

REVIEW OF ENVIRONMENTAL FACTORS



Construction of Orchard Hills Switching Substation



In accordance with Part 5 of the Environmental Planning & Assessment Act 1979 & State Environmental Planning Policy (Transport and Infrastructure) 2021.

September 2022

EXECUTIVE SUMMARY

Endeavour Energy (EE) is an electricity distributor 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 and operate the Orchard Hills Switching Substation (Orchard Hills) SS), which will serve to provide a connection for underground transmission feeder lines to the Sydney Metro and three other substations. The project is part of EE's broader electricity transmission and distribution network that will service the Western Sydney Growth Area, including the Sydney Metro, the Western Sydney Airport and the Aerotropolis, and other surrounding precincts.

The key features of this project will involve:

- The construction and operation of the Orchard Hills SS, which will be built on a subdivided land lot (the subject site) further described in Chapter 6 and Chapter 7.
- Raising the subject site by approximately 1-2 m to level with the surrounding proposed development.
- Connecting to transmission feeder lines that will connect to the Sydney Metro and three other substations.

This Review of Environmental Factors (REF) details the possible environmental impacts and identifies mitigating measures to be incorporated into the design, construction and operation of the Orchard Hills SS to minimise environmental impacts.

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

No significant environmental constraints to the proposal were identified by the assessment process required under Part 5 of the EP&A Act. Relative to this proposal, EE has concluded that there are no aspects of this proposal that have the potential to lead to, or result in, significant adverse impacts on the environment.

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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 <i>Electricity Networks Assets (Authorised Transactions) Act 2015</i>
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
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW). Provides the legislative framework for land use planning and development assessment in NSW.
EP&A Regulations	<i>Environmental Planning and Assessment Regulation 2021</i>
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
ES Act	<i>Electricity Supply Act 1995</i>
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

Term	Meaning
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
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	<i>National Parks and Wildlife Act 1974</i>
NPWS	National Parks and Wildlife Service (OEH)
OH	Overhead
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
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

Term	Meaning
TSC Act	<i>Threatened Species Conservation Act 1995</i>
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

Document Control

Revision	Prepared by and Company Name	Date	Reviewed by and Company Name	Comments
V1	Ruth Kelly and Tanja Ibsen, EMM Consulting Pty Ltd	21 July 2022	Mohammad Alam Environmental Specialist Endeavour Energy	
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Document Approval

To the best of the knowledge of the below signatories, this REF has been prepared to be neither false nor misleading and is in accordance with The Code of practice for Authorised Network Operators approved under section 171 of the Environmental Planning and Assessment Regulation 2021.

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1 Introduction

1.1 Background

Endeavour Energy (EE) is an electricity distribution system 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 install an approximately 22-kilometre (km) long 132 kilovolt (kV) underground transmission and distribution feeders and associated infrastructure, traversing through the suburbs of Bringelly, Luddenham, Badgerys Creek, Kemps Creek and Orchard Hills of the Greater Western Sydney region in NSW; as part of the transmission supply strategy to meet increasing electricity demand from critical infrastructure at the Western Sydney Growth Area including the future Nancy-Bird Walton Airport (Western Sydney Airport), Sydney Metro Trains Facility (Sydney Metro) and surrounding supporting development. The installation of the transmission feeder route and associated infrastructure is proposed over seven construction stages (Stage 1 – Stage 7) expected to commence from October 2022 through to December 2023.

The installation of EE's broader transmission supply network in the Western Sydney Growth Area will require the construction of zone substations (ZS) and switching substations (SS) in multiple locations, some of which have already been constructed or are currently under construction. This review of environmental factors (REF) has been prepared specifically for the construction and operation of the Orchard Hills Switching Substation (Orchard Hills SS), which will serve to provide a connection for transmission feeder lines to the Sydney Metro and three substations (North Orchard Hills ZS, South Erskine Park ZS, and Bringelly ZS) (the 'project').

EMM Consulting Pty Ltd (EMM) has been engaged by EE to prepare a 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 sensitivities at the site, a site visit undertaken by EMM's project director, technical assessment reports and other relevant project documentation provided by EE.

The construction of other proposed substations and the installation of the proposed feeder route installation have been assessed by EE separately and are not included in this REF.

1.2 Location of the study area

The project involves the construction and operation of the proposed Orchard Hills SS, which will be located on Lot 99, DP 1282927 at 221-227 Luddenham Road, Orchard Hills, NSW ('subject site'). The subject site is proposed within Lot 1, DP 1099147 ('subject property'), which is in the process of being subdivided prior to project construction. The subject site and the subject property are further described in Chapter 6.

The project is part of broader transmission supply installation works, which will involve connecting the proposed Orchard Hills SS and South Erskine Park ZS (both of which are located close to the northern

end of Luddenham Road), to their Bringelly ZS in Bringelly. The project will also connect to a proposed future ZS to be built in North Orchard Hills, and to the Sydney Metro which will be constructed and will traverse near the subject site. The context of the project within EE’s broader transmission supply installation works is shown in Figure 1-1.

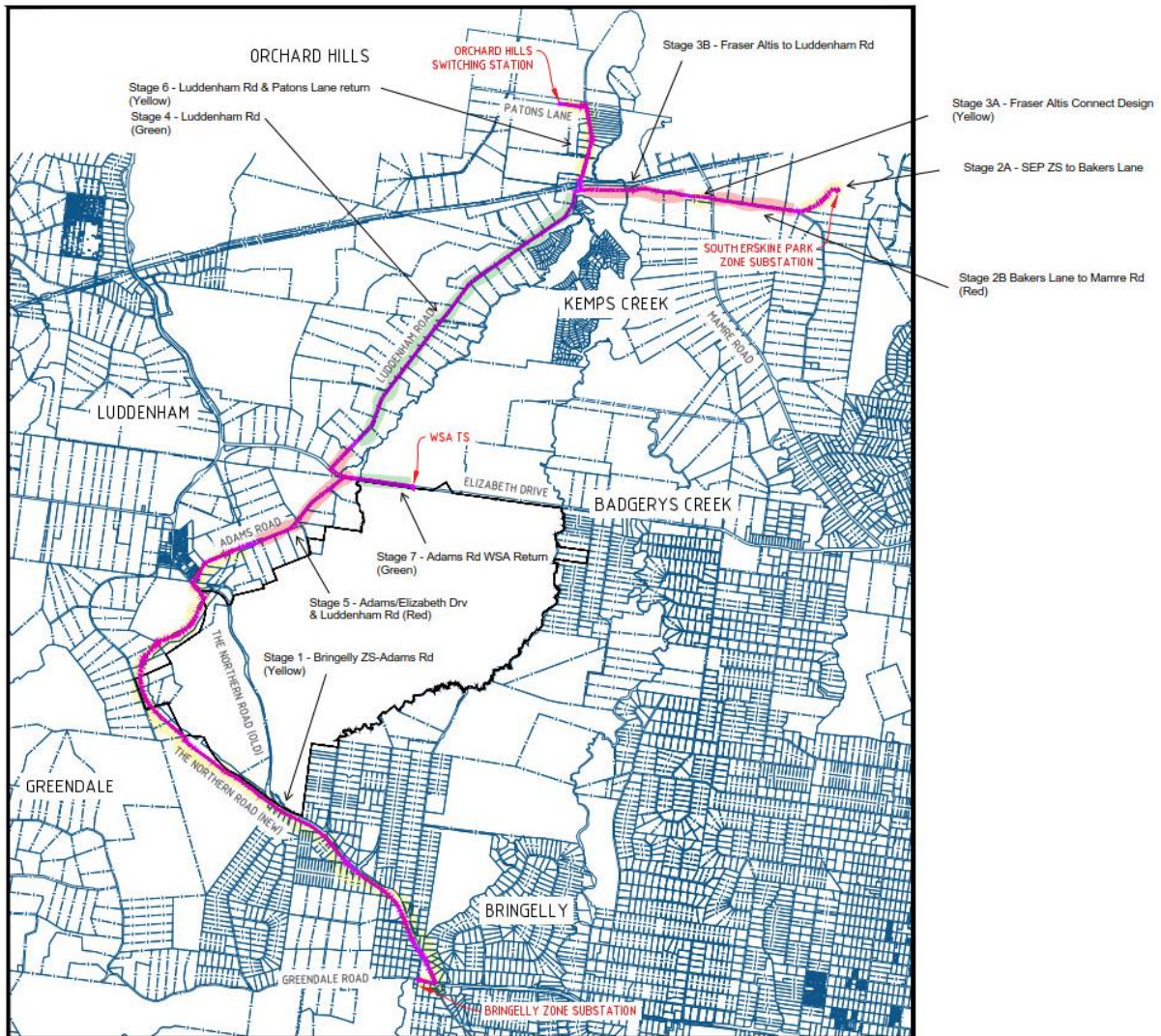


Figure 1-1 Endeavour Energy’s proposed transmission supply route in the Western Sydney Growth Area

The broader transmission supply installation works are divided into seven construction stages (Stage 1 – Stage 7). The Orchard Hills SS project will be constructed and commissioned within 18 months.

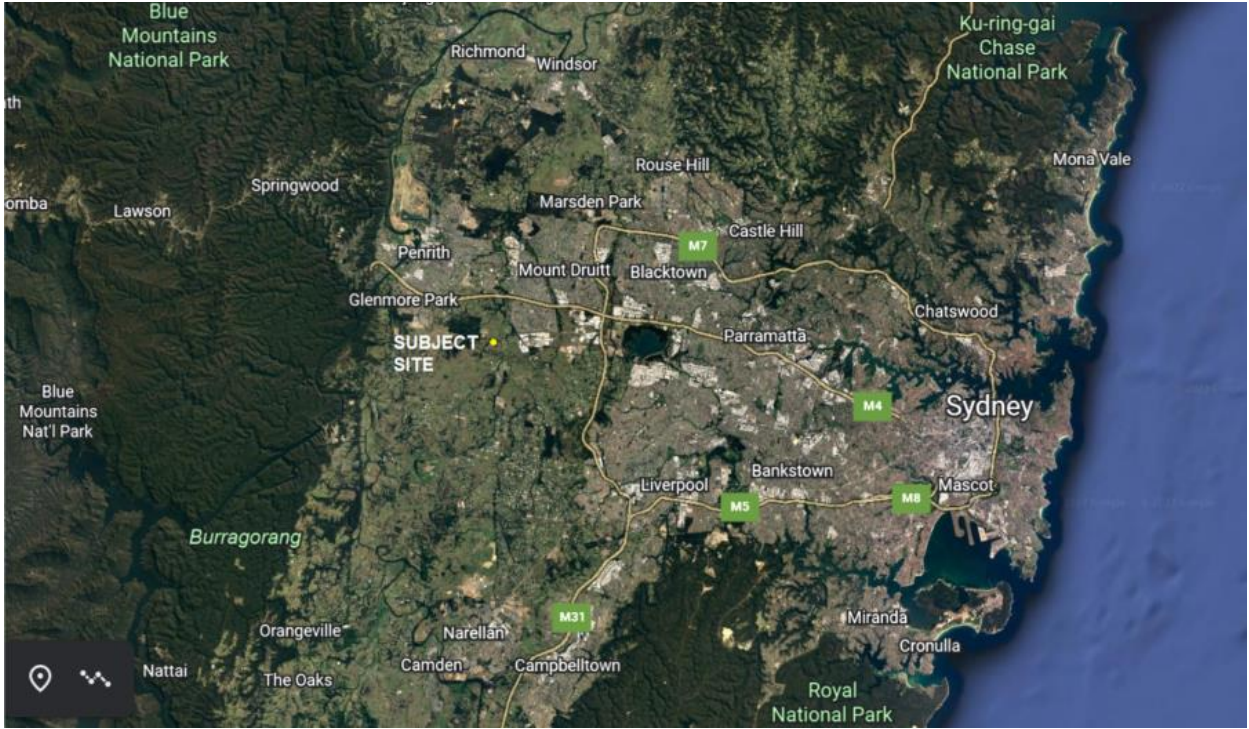


Figure 1-2 Location of subject site

1.3 Proponent

EE is the proponent of the project. EE is a safety focused and customer-centred business determined to be the best performing electricity provider in Australia. Proponent details are provided in the table below.

Table 1-1 Proponent details

Specification	Details
Proponent	Endeavour Energy
Address	51 Huntingwood Dr, Huntingwood NSW 2148
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. 5* (EE 2014) and in accordance with requirements set out in the Code, with the exception of a few additional report sections that were added.

2 Project justification

2.1 Overview

The project is located within the Greater Western Sydney suburb of Orchard Hills, which falls within a strategic growth area referred to as the 'Western Sydney Growth Area' and the 'Western Sydney Parkland'. The project is also located immediately adjacent to the 'Western Sydney Aerotropolis' (the Aerotropolis) which is also the home of many new State Significant Precincts (SSP), State Significant Infrastructure (SSI), and State Significant Development (SSD) projects.

The project plays a key role within EE's broader transmission supply network to connect and provide electricity to this rapidly transforming part of Sydney, and to service the many new households, businesses and projects within the area. In particular, the Orchard Hills SS will provide a continuous electrical supply to the Sydney Metro – Western Sydney Airport and will play a critical role in the safety and reliability of the trains service.

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 Sydney Parkland

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 project 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; and
- optimise infrastructure use.

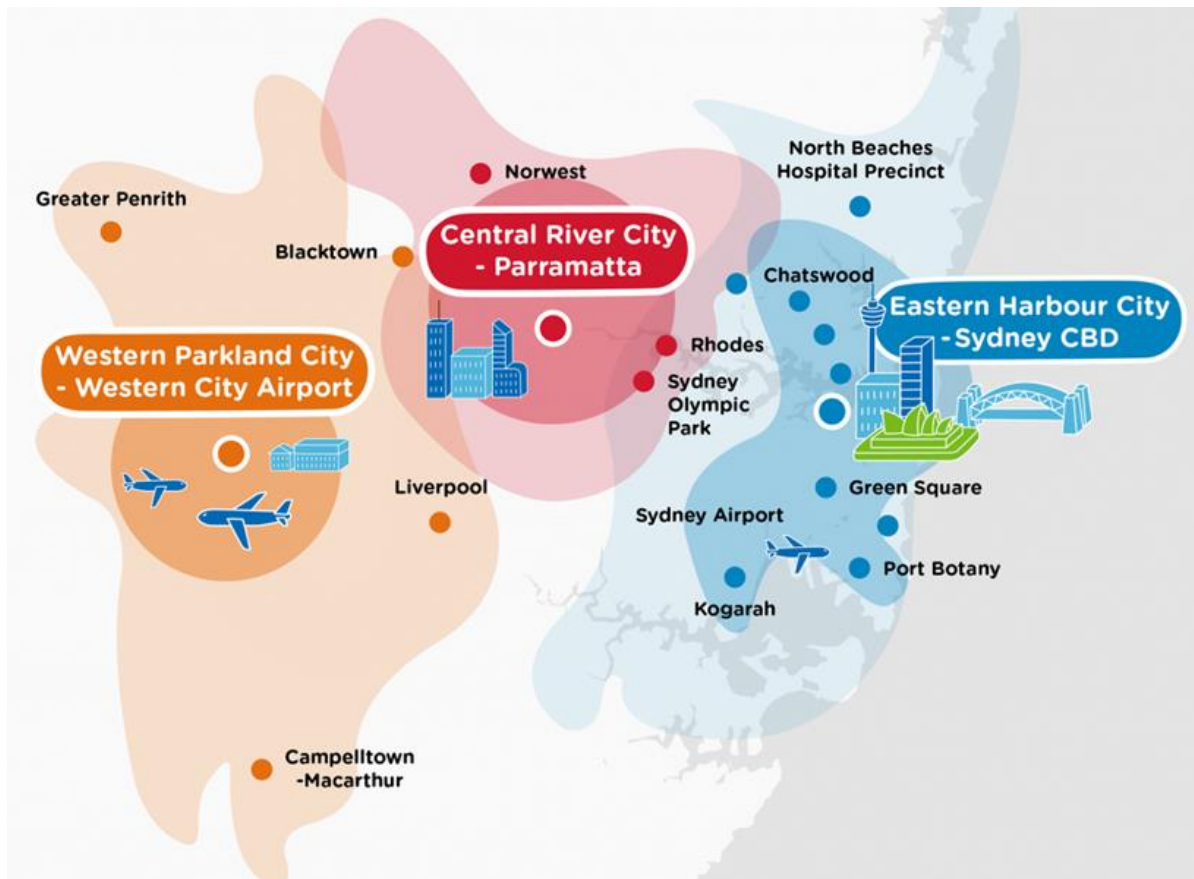


Figure 2-1 A Metropolis of Three Cities concept map (Source: Investment NSW 2021)

2.2.2 Western Sydney Aerotropolis Precinct Plan

Since the Federal Government's announcement of the Western Sydney Airport in 2014, the Government's vision of the land surrounding the airport has been detailed in a number of 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 falls approximately 500 m north of the land application boundary of the Aerotropolis. Even though the project is currently not subject to the land use provisions under the Western Parkland City SEPP, the future land uses within and surrounding the subject site will be greatly influenced by the rapid transformation of the Aerotropolis and the locality. Additionally, the project will service the growing needs of the Aerotropolis and surrounding infrastructure and development.

