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Endeavour Energy Berrima Junction New Permanent Zone Substation

Review of Environmental Factors

Prepared for Endeavour Energy 6 September 2024



Document control

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Version	Author	Review	Status	Date
D1	Charlotte Cross	Christie Chapman	Draft	1 December 2023
D2	Charlotte Cross	Christie Chapman	Draft	16 January 2024
D3	Charlotte Cross	Endeavour Energy	Draft	22 January 2024
D4	Justin Merdith	Chris McEvoy	Draft - Tracked Version	8 April 2024
D5	Justin Merdith	Chris McEvoy	Draft	8 April 2024
D6	Justin Merdith	Endeavor Energy	Final	17 May 2024
Rev 2	Justin Merdith	Endeavor Energy	Final	6 September 2024

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Glossary and list of abbreviations

Term or abbreviation	Definition
AHIMS	Aboriginal Heritage Information Management System
ANO	Authorised Network Operator
AoS	Assessment of Significance
Authorised Transactions Act	<i>Electricity Network Assets (Authorised Transactions) Act 2015</i>
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
CEMP	Construction Environmental Management Plan
CLM Act	<i>Contaminated Land Management Act 1997</i>
DCCEEW	Department of Climate Change, Energy, Environment and Water
NSW DCCEEW	NSW Department of Climate Change, Energy, Environment and Water (formerly Department of Planning and Environment)
EE	Endeavour Energy
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Reg	<i>Environmental Planning and Assessment Regulation 2021</i>
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPL	Environmental Protection License
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically Sustainable Development
ha	Hectare/s
Heritage Act	<i>Heritage Act 1979</i>
kV	Kilovolt
ILALC	Illawarra Local Aboriginal Land Council
LEP	<i>Wingecarribee Local Environmental Plan 2010</i>
LGA	Local Government Area
Locality	The Development site and surrounds, nominally a 10 km radius from the development site.
MNES	Matters of National Environmental Significance (from the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>).
Niche	Niche Environment and Heritage
NorBE	Neutral or Beneficial Effect
NPW Act	<i>National Parks and Wildlife Act 1974</i>
OEH	Office of Environment and Heritage (formerly DPIE, now DPE)
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
POEO Waste Regulation	<i>Protection of the Environment Operations (Waste) Regulation 2014</i>
Project	The proposed works involving the establishment of a new permanent zone substation and removal of the temporary Berrima Junction Zone Substation, as well as establishment of a new feeder including replacement of 34 existing poles and associated infrastructure on the existing Endeavour Energy power supply.
Project Footprint	The area of disturbance which was surveyed and assessed within this report
REF	Review of Environmental Factors
SEPP	State Environmental Planning Policy
SHR	State Heritage Register
TEC	Threatened Ecological Community

Term or abbreviation	Definition
TfNSW	Transport for NSW
Transport & Infrastructure SEPP	<i>State Environmental Planning Policy (Transport and Infrastructure) 2021</i>

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1. Introduction

1.1 Background and need for the Project

Endeavour Energy (EE) are responsible for the distribution of electricity to over 2.7 million people living and working across Sydney's Greater West, the Blue Mountains, Southern Highlands, Illawarra and the South Coast of NSW.

Berrima Junction is located in the Southern Highlands and is situated between the historic old town of Berrima to the north and Moss Vale to the south (Figure 1). EE supplies power to this area and also operates a field service centre in Moss Vale. The temporary 33/11kV 20MVA Berrima Junction Zone Substation (ZS), located on Douglas Road in Moss Vale, has a single 20 MVA 33/11 kV transformer and is supplied via Fairfax Lane 33 kV Feeder 7905. The current network infrastructure is experiencing load at risk, with the total capacity of Berrima Junction ZS forecast to be exceeded in 2030.

To meet expected demand, the establishment of a new permanent 33/11kV 35MVA ZS at Berrima Junction is required to replace the temporary ZS. The new permanent ZS will provide supply to major customers within the Berrima Junction Enterprise Growth Area, including a new data centre and industrial areas. The new permanent ZS will enhance the supply security and reliability of new developments by providing a diversified 33kV supply and associated fibre optic network.

The proposed works involves the removal of the temporary Berrima Junction ZS at Lot 11 Douglas Rd, Moss Vale and the establishment of a new permanent Berrima Junction ZS at the existing Berrima Junction ZS at the site. The works will also include installation of a new 33kV feeder from Moss Vale ZS and re-direction of two existing 33kV feeders from Moss Vale ZS, all within the existing easement (Figure 2). In addition, the project will establish a new feeder bay at the Moss Vale ZS, installation of underground/overhead fibre optic cable from Berrima Junction ZS to Moss Vale ZS, as well as associated distribution works from the new Berrima Junction ZS. It is anticipated that the current poles within the feeder alignment would be replaced within approximately 4 metres of their existing poles' position. An area with a 20 m radius (1,256 m² or 0.13 ha) around each pole is required to establish a work platform for the replacement of each. This area has the potential to be disturbed during the proposed works, but it is unlikely that disturbance of the entire area will be needed for the replacement of the pole. However, given the possibility of disturbance the entire area is assessed within this REF.

The 20 m radius (1,256 m² or 0.13 ha) around the poles, the existing Endeavour Energy overhead alignment used to access the poles and the Berrima Junction zone substation works are hereafter referred to as the Project Footprint. While the entire Project Footprint has the potential to be impacted by the Project, disturbance will be limited to a 20 m radius (1,256 m² or 0.13 ha) from the poles to be replaced and will be avoided wherever practical.

Under Clause 2.44 of the *State Environmental Planning Policy (Transport and Infrastructure) 2021*, 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.

EE have commissioned Niche Environment and Heritage (Niche) to prepare this Review of Environmental Factors (REF) for determination by EE (the Determining Authority) as an activity in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Clause 171 of the *Environmental Planning and Assessment Regulation 2021* (EP&A Reg).

The purpose of this REF is to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment as a result of this project. This REF identifies mitigating measures to be incorporated into the design and construction, to minimise environmental impacts.

2. Description of the project

2.1 Project overview

The Project comprises establishment of the new permanent Berrima Junction ZS and removal of the temporary Berrima Junction ZS. The works will also include installation of a new 33kV feeder from Moss Vale ZS and re-direction of two existing 33kV feeders from Moss Vale ZS, all within the existing easement (Figure 2). In addition, the project will establish a new feeder bay at the Moss Vale ZS, installation of underground/overhead fibre optic cable from Berrima Junction ZS to Moss Vale ZS, as well as associated distribution works from the new Berrima Junction ZS all within the existing easement. It is anticipated that 34 existing poles within the feeder alignment would be replaced within approximately 4 metres of their existing poles' position. There is an anticipated 20 m radius (1,256 m² or 0.13 ha) around each of the poles which is required for a pole replacement work platform which has the potential to be disturbed.

2.2 Proponent

Endeavour Energy is the proponent of the proposal. EE operates under national electricity laws, statutory instruments and policies which govern networks in the National Electricity Market.

Proponent address: 8 Parramatta Square (Levels 40-42), 10 Darcy Street Parramatta, NSW 2150.

Proponent website link: [Endeavour Energy](http://www.endeavourenergy.com.au)

2.3 Description of work

Berrima Junction new permanent ZS and removal of temporary ZS (refer Annex 4)

- Site preparation works including site clearing, civil works, conduits and trenching, transformer bunds, concrete and footings
- Establish an indoor 33kv/11kV ZS including one amenity room (meal room and toilets)
- Install a new 15m concrete pole to facilitate an antenna for radio communications
- Extend the existing driveway, install substation lighting, site drainage, sewer and water connection
- Install security fencing and gates and establish landscaping
- Carry out the Distribution Works Program including:
 - Establish a back-up feeder from the new Berrima Junction ZS to FDR BJ142 Taylor Ave by utilising OOS cable previously installed under UIS0802
 - Establish new feeder from the new Berrima Junction ZS to offload Moss Vale ZS FDR MVC2
 - Reconnect existing Berrima Junction ZS feeders to the new permanent Berrima Junction ZS
 - Reconnect existing Berrima Junction ZS feeders to the new permanent Berrima Junction ZS
- Remove the existing Berrima Junction temporary ZS and relocate equipment identified as spare to relevant storage locations.



Plate 1. Current Berrima Junction Zone Substation



Plate 2. Current Berrima Junction Zone Substation

Moss Vale ZS:

- Establish a new 33kV feeder bay on the western side of the existing 33kV feeder bay and install a new 33kV circuit breaker, voltage transformer, surge arrester, disconnector and earth switch (within existing easement).

Transmission/feeder mains:

- Install new 33kV Feeder 7925 from Moss Vale ZS (within existing easement). This would be mostly overhead works/pole replacements, with some sections as underground works.
- Re-direction of two existing 33kV feeders from Moss vale ZS (within existing easement).

Pole installation methodology:

To support the new heavier 33 kV powerlines, new power poles will be required to replace 34 existing poles. The poles for the project will be approximately 20 m tall, and either concrete or steel. Each new pole is placed on a pole stand and in preparation for their installation, the poles are dressed, and the arms installed. The location of the new power poles will have a hole drilled approximately 900-1000 mm in diameter and approximately 4.8 m deep either at the same location as the previous pole, or within 4 m. The poles being replaced in the same location will have the hole size increased if required. The poles are then lifted into position using a crane and concreted into the ground.

Overhead feeder Installation methodology:

The new augmented 33 kilovolt (kV) overhead feeder power lines will be installed in 1.5-2 km sections. To install the feeder, rollers are placed on top of the chosen pole and the rope is lifted on to the rollers. New cables are then spliced on to the rope. At the other end of the chosen section, a large winch winds the rope off, while pulling on the new cable across the defined section. The rollers are then removed, and the cables are clipped into the power pole.

Fibre Optic Connections:

- Install underground/overhead fibre optic cable from Berrima Junction ZS to Moss Vale ZS (within the existing easement). This will also be completed in the same methodology as described above.

Equipment and machinery associated with the construction works include:

- 20 tonne franna crane
- 40-60 tonne slew Crane
- 5/10 crane borer
- 18 – 23 m EWP
- Light, offroad utility vehicles
- Large flatbed truck with hiab
- 14 tonne excavator
- Winch truck
- 8 – 12 tonne tipper truck
- Cable stands

The Project would require vehicle movements to each new pole location eight times, equating to a total of approximately 176 vehicle movements for the duration of the Project. During construction, a temporary laydown area for plant and equipment will be located within the current Berrima Junction Zone Substation site, where there is vacant land.

Stockpiles:

All stockpiles will be within previously disturbed areas within the existing easement.

Access tracks:

The majority of the access tracks and roads to be used to access the replacement pole locations are existing. In the unlikely event that new access tracks are to be installed to allow access to work areas, these may require stabilisation with geotextile material overlaid with crushed gravel or similar. Any newly established access tracks will avoid creeks and waterways. All access tracks and roads to be used to access the pole locations/work areas are all within previous disturbed areas.

2.4 Workforce

The workforce numbers would include:

- 15-20 workers during construction phase
- No permanent staff on site during operation of the new permanent Berrima Junction ZS.

2.5 Location of works

The temporary Berrima Junction ZS is located at Lot 11/DP1126008 on Douglas Road, Moss Vale. This would be replaced with the new permanent ZS, the proposed new feeder works extend approximately 3.3 km along the existing EE feeder line easement between Berrima Junction ZS and Moss Vale ZS. All pole replacement works will be within 4 m of existing EE poles and within existing EE easements.

2.6 Land Tenure

The new feeder main traverses through several different tenures and land uses such as private, rail corridor, TfNSW road reserve and industrial, outlined in Table 1 (refer Figure 3). It is unlikely the works will be undertaken within privately owned lots. Works will stay within the rail corridor and roads and road verges/reserves where possible. All necessary consultation and negotiations will be undertaken by EE to carry out works within each tenure.

Table 1: Land Tenure

Pole number	Lot/DP intersecting pole and 20 m radius buffer
799916	3/DP1136734, 11/DP1126008, 12/DP1126008
799917	3/DP1136734, 12/DP1126008
800962	3/DP1136734, 12/DP1126008
3P1771	3/DP1136734, 12/DP1126008, 21/DP812725
3P1773	3/DP1136734, 21/DP812725
3P1774	3/DP1136734, 21/DP812725, 23/DP817194
820089	3/DP1136734, 6/DP1276958
962212	3/DP1136734, 6/DP1276958, 5/DP1276958
3P1776	3/DP1136734, 5/DP1276958, 4/DP1276958
962213	3/DP1136734, 5/DP1276958, 4/DP1276958
786174	3/DP1136734, 4/DP1276958, 1/DP1100533
786175	3/DP1136734, 1/DP1100533
315385	3/DP1136734, 1/DP1100533
786176	3/DP1136734, 1/DP1100533
315386	3/DP1136734, 1/DP1100533, 1/DP256868
3P1811	1/DP1100533, 1/DP122092, 2/DP1100533
3P1812	1/DP1100533, 2/DP1100533
3P1816	2/DP1100533, 19/DP1183591
3P1817	1/DP122092, 2/DP1100533, 19/DP1183591, 1/DP873240
974106	1/DP873240
3P2098	1/DP873240
3P2099	1/DP873240
891896	1/DP873240
3P2101	4/DP1292881
3P2102	4/DP1292881
UNK	4/DP1292881

Pole number	Lot/DP intersecting pole and 20 m radius buffer
3K1727	4/DP1292881
3K2519	4/DP1292881
3K2475	42/DP850568
882570	42/DP850568
3K2455	42/DP850568
3K2457	1/DP596883, 22/DP854027
Access Tracks	1/DP1100533, 1/DP873240, 4/DP1292881, 42/DP850568

2.7 Project Commencement and Hours of Operation

The Project construction is expected to commence in June 2024, with works expected to be completed by December 2027.

Most of the activities will be undertaken in accordance with the Interim Construction Noise Guideline (DECC 2009) and the Draft Construction Noise Guideline (EPA, 2020) standard construction working hours of:

- Monday to Friday: 7 am to 6 pm
- Saturday: 8 am to 1 pm
- No work on Sundays or public holidays.

For areas where the Project Footprint traverses busy roads, night works when traffic volumes are low may be required to allow for half-road closures. During the road closures, through traffic will be limited to single lane each way with short stoppages of traffic in both directions for specific tasks. Relevant licences and approvals (eg. road occupancy licenced from TfNSW) will be sought by EE for these works as required.

Works within rail corridor that require rail outage will be organised with the respective stakeholder within TfNSW.

Should any other construction work be required outside standard working hours, approval from the EE Environmental Services Team Manager will be sought.

Once commissioned, the Berrima Junction new permanent ZS will operate continuously, 24 hours a day, 7 days per week. The main source of noise from the project during operation will be the transformer that operates continually throughout the day and night. The noise level will not change appreciably from the day to the night and therefore the predicted noise level at night will be the worst-case scenario. Operational noise levels for the new permanent ZS have been assessed and are further discussed in Section 5.5. The new permanent ZS is expected to remain in operation at the site for approximately 50 years before significant maintenance work or replacement is required.

3. Project Justification and Alternatives

3.1 Justification for the Project

EE are responsible for the distribution of electricity to over 2.7 million people living and working across Sydney's Greater West, the Blue Mountains, Southern Highlands, Illawarra and the South Coast of NSW.

Berrima Junction is located in the Southern Highlands and is situated between the historic old town of Berrima to the north and Moss Vale to the south. EE supplies this area and also operates a field service centre in Moss Vale.

According to Endeavor Energy's *Berrima Junction Enterprise Growth Area Report* (EE, 2023), Berrima Junction is named after the railway station in the area between the two towns. The area is zoned for enterprise land use (LEP Zoning E4 General Industrial) and is the location for substantial development plans for major customers requiring a connection to the network and with a level of supply security to support the continuity of their business operations. Berrima Junction is in close proximity to the major vehicle access points to the Hume Highway which is the major road connecting Sydney-Canberra-Melbourne and will support enterprise customers with heavy vehicle operations and employees commuting to the location for work.

The major network connections in the Berrima Junction Enterprise Growth Area include:

- An enterprise customer with a maximum demand requirement of 15 MVA and requiring a highly secure and reliable supply to support their technology based business operations.
- Two industrial subdivisions with combined estimated maximum demand of 5.4 MVA. These industrial zoned lots will likely include transport, logistics and light industry as end use customers.
- The possible anticipated connection of a major customer with an estimated maximum demand of 16.5 MVA at one of two lots.
- The continuing supply to the existing major customer engaged in a manufacturing enterprise. The existing Berrima Junction Zone Substation was commissioned in 2010 and supplies a single major customer in close proximity to the substation site. The existing substation comprises a single power transformer and a single 33kV supply and is not capable of providing the security of supply required by the new customer connections.

Currently there is limited supply in the area as the existing substation has only one power transformer and is supplied from only one 33kV feeder. Further, the existing temporary Berrima Junction ZS contains several items of major equipment that are approaching the end of their service life and are likely to require replacement in the next 5 to 10 years. However, based on the demand forecast for the area, the need for augmenting supply in the area will occur earlier in time than the need to replace the existing network assets. This identified need is characterised as an augmentation rather than a replacement of existing assets due to the higher capacity and supply security required.

In order to meet this need and provide secure power supply to the Berrima Junction Enterprise Growth Area, EE proposes to establish a new permanent 33/11kV 35MVA Berrima Junction Zone Substation to and establish a new 33kV feeder supply from the Moss Vale Substation, which is the project described in this REF.

3.2 Alternatives

Various alternatives were considered by EE to address the needs of the project. An Options Screening Report for the Project was prepared in 2023 (*Providing secure supply to the Berrima Junction Enterprise Growth Area, Options screening report*, Endeavour Energy, 26 May 2023). The report was publicly exhibited by EE in August 2023 and can be accessed here: [Berrima Junction Enterprise Growth Area \(endeavourenergy.com.au\)](https://endeavourenergy.com.au)

EE identified three credible network options for providing secure supply to the Berrima Junction Enterprise Growth Area. All three options involved the augmentation of the existing Berrima Junction Zone Substation. The network options considered were:

- Option 1 – Augment Berrima Junction Zone Substation with the installation of 2 x 35MVA transformers and use the existing 33kV supply
- Option 2 – Augment Berrima Junction Zone Substation with the installation of 2 x 35MVA transformers and establish a new 33kV feeder supply from Moss Vale Zone Substation
- Option 3 – Augment Berrima Junction Zone Substation with the installation of 2 x 35MVA transformers and establish a new 33kV feeder supply from a connection to an existing feeder 7906.

Option 2 was determined to be the preferred option by EE to meet the project need.

The proposed design maximises the use of previously disturbed areas (i.e. within existing overhead alignments, within disturbed paddocks) and minimises any additional disturbance while achieving the objective of increasing power supply to meet the growth needs of the area.

3.3 Benefits

Residents, commercial and industrial business operators, and their customers will all benefit from safe, efficient, cost-effective, and continuous electrical supply within the Berrima Junction Enterprise Growth Area provided by the Project.

3.4 Consideration of ecologically sustainable development

While there is no universally accepted definition of Ecological Sustainable Development (ESD), in 1992 the Commonwealth Government, in “Australia’s National Strategy for Ecologically Sustainable Development” (1992) suggested the following definition for ESD in Australia:

‘Using, conserving and enhancing the community’s resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased’.

The Project has been designed with these values in mind and have incorporated these objectives in the Project through:

- Maximising the use of previously disturbed areas.
- Confining activities to areas that have lower environmental sensitivity where possible – i.e. Unnatural environmental such as urbanised and industrial areas.
- Minimising the disturbance footprint of the works.
- Incorporating environmental safeguards to avoid, minimise and mitigation the potential impact from the project that could not be avoided during the design process.

4. Statutory and Planning Framework

4.1 Code of Practice for Authorised Network Operators (ANOs)

The Code is approved under Clause 198C of the EP&A Reg that provides the statutory planning context for environmental assessment and approval of works to be undertaken by an ANO.

The Code requires an ANO to classify its activities and development proposals into one of six possible assessment classes. This Project has been identified as a Class 4 Proposal under the Code, which requires the preparation of an REF. A Class 4 Proposal 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.

On 14 June 2017 EE was transacted and became an ANO. This means that EE is now a privately managed network business in accordance with the *Electricity Networks Assets (Authorised Transactions) Act 2015* and is subject to The Code gazetted in September 2015 under Clause 198C of the Regulation. The Code is deemed to be in force until it is revoked or varied in accordance with the Regulation.

The NSW Government has prescribed the ANOs as "prescribed Determining Authorities" for the purposes of Section 5.2 of the EP&A Act and the definition of "public authority" under Part 1 of that Act.

This prescription allows an ANO to be a Part 5 Determining Authority (EP&A Act) for the purposes of an electricity transmission or distribution network. While Part 5 Activities do not require development consent under Part 4 of the EP&A Act, consideration of an Activity's environmental impact is required under Division 5.1, Section 5.5 of that Act.

The *Electricity Network Assets (Authorised Transactions) Act 2015* (Authorised Transactions Act) inserted Division 9 into Part 14 of the EP&A Regulation. Clause 198C provides that The Code may make provision for or with respect to the exercise by an ANO of its functions under Division 5.1 of the EP&A Act in respect of "an activity for the purposes of a transacted electricity transmission or distribution network". These words are defined non-exhaustively in Clause 198C as including: -

The exercise by an authorised network operator of its functions under the Act, section 5.5 in relation to activities, including activities for the following purposes—

- a) *Development for the purposes of the construction, maintenance or operation of a transacted electricity transmission or distribution network*
- b) *Geotechnical investigations relating to a transacted electricity transmission or distribution network*
- c) *Environmental management and pollution control relating to a transacted electricity transmission or distribution network*
- d) *Access for the purposes of the construction, maintenance or operation of a transacted electricity transmission or distribution network*
- e) *Temporary construction sites and storage areas, including batching plants, the storage of plant and equipment and the stockpiling of excavated material.*

As a Determining Authority an ANO can assess and self-determine Activities that are not likely to significantly affect the environment and are conducted for and on behalf of the ANO for the purposes of electricity transmission or distribution.

By virtue of an ANO's status under the Transport & Infrastructure SEPP, certain activities will be subject to Part 2.3 Division 5 Subdivision 1- *Electricity Transmission or Distribution Networks* of the Transport & Infrastructure SEPP for the purposes of development connected with electricity transmission or distribution.

These are outlined below:-

Under "Clause 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 1974.*

The Transport & Infrastructure SEPP's definition of an "electricity transmission or distribution network" includes the following components:

- a. *Above or below ground electricity transmission or distribution lines (and related bridges, cables, conductors, conduits, poles, towers, trenches, tunnels, ventilation and access structures)*
- b. *Above or below ground electricity kiosks or electricity substations, feeder pillars or transformer housing, substation yards or substation buildings*

The aim of this Policy is to facilitate the effective delivery of infrastructure across the State through increased regulatory certainty, improved efficiency and flexibility in the location of infrastructure and service facilities, while still providing adequate stakeholder consultation.

The nature of construction impacts of the Project are expected to be regarded as being minor but having some complexity. The Project is not envisaged to be an activity that is likely to significantly affect the environment (including critical habitat) or threatened species, populations or ecological communities or their habitats, an Environmental Impact Statement (EIS) is not expected to be required.

In view of the above, this Project has been assessed as a **Class 4 Proposal** in accordance with the Code.

Since this Project is classified as an activity in accordance with Part 5 of the EP&A Act, it must consider Clause 171 of the EP&A Reg.

4.2 Environmental Planning and Assessment Act 1979

The EP&A Act and the associated EP&A Reg provides the framework for assessing the potential environmental impacts associated with developments in NSW.

This REF has been prepared on behalf of EE and given that development consent is not required as outlined by the Transport and Infrastructure SEPP, the Project can be undertaken as an activity under Part 5 of the EP&A Act, with EE as the Determining Authority.

An assessment of the Project's impact on threatened species and ecological communities listed under the *Biodiversity Conservation Act 2016* (BC Act) and Aboriginal items or places, is required under Part 5 of the EP&A Act and is provided in Annex 3 and Annex 4 respectively.

Section 5.5 of the EP&A Act outlines the primary considerations for any determining authority when determining an application under Part 5 of the EP&A Act. Those matters are outlined below in Table 2.

Table 2: EP&A Act compliance

EP&A Act	Project Compliance
Take into account to the fullest extent possible all matters affecting or likely to affect the environment due to the proposed activity.	This REF addresses relevant environmental matters relating to the development of the Project. The Project would not have a significant environmental impact.
The effect of an activity on any wilderness area in the locality in which the activity is intended to be carried on.	The Project would not affect any wilderness areas.

4.3 Environmental Planning and Assessment Regulation 2021

Section 171 of the EP&A Regulation sets out the factors to consider when assessing impacts on the environment from activities (for the purposes of Part 5 of the EP&A Act). An assessment of the impacts of the activity against each of these is provided in Table 3Table 3.

Table 3: Compliance with EP&A Regulation 2021

Environmental factors	Impacts
<p>(a) The environmental impact on the community.</p> <p>Some of the Project Footprint is accessible to the public (roads, footpaths and driveways). The works would only be temporary. Road closures would occur at night to avoid high traffic volumes.</p>	Minor (Temporary)
<p>(b) The transformation of the locality.</p> <p>The Project involves the removal of the temporary Berrima Junction zone substation and establishment of a new permanent zone substation, as well as establishment of a new feeder including replacement of poles and associated infrastructure. These aspects are not considered to result in a major transformation of the locality with nil to negligible environmental impact.</p>	Minor
<p>(c) The environmental impact on the ecosystems of the locality.</p> <p>The Project has the potential to negatively impact on biodiversity. However, the areas are largely disturbed areas dominated by weed species and these impacts have been minimised through the mitigation and management safeguards in Section 5.4.</p>	Minor
<p>(d) Reduction of the aesthetic, recreational, scientific or other environmental quality or values of the locality.</p> <p>The Project will not significantly alter any aesthetic, recreational, scientific or other environmental quality or values of the locality.</p>	Minor
<p>(e) The effect on any locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations.</p> <p>The Project is not likely to significantly impact the locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations.</p>	Minor
<p>(f) The impact on the habitat of protected fauna, within the meaning of the Biodiversity Conservation Act 2016.</p> <p>An assessment of potential impact to threatened species, populations and ecological communities and their habitats listed under the NSW <i>Biodiversity Conservation Act 2016</i> was undertaken. Results of these assessments are covered in Section 5.4 and Annex 3. Threatened biodiversity will not likely be significantly impacted by the Project.</p>	Negligible
<p>(g) The endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air.</p>	Highly unlikely

Environmental factors	Impacts
<p>The Project will not endanger any species of animal, plant or other form of life, whether living on land, in water or in the air.</p>	
<p>(h) Long-term effects on the environment.</p> <p>The Project will not lead to any detrimental long-term impacts on the environment.</p>	Negligible
<p>(i) Degradation of the quality of the environment.</p> <p>The Project will not lead to the long-term degradation of the environment.</p>	Negligible
<p>(j) Risk to the safety of the environment.</p> <p>The Project will improve the safety of the environment from its existing state by upgrading the electricity distribution assets.</p>	Long term positive
<p>(k) Reduction in the range of beneficial uses of the environment.</p> <p>The Project will not lead to any reduction in the range of beneficial uses of the environment.</p>	Negligible
<p>(l) Pollution of the environment.</p> <p>The Project has the potential to contribute to pollution of the environment. These impacts have been minimised through the mitigation and management safeguards as outlined in Section 5.11.</p>	Minor
<p>(m) Environmental problems associated with the disposal of waste.</p> <p>The Project will generate waste streams which will be managed appropriately and therefore will not result in any environmental problems.</p>	Negligible
<p>(n) Increased demands on natural or other resources that are, or are likely to become, in short supply.</p> <p>The Project will not result in any increased demand on resources that are, or are likely to become, in short supply.</p>	Negligible
<p>(o) The cumulative environmental effect with other existing or likely future activities.</p> <p>The Project is not expected to have cumulative effects on existing or future activities of the Project Footprints or their surroundings.</p>	Minor
<p>(p) The impact on coastal processes and coastal hazards, including those under projected climate change conditions.</p> <p>The Project will not impact any coastal processes or coastal hazards.</p>	Negligible
<p>(q) Applicable local strategic planning statements, regional strategic plans or district strategic plans made under the ACT, Division 3.1</p> <p>This Project will not influence any local strategic planning statements, regional strategic plans or district strategic plans made under the ACT, Division 3.1.</p>	Complimentary
<p>(r) other relevant environmental factors.</p> <p>This REF has taken into account all relevant environmental factors.</p>	Negligible to minor

4.4 *Wingecarribee Local Environmental Plan 2010*

The *Wingecarribee Local Environmental Plan 2010* (WLEP) outlines the key planning controls used to manage the way land is used through zoning and development standards. The Project is mapped as E4 – General Industrial, C3 – Environmental Management, RE1 – Public Recreation and SP2 – Infrastructure.

