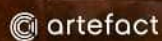


Davis Road Data Centres UG 132kV Cables Draft Review of Environmental Factors

Report to AUSCONNEX

30 May 2025



Artefact Heritage and Environment

ABN 73 144 973 526

Suite 56, Jones Bay Wharf

26-32 Pirrama Road

Pymont NSW 2009

Australia

+61 2 9518 8411

office@artefact.net.au

Document history and status

Revision	Revision type	Reviewed by	Approved by	Approved	Date issued
1	First draft (Internal)	Clinton Jurd (CJ)	CJ	05/12/2024	05/12/2024
2	Second draft (Internal)	CJ	Josh Symons	05/12/2024	10/12/2024
3	Draft (client review)	CJ			11/12/2024
4	EE review	Jason Chan			27/03/2025
5	Amendments	CJ	CJ	08/04/2025	09/04/2025
6	Amendments (to include comment responses)	CJ		24/05/2025	26/05/2025
7	Final EE review amendments	Susan Parrat (EE)		29/05/2025	30/05/2025

Last saved:	09 April 2025
File name:	UIL1964_SYD067_REF_finaldraft_250402.docx
Project name:	Davis Road Data Centres UG 132kV Cables REF
Author:	Clinton Jurd
Project manager:	Clinton Jurd
Project number:	240404
Name of organisation:	Artefact Heritage and Environment
Document version:	Final Draft

© Artefact Heritage and Environment

This document is and shall remain the property of Artefact Heritage and Environment. This document may only be used for the purposes for which it was commissioned and in accordance with the Terms of the Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

Disclaimer: Artefact Heritage and Environment has completed this document in accordance with the relevant federal, state and local legislation and current industry best practice. The company accepts no liability for any damages or loss incurred due to reliance placed upon the document content or for any purpose other than that for which it was intended. Contains potentially sensitive Aboriginal heritage and personal information that should be censored if published.

EXECUTIVE SUMMARY

Background / Justification

Artefact Heritage and Environment have been engaged by AUSCONNEX to carry out a Review of Environmental Factors (REF) environmental assessment of the proposed activity to construct and operate new dual circuit (two) underground (UG) 132 thousand-volt (kV) electricity transmission feeders or power cables. The new 132kV cables will supply electricity for the operation of the proposed Davis Road Data Centres at Wetherill Park, within the Fairfield local government area.

The State Significant Development (SSD) (Assessment Application Number SSD-59416728) Davis Road Data Centres will comprise two, three-storey data centre buildings, a two-storey tape storage building and high voltage substation connecting to the proposed 132kV power cables. The Data Centre is a proposed redevelopment of an existing distribution centre site. The maximum power consumption of the Data Centres will be approximately 180 mega-volt-amperes (MVA). The electricity distribution network in the area and specifically the existing 11kV high voltage electricity distribution along Davis Road has inadequate capacity to provide electricity supply to the proposed new Data Centres development.

The Activity

The proposed activity being assessed involves the construction and operation of dual circuit 132kV UG power cables. The new power cables will traverse approximately 1.6 kilometres (km) from the existing Endeavour Energy Wetherill Park Zone Substation (Zone Substation), located at Walter (Redfern) Street, Wetherill Park, NSW (Lot 3, DP584227), to the high voltage substation (not assessed herein) proposed at the western end of the Davis Road Data Centres site at 3 Davis Road, Wetherill Park (Lot 1 DP 864615). The new cables are proposed to traverse generally parallel each other along the paved carriageways and parking lanes of developed roads and undercrossing developed roads, including Redfern Street (Walter Street), Hassall Street, Widemere Road and Davis Road. A combination of open trench and underbore construction methods will be utilised, including underbore of the Liverpool-Parramatta Transitway near the eastern end of Davis Road and underbore of other underground infrastructure assets.

Activity Alternatives

Due to the anticipated 180MVA Data Centres load, there are limited feasible electricity supply options. The “do-nothing” and “demand management” options will not fulfil the objective of providing the significant electricity supply reliability for the proposed Data Centres development. Traditional network options that would include high voltage electricity distribution, such as 11kV 22kV and lower voltage electricity transmission such as 33kV and 66kV cannot efficiently meet the high electricity load and reliability demand of the Data Centres. Dedicated high voltage 132kV electricity transmission supply is required to efficiently deliver adequate and reliable electricity supply to meet the Data Centres load demand.

The nearest 132kV substation is the Wetherill Park Zone Substation. The Wetherill Park Zone Substation is 1.6kms from the Data Centres via the most direct route. The next nearest 132kV zone substation, the West Wetherill Park Transmission Substation, is approximately twice the distance from the Data Centres at 2.3km directly east northeast (ENE) of the Data Centres and further by the shortest potential UG electricity transmission cables routes due to various route constraints.

Three UG electricity transmission cables route options were considered from the Wetherill Park Zone Substation to the Data Centres. The preferred routes along Redfern (Walter) Street, Hassall Street, Widemere Road and Davis Road was identified as the most feasible. Whilst being of similar distance, other route options presented a range of more onerous or significant constraints.

Statutory Planning and Legislation

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the primary legislation regulating land use planning in NSW. It provides the framework for the development of state and local planning instruments which, through their hierarchy, determine the statutory process for environmental impact assessment. This activity satisfies the definition of an activity under Part 5 of the EP&A Act, because it:

- may be carried out without development consent
- is not exempt development, and
- would be carried out on behalf of a determining authority and requires the approval of a determining authority.