The close proximity to the Aerotropolis, and other surrounding projects to service the area, make the project crucial in supporting the development and servicing 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-):

- the Western Sydney Airport (Nancy Bird Walton);

- the Aerotropolis Core Precinct;
- the Agribusiness Precinct;
- the Northern Gateway Precinct; and
- Badgerys Creek Precinct.

The project aligns with a number of 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 Growth Area, and in particular, associated with the area surrounding the Aerotropolis. 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 the surrounding development.

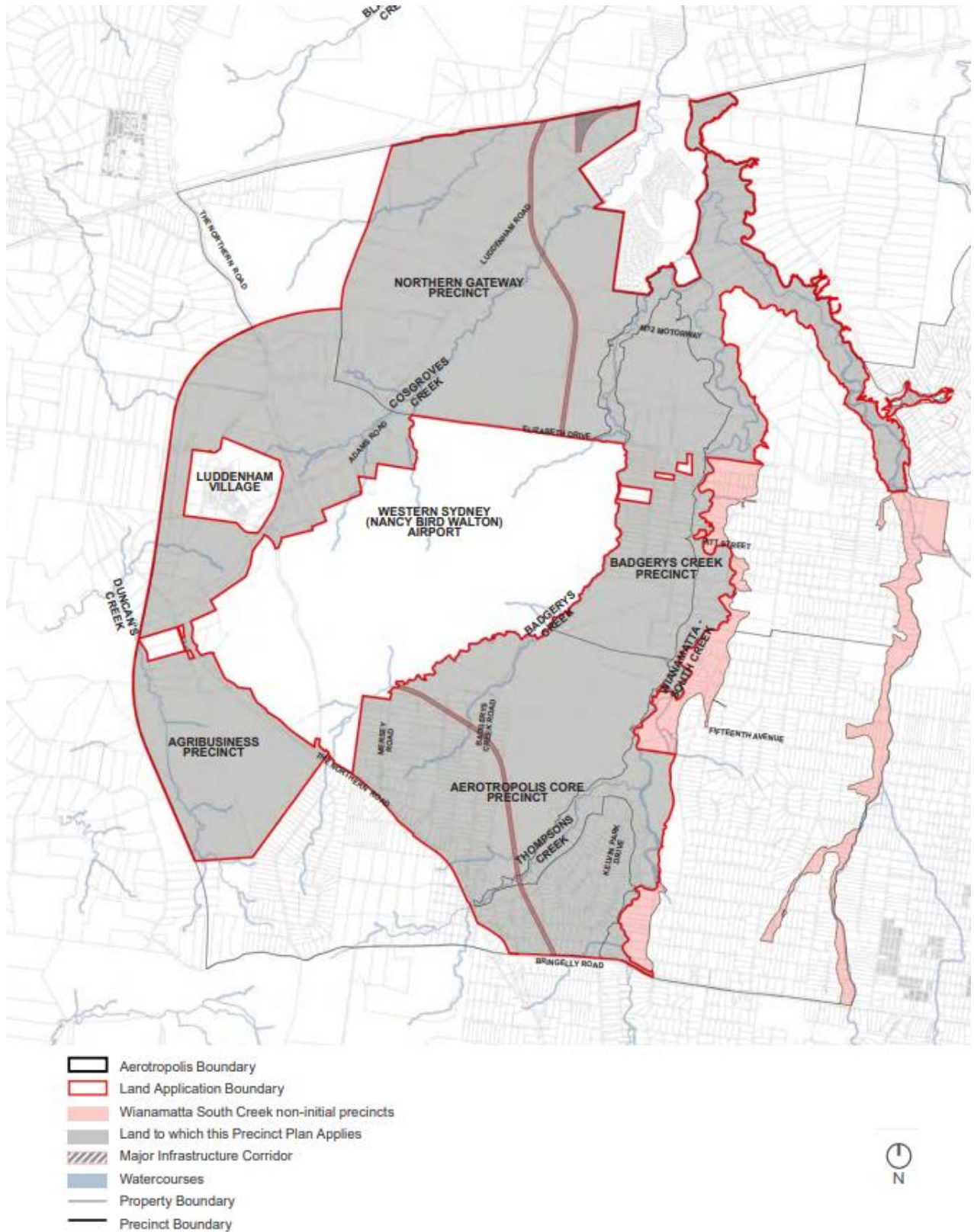


Figure 2-2 Land Application Map (Source: the Aerotropolis Plan DPE 2022a)

2.2.3 Greater Penrith to Eastern Creek Urban Release Investigation Area

In November 2018, the Minister for the Department of the Environment and Energy (DoEE) the NSW Minister for Planning and the NSW Minister for the Environment signed an agreement to undertake a strategic assessment of the proposed urban development of Western Sydney around the Western Sydney Airport (DCCEW 2021).

The development will be guided by the Cumberland Plain Conservation Plan (CPC Plan) which is due for release in 2022, will set out where and how the development will occur to ensure the protection and conservation of matters of national environmental significance (MNES) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and support the growth of a prosperous and liveable environment (DCCEW 2021). The CPC Plan will contribute to the Western Parkland City by supporting the strategic delivery of housing, jobs and infrastructure while protecting important biodiversity.

Furthermore, the CPC Plan will take into consideration four new growth areas in Western Sydney including, one of which covers the area of the subject property - the Greater Penrith to Eastern Creek Urban Release Investigation Area. The Greater Penrith to Eastern Creek Urban Release Investigation Area is proposed metropolitan cluster which is proposed to open access to jobs and increase potential for jobs growth in the Western Economic Corridor (including the Aerotropolis and Western Sydney Airport). The area is expected to grow and transform in the coming years.

The results outlined in Section 3.3 indicate that the project will not have a significant impact on any MNES. Furthermore, the project will support the growth and development within the Greater Penrith to Eastern Creek Urban Release Investigation Area, by providing electricity supply for the surrounding infrastructure and development. Therefore, the project is in line with the objectives of the CPC Plan.

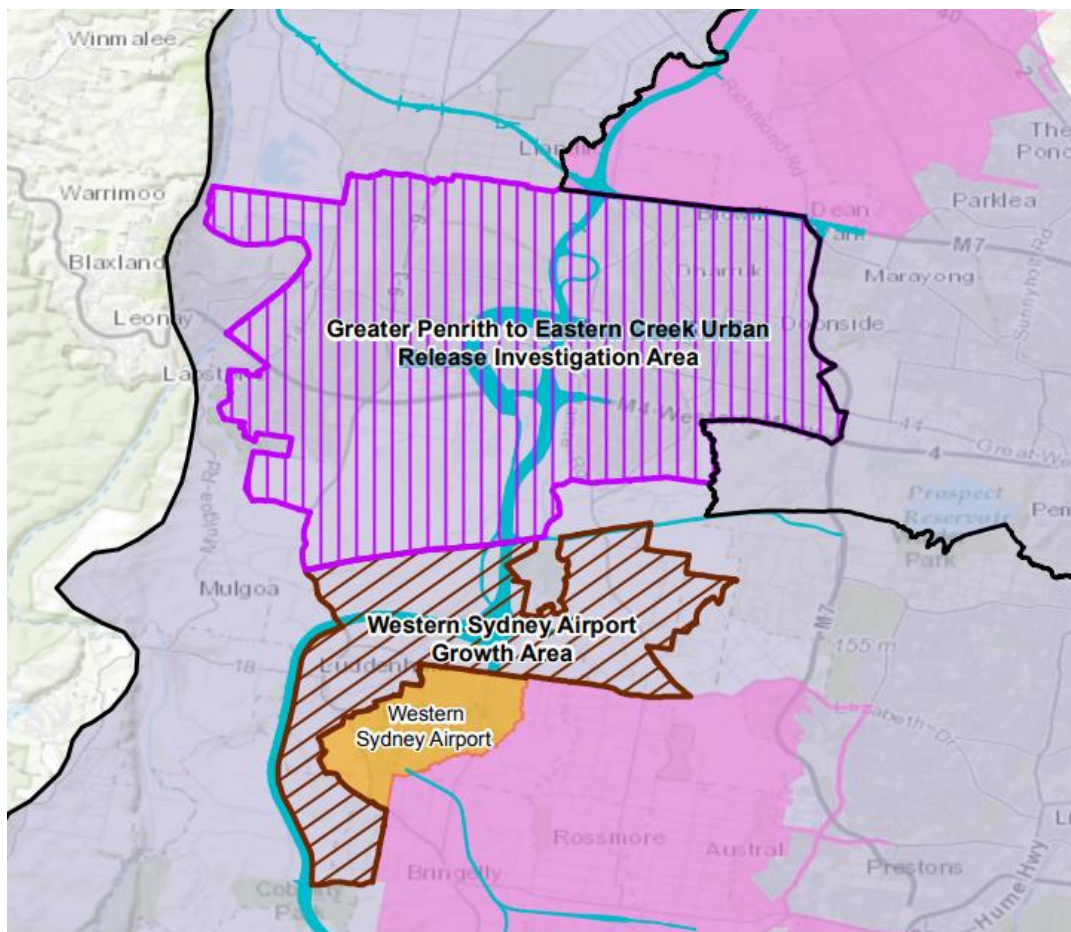


Figure 2-3 Strategic Assessment Area showing development areas (hashed) and transport corridors (blue) (Source: DCCEW 2021).

2.2.4 Sydney Metro – Western Sydney Airport

Sydney Metro – Western Sydney Airport is identified in the Greater Sydney Region Plan (GCC 2018a) as a key element to delivering an integrated transport system for the Western Parkland City. The new railway line to be constructed as part of the Sydney Metro, is projected to become the transport spine for connecting communities and travellers within the rest of Sydney's public transport system (Sydney Metro 2020a). The Sydney Metro plays a key component in achieving the State Government's vision to integrate land use, transport and infrastructure across Sydney so that most people in Sydney will have the opportunity of 30-minute access to jobs, schools, businesses and services (Sydney Metro 2020a).

Sydney Metro - Western Sydney Airport will be located within the Penrith and Liverpool local government areas (LGAs) and will provide a new metro railway between St Marys in the north and the Aerotropolis in the south. The railway line will traverse immediately adjacent to the subject property, as can be seen in Figure 2-3. A key objective of the project is to connect to and service the Sydney Metro – Western Sydney Airport, which is one of the reasons that the subject site was specifically selected for the construction and operation of the project.

Construction works for the Sydney Metro are expected to commence in December 2022 and to be completed in late 2026 in time for the opening of the Western Sydney Airport.

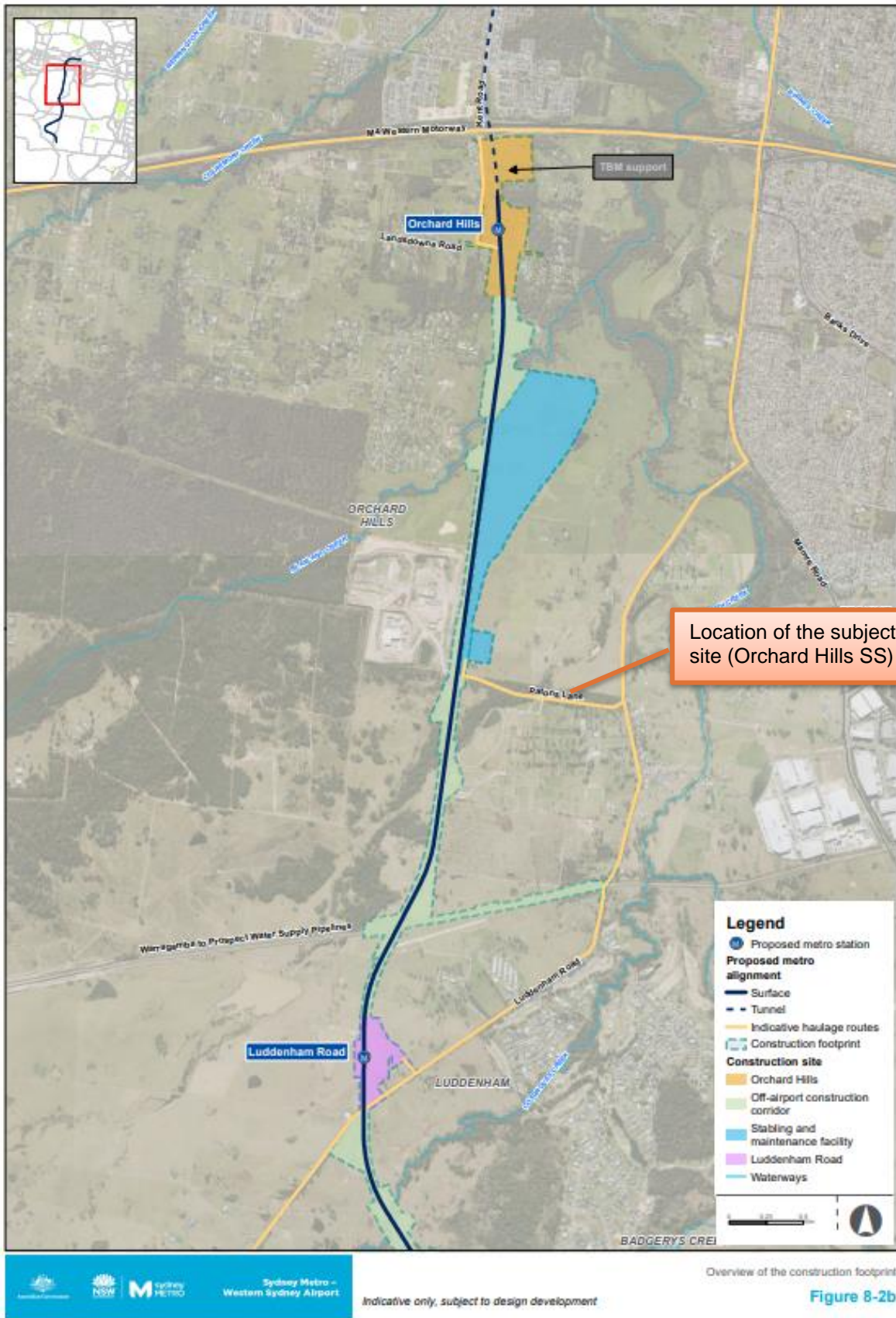


Figure 2-4 Patons Lane and the subject property in relation to the Sydney Metro – Western Sydney Airport railway line (Source: Sydney Metro 2020)

2.3 Project need

The project is needed to continue to meet increasing electricity demand from SSP, SSI and SSD associated with the Western Sydney Growth Area including the Aerotropolis and the Sydney Metro. The Western Sydney Growth Area in Sydney's south-west will provide greater opportunities for brand new homes, jobs, education, health, services, and infrastructure and is a priority area for the NSW Government.

The project will ensure 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- Western Sydney Airport.

2.4 Project objectives

The key objective of the project is to provide a reliable electricity supply and electrical network growth to the Western Sydney Growth Area, including the Western Sydney Airport, Sydney Metro and surrounding development of the Aerotropolis.

2.5 Project benefits

Residents, commercial and industrial business operators and their customers will all benefit from safe, efficient and cost-effective and continuous electrical supply within this growth region.

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 Growth 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

3.2.1 NSW *Environmental Planning and Assessment Act 1979*

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 establishes state environmental planning policies (SEPPs) and local environmental plans (LEP) which may include provisions relevant to the project.

Under the EP&A Act, EE is classified as a proponent and a determining authority, in accordance with the provisions of Part 5 of the Act. A project can be assessed by a determining authority under Part 5 of the Act if it:

- may be carried out without a development consent;
- is carried out, or approved, by a determining authority;
- is not a prohibited development.

The project does not require development consent under Part 4 of the EP&A Act (refer to Section 3.2.2) and is not classified as State Significant Infrastructure (SSI) under Part 5.1 of the EP&A Act. Therefore, the project has been assessed under Part 5 of the EP&A Act.

This REF has been prepared to determine if the project is likely to have a significant impact on the environment and community. Under section 5.7 of the EP&A Act, if a determining authority decides an activity is likely to significantly affect the environment, it must prepare an environmental impact statement. This project is unlikely to have a significant impact on the environment.

Section 171 of the EP&A Regulation lists factors that must be taken into account when considering the likely impact of an activity on the environment. Table 3-2 includes a consideration of these factors for the project.

3.2.2 Transport and Infrastructure State Environmental Planning Policy 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); and
- all of the provisions of State Environmental Planning Policy (State Significant Precincts) 2005 (State Significant Precincts SEPP).

It should be noted that the Coastal Management SEPP does not apply to the project.

