone bedrock material is considered suitable for reuse on the subject site or other commercial/industrial developments. However, given the sites long agricultural history, unidentified sources of contamination could be present, and it is recommended that an unexpected finds protocol be adopted during construction works.

iv Future land use vision

NSW Government's Western Sydney Aerotropolis Precinct Plan (2022) aims to develop the Aerotropolis Core into a dense urban employment and economic precinct with the Aerotropolis Metro station at its core. Additionally, Green areas around the Wianamatta-South Creek corridor will be preserved and given added amenity with a new regional park system. The plan estimates the precinct could be home to 50,000–60,000 jobs mostly in STEM educational facilities, creative industries, aerospace, and defence, but will also include other businesses and office spaces.

EE will undertake its work in line with Government objectives and will ensure that any works undertaken consider the natural landscape and waterway features into its project design, as well as the assessments undertaken for the project and outlined in this REF.

8.5.3 Impact assessment

The design of the proposed North Bradfield ZS has taken into account the existing topography, geology, soil and groundwater features.

Given the groundwater conditions encountered in the sampling boreholes, EE will undertake drainage improvements prior to any project construction works including:

- Diversion of surface runoff to prevent water from flowing into the subject site by construction of surface drainage and earth bunding.
- Moisture conditioning of the insitu silt and wet clays by spreading the wet fill over an area and tilling under good weather condition to dry the fill or mixing of the insitu fill with dryer fill, where required.
- Construction of subsurface drains and surface drains at appropriate if required.

No earthworks are included in the proposal. Disturbance to the soil and risk of erosion and sediment run-off will be greatest during the construction of the project, which can occur as a result of:

- Rain occurring whilst trenches are open.
- Groundwater entering the holes and trenches.
- Inadequate erosion and sediment control measures.

Clay and sandy soils, such as soils found closer to waterways, are generally less prone to erosion. However, given that they are mixed with silt, which can be prone to erosion, it can be assumed that the soils underlying the site have a moderate erosion hazard. The greatest erosion risks during construction works are expected when potentially dispersive soils are exposed during earthworks. Sediment control measures will be implemented as outlined in the following section.

Another risk is the storage and/or stockpiling of fill material or VENM that will need to be used at the subject site, or disposed of following construction works. Stockpile management will be a key element for inclusion in the CEMP, particularly in relation to location, drainage and appropriate handling and removal of any excess spoil from the subject site. The Waste Classification Report prepared by GeoEnviro (2023) outlines relevant management and mitigation measures which are summarised in Section 8.6.

As previously noted, construction works for the Sydney Metro are expected to commence in December 2022 and to be completed in late 2026. Given that the project will take place sometime between October 2023 through to December 2024, EE's Project Manager will communicate about the proposed works with the Sydney Metro project representatives, to ensure that any cumulative impacts such as flooding risks are mitigated during project

construction. It is important to note, however, that the surrounding landscape is currently undergoing a transformation that will mitigate any future risks associated with flooding events.

A combination of management and mitigation measures should be implemented to control offsite impacts of this risk, in particular when working close to any waterways.

i Operation

The construction of an appropriate on-site water and stormwater management system detailed in Chapter 7 is considered sufficient to manage and control water and soil-related impacts during the operation of the project.

8.5.4 Management and mitigation measures

The key objective of any water management and mitigation measures should be prevention of pollution, erosion prevention and sediment control. The practices that will be implemented during construction, and in particular any under boring activities, are described below.

i Pollution control measures, erosion and sediment control

The objective of erosion and sediment control practices will be to take all reasonable and practicable measures to minimise short- and long-term soil erosion, while minimising sediment transport. This will be achieved by applying the principles of erosion and sediment control detailed in Landcom *Soils and Construction Manual* (2004) to the identified site constraints and erosion hazards.

The following management and mitigation measures will be applied during construction:

- Spill kits will be available at the construction site, and all persons undertaking construction works will be made aware of EE's incident response procedures.
- Soil and water management will be conducted in accordance with EE's standards and Environmental Guidelines Handbook.
- The Project Manager/Supervisor responsible for construction works will be required to develop a site-specific Erosion and Sediment Control Plan as part of the CEMP.
- Disturbance will be restricted to those areas of the project required for the active stage of works.
- Detailed geotechnical investigations will be undertaken where necessary prior to any earthworks taking place.
- Any soil tracked on the roadways will be swept up on a regular basis.
- Any soil tracked on the roadways will be swept up on a regular basis.
- No fuels, oils or other chemicals are to be stored at worksites unless small amounts are required for that specific days' work.
- Refuelling and maintenance of vehicles, plant and equipment will not be carried out on the subject site. All vehicles, plant and equipment are to be refuelled prior to arriving on-site.
- The sequencing of construction and drainage, erosion and sediment control works will allow for the installation of the temporary drainage system, and preferably the permanent stormwater drainage system as soon as practicable.
- Where necessary, additional erosion and sediment controls will be installed during periods of highest rainfall risk (April to October).
- All drainage, erosion and sediment control measures will be maintained in proper working order until their function is no longer required.
- Flagging tape or bunting will be used during construction to minimise the potential or any disturbance outside of the designated work areas.
- Upon decommissioning any stage of works, erosion and sediment control measures, all materials used to form the control measures will be removed and/or disposed of appropriately.

ii Fill and excess material measures

- Where it is necessary to store spoil or other loose materials on site, sediment fences are to be constructed on the down slope side of the stockpile.
- Spoil and fill material management and dewatering of worksites will be managed in accordance with the following EE Standards and the Environmental Guidelines Handbook which are all violable on the EE standards and Accredited Service Provider (ASP) website:

  - EMS 0007 – Waste Management

- EMS 0008 – Environmental Incidence Response and Management
- EMS 0013 – Spoil management
- EMS 0014 – Dewatering worksites.

- Off-site disposal of surplus fill material or VENM should be undertaken in accordance with controls and measures summarised in this section.

iii Contamination of soil measures

- An unexpected finds protocol will be prepared and implemented to manage any contamination which may be encountered during construction works, and included in the CEMP.
- Should contamination be identified, an assessment of deeper soils, leachability and/or groundwater may be necessary to assess potential impacts to the unnamed tributary located within the north-west corner of the site.
- In the event that acid sulphate soils (ASS) are exposed during excavation works, these soils will be managed in accordance with EE's Generic Acid Sulphate Soil Management Plan – Annexure C of EMS0013 Spoil Management and the measures recommended by GeoEnviro below.

iv Acid sulfate soils

As part of their geotechnical investigations, GeoEnviro (2022a) concluded that the subject site is not significantly impacted by ASS and therefore an ASS management plan is not considered necessary. However, it is recommended that the presence of ASS is monitored during construction, and that appropriate remedial works should be carried out in the event where ASS is encountered during construction.

In the event that ASS are identified during construction, the soil should be properly managed as follows:

- The excavated stockpile material may either be treated on site or removed off-site to a landfill for treatment and disposal.
- The excavated ASS should be treated immediately otherwise the excavated soil should be captured in a manner specified in GeoEnviro's Geotechnical Report.
- All material to be removed from the site should be carried out by a licensed contractor. The material should be sealed and contained on the truck during haulage using appropriate lining and capping material.
- The disturbance of ASS should be avoided as much as possible by minimising excavation works.

v Inspection and maintenance

- The construction, inspection and maintenance requirements for all drainage, erosion and sediment control measures will be specified in the CEMP.
- Inspections will be undertaken 24 hours prior to predicted rainfall events and immediate clean-up of accidental chemical/fuel spills. Any contaminated spill rags are to be disposed of at an approved waste facility, and the incidents should be reported.
- All clean and dirty water, debris and sediment removal from drainage, erosion and sediment control measures will be disposed of in a manner that will not create erosion, sedimentation or a pollution hazard.