Under Part 5 of the EP&A Act, activities require a determining authority to consider all matters affecting or likely to affect the environment by the proposed activity. AUSCONNEX, as a Level 3 Accredited Service Provider (ASP) is providing electricity network design services. Endeavour Energy is the Determining Authority under Division 5.1 of the EP&A Act, it being the Authorised Network Operator (ANO) under the *Electricity Network Assets (Authorised Transactions) Act 2015*. Endeavour Energy is deemed to be carrying out development for the purposes of an electricity transmission or distribution network (within the meaning of State Environmental Planning Policy [Transport and Infrastructure] 2021) to be operated by the authorised network operator. Endeavour Energy is prescribed as a public authority under s198 of the *Environmental Planning and Assessment Regulation 2021* (EP&A Reg). The proposed electricity network assets will be assigned or “gifted” to Endeavour Energy, the electricity distribution network service provider (DNSP) upon electrification.

Environmental Impact Assessment

This assessment has been prepared in accordance with Part 5, Division 5.1 of the EP&A Act to assess the environmental impacts associated with the construction, operation and maintenance of the UG electricity cables. The assessment has examined and fully considered all matters possibly affecting or likely to affect the environment by reason of the activity.

Several potential environmental impacts associated with the activity have been avoided or reduced to acceptable levels through the design development and assessment stages. However, aspects of the activity may still result in some impacts including temporary noise, traffic and air quality impacts, waste generation, and minor visual amenity affects during construction. This assessment identified that, albeit temporary, traffic and access is an important aspect requiring effective impact mitigation during construction. Management and mitigation measures to alleviate traffic and access and other associated potential impacts have been developed as part of this assessment and would be implemented during construction and operation of the activity.

Considering the assessment of the impacts detailed in this assessment, it is concluded that the proposed activity is not likely to have a significant impact on the environment. On balance, the activity is justified on the basis it supports the Data Centres development, maintains and supports Endeavour

Energy's electricity network across the broader area, and minimises potential environmental impacts which are generally restricted to construction impacts.

CONTENTS

EXECUTIVE SUMMARY.....	iii
1.0 Introduction.....	1
1.1 Purpose of the Review of Environmental Factors	1
1.2 Context and Justification for the Activity.....	1
1.3 Activity Objectives	1
1.4 Feeder Routes.....	2
2.0 Description of the Activity.....	7
2.1 Scope of Works	7
3.0 Consultation.....	15
3.1 Overview.....	15
3.2 Statutory Notification Requirements.....	15
4.0 activity Alternatives	19
4.1 Assessing Alternative Options.....	19
4.2 Do Nothing (Maintain Current Supply Infrastructure)	19
4.3 Demand Options.....	19
4.4 Distribution or Lower Transmission Voltage Supply Options	19
4.5 Network options	19
4.6 Related Activities	20
5.0 Environmental Legislation	21
5.1 <i>Environmental Planning and Assessment Act 1979</i>	21
5.2 Environmental Planning Instruments.....	22
5.3 Key Legislation	23
6.0 Environmental Assessment.....	28
6.1 Traffic and access	28
6.2 Noise and vibration.....	32
6.3 Water Quality and Hydrology	37
6.4 Geology and Soil	41
6.5 Waste.....	43
6.6 Air quality	45
6.7 Flora and fauna	48
6.8 Aboriginal heritage.....	51
6.9 Non-Aboriginal heritage.....	54
6.10 Contamination.....	56
6.11 Electric and magnetic fields.....	59
6.12 Visual and aesthetics.....	64
6.13 Bush fire.....	66

6.14	Landuse	68
6.15	Social and Economic	70
6.16	Cumulative Impacts	71
6.17	Summary of Environmental Mitigation Measures	74
7.0	Ecologically Sustainable Development.....	80
7.1	Precautionary Principle.....	80
7.2	Principle of Inter-Generational Equity.....	81
7.3	Principle of Biological Diversity and Ecological Integrity	81
7.4	Improved Valuation of Environmental Resources	81
8.0	Environmental Management	83
8.1	Introduction	83
8.2	Construction Environmental Management Plan.....	83
8.3	Implementation of the CEMP	84
9.0	Consideration of Environmental Factors	86
10.0	Conclusions and recommendations	88
11.0	References	89
	Appendices	91

FIGURES

Figure 1: The location of the activity in the regional context	3
Figure 2: The proposed underground cables indicative routes shown in yellow in the local context (see Appendix 1)	5
Figure 3: View east through north to west along Davis Road with the Davis Road Data Centres site at right	6
Figure 4: Registered AHIMS sites nearest the routes	52

TABLES

Table 1: Engagement with relevant stakeholders (also see Table 3).....	17
Table 2: Matters of national environmental significance consideration	24
Table 3: Licences, permits, approvals and notifications (also see Table 1 and Appendix 3)	27
Table 4 Traffic and access impact mitigation measures.....	31
Table 5: Noise and vibration mitigation measures	34
Table 6 Water quality and hydrology impact mitigation measures.....	39
Table 7 Construction and operation geology and soil impact mitigation measures	42
Table 8 Impact mitigation measures for waste materials	44
Table 9 Construction and operation air quality impact mitigation measures	46
Table 10 Impact mitigation measures for flora and fauna for all phases of the activity	49
Table 11 AHIMS sites recorded proximal the routes, including their proximity to the routes, current site status, and likelihood of harm due to the activity (see Figure below)	52
Table 12 Impact mitigation measures for Aboriginal heritage	53
Table 13 The nearest historic heritage listed items identified from 550m and further southwest and south of the routes.....	54
Table 14 Impact mitigation measures for Historic heritage	55
Table 15 Impact mitigation measures for contamination.....	57
Table 16: Magnetic field Reference Levels at 50Hz for IEEE and ICNIRP.....	61
Table 17: EMF mitigation measures	63
Table 18 Visual impact mitigation measures.....	65
Table 19 Impact mitigation measures for bush fires	66
Table 20: Land uses adjacent to the proposed routes (also see Appendix 2).....	68
Table 21: Land use mitigation measures	69
Table 22 Social and economic mitigation measures	70
Table 23 Cumulative impacts mitigation measures.....	72
Table 24. Summary of Environmental Impact Mitigation Measures.....	74
Table 25 <i>Environmental Planning and Assessment Act 1979</i> , Section 5.5 requirements	86
Table 26. <i>Environmental Planning and Assessment Regulation 2021</i> , Clause 171 checklist....	86