The provisions of Clause 2.44, of the Transport and Infrastructure SEPP, permits development on any land for the purpose of an electricity transmission or distribution network to be carried out by or on behalf of an electricity supply authority without consent. The Project is therefore permissible under the Transport and Infrastructure SEPP and development consent from Council is not required.

4.5 Other Relevant Legislation

4.5.1 *Wingecarribee Development Control Plan 2021*

The *Wingecarribee Development Control Plan 2021* (WDCP) supports the WLEP, providing guidance for development including design, general standards and area-based provisions.

The Project will be compliant with the controls outlined in WDCP.

4.5.2 *Biodiversity Conservation Act 2016*

The *Biodiversity Conservation Act 2016* (BC Act) establishes mechanisms for the:

- Management and protection of listed threatened species of native flora and fauna (excluding fish and marine vegetation).
- Listing of threatened species or key threatening processes.
- Development and implementation of recovery and threat abatement plans.
- Declaration of critical habitat.
- Consideration and assessment of threatened species impacts in development assessment process.
- Management and regulation of actions that may damage critical or other habitat or otherwise significantly affect threatened species, populations and ecological communities.

If an Activity potentially affects any flora or fauna species, populations or ecological communities listed by the BC Act, a test of significance is required. The Test of Significance, referred to in Section 7.3 of the BC Act, determines whether the Project is likely to have a significant impact. If a significant impact is determined, either a Species Impact Statement is required, or the Biodiversity Offset Scheme would need to be applied.

A biodiversity assessment was carried out. The Project Footprint was assessed for the potential presence of threatened species; populations and ecological communities listed under the BC Act and concluded that the Project would not have significant impacts on biodiversity.

4.5.3 *NSW Biosecurity Act 2015*

The *Biosecurity Act 2015* provides for the management and control of priority and environmental weeds by local control authorities. All private landowners, occupiers, public authorities and councils are required to control weeds on their land under Schedule 1 of the Act.

4.5.4 *National Parks and Wildlife Act 1974*

The *National Parks and Wildlife Act 1974* (NPW Act) aims to conserve nature, objects, places or features of cultural value within the landscape. The NPW Act is the primary legislation regulating Aboriginal cultural heritage in NSW.

Items of Aboriginal cultural heritage (Aboriginal objects) or Aboriginal places (declared under Section 84) are protected and regulated under the NPW Act. Aboriginal objects are protected under Section 86 of the Act. Under Section 90(1) of the NPW Act, the Secretary may issue an Aboriginal heritage impact permit for an activity that would harm an Aboriginal object.

Further assessment of the potential impacts on Aboriginal cultural heritage is provided in Section 5.9.

4.5.5 Heritage Act 1977

The *Heritage Act 1977* (Heritage Act) aims to provide for the identification, registration and conservation of items of State heritage significance. Investigations of the Projects potential to interact with or impact on items of heritage significance are documented in Section 5.10.

4.5.6 Waste Avoidance and Resource Recovery Act 2001

The main objectives of the *Waste Avoidance and Resource Recovery Act 2001* is to develop and support the implementation of regional and local programs to meet the outcomes of a State-wide strategy for waste avoidance and resource recovery and to minimise the consumption of natural resources and final disposal of waste by encouraging the reuse and recycling of waste.

The recording of waste disposal would be undertaken as part of the Project during the construction phase. Procedures would be implemented during construction in an attempt to promote the objectives of the Act, refer to Section 5.11.

4.5.7 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) establishes the procedures for issuing licences for activities listed in Scheduled 1 of the POEO Act to regulate aspects such as waste, air, noise and water pollution. The owner or occupiers of the premises engaged in scheduled activities is required to hold an Environment protection Licence (EPL) and comply with the conditions of that licence.

Under Part 3.2 of the POEO Act, the carrying out of scheduled activities as defined in Schedule 1 requires an EPL. The Project is not listed as a Scheduled Activity in Schedule 1 and therefore an EPL is not required.

4.5.8 Contaminated Land Management Act 1997

The *Contaminated Land Management Act 1997* (CLM Act) establishes a process for investigating and remediating land where contamination presents a “significant risk of harm” to human health or the environment. It applies to contamination which occurred before or after its commencement.

A search of the NSW Environment Protection Authority (EPA) Contaminated Land Register has identified no registered contaminated sites within one kilometre of the Project Footprint (Annex 8).

4.5.9 Electricity Supply Act 1995

The *Electricity Supply Act 1995* provides for network operators such as EE to carry out development and maintenance of electricity works for the purpose of exercising its function to supply electricity.

Section 45 Erection and placement of electricity works provides:

- (1) *This section applies to work connected with the erection, installation, extension, alteration, maintenance and removal of electricity works.*
- (2) *For the purpose of exercising its functions under this or any other Act or law, a network operator:*
 - (a) *may carry out work to which this section applies, and*
 - (b) *in particular, may carry out any such work on a public road or public reserve.*

Section 53 of the Act protects existing “electricity works” and the repairing, modifying or upgrading of these works, where the electricity work is located within land over which the network operator does not own or have the benefit of an easement. Electrical infrastructure is protected under Section 53 where it existed before the commencement of the *Electricity Supply Amendment (Protection of Electricity Works) Act 2006*. The Act also provides for entry to property to operate and maintain network assets, trim and remove trees, as well as duties for notifying landowners. The proposed access routes traverse through four properties identified in Table 1, EE will notify the landowners prior to works. The Act requires that works (other than routine repairs or maintenance works) must not be undertaken unless a minimum of 40 days notice is provided to the relevant local council. Any submissions received must be considered by EE.

4.6 State Environmental Planning Policies

4.6.1 State Environmental Planning Policy (Transport and Infrastructure) 2021

The Transport and Infrastructure SEPP aims to facilitate the effective delivery of infrastructure and transport across the State, including for power supply networks. Clause 2.44 of the Transport and Infrastructure SEPP permits development on any land 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 1974*.

The Project is not located on and reserved under the *National Parks and Wildlife Act 1974* and does not affect land or development regulated by the *State Environmental Planning Policy (Coastal Management) 2018*, *State Environmental Planning Policy (State and Regional Development) 2011* or *State Environmental Planning Policy (Transitional Major Projects) 2005* and does not trigger the requirement for development consent or designated development.

As the Project is appropriately characterised as development for the purposes of electricity transmission and is to be carried out by an electricity supply authority, it can be assessed under Part 5 of the EP&A Act. Development consent from Council under Part 4 is not required.

Part 2.2, Division 1 of the Transport and Infrastructure SEPP outlines the consultation requirements for public authorities to consult with local council and other public authorities before the start of certain types of development, the consultation requirements for the Project are further outlined in Section 4.8.

4.6.2 State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP)

The Biodiversity and Conservation SEPP consolidates, transfers and repeals provisions of the following 11 SEPPs (or deemed SEPPs):

- SEPP (Vegetation in Non-Rural Areas) 2017 (Vegetation SEPP)
- SEPP (Koala Habitat Protection) 2020 (Koala SEPP 2020)
- SEPP (Koala Habitat Protection) 2021 (Koala SEPP 2021)
- Murray Regional Environmental Plan No 2—Riverine Land (Murray REP)
- SEPP No 19—Bushland in Urban Areas (SEPP 19)
- SEPP No 50—Canal Estate Development (SEPP 50)
- SEPP (Sydney Drinking Water Catchment) 2011 (Sydney Drinking Water SEPP)
- Sydney Regional Environmental Plan No 20 – Hawkesbury – Nepean River (No 2 – 1997) (Hawkesbury–Nepean River SREP)
- Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (Sydney Harbour Catchment SREP)

- Greater Metropolitan Regional Environmental Plan No 2 – Georges River Catchment (Georges River REP)
- Willandra Lakes Regional Environmental Plan No 1 – World Heritage Property (Willandra Lakes REP).

The Biodiversity and Conservation SEPP incorporates provisions from these SEPPs.

The Project Footprint is located within the Wingecarribee LGA, and therefore this would apply to this assessment if it was being assessed under Part 4 of the EP&A Act. As the Project is being assessed under Part 5 of the EP&A Act, the provisions of Chapter 4 Koala habitat protection 2021 do not apply in relation to the assessment of Koala habitat.

Koala habitat is not likely to be impacted by the Project as clearing of native mature trees is not proposed. Where further clearing is necessary additional survey and assessment would be required to determine any potential impacts to koala habitat. The Koala is independently considered as a listed species under the BC Act and EPBC Act.

State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP)

The Resilience and Hazards SEPP consolidates, transfers and repeals provisions of the following three (3) SEPPs (or deemed SEPPs):

- SEPP (Coastal Management) 2018
- SEPP 33 – Hazardous and Offensive Development
- SEPP 55 – Remediation of Land

The Resilience and Hazards SEPP incorporates provisions from these former SEPPs.

It is unlikely that the works would trigger relevant provisions of these SEPPs and the works do not trigger requirements for designated development as stated in Schedule 3 of the *Environmental Planning and Assessment Regulation 2000*.

4.7 Commonwealth Legislation

4.7.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides for the protection of nationally significant natural or cultural values and the regulation of certain nationally significant activities. These values are known as Matters of National Environmental Significance (MNES) and the regulated activities are known as Controlled Actions and include activities, which may impact:

1. World Heritage properties.
2. National Heritage places.
3. Wetlands of international importance.
4. Commonwealth listed threatened species and ecological communities.
5. Commonwealth listed Migratory species.
6. Commonwealth marine or land areas.
7. The Great Barrier Reef Marine Park.
8. Nuclear actions (including uranium mining).
9. A water resource, in relation to coal seam gas development and large coal mining development.

None of the components of the Project would be located within a World Heritage site, a National Heritage place, a wetland of international importance, a Commonwealth Marine or land area, are located in The Great Barrier Reef Marine Park or involve any nuclear actions or impact on water resources.

Section 5.4 of this document considers potential impacts on habitat for threatened species and ecological communities listed under the EPBC Act. The Project is unlikely to significantly impact any MNES.

As the Project is unlikely to have a significant impact on controlled matters or MNES, a referral under the EPBC Act is not considered necessary.

4.8 Consultation

This Project is proposed to be assessed as a Class 4 Proposal under the *Code of Practice for Authorised Network Operators* (DPIE, 2015) (referred to here as *the Code*). The Code is further discussed in Section 4.1.

As the Project in part lies within multiple land uses and tenures, consultation will be undertaken with the affected residences, Wingecarribee Shire Council and Transport for NSW (TfNSW).

The Code

The Code requires that EE must publish on its website, and in a newspaper which circulates in the region of the location of the proposed works, the proposed activity and its impacts and invite members of the public to make submissions on the proposal. This draft REF will be published on the EE website and community feedback will be sought.

Affected residences

Direct notification of potentially affected residences will be carried out with adjacent or nearby landowners with a letterbox drop in the affected area to notify of the proposal and seek comments on the Draft REF. A copy of the letter will be attached to Annex 6 in the final revision of the REF.

Electricity Supply Act 1995

Section 45(4) of the *Electricity Supply Act 1995* requires that the local Council be given a reasonable opportunity (no less than 40 days from the date on which the notice was given) to make submissions on the Project. All submissions must be considered prior to the commencement of the works.

State Environmental Planning Policy (Transport and Infrastructure) 2021 (Transport & Infrastructure SEPP)

Section 2.10-2.12 & 2.14 of the Transport & Infrastructure SEPP require that consultation is undertaken with Council if the development has impacts on Council-related infrastructure or services, local heritage, flood liable land and certain land within the coastal zone.

Clause 2.15 of the Transport & Infrastructure SEPP requires that consultation is undertaken with public authorities other than Council, in certain circumstances.

Clause 2.45 of the Transport and Infrastructure SEPP provides that written notification must be given to Council and the occupiers of adjoining land for development for the purpose of a new or existing electricity substation. Any responses received within 21 days after the notice is given must be taken into consideration.

The Project is not impacting any state infrastructure, local heritage or flood liable land.

Wingecarribee Shire Council

A letter providing notification of the proposal will be sent to Wingecarribee Council. Notifications will also be sent to the local MP. A copy of the letter will be attached to Annex 6 in the final revision of the REF.

TfNSW

Work involving road closures will be organised with Transport for NSW and a traffic management plan/s will be prepared.

Works within rail corridor that require rail outage (during railway overhead line works) will be organised with the respective stakeholder within TfNSW.

5. Existing environment, potential impacts, and environmental safeguards

This section discusses the potential impacts of the Project on the environment, as well as discussing safeguards that may help reduce or eliminated these potential impacts. A constraints figure, Figure 11, has been provided for this Project which shows the main constraints within the Project Footprint and surrounds. A summary of all the safeguards discussed in the section is provided in Annex 1.

5.1 Land use

5.1.1 Existing land uses and Infrastructure

The proposed works are located within E4 - General Industrial, C3 - Environmental Management, RE1 - Public Recreation and SP2 - Infrastructure under the *Wingecarribee Local Environmental Plan 2010* (WLEP).

For the most part, the Project occurs within previously cleared areas such as road verges, and disturbed paddocks (Figure 3).

5.1.2 Potential impacts

5.1.2.1 Construction

The Project predominately lies within areas previously disturbed and will avoid disturbance of native vegetation wherever possible. The scale of this Project would be commensurate with a small to moderate scale construction project; temporary and short-term. Land use within the alignment would not be significantly altered by the construction of the Project.

5.1.2.2 Operation

The Project is not expected to cause any significant changes or impact to any land uses within the general area.

5.1.3 Environmental Safeguards

The following safeguards would be implemented to minimise land use impacts:

- All impacted sensitive receivers and landowners within or adjacent to the works will be notified in writing 7 to 14 days prior to the commencement of construction works. Notification will include:
 - Proposed commencement date
 - Brief of scope of works
 - Anticipated duration of the works
 - 24 hour contact details of the Project Manager or other appropriate contact person in the event of any complaints
 - Details on proposed blocking or impairing access to driveways and/or residences/businesses (if any)

Evidence of this notification should be stored in the project file. This notification will be required in addition to any notification carried out during the preparation of this REF.

- On completion of the work disturbed areas shall be stabilised and returned to as close to original condition or as otherwise agreed with the landowner.

5.2 Geology and Soils

5.2.1 Existing environment

The Project Footprint is characterised by Triassic sedimentary and volcanic rocks. The Project Footprint is situated within the Hawkesbury Sandstone formation in the Sydney Basin (Figure 4).

The Project Footprint transverses across dermosols and kurosols soils within the region (Figure 5). No acid sulfate soils occur in the locality.

5.2.2 Potential impacts

5.2.2.1 Construction

During construction, the Project has the potential to impact the soils and/or water quality of the area in the following ways:

- Ground disturbance and specifically excavation has the potential to lead to local erosion and downstream water quality impacts.
- Compaction of soils due to vehicular movement.
- Contamination of soils or waterways from hydrocarbon spills.
- Entrainment of sediments from spoil stockpiles.
- Placement of crushed rock or gravel only where required for the new access tracks.

Erosion generated from the movement of vehicles along existing access tracks and exposed surfaces is not expected to be significant given the low volume of vehicles required to service the Project. Providing the mitigation measures below are implemented, the risk of erosion and sedimentation can be effectively managed.

Soil contamination has the potential to occur during construction works because of any accidental spills or leaks of fuels, oils and other chemicals from plant, equipment and vehicles used during construction works. Any unplanned release is expected to be minor and can be effectively managed through the implementation of the mitigation measures in Section 5.2.3.

The Project Footprint is predominately located on flat or low-grade sloping land which will reduce the erosion potential of rain events during construction.

5.2.2.2 Operation

The proposed works are not expected to contribute to any additional impacts on geology and soils during operation.

5.2.3 Environmental safeguards

The following safeguards will be employed to protect and minimise geology and soil impacts to waterbodies:

- An Erosion and Sediment Control Plan (ESCP) shall be prepared as part of the CEMP. All erosion and sediment control measures shall be designed, implemented and maintained in general accordance with *Managing Urban Stormwater: Soil and Construction Volume 1* (Landcom, 2004) ('the Blue Book') (particularly Section 2.2). The ESCP shall include stockpiles, stormwater run-off, trees, site boundaries, site access and storage areas. Exposed surfaces shall be kept to a minimum to limit the potential for erosion and dust generation.
- Inspections of the erosion and sediment controls will be on a periodic basis and at opportunistic times such as following rainfall events that cause run-off. The inspection program will record the following:
 - Condition of rehabilitation areas (including records of any slumping)
 - Condition of sediment and erosion control structures
 - Whether sediment or other pollutants are leaving the site or have the potential to do so
 - Maintenance requirements Location(s) where sediment is disposed.
 - Pre-rainfall inspection to ensure that the controls are in place and working.

- Vegetation disturbance is to be minimised. Activities will be preferentially undertaken in cleared or weedy areas or in areas that have been subject to previous disturbance or are themselves existing access tracks.
- Soil compaction will be minimised by utilising existing access tracks where possible and minimising vehicle movements along access tracks to only that required.
- Sites which are subject to levelling will be re-contoured to match the surrounding topography post development.
- All chemicals or other hazardous substances shall be stored in bunded and weatherproof facilities away from drainage lines. The capacity of the bunded area shall be at least 110% of the largest chemical volume contained within the bunded area.
- A spill kit will be located at each site to manage hydrocarbon spills (if there are any) and be used in the event of a spill.
- Any imported fill shall be certified at source location as pathogen and weed free Excavated Natural Material (ENM) or Virgin Excavated Natural Material (VENM) in accordance with the POEO Act and the *Protection of the Environment (Waste) Regulation 2014* (POEO Waste Regulation).
- Any material or soil suspected of showing evidence of contamination shall be sampled and analysed by a NATA Registered laboratory and managed in accordance with the *Waste Classification Guidelines* (EPA, 2014), the *Guidelines on the Duty to Report Contamination* (EPA, 2015) and the *Contaminated Land Management Act 1997*.
- Spoil management and dewatering of worksites will be managed in accordance with the following EE Standards and the Environmental Guidelines Handbook:
 - EMS 0007 – Waste Management
 - EMS 0008 - Environmental Incidents Response and Management
 - EMS 0013 - Spoil Management
 - EMS 0014 – Dewatering worksites.
- Existing roads, access tracks and rail corridor are to be used for vehicles and equipment to gain access to the sites.
- New access tracks shall be constructed with erosion and sediment controls.

5.3 Hydrology and Water Quality

5.3.1 Existing Environment

Wingecarribee River is the main drainage line flowing through the Project Footprint. Figure 6 shows the drainage lines within the general area of the Project.

Drainage lines within the Project Footprint consist of streams within disturbed paddocks, and man-made structures such as concrete drainage channels and culverts. Based on the field assessment, pole 3P1812 is in proximity to a drainage line.

The Project is not mapped within the Flood Planning Map under the Wingecarribee LEP 2010. Groundwater may be encountered during pole removal and/or installations.

5.3.2 Potential Impacts

5.3.2.1 Construction

Erosion and sedimentation, if uncontrolled, would have the potential to increase the amount of sediment and organic matter entering waterways, including, the concrete drainage lines. This has the potential to increase turbidity and result in a decline in the water quality of these watercourses. This risk of impacts on the water quality of surrounding watercourses is increased where ground disturbance work is carried out in

close proximity (particularly within 40 m) of watercourses and during periods of high rainfall where exposed areas are more susceptible to sediment runoff.

Water quality impacts also have the potential to occur during construction if fuel or chemical spills from construction vehicles enter waterways. If not managed appropriately, the introduction of pollutants could result in the following potential impacts to the quality of the watercourses:

- Changes to pH, electrical conductivity, dissolved oxygen and temperature.
- Reduced light penetration due to increased turbidity.
- Increased sediment load, organic matter and turbidity of water.
- Increase in gross pollutants.
- Introduction of toxic pollutants such as construction fuels, oils and grease and chemicals.

Potential chemical or oil leaks and accidental spills associated with construction machinery could also result in localised contamination of soils. However, with the implementation of the mitigation measures in Section 5.3.3, the risk of contaminating nearby watercourses would be adequately managed.

There is potential that groundwater may be encountered during augering for the replacement pole locations and where there is underground works proposed. The NSW Office of Water state in their Dewatering Applications - Mandatory Information requirements to support licence applications for construction dewatering projects that any take of water as a result of minor temporary dewatering activities that is estimated to be less than three megalitres per year (ML/yr) would not require a licence. It is extremely unlikely that this volume would be exceeded should groundwater be encountered during the structure replacement works.

No drainage lines or waterbodies would be directly impacted by the proposed works. Mitigation measures will be implemented where impacts to the aquatic environment are likely to occur.

The Project would not significantly alter the shape and contour of the land within the Project Footprint. As such, the flood regime of the Project Footprint is not expected to be affected.

5.3.2.2 Operation

No ongoing adverse impacts to water quality and hydrology are anticipated once proposed activity works have been completed or during the ongoing operation of the new permanent ZS.

5.3.3 Environmental Safeguards

The following safeguards would be implemented to minimise hydrology and water quality impacts:

- The drainage lines and waterbodies would be avoided by the proposed works.
- Spoil shall be stockpiled in a manner so as to avoid the possibility of sediments entering watercourses (including stormwater drains) or migrating off-site.
- Any bulk fuel or hazardous material transport vehicles shall be parked on level ground a minimum of 40 m away from watercourses (including drainage lines).
- Any groundwater encountered would be dewatered, collected and disposed of appropriately. If minor dewatering is required, the management of discharge water shall be documented in the CEMP and be in accordance with EE Procedure EMS0014. Discharge water should be limited to vegetated, grassed areas, away from waterways, and within the feeder line overhead alignment. If the discharge water is highly turbid, dewatering through a filter sock (or similar) shall be considered, where appropriate, to minimise sedimentation.

5.4 Flora and fauna

5.4.1 Existing Environment

A review of spatial records of threatened flora and fauna within a 10 kilometre (km) radius of the Project Footprint was undertaken using data obtained from the BioNet Atlas of NSW Wildlife (NSW Department of Climate Change, Energy, the Environment and Water [NSW DCCEEW] 2023). The Commonwealth Protected Matters Search Tool (Commonwealth Department of Climate Change, Energy, the Environment and Water [DCCEEW] 2023) was also used to identify threatened biodiversity and any other Matters of National Environmental Significance (MNES) listed under the EPBC Act with the potential to occur within a 10 km radius of the Project Footprint. Records were obtained prior to undertaking the field survey to identify threatened biodiversity with the potential to occur in the Project Footprint. The likely occurrence of threatened biodiversity previously recorded was considered during the subsequent field survey and a likelihood of occurrence analysis (Annex 3) was undertaken.

5.4.2 Site Assessment

The site assessment was undertaken on the 19th of December by two environmental scientists (Niche Environment and Heritage) to verify existing vegetation mapping, including the presence of Threatened Ecological Communities (TECs), and determine flora and fauna habitat of the Project Footprint. As this was primarily a habitat-based assessment, targeted threatened species surveys were not undertaken.

Vegetation Disturbance and Threatened Ecological Communities

Vegetation mapping indicates that there is one vegetation community; PCT 3338 *Goulburn Tableland Frost Hollow Grassy Woodland* (BC Act: CE; EPBC Act: CE) in close proximity to the Project Footprint (see Figure 7) which was validated during field surveys. For the most part, the Project occurs within previously cleared areas such as road verges, and disturbed paddocks.

This PCT aligns with the critically endangered threatened ecological community (TEC), *NSW Werriwa Tablelands Cool Temperate Grassy Woodland* under the BC Act.

The TEC is in very low condition consisting of only canopy trees (Plate 3). The vegetation has been under scrubbed, and the groundcover and understory consist of weed species. The canopy trees will be avoided by the proposed works.

An Assessment of Significance (AoS) is not required as no native vegetation is proposed to be removed.

The removal of non-native vegetation is required in the Project Footprint on Douglas Road near the Berrima Junction ZS, namely a stand of Radiata Pines as well as Quaking aspen trees (Plate 4). This stand of 32 trees require removal for the 33kV feeder works to provide clearance for the overhead lines. Furthermore, non-native vegetation removal is required near the corner of the Moss Vale ZS including Crab Apple, and Japanese Maple.



Plate 3. PCT 3338 Goulburn Tableland Frost Hollow Grassy Woodland, located in the vicinity of pole 3P2098



Plate 4. Radiata pines to be removed on Douglas Road near the Berrima Junction ZS

Threatened Flora

A total of 34 threatened flora, as listed on the BC and/or EPBC Acts, were considered in this assessment. This list was derived from the database searches.

Based on previous records (NSW DCCEEW 2023), one threatened plant species is known to occur in the vicinity of the Project Footprint: *Eucalyptus macarthurii*, which has been given a high likelihood of occurrence within the patches of native vegetation within the Project Footprint (Figure 8). No threatened flora species were recorded during the current survey.

Threatened fauna and habitat

A total of 49 threatened fauna species records have been recorded (NSW DCCEEW 2023) or are predicted to have habitat (DCCEEW 2023) within 5 km of the Project Footprint (Figure 9).

No threatened fauna species were recorded during the current survey. However, 6 threatened fauna were considered to have a High or Moderate likelihood of occurrence in the Project Footprint (Appendix 1):

- Little Eagle (*Hieraetus morphnoides*)
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)
- Gang-gang Cockatoo (*Callocephalon fimbriatum*)

- South-eastern Glossy Black-Cockatoo (*Calyptorhynchus lathami*)
- Scarlet Robin (*Petroica boodang*)
- Southern Myotis (*Myotis Macropus*)

Woodland habitat

Woodland habitat provides a wide range of food and shelter for vertebrate fauna. Trees from the family Myrtaceae (mostly *Eucalyptus* spp.) generally dominate the upper canopy in these areas and supply a direct (foliage, nectar, exudates) and indirect food (arthropods) source for a range of vertebrates, particularly birds and arboreal mammals.

No hollow bearing trees were observed within the Project Footprint. All native trees will be retained.

Drainage lines

Drainage lines within the Project Footprint consisted of streams within disturbed paddocks, and man-made structures such as concrete drainage channels and culverts. Based on the field assessment, pole 3P1812 was in proximity to a drainage line.

These habitats are unlikely to provide shelter and/or foraging resources for a range of reptile, frog and small mammal species.

The drainage lines and waterbodies would be avoided by the proposed works where feasible and therefore are unlikely to be impacted by the Project. Mitigation measures will be implemented to avoid impacts to these drainage lines.

5.4.3 Potential Impacts

5.4.3.1 Construction

The Project has the potential to impact vegetation and threatened fauna in the following ways:

- Removal or modification of native/exotic vegetation.
- Removal or modification of threatened species habitat
- Deleterious hydrological changes.
- Sedimentation and erosion.
- Weed invasion.
- Increased human activity directly adjacent to sensitive habitat areas.

The Project Footprint is outside of mapped areas of native vegetation (Figure 7) and vegetation removal will be limited to exotic vegetation.

No suitable habitat of the threatened species that are likely to occur (listed above) will be altered as a result of the Project.

With consideration of the mitigation measure stipulated in Section 5.4.4, there is not expected to be significant impacts on nearby watercourses, sedimentation and erosion or weed invasion.

Landscaping will be established at the substation site. The area will be prepared, weeds managed and vegetation planted in accordance the Site Landscape Plan included in Annex 4.

Potential impacts on biodiversity are expected to be minor. There is not expected to be any significant impacts on biodiversity resulting from the construction phase of the Project. These impacts will be mitigated through the safeguards in Section 5.4.4.

5.4.3.2 Operation

No ongoing adverse impacts to biodiversity are anticipated once the Project construction is completed or during the ongoing operation of the new permanent ZS.

The biodiversity assessment concluded that the Project would not have significant impacts on biodiversity.