8.6 Waste

8.6.1 Construction

i General Construction Waste

Activities associated with the construction of the project have the potential to generate waste, including surplus construction materials, old conductors and cables, general waste, excess fill material and VENM, as well as green waste due to the removal of vegetation including trees.

Other wastes might include:

- drilling fluids
- construction worker generated general waste
- unused raw materials
- wastewater
- vegetation, including trees.

All waste generated during construction will be reused if appropriate, or removed, transported, and disposed from site in accordance with the NSW Environment Protection Authority's *Waste Classification Guidelines* (EPA 2014) and the POEO Act.

Based on the findings of the Waste Classification Report, the in-situ material can be classified in accordance with the EPA's Waste Classification Guidelines, pursuant to Part 1 – Classifying Waste, as follows:

- Clayey Silt topsoil – General Solid Waste (Non-Putrescible).
- Silty Clay, Sandy Clay, Interbedded Shale and Clay – VENM.
- Shale/ siltstone bedrock – VENM.

ii Fill material

If fill material is brought to site, fill material will be stockpiled in dedicated areas and managed in accordance with the EE Standards and the Environmental Guidelines Handbook and EMS 0013 – Spoil management.

iii Vegetation

Vegetation such as garden and wood waste are classified as general solid waste (non-putrescible) as per the Waste Classification Guidelines. Should trees need to be removed, they will be removed by licensed arborists in accordance with the management and mitigation measures specified by the arborist, or by a suitably qualified professional as part of a 5-part test. However, vegetation removal will only be undertaken where absolutely required.

8.6.2 Operation

Once constructed, the project will generate minimal waste, with the exception of any maintenance works that may be required throughout the ZS's operations life.

8.6.3 Waste management and mitigation measures

Measures to prevent adverse impacts in relation to generated waste will include:

- Waste mitigation and management strategies will be documented in the CEMP and in accordance with EE's Environmental Management Standard EMS 0007 Waste Management.
- Stockpiles and excess fill material will be managed in accordance with managed in accordance with the EE Standards and the Environmental Guidelines Handbook and EMS 0013 – Spoil management.
- Waste material generated on site will not be left on site once the works have been completed.
- Every effort will be made to minimise tree trimming and removal, where possible.
- Trees will be removed by a licensed arborist.
- Earthworks should be closely monitored by a geotechnical consultant and must include field density testing at an appropriate frequency and level of supervision as detailed in AS 3798-2007.
- Any excess waste or spoil including, fill material and VENIM, will be disposed of at a licensed waste or recycling facility as appropriate.
- All excavated spoil will be classified prior to disposal and/or re-use. Waste disposal dockets will be obtained from the licensed waste disposal facility and copies retained for audit purposes.
- Where excavated spoil is suspected to be contaminated, works will immediately cease, and the Project Manager and the relevant Environmental Specialist notified. Spoil suspected of being contaminated will be tested to provide a waste classification for disposal.
- All other waste materials will be removed from the work site at the end of each working day. Where items are able to be recycled, the materials will be sorted and stored at an appropriate site (e.g. the nearest Field Service Centre) for collection and recycling.
- Once works are completed in any given location, all disturbed ground surfaces will be reinstated as soon as possible.

8.7 Utilities and services

A detailed Before You Dig Australia (BYDA) search will be conducted for all services in the vicinity of the project route as part of the final project design and prior to construction commencing. Where necessary, relevant authorities and customers will be contacted regarding potential impacts on their services.

8.7.1 Management and mitigation measures

- The Project Manager will conduct BYDA searches prior to works commencing on site.
- The Project Manager will notify impacted residents and businesses regarding any potential interruptions to electricity supply prior to these outages occurring in accordance with National Energy Customer Framework (NECF) requirements.

8.8 Roads, traffic and access

8.8.1 Overview

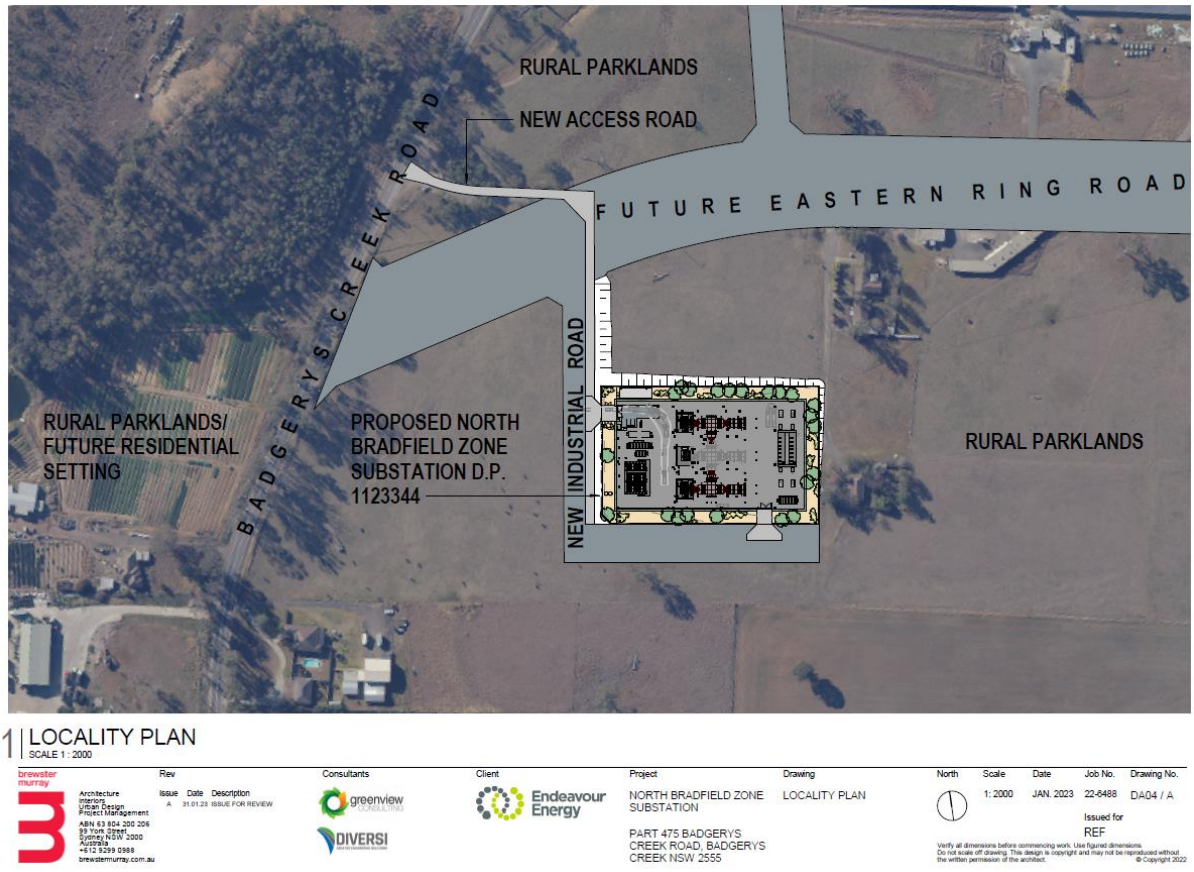
This project is confined within Lot 99 and will not cross any roads or impede traffic.