The State Significant Precincts SEPP sets out the process for the rezoning of State Significant Precincts, which is not relevant to the subject site given that it is not located within a State Significant Precinct. The subject site is located over 500 m north of the land application boundary of the Western Parkland City and the Aerotropolis (ie State Significant Precincts), as per the State Environmental Planning Policy (Precincts – Western Parkland City) 2021 land use zoning map (DPIE 2021).

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:

- 1) 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 that 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 Penrith City Council (PCC). However, PCC will be notified of the intention to carry out the proposed works and EE will consider any response received from the Council.

3.2.3 NSW Code of Practice for Authorised Network Operators

3.2.3.1 Determining authority

The Code is the approved Code under section 201 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.

3.2.3.2 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 section 7 and Appendix A which will be within the subject site, and an area of 200 metres (m) within the road reserve of Patons Lane, Orchard Hills (refer Figure 7-2). While a few trees may be removed close to the proposed driveway of the subject site, 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.

3.2.3.3 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 9 Environmental assessment and mitigation

Requirement	Summarised description	Addressed
	<ul style="list-style-type: none"> Discuss viable alternatives and any mitigation measures to be implemented. 	Chapter 5 Consideration of alternatives
Certification	<ul style="list-style-type: none"> 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. 	Front page of this REF
The proponent, determining authorities and any required approvals	<ul style="list-style-type: none"> Identify the proponent and all determining authorities and required approvals for the activity. 	<p>Section 1.3 Proponent</p> <p>Section 3.2.3 and 3.2.3.1 NSW Code of Practice for Authorised Network Operators, Determining authority</p>
The environment of the activity	<ul style="list-style-type: none"> 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. 	<p>Section 3.3 Commonwealth Environment Protection and Biodiversity Conservation Act 1999</p> <p>Chapter 6 Existing environment</p> <p>Section 9.4 Biodiversity</p>
	<ul style="list-style-type: none"> 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 9.4 Biodiversity
The impacts of the activity	<ul style="list-style-type: none"> The likely environmental impacts for all phases of the activity and describe their extent, size, scope, intensity and duration. 	Chapter 9 Environmental assessment and mitigation
	<ul style="list-style-type: none"> As a minimum, the REF should document consideration of each of the factors listed in clause 228(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. 	3.5 NSW Environmental Planning and Assessment Regulation 2021
	<ul style="list-style-type: none"> List the sources and data the ANO relied on when preparing the REF. 	References (see end of RFI)

Requirement	Summarised description	Addressed
Mitigating measures that will apply to the activity	<ul style="list-style-type: none"> 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. 	<p>Chapter 8 Environmental Management</p> <p>Chapter 9 Impact assessment and mitigation</p>
Summary of impacts	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> The REF should describe: <ol style="list-style-type: none"> 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. 	<p>Section 3.2.2 Transport and Infrastructure State Environmental Planning Policy 2021</p> <p>Section 9.4 Biodiversity</p> <p>Chapter 10 Conclusion</p>
	<ul style="list-style-type: none"> 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*

3.3.1 EPBC Act requirements

The EPBC Act outlines the Commonwealth Government's role in regards to environmental assessment, biodiversity conservation, the management of protected species, populations and communities and heritage items.

The EPBC Act lists nine 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); and
- 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.

3.3.2 Assessment against the EPBC Act

A search of the Commonwealth Protected Matters Search Tool (PMST) has been undertaken on 16 June 2022.

The search results indicate that there are no world heritage properties or national heritage places within the vicinity of the site. This finding is supported by the PMST search undertaken by the heritage consultant for the project, who has also concluded that there are no items within or in the immediate vicinity of the project listed on the World Heritage List (WHL), National Heritage List (NHL) or Commonwealth Heritage List (CHL) (Artefact 2022b).

The closest MNES identified are:

- Orchard Hills Cumberland Plain Woodland (Place ID 105317), a Commonwealth Heritage Place located approximately 0.6 km west from the western boundary of the subject property.
- Prospect Nature Reserve (Protected Area ID NSW_N0938), a Terrestrial Protected Area located approximately 10 km north-west from Stage 6 of the project; and
- Kemps Creek Nature Reserve (Protected Area ID NSW_N0863), a Terrestrial Protected Area located approximately 8 km south-west from Stage 5 of the project.

A PMST search undertaken on 9 June 2022 as part of the ecological assessment prepared for the project identified 20 listed threatened flora species recorded from within a 10 km radius of the study area, and 25 threatened fauna species recorded within the same radius (GES 2022a). The ecological assessment detailed in Section 9.4 further discusses the PMST search results.

The ecological assessment identified that the Cumberland Plain Woodland Critically Endangered Ecological Community (CEEC) is situated on either side of the road verge of Patons Lane, Orchard Hills. However, the Cumberland Plain Woodland CEEC is not listed under the EPBC Act. The transmission feeder installation route has been designed to be within the road reserve so as to minimise any impacts to Cumberland Plain Woodland CEEC trees.

None of the EPBC Act threatened fauna are likely to be affected by the proposed activity.

Thus, it has been concluded that the project will not have a significant impact on any matters of MNES. Accordingly, approval from the Commonwealth is not required under the EPBC Act.

3.4 Land use and permissibility

The subject site is currently zoned RU2 Rural Landscape in the Penrith Local Environmental Plan 2010 (Penrith LEP however parts of the subject property and Patons Lane immediately north of the subject property entail areas zoned C2 Environmental Conservation).

The objectives of the RU2 Rural Landscape zone are:

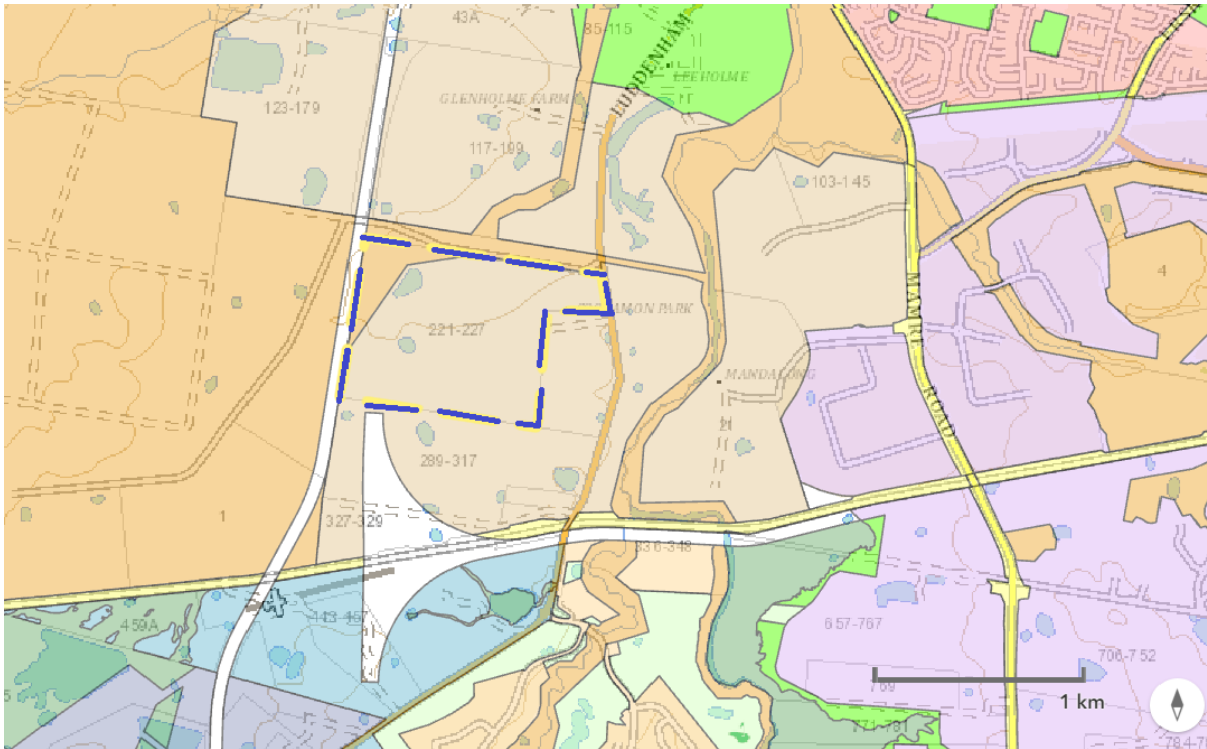
- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To maintain the rural landscape character of the land.
- To provide for a range of compatible land uses, including extensive agriculture.
- To minimise conflict between land uses within the zone and land uses within adjoining zones.
- To preserve and improve natural resources through appropriate land management practices.
- To ensure development is compatible with the environmental capabilities of the land and does not unreasonably increase the demand for public services or public facilities.

The objectives of the C2 Environmental Conservation zone are:

- To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.
- To prevent development that could destroy, damage or otherwise have an adverse effect on those values.
- To protect, manage, restore and enhance the ecology, hydrology and scenic values of riparian corridors and waterways, wetlands, groundwater resources, biodiversity corridors, areas of remnant indigenous vegetation and dependent ecosystems.
- To allow for low impact passive recreational and ancillary land uses that are consistent with the retention of the natural ecological significance.

Given that the subject site is located within the 'Greater Penrith to Eastern Creek Urban Release Investigation Area', the surrounding land uses are likely to change in the near future with the NSW Government's plans "to support access to urban renewal and new land release areas including the Greater Penrith to Eastern Creek Growth Investigation Area and the Western Sydney Aerotropolis precincts" (Sydney Metro 2020b). The subject property is proposed for redevelopment which would comprise of commercial and industrial land uses, which would consist of large warehouses and industrial units. Preliminary environmental assessments are currently being undertaken as part of the proposed redevelopment on the subject property and are further discussed in Chapter 7. This suggests that the area within the immediate vicinity of the subject site will soon be transformed, and perhaps rezoned allowing for greater compatibility (in terms of land use) with the project.

Furthermore, the area to the immediate west of the subject property will feature the proposed metro alignment for the Sydney Metro – Western Sydney Airport, suggesting that this corridor will also likely be rezoned in line with the new infrastructure.



Note: zoning colours: RU2 -Lighter orange/peach colour, C2- darker orange/peach colour

Figure 3-1 Land use zoning of the subject property (Source: Penrith LEP, ePlanning Spatial Viewer)

It should also be noted that Part 2 of the Western Parkland City SEPP outlines the permissibility in relation to land use zones in and surrounding the Aerotropolis. Figure 3-1 and Figure 3-3 show the land use zones that will apply to the Aerotropolis and the surrounding precincts, showing that the entire area will be transforming and suggesting that this will also, at some stage, impact on the land use zones surrounding the are of the subject property in order to be able to service the growth and development of these new areas.

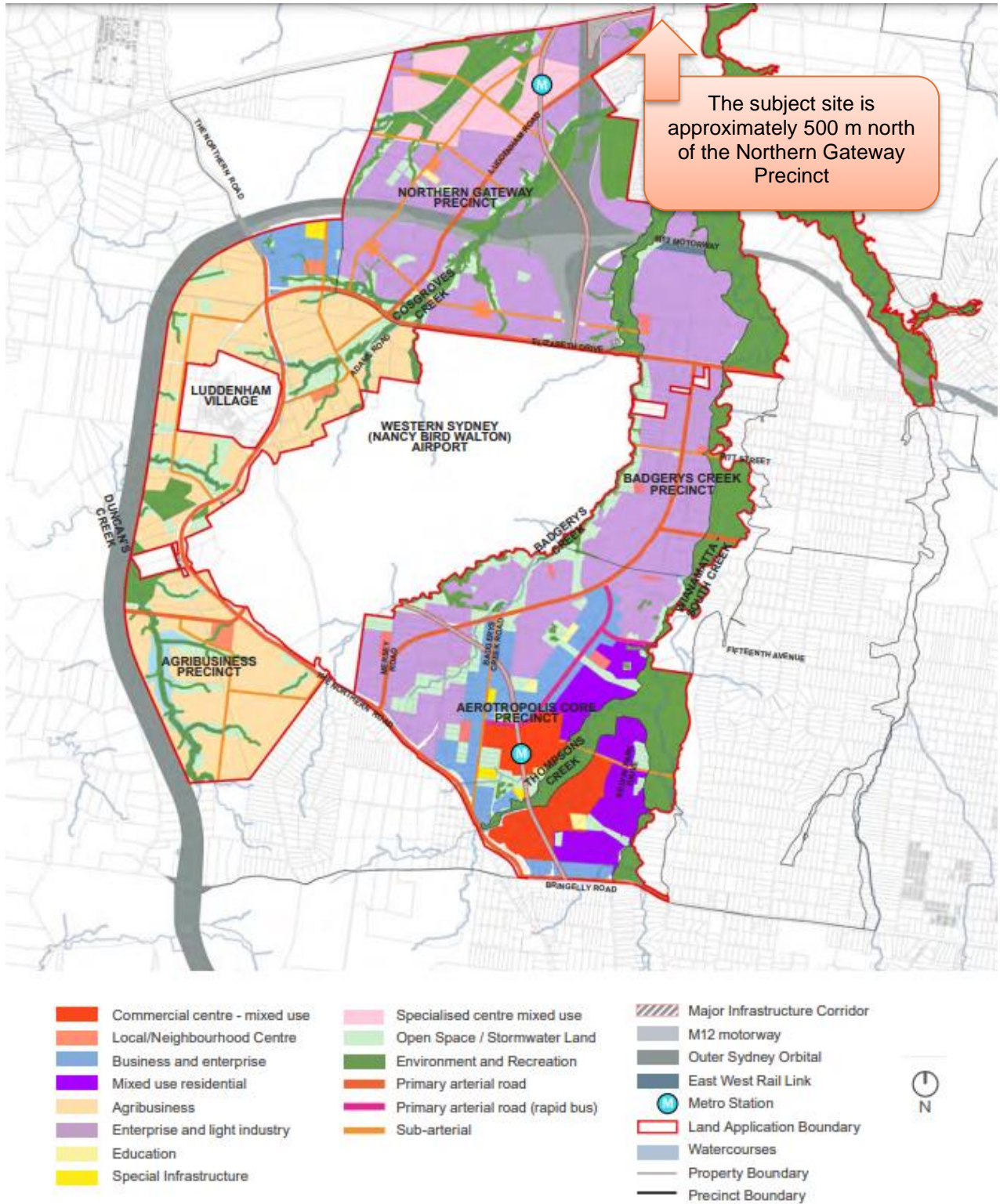
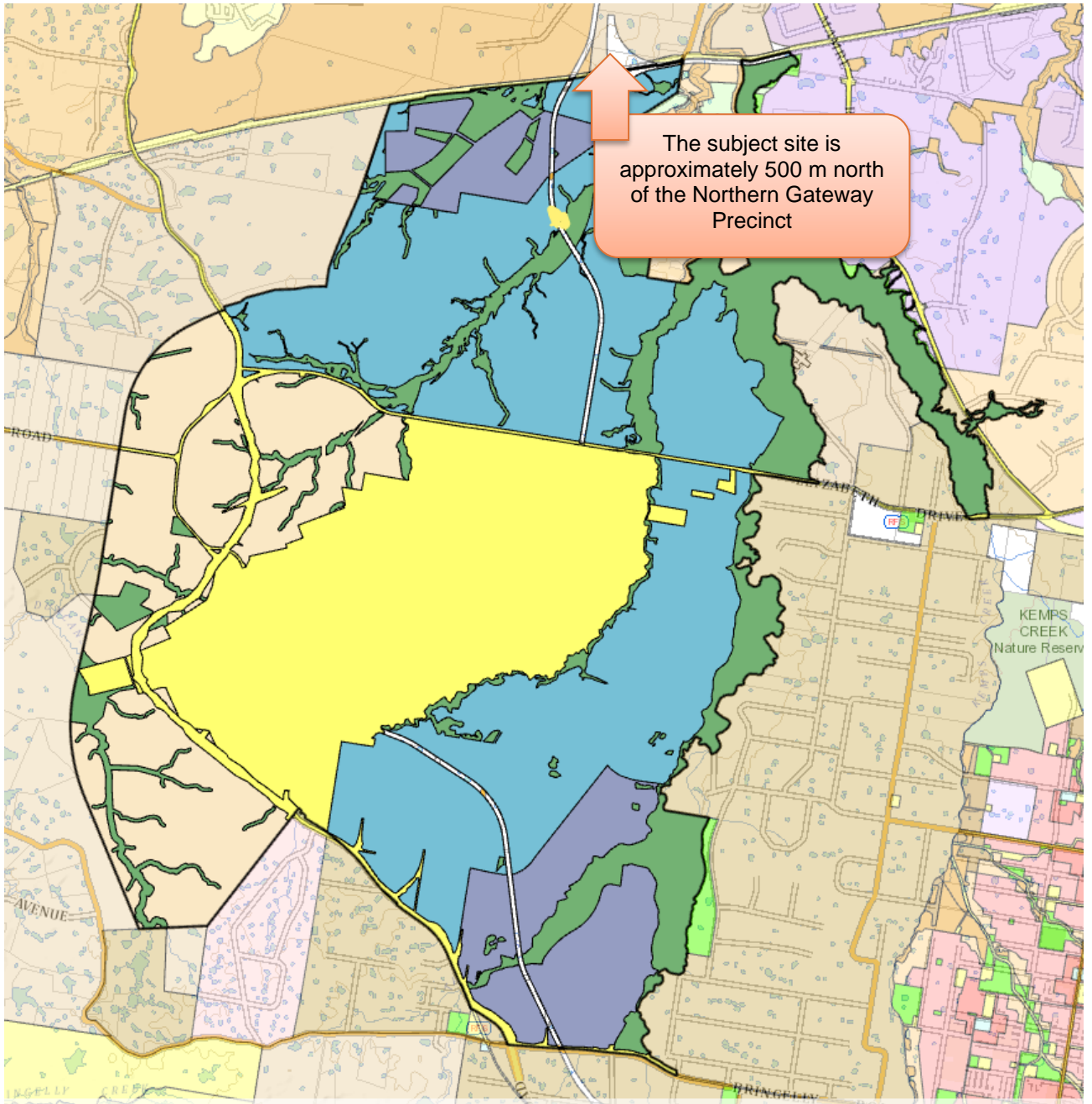


Figure 3-2 Land use and structure plan (Source: the Aerotropolis Plan DPE 2022a)



Note: zoning colours - SP2- yellow, AGB- light orange/apricot colour, ENT- blue, EN2/C2 – green, MU- purple.