5.4.4 Environmental Safeguards

The following recommendations are to be implemented to minimise disturbance to flora:

1. Disturbance would be restricted to the removal of non-native shrubs and trees, including the removal of Radiata Pines.
2. Soil disturbance would be minimised and soil that is disturbed would be replaced according to the natural profile of the soil (i.e. topsoil reinstated as the top layer).
3. Landscaping at substation site to be established in accordance with Site Landscape Plan (Annex 4), including site preparation, weed management and planting.
4. All actions should be in accordance with EE's "Pests, Weeds and Diseases" section of the EE Environmental Guidelines Handbook.

The following recommendations are to be implemented to minimise disturbance to fauna and their habitats:

5. An Erosion and Sediment Control Plan (ESCP) shall be prepared as part of the CEMP. All erosion and sediment control measures shall be designed, implemented and maintained in general accordance with *Managing Urban Stormwater: Soil and Construction Volume 1* (Landcom, 2004) ('the Blue Book') (particularly Section 2.2). The ESCP shall include stockpiles, stormwater run-off, trees, site boundaries, site access and storage areas. Exposed surfaces shall be kept to a minimum to limit the potential for erosion.
6. All large trees, stags and fallen hollow logs would be avoided where practical. The Radiata Pines are the exception, 32 are proposed for removal (Section 5.4.2).
7. The removal of hollow bearing trees is not anticipated to be required. However, if it is required it would be performed in the presence of a qualified ecologist to assist in detection and translocation of potentially displaced fauna.
8. All creeks and drainage lines that contain flowing or still water are to be avoided.

5.5 Noise and Vibration

5.5.1 Existing environment

The noise emissions surrounding the Project Footprint consists of localised traffic noise, rail associated noise and noise emitted from the industrial area. Therefore, there are moderate levels of background noise already occurring.

Acceptable operational noise limits are derived from the EPA's Noise Policy for Industry for intrusive noise impacts at each residence, and amenity criterion at the nearest commercial premises. The nearest potentially affected receiver from the proposed ZS is located 370 m to the South-West (refer Annex 5).

5.5.2 Potential impacts

5.5.2.1 Construction

The main sources of Project construction noise and vibration emissions are movement and operation of the machinery outlined in Section 2.3 undertaking Project activities (Section 2.3). Larger plant and heavy

equipment with diesel engines (such as the proposed franna crane, slew crane, crane borer, excavator, tipper truck) typically generate higher noise levels than smaller equipment (such as light vehicles).

Activities associated with the Project are likely to lead to temporary increased noise levels for residents. Construction hours will be limited to the Interim Construction Noise Guideline (DECC 2009) standard construction working hours outlined in Section 2.4. Works within rail corridor that require rail outage will be organised with the respective stakeholder within TfNSW. These works may be required at night in which case out-of-hours works approval from the EE Environmental Services Team Manager will be sought.

Vibrational outputs are expected to be relatively minor and would be managed in accordance with *Assessing Vibration: a technical guideline* (DEC 2006). Vibrational sources are likely to be during the construction phase of the Project and from borers. This machinery will be typical plant items consistent with Section 2.3. The activities producing vibrational output can be described as continuous, impulsive and intermittent vibration in DEC (2006).

Noise and vibrational emissions during construction would be commensurate with a typical small to moderate scale construction project. The impacts are assessed as relatively minor and temporary (short term).

5.5.2.2 Operation

Noise emissions during the ongoing operation of the new permanent ZS have been calculated at the nearest residential premises and comply with the EPA's Noise Policy for Industry (refer Annex 5).

5.5.3 Environmental safeguards

The following safeguards will be employed to reduce noise and vibration:

- Construction hours must be limited to standard construction working hours (Monday to Friday: 7 am to 6 pm, Saturday: 8 am to 1 pm, No work on Sundays or public holidays), unless otherwise approved. Any out-of-hours-works must be conducted in accordance with the requirements of EE's Environmental Guidelines Handbook.
- All vehicles and other equipment will be switched off when not in use. Vehicles must adhere to speed limits.
- Limit concurrent use of machinery where possible.
- Minimising noisy activities in proximity to the residential premises where feasible.
- Where maximum vibration values in DEC (2006) cannot be met after all feasible and reasonable measures have been applied, any unacceptable impacts may be dealt with between the operator and the affected community. Negotiation should be made available to those people whose amenity is potentially affected by non-achievement of the relevant vibration criteria.
- Where minimum distances outlined in BS 7385 (1993) cannot be maintained, a dilapidation assessment will be required to manage the risk of cosmetic damages within the Project Footprint.
- Compliance with the amenity criteria identified in Environmental Noise Impact Assessment (29 August 2023) prepared by Day Design Pty Ltd (Annex 5).

5.6 Air Quality

5.6.1 Existing environment

The surrounding environments consist of predominantly built up areas with some minor remnant vegetation remaining. The surrounding areas consist of residential and industrial land use areas. The air quality is expected to be typical of the Sydney airshed.

5.6.2 Potential impacts

5.6.2.1 Construction

Activities associated with the Project have the potential to impact air quality in the following ways:

- Increased vehicular movements and construction activities (Section 2.3) leading to the generation of dust.
- Increased machinery/vehicular exhaust and fuel combustion related particulate and greenhouse gas emissions.

Air emissions during construction would be commensurate with a typical small to moderate construction project. The impacts are assessed as relatively minor and short term.

5.6.2.2 Operation

Negligible air emissions are expected from the ongoing operation of the new permanent ZS and therefore air quality impacts during operation would be negligible.

Air quality impacts during the ongoing operation of the new permanent ZS would be negligible.

5.6.3 Environmental safeguards

The following safeguards will be employed to protect air quality and reduce noise:

- Minimise soil disturbance. Water carts to be used if necessary.
- Weather conditions to be monitored. Works are not to take place in extreme wind conditions (> 40km/h).
- All vehicles, plant and equipment are modern, well maintained and fit for purpose. Emissions from these items will be regulated by their standard exhaust systems.
- All vehicles and other equipment will be switched off when not in use. Vehicles must adhere to speed limits.
- Limit concurrent use of machinery where possible.
- Where minimum distances outlined in BS 7385 (1993) cannot be maintained, a dilapidation assessment will be required to manage the risk of cosmetic damages within the Project Footprint.
- An Erosion and Sediment Control Plan (ESCP) shall be prepared as part of the CEMP. All erosion and sediment control measures shall be designed, implemented and maintained in accordance with Managing Urban Stormwater: Soil and Construction Volume 1 (Landcom, 2004) ('the Blue Book') (particularly Section 2.1). The ESCP shall include stockpiles, stormwater run-off, trees, site boundaries, site access and storage areas. Exposed surfaces shall be kept to a minimum to limit the potential for dust generation.

5.7 Traffic and accessibility

5.7.1 Existing environment

The Berrima Junction ZS is located on Douglas Road Moss Vale and has an existing driveway that will be used to access the site. Access for the 33kV feeder will be along the existing easement using existing public roads and access tracks. For a number of poles that require replacing, the access to them is along public roads, with ease of access, and passing many residential dwellings. The remaining poles are located in open paddocks. The majority of the access tracks and roads to be used to access the replacement pole locations are existing. Some works may be required in the rail corridor where there will be railway overhead works.

5.7.2 Potential impacts

5.7.2.1 Construction

The Project will temporarily impact vehicular traffic levels and accessibility to the Project Footprint.

During construction, vehicles would be used to transport personnel, materials, waste and equipment to and from the work locations within the Project Footprint via the existing roads, access tracks and the rail corridor.

The works would temporary fence-off some sections of footpaths in some area, impacting pedestrians' accessibility of the footpath.

The Project will impact the traffic on public roads. However, these impacts are only expected to be minor and temporary. For areas where the Project Footprint traverses busy roads, night works when traffic volumes are low may be required to allow for half-road closures. During the road closures, through traffic will be limited to single lane each way with short stoppages of traffic in both directions for specific tasks. These works will be organised with the respective stakeholder/s and traffic management plans will be prepared. The relevant licences and permits (eg. road occupancy licences from TfNSW) will be sought by EE prior to commencement of works as required.

For works involving low traffic areas, lane closures may also temporarily affect the function of the road network. This will occur during standard construction hours and will allow the road to remain open, with restrictions and necessary permits will be obtained and affected residents notified.

Works within rail corridor will require rail outage and will be organised with the respective stakeholder. Where the installation schedule permits, works will be undertaken during planned rail line outages to minimise impact to rail operations where feasible. Coordination with TfNSW will occur to determine the conditions of stopping train movements during the proposed activity.

There will be no restrictions to emergency service accessibility as public transport companies and emergency services will be contacted directly, at least 14 days prior to any traffic alterations to allow for sufficient time to alter routes if required.

The traffic and accessibility impacts of construction are assessed as relatively minor/moderate but temporary and localised. It is not anticipated that the increase in traffic due to the works would significantly affect the safety and function of the surrounding road network.

5.7.2.2 Operation

After the completion of the proposed activity, traffic and rail conditions would return back to the existing state.

5.7.3 Environmental safeguards

The following safeguards will be employed to minimise traffic impacts:

- Ensure that a Traffic Management Plan is prepared and followed.
- Traffic control is to be used to maintain continued traffic access where feasible.
- The temporary modification to traffic will be as minimal as possible.
- Any Transport for NSW (TfNSW) Permits and or Council permits required for lane closures will be obtained prior to the commencements of the works and affected residents notified.
- Emergency services and public transport methods will be notified.
- Ensure that the works to be done in the rail corridor are conducted during planned rail line outages or further consultation is required.
- After significant rainfall of < 10 mm/24 hrs, undertake inspection of the access tracks to determine if use of tracks at this time would potentially result in a detrimental effect, and if required allow for the road to sufficiently dry out.

- Traffic, transportation and access mitigation and management strategies shall be documented and implemented in accordance with the CEMP and updated as required.

5.8 Visual amenity

5.8.1 Existing environment

The Project Footprint does not offer very high visual amenity, mostly consisting of industrial, residential and semi-rural areas and includes an existing easement. Refer Figure 2.

5.8.2 Potential impacts

5.8.2.1 Construction

Activities associated with the Project have the potential to impact visual amenity in the following way:

- Vegetation and soil disturbance associated with set up for new poles.
- Vegetation (grass removal) and soil disturbance associated with new access tracks.
- Soil disturbance associated with localised excavations at the Berrima Junction ZS site, and vegetation removal of stand of radiata pine trees along Douglas Road.

Construction works would move progressively along the feeder line (existing easement) and as such, visual impacts associated with the construction activities would be temporary and considered minor in nature.

Visual amenity would be altered at site of Berrima Junction ZS. Construction works associated with the upgrade of the ZS would be temporary and considered minor in nature.

Visual amenity associated with the removal of vegetation during construction is unlikely to impact the surrounding visual environment, due to previous disturbances in the location, and minimal residential dwellings within proximity.

With the implementation of the mitigation measures below, visual impacts during construction are anticipated to be minor and unlikely to be significant.

5.8.2.2 Operation

Visual amenity during operation would be similar to current conditions, apart from minor vegetation disturbance.

The proposed 15 m communications pole would have a high visual compatibility with the existing substation as it would be an incremental change and consistent in style and materials to the existing substation.

Appropriate site security fencing to be installed around the new permanent Berrima Junction ZS site to provide visual screening and ensure the site is safe and secure.

Landscaping will also be installed outside the security fence. Species to be planted are native and include *Casuarina glauca* (swamp oak) which grow to 15m and *Callisterol citrinus* (crimson bottlebrush) which grow to 6m. This will provide additional visual screening.

A photo montage and Site Landscape Plan for the proposed site is included in Annex 4.

5.8.3 Environmental safeguards

The following safeguards will be implemented to reduce or eliminate impacts to visual amenity:

- Native vegetation such as the canopy trees within the TEC will be avoided.
- All actions should be in accordance with the best Practice weed management guidelines (DPI 2021).

- All construction plant, equipment, waste and excess materials shall be contained within the designated boundaries of the work site and shall be removed from the site following the completion of construction.
- Disturbed areas would be rehabilitated to previous conditions if feasible.
- Materials used for the Project would be consistent with the existing materials where practical
- Appropriate site security fencing and landscaping to be installed around the new permanent Berrima Junction ZS site to provide visual screening and ensure the site is safe and secure.

5.9 Aboriginal cultural heritage and archaeology

An assessment of Aboriginal cultural heritage and archaeology is provided below.

5.9.1 Existing Environment

5.9.1.1 Heritage registers search results

A search of the Aboriginal Heritage Information Management System (AHIMS) was completed on the 6th of December 2023 covering the Project Footprint and broader surrounds (AHIMS Client Service ID #846692) (Annex 7).

A total of twenty (20) Aboriginal cultural heritage sites are recorded within the AHIMS search boundaries (see Figure 10 of the REF). None of these identified sites are located within 200m of the Project Footprint (Figure 10).

5.9.2 Potential impacts and safeguards

The Project footprint has been previously disturbed and no Aboriginal cultural heritage constraints were identified within or directly adjacent to the Project Footprint. *The National Parks and Wildlife Regulation 2009* (NPW Regulation) removes the need to follow the due diligence process if the proponent is carrying out a specifically defined low impact activity. The proposed activity is consistent with a specifically defined low impact activity and therefore the Project may therefore proceed with caution without the need for a further Aboriginal Objects Due Diligence Report (AODD). The following recommendations are made:

- All site workers and contractors should be inducted to the area and informed of their obligations under the *National Parks and Wildlife Act 1974*.
- In the event that previously unknown Aboriginal object(s) and/or sites are discovered during the proposed activity, work must stop. A temporary fence is to be erected around the Aboriginal cultural heritage site, with a buffer zone of at least 10 metres around the known edge. Contact an EE Environmental Specialist as further assessment may be required. The EE Environmental Specialist will be responsible for notifying Heritage NSW and Aboriginal Stakeholders. A qualified archaeologist may also be required to assess the find. Works should not proceed without advice from Heritage NSW or an appropriately qualified archaeologist.
- In the unlikely event that suspected human remains are encountered during the proposed activity, all work in the area that may cause further impact, must cease immediately and:
 - The location, including a 10 m curtilage, should be secured using barrier fencing to avoid further harm.
 - The NSW Police must be contacted immediately.
 - No further action is to be undertaken until the NSW Police provide written notification to the Proponent.
 - If the skeletal remains are identified as Aboriginal, the Proponent or their agent must contact Heritage NSW, previously known as the Office of Environment and Heritage (OEH) Enviroline on 131 555; and representatives of the Illawarra Local Aboriginal Land Council (ILALC).

- No works are to continue until Heritage NSW provides notification to the Proponent or their Agent.

5.10 Non-Aboriginal heritage

5.10.1 Heritage registers search results

A search of the following databases on 29th October 2023 was undertaken to identify items and places of non-Aboriginal heritage recorded within the Project Footprint:

- World Heritage Register.
- National Heritage List.
- Commonwealth Heritage Register.
- NSW State Heritage Register and State Heritage Inventory.
- Section 170 register (NSW government agencies) on the State Heritage Inventory.
- *Wingecarribee Local Environment Plan (2010)*.

The Project Footprint transverses Bong Bong Common (refer Figure 10). The proposed works in this area include overhead works for the 33kV feeder and pole replacements. All of these works will be within the existing easement and previously disturbed areas. The works will therefore not impact on the heritage value of the Bong Bong Common. The Project Footprint is located north of Christ Church, Churchyard & Cemetery, a State Heritage Register Curtilage (refer Figure 10). Moss Vale ZS is located adjacent to this curtilage. Some minor excavation/connection works are planned within the central section of the Moss Vale ZS, however these works will be well contained within the Moss Vale ZS site. The proposed works would therefore not impact the curtilage of the Christ Church, Churchyard and Cemetery as all works will be within the Moss Vale ZS and will move North, away from the site.

5.10.2 Potential impacts and safeguards

The Project would have negligible impact on the heritage values of the listed heritage sites described above.

It is recommended that prior to the proposed works within the Project Footprint:

- If potential archaeological deposits are found in areas that have not been identified in this assessment, work should stop immediately, and a qualified heritage specialist contacted. Heritage NSW should be notified, and their advice followed as per Heritage NSW guidelines.

5.11 Electromagnetic Fields

5.11.1 Existing Environment

Electromagnetic fields (EMF) are part of the natural environment and are present in the atmosphere. Static magnetic fields are created by the earth's core. EMF is also produced wherever electricity or electrical equipment is in use. Existing sources of EMF within and close to the Project Footprint include Berrima Junction ZS, 11 kV transformers and 33 kV Feeder.

5.11.2 Potential impacts

5.11.2.1 Construction

During construction, the new Berrima Junction ZS, the new 33kV feeder and antenna would not be energised and is therefore not expected to generate an electromagnetic field. Existing electrical infrastructure such as substations have been designed to meet relevant EMF standards and therefore construction work in proximity to existing infrastructure would not create EMF risks.

5.11.2.2 Operation

During operation, the Project would produce electromagnetic emissions. The Radio Frequency Electromagnetic Energy (RF EME) Analysis Report (Annex 9) indicates that the predicted levels of electromagnetic energy surrounding the proposed antenna comply with the limits established by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). No exclusion zone is required.

5.11.3 Environmental safeguards

The following safeguards will be employed to reduce or eliminate impacts from EMF:

- All designs are to comply with ARPANSA Radio Protection Standard 3 exposure limits (ARPANSA, 2002).

5.12 Generation of waste and hazardous materials

5.12.1 Existing environment

The Project Footprint's vegetation has been under scrubbed, and the groundcover and understory consist of grasses and weed species.

A search of the Environmental Protection Authority (EPA) Contaminated Sites Register identified no contaminated sites within proximity to the Project Footprint.

5.12.2 Potential impacts

5.12.2.1 Construction

Activities associated with the Project are unlikely to generate hazardous materials.

The Project has the potential to increase the generation of waste in the following ways:

- The inappropriate discarding of packaging of consumables and other general site rubbish.

Anticipated waste streams generated during construction works would include:

- General construction waste such as off-cuts, packaging and excess construction material (such as wood, concrete, plastic and metal).
- Excess spoil. The excess spoil will be tested and classified and disposed of off-site at a licensed waste facility in accordance with its waste classification.
- Redundant cables, wooden pole structures, steel members, steel structures, conductors, earth wires and fittings.
- Waste oils, greases and lubricants from maintenance of construction plant and equipment.
- Domestic and putrescible waste (including food scraps, bottles, cans and paper).
- Invasive weed material.

All waste generated during construction would be reused or recycled if appropriate, or removed, transported and lawfully disposed from the site in accordance with the *Waste Classification Guidelines* (NSW EPA, 2014), *Protection of the Environment Operations Act 1997* (POEO Act) and POEO (Waste) Regulation 2005.

5.12.2.2 Operation

A minimal amount of waste will be generated during the operational phase of at the new permanent Berrima Junction ZS.

Minimal waste is generated from the current operation of the existing easement. Maintenance activities may generate waste associated with any damaged components of the line that require replacement (e.g.

earth wire, insulators and fittings). Routine vegetation maintenance also results in the generation of green waste, in addition to domestic waste generated during line inspections.

With the implementation of the mitigation measures described below, waste related impacts are considered to be minor.

5.12.3 Environmental safeguards

The following safeguards will be employed to reduce or eliminate impacts due to waste or hazardous materials generation:

- Avoid the generation of waste and recycle and reuse whenever possible.
- Waste mitigation and management strategies shall be documented in the Work Instructions.
- All waste, including surplus soils, which cannot be reused shall be classified in accordance with the *Waste Classification Guidelines* (EPA, 2014), removed from the site and disposed of at a facility that can lawfully accept the waste in accordance with the POEO Act and POEO Waste Regulation.
- Invasive weed material to be disposed of or treated appropriately as per EE's "Pests, Weeds and Diseases" section of the EE Environmental Guidelines Handbook and EMS0004.

5.13 Cumulative impacts

Cumulative impacts are incremental environmental impacts caused by the combination of past, present and reasonably foreseeable future actions (or projects). Cumulative impacts accumulate over time, from one or more sources. Whilst impacts may be insignificant in isolation, significant impacts may occur when individual effects are considered in combination.

Wherever possible, the existing access tracks would be utilised to provide at least partial access, thereby minimising any cumulative vegetation clearance and associated impacts.

The assessment of cumulative impacts also focused on the proposed activity's interaction with other projects in the vicinity of the proposed activity, and where construction and/or operational timeframes are likely to be concurrent.

A search of the Department of Planning, Industry and Environment's major Projects website was conducted on the 6 December 2023. This concluded that there are no upcoming Projects within the vicinity that would result in cumulative impacts when combined with this Project.

5.13.1 Environmental Safeguards

The safeguards listed throughout this REF will be employed to reduce cumulative impacts and are consolidated in Annex 1.

6. Conclusion

The Project is required to support the development and increased demand within the Berrima Junction Enterprise Growth area located within Wingecarribee Shire Council.

The Project will be located within the existing Berrima Junction ZS site and existing EE overhead alignment easements to minimise the disturbance and vegetation clearing within the Project Footprint. All proposed pole replacements would be within 4 m of the existing pole.

No threatened flora or fauna were recorded in the Project Footprint. Any nearby species will not be affected by the proposed works. A biodiversity assessment determined the Project is not likely to result in a significant impact to any threatened fauna listed under the BC Act and/or EPBC Act.

A number of recommendations have been provided to avoid and mitigate the potential impact the Project may have on native vegetation, flora and fauna.

Given the careful design of the Project and mitigation measures proposed, this Project has been identified as a Class 4 Proposal under the Code and is unlikely to have a significant impact on the environment. Preparation of an EIS is therefore not required.

As the determining authority, EE should prepare a Decision Statement and make a formal determination in relation to the Project.

A separate environmental assessment should be prepared for any other works associated with this Project that are not covered by this REF.

All works should be undertaken in accordance with this REF, including the mitigation measures provided in Annex 1. Summary of mitigation measures, any Decision Statement issued in relation to this REF, the associated CEMP and any other specific mitigation measures that are developed for this project.

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Annex 1. Summary of mitigation measures

Environmental Aspect	Mitigation Measures
Endeavour Energy (General requirements)	The Project or Activity shall be carried out consistent with the REF
	Prior to any work commencing, the Endeavour Energy Project Manager and the Principal Construction Contractor must obtain the project Decision Statement and familiarise themselves with its conditions.
	A Construction Environmental Management Plan (CEMP), or equivalent, shall be prepared addressing the environmental safeguards identified in the REF and any appropriate industry standards. The CEMP shall be submitted to the Environmental Services Team for review and approval prior to on-ground works commencing.
	A copy of the project REF Decision statement and any other pertinent certificates/agreements, permits and documentation to be relied upon shall be always available to the project team/crews during construction.
	All works to be carried out in accordance with the approved project design.
	The Project Manager/Construction Contractor is to prepare a dilapidation report or photographic record as deemed necessary of any Council, private or Endeavour Energy assets which have the potential to be damaged by the proposed works.
	All works shall be consistent with Endeavour Energy’s Environmental Management System (EMS).
Land Use	<p>All impacted sensitive receivers and landowners within or adjacent to the works will be notified in writing 7 to 14 days prior to the commencement of construction works. Notification will include:</p> <ul style="list-style-type: none"> ▪ Proposed commencement date ▪ Brief of scope of works ▪ Anticipated duration of the works ▪ 24 hour contact details of the Project Manager or other appropriate contact person in the event of any complaints ▪ Details on proposed blocking or impairing access to driveways and/or residences/businesses (if any)
	Evidence of this notification should be stored in the project file. This notification will be required in addition to any notification carried out during the preparation of this REF.
	On completion of the work, the existing easement associated with the replacement of fibre optic works, shall be stabilised and returned to as close to original condition or as otherwise agreed with the landowner.
Geology and Soils	An Erosion and Sediment Control Plan (ESCP) shall be prepared as part of the CEMP. All erosion and sediment control measures shall be designed, implemented and maintained in general accordance with <i>Managing Urban Stormwater: Soil and Construction Volume 1</i> (Landcom, 2004) (‘the Blue Book’) (particularly Section 2.2). The ESCP shall include stockpiles, stormwater run-off, trees, site boundaries, site access and storage areas. Exposed surfaces shall be kept to a minimum to limit the potential for erosion and dust generation.
	<p>Inspections of the erosion and sediment controls will be on a periodic basis and at opportunistic times such as following rainfall events that cause run-off. The inspection program will record the following:</p> <ul style="list-style-type: none"> • Condition of rehabilitation areas (including records of any slumping) • Condition of sediment and erosion control structures • Whether sediment or other pollutants are leaving the site or have the potential to do so • Maintenance requirements Location(s) where sediment is disposed. • Pre-rainfall inspection to ensure that the controls are in place and working.
	Vegetation disturbance is to be minimised. Activities will be preferentially undertaken in cleared or weedy areas or in areas that have been subject to previous disturbance or are themselves existing access tracks.
	Soil compaction will be minimised by utilising existing access tracks where possible and minimising vehicle movements along access tracks to only that required.