The following section describes the road, traffic and access impacts resulting from the construction and operation of the project.

8.8.2 Existing environment

i Local road network

While this project will have almost no interaction with the local road network, an access road will be constructed off Badgerys Creek Road (regional road) (Figure 8.7) to access the ZS prior to development of Eastern Ring Road and the new industrial road. IPG will be responsible for constructing a temporary all-weather access road which will remain in place until the permanent public road is developed. The project is not expected to impact the local road network as works vehicles are low in number and construction of the access track is within property boundaries.



Source: Endeavour Energy

Figure 8.7 Proposed access track in relation to Badgerys Creek Road

ii Traffic movements

The local road network carries high volumes of passenger vehicle and truck movements, especially with the redevelopment of the aerotropolis area. Some parts of the network may even carry plant and machinery for farming given the proximity to agricultural premises.

The project fronts Badgerys Creek Road, which serves as a connection between the Northern Road and Elizabeth Drive. Additionally, Badgerys Creek Road connects to the Western Sydney Airport. While there will be additional traffic due to construction vehicles coming and going from the subject site, movements will be insignificant compared to increases in the use of Badgerys Creek Road and the local road network due to development of the surrounding area.

No local intersections will be impacted by the construction works and operation of the ZS.

8.8.3 Impact assessment

i Construction

Traffic accessing adjoining residential, commercial, and industrial premises will be impacted minimally by the project, due to the project location within the project site, mostly away from Badgerys Creek Road. However, there may be minimal short-term impact to users of the Badgerys Creek Road due to trucks going in and out of the project site.

Delivery, construction, and workers' vehicles will be parked safely inside the project site, in a safe and appropriate manner at all times.

ii Operation

Following completion of construction works, the subject site will only be accessed periodically for inspection and maintenance purposes. This will also involve the intermittent access by EE and its contractors to the North Bradfield ZS for maintenance and operations purposes.

8.8.4 Management and mitigation measures

The following management and mitigation measures will be implemented to minimise traffic and access impacts:

- Transportation and equipment deliveries will be in accordance with TfNSW and LCC requirements.
- All other appropriate permits will be obtained from the relevant road authorities prior to construction commencing, and works will be conducted with these permits.
- A Traffic Management Plan (TMP) will be prepared as required and included as part of the overarching CEMP. The TMP will clearly show the following site features: pedestrian paths, site sheds, material storage, waste material storage, vehicle parking, the location of short stay vehicle parking, and drop off area for delivery of materials.
- Vehicles will not carry mud onto adjacent paved streets or other areas.
- Designated worksite areas along the road are to be of sufficient size to accommodate skip bins if required and include room for the loading, unloading and manoeuvring of trucks.
- Electronic signage may be used if considered appropriate in advance of construction commencing to advise residents and road users of the upcoming works.

- Traffic control and safe pedestrian pathways will be established and maintained around worksites, as required for the duration of the construction works.
- Sufficient notice will be given to residents that may be impacted by the project before construction commences.
- Should there be any open points and trenches, they will be covered and/or fenced when workers are not in attendance at these sites.
- Vehicles will not block access to residential or commercial properties at any time.
- Worksites and any other assets, including lawns and grass verges along the project route will be restored to the condition that they were in prior to construction commencing.
- Works including vehicular movements will not be permitted during or immediately following heavy rain or inclement weather where disturbance of the subsoil is likely to occur within impervious or unsealed surface areas. However, construction works may be able to continue during or following inclement weather where those works are restricted to only along the road reserve section of the route or other impervious surfaces.

8.9 Visual assessment

The project will result in temporary changes to the appearance of the project route along Badgerys Creek Road. Nearby residences and those traveling on Badgerys Creek Road have the potential to be to be impacted during construction due to vehicle and staff movements. However, all construction works will be temporary in nature and works will be rehabilitated as soon as they are completed. The feeders will all be underground with none of the alignment utilising overhead poles. Thus, in the long-term the project is not expected to have any impacts to the visual nature of the area.

The subject site will experience permanent changes however the changes will be in line with the surrounding transformation and development, which will most likely be industrial and commercial and also includes new road infrastructure. The outside of the subject site will be landscaped with vegetation planted between the two outside fences.

8.10 Socio-economic impacts

The project may temporarily affect the local community due to minor increases in dust and air quality emissions, noise, traffic and access and visual amenity. These impacts have been considered in the REF and mitigation measures proposed to manage and/or mitigate these impacts, which will be temporary in nature.

The project will, however, result in long-term social benefits for the Aerotropolis Core Precinct, the Western Sydney Aerotropolis Area, and the many new precincts and infrastructure projects in the area. The project will provide safe, reliable, and cost-effective electricity supply for residents, commercial and industrial users/operators.

Furthermore, economic benefits associated with the project include an increase in employment during the construction phase of the project, plus the many employment opportunities that come from new businesses in the area that will have the electricity they need to operate as a result of this project.

Project needs and benefits are addressed in Section 2.3.

8.11 Noise

8.11.1 Overview

A noise impact assessment (NIA) was prepared by Day Design Pty Ltd (Day Design) (2022) in order to assess any noise impact of the project on the surrounding area. It has been provided in Appendix E.

The NIA involved a desktop assessment and a site inspection, which are summarised further below.