1.0 INTRODUCTION

1.1 Purpose of the Review of Environmental Factors

Artefact Heritage and Environment have been engaged by AUSCONNEX to carry out a Review of Environmental Factors (REF) for the activity to construct, operate and maintain two new (dual circuit) underground (UG) one-hundred and thirty-two-thousand-volt (132kV) electricity transmission feeders or power cables (see Appendix 1). This assessment considers the potential environmental impacts associated with the proposed activity. The significance of impacts has been considered, and appropriate impact mitigation measures recommended as required. Endeavour Energy's determination of the activity under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as an Authorised Network Operator or ANO is required prior to the activity proceeding.

1.2 Context and Justification for the Activity

The activity is required to provide reliability of electricity supply for the operation of the proposed Davis Road Data Centres (Cundall) at Wetherill Park, within the Fairfield Local Government Area (LGA). The two Data Centres are proposed within the Wetherill Park Industrial Area and are the subject of State Significant Development (SSD) Assessment (Application Number SSD-59416728) (Willowtree Planning, 2024) (SSD). The Data Centres development is a proposed redevelopment of an existing distribution centre site. At the time of writing, the SSD application was at the assessment stage and has since progressed to being determined. The proposed Data Centres development comprises two three-storey data centre buildings, a two-storey tape storage building and a high voltage substation into which the proposed new 132kV cables will connect from the nearby Endeavour Energy Wetherill Park Zone Substation.

The Data Centres require up to approximately one hundred and eighty mega-volt-amperes (180MVA) of electricity supply which can only be efficiently provided at 132kV. The existing electricity distribution network in the area, that currently traverses Davis Road to supply other businesses, neither has the spare capacity nor could it be upgraded or augmented to provide the high electricity load demand of the proposed new Data Centres development.

1.3 Activity Objectives

The objective of the activity is to construct, operate and maintain new dual circuit underground 132kV power cables from the Wetherill Park Zone Substation to the Data Centres to provide reliable electricity supply to the Data Centres.

The electricity supply reliability for the Data Centres must meet Endeavor Energy's licensing requirements, including to provide N-1 redundancy or supply reliability for the forecast load, whilst not otherwise compromising the supply reliability to other surrounding customers.

N-1 electricity supply reliability or redundancy ensures electricity network supply is maintained in the event of electricity network equipment failure. In this instance this would mean electricity supply would be maintained should there be an unexpected cable failure for any reason, or where planned maintenance is required. Other objectives of the activity are to:

- comply with relevant laws and standards
- meet relevant duty of care requirements
- meet obligations to plan for and supply reliable electricity
- maximise social, economic and environmental benefits, and

- minimise environmental, social and cultural impacts.

1.4 Feeder Routes

This assessment is based on the AUSCONNEX Proposed Method of Supply (PMOS) sketch or preliminary design (see Appendix 1). The proposed routes through the Smithfield-Wetherill Park Industrial Area at Wetherill Park include:

- The northern through eastern area of the Wetherill Park Zone Substation property located at Walter (Redfern) Street, Wetherill Park, NSW (Lot 3, DP584227)
- the northwestern area of the proposed Davis Road Data Centres property at 3 Davis Road, Wetherill Park (Lot 1, DP 864615)
- local connector roads including:
 - Walter (Redfern) Street
 - Hassall Street
 - Widemere Road, and
 - Davis Road.

The assessment study area is considered the area of the activity and the limited surrounding environment that could be directly or indirectly affected by the activity. Based on the scope and extent of the activity, a buffer area not generally extending beyond the road reserve boundaries and extending into the affected Zone Substation and Data Centres properties is considered appropriate unless otherwise stated.

The study area includes the various Fairfield City Council local roads, the properties at either end of the activity (underground cables) routes, and associated assets, natural or otherwise, that could be impacted by construction activity or the operation of the activity. Those aspects where there is potential for wider impacts due to a lack of physical boundaries or the nature of the activities aspects and impacts to extend beyond the area of the activity are also considered. These may include though not be limited to:

- land use
- climate change
- air quality
- hydrology
- waste disposal
- fauna and flora
- visual aesthetics, and
- social and economic impacts.

Figure 1 and Figure 2 below show the location of the activity at Wetherill Park in the regional and local context. The activity is located south of Prospect Reservoir, within the Smithfield-Wetherill Park industrial commercial area in the Deerubbin Local Aboriginal Land Council (LALC) area. The Smithfield-Wetherill Park Industrial Estate is the largest industrial estate in the southern hemisphere and is the centre of manufacturing and distribution in Greater Western Sydney.

The activity is located about 28 kilometres (km) west of the Sydney CBD, 7km south of the Blacktown CBD and 5.5km northwest of the Fairfield CBD within the Fairfield City Council LGA. Prospect Reservoir is located approximately 1.2km north of the activity. Site photographs along the routes and immediate surrounds taken late September 2024 are included at Appendix 2.