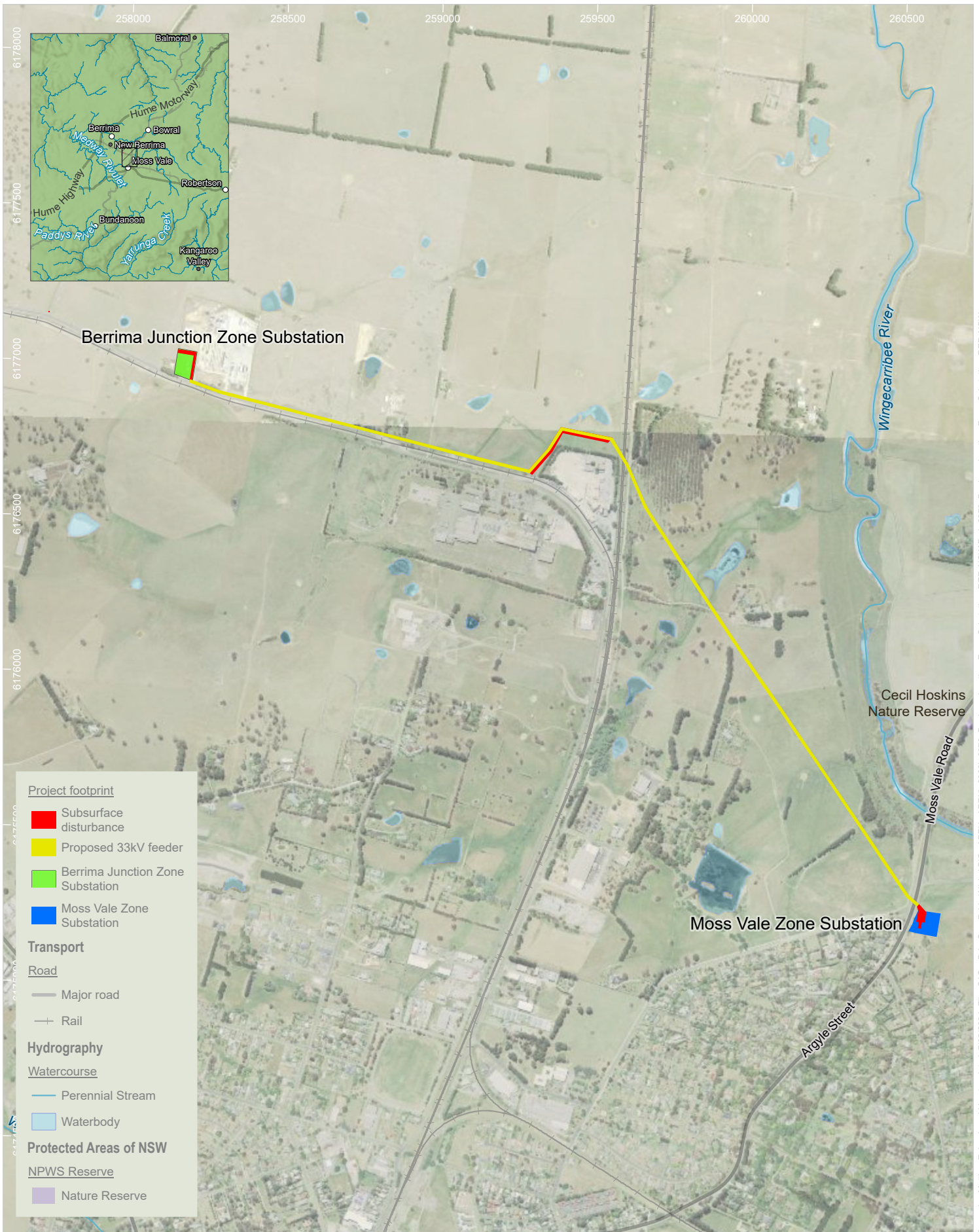
	<p>Sites which are subject to levelling will be re-contoured to match the surrounding topography post development.</p> <p>All chemicals or other hazardous substances shall be stored in bunded and weatherproof facilities away from drainage lines. The capacity of the bunded area shall be at least 110% of the largest chemical volume contained within the bunded area.</p> <p>A spill kit will be located at each site to manage hydrocarbon spills (if there are any) and be used in the event of a spill.</p> <p>Any imported fill shall be certified at source location as pathogen and weed free Excavated Natural Material (ENM) or Virgin Excavated Natural Material (VENM) in accordance with the POEO Act and the <i>Protection of the Environment (Waste) Regulation 2014</i> (POEO Waste Regulation).</p> <p>Any sediment removed from the site that is potential acid sulphate soil is to be tested and treated to ensure compliance with waste classification guidelines for offsite disposal (EPA 2014).</p> <p>Any material or soil suspected of showing evidence of contamination shall be sampled and analysed by a NATA Registered laboratory and managed in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014), the <i>Guidelines on the Duty to Report Contamination</i> (EPA, 2015) and the <i>Contaminated Land Management Act 1997</i>.</p> <p>Spoil management and dewatering of worksites will be managed in accordance with the following EE Standards and the Environmental Guidelines Handbook: EMS 0007 – Waste Management EMS 0008 - Environmental Incidents Response and Management EMS 0013 - Spoil Management EMS 0014 – Dewatering worksites.</p> <p>Existing roads and, access tracks and rail corridor are to be used for vehicles and equipment to gain access to the sites.</p> <p>New access tracks shall be constructed with erosion and sediment controls.</p>
Hydrology and Water Quality	<p>The drainage lines and waterbodies would be avoided by the proposed works.</p> <p>Spoil shall be stockpiled in a manner so as to avoid the possibility of sediments entering watercourses (including stormwater drains) or migrating off-site.</p> <p>Any bulk fuel or hazardous material transport vehicles shall be parked on level ground a minimum of 40 m away from watercourses (including drainage lines).</p> <p>Any groundwater encountered would be dewatered, collected and disposed of appropriately. If minor dewatering is required, the management of discharge water shall be documented in the CEMP and be in accordance with EE procedure EMS0014. Discharge water should be limited to vegetated, grassed areas, away from waterways, and within the feeder line overhead alignment. If the discharge water is highly turbid, dewatering through a filter sock (or similar) shall be considered, where appropriate, to minimise sedimentation.</p>
Flora	<p>Disturbance would be restricted to the removal of non-native shrubs and trees, including the removal of radiata pines.</p> <p>Soil disturbance would be minimised and soil that is disturbed would be replaced according to the natural profile of the soil (i.e. topsoil reinstated as the top layer).</p> <p>Landscaping at substation site to be established in accordance with Site Landscape Plan (Annex 4), including site preparation, weed management and planting.</p> <p>All actions should be in accordance with EE’s “Pests, Weeds and Diseases” section of the EE Environmental Guidelines Handbook.</p>
Fauna	<p>All large trees, stags and fallen hollow logs would be avoided where practical. The Radiata Pines are the exception, 32 are proposed for removal (Section 5.4.2).</p> <p>The removal of hollow bearing trees is not anticipated to be required. However, if it is required it would be performed in the presence of a qualified ecologist to assist in detection and translocation of potentially displaced fauna.</p> <p>All creeks and drainage lines that contain flowing or still water are to be avoided.</p>
Noise and Vibration	<p>Construction hours must be limited to standard construction working hours (Monday to Friday: 7 am to 6 pm, Saturday: 8 am to 1 pm, No work on Sundays or public holidays), unless otherwise approved.</p>

	<p>Any out-of-hours-works must be conducted in accordance with the requirements of EE's Environmental Guidelines Handbook.</p> <p>All vehicles and other equipment will be switched off when not in use. Vehicles must adhere to speed limits.</p> <p>Limit concurrent use of machinery where possible.</p> <p>Minimising noisy activities in proximity to the residential premises where feasible.</p> <p>Where maximum vibration values in DEC (2006) cannot be met after all feasible and reasonable measures have been applied, any unacceptable impacts may be dealt with between the operator and the affected community. Negotiation should be made available to those people whose amenity is potentially affected by non-achievement of the relevant vibration criteria.</p> <p>Where minimum distances outlined in BS 7385 (1993) cannot be maintained, a dilapidation assessment will be required to manage the risk of cosmetic damages within the Project Footprint.</p> <p>Compliance with the amenity criteria identified in Environmental Noise Impact Assessment (29 August 2023) prepared by Day Design Pty Ltd (Annex 5).</p>
Air Quality	<p>Minimise soil disturbance. Water carts to be used if necessary.</p> <p>Weather conditions to be monitored. Works are not to take place in extreme wind conditions (> 40km/h).</p> <p>All vehicles, plant and equipment are modern, well maintained and fit for purpose. Emissions from these items will be regulated by their standard exhaust systems.</p> <p>All vehicles and other equipment will be switched off when not in use. Vehicles must adhere to speed limits.</p> <p>Limit concurrent use of machinery where possible.</p> <p>Where minimum distances outlined in BS 7385 (1993) cannot be maintained, a dilapidation assessment will be required to manage the risk of cosmetic damages within the Project Footprint.</p>
Traffic and Accessibility	<p>Ensure that a Traffic Management Plan is prepared and followed.</p> <p>Traffic control is to be used to maintain continued traffic access where feasible.</p> <p>The temporary modification to traffic will be as minimal as possible.</p> <p>Any Transport for NSW (TfNSW) Permits required for the lane closures will be obtained prior to the commencements of the works.</p> <p>Emergency services and public transport methods will be notified.</p> <p>Ensure that the works to be done in the rail corridor are conducted during planned rail line outages or further consultation is required.</p> <p>After significant rainfall of < 10 mm/24 hrs, undertake inspection of the access track to determine if use of the track at this time would potentially result in a detrimental effect, and if required allow for the road to sufficiently dry out.</p> <p>Traffic, transportation and access mitigation and management strategies shall be documented and implemented in accordance with the CEMP and updated as required.</p>
Visual Amenity	<p>The canopy trees within the TEC will be avoided.</p> <p>All actions should be in accordance with the best Practice weed management guidelines (DPI 2021).</p> <p>All construction plant, equipment, waste and excess materials shall be contained within the designated boundaries of the work site and shall be removed from the site following the completion of construction.</p> <p>Disturbed areas would be rehabilitated to previous conditions if feasible.</p> <p>Materials used for the Project would be consistent the existing materials where possible.</p> <p>Appropriate site security fencing and landscaping to be installed as required around the new permanent Berrima Junction ZS site to provide visual screening and ensure the site is safe and secure.</p>
Aboriginal cultural heritage and archaeology	<p>All site workers and contractors should be inducted to the area and informed of their obligations under the <i>National Parks and Wildlife Act 1974</i>.</p> <p>In the event that previously unknown Aboriginal object(s) and/or sites are discovered during the proposed activity, work must stop. A temporary fence is to be erected around the Aboriginal cultural heritage site, with a buffer zone of at least 10 metres around the known edge. Contact an EE</p>

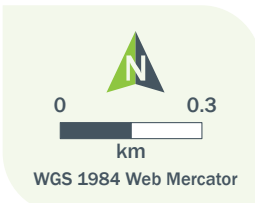
	<p>Environmental Specialist as further assessment may be required. The EE Environmental Specialist will be responsible for notifying Heritage NSW and Aboriginal Stakeholders. A qualified archaeologist may also be required to assess the find. Works should not proceed without advice from Heritage NSW or an appropriately qualified archaeologist.</p> <p>In the unlikely event that suspected human remains are encountered during the proposed activity, all work in the area that may cause further impact, must cease immediately and:</p> <ul style="list-style-type: none"> • The location, including a 10 m curtilage, should be secured using barrier fencing to avoid further harm. • The NSW Police must be contacted immediately. • No further action is to be undertaken until the NSW Police provide written notification to the Proponent. • If the skeletal remains are identified as Aboriginal, the Proponent or their agent must contact Heritage NSW, previously known as the Office of Environment and Heritage (OEH) Enviroline on 131 555; and representatives of the Gandangara Local Aboriginal Land Council (ILALC). • No works are to continue until Heritage NSW provides notification to the Proponent or their Agent.
Historic Heritage	<p>If potential archaeological deposits are found in areas that have not been identified in this assessment, work should stop immediately, and a qualified heritage specialist contacted. Heritage NSW should be notified, and their advice followed as per Heritage NSW guidelines.</p>
Electromagnetic Fields	<p>All designs are to comply with ARPANSA Radio Protection Standard 3 exposure limits (ARPANSA, 2002).</p>
Generation of waste and hazardous materials	<p>Avoid the generation of waste and recycle and reuse whenever possible.</p> <p>Waste mitigation and management strategies shall be documented in the Work Instructions.</p> <p>All waste, including surplus soils, which cannot be reused shall be classified in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014), removed from the site and disposed of at a facility that can lawfully accept the waste in accordance with the POEO Act and POEO Waste Regulation.</p> <p>Invasive weed material to be disposed of or treated appropriately as per EE’s “Pests, Weeds and Diseases” section of the EE Environmental Guidelines Handbook and EMS0004.</p>

Annex 2. Figures

Figure 1. Locality



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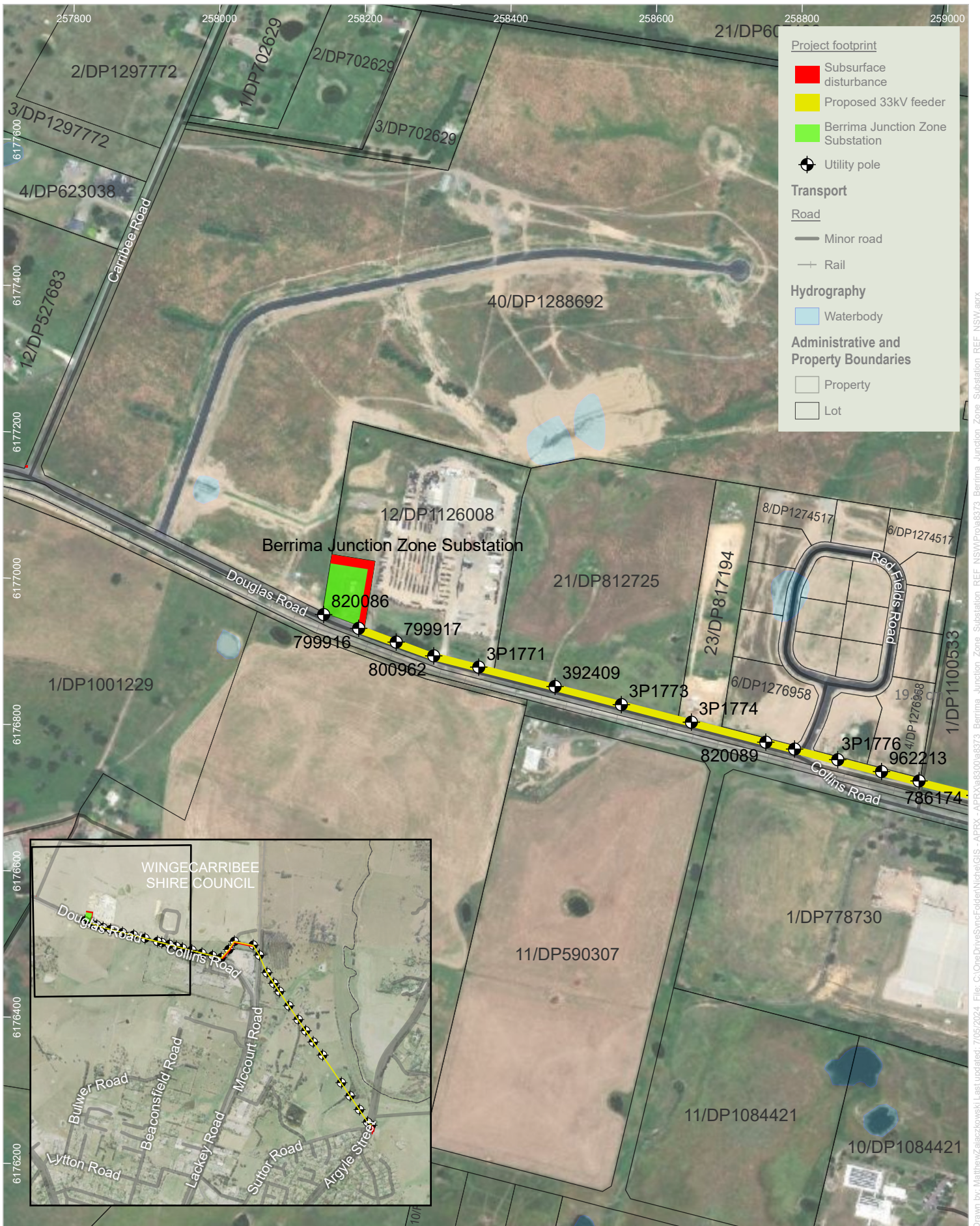
Locality Map
Berrima Junction Zone Substation REF

Niche PM: Christie Chapman
Niche Proj. #: 8373
Client: Endeavour Energy

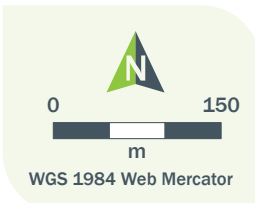
Figure 1

World Hillshade: Esri, CGIAR/World_Ocean_Base; NIWA, GeosciencesAustralia, Esri, GEBCO, Garmin, NaturalVue/public/NSW_Imagery; © Department of Customer Service 2020/Terrain: Multi-Directional Hillshade; Airbus, USGS, NGA, NASA, CGIAR, NCEAS, NLS, OS, NMA, Geodastatysreisen, GSA, GSI and the GIS User Community | Watercourses, Waterbodies, Road and Rail alignments, Protected areas of NSW © Spatial Services 2021. | Niche uses GDA2020 as standard for all project-related data. In order to ensure that data from numerous sources and coordinate systems is aligned, on-the-fly transformation to WGS1984 Web Mercator Auxiliary Sphere is used in the map above. For ease of reference, the grid tick marks and labels shown around the border of the map are presented in GDA2020, using the relevant MGA zone.

Figure 2. Site Plan



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Site Plan
Berrima Junction Zone Substation REF

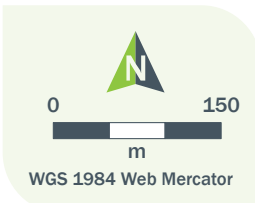
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Niche Proj. #: 8373
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Figure 2a

World Imagery: Maxar/public/NSW_Imagery: © Department of Customer Service 2020/Terrain: Multi-Directional Hillshade: Airbus,USGS,NGA,NASA,CGIAR,NCEAS,NLS,OS,NMA,Geodatastyreisen,GSA,GSI and the GIS User Community | Watercourses, Waterbodies, Road and Rail alignments, Protected areas of NSW © Spatial Services 2021. | Niche uses GDA2020 as standard for all project-related data. In order to ensure that data from numerous sources and coordinate systems is aligned, on-the-fly transformation to WGS1984 Web Mercator Auxiliary Sphere is used in the map above. For ease of reference, the grid tick marks and labels shown around the border of the map are presented in GDA2020, using the relevant MGA zone.



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Niche Proj. #: 8373
Client: Endeavour Energy

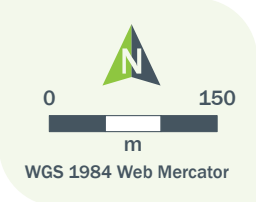
Site Plan
Berrima Junction Zone Substation REF

Figure 2b

World Imagery: Maxar/public/NSW_Imagery; © Department of Customer Service 2020/Terrain: Multi-Directional Hillshade: Airbus, USGS, NGA, NASA, CGIAR, NCEAS, NLS, OS, NMA, Geodatastyrelsen, GSA, GSI and the GIS User Community | Watercourses, Waterbodies, Road and Rail alignments, Protected areas of NSW © Spatial Services 2021. | Niche uses GDA2020 as standard for all project-related data. In order to ensure that data from numerous sources and coordinate systems is aligned, on-the-fly transformation to WGS1984 Web Mercator Auxiliary Sphere is used in the map above. For ease of reference, the grid tick marks and labels shown around the border of the map are presented in GDA2020, using the relevant MGA zone.



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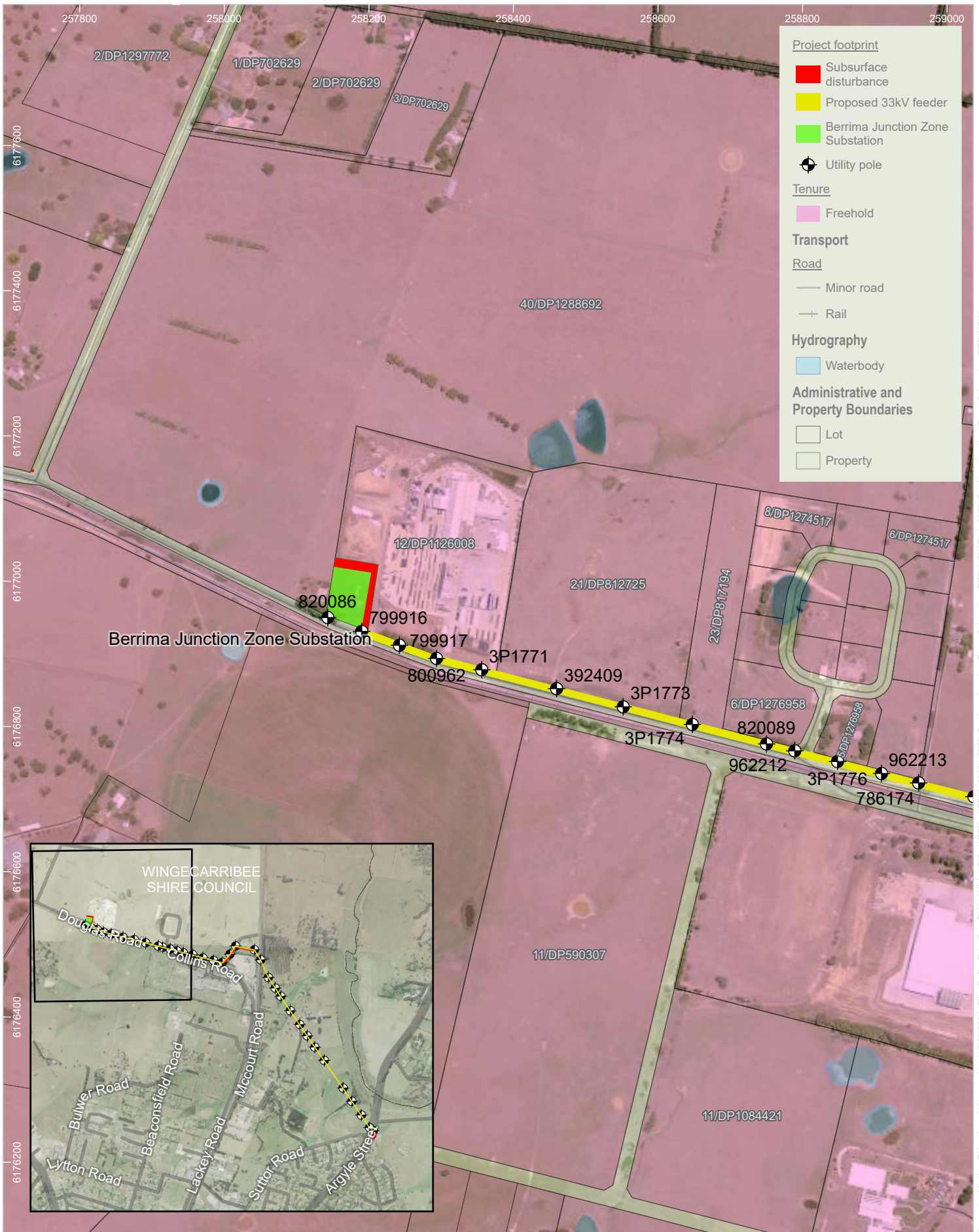
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Site Plan
Berrima Junction Zone Substation REF

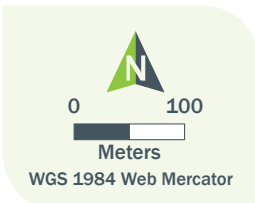
Figure 2c

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Figure 3. Landuse



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Land Tenure and Leases
Berrima Junction Zone Substation REF

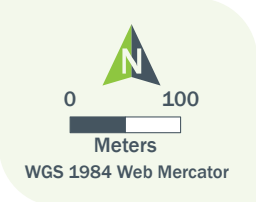
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Niche Proj. #: 8373
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Figure 3a

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Land Tenure and Leases
Berrima Junction Zone Substation REF

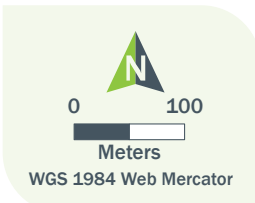
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Figure 3b

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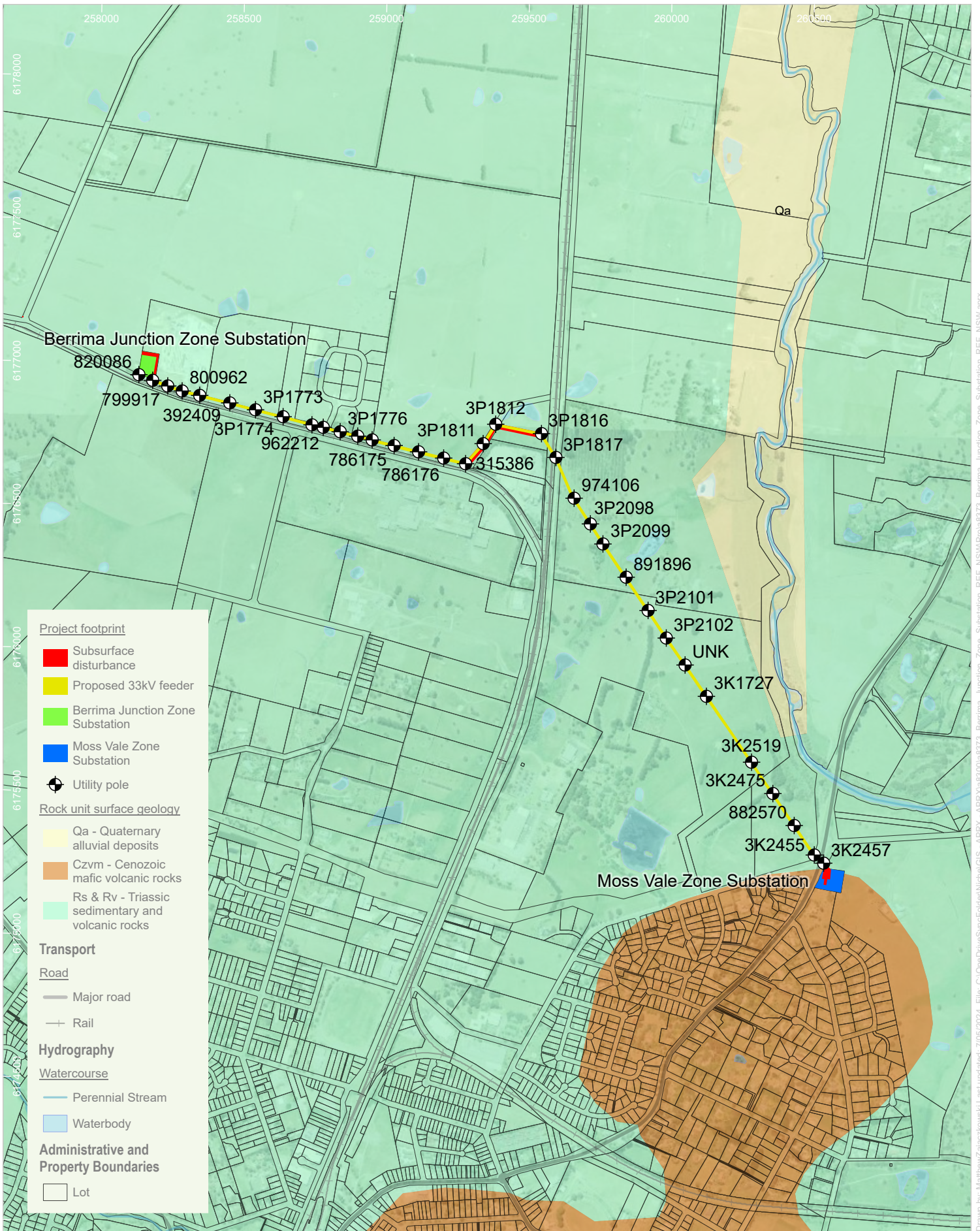
Land Tenure and Leases
Berrima Junction Zone Substation REF

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Figure 3c

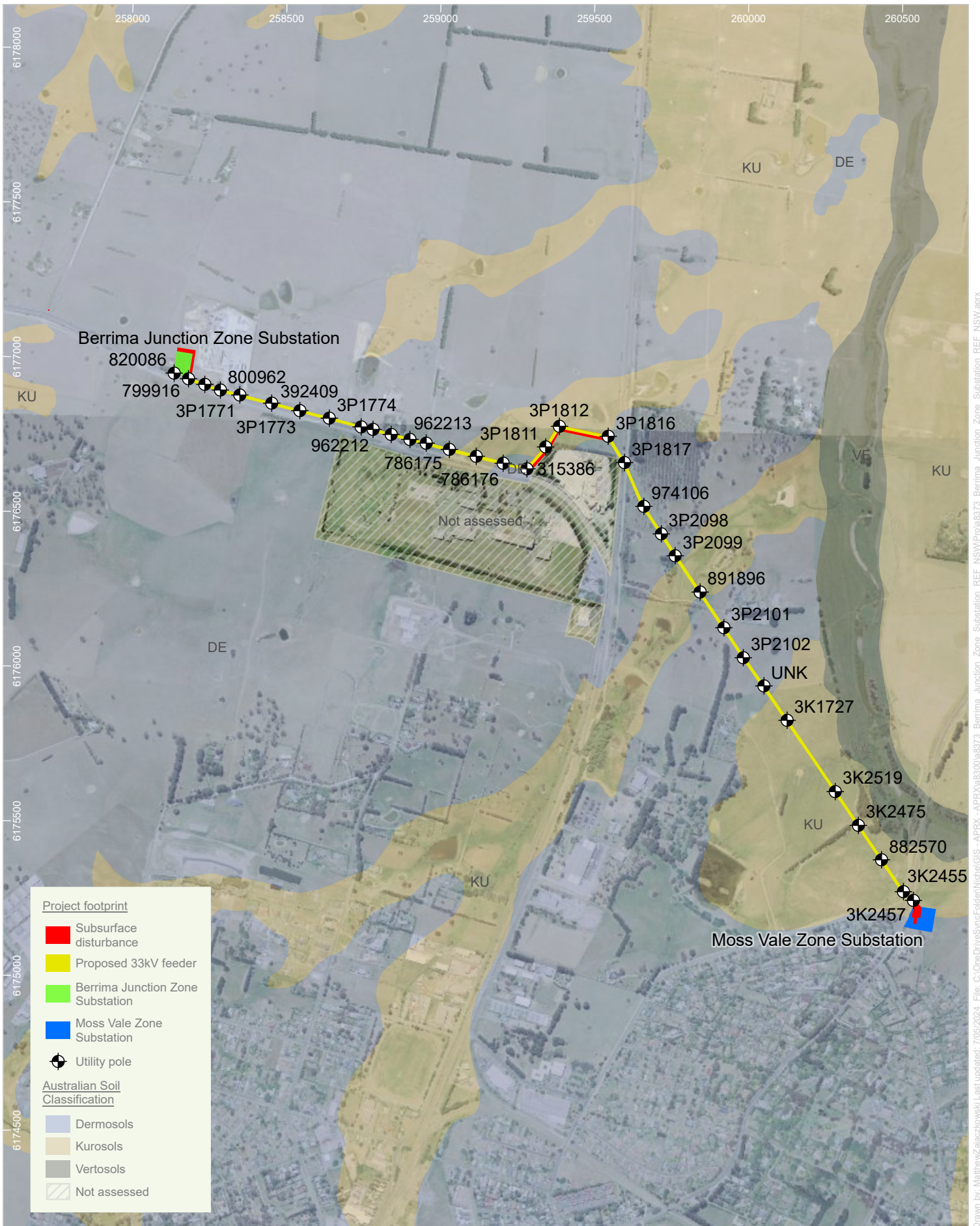
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Figure 4. Geology