8.11.2 Existing environment

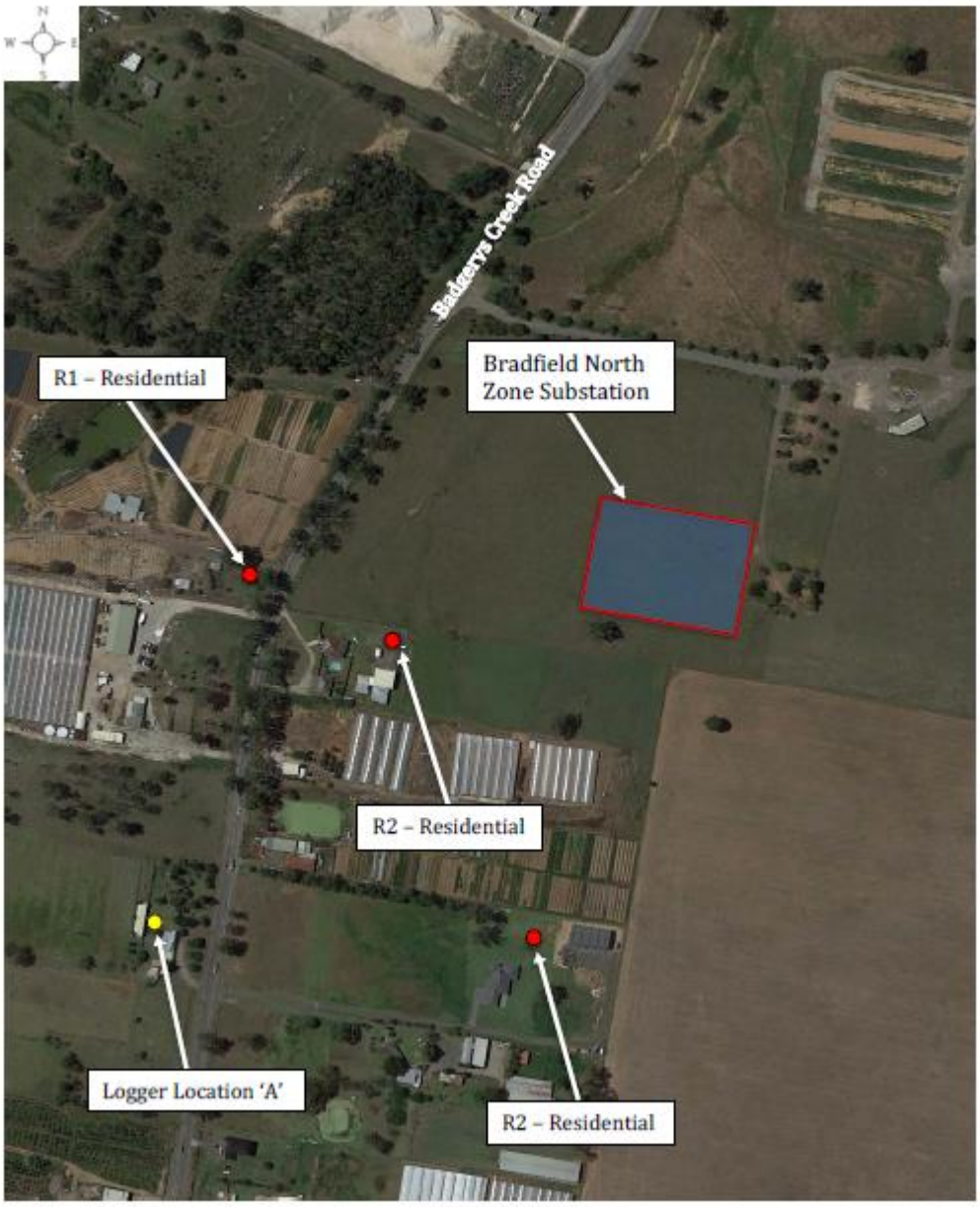
i Sensitive receivers

Currently, the nearest potentially affected residential premises are located west of the proposed substation at 270 Badgerys Creek Road, to the southwest at 355 Badgerys Creek Road and to the south at 325 Badgerys Creek Road.

The nearest noise sensitive receivers to the property, in various directions, are provided in Table 8.3 and shown in Figure 8.8.

Table 8.3 Noise Sensitive Receivers

Receptor and type	Address	Direction from site	Distance (m)
R1 – Residential (Existing)	270 Badgerys Creek Road, Badgerys Creek	West	500 m
R2 – Residential (Existing)	355 Badgerys Creek Road, Badgerys Creek	South-west	410 m
R3 – Residential (Existing)	325 Badgerys Creek Road, Badgerys Creek	South	Adjacent



Source: NIA

Figure 8.8 Nearest sensitive receivers

8.11.3 Background noise level

Ambient noise level can be defined as the background sound pressure level at any given location, normally used as a reference level to study a new intrusive sound source. The ambient L_{90} background noise level is a statistical measure of the sound pressure level that is exceeded for 90% of the measuring period, normally for a duration of 15 minutes. The Rating Background Level (RBL) is defined by the NSW Environment Protection Authority (EPA) as the median value of the (lower) tenth percentile of L_{90} ambient background noise levels for the day, evening or nighttime periods, measured over a number of days during the proposed days and times of operation.

The NIA notes that the sensitive receivers that may be most impacted by the project would be the residences located to the north of the project. They may experience the most impact during the night-time hours when the zone substation is operating. A noise logger was placed at 230 Badgerys Creek Road, Bringelly. Noise levels were measured from 12 September 2022 – 20 September 2022 during a period with clear skies and temperatures of 5°C to 24, with the results presented in Table 8.4.

Table 8.4 Ambient Noise Levels, 230 Badgerys Creek Road

Location	Time period	L_{90} rating background level	Proposed L_{eq} noise level
Location 'A'	Day (7:00 am to 6:00 pm)	40 dBA	54 dBA
	Evening (6:00 pm to 10:00 pm)	36 dBA	50 dBA
	Night (10:00 pm to 7:00 am)	32 dBA	50 dBA

8.11.4 Assessment criteria

The NIA assessed the project for background noise levels outlined above, as well as against NSW Noise Policy for Industry (NPfI) standards and modifying factors, in order to derive at Project Specific Noise criteria. The most stringent Project Specific Noise criterion identified included the following:

Residential receptors in Rural zone:

- 50 dBA during the day
- 45 dBA in the evening
- 40 dBA at night.

8.11.5 Impact assessment

i Construction

Construction works associated with the project will result in some noise generation. Typical noise generation for the construction of the project will include excavation machinery, large backhoe and trench digging equipment, and directional digging. It will also include other small items of plant, and light and heavy vehicles used by the construction contractors and traffic controllers.

Construction will generally be restricted to standard construction hours:

- Mondays to Fridays: 7:00 am to 6:00pm
- Saturdays: 8:00 am to 1:00 pm
- Sundays and public holidays: no work.

Should construction works need to be conducted outside the times specified above, notification of the nearby residents and other receivers of the works to be undertaken. Approval is required from the Environmental Team for more than 2 consecutive nights of out of hours works.

Given that the area is sparsely populated, it is anticipated that construction noise should not greatly disturb many residential, commercial, and industrial premises. However, as noted, there are some receivers that are located approximately 200 m from the subject site. These receivers may be affected by the noise from construction works. However, it is important to note that construction works will only be for a duration of 18 months and will thus be short-lived. Nevertheless, the entire area is in the process of being transformed and cumulative noise impacts may occur during the construction of the SSP and the surrounding Aerotropolis.

Feasible and reasonable noise mitigation and management measures will be implemented for the duration of construction works.

ii Operation

Once commissioned, the project (i.e. the zone substation) will operate continuously, 24 hours a day, 7 days a week. The main source of noise from the project will the transformers that operate continually throughout the day and night. The noise level will not change appreciably from the day to the night and therefore the predicted noise level at night will be the worst-case scenario.

EE has provided three potential transformer options to be assessed for the project. Their specifications including sound power levels are provided in Table 8.5. The project will initially include two transformers with another transformer added at a later date, and one auxiliary transformer. The NIA assumed three transformers will be in operation at 105% no-load with cooling and 2/3 rated load, and that fire walls will be installed on the north, east and western side of the transformers.

Table 8.5 Transformer type options

Transformer options	Transformer	dBA
Option 1	At 105% Regulated Voltage (Ur) No-Load with cooling for maximum rating	71 dBA
Option 2	At 105% Ur No-Load with cooling for maximum rating	63 dBA
Option 3	At 105% Ur No-Load and 2/3 rated load with cooling configuration for 2/3 rated load	63 dBA

The results of the assessment using the three optional transformers are presented in Table 8.6.

Table 8.6 Predicted L_{eq} noise levels for each transformer option

Transformer options	R1	R2	R3
Acceptable Noise Limit	**37 L_{eq}**	**37 L_{eq}**	**37 L_{eq}**
Premises	Rural Residential	Rural Residential	Rural Residential
Option 1	27	30	18
Complies	Yes	Yes	Yes
Option 2	20	23	12
Complies	Yes	Yes	Yes
Option 3	14	17	<10
Complies	Yes	Yes	Yes

As can be seen from the tabled results, Option 1 which has the worst-case scenario, meets the most stringent noise criteria by a margin of 10 dB. Provided the sound power level of the new transformers are limited to a maximum level of 91 dBA at 66% load (approximately 84 dBA at no load), the noise emission at all nearby sensitive receivers will meet the acceptable noise limits.

Thus, measurements and calculations show that the level of noise emitted by all three transformer options proposed for the project, will meet the acceptable noise level requirements of the EPA's Noise Policy for Industry and will therefore be acceptable.