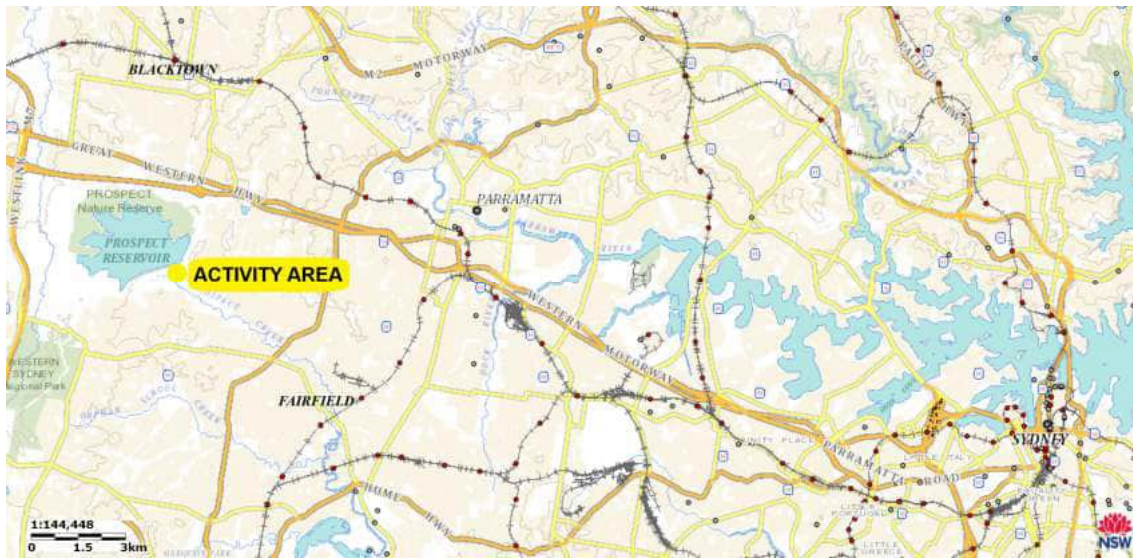


Figure 1: The location of the activity in the regional context

From its eastern extent originating in the Wetherill Park Zone Substation, the routes traverse north along each paved roadside of Redfern Street. Continuing east and then southeast along each paved roadside of Hassall Street into and along each paved roadside of Widemere Road. To then veer west and continue along each paved roadside Davis Road to the western end of the Data Centres property. The circuit or cable known as Alignment 1 is proposed (shown red in Appendix 1) to exit nearest the northern boundary of the Wetherill Park Zone Substation to traverse the eastern paved roadside of Redfern Street, the southern paved roadside of Hassall Street, the eastern paved roadside of Widemere Road and the northern paved roadside of Davis Road to enter the western end of the proposed Data Centres property. The circuit or cable known as Alignment 2 (shown yellow in Appendix 1) exits the Wetherill Park Zone Substation adjacent to the south of the Alignment 1 cable to cross and traverse the western paved roadside of Redfern Street. Then continuing along the northern paved roadside of Hassall Street. Then continuing along the western paved roadside of Widemere Road. Then continuing along the southern paved roadside of Davis Road to enter the western end of the proposed Data Centres property adjacent to the east of the Alignment 2 cable.

The roads and the two properties traversed by the activity are within the Wetherill Park Industrial Commercial area *E4 General Industrial* land use zone of the *Fairfield Local Environmental Plan 2013* (Fairfield City Council 2024). The objectives of this land use zone include:

- To provide a range of industrial, warehouse, logistics and related land uses
- To ensure the efficient and viable use of land for industrial use
- To minimise any adverse effect of industry on other land uses
- To encourage employment opportunities
- To enable limited non-industrial land uses that provide facilities and services to meet the needs of businesses and workers
- To ensure development is not likely to detrimentally affect the viability of nearby business centre.

The routes roads are Fairfield City Council local roads. The roads function as direct connector roads into and through the Smithfield-Wetherill Park Industrial Area from the northeast. To the north Widemere Road becomes Widemere Road – Reconciliation Road – Prospect Highway to provide access to Bellevue, Prospect and Blacktown, and the M4 Western Motorway. The various roads are subject to high traffic volumes, particularly during business hours on weekdays and Saturdays including a mix of passenger vehicles as well light through, medium and heavy-duty vehicles. Maintaining twenty-four-hour vehicle access to businesses and parking along the routes will be a key factor of the works management to minimise impacts.

Davis Road, Hassall Street and Redfern Street are two direction single lane roads with vehicle parking lanes along either roadside. Widemere Road doesn't provide outside parking lanes, however there is a truck parking area along its eastern side near opposite the Hassall Street intersection. Appropriate construction notification and traffic management will be important to minimise construction impacts (see 2.1 Scope of Works and Traffic and access).

The routes feature a variety of small to medium and large commercial and industrial businesses operating from a range of factory units and larger office/warehouse type buildings.

The routes feature numerous existing services or utilities, the majority of which are UG. These UG utilities have been considered through the design process to minimise disruption and impacts to services. The Parramatta to Liverpool Transitway crosses the routes at the eastern end of Davis Road. Underbore construction is proposed to under cross this roadway to avoid impacts. Notification and consultation is underway with the various utility asset owners and operators (see 3.0 Consultation).

Any alteration or deviation to the design and construction methodology from the provided PMOS sketch or preliminary design (see Appendix 1) as considered herein may require further assessment.