Figure 3-3 Land zoning map for the Western Sydney Aerotropolis (Source: Planning Portal, DPE 2022)

3.5 NSW Environment and Planning Assessment Regulation 2021

Table 3-2 Section 171(2) Review of environmental factors – the Act, s 5.10(a)

Clause	Response
(a) the environmental impact on the community	<p>The construction of the project will have temporary impacts on the surrounding sensitive receivers outlined in Section 6.1.</p> <p>It is important to note that the area is currently sparsely populated, and thus the minimal impacts (noise, dust and visual) will only be felt by a few adjoining premises.</p> <p>Furthermore, Patons Lane is a side street with no residential dwellings. The road is mainly utilised by traffic passing through and Bingo’s Patons Lane Resource Recovery Centre (Patons Lane RRC). Part of the road may be obstructed temporarily, however appropriate signage and controls will be implemented.</p> <p>It is important to note that any impacts will be short-lived.</p> <p>Should there be any planned electricity outages, relevant residents, commercial and industrial premises will be notified.</p> <p>Furthermore, construction notification will be provided to affected residents on Luddenham Road 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.</p>
(b) the transformation of the locality	<p>Once the Orchard Hills SS has been constructed works have been completed, the boundary within the subject site will be landscaped and vegetation planted along the edges as per the designs shown in Appendix A. The vegetation should hide most of the site components, however fences and will still be visible.</p> <p>However, the entire surrounding area is currently undergoing a transformation. Thus, even though the project may not directly contribute to a significant transformation, the locality will be transformed by other new infrastructure (ie Sydney Metro) and other development in the area.</p>
(c) the environmental impact on the ecosystems of the locality,	<p>Local ecosystems are not expected to experience any significant impacts, as per the conclusions from the ecological impact assessment summarised in Section 9.4 Biodiversity.</p>

Table 3-2 Section 171(2) Review of environmental factors – the Act, s 5.10(a)

Clause	Response
(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 Aerotropolis, Sydney Metro and the surrounding area.
(e) the effects on any locality, place or building that has—	Potential impacts to Aboriginal and historic heritage are addressed in Sections 9.2 and 9.3 respectively. No major impacts are expected.
(i) aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance, or	
(ii) other special value for present or future generations,	
(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 9.4 Biodiversity. Impacts 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 the Aerotropolis, Sydney Metro and other new infrastructure and development in the Western Sydney Growth Area.
(i) degradation of the quality of the environment,	Refer to (h).
(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.

Table 3-2 Section 171(2) Review of environmental factors – the Act, s 5.10(a)

Clause	Response
(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 of the materials required for the construction of the project All of the materials required for construction of the project are readily commercially available and considered to be generally in supply.
(o) the cumulative environmental effect with other existing or likely future activities,	As previously noted, the entire precinct surrounding the project is currently in the process of being transformed, and 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 within the Aerotropolis and the surrounding area 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 9 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.

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; and
- environmental incidents involving actual or potential harm to human health or the environment must be reported to OEH.

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 has been assessed for relevant contaminants of concern, and the results are included in Section 9.6. Based on the laboratory test results summarised in Section 9.6, it has been concluded that the in-situ material may be classified in accordance with EPA's Waste Classification Guidelines as:

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

3.6.4 NSW Biodiversity Conservation Act 2016

In accordance with the NSW *Biodiversity Conservation Act 2016* (BC Act), a number of factors need to be taken into account 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 (GES 2022).

The ecological assessment has concluded that the majority of works associated with the project are designed to take place on land which has been cleared and disturbed by past land uses (ie the subject site). However, a portion of the works will occur within the road reserve of Patons Lane, with some minimal works along the road verge to enable the construction of the proposed driveway to the subject site. Construction works along the verge may result in the removal of a few trees belonging to the Cumberland Plan Woodland CEEC, however the impact to the local population would be negligible. If removal of trees is required, a 5-part test under the BC Act would be undertaken.

3.6.5 Summary of legislative requirements

Table 3-3 Other legislative requirements

Legislation	Authority	Responsibility	Requirement	Comment
NSW <i>Contaminated Land Management Act 1997</i> (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 <i>Electricity Supply Act 1995</i> (ES Act)	Local Council	EE	Notification – under s45, a 40 days' notice is required for proposed electricity works.	PCC will be notified as part of REF notification process.
NSW <i>Heritage Act 1977</i> (Heritage Act)	DPE / Heritage Council	EE/ Project manager	Consideration – under s139 as to whether a permit to excavate or disturb land is required.	No items of non-Aboriginal heritage have been identified within the subject site or any other area to be impacted by the project. Refer to Section 11.5 on heritage and archaeology.

Table 3-3 Other legislative requirements

Legislation	Authority	Responsibility	Requirement	Comment
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.	Notified as part of REF notification process.
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.
<i>National Greenhouse and Energy Reporting Act 2007</i>	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.	EE's company-wide reporting will be undertaken each year in accordance with legislative requirements.
<i>NSW National Parks and Wildlife Act 1979</i>	DPE	Project manager/ Project supervisor	Consideration/ Approval – under s90 to harm or desecrate Aboriginal objects or places. Determining authority for works on NPWS land.	There are no Aboriginal artefacts that have been identified within the subject site and along the transmission feeder route which is the subject of this REF.

Table 3-3 Other legislative requirements

Legislation	Authority	Responsibility	Requirement	Comment
NSW <i>Protection of the Environment Operations Act 1997</i> (POEO Act)	DPE	Project manager/ Project supervisor	General – under s120 no “dirty water” discharge into stormwater drains.	Refer section 9.5
POEO Waste Regulation	DPE	Project manager/ Project supervisor	General – under section 24 transportation of certain waste must be tracked.	Refer section 9.6
NSW <i>Roads Act 1993</i>	PCC	Project manager / Project supervisor	Approval – under s138 for work on a classified road.	Approval for any works on Paton Lane will be obtained by the project manager/ project supervisor before commencing any road works.
NSW <i>Rural Fires Act 1997</i>	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 9.14
NSW <i>Biodiversity Conservation Act 2016</i> (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 9.4
NSW <i>Water Act 1912</i>	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 groundwater 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.

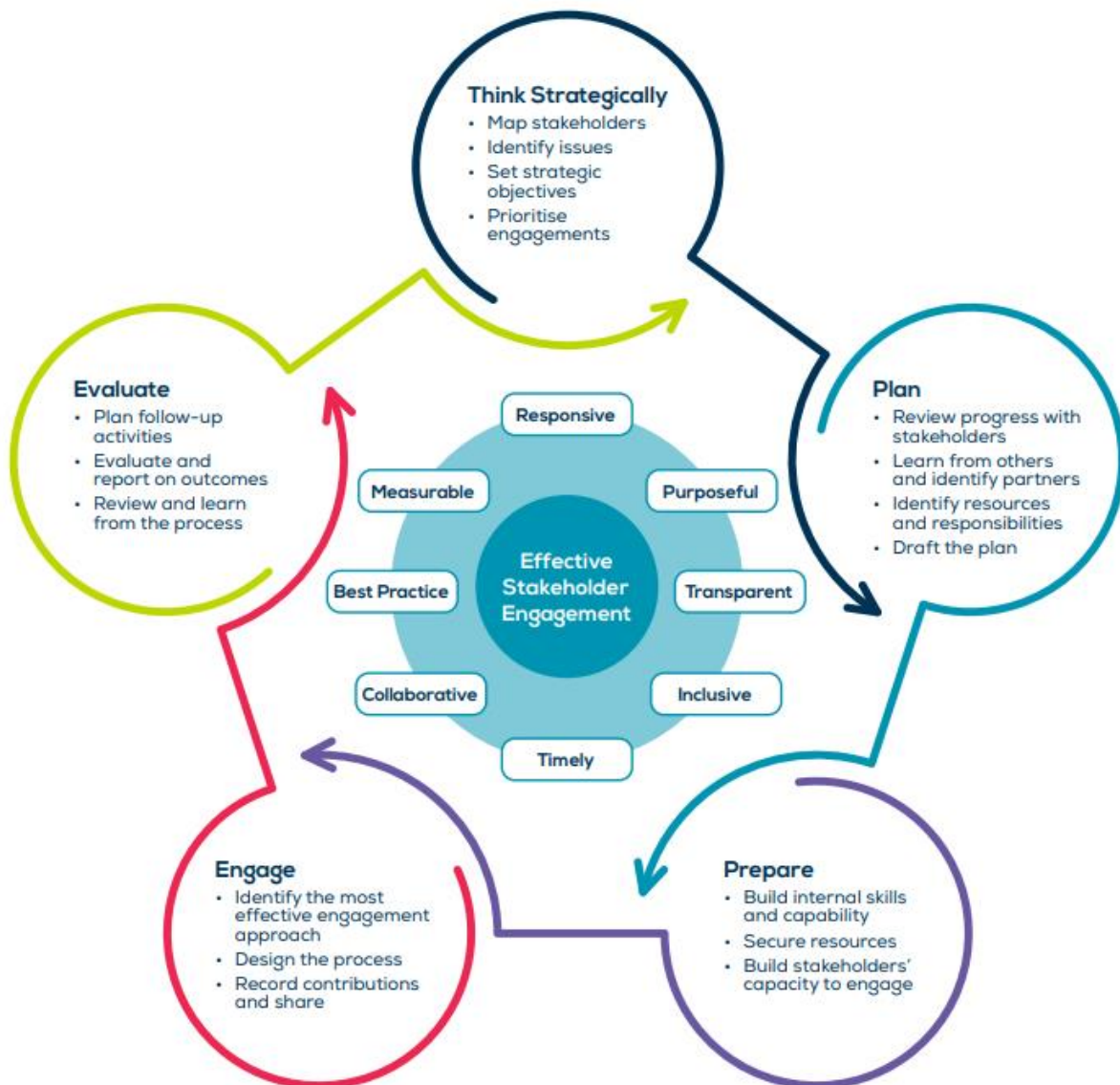


Figure 4.1 Endeavour Energy Stakeholder Engagement Framework

4.2 Project specific consultation

EE notified a range of stakeholders in relation to the environmental assessment for the SS and the associated 132kV network feeders connection projects (not assessed herein). See Attachment 3.

A public notice in relation to the draft REF was published in the Western Weekender on 26th August. The draft REF will also be published on the EE website.

The stakeholders directly consulted in relation to the draft REF included Penrith City Council (on 18th August 2022) and residents and businesses occupying properties adjacent the proposed SS property (on 19th August 2022).

No responses have been received to date.

Endeavour Energy will also consult with landowners nearby the works prior to commencement of construction.

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 and 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/>

In addition, EE will place notifications in local news outlets to ensure people know about the project and have an opportunity to access the REF and provide comments.

In accordance with section 45(4) of the Electricity Supply Act 1995, EE will be notifying council, no less than 40 days prior to the commencement of construction. This allows PCC to provide comment to, or ask questions of, EE on the project and the environmental assessment. This notification was sent to PCC on 18th August 2022.

5 Consideration of alternatives

A number of alternatives were considered to address the primary objectives of the broader project associated with the aerotropolis – including feeders and substations. EE’s Asset Planning and Performance (APP) division identified the need for network expansion and augmentation to cater for the required demand forecasts of the Western Sydney Aerotropolis Growth Area (WSAGA).

A 132kV transmission electricity supply strategy was proposed by APP, that would interconnect the recently built South Erskine Park zone substation (ZS) in Oakdale West and Bringelly ZS in Bringelly. Two route options were taken forward as outlined below.

Route 1 (shown on Figure 5-1 below as pale blue and magenta) was proposed to commence at the new South Erskine Park ZS in Kemps Creek, then heading south via the new Oakdale West subdivision on to Bakers Lane. From there, the route traversed west via Bakers Lane, crossing Mamre Road and then on to Luddenham Road at Luddenham. From there, the route extended south via Luddenham Road, on to Adams Road and then join the new Northern Road (TNR). The proposal would then traverse south via TNR and connect to Bringelly ZS.

Route 2 (shown on Figure 5-1 below as red and magenta) was proposed to commence at TransGrid’s Sydney West Bulk Supply Point (BSP) at Eastern Creek, following the existing 330kV overhead feeder ‘39’ easement to the west, then south through multiple land parcels on to Elizabeth Drive at Luddenham. The route would then traverse east on Elizabeth Drive, then south on to Adams Road and then join the new TNR. Like Route 1, the feeder then traverse south via TNR and connects to Bringelly ZS.

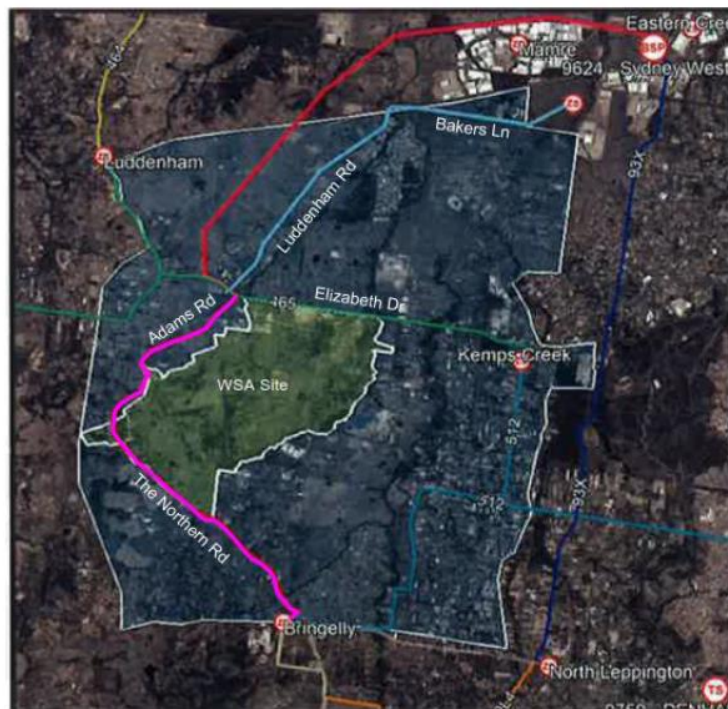


Figure 5.1 Proposed route options

Route 1 was determined as the preferred route. The preferred route was determined by Endeavour Energy following the feeder route options study, and it is in keeping with the essential infrastructure corridors agreed to by the Western Sydney Utilities Collaboration (which includes MOU partners, TransGrid, Transport for NSW and the Department of Planning & Environment).

The substation works were confirmed on the basis of the final route alignments.

6 Existing environment

6.1 General context

The subject site is located within the suburb of Orchard Hills, which is part of the Greater Western Sydney region and is located approximately 25 km north-west of the city of Liverpool, 20 km south-west of the city of Parramatta and approximately 50 km south-west of the city of Sydney. Orchard Hills falls within the Penrith local government area (LGA) and is characterised by a rural landscape with undulating hills and a scenic background.

The subject site is located on Patons Lane, Orchard Hills. The subject site is within a land lot (subject property; currently Lot 1, DP 1099147 as shown in **Figure 6-1**) at 221-227 Luddenham Road, Orchard Hills; however once this land lot is subdivided the main access to the site will be via Patons Lane. Once subdivided, the subject site will encompass approximately 6,372 metres squared (m²) of land, which will become Lot 99, DP 1282927.

The subject site is on relatively flat terrain with the ground surface slightly falling to the north-west at angles of less than 3 degrees (GeoEnviro 2022a). Based on Google Earth, the subject site is situated at approximately 37 m above sea level (GeoEnviro 2022a).

The entire subject property is set within a rural setting, on a disturbed land lot which was previously a horse agistment facility (Coolamon Park). The subject property features numerous brick stable structures and horse agistment yards, some of which are delineated by timber fencing. A number of man-made access tracks exist within the subject property.