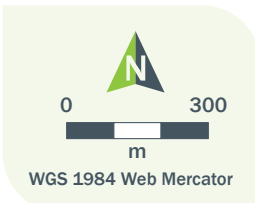


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Figure 5. Soil landscapes



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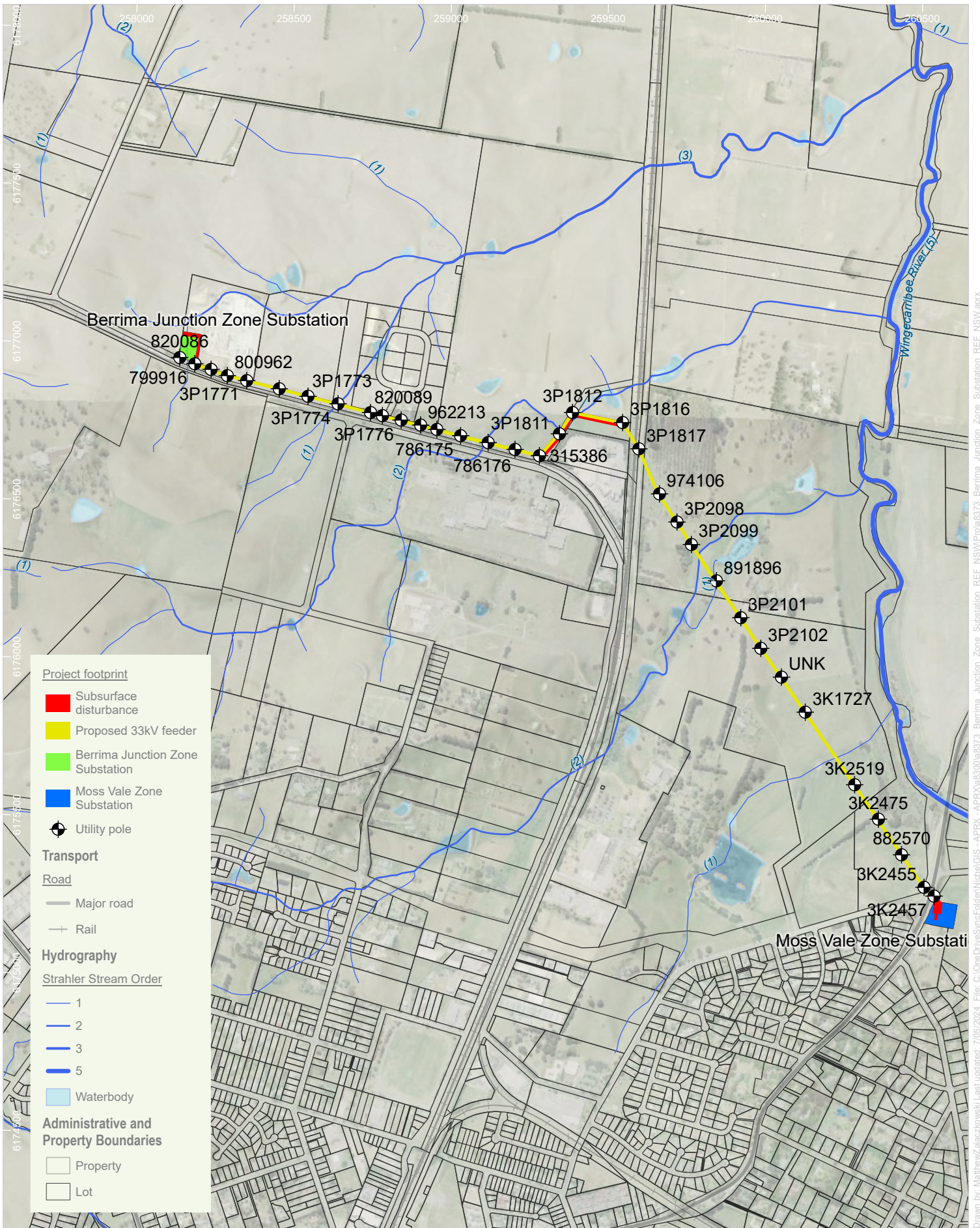
Soil Landscapes
Berrima Junction Zone Substation REF

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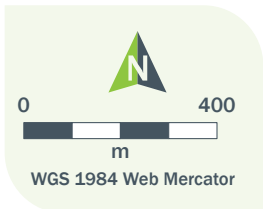
Figure 5

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Figure 6. Hydrology



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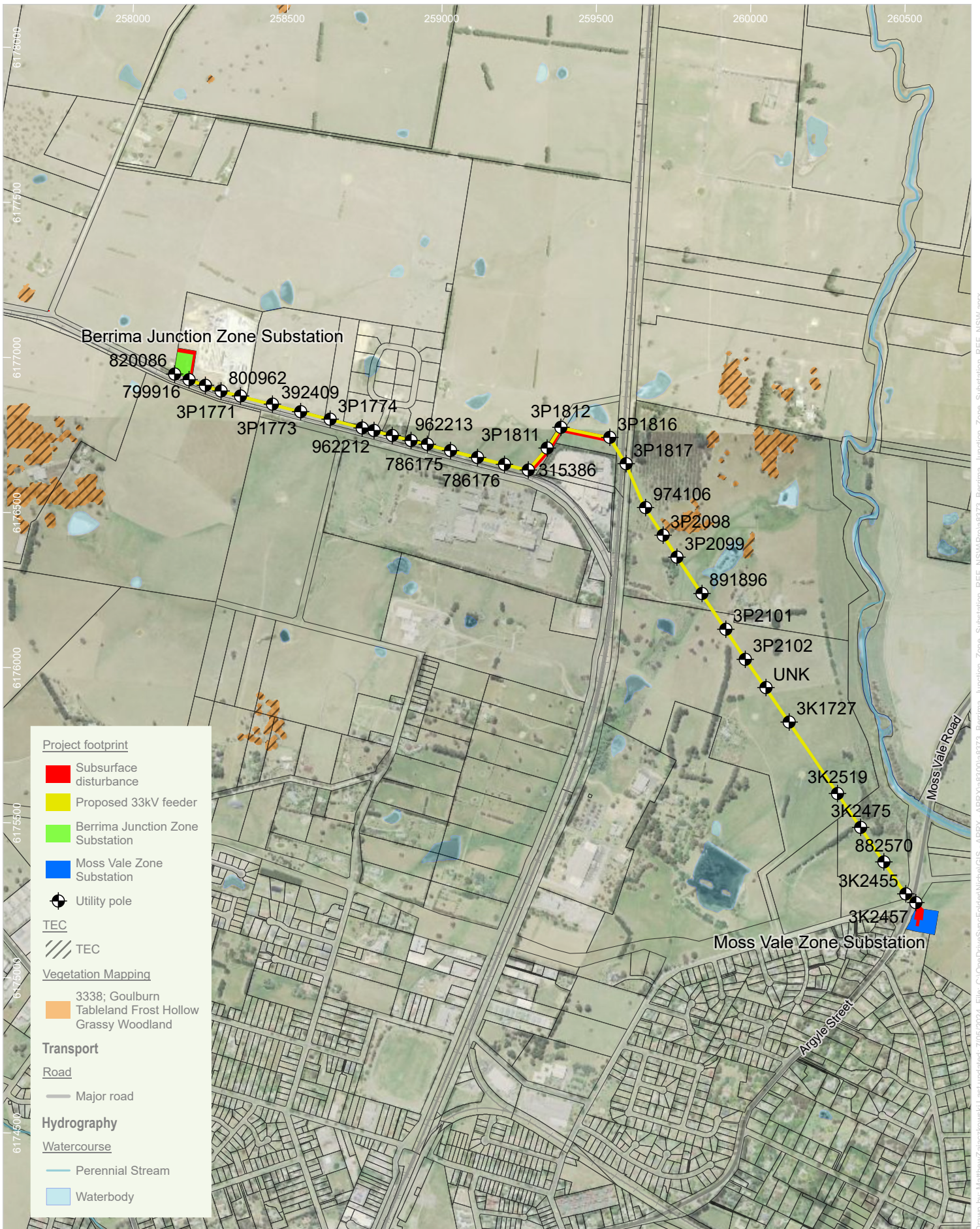
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Hydrology
 Berrima Junction Zone Substation REF

Figure 6

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Figure 7. Vegetation



Project footprint

- Subsurface disturbance
- Proposed 33kV feeder
- Berrima Junction Zone Substation
- Moss Vale Zone Substation
- + Utility pole

TEC

- TEC

Vegetation Mapping

- 3338; Goulburn
- Tableland Frost Hollow Grassy Woodland

Transport

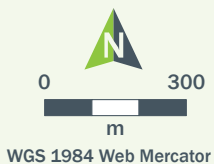
Road

- Major road

Hydrography

Watercourse

- Perennial Stream
- Waterbody



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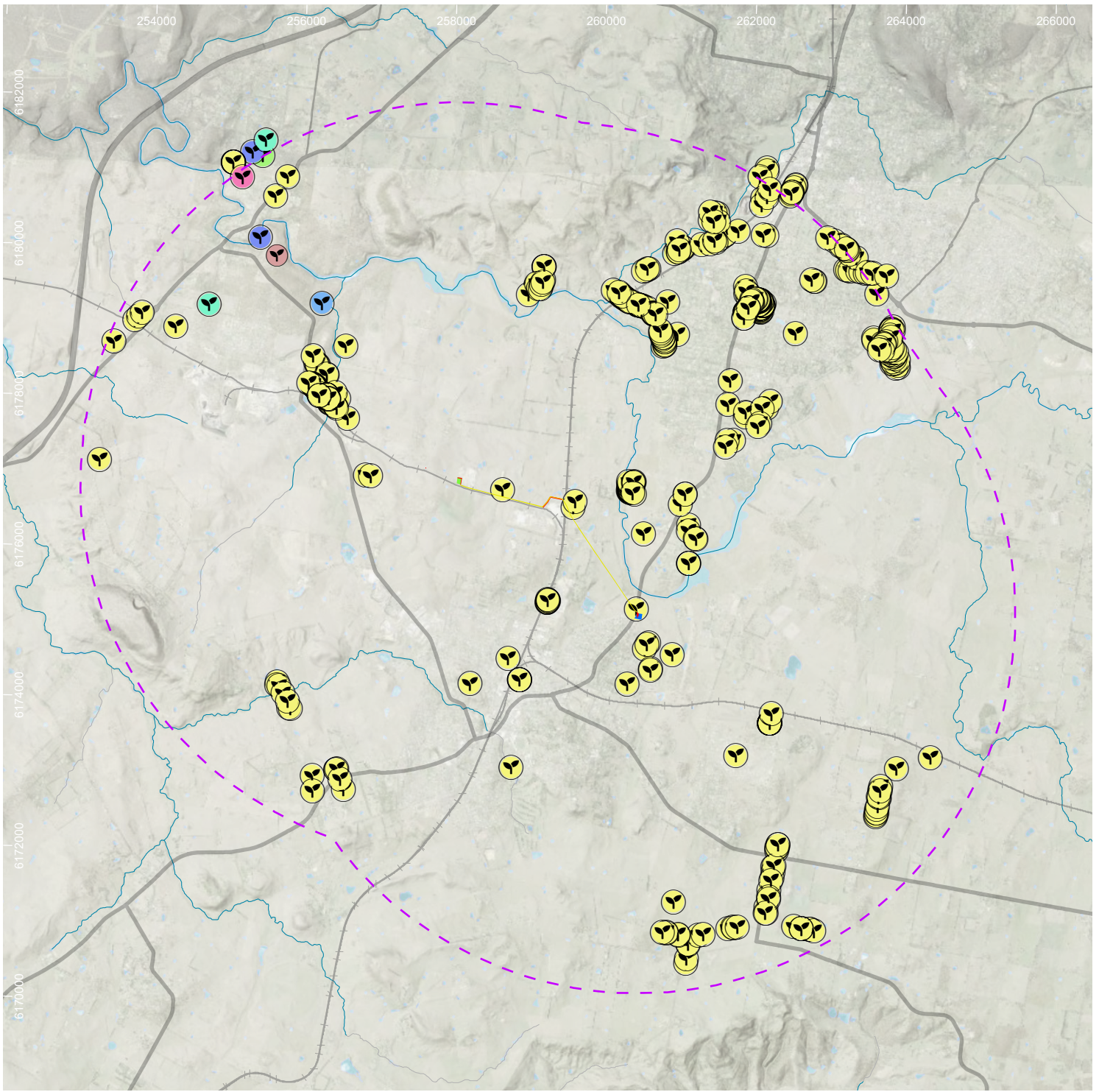
Vegetation
 Berrima Junction Zone Substation REF

Figure 7

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Figure 8. Threatened flora



Project footprint

- Subsurface disturbance
- Proposed 33kV feeder
- Berrima Junction Zone Substation
- Moss Vale Zone Substation
- - - 5km Buffer

Threatened Flora

- *Acacia bynoeana*
- *Eucalyptus aggregata*
- *Eucalyptus macarthurii*
- *Leucochrysum albicans subsp. tricolor*
- *Persoonia glaucescens*

- *Persoonia mollis subsp. revoluta*
- *Phyllota humifusa*
- *Pomaderris sericea*

Transport

- Road
- Major road

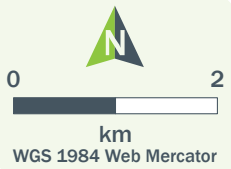
- Minor road
- + Rail

Hydrography

- Watercourse
- Non Perennial Stream
- Perennial Stream
- Waterbody

Administrative and Property Boundaries

- Local Government Area



Threatened Flora recorded within 5 km of the study area
Berrima Junction Zone Substation REF

*Sensitive species not displayed

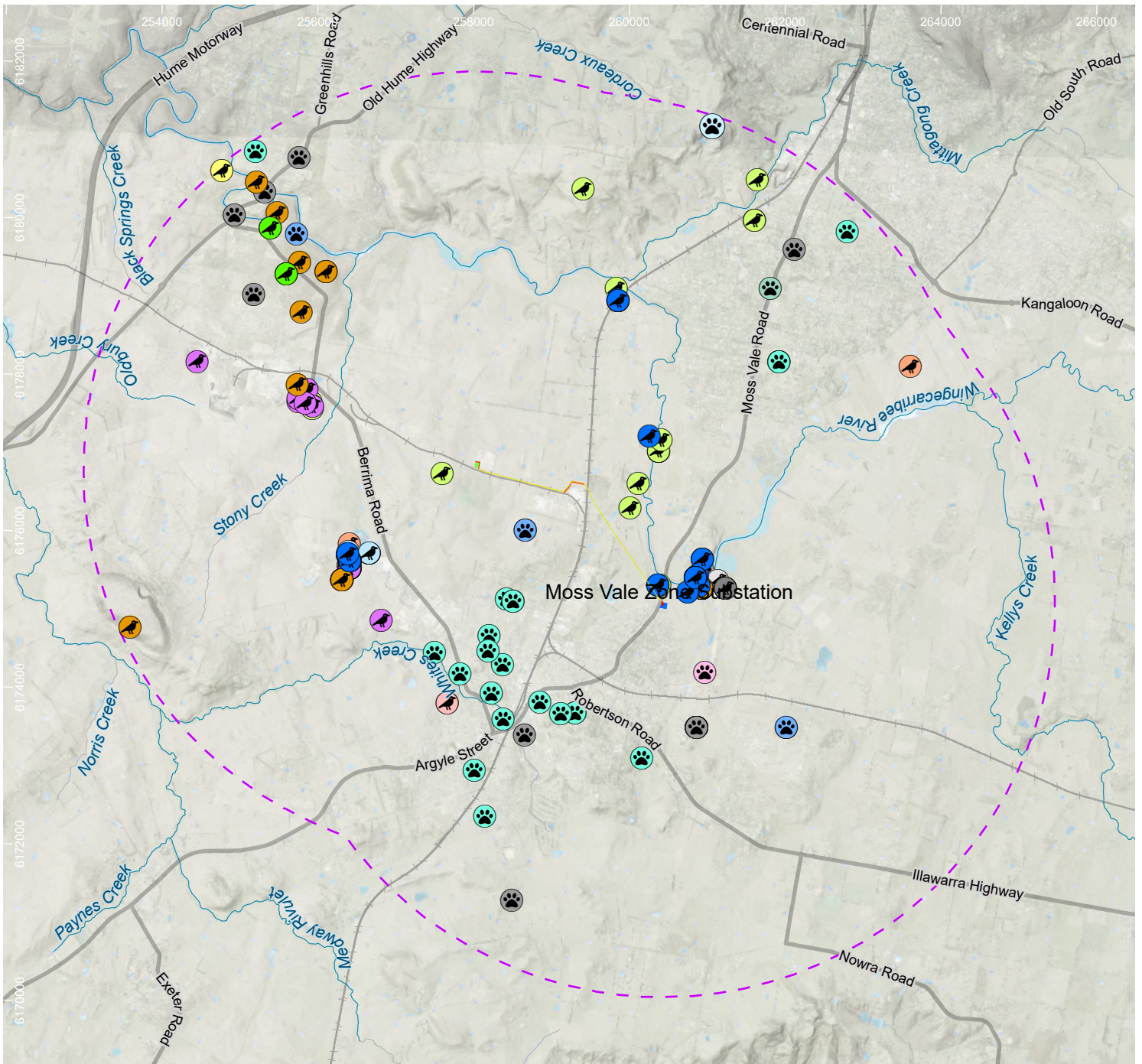
Niche PM: Christie Chapman
 Niche Proj. #: 8373
 Client: Endeavour Energy

Figure 8

NSW Office of Environment and Heritage's BioNet Atlas, which holds the data from a number of custodians. Data Obtained 13/12/2023. | public/NSW_Imagery: © Department of Customer Service 2020/ Terrain: Multi-Directional Hillshade: Airbus,USGS,NGA,NASA,CGIAR,NCEAS,NLS,OS,NMA,Geodatasytrelsen,GSA,GSI and the GIS User Community | Watercourses, Waterbodies, Road and Rail alignments, Protected areas of NSW © Spatial Services 2021. | Niche uses GDA2020 as standard for all project-related data. In order to ensure that data from numerous sources and coordinate systems is aligned, on-the-fly transformation to WGS1984 Web Mercator Auxiliary Sphere is used in the map above. For ease of reference, the grid tick marks and labels shown around the border of the map are presented in GDA2020, using the relevant MGA zone.

Drawn by: File: C:\OneDriveSync\Folder\Niche\GIS-APRX-APRX\APRX\APRX\Berrima_Junction_Zone_Substation_REF_NSWMPro\ab8373_Berrima_Junction_Zone_Substation_REF_NSWMPro.aprx Last updated: 7/05/2024 4:28 PM

Figure 9. Threatened fauna



Project footprint

- Subsurface disturbance
- Proposed 33kV feeder
- Berrima Junction Zone Substation
- Moss Vale Zone Substation
- 5km Buffer

Mammalia

- 🐾 Grey-headed Flying-fox

- 🐾 Koala
- 🐾 Large Bent-winged Bat
- 🐾 Southern Myotis
- 🐾 Spotted-tailed Quoll
- 🐾 Squirrel Glider

Aves

- 🐦 Australasian Bittern
- 🐦 Australian Painted Snipe
- 🐦 Blue-billed Duck

- 🐦 Brown Treecreeper (eastern subspecies)
- 🐦 Dusky Woodswallow
- 🐦 Flame Robin
- 🐦 Freckled Duck
- 🐦 Little Eagle
- 🐦 Scarlet Robin
- 🐦 Spotted Harrier
- 🐦 Varied Sittella
- 🐦 White-bellied Sea-Eagle

- 🐦 White-throated Needletail

Transport

- Major road
- Minor road
- + Rail

Hydrography

- Non Perennial Stream
- Perennial Stream
- Waterbody

- Local Government Area

Sensitive Species not displayed

- *Callocephalon fimbriatum*
- *Calyptorhynchus lathami lathami*
- *Ninox connivens*
- *Tyto novaehollandiae*



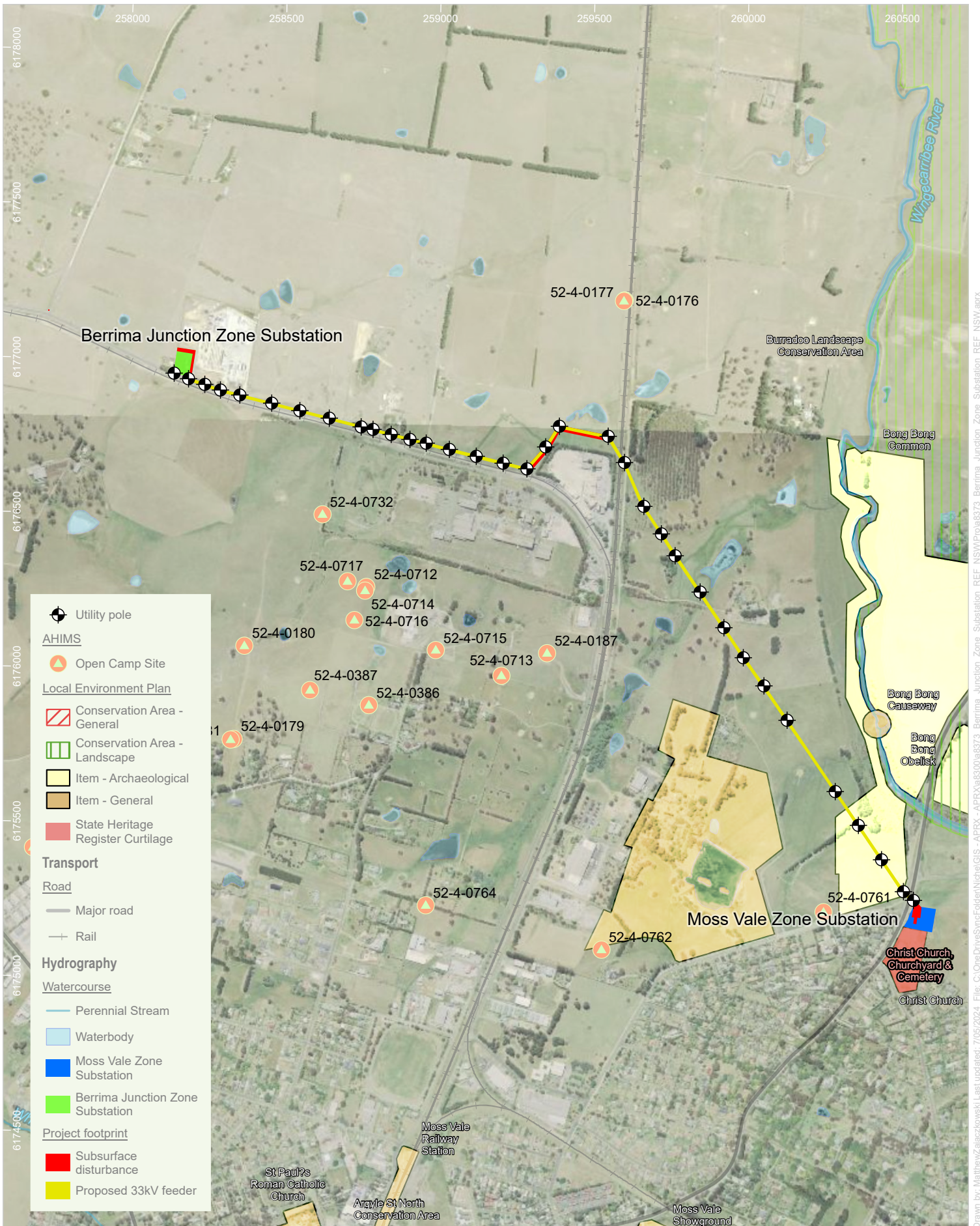
Threatened Fauna recorded within 5 km of the study area
Berrima Junction Zone Substation REF

*Sensitive species not displayed

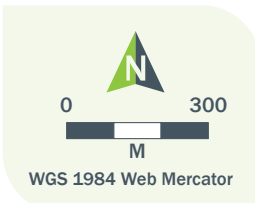
Niche PM: Christie Chapman
Niche Proj. #: 8373
Client: Endeavour Energy

Figure 9

Figure 10. Cultural Heritage including AHIMS



Drawn by: MatthewZajackowski Last updated: 7/05/2024. File: C:\OneDrive\Sync\Folder\Niche\GIS - APRX - APRX\ba300\ba300\Berrima_Junction_Zone_Substation_REF_NSW.aprx



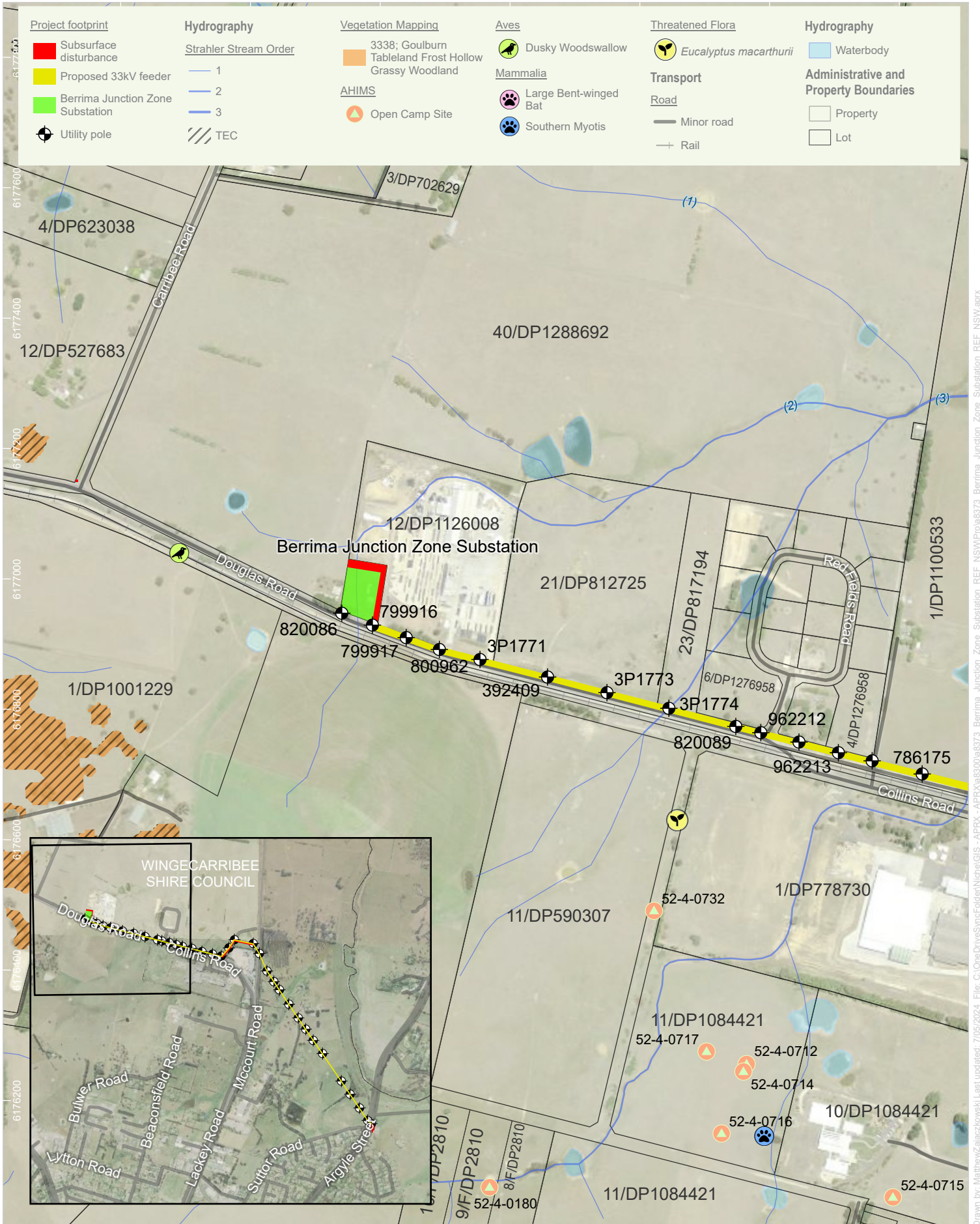
Cultural Heritage Sites (includes historic heritage sites plus AHIMS)
Berrima Junction Zone Substation REF

Niche PM: Christie Chapman
 Niche Proj. #: 8373
 Client: Endeavour Energy

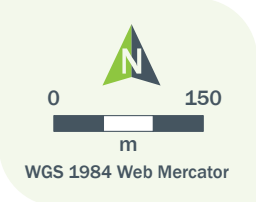
Figure 10

public/NSW_Imagery: © Department of Customer Service 2020/Terrain: Multi-Directional Hillshade: Airbus,USGS,NGA,NASA,CGIAR,NCEAS,NLS,OS,NMA,Geodastatysreln,GSA,GS1 and the GIS User Community | Watercourses, Waterbodies, Road and Rail alignments, Protected areas of NSW © Spatial Services 2021. | Niche uses GDA2020 as standard for all project-related data. In order to ensure that data from numerous sources and coordinate systems is aligned, on-the-fly transformation to WGS1984 Web Mercator Auxiliary Sphere is used in the map above. For ease of reference, the grid tick marks and labels shown around the border of the map are sourced in GDA2020, using the relevant MGA zone.