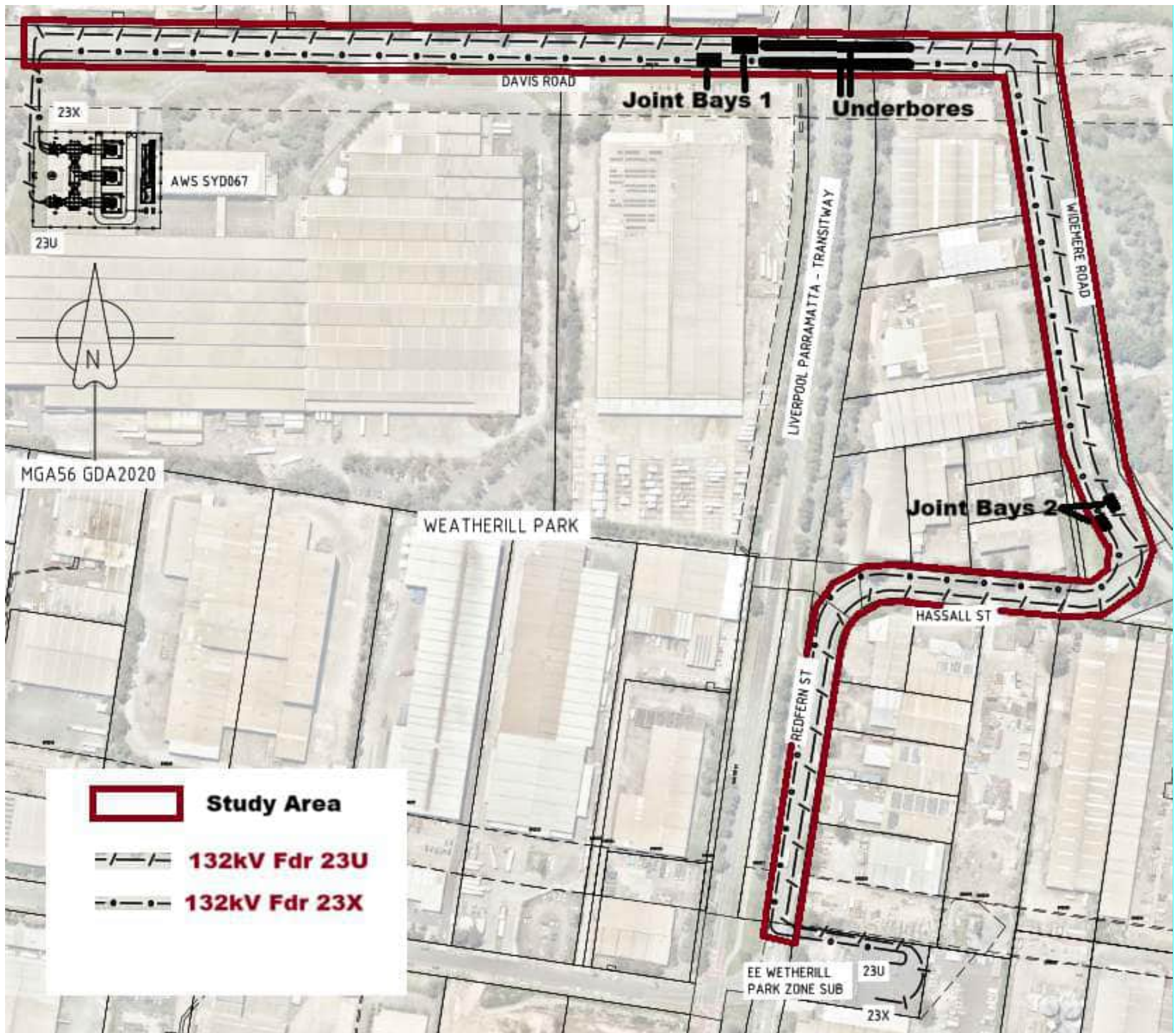


Figure 2: The proposed underground cables indicative routes shown in yellow in the local context (see Appendix 1)



Figure 3: View east through north to west along Davis Road (Davis Road Data Centres site at right opposite)

2.0 DESCRIPTION OF THE ACTIVITY

2.1 Scope of Works

The activity involves the construction and operation of two (dual circuit) new underground 132,000-volt (132kV) power supply cables or underground cables along several roads from the existing Wetherill Park Zone Substation (Zone Substation) to supply the proposed new Davis Data Centres. The new underground cables are proposed to traverse approximately 1.6km generally parallel each other along and crossing existing developed roads (see Figure 1, Figure 2, Figure 3, Appendix 1 and Appendix 2). The cables will generally be aligned along the outer paved carriageways and parking lanes of developed roads and will cross developed roads at intersections. The new Data Centres facility that is proposed to be constructed is currently subject to SSD assessment Davis Road Data Centres (Cundall) (Application No. SSD-59416728).

2.1.1 The anticipated construction activities would include:

- establishing structures, such as temporary construction fencing, hoarding and signage
- installing pre-construction mitigation measures, such as erosion and sediment water quality controls, and fencing and or signposting sensitive areas
- relocating utilities, services and signage
- concrete/asphalt saw cutting and recycling of concrete or asphalt pavement where possible
- establishing temporary site compounds/storage/lay-down areas
- excavating cable trenches
- laying and installing conduits and backfilling
- underboring or horizontal directional drilling and conduit pulling
- pulling cables through conduits
- cable joining
- dewatering
- testing and commissioning
- pavements and road reinstatement and permanent restoration
- rehabilitating topsoil and re-vegetating
- restoring works/storage areas (general site clean-up, removing site compounds, temporary construction facilities and temporary environmental controls).