The surrounding landscape of low relief hills and plains features several small ponds and a few larger dams located to the west and south of the subject site, two of which appear to be located within the subject property. The closest drainage line is a small unnamed tributary that traverses the north-western corner of the subject property and is to the immediate north-west from the subject site. South Creek is located approximately 500 m east of the subject property. Groundwater is expected to flow to the north-west into a tributary of South Creek which eventually flows to the Hawkesbury Nepean River (GeoEnviro 2022a).

The subject property and the subject site are covered by thick pasture grasses given the previous land uses. There is a patch of trees and shrubs along the unnamed tributary in the north-western corner of the subject property, and immediately north-west of the subject site. The subject site has no trees or shrubs. The subject site is shown in the photographs below.



Plate 1: From east through south to west at the approximate NW corner of the proposed Orchard Hills SS site from Patons Lane. Patons Lane is on the left and continues east into the distance at centre. The fencing and shelters of the horse agistment facility that remain will be demolished and the proposed SS site property raised or benched and levelled



Plate 2: From west through NW to north at the approximate SE corner of the proposed Orchard Hills SS site towards Patons Lane at far right. The fencing and shelters of the horse agistment facility that remain will be demolished and the proposed SS site property raised or benched and levelled

As previously noted, a strip of roadside trees belonging to the Cumberland Plain Woodland CEEC is located within the road verge of Patons Lane immediately north of the subject property. The trees are located on both sides of Patons Lane.

There is an events centre (Bosna Croatian Club) located at 229a Luddenham Road, Orchard Hills immediately east of the subject property. The Luddenham Oval (Werrington Football Club) is also located immediately east to the subject property at 229-231 Luddenham Road, Orchard Hills.

Surrounding rural dwellings are sparsely populated, with no residential premises located to the north, west and south of the subject property. Closest occupied residential premises are situated to the east of the subject property at:

- 233A Luddenham Road, Orchard Hills (approximately 230 m east);
- 251 Luddenham Road, Orchard Hills (approximately 210 m east);
- 263 Luddenham Road, Orchard Hills (approximately 210 m east);
- 275 Luddenham Road, Orchard Hills (approximately 140 m east);
- 287 Luddenham Road, Orchard Hills (approximately 145 m east); and
- 289 Luddenham Road, Orchard Hills (approximately 40 m east).

The distance of the surrounding premises, residential properties and land uses would be approximately another 200 m or more from the subject site given that the subject site will be located in the northern part of the subject property.

Other rural residential premises in the vicinity of the subject property are located on the other side of the Luddenham Road, Orchard Hill, as can be seen in Figure 6-1.

Other than local passing traffic, the main road user sharing Patons Lane is Bingo Industries' Patons Lane Resource Recovery Centre (Patons Lane RRC), situated approximately 450 m north-west of the subject site and shown in Figure 6-1.

As previously noted, the area is expected to transform with the construction of the Sydney Metro and other surrounding development.



Figure 6-1 Local context of the subject property (Source: Six Maps 2022)

6.2 Physical context

The project is located within the Sydney Basin and while the subject property is relatively low lying and flat, the broader landscape traverses a topography of gently undulating hills.

Native trees remaining in the area are characteristic of the open forest and woodland that once used to dominate the area, and include species such as spotted gum, broad-leaved ironbark, woollybutt, forest red gum, narrow-leaved ironbark, grey box and spotted gym (Artefact 2022a). As previously noted, the trees along the road verge in Patons Lane have been identified as belonging to the Cumberland Plain Woodland CEEC. Grasses found in the area include speargrass, bordered panic, kangaroo grass and paddock lovegrass (Artefact 2022a).

A broader study area was assessed as part of the broader transmission supply installation works and noted that the areas surrounding the subject property straddle a number of soil landscapes. The Cumberland landscape unit is underlain by Triassic Wianamatta Group of sediments, predominantly shales with some areas of sandstone and interbedded claystones and ironstones (GES 2022a). The South Creek floodplain also includes areas of Quaternary alluvial deposits.

The soils are generally red podzolics with a moderately deep profile. They are moderate fertility and have a moderate erosion hazard. Soils in lower lying areas tend to have a yellow B horizon and higher levels of salinity. Soil properties are further discussed in Section 9.5.

6.3 Cultural setting

Most of the areas surrounding the subject property have 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 (GES 2022).

As previously noted, the area surrounding the subject property is sparsely populated, with a small cluster of residential dwellings on either side of Luddenham Road, close to its intersection with Patons Lane.

There is another cluster of residential dwellings either adjacent to, or about 100-200 m south-east of Luddenham Road, approximately 300-400 m south of the Warragamba pipelines.

The closest densely populated areas are the town centre of Orchard Hills, which is approximately 1.8 km north-west and the town centre of St Claire, which is approximately 1.8 km north-east of the subject property.

Orchard Hills belongs to the 'Mulgoa-Luddenham-Orchard Hills region' as categorised by the Australian Bureau of Statistics (ABS 2020). The total estimated residential population of this region is 11,934 persons, spaced over an area of 15,868 ha. Approximately 1.7 ha of the entire region includes protected land area.

At present, the area has about 1,308 businesses, with 65.7% of the population classified as working age population (aged 15-64).

The area has a rich Aboriginal and European history, which has been assessed as part of the broader transmission supply installation works (Artefact 2022).

7 Proposed works

7.1 Overview

EE is proposing to construct and operate the Orchard Hills SS, which will be contained wholly within the proposed Lot 99, DP 1282927 on Patons Lane, Orchard Hills. The Orchard Hills SS will serve EE's broader transmission supply network within the Western Sydney Growth Area, with proposed feeder connections to the Sydney Metro – Western Sydney Airport, and multiple other proposed or existing zone substations.

This section describes the construction works proposed as part of the project.

7.2 Subject site

Once subdivided, the surrounding subject property (Lot 1, DP 1099147) is proposed for redevelopment which would comprise of commercial and industrial land uses, which would consist of large warehouses and industrial units. Preliminary environmental assessments are currently being undertaken as part of the proposed redevelopment on the subject property. EE is working in close collaboration with the investors of the redevelopment, and the subject site will be designed with consideration of the proposed surrounding land uses and design.

7.3 Description of work

7.3.1 Site layout components

Key project components that will need to be constructed and installed are shown in Figure 7-1 and listed below:

- An indoor SS building, which will house the connection for 132 kV underground transmission feeder cables, 11 kV distribution feeder cables, switchgear, and associated bus-bar sections with three feeder bays.
- Auxiliary service buildings including a control room building, an amenities building, and safety station.
 - The control room building will be approximately 3 – 3.5 m high depending on the aspect of the building (refer to Appendix A). It will contain control, protection, batteries, SCADA, communications, and fire equipment.
 - The amenities building will include a meal room and toilet facilities, as well as a connection to a sewer septic tank.
- Concrete pavement areas for site access and egress points (ie two separate driveways in and out of the subject site), flexible pavement for the area close to site access, and gravel pavement for all other areas of the site.
- On-site water and stormwater management systems including:
 - a mains water supply booster pump-house structure in the north-west corner of the subject site;
 - temporary water storage tanks along the western buffer area;
 - above ground detention tank and water quality basin;
 - underground stormwater pipes;

- sub soil drainage and flushing point; and
- a grated trench drain.
- A fire hydrant system including fire extinguishers and fire hydrant enclosure boosters.
- Other ancillary plant, equipment and components including:
 - two external auxiliary power transformers;
 - four control cable pits (CCPs);
 - two safety deluge showers (DSs);
 - rooftop solar photo-voltaic (PV) panels; and
 - security alarm system.
- Parking spaces for two light vehicles.
- Two electric vehicle charging stations, with the ability to accept heavy vehicles.
- Double security perimeter fencing, with an outer 1.2 m post and rail fence and another inner security fence. The two fences will be approximately 10 m apart, with a grassed landscape area between the fences. This area will be vegetated with appropriate native flora species.
- Temporary construction sheds and laydown area will be established on site during the construction works. The temporary construction sheds and laydown areas will be removed upon completion and commissioning of the project.
- Underground feeder cable ducts from the subject site to Patons Lane road corridor boundary to facilitate underground transmission and distribution feeder connections to the SS.

New waste water facilities including a sewer septic tank for the toilet and amenities basin. Connection to the sewer will be made when a sewage network is available from the surrounding development.

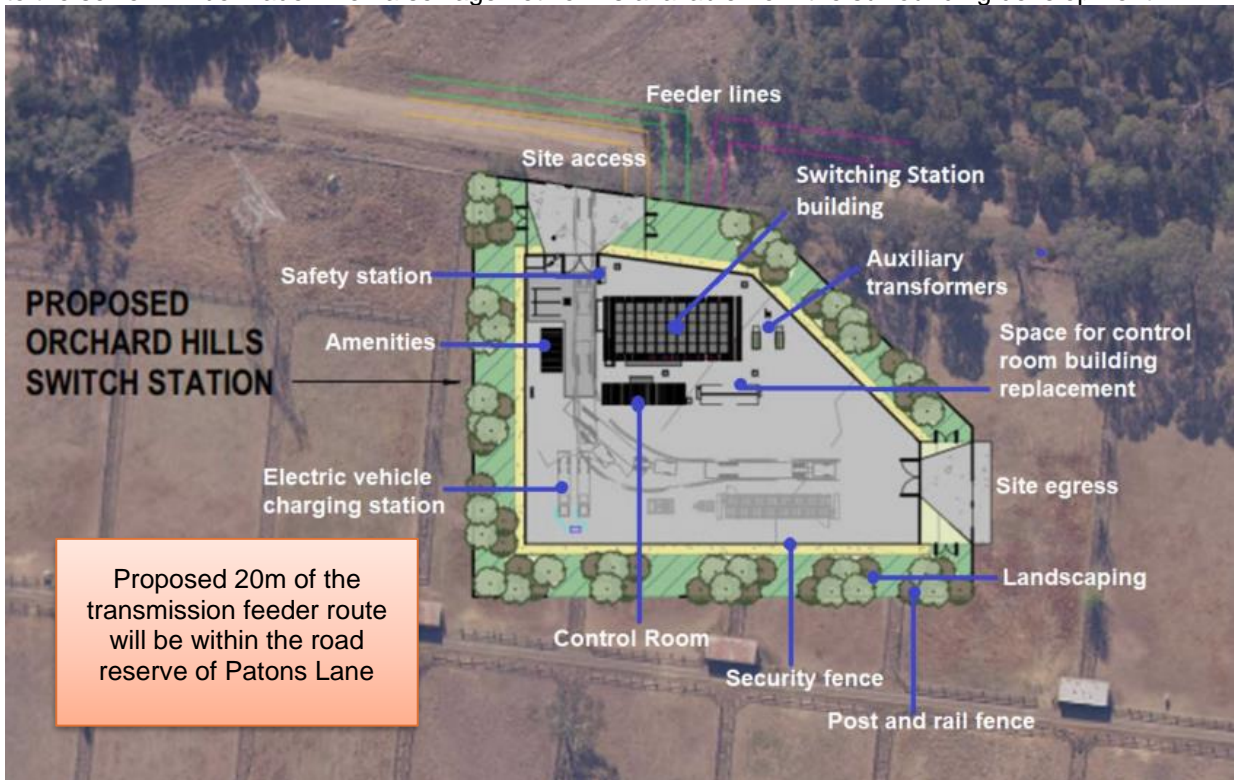


Figure 7-1 Orchard Hills Switching Station - indicative site layout

7.3.2 Stages of construction

As previously noted, EE's broader transmission supply works within this Western Sydney Area will be undertaken during seven construction stages (Stage 1 -Stage7). The Orchard Hills SS will be constructed over 18 months.

7.4 Methods to be used

7.4.1 Trenching

Trenching will occur beneath the road verge from the subject site to Patons Lane, to connect the underground transmission and distribution feeder lines. Given that these works will be confined to the road verge, minimal disruption is expected to road users along Patons Lane.

7.4.2 Platform preparation and earthworks

EE proposes to raise the subject site by about 1 – 2 m, to be in line with the proposed surrounding development on the adjoining areas. The proposed Orchard Hills SS structures are likely to be supported on piles to minimise long term settlement of the fill layer.

Given the presence of weak and wet subsurface ground conditions, GeoEnviro's Geotechnical and Environmental Engineers propose the following platform preparation and earthworks for the construction of the project:

Drainage improvement

- The subject site was found to be poorly drained with the majority of the site waterlogged, thus the following drainage improvements are required:

- 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.
- Construction of subsurface drains and surface drains at appropriate locations.

Earthworks

- Earthworks to raise the SS platform to design level to be carried out in a controlled manner in order to avoid surface ground subsidence, with consideration of the following techniques:
 - Stripping and removal of all topsoil and organic material.
 - All uncontrolled fill (if encountered) should be excavated to expose natural clay.
 - Proof rolling of the exposed surface with a minimum 10 tonne (t) vibrating roller to identify soft and heaving areas. Based on the borehole investigation undertaken as part of geotechnical investigation works summarised in Section 9.5, it is expected that the upper 1-2 m of the insitu clay is weak with high moisture requiring excavation moisture conditioning and recompacting.
 - Depending on the weather during construction works, and the success of drainage improvements described above, deep excavation may be impacted by the presence of groundwater. Should groundwater be encountered, the construction of a bridging layer comprised of crushed rock may be required.

Retaining walls

- Rigid or 'propped' retaining walls may be required to retain cut or fill.

Batter slopes

- All fill not retained to be appropriately battered to ensure stability.

Footings

- It is recommended that all footings for the proposed SS structures 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 should be undertaken by a suitably qualified geotechnical engineer to ensure piers are founded on adequate foundation material and to ensure site conditions and design assumptions are consistent with the findings of this report.

Internal Pavement and Access Driveway

- Pavement upgrade for the proposed driveway and road should be prepared as follows:
 - Boxing down of the pavement subgrade to design level.
 - Proof rolling of the exposed surface with a minimum 10 t vibrating roller to identify soft and heaving areas. If soft and heaving areas are encountered, excavation of soft material

should be carried out and replaced with good quality granular fill such as ripped sandstone having a maximum particle size of 75 mm.

- Pavement structure, composition and thickness should reflect the recommendations in GeoEnviro's geotechnical investigation report.
- Adequate surface and sub-surface drainage should be provided for the pavement and adjacent areas.

7.5 Stockpiling of materials

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.

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

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).

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.

7.6 Timing, duration, hours of work

As noted above, the trenching and earthworks are due for commencement in October 2022 and are expected to last over approximately 18 months. This will be followed by cable pulling and jointing with the former occurring for approximately another 18 months with the latter completed in 9-10 months from March 2023 to December 2023. Impacted landowners will be notified about proposed construction activities in a timely manner.

Construction works will be undertaken during standard working hours:

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

EE can construct for two consecutive nights without approval. However, this eventuality would not be undertaken without consultation with nearby residents.

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 to progress approval for those works.

7.7 Equipment and materials required

The general plant and equipment required for the works include:

- Trenching, conduit laying and backfilling:
 - Excavators
 - Tippers
 - Agitators
 - flatbed trucks
 - bob cat,
 - crew/tool truck
 - vac truck.
- cable pulling at the joint bays:
 - crane
 - winch
 - cable trailers
 - drum stand
 - crew/ tool truck.
- Earthworks:
 - Excavators
 - tippers
 - agitators
 - flat-bed trucks
 - crane
 - vac truck.

8 Environmental management

8.1 Environmental management standards

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

EE Environmental Management Standard *EMS0001 Environmental Impact Assessment and Environmental Management Plans* (EMS 0001) 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.

8.2 Environmental management plan

This REF has identified a number of mitigation and management measures to minimise adverse environmental impacts that could potentially arise from the project. These mitigation and management measures would mostly be implemented during the construction phase of the project.

A site-specific Construction Environmental Management Plan (CEMP) will be prepared 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, 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.

Furthermore, the construction of the project will be subject to audits by EE's S&E Team 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.

8.3 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.

9 Environmental assessment and mitigation

9.1 Overview

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

- Aboriginal cultural heritage;
- Historic heritage;
- Biodiversity;
- Geotechnical features at the subject site; and
- Waste associated with earthworks and construction activities.

The assessment reports are provided in appendices B, C and 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 are also addressed in this section and comprise water, utilities and services, roads, traffic and access, visual, socio-economic impacts, noise, air quality and dust suppression, safety and hazards, bushfire, and cumulative impacts.

Prior to the commencement of construction, a construction contractor will develop a CEMP with the approval of EE's Environmental Specialist, 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.

EE will ensure that any construction works are undertaken with consideration of other planned construction works surrounding the subject site, and to minimise any cumulative impacts that may result from the same.

9.2 Aboriginal heritage

9.2.1 Overview

An Aboriginal heritage due diligence assessment (AHDDA) for the broader transmission installation route and project was prepared by Artefact Heritage Services (Artefact) (Artefact 2022a). Potential impacts on Aboriginal heritage from the broader project were assessed in accordance with the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (due diligence guidelines) (DECCW 2010b). 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.