8.11.6 Management and mitigation measures

The following management and mitigation measures are recommended for the duration of construction works:

- Appropriate approvals are to be obtained from the LCC as required prior to commencing construction.
- All potentially affected residents should be notified prior to the commencement of construction works. Details are to include the likely duration of the works and 24-hour contract details for the Project Manager and Construction Contractor.
- Construction works must be carried out within normal working hours unless otherwise approved. Any out-of-hours-works will be carried out in accordance with the requirements of EE's Environmental Guidelines Handbook.
- Should power generators be required to supply private properties during any stage of the construction works, the Project Manager must liaise with the Environmental Services Team. If generators are required to operate at night, acoustic consultants may be required to undertake noise assessment prior to their use.

8.12 Air quality and dust suppression

8.12.1 Construction

The project has the potential to generate dust and other air emissions as a result of the construction works including excavation for land levelling, vehicle emissions and vehicles driving over any loose construction material or unsealed surfaces.

Dust and exhaust emissions, such as exhaust emissions generated from construction plant and vehicles, would be temporary. Thus, the impact of the project on the air quality in the surrounding environment will be temporary and minor.

8.12.2 Operation

During operation, the project is expected not to have any impact on air quality of the surrounding environment. Minor emissions are expected to be generated by maintenance vehicles, which will be comparable to that of other vehicles on the roads of the local road network.

8.12.3 Management and mitigation measures

The management and mitigation measures listed below will be implemented to ensure the amount of dust and emissions generated by the construction works are minimal.

- Visually monitor dust levels during construction works. If excessive dust generation is occurring on site, causing a safety issue or complaints are received, immediately follow appropriate mitigation options.
- Traffic movement and speed will be restricted over disturbed areas of ground and unsealed access tracks.
- Ensure any soil/spoil tracked onto roadways is swept up on a regular basis.
- Excavated materials are to be either spread out on site or removed off site immediately; no loose or stockpiled materials are to be stored without appropriate sediment controls or left uncovered for a long time.
- Vehicles and machinery are not to be left idling when not in use to reduce exhaust emissions.

- Dust suppression techniques, including wetting down surfaces will be used as necessary.
- Reference is made to EE's Environmental Guideline Handbook for dust mitigation and management techniques.

8.13 Safety and hazards

8.13.1 Construction

All components of the project will be designed and constructed to meet all statutory safety requirements in accordance with the EE's design and construction standards, and the relevant Australian Standards.

Safety precautions will be implemented throughout the construction works for the protection of the surrounding community, the workforce, road users, pedestrians, and residents. Hazards which may arise during the construction works, such as machinery and vehicle movements will be managed appropriately.

8.13.2 Operation

Once in operation, project components will be inspected and maintained in accordance with EE's maintenance standards and electricity industry requirements.

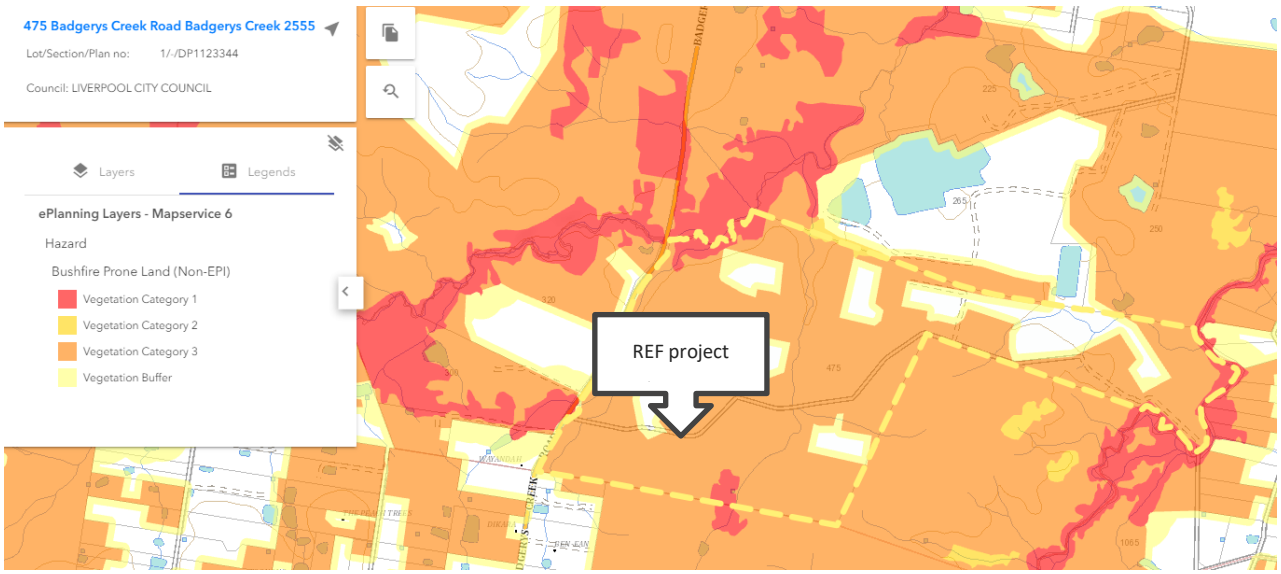
8.13.3 Management and mitigation measures

The following mitigation measures will be implemented to ensure management of safety and hazards:

- Safety signage, barriers, fencing, etc will be placed around construction areas, as required. These will be checked on a regular basis to ensure they are in adequate working condition.
- The works will not occur on days that have extreme or catastrophic fire rating.
- Any recommendations in the TMP will be implemented during the construction works.
- Any open holes that are left unattended at any time will be covered and fenced as necessary to prevent access.
- All works will be undertaken in accordance with SafeWork NSW requirements, EE standards and procedures and any other applicable requirements.

8.14 Bushfire.

Bushfire prone land is mapped within local Government areas, which becomes the trigger for planning for bushfire protection. The results from the NSW ePlanning Spatial Viewer for 'Bushfire Prone Land' shows that most of Lot 99 falls within category 3, while a small portion that is not proposed as part of the ZS is category 1.



Source: ePlanning Spatial Viewer

Figure 8.9 Bushfire prone land layer for project area (475 Bringelly Road shown in dashed yellow line)

8.14.1 Management and mitigation measures

A minimum asset protection zone (APZ) of 10 m is advised for all project related infrastructure. Vulnerable infrastructure should be provided with a APZ of 20-23 m from the surrounding grassland (equivalent to BAL 12.5). The APZ should be managed as an Inner Protection Area (IPA) for the life of the development with the following measures:

- ensuring no trees or shrubs are present within the APZ
- maintaining the grass within the APZ at a maximum height of 100 mm.

The CEMP prepared for the project will make provision for the following bushfire protection measures:

- Site induction for contractors working on the project will include general bushfire protection measures and requirements.
- Electrical equipment, plant, and equipment to be used for construction works will be maintained in operational order to prevent any potential sparks.
- All legislative requirements regarding safe work procedures will be adhered to, including chemical handling and storage.
- An emergency management plan will be developed as part of the CEMP, which is to include protocols in how to respond to bushfire incidents, including evacuation during construction.
- Any works that have the potential to generate heat and sparks will be restricted on days of declared catastrophic fire danger.
- Construction waste will be removed from the site in a timely manner so as not to cause a fire risk or obstruct emergency vehicle access.
- The project will be constructed and maintained in accordance with EE Company Procedure GAM 0011.