Figure 11. Constraints



Drawn by: Matthew Zajaczkowski Last updated: 7/05/2024. File: C:\OneDrive\Sync\Folder\Niche\GIS - APRX - APRX\ba300\ba373_Berrima_Junction_Zone_Substation_REF_NS\W\Pro\ba8373_Berrima_Junction_Zone_Substation_REF_NS\W.aprx

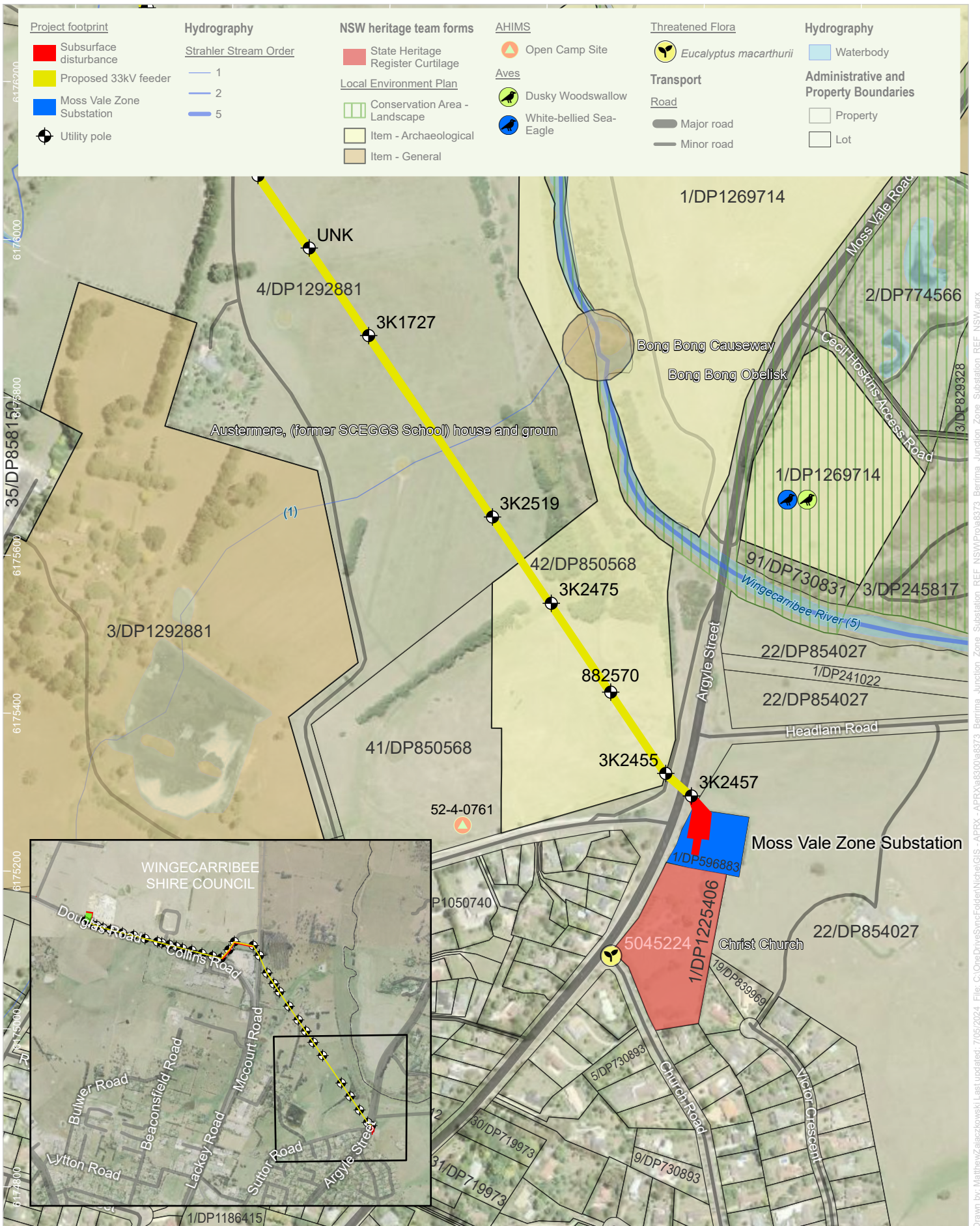


Constraints: 1
Berrima Junction Zone Substation REF

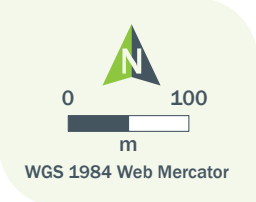
Niche PM: Christie Chapman
 Niche Proj. #: 8373
 Client: Endeavour Energy

Figure 11a

public/NSW_Imagery: © Department of Customer Service 2020/Terrain: Multi-Directional Hillshade: Airbus,USGS,NGA,NASA,CGIAR,NCEAS,NLS,OS,NMA,Geodastayrelsen,GSA,GS) and the GIS User Community | Watercourses, Waterbodies, Road and Rail alignments, Protected areas of NSW © Spatial Services 2021. | Niche uses GDA2020 as standard for all project-related data. In order to ensure that data from numerous sources and coordinate systems is aligned, on-the-fly transformation to WGS1984 Web Mercator Auxiliary Sphere is used in the map above. For ease of reference, the grid tick marks and labels shown around the border of the map are presented in GDA2020, using the relevant MGA zone.



Drawn by: Matthew Zajaczkowski Last updated: 7/05/2024. File: C:\OneDrive\Sync\Folder\Niche\GIS - APRX - APRX\Berrima_Junction_Zone_Substation_REF_NSW.aprx



Constraints: 3
Berrima Junction Zone Substation REF

Niche PM: Christie Chapman
Niche Proj. #: 8373
Client: Endeavour Energy

Figure 11c

public/NSW_Imagery: © Department of Customer Service 2020/Terrain: Multi-Directional Hillshade: Airbus,USGS,NGA,NASA,CGIAR,NCEAS,NLS,OS,NMA,Geodastystrelsen,GSA,GS1 and the GIS User Community | Watercourses, Waterbodies, Road and Rail alignments, Protected areas of NSW © Spatial Services 2021. | Niche uses GDA2020 as standard for all project-related data. In order to ensure that data from numerous sources and coordinate systems is aligned, on-the-fly transformation to WGS1984 Web Mercator Auxiliary Sphere is used in the map above. For ease of reference, the grid tick marks and labels shown around the border of the map are presented in GDA2020, using the relevant MGA zone.

Annex 3. Likelihood of occurrence table

Kingdom	Class	Scientific Name	Common Name	EPBC Act	BC Act	Likelihood of Occurrence	Likelihood of Impact
Fauna	Amphibian	<i>Litoria littlejohni</i>	Littlejohn's Tree Frog, Heath Frog	V	E	Low: Minimal suitable habitat present.	Low: No clearing of suitable habitat.
Fauna	Amphibian	<i>Litoria watsoni</i>	Watson's Tree Frog		E	Low: Minimal suitable habitat present.	Low: No clearing of suitable habitat.
Fauna	Amphibian	<i>Heleioporus australiacus</i>	Giant Burrowing Frog	V	V	Low: Minimal suitable habitat present.	Low: No clearing of suitable habitat.
Fauna	Amphibian	<i>Mixophyes balbus</i>	Stuttering Frog, Southern Barred Frog (in Victoria)	E	V	Low: Minimal suitable habitat present.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Pycnoptilus floccosus</i>	Pilotbird		V	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Circus assimilis</i>	Spotted Harrier	V		Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V		Low: Likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Hieraaetus morphnoides</i>	Little Eagle	V		Moderate: Records within 5km.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Oxyura australis</i>	Blue-billed Duck	V		Low: Minimal suitable habitat present.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Stictonetta naevosa</i>	Freckled Duck	V		Low: Minimal suitable habitat present.	Low: No clearing of suitable habitat.

Fauna	Bird	<i>Hirundapus caudacutus</i>	White-throated Needle-tail		V,C,J,K	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	E	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V		Moderate: Records within 5km.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Collocephalon fimbriatum</i>	Gang-gang Cockatoo	V	E	High: Large number of records within 5km.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Calyptorhynchus lathami</i>	South-eastern Glossy Black-Cockatoo	V	V	Moderate: Records within 5km.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (south-eastern)	V	V	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Stagonopleura guttata</i>	Diamond Firetail	V	V	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Falco hypoleucos</i>	Grey Falcon	E	V	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	CE	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Grantiella picta</i>	Painted Honeyeater	V	V	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Daphoenositta chrysoptera</i>	Varied Sittella	V		Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Aphelocephala leucopsis</i>	Southern Whiteface		V	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.

Fauna	Bird	<i>Melanodryas cucullata cucullata</i>	South-eastern Hooded Robin, Hooded Robin (south-eastern)	V	E	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Petroica boodang</i>	Scarlet Robin	V		Moderate: Records within 5km.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Petroica phoenicea</i>	Flame Robin	V		Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Lathamus discolor</i>	Swift Parrot	E	CE	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Polytelis swainsonii</i>	Superb Parrot	V	V	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Neophema chrysostoma</i>	Blue-winged Parrot		V	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Rostratula australis</i>	Australian Painted Snipe	E	E	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Gallinago hardwickii</i>	Latham's Snipe		J,K	Low: If present, would likely be a transient visitor.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Ninox connivens</i>	Barking Owl	V		Low: No records within 5km.	Low: No clearing of suitable habitat.
Fauna	Bird	<i>Tyto novaehollandiae</i>	Australian Masked Owl	V		Low: No records within 5km.	Low: No clearing of suitable habitat.
Fauna	Insect	<i>Keyacris scurra</i>	Key's Matchstick Grasshopper	E	E	Low: No records within 5km.	Low: Minimal disturbance to suitable habitat.

Fauna	Mammal	<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V		Low: No records within 5km.	Low: No clearing of suitable habitat.
Fauna	Mammal	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E	Low: Minimal suitable habitat present.	Low: No clearing of suitable habitat.
Fauna	Mammal	<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E	V	Low: No records within 5km.	Low: No clearing of suitable habitat.
Fauna	Mammal	<i>Notamacropus parma</i>	Parma Wallaby		V	Low: No records within 5km.	Low: No clearing of suitable habitat.
Fauna	Mammal	<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V		None: No suitable habitat present.	None: No disturbance of suitable habitat.
Fauna	Mammal	<i>Pseudomys novaehollandiae</i>	New Holland Mouse, Pookila		V	Low: No records within 5km.	Low: Minimal disturbance to suitable habitat.
Fauna	Mammal	<i>Isoodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern)	E	E	Low: No records within 5km.	Low: No disturbance to suitable habitat.
Fauna	Mammal	<i>Petaurus australis</i>	Yellow-bellied Glider (south-eastern)	V	V	Low: No records within 5km.	Low: No disturbance to suitable habitat.
Fauna	Mammal	<i>Petaurus norfolcensis</i>	Squirrel Glider	V		Low: Minimal suitable habitat present.	Low: No clearing of suitable habitat.
Fauna	Mammal	<i>Phascolarctos cinereus</i>	Koala	E	E	Low: Records within 5km. Minimal suitable habitat present.	Low: No clearing of suitable habitat.
Fauna	Mammal	<i>Petauroides volans</i>	Greater Glider (southern and central)		E	Low: No records within 5km.	Low: No clearing of suitable habitat.
Fauna	Mammal	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	Low: Large number of records within 5km. No suitable habitat present. If present, would likely be a transient visitor.	Low: No disturbance to suitable habitat.

Fauna	Mammal	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat, Large Pied Bat	V	V	Low: No records within 5km.	Low: No disturbance to suitable habitat.
Fauna	Mammal	<i>Myotis macropus</i>	Southern Myotis	V		Moderate: Records within 5km.	Low: No disturbance to suitable habitat.
Fauna	Reptile	<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	E	V	Low: No records within 5km.	Low: No disturbance to suitable habitat.
Fauna	Reptile	<i>Aprasia parapulchella</i>	Pink-tailed Worm-lizard, Pink-tailed Legless Lizard	V	V	None: No suitable habitat present.	None: No disturbance of suitable habitat.
Flora	Plant	<i>Helichrysum calvertianum</i>		V		Low: Minimal records within 5km.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Leucochrysum albicans</i>	Hoary Sunray, Grassland Paper-daisy		E	None: No suitable habitat present.	None: No disturbance of suitable habitat.
Flora	Plant	<i>Leucochrysum albicans subsp. tricolor</i>	Hoary Sunray	E	E	Low: Minimal records within 5km.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Xerochrysum palustre</i>	Swamp Everlasting, Swamp Paper Daisy		V	None: No suitable habitat present.	None: No disturbance of suitable habitat.
Flora	Plant	<i>Leucopogon exolasius</i>	Woronora Beard-heath	V	V	None: No suitable habitat present.	None: No disturbance of suitable habitat.
Flora	Plant	<i>Phyllota humifusa</i>	Dwarf Phyllota	V	V	Low: Minimal records within 5km.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Acacia bynoeana</i>	Bynoe's Wattle	E	V	Low: Minimal records within 5km.	Low: Minimal disturbance to suitable habitat.

Flora	Plant	<i>Commersonia prostrata</i>	Dwarf Kerrawang	E	E	Low: No records within 5km.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Eucalyptus aggregata</i>	Black Gum	V	V	Low: Minimal records within 5km.	Low: No clearing of suitable habitat.
Flora	Plant	<i>Eucalyptus macarthurii</i>	Paddys River Box, Camden Woollybutt	E	E	High: Large number of records within 5km.	Low: No clearing of suitable habitat.
Flora	Plant	<i>Kunzea cabbagei</i>	null	V	V	Low: No records within 5km.	Low: No clearing of suitable habitat.
Flora	Plant	<i>Rhodamnia rubescens</i>	Scrub Turpentine, Brown Malletwood	CE	CE	Low: No records within 5km.	Low: No clearing of suitable habitat.
Flora	Plant	<i>Caladenia tessellata</i>	Thick-lipped Spider-orchid, Daddy Long-legs	E	V	Low: No records within 5km.	Low: No clearing of suitable habitat.
Flora	Plant	<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	V	V	Low: No records within 5km.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Diuris aequalis</i>	Buttercup Doubletail	E	V	Low: No records within 5km.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Genoplesium baueri</i>	Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid	E	E	Low: No records within 5km.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Prasophyllum affine</i>	Jervis Bay Leek Orchid, Culburra Leek-orchid, Kinghorn Point Leek-orchid	E	E	Low: No records within 5km.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Prasophyllum fuscum</i>	Tawny Leek-orchid, Slaty Leek-orchid	CE	V	None: No suitable habitat present.	None: No disturbance of suitable habitat.
Flora	Plant	<i>Rhizanthella slateri</i>	Eastern Underground Orchid	V	E	None: No suitable habitat present.	None: No disturbance of suitable habitat.

Flora	Plant	<i>Thelymitra kangaloonica</i>	Kangaloon Sun Orchid	CE	CE	Low: Minimal suitable habitat present.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Persicaria elatior</i>	Knotweed, Tall Knotweed	V	V	Low: Minimal suitable habitat present.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Grevillea molyneuxii</i>	null	V	E	Low: No records within 5km.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Grevillea raybrownii</i>	null	V	V	Low: No records within 5km.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Persoonia glaucescens</i>	Mittagong Geebung	V	V	Low: Minimal suitable habitat present.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Persoonia hirsuta</i>	Hairy Geebung, Hairy Persoonia	E	E	Low: No records within 5km.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Persoonia mollis subsp. revoluta</i>		V		Low: Minimal suitable habitat present.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Persoonia oxycoccoides</i>		E		Low: Minimal suitable habitat present.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Pomaderris brunnea</i>	Rufous Pomaderris, Brown Pomaderris	E	V	Low: No records within 5km.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Pomaderris cotoneaster</i>	Cotoneaster Pomaderris	E	E	Low: No records within 5km.	Low: Minimal disturbance to suitable habitat.
Flora	Plant	<i>Pomaderris sericea</i>	Silky Pomaderris	E	V	Low: Minimal records within 5km.	Low: Minimal disturbance to suitable habitat.

Flora	Plant	<i>Boronia deanei</i>	Deane's Boronia	V	V	None: No suitable habitat present.	None: No disturbance of suitable habitat.
Flora	Plant	<i>Zieria murphyi</i>	Velvet Zieria	V	V	None: No suitable habitat present.	None: No disturbance of suitable habitat.
Flora	Plant	<i>Thesium australe</i>	Austral Toadflax, Toadflax	V	V	Low: No records within 5km.	Low: No clearing of suitable habitat.

Annex 4. Design Plans



LOCALITY PLAN

Scale 1:200

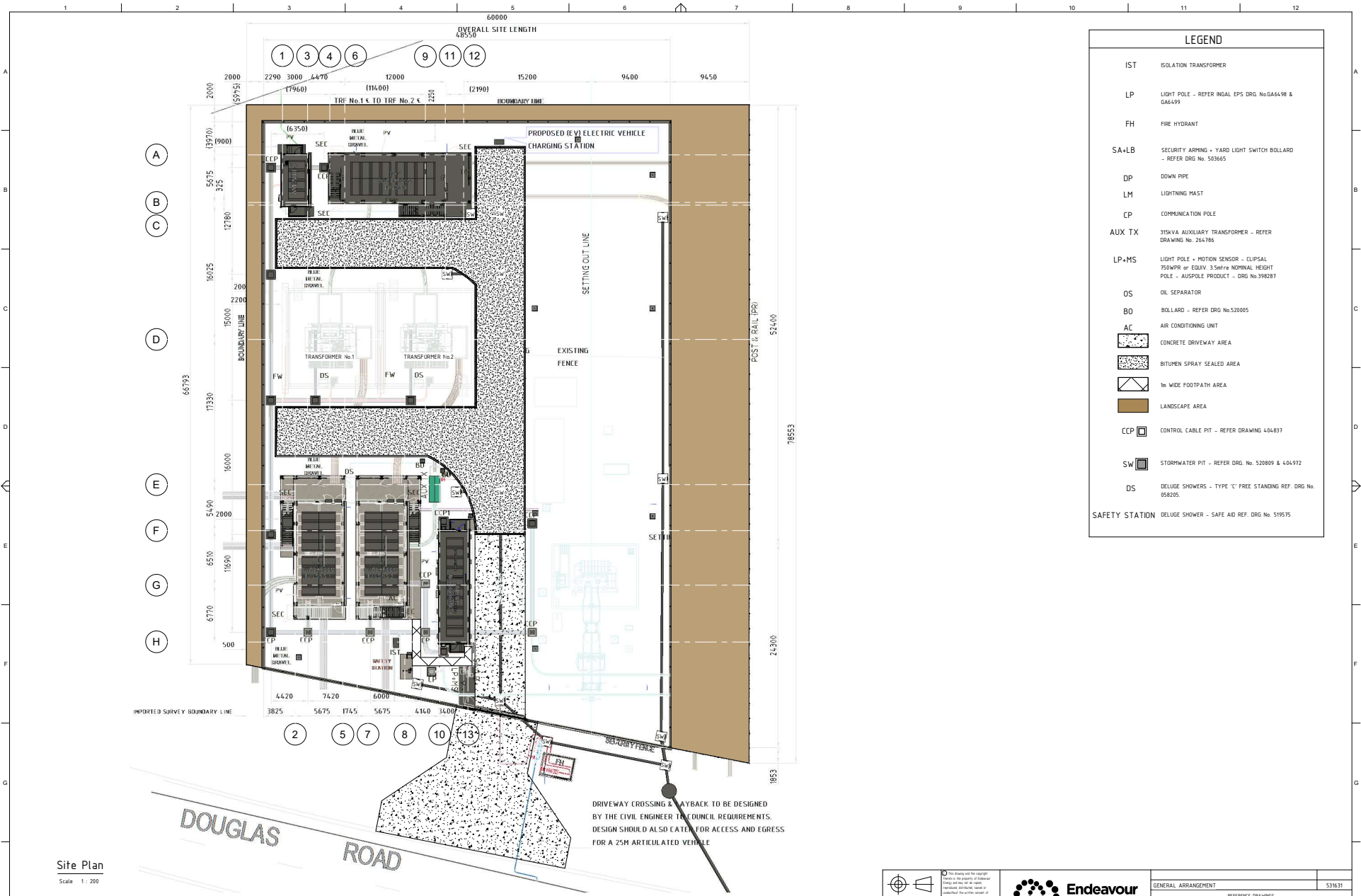
REVISION NUMBER	JOB No / DESCRIPTION	DATE	DESIGN / DRN	CHK / APPR
1	PRELIMINARY	25/02/2024	KL	

DESIGNED	KL	DATE	-
DRAWN	KL		
CHECKED	PJB		



BERRIMA JUNCTION ZONE SUBSTATION REDEVELOPMENT FOR
33kV / 11kV (35MVA) WITHOUT BESS
CONCEPT - LOCATION PLAN

SURVEY DRAWING	REFERENCE DRAWINGS
DO NOT SCALE (DIMENSIONS IN MILLIMETRES)	AUTHORISED IDENTIFIERS
A1	SK- 01
SHEET No	OF SHEETS



LEGEND	
IST	ISOLATION TRANSFORMER
LP	LIGHT POLE - REFER NGAL EPS DRG No GA6498 & GA6499
FH	FIRE HYDRANT
SA+LB	SECURITY ARMING - YARD LIGHT SWITCH BOLLARD - REFER DRG No. 503665
DP	DOWN PIPE
LM	LIGHTNING MAST
CP	COMMUNICATION POLE
AUX TX	315kVA AUXILIARY TRANSFORMER - REFER DRAWING No. 264786
LP+MS	LIGHT POLE + MOTION SENSOR - CLIPSAL 750WPR or EQUIV. 3.5mTie NOMINAL HEIGHT POLE - AUSPOLE PRODUCT - DRG No.398287
OS	OIL SEPARATOR
BO	BOLLARD - REFER DRG No.520005
AC	AIR CONDITIONING UNIT
[Pattern]	CONCRETE DRIVEWAY AREA
[Pattern]	BITUMEN SPRAY SEALED AREA
[Pattern]	1m WIDE FOOTPATH AREA
[Pattern]	LANDSCAPE AREA
CCP	CONTROL CABLE PIT - REFER DRAWING 404837
SW	STORMWATER PIT - REFER DRG. No. 520809 & 404972
DS	DELUGE SHOWERS - TYPE 'C' FREE STANDING REF. DRG No. 058205
SAFETY STATION	DELUGE SHOWER - SAFE AID REF. DRG No. 519575

Site Plan
Scale 1:200

DRIVEWAY CROSSING & LAYBACK TO BE DESIGNED BY THE CIVIL ENGINEER TO COUNCIL REQUIREMENTS. DESIGN SHOULD ALSO CATER FOR ACCESS AND EGRESS FOR A 25M ARTICULATED VEHICLE

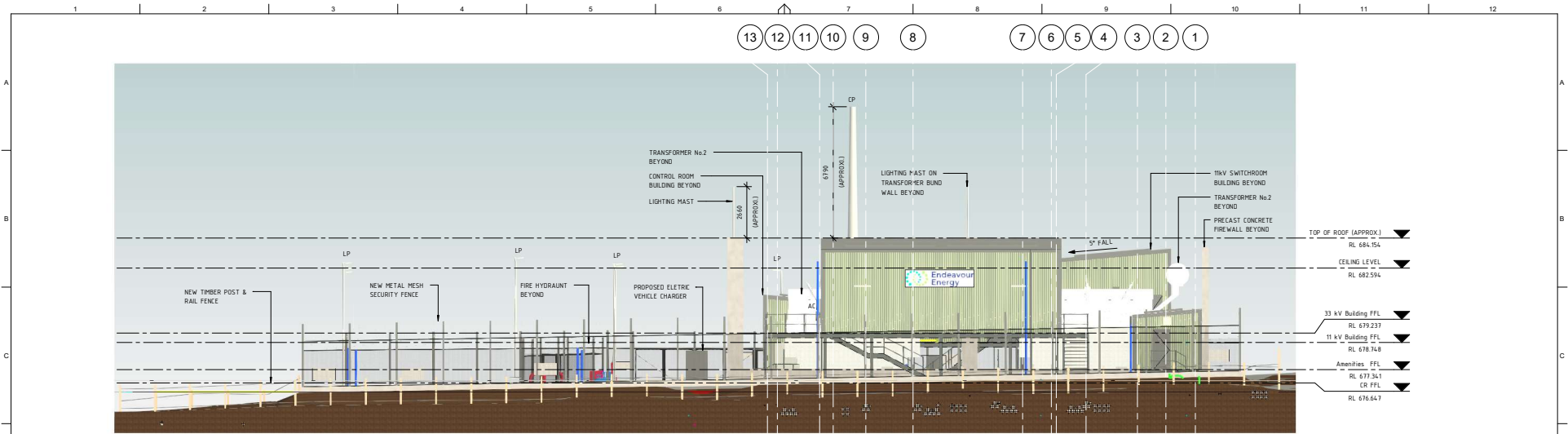
REVISION NUMBER	JOB No / DESCRIPTION	DATE	DESIGN / DRAWN	CHK / APPD
1	PRELIMINARY	25/02/2024	KL	

DESIGNED	KL	DATE	-
DRAWN	KL	DATE	-
CHECKED	JC	DATE	-

Endeavour Energy

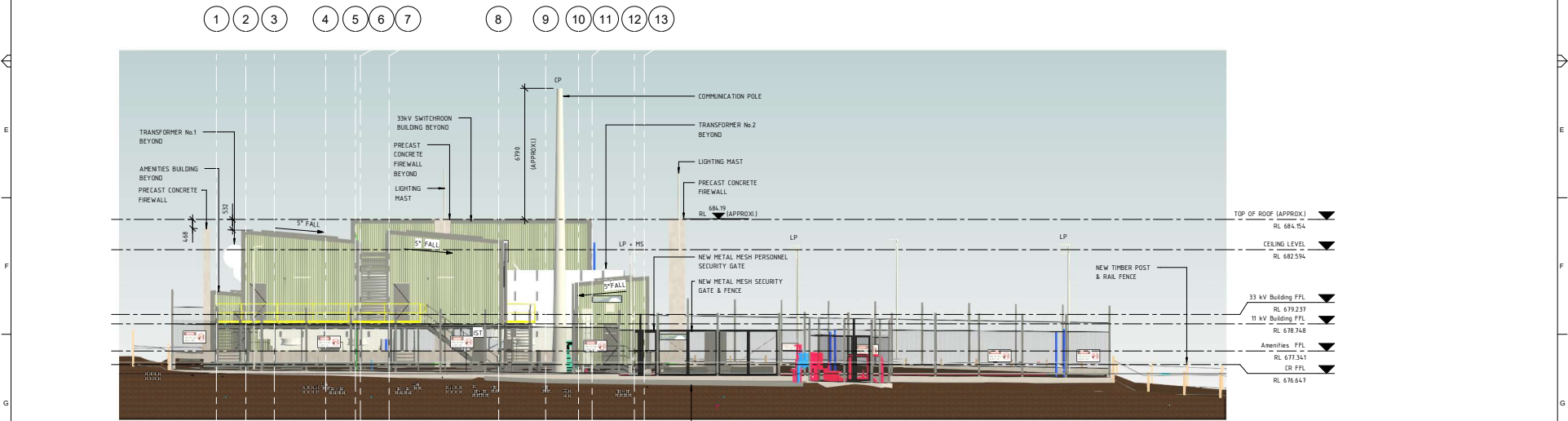
BERRIMA JUNCTION ZONE SUBSTATION REDEVELOPMENT FOR 33kV /11kV (35MVA) WITHOUT BESS
CONCEPT - SITE PLAN