2.1.2 Materials and equipment

There may be approximately 30 to 50 personnel engaged in construction, depending on the number of works sites that may be underway either concurrently or in a staggered or staged manner. The following equipment and materials that may be used on site includes though are not limited to:

- large rock breaking equipment
- large and small excavators
- grader
- concrete form work

- directional borer with slurry cart
- horizontal underbore machine
- crane
- truck mounted borer
- truck mounted augers and cranes
- trucks for material transport including soil, concrete and cable
- passenger vehicles and utility vehicles
- saw cutting machine with vacuum and transport utility
- cable winch (for high voltage)
- portable / roller compactor
- compressor
- traffic control vehicles
- fire suppression
- power generator
- water pump
- construction fencing
- street sweeper vehicles
- dust suppression vehicles
- water tankers
- skip bins
- tipper
- site and compound sheds
- temporary construction facilities, and
- associated minor construction equipment.

Materials that may be required for the activity include though are not limited to:

- asphalt and concrete
- sheet metal or timber boards for shoring trenches, underbore entry/exit points, and joint bay walls
- conduits, power cables, and communication cables
- polythene membrane
- ladders and scaffolding
- imported soil, engineered thermally stable fill, and topsoil
- underbore drilling lubricant fluid
- energy sources such as fuel, fuel oils and gas, and lubricants
- pollution prevention/response materials.

It is not considered that any of the resources required for the activity to proceed to construction and operation are or are likely to be in short supply because of the activity.

2.1.3 Fencing and signage

Temporary construction fencing or barricades are typically installed to secure construction areas as works progresses along the route. During construction, signage would be displayed in accordance with WHS Regulations for construction sites. This would include danger and protective equipment signs.

Temporary fencing or barricades would be installed around the temporary staging or storage and stockpile areas to secure these areas during the activity.

All temporary fencing and barricades would be removed, and the areas appropriately restored at the completion of construction activities.

Permanent fencing will be maintained at the Zone Substation and installed at the proposed Data Centres to prevent unauthorised access to the new cable connection switch yard areas.

2.1.4 Temporary environmental controls

Temporary environmental controls would be required and installed during the construction phase of the activity to mitigate potential environmental impacts as detailed and summarised in Environmental Assessment. Controls for the activity to mitigate potential impacts, such as in relation to erosion and sediment pollution, noise emissions and traffic disruption would be implemented and maintained where appropriate. These controls would be removed or cease once construction is complete.

2.1.5 Underground conduits and cables

The new cables installed in plastic conduits are proposed to be constructed paralleling each other at varying separations generally greater than and not less than 3 metres (m) along the various roads routes. Except for the cables ends within the Wetherill Park Zone Substation and Davis Road Data Centres, the cables will traverse the outside parking lanes of the paved carriageways of the various Fairfield City Council local roads and crossing the various intersections along the routes, including under crossing by underbore the bus rapid transit infrastructure Liverpool to Parramatta Transitway NSW classified state road (LPT). Underbore construction may be used to install conduits for cables in conduits under or over existing utility assets such as near gas mains and water mains. Easements must be obtained over the cable end sections that traverses into the Davis Road Data Centres property. It is understood that easement negotiations have commenced and are ongoing.

Each of the two underground powerlines that will transfer or conduct electricity at 132kV comprise three independent single core cables each installed in a polyvinyl chloride (PVC) conduit. Additional smaller earthing, monitoring, and control cables are also installed in additional PVC conduits with the 132kV cables.

Surface materials such as asphalt, concrete, grass and landscaping vegetation are expected to be removed to expose the underlying ground. Generally, soil to an approximate width of 600 millimetres (mm) and a depth of 1330mm would be removed for open trench construction. Where unsuitable for backfilling, excavated soil or spoil would be transported and disposed off-site to a facility licensed to accept this type of waste following testing. Any spoil requiring on site storage should be kept in trucks or portable skips rather than being deposited on the ground, subject to the recommendations of this assessment and the subsequently developed and approved CEMP. Reinstatement and permanent restoration of affected areas would be undertaken in consultation with the relevant authorities, including Fairfield City Council, Transport for NSW (TfNSW), and other relevant property owners/managers and utility asset owners and managers.

2.1.5.1 Installation of underground powerlines

Construction for the activity involves a combination of traditional open trench excavation and horizontal directional drilling (HDD) to install cable conduits generally along the outer paved surface of the roadways. The cables are then pulled through the underground conduits in sections from the various joint bays, joined, tested, and commissioned.

2.1.5.2 Open Trenching

Trenches are 600mm wide by 1330mm deep. Trenching works typically progress in short lengths of between 50 to 100 m (per crew) being opened or trenched at a time, potentially with more than one crew working concurrently or simultaneously at different locations to minimise traffic disruption. The trench is dug using an excavator except where cables may need to pass over or under existing underground services. Non-destructive digging utility location techniques and underbore may be applied at such locations to avoid underground utilities (2.1.5.3 Underbore). The conduits are typically laid in the trench in an inverted trefoil arrangement.

Once each segment of trench and conduit installation is completed, it is backfilled with thermally stable backfill to above the conduits and either compacted soil excavated from the trench alignment (if deemed suitable) or new backfill placed above that. Temporary and permanent restoration will also be carried out following backfilling. Thermally stable backfill is typically placed around the cables to provide ideal thermally conductive operating conditions for the cables. The next excavation segment is then opened along this route section as the trench and conduit installation process continues.

Once conduits have been installed along the entire route, cables are pulled through in various lengths depending on joint bay locations and cable lengths. The cables are winched from cable drums (on a truck or trailer) through the conduits from one joint bay to the next. Cable pulling pits (commonly referred to as caterpillar holes or cat-holes) may be required between joint bays (depending on the cable section length, the number of bends and their radii in that section) to assist installation of the cable in each section. Each section of cable can take up to approximately two weeks to install and join to the next, meaning joint bays will be temporarily opened and closed during this period.