8.15 Contamination

8.15.1 Overview

A Due Diligence (JBS&G Australia Pty Ltd in 2022), Preliminary Site Investigation (Senversa) and Detailed Site Investigation (JBS&G Australia Pty Ltd in 2022) of potential contamination at Lot 1 of Deposited Plan (DP) 1123344 was undertaken. Information from the report has been used to determine the likely levels of contamination present at the site. The full reports are attached in Appendix F.

8.15.2 Existing environment

Potentially contaminating activities have been undertaken on the subject site, including grazing and the introduction of fill to create site levels. Despite this, the topsoil is underlain by natural undisturbed clay soils and none of the following were found to be present during on-site investigations:

- odours
- staining material
- asbestos containing material
- stressed vegetation
- evidence of imported fill
- any other evidence of existing gross environmental contamination.

Desktop searches of the NSW EPA database identified the following:

- One license variation has been issued under the POEO Act for the adjacent property to the west for waste storage, recovery of general waste and extractive activities.
- The closest clean-up notice issued under the POEO Act is 2.7 km north east of the subject site for largely processed and unprocessed building and demolition waste with confirmed presence of asbestos (Chrysotile, Crocidolite and Amosite). The remediation plan, implemented no later than November 3 2022, for the safe and lawful management of all waste material at the premises, coupled with the distance from the subject site, indicates that any potential impacts are unlikely to pose a risk to the subject site
- No prevention or prohibitions notices have been issued under the POEO Act for the subject site or immediate surrounding land.
- No notices have been issued under the CLM Act for the subject site and immediate surrounding land.
- The subject site or immediate surrounding are not on the list of NSW contaminated sites notified to the EPA.
- The site is not listed by EPA on the NSW Government PFAS Investigation program. The closest PFAS investigation area identified by the EPA is the Richmond RAAF Base (Middleton Avenue, Richmond). Given the RAAF Base is 6 km south of the subject site, and the Hawkesbury River separates the subject site and the RAAF Base, it is unlikely any PFAS related impacts at the Base pose a risk to the subject site.

Furthermore, previous reports indicated that no chemical or fuel storage was known to be present on the subject site, consistent with site observations and review of historical aerials as reported above.

8.15.3 Impact assessment

Site investigation and desktop assessment findings are summarised below:

- No odours, staining or asbestos containing material (ACM) were observed across the site. No asbestos was detected within analysed soil samples.
- Concentrations of heavy metals were reported below the adopted commercial ecological and/or human health criteria in all soil samples selected for analysis.
- Total recovery hydrocarbons (TRH) and benzene, toluene, ethylbenzene and xylenes (BTEX) concentrations were reported below the limit of reporting (LOR) and/or the adopted commercial assessment criteria.
- Polycyclic aromatic hydrocarbons (PAH) concentrations were reported below the LOR and the adopted commercial assessment criteria.
- Polychlorinated biphenyls (PCB) concentrations were reported below the LOR and the adopted commercial assessment criteria.
- OCP concentrations were reported below the LOR and the adopted commercial assessment criteria.

Laboratory testing found no outstanding issues in relation to local area background soil conditions that necessitate further consideration. These results indicate that all NPEC (2013) human and ecological criteria are satisfied and that there is no evidence of any existing gross environmental contamination. As such, the land is found to be suitable for the proposed commercial/industrial land use.

8.15.4 Management and mitigation measures

8.15.5 Conclusions and recommendations

Based on the results of the PSI and DSI, the following key findings have been made:

- No significant filling was observed across the site.
- No ACM was observed in soils, on the ground surface or was detected within laboratory analysed soil samples.
- All individual chemical contaminants in soil were below the LOR and/or the adopted site criteria.
- The concentration of E. coli detected in the dam sediment exceeded the adopted screening criterion and will require management after dam is decommissioned. Concentrations of remaining biological contaminants in dam sediments were reported below the screening criteria.
- The area assessed for salinity was classified as non-saline.
- The concentration of copper in dam surface water exceeded the adopted freshwater criterion and as such, water cannot be released directly to nearby ecological receptors. The water is considered appropriate to be irrigated across the site or used in dust suppression during development.

Based on the information provided in the PSI, the history of the site and immediately surrounding land did not identify any obvious activities which are likely to have resulted in significant or widespread contamination of natural soil or water that would prevent development within the subject site. It is concluded that the site is suitable for the proposed commercial/ industrial land use scenario as a zone substation. Appropriate management of dam sediment and surface water via a dam dewatering plan is recommended.

8.16 Cumulative impacts

The NSW Government is working closely with Councils and industry stakeholders to coordinate and refine development associated with the Western Parkland City and its defined growth areas. Together, the different levels of government are coordinating the delivery of multiple projects that have been planned for the Western Sydney Growth Area. Some of these projects include:

- Outer Sydney Orbital Corridor.
- M12 Motorway linking the M7 Motorway to the Western Sydney Airport.
- Sydney Metro – Western Sydney Airport.
- Bradfield City.
- The development of multiple precincts within the growth region that will contribute to agriculture (food security), education and technology, health, services, jobs, and infrastructure.

The cumulative impacts of all these developments have been considered in each of their respective environmental assessment documents. This project is small in comparison to the development and infrastructure works currently transforming the Western Sydney Aerotropolis Area and will only be minor in terms of impacts that will arise from these larger projects. Nevertheless, any immediate cumulative impacts such as traffic congestion, noise or air quality and dust impacts will be addressed on a case-to-case basis using the management and mitigation measures provided in this REF, and standard best practice approach that EE employs during the construction of their projects.

9 Environmental management

9.1 Environmental management standards

To ensure that appropriate steps are taken to manage environmental aspects of infrastructure projects, EE has developed several Environmental Management Standards.

EE Environmental Management Standard EMS0001 *Environmental Impact Assessment and Environmental Management Plans* (EMS 0001) and EE Environmental Guidelines Handbook (EGH) has the stated purpose of ensuring 'that all works on EE's Network is undertaken in such a manner as to manage any actual or potential environmental impacts. Activities are to be carried out using a due diligence approach, in accordance with industry and other appropriate standards to ensure positive environmental outcomes and compliance with relevant legislation'. A copy of EMS 0001 is available on EE's Standard and EE's Accredited Service Provider (ASP) website.

9.2 Environmental management plan

This REF has identified several mitigation and management measures to minimise adverse environmental impacts that could potentially arise from the project (refer Table 9.1). These mitigation and management measures would mostly be implemented during the construction phase of the project.

EE will require the preparation of a site-specific Construction Environmental Management Plan (CEMP) for the proposed construction works, which will provide a clear framework for how these measures will be implemented and who will be responsible for their implementation. The CEMP will be prepared prior to commencement of any construction works and will be reviewed and certified by EE's environment team, prior to the commencement of any on-site works.

The CEMP will be a working document and will be subject to ongoing updates as required to respond to specific requirements. The CEMP will be developed in accordance with the specifications set out in the EMS 0001 and EGH. The CEMP will include complaints and notification procedures, ensuring consultation during construction, and incorporating a complaints register, monitoring, and reporting mechanisms.

Furthermore, the construction of the project will be subject to audits by EE to ensure that the works are carried out in an environmentally satisfactory manner. The assessment has not identified any issues that cannot be managed by employment industry 'best practice' environmental management techniques.

9.3 Monitoring of impacts

Environmental monitoring will be undertaken in accordance with environmental mitigation and management measures proposed for each of the environmental aspects assessed as part of this REF.