GENERAL ARRANGEMENT	531631
DO NOT SCALE DIMENSIONS IN PICTURES	
A1	SK- 02



NORTH ELEVATION VIEW

Scale 1 : 100



STREET ELEVATION VIEW FROM DOUGLAS ROAD

Scale 1 : 100

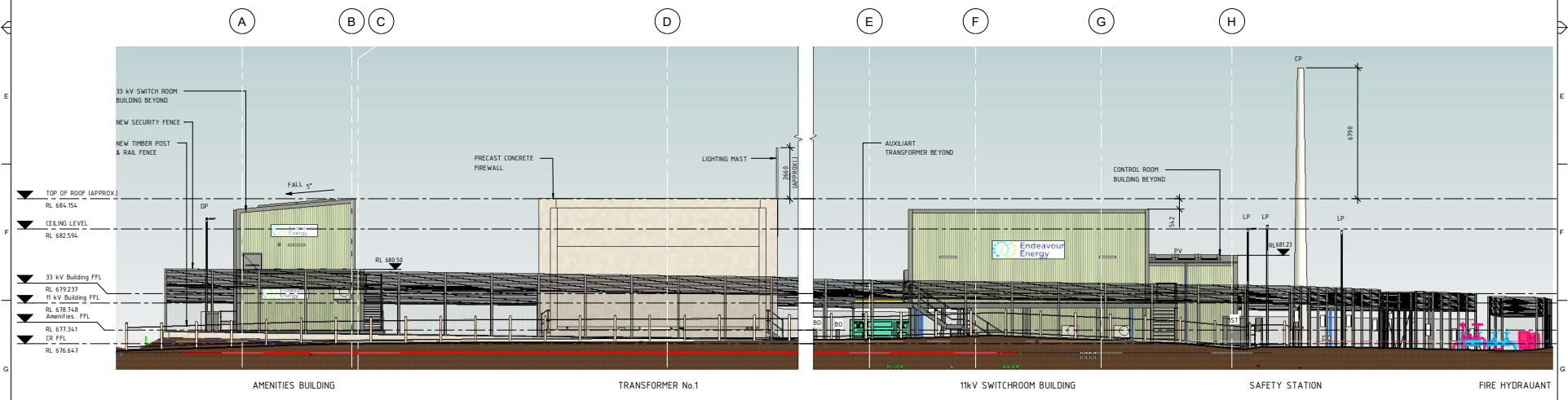
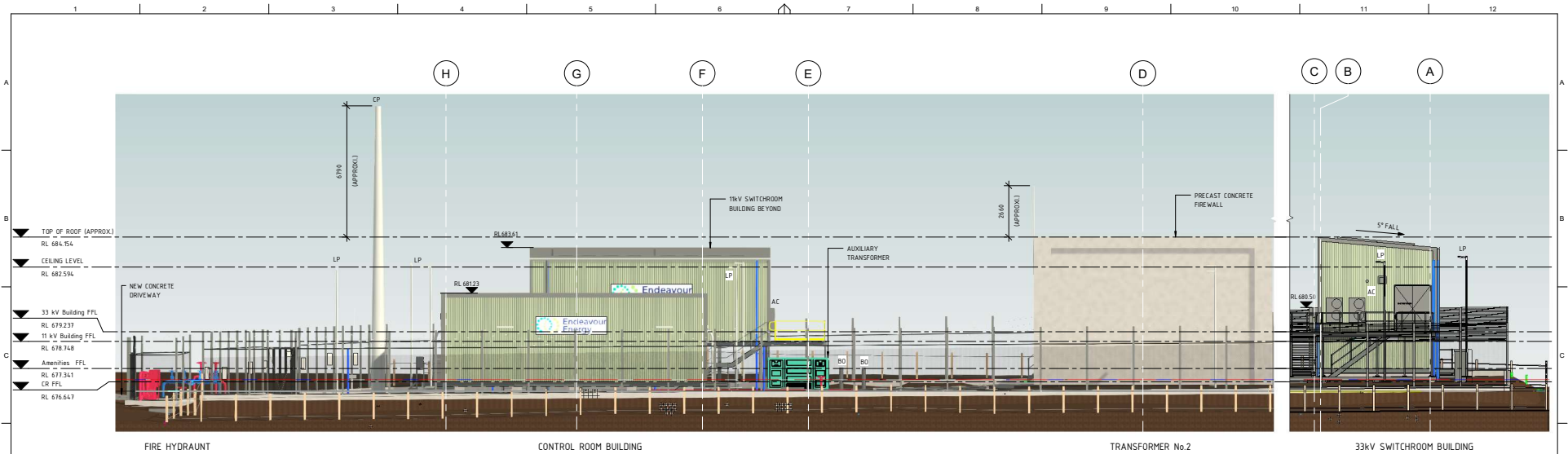
REVISION NUMBER	JOB No. / DESCRIPTION	DATE	DESIGN / DRAWN	CHECKED / APPROVED
1	PRELIMINARY	25/09/2024	KL, AL	

DESIGNED	KL	DATE	-
DRAWN	KL		
CHECKED	JC		

Endeavour Energy

BERRIMA JUNCTION ZONE SUBSTATION REDEVELOPMENT FOR 33kV / 11kV (35MVA) WITHOUT BESS CONCEPT - ELEVATIONS

GENERAL AGREEMENT	531631
DO NOT SCALE DIMENSIONS IN MILLIMETRES	AUTHORISED IDENTIFIER
A1	SK-03
SHEET No	OF SHEETS



REVISION NUMBER	JOB No / DESCRIPTION	DATE	DESIGN / DRAWN	CHECKED / APPROVED
1	PRELIMINARY	25/02/2024	KL	

DESIGNED	KL	DATE	-
DRAWN	KL		
CHECKED	JC		

ORIGINAL SCALE: 1:100
 APPROVED: -

Endeavour Energy

GENERAL ARRANGEMENT	531631
DO NOT SCALE DIMENSIONS IN PICTURES	AUTHORISED/VERIFIED
BERRIMA JUNCTION ZONE SUBSTATION REDEVELOPMENT FOR 33kV /11kV (35MVA) WITHOUT BESS CONCEPT - ELEVATIONS	
A1	SK- 04
SHEET No	OF SHEETS



DRONE VIEW PLAN

REVISION NUMBER	JOB No / DESCRIPTION	DATE	DESIGN / DRN	CHK / APPD
1	PRELIMINARY	25/02/2024	JC, KL	

DESIGNED	KL	DATE	-
DRAWN	KL		
CHECKED	JC		


Endeavour Energy

GENERAL ARRANGEMENT	531631
DO NOT SCALE (DIMENSIONS IN MILLIMETRES)	AUTHORISED/VERIFIED
A1	SK-05
SHEET No	OF SHEETS


BERRIMA JUNCTION ZONE SUBSTATION REDEVELOPMENT FOR
 33kV / 11kV (35MVA) WITHOUT BESS
 CONCEPT - PHOTOMONTAGE 1



STREET VIEW FROM DOUGLAS ROAD -1

REVISION NUMBER	JOB No / DESCRIPTION	DATE	DESIGN / DRAWN	CHK / APP'D
1	PRELIMINARY	25/02/2024	KL	

DESIGNED	KL	DATE	-
DRAWN	KL		
CHECKED	JC		


Endeavour Energy
 BERRIMA JUNCTION ZONE SUBSTATION REDEVELOPMENT FOR
 33kV / 11kV (35MVA) WITHOUT BESS
 CONCEPT - PHOTOMONTAGE 2


GENERAL ARRANGEMENT	531631
DO NOT SCALE (DIMENSIONS IN MILLIMETRES)	AUTHORISED/VERIFIED
A1	SK-06
SHEET No OF SHEETS	



STREET VIEW FROM DOUGLAS ROAD -2

REVISION NUMBER	JOB No / DESCRIPTION	DATE	DESIGN / DRN	CHK / APP'D
1	PRELIMINARY	25/02/2024	KL, AL	

DESIGNED	KL	DATE	-
DRAWN	KL		
CHECKED	JC		


Endeavour Energy
 BERRIMA JUNCTION ZONE SUBSTATION REDEVELOPMENT FOR
 33kV / 11kV (35MVA) WITHOUT BESS
 CONCEPT - PHOTOMONTAGE 3


GENERAL ARRANGEMENT	531631
DO NOT SCALE (DIMENSIONS IN MILLIMETRES)	AUTHORISED/VERIFIED
A1	SK-07
SHEET No	OF SHEETS



VIEW FROM WEST ELEVATION

REVISION NUMBER	JOB No / DESCRIPTION	DATE	DESIGN / DRN	CHK / APPD
1	PRELIMINARY	25/09/2024	KL	

DESIGNED	KL	DATE	-
DRAWN	KL		
CHECKED	JC		


Endeavour Energy
 BERRIMA JUNCTION ZONE SUBSTATION REDEVELOPMENT FOR
 33kV / 11kV (35MVA) WITHOUT BESS
 CONCEPT - PHOTOMONTAGE 4


GENERAL ARRANGEMENT	531631
DO NOT SCALE (DIMENSIONS IN MILLIMETRES)	AUTHORISED/VERIFIED
A1	SK-08
SHEET No OF SHEETS	



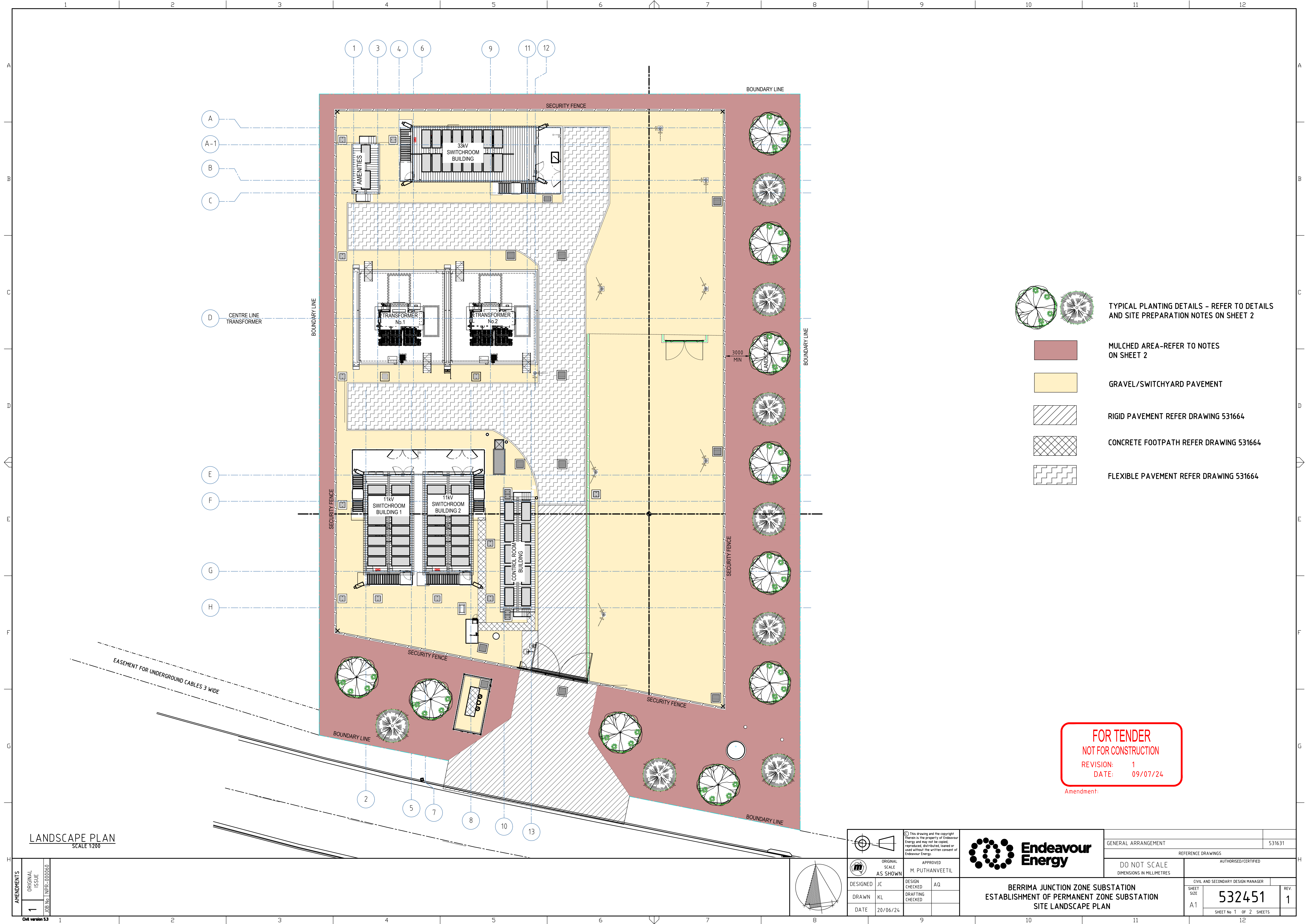
NORTH WEST CORNER SITE VIEW

REVISION NUMBER	JOB No / DESCRIPTION	DATE	DESIGN / DRN	CHK / APP'D
1	PRELIMINARY	25/02/2024	KL, AL	

DESIGNED	KL	DATE	-
DRAWN	KL		
CHECKED	JC		

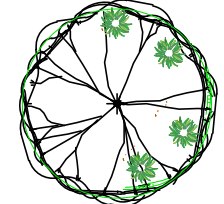
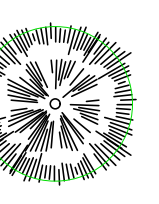

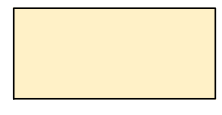
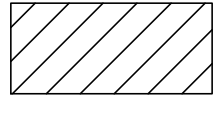
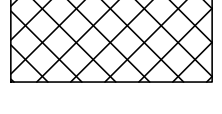
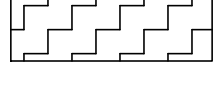

Endeavour Energy
 BERRIMA JUNCTION ZONE SUBSTATION REDEVELOPMENT FOR
 33kV / 11kV (35MVA) WITHOUT BESS
 CONCEPT - PHOTOMONTAGE 5

GENERAL ARRANGEMENT	531631
DO NOT SCALE (DIMENSIONS IN MILLIMETRES)	AUTHORISED/INITIALES
A1	SK-09
SHEET No OF SHEETS	



A
A-1
B
C
D CENTRE LINE TRANSFORMER
E
F
G
H

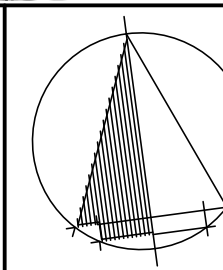
1 3 4 6 9 11 12

-   TYPICAL PLANTING DETAILS - REFER TO DETAILS AND SITE PREPARATION NOTES ON SHEET 2
-  MULCHED AREA-REFER TO NOTES ON SHEET 2
-  GRAVEL/SWITCHYARD PAVEMENT
-  RIGID PAVEMENT REFER DRAWING 531664
-  CONCRETE FOOTPATH REFER DRAWING 531664
-  FLEXIBLE PAVEMENT REFER DRAWING 531664

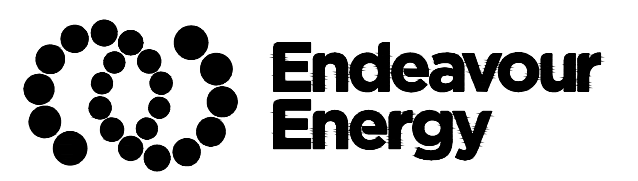
FOR TENDER
NOT FOR CONSTRUCTION
REVISION: 1
DATE: 09/07/24
Amendment:

LANDSCAPE PLAN
SCALE 1:200

AMENDMENTS	ORIGINAL ISSUE
1	1
JOB No. NFR-200660	
Civil version 53	



DESIGNED JC		APPROVED M. PUTHANVEETIL	
DRAWN KL		AUTHORISED/CERTIFIED	
DATE 20/06/24		CIVIL AND SECONDARY DESIGN MANAGER	



BERRIMA JUNCTION ZONE SUBSTATION
ESTABLISHMENT OF PERMANENT ZONE SUBSTATION
SITE LANDSCAPE PLAN

GENERAL ARRANGEMENT	531631
DO NOT SCALE DIMENSIONS IN MILLIMETRES	AUTHORISED/CERTIFIED
CIVIL AND SECONDARY DESIGN MANAGER	REV. 1
SHEET SIZE A1	532451
SHEET No 1 OF 2 SHEETS	

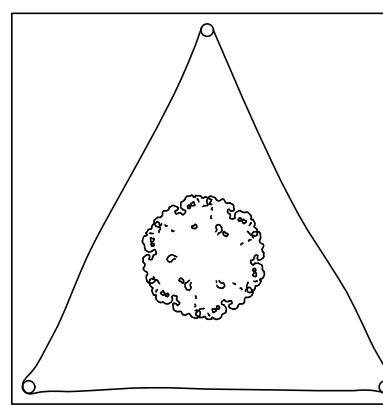
PLANTING AND FINISHES SCHEDULE

All plants should be true nominated botanical listing. Plants should be ordered THREE MONTHS prior to the commencement of Landscape Works.
 PLANTS HELD ON SITE PRIOR TO PLANTING MUST BE MAINTAINED TO NURSERY CARE STANDARDS AND WATERING TWICE DAILY FOR THE PERIOD BETWEEN DELIVERY AND INSTALLATION.

ALL PLANTING TO BE PROTECTED WITH AN APPROVED VERMIN BARRIER WHICH IS TO BE MAINTAINED TO COMPLETION OF THE ESTABLISHMENT PERIOD.

Plant substitutions are not acceptable without prior approval.

Symbol	Supply Size (Min) To comply with Natspec	Appr. Mature Size (This location Height x spread)	Stake and Tie	QTY
TYPE B LINEAR MODULE AREA: 33.375 Sq.m				
TREES CASUARINA GLAUCA	150 mm Pot		No	10
GROUND COVERS LOMANDRA LONGIFOLIA	Tube Stock		No	40
SHRUBS CALLISTEMON CITRINUS (bottlebrush)	Tube Stock		No	8
MASONRY/CONCRETE EDGING				
MULCH AREA	ORGANIC MULCH 100MM DEPTH FEATHERED CLEAR OF PLANT STEMS			



PLAN
TREE/SHRUB PLANTING DETAIL

SOFT LANDSCAPE WORKS OUTLINE SPECIFICATION:
 NOTE: THE FOLLOWING AUSTRALIAN STANDARDS SHALL BE APPLICABLE TO WORKS INCLUDED IN THIS SPECIFICATION.
 AS 4419: SOILS FOR LANDSCAPING AND GARDEN WORKS
 AS 4454: COMPOSTS, SOIL CONDITIONERS AND MULCHES
 AS 4373: PRUNING OF AMENITY TREES
 AS 4970: PROTECTION OF TREES ON DEVELOPMENT SITES
 COPIES OF THESE STANDARDS SHOULD BE AVAILABLE ON SITE ALL TIMES.

1: SITE PREPARATION
 PRIOR TO THE COMMENCEMENT OF ANY SITE LANDSCAPE WORKS, REMOVE ALL BUILDING RUBBISH AND DEBRIS FROM THE SITE, REMOVE ALL WEED GROWTH AND UNWANTED REMNANT PLANT MATERIAL.

FORM UP ALL GROUND SURFACES, ALLOWING FOR GRADES FOR DRAINAGE AS REQUIRED, AND TO LEVELS ALLOWING FOR LANDSCAPE PREPARATION AND FINISHES TO PROCEED. ALLOW FOR SUPPLEMENTARY AND INTRODUCED TOPSOILS AS LATER SPECIFIED, TO ACHIEVE FINISHES LEVELS.

BUILD UP, AND/OR REDUCE FORMATION LEVELS TO ENABLE LANDSCAPE FINISHES TO BE FINISHED OFF FLUSH WITH ADJACENT BOUNDARY LEVELS, PITS, PATHWAYS KERBS, AND GARDEN EDGING.

TO EACH GARDEN AREA, REMOVE EXISTING MATERIAL, AS FOUND, TO A MEAN DEPTH OF 300 MM FOR THE WHOLE OF THE GARDEN BED.

TO GARDEN AREAS, PROVIDE TOPSOIL MIX COMPRISING 40% COARSE RIVER SAND, 30% COMPOSTED HARDWOOD FINES, OR EQUAL COMPOSTING, AND 30% FINE LOAM TO 150mm THICKNESS. IMPORTED TOPSOIL SHALL HAVE A PH IN THE RANGE 5.5-7.0, AND SHALL COMPLY WITH AS4419.

2: PLANTING
 PLANT OUT ALL PLANT MATERIALS TO THE SET OUT NOTED ON THE DRAWINGS, AND TO THE QUANTITY SCHEDULED. CHECK SET OUT OF TALL TREES AND SHRUBS AGAINST LOCATIONS OF OVERHEAD WIRING INCLUDING POLES FOR INCOMING POWER TO THE SITE.
 ALL PLANTS SHALL BE KEPT UNDER "NURSERY CARE" FOLLOWING DELIVERY TO THE SITE AND ARE NOT TO BE ALLOWED TO DRY OUT. DIG OUT PLANTING HOLES TO THE DEPTH OF THE CONTAINER, PLUS 25 MM AND TO DOUBLE THE DIAMETER OF THE CONTAINER, WITH SIDES OF PLANTER HOLES LOOSELY REMOVE PLANTS FROM NURSERY CONTAINERS AND REMOVE NURSERY CANES PRIOR TO PLANTING. TYPICALLY PLACE PLANTS 20-25 BELOW ADJACENT FINISHED GROUND LEVEL, AND BACKFILL WITH NO AIR VOIDS, AND FORM LOCALISED DISHING AROUND EACH PLANT. DO NOT PLACE ANY ADDITIONAL SOIL OVER CONTAINER SOIL. PLACE PLANTS INTO DAMPED SOIL, AND DEEP WATER IMMEDIATELY FOLLOWING PLANTING. ALL PLANTS SHALL BE SPECIES AS SCHEDULED, TRUE TO TYPE, MATURE FOR THE CONTAINER SIZE, NO ROOT BOUND AND READY FOR PLANTING. PLANTS SCHEDULED AS "SHADE HARDENED" ARE PROPOSED FOR AREAS PREDOMINATELY IN THE SHADE AND SHALL HAVE BEEN GROWN UNDER SHADED CONDITIONS FOR AT LEAST TWO MONTHS PRIOR TO DELIVERY. PLANTS OTHER THAN NATIVE GRASSES, REEDS AND RUSHES, PLACED INTO EITHER OVERLAND FLOW SWALES OR DETENTION BASINS SHALL BE UNDERCUT 100MM TO ALLOW FREE FLOW OF WATER THROUGH THE SWALE.

3: MULCHING
 MULCH ALL GARDEN/PLANTER AREAS WITHIN 24 HOURS OF PLANTING, TAKING CARE THAT MULCH IS PLACED FREE FROM PLANT STEMS. ORGANIC OR VEGETATIVE MULCH SHALL COMPRISE WEED FREE LEAF LITTER, OR SIMILAR FLAKE OR WOODCHIP MATERIAL OF IRREGULAR DIMENSION CONTAINING BUT LESS THAN 65% CHUNKY MATERIAL (IE MATERIAL LARGER THAN A MINIMUM DIMENSION OF 5MM), PLACED TO A MEAN DEPTH OF 100MM.
NOTE: PLASTIC OR "WEED MATTING" BARRIERS BETWEEN MULCH AND SOILS ARE NOT TO BE USED

4: STAKING AND TYING
 STAKE AND TIE ALL PLANTS SCHEDULED, AND ALL PLANTS SUPPLIED IN 25 LITRE, OR GREATER SIZE CONTAINERS. STAKES SHALL BE 37 X 37 X 1800 LONG HARDWOOD OR EQUAL AND EMBEDDED 400MM. TIES SHALL BE HESSIAN, OR EQUAL NON-ABRASIVE MATERIAL, SECURELY ANCHORED TO STAKES, AND LOOPED AROUND PLANT STEMS IN A FIGURE OF EIGHT PATTERN. TIES SHALL BE SET AS THE APPROXIMATE HALF HEIGHT OF EACH PLANT, AND SHALL BE ADJUSTED SUCH THAT PLANTS CAN FLEX AND THAT LATERAL GROWTH IS NOT DISTURBED. REMOVE STAKES AND TIES AT COMPLETION OF ESTABLISHMENT PERIOD.
 NOTE: ALL NURSERY CANES, STAKES AND TIES SUPPLIED WITH PLANTS SHALL BE REMOVED AT THE TIME OF PLANTING.

5: ESTABLISHMENT AND CONTINUING SITE LANDSCAPE MANAGEMENT
 THE ESTABLISHMENT PERIOD SHALL BE 12 MONTHS, FROM THE TIME OF PRACTICAL COMPLETION OF THE LANDSCAPE WORKS. THE FOLLOWING WORKS SHALL BE CARRIED OUT AS REGULAR ROUTINE, WITH ATTENDANCES TO BE CARRIED OUT TO MEET MINIMUM WATERING REQUIREMENTS.

PROVIDE A LOG BOOK OF ALL ACTIVITIES CARRIED OUT ON SITE DURING THE MAINTENANCE/ESTABLISHMENT PERIOD. COPIES OF THE LOG BOOK SHALL BE PROVIDED TO THE PRINCIPAL, AT INTERVALS OF ONE MONTH, SETTING OUT DATES OF ATTENDANCES AND ALL WORKS CARRIED OUT AT EACH ATTENDANCE. THE WHOLE OF THE LOG BOOK SHALL BE ISSUED TO THE PRINCIPAL, AT COMPLETION. FAILURE TO PROVIDE LOG BOOK RECORDS MAY RESULT IN CLAIMS FOR PAYMENT FOR MAINTENANCE WORKS BEING REFUSED.

5.1: REGULARLY DEEP WATER ALL AREAS. TURF SHALL BE WATERED AT MINIMUM INTERVALS OF TWICE PER WEEK UNTIL TURF HAS ACHIEVED A HEIGHT OF 50MM ABOVE PLANTED HEIGHT. MULCHED AREAS SHALL BE DEEP WATERED AT MINIMUM INTERVALS OF ONE WEEK. GRASS CLIPPINGS SHALL NOT BE USED TO SUPPLEMENT ORGANIC MULCH.

5.2: REPLACE ANY PLANTS THAT DO NOT PROGRESS, OR DIE, DURING THE MAINTENANCE PERIOD. WHERE APPLICABLE, MAINTAIN ALL VERMIN GUARDS IN PLACE, AND REPAIR AS NECESSARY TO SUSTAIN PROTECTION FOR EACH PLANT.

5.3: DO NOT APPLY ANY FERTILISERS FOR THE FIRST THREE MONTHS OF THE MAINTENANCE PERIOD. FERTILISERS SHALL BE APPLIED STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS WHERE USED THERE AFTER. GARDEN FERTILISERS SHALL BE LOW RELEASE MATERIALS EQUAL TO "OSMOCOTE" SPECIFIC TO THE PLANTS BEING FERTILIZED (IE USE NATIVE PLANT MIXES FOR NATIVE PLANTS ETC). LAWN FERTILISERS SHALL BE SIMILARLY SPECIFIC FOR THE TURF USED ON THE PROJECT. KEEP RECORDS OF ALL FERTILIZER APPLICATIONS IN THE LOG BOOK, SETTING OUT DATE, AND SPECIFIC MATERIALS APPLIED.

5.4: KEEP ALL GRASSING AND PLANTED ZONES IN A WEED FREE CONDITION; REPLACE ALL PLANTS WHICH SUFFER DISEASE OR INSECT INFESTATION WITHIN THIS ESTABLISHMENT / MAINTENANCE PERIOD. WEEDING MAY BE MANAGED BY THE USE OF GLYPHOSATE BASED OR ORGANIC WEEDICIDES APPLIED ONLY BY WAND AND SHALL NOT BE USED UNDER SAFE WORKING CONDITIONS AND STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.