Temporary road reinstatement or restoration would typically take place after the trench has been backfilled to minimise any environmental or traffic impacts. Final restoration is typically undertaken after the cables have been joined, tested, and commissioned. Carrying out final reinstatement after commissioning avoids excavation that may be required if testing and commissioning identifies a cable fault. The construction activity footprint width will vary, typically from not more than one lane wide along typical trench sections to wider at joint bay and underbore entry and exit locations.

2.1.5.3 Underbore

Underbore (also known as horizontal directional drilling or HDD) construction would be required to install the conduits at various locations along the proposed routes. The underbore paths would be generally 3m or more below the ground surface, with detailed survey and design including dial before you dig queries and consultation with the relevant utility owners and managers to ensure adequate clearance to other assets and avoid frac-out or interference with other assets.

Underbore construction is proposed where open trenching is not practical or feasible due to critical infrastructure use requirements or where existing underground utility assets must be avoided or are at greater depth than open trenching will practically or safely permit. Detailed underground services searches and design, and ongoing consultation with utility asset owners will precede construction. The specific design and construction related requirements of the various utility asset owners will be considered and generally satisfied to ensure existing utilities are not damaged or otherwise compromised. Underbore construction is proposed:

- at the eastern end of Davis Road under the bus rapid transit infrastructure LPT
- other potential locations where existing utility constraints require.

Underbore construction enables the installation of conduits along a prescribed route with minimal to nil impact on the ground surface and the surrounding environment including existing underground utility assets. Ground disturbance is required the bore hole entry and exit pits at either end of the underbore bore path. Underbore is generally carried out in stages, including:

1. underbore design [that is typically subject to the relevant utility asset owner review, comment and approval]
2. boring or drilling of a pilot bore hole which uses a directional drill bit that can be directed or controlled along the pre-determined bore path from the underbore entry pit to the underbore exit pit
3. staged back-reaming or back-boring to expand or open the borehole out to an appropriately larger diameter along the pre-drilled route to accommodate the various cable conduits, and
4. pulling conduits through the expanded borehole (cables are pulled through subsequently during the cable pulling stage).

Entry and exit pits are typically approximately 2m long by 2m wide and 2m deep and positioned at the end of open trench sections. Like joint bays, cover plates are typically used where required to temporarily cover entry and exit pits during construction.

The underbore drilling and lubricant fluid recycling unit would typically be located at the entry pit end of the underbore and may require noise barriers, potentially if out-of-hours works are proposed, noting the lack sensitive receivers such as residences along the routes. Depending on the underbore path length, conduits are typically welded together prior to being pulled through the expanded final diameter borehole.

A drilling fluid is used for the pilot hole drilling, the subsequent back-reaming or expanding of the bore hole diameter, and the conduit installation processes. Drilling fluid comprises a water-based carrier fluid and drill additives such as Bentonite and various polymers. The drilling fluids:

- help suspend and reduce friction, and cool the bore, cutting drill and back-ream heads as they proceed along the bore path
- seal the hole to prevent flow into the surrounding ground formation
- minimise the risk of frac-outs or breakouts by maintaining fluid circulation and carrying solids out of the bore hole
- stabilise the under bore by providing positive hydrostatic pressure, and
- reduce friction during conduit installation.

2.1.6 Joint bays, cable pulling pits, ancillary pits and cable installation

Two joint bays are proposed along the route of each cable to join the sections of cable to make a continuous conductor or cable. Currently proposed along Widemere Road and Davis Road near adjacent each other, the joint bays would be approximately 10 m long by 2 m wide by 1.5 m deep. Whilst shown indicatively in the PMOS Sketch (Appendix 1), the final locations of joint bays would be confirmed during the detailed design stage.

‘Pre-cast’ joint bays are preferred over on-site formed joint bays, as on-site formed joint bays require additional construction site time to complete. Construction of pre-cast joint bays typically requires approximately three days of site works. Formed on-site joint bays typically require two to three weeks to complete at each site.

Joint bays are generally covered with a steel road plate between excavation, cable pulling and cable joining works. A temporary enclosure is installed over each joint bay to protect the cables from environmental elements during cable pulling and joining procedures. Cable joining typically requires up to six weeks per join location and a generator may be required to supply electricity during cable joining activities.

Other pits to be installed include communication pits, temperature sensing pits and cable pulling pits. Temporary security fencing, road barricades and site containers may be installed around the sites to manage traffic, restrict unauthorised access and protect personnel working at the site. Cable joint bays are typically backfilled with sand and the roadway temporarily reinstated. Permanent road restoration would typically follow and be carried by council or an approved Council contractor.

Other associated infrastructure that would be constructed as part of the activity includes:

- communication pits, generally located in the roadside verge or footpath,
- Temperature sensing pits, generally located in the roadside verge or footpath,
- cable pulling machine pits, generally located near corners and bends, and
- link box pits, generally located near joint bays.

2.1.6.1 Proposed Data Centres Connection

The routes in the new Data Centres (Lot 1, DP864615) are proposed through the cleared exotic lawn/non-native species western end of the property to an onsite high voltage substation (HVSS) incorporating three (3) 132/22kV transformers and associated switching and control buildings. The HVSS is considered by SSD assessment for the Data Centres the not assessed herein,

2.1.7 Construction access, parking and site compounds

Construction activity, mostly including open trench excavation and limited underbore activity followed by cable installation will transition along the linear road alignments of the routes through the industrial commercial area, with existing road access suitable for carrying out the works. Construction traffic will access the designated works sites including the private properties at either end of the routes via the existing public roadways. The traffic management plan will consider and detail the requirements for the safe and continued use of the local road transport corridors during construction.