This section provides a summary of the AHDDA which is relevant to the project.

9.2.2 Existing environment

i Aboriginal history of the locality

The area studied for the AHDDA (ie study area) is located in the traditional lands of the Darug, Dharawal and Gandangara people, whose traditional lands within the region are described in Section 1.4.5 of the AHDDA.

The oldest archaeological evidence of Aboriginal activity in the Sydney region is from Cranebrook Terrace, which is located approximately 15 km north-west of the study area. Sediments from an archaeological excavation at this site have been dated to 41,700 years Before Present (BP) (ANU-4016). Interactions with Aboriginal people across Sydney and surrounds are documented from early 1800s, from which point their population declined. Descendants of the Darug, Gandangara and Dharawal groups continue to live across the Cumberland Plain along with Aboriginal people from other areas of NSW.

ii European history of the locality

Exploration of the area within Western Sydney began soon after first settlement, given that the sandy shallow soils of coastal Sydney were unsuitable for cultivation and it was necessary to find more fertile land. Early residential settlement in Western Sydney, predominantly surrounding Penrith and Parramatta, was driven by agriculture.

The study area was first visited by Europeans in the 1800s. The earliest European land use in the study area was likely to have been associated with timber getting, grazing and pastoralism from the early 19th century onwards. Analysis of historical aerial imagery shows that the most of the study area had roads constructed prior to the earliest photographs being taken in the 1930s.

iii Previous archaeological investigations and research

A number of archaeological assessments took place in locations of similar topography to the study area, across Western Sydney, including the suburbs of Quakers Hill, Oakdale, Horsley Park, and Erskine Park, contributing 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, and 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 as a result of the resources that were associated with these landforms. OEH (now DPE) lists 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; and
- Within 20 m of or in a cave, rock shelter, or a cave mouth.

iv Aboriginal Heritage Information System (AHIMS) database search

The Aboriginal Heritage Information System (AHIMS) was searched on 2 and 9 May 2022 for an area of approximately 1000 m (east-west) by 1000 m (north-south) from the study area. The AHIMS search identified a total of 331 sites within approximately 1000 m of the study area.

DPE – Heritage (former OEH) lists 20 standard site features that can be used for each site, the frequency of which is summarised in Table 9.1. The results of the search are shown in Table 9.1 and in Figure 9-1.

However, it is important to note that no sites were identified within the subject site, subject property or within the Patons Lane road reserve, as can be seen in Figure 9-1.

Table 9.1 Frequency of recorded site types

Site features	Frequency	Percentage
Artefact	304	91.9
Artefact, potential archaeological deposit (PAD)	14	4.2
PAD	8	2.4
Modified tree (scarred or carved)	4	1.2
Grinding groove	1	0.3
Total	331	100

The findings are consistent with previous archaeological investigations within the Cumberland Plain, in that although Aboriginal occupation covered the whole of the landscape the availability of fresh water, and associated resources, was a significant factor in repeated and long-term occupation of specific areas within the landscape. Certain site types, such as culturally modified trees, are particularly sensitive and can be easily destroyed throughout historical occupation, while others, such as stone artefacts, are more resilient.

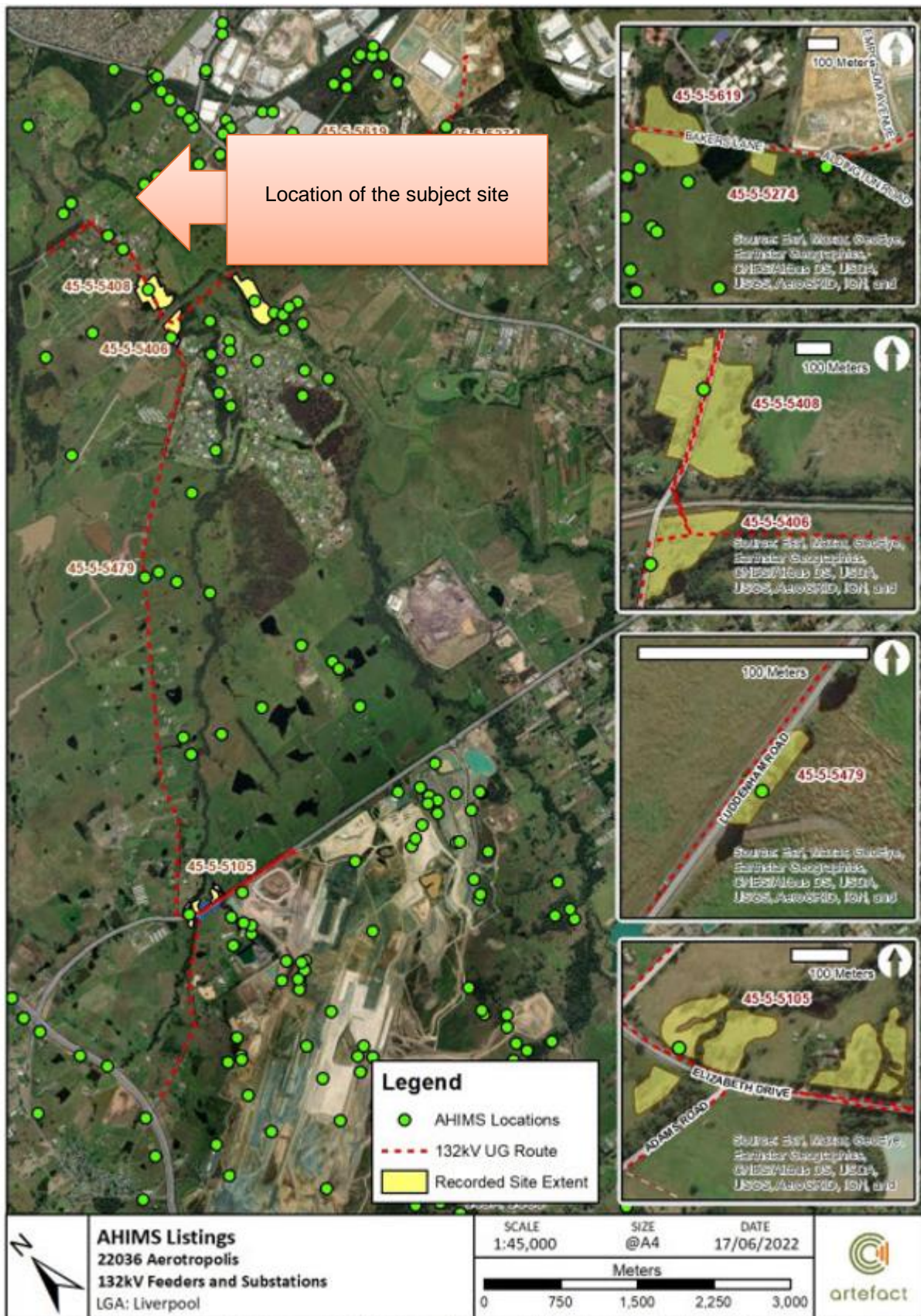


Figure 9-1 Map showing the location of recorded Aboriginal sites from AHIMS search results

v Site inspection

A due diligence assessment was carried out on 18 May 2022 by Artefact's Senior Heritage Consultant, Heritage Consultant and EE's representative (J. Sokalik, E. Jones and C. Jurd respectively). Another inspection was carried out on 27 May 2022 by Artefact's Technical Director, Heritage Consultant and EE's representative (J. Symons, E. Jones and C. Jurd respectively). The due diligence assessment served to inspect paved roads including Luddenham Road and Patons Lane.

Patons Lane was assessed from a vehicle and on foot. The road pavement for much of Patons Lane within the study area has been artificially raised above the surrounding ground surface.

vi Archaeological sensitivity

Archaeological sensitivity is closely related to levels of ground disturbance, whether artefacts are located on, or close to, the surface, and whether the area is within a sensitive landform unit according to the predictive statements. Assessment of the paved bitumen surfaces of Patons Lane did not identify any areas of archaeological sensitivity.



Photograph 9-2 Low ground visibility on Patons Lane (Source: Artefact 2022a)

vii Predicted impacts

There are no areas of high impact within the subject site or the subject property. There are no AHIMS listings recorded within the subject site.

9.2.3 Management and mitigation measures

The following management and mitigation measures are recommended in the AHDDA:

- Additional Aboriginal heritage assessment must be undertaken where it is identified that the proposed works require activities within the road verge. And this is currently being undertaken.
- Unexpected Aboriginal objects remain protected by the NP&W Act. If any such objects, or potential objects, are uncovered in the course of the proposed works, work in the vicinity must cease and Heritage NSW, Deerubbin Local Aboriginal Land Council (LALC), and a qualified archaeologist must be contacted for advice. Further assessment and permits may be required before works can recommence.
- If human remains are found, work must cease, the site must be secured, and the NSW Police and Heritage NSW, DPE must be notified.
- A heritage induction should be provided to all contractors prior to works commencing. The heritage inducing would identify the relevant legislative requirements and the unexpected finds procedure.

- Aboriginal objects cannot be impacted without an Australian Heritage Impact Permit (AHIP).

It should be noted that EE is currently undertaking further investigations at the AHIMS sites within the broader study area, which are a subject of a separate REF. However, there are no known archaeological and Aboriginal heritage items that have been identified within the subject site.

9.3 Historic heritage

9.3.1 Overview

A non-Aboriginal (historic) heritage impact assessment (HIA) was prepared by Artefact for the broader transmission installation project, to identify any areas of European heritage that are within the vicinity (Artefact 2022b).

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.

9.3.2 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 50 m of the study area that are listed on the RNE.

ii Listed heritage items

A search of the State and local heritage registers identified two items within 50 m of the study area, as shown in Table 9.2.

Table 9.2 Historic heritage items within the study area

Register	Listing	Significance
Water NSW Section 170 Register	Warragamba Supply Scheme (SHI# 4580161)	State
Penrith LEP 2010	Luddenham Road Alignment (LEP item no. 843)	Local
SEPP (Western Sydney Aerotropolis) 2020	Luddenham Road Alignment (item no. I8)	Local

iii History of the locality

Chapter 3 of the HIA in Appendix B outlines the history of the locality of the project, including the history of Luddenham Road and Warragamba pipelines and the value of the surrounding developments. Key historical heritage features of the area are summarised below:

- The first settlers were attracted to different regions of Western Sydney due to rich alluvial soils and local waterways required for agriculture. The availability of several local waterways including Badgerys Creek added to the attraction of the area surrounding Badgerys Creek.
- The first land grants in the area were made in 1808, which allowed settlers to establish rural estates.
- The study area passes through several early land grants, which were made to emancipated convicts. Private soldiers, free settlers, officials and officers between 1811 and 1821.

- Notable individuals that were granted land within the study area include wealthy landowner Gregory Blaxland and government official Captain John Piper. A portion of the study area also crosses Cosgrove Creek and South Creek, where Lot 222 DP 270417 identified as part of a 60-acre area granted to William Cosgrove in 1811.
- Works on the original Warragamba Emergency Scheme began in 1936 and was completed in 1940, whereby water was conveyed via a 48-inch pipeline across Megarrity's Creek Bridge at Warragamba, 16 km to the Prospect Reservoir. The Warragamba Dam was commissioned in 1960. The original Warragamba pipeline was upgraded in 1953 to an 84-inch pipeline, and a second 84-inch pipeline from Warragamba to Prospect was constructed between 1957 and 1969. No other major works have occurred on these pipelines, other than basic maintenance.

Artefact's HIA concludes that land development has changed little in the area, although some intensification has occurred such as in dairy and poultry farming, aviary activities and market gardening. Early slab cottages, homesteads, cisterns, sheds and vineyards persist as reflections of the districts former character.

Given the area is sparsely populated and is characterised by an open landscape, the location has seen it used for projects including defence and government radio infrastructure, and most recently and more widely, the construction of the Western Sydney Airport.

iv Site inspection

A site inspection of the study area was conducted on 27 May 2022 by Artefact's Technical Director and Heritage Consultant (J. Symons and E. Jones respectively). The site inspection served to investigate the project route including the landscape surrounding the road corridors.

No original road fabric was observed during the site inspection, as all existing road surfaces were observed to consist of modern bitumen with concrete culverts present at intervals.

9.3.3 Impact assessment

i Archaeological assessment

Artefact conducted an assessment of archaeological potential and significance, based on analysis of available historical plans, secondary sources and an understanding of previous impacts within the study area. A summary of archaeological potential and significance is provided in Table 9.3.

None of these heritage items are within the Orchard Hill SS site.

Table 9.3 Summary of archaeological potential

Phases	Potential remains	Archaeological potential	Archaeologica l significance	Potential for 'relics'
Early land grants	1809 - 1978 Luddenham Road corridor: Evidence of land clearing (tree boles, burnt soil), undocumented evidence of agricultural uses (postholes associated with fencelines/huts/agricultural structures, water management, structural evidence of huts, artefact scatters).	Nil	n/a	No

Table 9.3 Summary of archaeological potential

Phases	Potential remains	Archaeological potential	Archaeological significance	Potential for 'relics'
Luddenham Road	Pre-1879 - c.1920 Compressed earth surface, table drains, stone culverts.	Nil-low	Local	No
	1920 - 1950 Gravel ballast, table drains, stone/concrete culverts.	Low	Nil	No
	1950 - current Bitumen and modern road surfaces, table drains, concrete culverts.	Extant (not archaeological)	Nil	No

ii Impacts to heritage items

Section 6.3 assess the potential direct (physical), indirect (visual) and cumulative impacts of the proposed works on heritage items within the study area itself and its vicinity. An assessment of heritage impacts of the proposed works are outlined in Table 8 of the HIA, with the overall conclusion provided in the statement of heritage impact (SHI) below.

iii Statement of heritage impact

The HIA has concluded that the project will involve trenching within the existing road corridor along the Patons Lane. The existing road surface is not considered to be an element of the item's heritage significance as it is a modern addition to the road network.

The study area has generally low potential to contain locally significant archaeological 'works' associated with earlier phases of road construction.

Overall, the proposed works will not result in indirect or direct impacts on the Warragamba Supply Scheme pipeline listed on the Water NSW Section 170 register and the SEPP (Western Sydney Airport) 2020.

9.3.4 Management and mitigation measures

The following management and mitigation measures are recommended in the HIA:

- 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.

9.4 Biodiversity

9.4.1 Overview

An ecological assessment for the project was prepared by Gingra Ecological Surveys (GES) in order to assess whether the project route may support any flora and fauna species listed under the BC Act and the EPBC Act.

The ecological assessment involved desktop searches and a field survey, which was undertaken on 1 June 2022.

This was supplemented by a 5-part test that was undertaken in September 2022 to assess the trees in the road verge next to the site that will be removed.

This section provides a summary of the ecological assessment which is provided in Appendix D.

9.4.2 Existing environment

The study area is within the Hawkesbury Nepean catchment and is within the Central Coast botanical subdivision. It lies within the Cumberland Plain landscape unit.

i Desktop searches

GES conducted searches of the Atlas of NSW Wildlife and EPBC listed threatened flora for flora species present within 5 km and 10 km of the project. The results are presented in Table 9.4. For a full description of habitat preferences, presence in locality and whether it could possibly be affected, refer to Table 2 and Table 3 of the ecological assessment in Appendix D.

Table 9.4 Threatened flora desktop search results

Scientific name	Common Name	Atlas of NSW Wildlife *recorded within 5 km radius	EPBC listed threatened flora search *recorded within 10km radius
<i>Acacia bynoeana</i>	Bynoe's Wattle		X
<i>Acacia pubescens</i>	Downy Wattle	X	X
<i>Allocasuarina glauca</i>			X
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid		X
<i>Cynanchum elegans</i>			X
<i>Dillwynia tenuifolia</i>		X	
<i>Genoplesium baueri</i>	Yellow Gnat-orchid		X
<i>Grevillea juniperina</i> subsp. <i>juniperina</i>		X	
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>		X	X
<i>Haloragis exalata</i> subsp. <i>exalata</i>	Wingless Raspwort		X
<i>Isotoma fluviatilis</i> subsp. <i>fluviatilis</i>		X	
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i>		X	
<i>Melaleuca deanei</i>			X
<i>Persicaria elatior</i>			X
<i>Persoonia hirsuta</i>	Hairy Geebung		X
<i>Persoonia nutans</i>	Nodding Geebung	X	X
<i>Pimelea curviflora</i> var. <i>curviflora</i>			X
<i>Pimelea spicata</i>	Spiked Riceflower	X	X
<i>Pomaderris brunnea</i>			X
<i>Pterostylis gibbosa</i>	Yallah Greenhood		X

Table 9.4 Threatened flora desktop search results

Scientific name	Common Name	Atlas of NSW Wildlife *recorded within 5 km radius	EPBC listed threatened flora search *recorded within 10km radius
<i>Pterostylis saxicola</i>			X
<i>Pultenaea parviflora</i>		X	X
<i>Rhizanthella slateri</i>	Eastern Australian Underground Orchid		X
<i>Thesium australe</i>	Austral Toadflax		X

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

GES conducted a search of the Atlas of NSW Wildlife and EPBC listed threatened fauna for fauna species present within 5 km and 10 km of the project. The results are presented in Table 9.4. For a full description of habitat preferences, presence in locality and whether it could possibly be affected, refer to Table 2 and Table 3 of the ecological assessment in Appendix D.