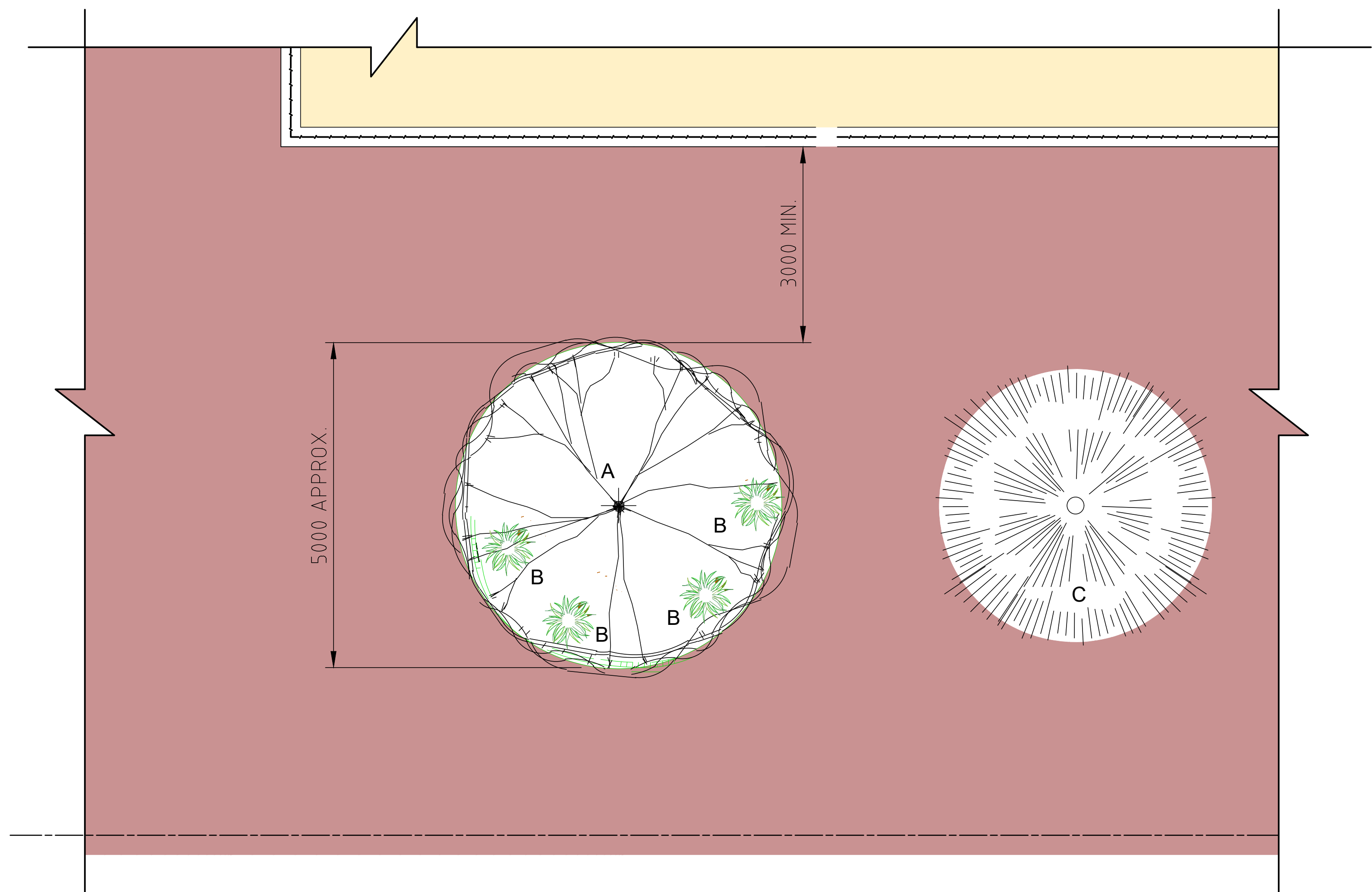
5.5: MULCHING DEPTHS SHALL BE REPLENISHED AS NECESSARY TO MAINTAIN SPECIFIED DEPTHS OF MULCHES AS SPECIFIED. REGULARLY CHECK THAT MULCHES ARE BEING KEPT CLEAR OF PLANT STEMS AS SPECIFIED AND DETAILED.

5.6: ANY TREEGUARDS ARE TO BE REMOVED AT THE CONCLUSION OF THE 12 MONTH MAINTENANCE PERIOD.

6: HYDRO-MULCHING
 AREAS TO BE HYDROMULCHED SHALL BE GRADED TO CREATE AN EVEN SURFACE READY TO RECEIVE THE GRASS SEEDS, AS SPECIFIED BELOW. IN GRADING, ALLOW FOR FALLS TO DRAINAGE OUTLETS AS REQUIRED TO ALLOW FOR FREE DRAINAGE OF THE GRASSED ZONES, AND FOR DRAINAGE TO PITS, AS REQUIRED. FOLLOWING GRADING, PROVIDE AND LAY A 150MM THICK SCREEDED TOPSOIL MIX COMPRISING 50% LOAM, 40% COARSE SAND AND 10% DRIED AND SHREDDED FOWL MANURE. INSTALL HYDRO MULCH IN ACCORDANCE WITH THE MANUFACTURER'S DETAILS

IMPORTANT NOTES:

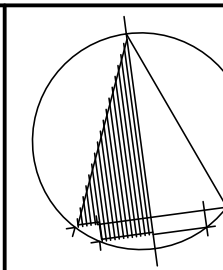
- ALL EXISTING AND PROPOSED UNDERGROUND ASSETS WITHIN THE PROPOSED LANDSCAPE AREA MUST BE LOCATED PRIOR TO LANDSCAPING WORKS COMMENCING AND APPROPRIATE CLEARANCES COMPLIED WITH.
- THIS SITE LANDSCAPE PLAN IS INDICATIVE ONLY. FINAL POSITIONING OF GARDEN BEDS, TURF, PLANTS, ETC. SHALL BE DETERMINED UPON SITE INSPECTION AND CONSULTATION WITH ENDEAVOUR ENERGY'S PROJECT MANAGER AND ENVIRONMENTAL SPECIALIST, PRIOR TO LANDSCAPING WORKS COMMENCING.



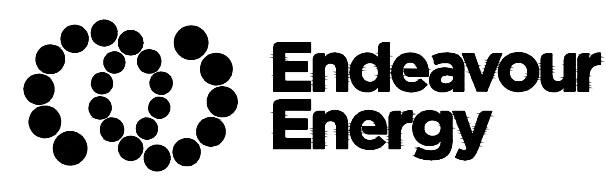
FOR TENDER
 NOT FOR CONSTRUCTION
 REVISION: 1
 DATE: 09/07/24
 Amendment:

LANDSCAPE PLAN
 SCALE 1:200

AMENDMENTS	ORIGINAL ISSUE
1	INFR-200660



DESIGNED	JC	DESIGN CHECKED	AQ
DRAWN	KL	DRAFTING CHECKED	
DATE	20/06/24		



BERRIMA JUNCTION ZONE SUBSTATION
 ESTABLISHMENT OF PERMANENT ZONE SUBSTATION
 SITE LANDSCAPE PLAN

GENERAL ARRANGEMENT	531631
REFERENCE DRAWINGS	
DO NOT SCALE DIMENSIONS IN MILLIMETRES	AUTHORISED/CERTIFIED
CIVIL AND SECONDARY DESIGN MANAGER	
SHEET SIZE A1	532451
	REV. 1
SHEET No 2 OF 2 SHEETS	

Annex 5. Acoustic Report

(Environmental Noise Impact Assessment, Day Design, August 2023)

Annex 6. Notifications and Responses (Consultation)

Berrima Junction New Permanent Zone Substation

[REDACTED]
Sun 23/06/2024 9:17 AM

To:Environment <environment@endeavourenenergy.com.au>

I would like to add my support for this upgrade which I think is long overdue. Developments in the Southern Highlands Innovation Park have been long constrained by the lack of infrastructure in this area - particularly power supply. Such an upgrade can only mean the Park becomes more attractive for light industry in the years ahead. It will also allow the introduction of more EV charging facilities which are sadly lacking in the Wingecarribee Shire

Kind regards

Derek [REDACTED]

Mittagong NSW 2575

David [REDACTED]

Why do these things look like colditz ? And the power poles you guys put up , ie Illawarra highway between moss vale along highway to Sutton Forrest then too Exeter are a blight and a disgraceful disrespect and disregard for our community . If it needs a fence maybe a building with concrete walls . Anything but the eye sore at the entrance too moss vale.

5d Like Reply [Send message](#) Hide

2 😬



Author

Endeavour Energy

David [REDACTED] thanks for your comments. We undertake prudent planning and sound investment to design, construct and operate a safe, reliable and sustainable electricity supply in a cost effective and efficient way. Individual parts of the network are built to comply with the relevant technical and environmental standards to maintain their safe and reliable operation. We welcome your feedback on our plans for our proposed new major substation at Berrima Junction. To make a submission, please email us at environment@endeavourenergy.com.au by 18 July. For further details on the project <https://www.endeavourenergy.com.au/.../berrima-junction....> Thx Peter EE Team



ENDEAVOURENERGY.COM.AU

Berrima Junction New Permanent Zone Substation



2m Like Reply Commented on by Peter [REDACTED] [Remove Preview](#) Edited

Annex 7. AHIMS Search

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
52-4-0176	MVEnt Art 58 Contact Searle	GDA	56	259622	6177233	Open site	Valid	Artefact : -		
		Recorders	Total Earth Care Pty Ltd							Permits
52-4-0177	MVEnt Art 57 Contact Searle	GDA	56	259619	6177232	Open site	Valid	Artefact : -		
		Recorders	Total Communications Infrastructure P/L							Permits
52-4-0179	MVEnt Art 42 Contact Searle	GDA	56	258388	6175784	Open site	Valid	Artefact : -		
		Recorders	Total Earth Care Pty Ltd							Permits
52-4-0180	MVEent Art 43 Contact Searle	GDA	56	258416	6176086	Open site	Valid	Artefact : -		
		Recorders	Total Earth Care Pty Ltd							Permits
52-4-0181	MVEnt Art 41 Contact Searle	GDA	56	258379	6175782	Open site	Valid	Artefact : -		
		Recorders	Total Earth Care Pty Ltd							Permits
52-4-0187	MVEnt Site 7 Contact Searle	GDA	56	259399	6176087	Open site	Valid	Artefact : -		
		Recorders	Total Earth Care Pty Ltd							Permits
52-4-0386	BR-IF1; Contact	GDA	56	258825	6175904	Open site	Valid	Artefact : -		
		Recorders	Mr.Lance Syme							Permits
52-4-0387	BR-IF2 Contact	GDA	56	258633	6175948	Open site	Valid	Artefact : -		
		Recorders	Mr.Lance Syme							Permits
52-4-0712	MVRec IF1 Contact	GDA	56	258807	6176286	Open site	Valid	Artefact : -		
		Recorders	Biosis Pty Ltd - Wollongong,Mrs.Samantha Keats							Permits
52-4-0713	Beaconsfield Rd OS-1 Contact	GDA	56	259253	6176010	Open site	Destroyed	Artefact : -		104831
		Recorders	OzArk Environmental and Heritage Management - Dubbo,OzArk Environmental an							Permits
52-4-0714	Beaconsfield Rd OS-2 Contact	GDA	56	258802	6176274	Open site	Destroyed	Artefact : -		104831
		Recorders	OzArk Environmental and Heritage Management - Dubbo,OzArk Environmental an							Permits
52-4-0715	Beaconsfield Rd IF-1 Contact	GDA	56	259038	6176087	Open site	Valid	Artefact : -		104831
		Recorders	OzArk Environmental and Heritage Management - Dubbo,Mr.Ben Churcher							Permits
52-4-0716	Beaconsfield Rd IF-2 Contact	GDA	56	258771	6176178	Open site	Destroyed	Artefact : -		104831
		Recorders	OzArk Environmental and Heritage Management - Dubbo,OzArk Environmental an							Permits
52-4-0717	Beaconsfield Rd IF-3 Contact	GDA	56	258745	6176303	Open site	Destroyed	Artefact : -		104831
		Recorders	OzArk Environmental and Heritage Management - Dubbo,OzArk Environmental an							Permits
52-4-0732	Douglas Rd OS-1 Contact	GDA	56	258658	6176517	Open site	Valid	Artefact : -		
		Recorders	OzArk Environmental and Heritage Management - Dubbo,Mr.Ben Churcher							Permits
52-4-0761	MVB AS1 Contact	GDA	56	260319	6175273	Open site	Valid	Artefact : -		
		Recorders	Austral Archaeology,Miss.Taylor (austral arch) Foster							Permits
52-4-0762	MVB AS2 Contact	GDA	56	259600	6175133	Open site	Valid	Artefact : -		
		Recorders	Austral Archaeology,Miss.Taylor (austral arch) Foster							Permits
52-4-0763	MVB AS3 Contact	GDA	56	257747	6175417	Open site	Valid	Artefact : -		
		Recorders	Austral Archaeology,Miss.Taylor (austral arch) Foster							Permits



AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 8373_Berrima_AHIMS

Client Service ID : 846715

<u>SiteID</u>	<u>SiteName</u>	<u>Datum</u>	<u>Zone</u>	<u>Easting</u>	<u>Northing</u>	<u>Context</u>	<u>Site Status **</u>	<u>SiteFeatures</u>	<u>SiteTypes</u>	<u>Reports</u>	
52-4-0764	MVB AS4	GDA	56	259026	6175261	Open site	Valid	Artefact : -			
	Contact										
52-4-0765	MVB IF1	GDA	56	258032	6175506	Open site	Valid	Artefact : -			
	Contact										
		Recorders	Austral Archaeology, Miss. Taylor (austral arch) Foster							Permits	
		Recorders	Austral Archaeology, Miss. Taylor (austral arch) Foster							Permits	

**** Site Status**
Valid - The site has been recorded and accepted onto the system as valid
Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.
Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground
Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

Report generated by AHIMS Web Service on 06/12/2023 for Riley Finnerty for the following area at Datum :GDA, Zone : 56, Eastings : 257358.0 - 261501.0, Northings : 6174490.0 - 6177818.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 20

This information is not guaranteed to be free from error omission. Heritage NSW and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

Annex 8. Environmental Protection Authority Search



Public registers

+ POEO Public Register

- Contaminated land record of notices

About the record of notices

List of notified sites

Tips for searching

Disclaimer

Dangerous goods licences

Pesticide licences

Radiation licences

[Home](#)
[Public registers](#)
[Contaminated land record of notices](#)

Search results

Your search for: LGA: WINGECARRIBEE SHIRE COUNCIL

Matched 14 notices relating to 4 sites.

Suburb	Address	Site Name	Notices related to this site
BOWRAL	Merrigang STREET	Former Gasworks	3 current
JOADJA	Joadja ROAD	Former Shale Oil Refinery	1 former
MITTAGONG	Alfred STREET	Lots 1 and 2 Alfred St	9 former
MOSS VALE	Bowman/Berrima ROAD	Moss Vale North Depot	1 current

Page 1 of 1

4 March 2024

For business and industry

Public registers

Recycling and reuse

Legislation and compliance

Guide to licensing

Duty to notify pollution incidents

Waste

Environment protection licences

Dangerous goods

For local government

Information and resources for local government

Contact us

131 555

Online

info@epa.nsw.gov.au

EPA Office Locations



Annex 9. RF EME Analysis Report



TOTAL RADIATION SOLUTIONS



WORLD RECOGNISED
ACCREDITATION

RF EME ANALYSIS REPORT

ENDEAVOUR ENERGY

RFI YB-10-65

NEW SOUTH WALES

October 2012

Prepared by

James Ward
RF EME Manager

RF EME ANALYSIS REPORT

**Endeavour Energy
51 Huntingwood Drive
HUNTINGWOOD NSW 2148**

RFI YB-10-65

Assessment Date 4 October 2012

Reference No. 1370-2814

Authorised Signatory



James Ward
RF EME Manager
Total Radiation Solutions



NATA Accredited Inspection Body - Number: 15096

This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17020

NATA is a signatory to the APLAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports

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1. Introduction

Endeavour Energy (EE) requested Total Radiation Solutions Pty Ltd (TRS) to undertake a radio frequency (RF) electromagnetic energy (EME) assessment of the RFI YB-10-65 yagi antenna.

The purpose of this assessment was to establish the occupational and non-occupational boundaries for the antenna.

This report is based on information provided by EE and the manufacturer’s technical sheet for the RFI YB-10-65 yagi antenna.

2. Regulatory Exposure Limits

ARPANSA, an agency of the Commonwealth Department of Health has established a Radiation Protection Standard (ARPANSA 2002) specifying limits for continuous exposure of the general public to RF EME transmissions (Table 1). Further information can be gained from the ARPANSA web site.

The Australian Communications and Media Authority (ACMA) mandates exposure limits for continuous exposure of the general public to RF EME. Further information can be found at the ACMA website at <http://www.acma.gov.au>

Table 1 Reference Levels for Time Averaged Exposure to RMS Electric and Magnetic Fields (Unperturbed) (ARPANSA 2002)

Exposure Category	Frequency Range	E-field (V/m)	H-field (A/m)	Power Flux Density (W/m ²)
Occupational (RF Worker)	100 kHz – 1 MHz	614	163/ <i>f</i>	–
	1 MHz – 10 MHz	614/ <i>f</i>	163/ <i>f</i>	1000/ <i>f</i> ²
	10MHz – 400 MHz	61.4	163	10
	400 MHz – 2 GHz	3.07 x <i>f</i> ^{0.5}	0.00814 x <i>f</i> ^{0.5}	<i>f</i> /40
	2 GHz – 300 GHz	137	0.364	50
Non-Occupational (General Public)	100 kHz – 150 kHz	86.8	4.86	–
	150 kHz – 1 MHz	86.8	0.729/ <i>f</i>	–
	1 MHz – 10 MHz	86.8/ <i>f</i> ^{0.5}	0.729/ <i>f</i>	–
	10MHz – 400 MHz	27.4	0.729	2
	400 MHz – 2 GHz	1.37 x <i>f</i> ^{0.5}	0.00364 x <i>f</i> ^{0.5}	<i>f</i> /200
	2 GHz – 300 GHz	61.4	0.163	10

f is frequency in MHz

3. Modelling Methodology

Using the IXUS and Feko modelling software in conjunction with the NATA accredited inspection body process, the occupational and non-occupation exclusion zones for the antenna listed in Table 2 were calculated.

Table 2 Antenna Assessed

Manufacturer	Model	Type	Frequency Band (MHz)
RFI	YB-10-65	Yagi	400-420

Table 3 Antenna Parameters

Antenna	Assessment Frequency (MHz)	Gain (dBi)	Power (Watts)
RFI YB-10-65	410	13	0.042

4. Calculation Results

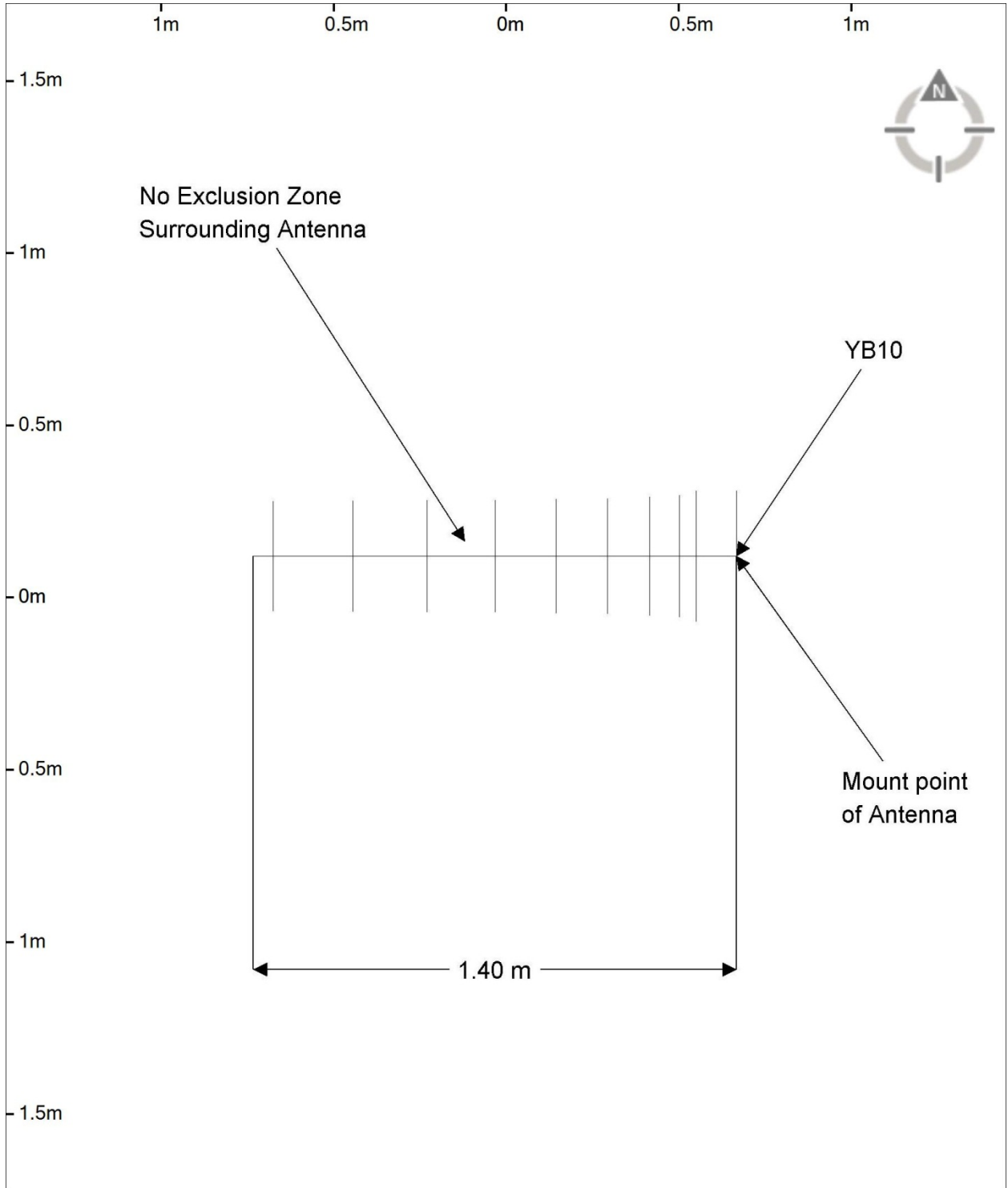
Antenna	Distance to Limit (m)	
	Occupational Limit	Non-Occupational Limit
RFI YB-10-65	0	0

Notes:

1. RF EME exclusion zones have been calculated based on the formulae specified in AS2772.2 using the specified transmit powers for the antennas by the IXUS software
2. Assessment was conducted within the specified limits of the IXUS software
3. Antenna power is based on 1 watt of power supplied with a duty cycle of 15 in 360 seconds.

5. RF EME Exclusion Zones

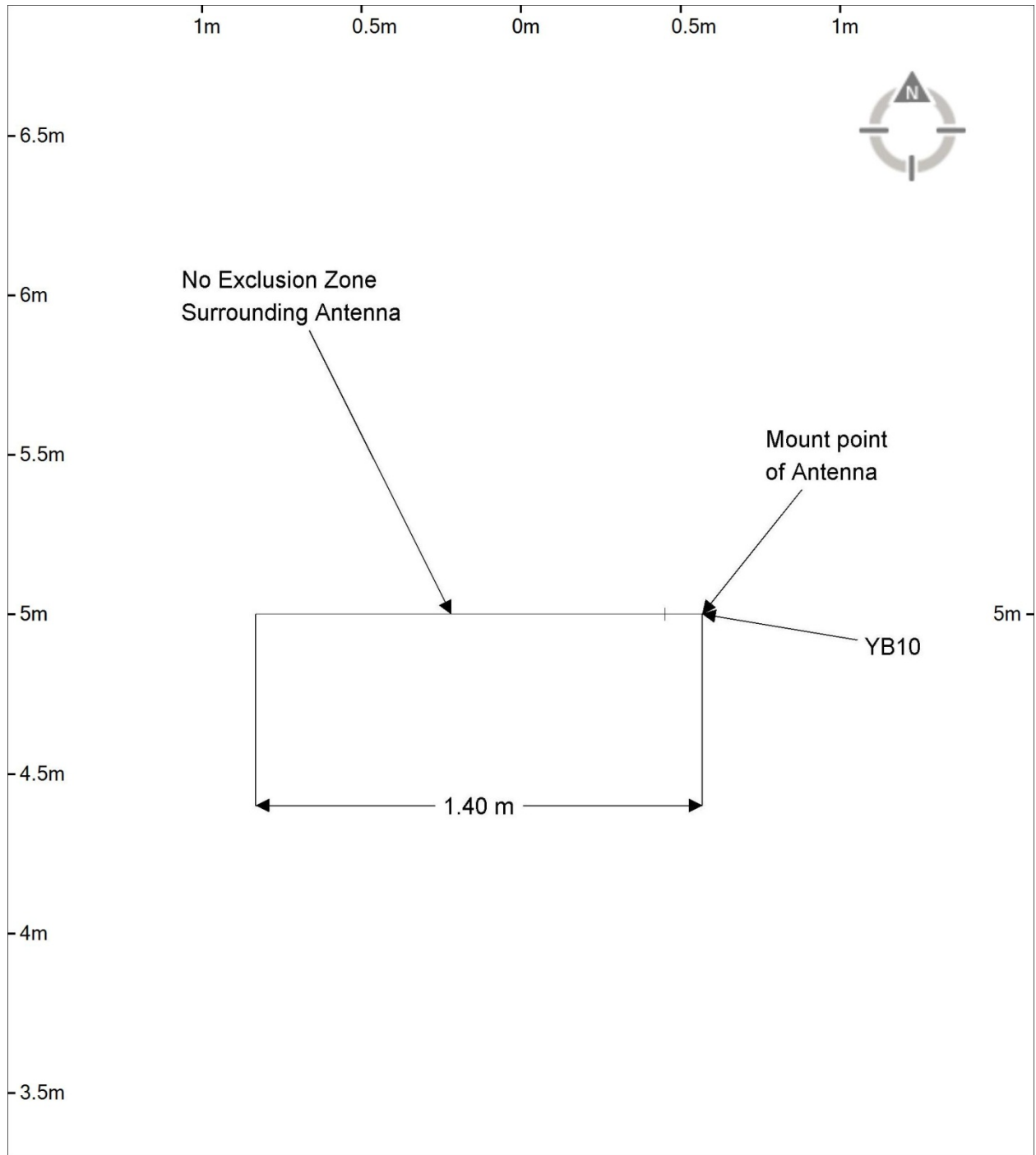
Figure 1 Plan View – YB10-65 @ 0.042W



■ Areas above RPS3 public limits

■ Areas above RPS3 occupational limits

Figure 2 Elevation View – YB10-65 @ 0.042W



 Areas above RPS3 public limits

 Areas above RPS3 occupational limits

APPENDIX A – References

ARPANSA (2002). Radiation Protection Standard - Maximum Exposure Levels to Radiofrequency Fields - 3 kHz to 300 GHz, Chief Executive Officer of ARPANSA.

AS/NZS (2011). Radiofrequency fields Part 2: Principles and methods of measurement and computation - 3 kHz to 300 GHz. AS/NZS 2772.2:2011. Australia, Standards Australia.

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Central Coast
Gold Coast
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Terrestrial
Freshwater
Marine and coastal
Research and monitoring
Wildlife Schools and training

Heritage management

Aboriginal heritage
Historical heritage
Conservation management
Community consultation
Archaeological, built and landscape values

Environmental management and approvals

Impact assessments
Development and activity approvals
Rehabilitation
Stakeholder consultation and facilitation
Project management

Environmental offsetting

Offset strategy and assessment (NSW, QLD, Commonwealth)
Accredited BAM assessors (NSW)
Biodiversity Stewardship Site Agreements (NSW)
Offset site establishment and management
Offset brokerage
Advanced Offset establishment (QLD)