In addition, in accordance with EMS 0001, environmental inspections for 'Class 4 activities' will be conducted by EE's Sustainability and Environment (S&E) team at the commencement, completion (close out inspection) and periodically during works for activities being carried out in environmentally sensitive areas, or where the activity duration exceeds six months. The frequency of these periodic inspections will be determined at the commencement of the construction phase of the works by the Project Manager or the Environmental Services Manager or the technical specialists that have full knowledge of the environmental impact assessments for this REF.

Environmental monitoring and inspections will be undertaken in accordance with EMS 0001 where any potential non-conformance identified from the inspection will be discussed, recorded, and addressed.

Table 9.1 Summary of environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility
Biodiversity	It is not envisaged that the proposal will require the removal of any native vegetation. Notwithstanding, measures to avoid and minimise the construction footprint and native vegetation or habitat removal will be investigated during detailed design and implemented where practicable and feasible.	Contractor
General ecological mitigation	Where feasible, dead wood, fallen branches and logs should be retained as habitat. Where removal of dead logs or wood is required, these should be relocated (not removed from the site) into adjacent areas that will not be disturbed by construction workers.	Contractor
Invasive and noxious weed management	Weed control measures (e.g. herbicide spraying) should be undertaken prior to construction commencing in areas where high densities or infestations of weeds occur. This will help to reduce the risk of weeds being spread as a result of the proposed project.	Contractor
Risk of pathogen and pest species	To reduce the likelihood of spreading weeds, tyres and undercarriages of vehicles are to be washed and cleaned out/ or sprayed after working with weed infested areas, and prior to entering.	Contractor
Contaminated land	No specific management strategy is considered to be necessary due to the lack of indication that gross contamination is present on site. However, an Unexpected Finds Protocol should be prepared and implemented during construction, particularly when earthworks are undertaken, as a precautionary measure.	
Contaminated land	If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the Transport for NSW's Environment Manager and/or EPA.	Contractor
Accidental spills	Spill kits will be available at all work sites, and all persons undertaking construction works will be made aware of EE's incident response procedures.	Contractor
Pollution control measures, erosion, and sediment control	Soil and water management will be conducted in accordance with EE's standards and Environmental Guidelines Handbook	Contractor
Pollution control measures, erosion, and sediment control	The Project Manager/Supervisor responsible for construction works will be required to develop a site-specific Erosion and Sediment Control Plan as part of the CEMP.	Contractor
Pollution control measures, erosion, and sediment control	Disturbance will be restricted to those areas of the project route required for the active stage of works.	Contractor

Table 9.1 Summary of environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility
Pollution control measures, erosion, and sediment control	Any soil tracked on the roadways will be swept up on a regular basis.	Contractor
Pollution control measures, erosion, and sediment control	No fuels, oils or other chemicals are to be stored at worksites unless small amounts are required for that specific days' work.	Contractor
Pollution control measures, erosion, and sediment control	Refuelling and maintenance of vehicles, plant and equipment will not be carried out on site. All vehicles, plant and equipment are to be refuelled prior to arriving on site.	Contractor
Pollution control measures, erosion, and sediment control	Where necessary, additional erosion and sediment controls will be installed during periods of highest rainfall risk (April to October)	Contractor
Pollution control measures, erosion, and sediment control	All drainage, erosion and sediment control measures will be maintained in proper working order until their function is no longer required.	Contractor
Pollution control measures, erosion, and sediment control	Flagging tape or bunting will be used during construction to minimise the potential or any disturbance outside of the designated work areas.	Contractor
Pollution control measures, erosion, and sediment control	Upon decommissioning any stage of works, erosion and sediment control measures, all materials used to form the control measures will be removed and/or disposed of appropriately.	Contractor
Excavated material measures	Excavated materials are to be taken off site each day. Where it is necessary to store spoil or other loose materials on site, sediment fences are to be constructed on the down slope side of the stockpile.	Contractor
Excavated material measures	Permission of the landowner is to be sought prior to establishing site compounds or stock piling on their land.	Contractor

Table 9.1 Summary of environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility
Excavated material measures	Spoil management and dewatering of worksites will all be managed in accordance with the following EE Standards and the Environmental Guidelines Handbook which are all available on the EE Standards and ASP Website: • EMS 0007 – Waste Management. • EMS 0008 – Environmental Incidence Response and Management. • EMS 0013 – Spoil management. • EMS 0014 – Dewatering worksites.	Contractor
Excavated material measures – inspection and maintenance	The construction, inspection and maintenance requirements for all drainage, erosion and sediment control measures will be specified in the CEMP.	Contractor
Excavated material measures – inspection and maintenance	Inspections will be undertaken 24 hours prior to predicted rainfall events and immediately following rainfall events that cause run-off, and weekly during periods of no rain.	Contractor
Excavated material measures – inspection and maintenance	All clean and dirty water, debris and sediment removed from drainage, erosion and sediment control measures will be disposed of in a manner that will not create erosion, sedimentation, or a pollution hazard.	Contractor

Table 9.1 Summary of environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility
Waste	All waste generated during construction will be reused if appropriate, or removed, transported, and disposed from site in accordance with the NSW Environment Protection Authority's Waste Classification Guidelines (EPA 2014) and the POEO Act. Measures to prevent adverse impacts in relation to generated waste will include: • Waste mitigation and management strategies will be documented in the CEMP and in accordance with EE's Environmental Management Standard EMS 0007 Waste Management. • Stockpiles and excess fill material will be managed in accordance with managed in accordance with the EE Standards and the Environmental Guidelines Handbook and EMS 0013 – Spoil management. • Waste material generated on site will not be left on site once the works have been completed. • Every effort will be made to minimise tree trimming and removal, where possible. • Trees will be removed by a licensed arborist. • Earthworks should be closely monitored by a geotechnical consultant and must include field density testing at an appropriate frequency and level of supervision as detailed in AS 3798-2007. • Any excess waste or spoil including, fill material and VENIM, will be disposed of at a licensed waste or recycling facility as appropriate. • All excavated spoil will be classified prior to disposal and/or re-use. Waste disposal dockets will be obtained from the licensed waste disposal facility and copies retained for audit purposes. • Where excavated spoil is suspected to be contaminated, works will immediately cease, and the Project Manager and the relevant Environmental Specialist notified. Spoil suspected of being contaminated will be tested to provide a waste classification for disposal. • All other waste materials will be removed from the work site at the end of each working day. Where items are able to be recycled, the materials will be sorted and stored at an appropriate site (e.g. the nearest Field Service Centre) for collection and recycling. • Once works are completed in any given location, all disturbed ground surfaces will be reinstated as soon as possible.	Contractor
Waste – vegetation	Vegetation such as garden and wood waste are classified as general solid waste (non-putrescible) as per the Waste Classification Guidelines. Should trees need to be removed, they will be removed by licensed arborists in accordance with the management and mitigation measures specified by the arborist, or by a suitably qualified professional as part of a 5-part test. However, vegetation removal will only be undertaken where absolutely required.	Contractor
Fill material	If fill material is brought to site, fill material will be stockpiled in dedicated areas and managed in accordance with the EE Standards and the Environmental Guidelines Handbook and EMS 0013 – Spoil management.	Contractor
Before You Dig Australia	The Project Manager will conduct BYDA searches prior to works commencing on site.	Contractor