Table 9.5 Threatened fauna desktop search results

Scientific name	Common Name	Atlas of NSW Wildlife *recorded within 5 km radius	EPBC listed threatened flora search *recorded within 10km radius
Fish			
<i>Macquaria australasica</i>	Macquarie Perch		X
<i>Prototroctes maraena</i>	Australian Grayling		X
Frogs			
<i>Heleioporus australiacus</i>	Giant Burrowing Frog		X
<i>Litoria aurea</i>	Green & Golden Bell Frog		X
Reptile			
<i>Delma impar</i>	Striped Legless Lizard		X
Mammals			
<i>Dasyurus maculatus</i> <i>maculatus</i> (SE mainland population)	Spotted-tailed Quoll		X
<i>Falsistrelle tasmaniensis</i>	Eastern False Pipistrelle	X	
<i>Phascolarctos cinereus</i>	Koala		X
<i>Petauroides volans</i>	Greater Glider		X
<i>Petaurus australis</i>	Yellow-bellied Glider	X	X
<i>Petrogale penicillata</i>	Brush-tailed Rock Wallaby		X

Table 9.5 Threatened fauna desktop search results

Scientific name	Common Name	Atlas of NSW Wildlife *recorded within 5 km radius	EPBC listed threatened flora search *recorded within 10km radius
<i>Pseudomys novaehollandiae</i>	New Holland Mouse		X
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	X	X
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat		X
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail Bat	X	
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat		
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	X	
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	X	
<i>Miniopterus australis</i>	Little Bent-winged Bat	X	
<i>Myotis Macropus</i>	Southern Myotis	X	
Birds			
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	X	
<i>Botaurus poiciloptilus</i>	Australasian Bittern		X
<i>Burhinus grallarius</i>	Bush Stone Curlew	X	
<i>Numenius madagascariensis</i>	Eastern Curlew		X
<i>Calidris ferruginea</i>	Curlew Sandpiper		X
<i>Rostratula australis</i>	Australian Painted Snipe	X	X
<i>Falco hypoleucos</i>	Grey Falcon		X
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper	X	
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo		X
<i>Chthonicola sagittata</i>	Speckled Warbler	X	
<i>Daphoenositta chrysoptera</i>	Varied Sittella	X	
<i>Lathamus discolor</i>	Swift Parrot	X	X
<i>Lophoictinia isura</i>	Square-tailed Kite	X	
<i>Ninox strenua</i>	Powerful Owl		
<i>Hieraaetus morphnoides</i>	White-bellied Sea-Eagle	X	

Table 9.5 Threatened fauna desktop search results

Scientific name	Common Name	Atlas of NSW Wildlife *recorded within 5 km radius	EPBC listed threatened flora search *recorded within 10km radius
<i>Hieraaetus morphnoides</i>	Little Eagle	X	
<i>Hirundapus caudacutus</i>	White-throated Needletail		X
<i>Ixobrychus flavicollis</i>	Black Bittern	X	
<i>Grantiella picta</i>	Painted Honeyeater		X
<i>Anthochaera phrygia</i>	Regent Honeyeater		X
<i>Petroica boodang</i>	Scarlet Robin	X	
<i>Pycnoptilus floccosus</i>	Pilotbird		X
<i>Stictonetta naevosa</i>	Freckled Duck	X	
<i>Stagonopleura guttata</i>	Diamond Firetail	X	
Gastropod			
<i>Pommerhelix duralensis</i>	Dural Land Snail		X
<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail	X	

ii Field surveys

A field survey involved a targeted search for each of the flora species. None of the species were detected and the disturbed nature of the habitat across the area of impact (ie subject property) means it is highly unlikely that any occur. The strip of roadside vegetation along Patons Lane dominated by Forest Red Gum (*E. tereticornis*) corresponds to the Cumberland Plain Woodland CEEC. An assessment of significance has been prepared in relation to this species and is provided in the ecological assessment.

The project is likely to result in minimal loss of trees, some of which may be hollow bearing. This impact is addressed in the Assessment of Significance in the ecological assessment. It is considered that there is no need to undertake additional detailed assessment in relation to the listed threatened fauna species, as the loss will be negligible.

9.4.3 Impact assessment

The works are designed to take place in land which has been cleared and disturbed by past land uses

The field surveys identified that there is no need to undertake detailed assessment in relation to any of the threatened flora and fauna species identified through desktop searches and listed in Table 9.5. However, consideration was given to the likely impact of the project on threatened species recorded from within a 10 km radius of the study area. It was considered that there could be impacts to the CEEC along the road verge. On this basis, the design was amended to bring the alignment into the road – thereby avoiding the threatened vegetation along the road verge. The only remaining potential impact is a few trees where the feeder enters the SS.

Even though the project involves some minimal clearing of native vegetation (ie a few trees), the extent of vegetation clearing is extremely minor and well below thresholds prescribed in the BC Act. Thus, it was concluded in the initial ecology report that:

- It is highly unlikely that the development will significantly affect the regional or local population status of Cumberland Plain Woodland CEEC;
- There is no need to provide a Species Impact Statement or a BDAR, however, if the trees cannot be avoided, they should be assessed by an arborist and a 5-part test completed by a suitably qualified professional.

Subsequently, 8 trees at the entrance of the proposed SS were identified for removal. The 8 trees totalled 0.34 ha of vegetation and were assessed in the field on 5th August 2022. The vegetation was found to comprise Plant Community Type (PCT) 849. PCT 849, *Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion* was further found to meet *Biodiversity Conservation Act 2016* (BC Act) listed Critically Endangered Ecological Community (CEEC) *Cumberland Plain Woodland in the Sydney Basin Bioregion* referred to as Cumberland Plain Woodland. This community was not found to comprise the *Environment Protection and Conservation Act 1999* listing due to patch size being less than 0.5 hectares and less than 50 % of native species within the understorey (DEECCW 2022a and 2022b).

A Test of Significance (ToS) was undertaken and concluded that the project is unlikely to significantly impact Cumberland Plain Woodland for the following reasons:

- The project will not adversely affect the extent or composition of the ecological community to the point where its current ecological function is compromised causing it to become locally extinct.
- The project is unlikely to significantly alter floristic or structural diversity of the retained portions of the CEEC.
- The localised nature of the project will not significantly trigger or exacerbate any key threatening processes.

9.4.4 Management and mitigation measures

The following 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 (eg 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.

9.5 Water

9.5.1 Overview

This section assesses the potential hydrology, flooding, water quality, soil erosion and sedimentation aspects and impacts of the project. A Geotechnical Investigation Report (Geotechnical Report) prepared by GeoEnviro Consultancy Pty Ltd (GeoEnviro 2022a) 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 E and summarised in this section and Chapter 7.

9.5.2 Existing environment

i Hydrology and water quality

The project is within the Hawkesbury-Nepean catchment, and more specifically within the Wianamatta South Creek catchment (South Creek catchment). South Creek rises in Sydney's south-western suburbs, approximately 4 km north-east of Narellan and 7 km west of Minto, and generally flows north. It is joined by numerous tributaries including Badgerys Creek, Kemps Creek, Ropes Creek and Eastern Creek until it

reaches its confluence with the Hawkesbury River close to Windsor. South Creek flows through many Western Sydney suburbs including Bringelly, Badgerys Creek, Kemps Creek, Orchard Hills. South Creek is joined by Badgerys Creek and Kemps Creek at the suburb of Badgerys Creek, by Blaxland Creek at Orchard Hills, and by Cosgrove Creek at Luddenham.

The floodplains and watercourses set within the catchment area are largely interrupted by storages for grazing and cropping with drainage infrastructure provided in some more urbanised areas (Sydney Metro 2020). As previously noted in Chapter 6, a small unnamed tributary traverses the north-west corner of the subject property. Two dams appear to be located on the subject property.

It is important to note that 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 and the new precincts associated Aerotropolis, due to the introduction of hard stand areas, levelling of existing topography and introduction of water management infrastructure such as detention basins 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; and 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 that 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 the 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.

ii Flooding

The urbanised areas within the catchment have more formalised drainage systems that discharge into the main watercourse (Sydney Metro 2020a). However, the subject property is located within a rural landscape which at present does not have the same formalised drainage features. The subject property and the surrounds are expected to undergo transformation as the area develops, in particular with the Sydney Metro corridor and the urban release of the surrounding area.

Sydney Metro – Western Sydney Airport Environmental Impact Statement (Sydney Metro EIS) (Sydney Metro 2020a) provides a figure that shows the existing modelled peak flood levels for one per cent Annual Exceedance Probability (AEP) event at South Creek and the surrounding tributaries. The modelling is presented in Figure 9-3 below. The figure shows that the north-western part of the subject property, which contains the unnamed tributary and a dam, can be prone to flooding.

Flood modelling undertaken for the Sydney Metro project shows that regular rainfall events indicate that regular flood events are generally confined to the main drainage channels (Sydney Metro 2020a). Furthermore, Chapter 14 of the Sydney Metro EIS notes that Sydney Metro construction works have the potential to temporarily impact the local flooding regime. In particular, *“viaduct construction works have the potential to temporarily block floodplain flows by introducing temporary creek crossings at Blaxland Creek and associated tributary south of Lansdown Road, an unnamed creek (tributary of South Creek) south of*

Patons Lane, and Cosgroves Creek" (Sydney Metro 2020a). The Sydney Metro EIS notes that for the modelled five per cent AEP flood event, the potential impacts at each crossing are likely to be negligible, of limited duration and localised, with minimal impacts beyond the construction footprint; and no afflux impacts expected on upstream infrastructure properties.

Nevertheless, further development anticipated in the area, and the introduction of formalised stormwater and water management systems, is expected to further mitigate the overall flooding risks in the long run.

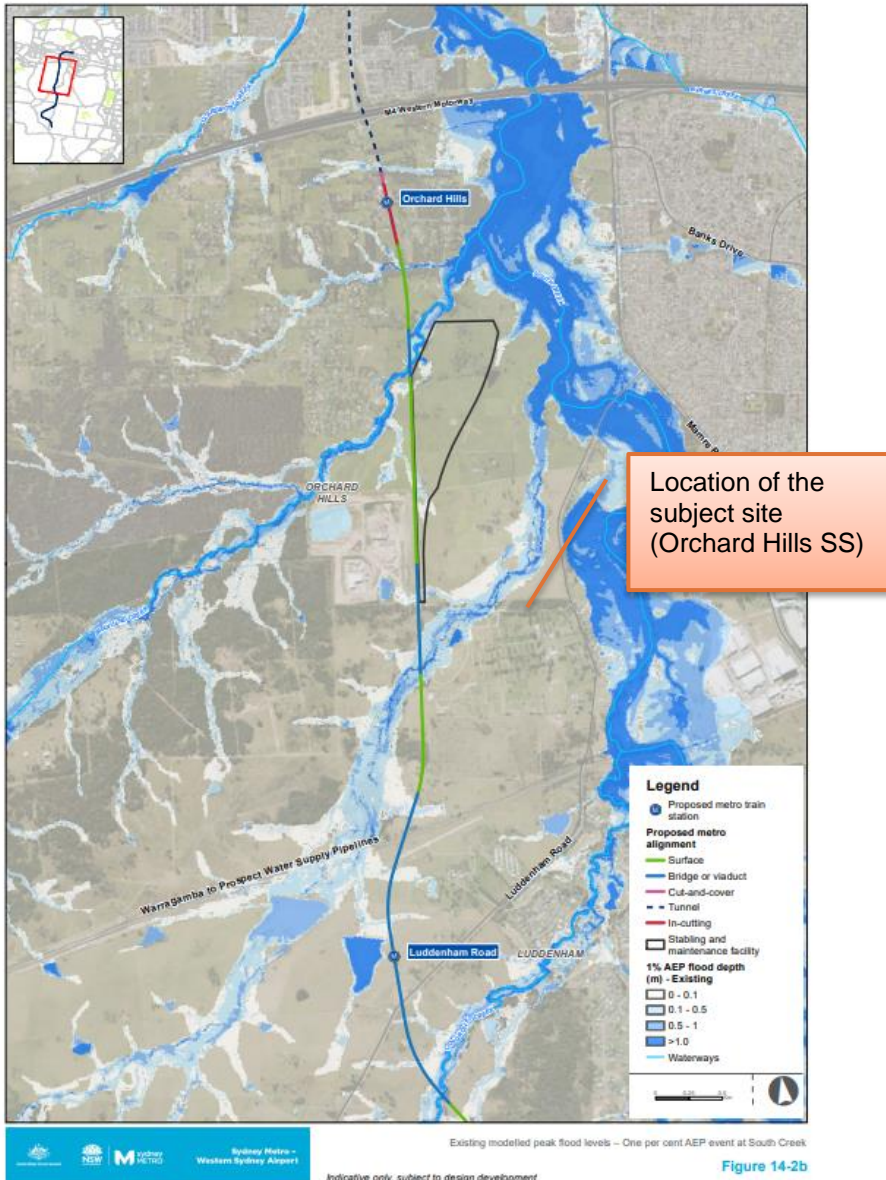


Figure 9-3 Existing modelled peak flood levels – one per cent AEP event at South Creek (Source: Sydney Metro EIS (Sydney Metro 2020)).

iii Geology and soils

The project is located within the Sydney Basin which traverses a number of geographic formations. A desktop assessment of site geology undertaken as part of the Geotechnical Investigation Report (Geotechnical Report) prepared by GeoEnviro Consultancy Pty Ltd (GeoEnviro 2022a) has identified the following features:

- Based on the 1:100,000 Soil Landscape Map of Penrith, the subject site is underlain by fluvial soil of the South Creek landscape ground consisting of deep soil.
- Based on the 1:100,000 Geological Map of Penrith, the site is underlain by fine grained sand, silt and clay derived from Wianamatta Group shale and Hawkesbury Sandstone.

- Based on the Department of Infrastructure, Planning and Natural Resources 'Salinity Potential in Western Sydney 2022' Map the subject site is situated in an area of "moderate to high" salinity potential.
- A review of the Acid Sulfate Soil (ASS) Rusk Maps was carried out for the site and though there were no available maps for the subject site, the surrounding maps indicate sites with similar landscapes, topography and geology to have "no known occurrence of acid sulfate soils".

iv Site investigations

Site investigations carried out on 12 April 2022 as part of the GeoEnviro geotechnical investigations identified the following soil, surface water and groundwater features as part of the borehole investigation works (GeoEnviro 2022a) at the site. Borehole locations are shown in Figure 9-4.

- The site is situated on low lying alluvial terrain and is underlain by weak and wet clay overlying shale and siltstone bedrock.
- Topsoil encountered during the sampling process consisted of Clayey Silt of low liquid limit with some sand, which was found to range from 300 millimetres (mm) – 400 mm in thickness.
- Natural soil was encountered during the sampling process and generally consisted of low to medium plasticity Silty Clay and Sandy Clay with varying amounts of ironstone gravel bands and sand. Some Interbedded Shale and Clay was encountered in 2-4 at lower depths.
- Bedrock consisted of Shale and Siltstone and was encountered at depths ranging from 4.4 m – 5 m below existing ground surface.
- Groundwater was encountered during the site investigation at relatively shallow depths ranging from 1 m-2.6 m below existing ground surface.
- The subject site was found to be poorly drained with the majority of the subject site waterlogged, due to the prevailing weather conditions at the time of site investigation works.

Soil sampling results have identified the following soil properties at the subject site:

- Insitu soil is generally slightly saline to moderately saline, has low concentrations of sulfate and low concentration of chloride.
- GeoEnviro concluded that the subject site is not significantly impacted by ASS.

Furthermore, soil at the site was tested for a number of contaminants, the results of which are further discussed in Section 9.6.2.

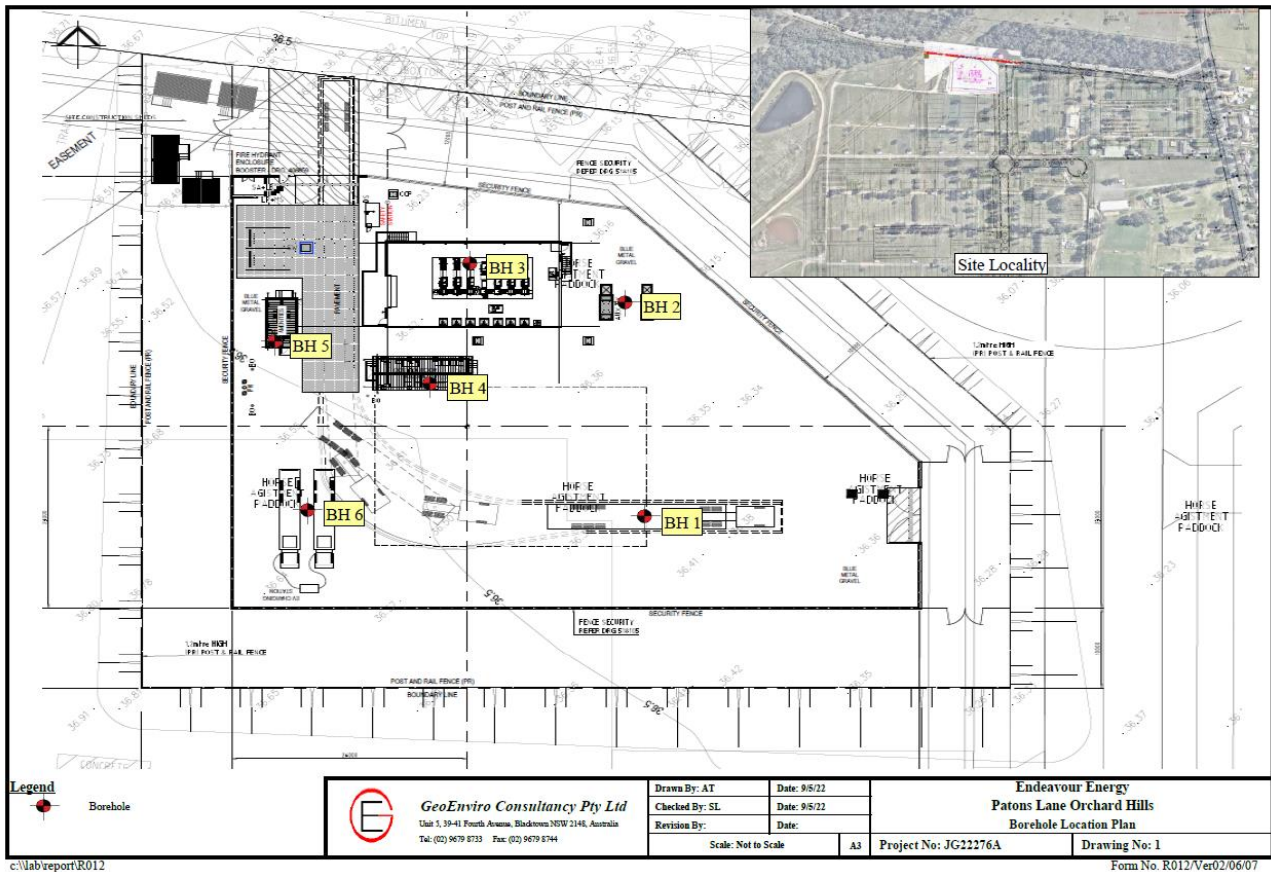


Figure 9-4 Subject site borehole locations (Source: GeoEnviro's Geotechnical Report (2022a))

9.5.3 Impact assessment

Construction

Construction works associated with the project will be confined to the subject site, and the 200 m road verge along Patons Lane shown in Figure 7-2.

The design of the proposed Orchard Hills SS has taken into account the existing topography, geology, soil and groundwater features, as well as the flooding potential within the north-west corner of the subject property.

The Orchard Hills SS will be raised using approximately 1 m – 2 m of fill, and the SS structures are likely to be supported on piles to minimise any long-term settlement of the fill layer. Given the presence of weak and wet subsurface ground conditions with high groundwater 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.
- Construction of subsurface drains and surface drains at appropriate locations.

Earthworks to be undertaken as part of project construction are summarised in Chapter 7. Earthworks will take into consideration the geology and soils, groundwater and flooding risks at the site. Proposed earthworks have been planned out with guidance from specialised geotechnical consultants (GeoEnviro 2022a) who have undertaken extensive site investigation works at the subject site and were able to propose controlled earthworks that will avoid surface ground subsidence.

Earthworks that have the potential to impact on the water quality of the surrounding area need to be managed. 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 (2022b) outlines relevant management and mitigation measures which are summarised in Section 9.6.

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 2022 through to December 2023, 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.

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.

9.5.4 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.

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 of 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.

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; and
 - 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.

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.

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.

Earthworks management

Earthworks should be carried out in a controlled manner as specified in GeoEnviro's Geotechnical Report, to minimise effects of impacts. Other mitigation measures include:

- Double sediment and erosion controls are required during earthworks.
- Should groundwater be encountered during earthworks, the Site Supervisor would notify the Environmental Advisor and Project Manager who will co-ordinate any further actions, in line with the recommendations provided in the GeoEnviro Geotechnical Report.
- A functioning 'spill kit' will be kept near the construction site at all times for 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.

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.

9.6 Waste

9.6.1 Overview

This section assesses the waste impacts anticipated from the construction and operation of the project. A Waste Classification Report prepared by GeoEnviro (2022b) to support the environmental assessment of the insitu material from the subject site, in accordance with the relevant legislation and guidelines.

9.6.2 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. As previously noted in Chapter 7, there will be fill material that will be removed from the subject site. Approximately 1000 m² of vegetation will be removed from Patons Lane.

Other wastes might include:

- Drilling fluids;
- Construction worker generated general waste;
- Unused raw materials;
- Wastewater; and
- 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.

ii In-situ material

Soils at the subject site were tested for a number of 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). The 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). Findings of the Waste Classification Report (GeoEnviro 2022b) concluded the following:

- The laboratory test results indicated all concentrations of heavy metals analysed to 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, adjoining site or other sites with the most sensitive land use (residential).

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.

iii Fill material

Fill material will also be 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.

iv Vegetation

Vegetation such as garden and wood waste is classified as general solid waste (non-putrescible) as per the Waste Classification Guidelines. A few trees 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.

9.6.3 Operation

Once constructed, the project will generate minimal waste, with the exception of any maintenance works that may be required throughout its operational life.

9.6.4 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 (eg 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.

9.7 Utilities and services

A detailed Dial Before You Dig (DBYD) search will be conducted for all services in the vicinity of the subject site 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.

9.7.1 Management and mitigation measures

The following management and mitigation measures will be undertaken:

- The Project managed will conduct DBYD 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.

9.8 Roads, traffic and access

9.8.1 Overview

The construction works will predominantly occur within the subject site with minor works along the road verge of Patons Lane, to connect underground transmission feeders.

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

9.8.2 Existing environment

i Local road network

The local road network carries high volumes of passenger vehicle and truck movements, mostly within Luddenham Road, and some parts may even carry plant and machinery for farming given the proximity to agricultural premises.

The project traverses Patons Lane and shares this road with Bingo's Patons Lane RRC. The Patons Lane RRC Quarry Operation Management Plan (2020) notes that the RRC's approved maximum daily number of heavy vehicle movement is 250 per day.

The project will have minimal impacts on the traffic along Patons Lane. Trenching activities along the road verge will have minimal traffic impacts. Appropriate signage will be used.

ii Traffic movements

Traffic movements anticipated during the construction of the project are outlined in Chapter 7.

iii Crash and casualty statistics – NSW general view

A search of TfNSW's Centre for Road Safety 'Crash and casualty statistics – NSW general view' has identified the following statistics for the Penrith LGAs and the road network surrounding the subject site:

- The statistics results show that the number of crashes and casualties has gradually decreased within the Penrith LGA between 2016-2020 (from 109 crashes and 149 casualties in 2016 to 65 crashes and 103 casualties in 2020).
- 2 km of the project including four minor injuries, eight moderate injuries and two serious injuries.
- There were nine accidents on Luddenham Road between 2016-2020, most of which occurred close to the residential development off Creek Twins Drive and involves four minor injuries, five moderate injuries and two serious injuries.
- There were no accidents recorded at Patons Lane between 2016-2020.

9.8.3 Impact assessment

i Construction

Paton Lane is a quiet street without any rural residential dwellings and without much industry. As previously noted, the road has only one main industrial/ commercial premise - Bingo's Patons Lane RRC.

Traffic accessing Bingo's Patons Lane RRC and passing through the road may only be slightly affected by roadside works, where road users may be asked to reduce speed. EE will manage partial road closures should

they be required, traffic and pedestrian access around worksites and property access during the construction of the project.

Project works may require sections of impacted roads to be closed for specific period of time over the construction period. Road occupancy permits will be obtained from PCC as required.

Use of signage in advance of construction commencing may be appropriate on Patons Lane to advise residents and road users of the adjacent construction works.

Delivery, construction and workers vehicles will be parked safely on the road verges and within the subject 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. Overall, vehicle movements will return to current operational levels.

This will also involve access by EE and its contractors to the feeder line easement along Patons Lane for maintenance purposes.

9.8.4 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 PCC 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.

9.9 Visual assessment

The project will result in temporary changes to the appearance of the project route along Patons Lane. 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. The outside of the subject site will be landscaped with vegetation planted between the two outside fences. Nevertheless, the control room and amenities building will most likely be visible from Patons Lane.

9.10 Socio-economic impacts

The project may temporarily affect the local community as a result of 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 in order 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 Western Sydney Growth Area, Sydney Metro and the Western Sydney Airport and the many new precincts and infrastructure projects in this area. The project will provide safe, reliable, and cost-effective electricity supply for local 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.

Project needs and benefits are addressed in Section 2.3 and Section 2.5 respectively.

9.11 Noise

9.11.1 Construction noise

Construction works associated with the project will result in some noise generation. Typical noise generation for the construction of the project will include earthworks, concrete cutting and excavation machinery, large back hoe 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, specific management measures will be implemented to notify nearby residents and other receivers of the works to be undertaken.

Given that the project will be constructed in a rural setting with sparse residential and commercial properties, it is anticipated that construction noise should not greatly disturb many surrounding premises.

Nevertheless, as noted in Section 6.1, there are some receivers that are located approximately 250 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 short-lived.

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

9.11.2 Operational noise

Once commissioned, the project (ie the SS and the feeder route) will operate continuously, 24 hours a day, 7 days a week; with minimal noise generation. There should be no alteration to the existing background noise levels.

9.11.3 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 affected PCC and the TfNSW 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 S&E team. If generators are required to operate at night, acoustic consultants may be required to undertake noise assessment prior to their use.

9.12 Air quality and dust suppression

9.12.1 Construction

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

As previously mentioned, areas disturbed by construction works will be progressively rehabilitated as works are completed.

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.

9.12.2 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.

9.12.3 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.
- Any disturbed areas along the road reserve or road verge will be revegetated or resurfaced as soon as possible after works have been completed in that area.
- 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.
- Stockpiled materials are to be stored with appropriate sediment controls.
- Vehicles and machinery are not to be left idling when not in use so as to reduce exhaust emissions.
- Dust suppression techniques, including wetting down surfaces will be used as necessary.
- Reference is to made to EE's Environmental Guideline Handbook for dust mitigation and management techniques.

9.13 Safety and hazards

9.13.1 Construction

All components of the project will be designed and constructed in such a manner so as 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 local residents. Hazards which may arise during the construction works, such as open pits, open trenching, machinery and vehicle movements and changes to road and traffic conditions will be managed appropriately.

9.13.2 Operation

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

9.13.3 Management and mitigation measures

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

- Any worksite areas will be cordoned off with security fencing to direct pedestrians away from any excavations or open manholes.
- 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.

9.14 Bushfire

Bushfire prone land is mapped within a local Government area, which becomes the trigger for planning for bushfire protection. The results of the NSW Rural Fire Service search for 'bush fire prone land' conducted on 22 July 2022 shows the project falls within bushfire prone land of some category (Vegetation Category 2 and Vegetation Category 1).

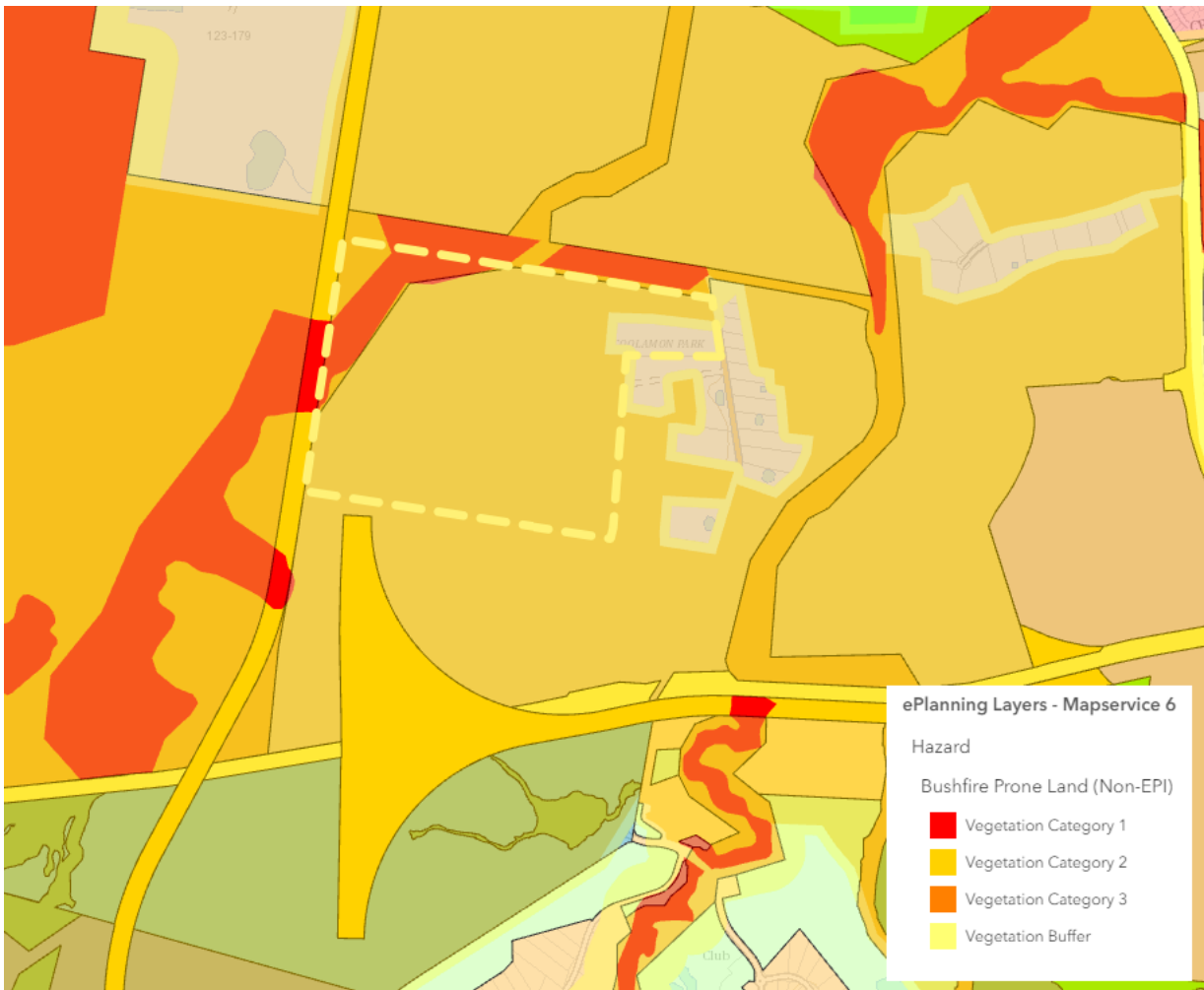


Figure 9-3 NSW Rural Fire Service search results for 'bush fire prone land' along the project route (Source: ePlanning Spatial Viewer search results)

9.14.1 Management and mitigation measures

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

- A 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, 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.
- Vegetation clearances will be established to construct the feeder and maintained thereafter.
- 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.

9.15 Cumulative impacts

The NSW Government is working closely with Councils and industry stakeholders to coordinate and refine development associated with the Aerotropolis, Sydney Metro and the surrounding projects and precincts. Together, the different levels of government are coordinating the delivery of multiple projects that have been planned out for the Western Sydney Growth Area. Some of these projects include:

- Bringelly Road upgrade;
- Elizabeth Drive;
- The Northern Road Upgrade;
- M12 Motorway linking the M7 Motorway to the Western Sydney Airport;
- Sydney Metro – Western Sydney Airport;
- New urban release areas; and
- 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 Growth 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 projects.

10 Conclusion

The investigations undertaken as part of this REF have shown that the construction of the project will have minimal environmental impacts and should proceed subject to the mitigation measures outlined herein and in accordance with any other additional management and mitigation measures (or conditions) required by the determining authority.

The supporting environmental assessment has concluded that the project will not have a significant effect on the environment.

It is therefore concluded that:

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

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1	Appendix A	Design Plans
2	Appendix B	Historical Impact Assessment
3	Appendix C	Aboriginal Heritage Due Diligence Assessment
4	Appendix D	Patons Lane, Orchard Hills Ecological Assessment
5	Appendix E	Test of Significance for Orchard Hills Substation on Patons Lane
6	Appendix F	Geotechnical Investigation Report
7	Appendix G	Waste Classification Report
8	Appendix H	Consultation material