Table 9.1 Summary of environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility
Impacts on neighbouring properties – electricity supply	The Project Manager will notify impacted residents and businesses regarding any potential interruptions to electricity supply prior to these outages occurring in accordance with National Energy Customer Framework (NECF) requirements.	Contractor
Noise	Appropriate approvals are to be obtained from the affected Councils as required prior to commencing construction.	Contractor
Noise	All potentially affected residents should be notified prior to the commencement of construction works. Details are to include the likely duration of the works and 24-hour contract details for the Project Manager and Construction Contractor.	Contractor
Noise	Construction works must be carried out within normal working hours unless otherwise approved. Any out-of-hours-works will be carried out in accordance with the requirements of EE's Environmental Guidelines Handbook.	Contractor
Noise	Should power generators be required to supply private properties during any stage of the construction works, the Project Manager must liaise with the S&E team. If generators are required to operate at night, acoustic consultants may be required to undertake noise assessment prior to their use.	Contractor
Air quality	Visually monitor dust levels during construction works. If excessive dust generation is occurring on site, causing a safety issue or complaints are received, immediately follow appropriate mitigation options.	Contractor
Air quality	Traffic movement and speed will be restricted over disturbed areas of ground and unsealed access tracks.	Contractor
Air quality	Ensure any soil/spoil tracked onto roadways is swept up on a regular basis.	Contractor
Air quality	Excavated materials are to be either spread out on site or removed off site immediately; no loose or stockpiled materials are to be stored without appropriate sediment controls or left uncovered for a long time.	Contractor
Air quality	Vehicles and machinery are not to be left idling when not in use to reduce exhaust emissions.	Contractor
Air quality	Dust suppression techniques, including wetting down surfaces will be used as necessary.	Contractor
Air quality	Reference is made to EE's Environmental Guideline Handbook for dust mitigation and management techniques.	Contractor
Aboriginal heritage	An unexpected finds procedure will be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. Work will only re-commence once the requirements of that Procedure have been satisfied.	Contractor

Table 9.1 Summary of environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility
Non-Aboriginal heritage	An unexpected finds procedure will be followed in the event that any unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered. Work will only re-commence once the requirements of that Procedure have been satisfied.	Contractor
Safety and hazards	The following mitigation measures will be implemented to ensure management of safety and hazards: • Safety signage, barriers, fencing, etc. will be placed around construction areas, as required. These will be checked on a regular basis to ensure they are in adequate working condition. • The works will not occur on days that have extreme or catastrophic fire rating. • Any recommendations in the TMP will be implemented during the construction works. • Any open holes that are left unattended at any time will be covered and fenced as necessary to prevent access. • All works will be undertaken in accordance with SafeWork NSW requirements, EE standards and procedures and any other applicable requirements.	Contractor
Bushfire	The CEMP prepared for the project will make provision for the following bushfire protection measures: • Site induction for contractors working on the project will include general bushfire protection measures and requirements. • Electrical equipment, plant, and equipment to be used for construction works will be maintained in operational order to prevent any potential sparks. • All legislative requirements regarding safe work procedures will be adhered to, including chemical handling and storage. • An emergency management plan will be developed as part of the CEMP, which is to include protocols in how to respond to bushfire incidents, including evacuation during construction. • Any works that have the potential to generate heat and sparks will be restricted on days of declared catastrophic fire danger. • Construction waste will be removed from the site in a timely manner so as not to cause a fire risk or obstruct emergency vehicle access. • The project will be constructed and maintained in accordance with EE Company Procedure GAM 0011.	Contractor

10 Conclusion

The investigations and assessment undertaken as part of this REF has determined that the construction of North Bradfield Zone Substation and associated access road are unlikely to significantly affect the environment and should proceed subject to the mitigation measures outlined section 9 and in accordance with any other additional management and mitigation measures (or conditions) required by the Endeavour Energy.

It is therefore concluded that:

- An EIS is not required for the project.
- EE makes a formal determination in relation to the project.
- A separate environmental assessment will be prepared for any other works associated to this project that are not covered in this REF.
- It is required that all works be undertaken in accordance with this REF, any Notice of Determination issued in relation to this REF, approved design, the associated CEMP and any other specific mitigation measures that have been developed for this project.

References

ABS 2016, *Badgerys Creek,* Australian Bureau of Statistics. Viewed 20.10.2022. https://www.abs.gov.au/census/find-census-data/quickstats/2016/SSC10132

Day Design 2022, *Environmental Noise Impact Assessment,* Prepared for Endeavour Energy.

DECCW 2010, *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW,* Department of Environment, Climate Change and Water.

DIRD 2016, *Western Sydney Airport – Environmental Impact Statement – Volume 2,* Department of Infrastructure and Regional Development, viewed 21 October 2022, https://www.westernsydneyairport.gov.au/sites/default/files/WSA-EIS-Volume-2b-Stage-1-Development.pdf.

DPE 2020a, *Overview of Aerotropolis Core, Badgerys Creek & Wianamatta – South Creek Precinct Plans,* Department of Planning, Industry and Environment.

DPE 2020b, *State Environmental Planning Policy (Western Sydney Aerotropolis) 2020,* NSW Department of Planning, Industry and Environment.

DPE 2022 *Western Sydney Aerotropolis Precinct Plan,* NSW Department of Planning and Environment.

DPE 2022, *Consolidation of state environmental planning policies: Frequently asked questions*, NSW Department of Planning and Environment, viewed 20.08.2022. https://www.planning.nsw.gov.au/-/media/Files/DPE/Factsheets-and-faqs/Policy-and-legislation/SEPP-2021/consolidation-of-state-environmental-planning-policies-frequently-asked-questions.pdf?la=en

Eco Logical Australia 2022, *Aboriginal Archaeological Technical Report,* prepared for Ingham Rural Property Group Pty Limited.

EE 2022, *RIT-D Draft Project Assessment Report Providing supply to the Aerotropolis Core Precinct,* Endeavour Energy, viewed 20 October 2022, https://www.endeavourenergy.com.au/__data/assets/pdf_file/0027/46692/DPAR-Aerotropolis-Core-North-Bradfield-V1.3-Final.pdf.

EH 2020, *Western Sydney Aerotropolis Initial Precincts,* Extent Heritage.

ELA 2022, *475 Badgerys Creek Road, NSW – Stage 1 (Substation) Archaeoloigcal Technical Report.* Prepared for Ingham Rural Property Group Pty Limited.

Environmental Protection Authority (EPA). PRPOEO Application Search Result. Retrieved July 17, 2023, from https://apps.epa.nsw.gov.au/prpoeoapp/SearchResult.aspx?SearchTag=all&searchrange=general&range=general&PageIndex=0&SortExpression=DateIssued&SortDirection=DESC

GCC 2018, *Greater Sydney Region Plan - A Metropolis of Three Cities*, Greater Sydney Commission. Viewed 20.10.2022.

Senversa 2022, *2022 Preliminary Site Investigation, Former Ingham Breeder Farm, 475 Badgerys Creek Road, Badgerys Creek NSW,* Prepared for Ingham Rural Property Group Pty Limited.

Senversa 2022a, *Badgerys Creek Environmental Report 475 Badgerys Creek Road, Badgerys Creek NSW,* Prepared for Ingham Rural Property Group Pty Limited.

Appendix A
Design Plans (January 2023)

EMM
creating opportunities

Appendix B

Aboriginal Archaeological Technical Report (Eco Logical Australia 2022)

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Appendix C

Preliminary Site Investigation (Senversa March 2022)

EMM
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Appendix D

Environmental Report Badgerys Creek (Senversa 2022)

EMM
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Appendix E

Noise Impact Assessment (Day Design October 2022)

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Appendix F
Detailed Site Investigation (JBS&G Oct 2022)

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Appendix G
LCC submission

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Appendix H

EE response to LCC submission

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Appendix I
LCC reply to EE response

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