Based on the approximate number of 30 to 50 construction personnel required for the works, it is expected there will not be more than 20 construction vehicles required during works. Most of these vehicles will be passenger transport vehicles and several utility vehicles, and a small number of larger vehicles such as small to medium sized trucks for equipment and material delivery and pick-up.

A temporary storage or laydown area or areas that may feature basic amenities may be required and would be strategically located to balance the need for its relocation against minimising potential impacts associated with re-transporting materials and equipment to the transient works locations. The siting of temporary storage if required is expected to be determined during construction scheduling based on the detailed design and in consultation with the relevant contractor, Council and adjacent stakeholders. This would be reflected in the CEMP as required, to minimise potential impacts to sensitive receivers and allow for consultation and negotiation with occupiers of affected and adjacent properties. It is assumed for the purposes of this assessment that temporary storage will be sited in existing cleared areas where works are being carried out and will progress with the works. Equipment storage will not require vegetation removal, excavation or other works not considered by this assessment.

Each works compound is to be managed in accordance with:

- An approved site management plan or CEMP, which is to outline (and depict) all activities that will be undertaken at the site or sites, including for example material storage, waste storage, plant and equipment storage, fuels, oils, and chemicals storage and use, and erosion and sediment controls
- the relevant components of AUSCONNEX site inspection and workplace inspection checklists, which must be submitted to AUSCONNEX at appropriate reporting intervals, and
- Be subject to a pre and post dilapidation assessment reports submitted to AUSCONNEX prior to and following occupation.

2.1.8 Vegetation

The routes are proposed generally along paved the carriageways and parking lanes of the various developed road reserves and will not affect street trees or other significant vegetation, including tree root zones. Appropriate tree protection measures and the advice of an Arboriculturist may be required should the alignment be altered from that considered herein resulting in potential impacts to street trees, tree root zones or other significant vegetation. The route ends at the Wetherill Park Zone Substation and Data Centres properties traverse cleared areas generally featuring either gravel, pavement, landscape plantings or exotic lawn.

2.1.9 Utilities

Being proposed along busy roads within the mature developed and active Wetherill Park Industrial area, there are numerous existing underground utilities or services along the routes that parallel and or cross the alignment. These include:

- underground high-pressure gas mains
- underground water mains
- stormwater pipes
- sewer pipes
- electricity distribution cables
- traffic light cables, and
- numerous telecommunications cables.

A key aspect of the design process has been to identify and ensure the cables alignments eliminate the risk of impacts and potential disruption to existing utilities and services with an appropriate combination of open trench and underbore construction methodologies proposed. By utilising current services searches and consulting with the relevant utility owners and managers, the design process has ensured that the minimum separation or buffer distances have at least been applied.

2.1.9.1 Temporary utilities

Mains supply is generally preferred and is to be used by the contractor where available and safe to do so. It should be noted that that a temporary portable generator may be required for on-site construction activity electricity supply. The type, use and size of which would be specified by the contractor as part of their CEMP, including that it must be shut down when electricity supply is not required (see 6.0 Environmental Assessment).

2.1.10 Timing and working hours

The activity would commence in early to mid-2025, with the installation, commissioning, and restoration continuing for approximately 18 months to 2 years. The works are generally proposed during standard construction hours, i.e. 7am and 6pm Monday to Friday and 8am and 1pm on Saturday.

Whilst it is proposed to carry out construction during standard construction hours, given traffic is likely to be a key aspect requiring impact mitigation during construction, it may be necessary for out-of-hours works at some locations to appropriately mitigate traffic impacts. This will be determined during the traffic management plan development stage, with impact mitigation reflected in the environmental management plan. Traffic management planning and the environmental management plan will be developed in consultation with Fairfield City Council, Transport for NSW, adjacent businesses, and Endeavour Energy.

2.1.11 Easements and ownership

Easements, leases, licences and rights of way / carriageway over land are established to protect the future security and tenure of the electricity network asset, being the underground powerlines that will be gifted to Endeavour Energy upon commissioning. Endeavour Energy will be responsible for the ongoing operation and maintenance of the powerlines following commissioning.

An easement would not be required for the sections of the cable assets that will be located within public roads and existing electricity easements, noting sections of the routes traverse unreleased roads that will require easements to be established.

2.1.12 Dilapidation Assessment

Prior to the commencement of works, including prior to the establishment of temporary staging and storage sites, a pre-works dilapidation inspection should be carried out and documented to record the condition of all infrastructure and assets at and in the vicinity of the activity, including kerbs, footpaths, buildings and fences etc. Subject to owner consent, this may include a dilapidation inspection of the external and internal areas of private properties directly along the routes.

The dilapidation report is typically maintained as dated digital photographs and video records. Dilapidation inspections should also be carried out during the construction period as considered appropriate, and following completion of works including following temporary restoration and final restoration works.

2.1.13 Operation and maintenance requirements

Access to the underground cables would typically be necessary when some types of maintenance and repairs are required. The need for repairs is generally infrequent and would require excavation to provide access to the faulty cable. The cables will mostly be located beneath roadways which provides reasonable ease of access for inspection and repairs, noting that such works may cause some temporary traffic impacts surrounding such works.

Maintenance and operational activities generally associated with the cables may include though not be limited to unplanned fault and breakdown repairs and attendance for routine operational inspection and maintenance activities.

3.0 CONSULTATION

3.1 Overview

Consultation defines the processes an electricity network operator, including AUSCONNEX as an accredited service provider undertaking works on behalf of a Network Operator, should undertake to engage with and understand stakeholder views, provide information about proposed works, and seek stakeholder and general community feedback. Consultation can include a range of communication activities, such as:

- notification to:
 - the general community
 - specific community members
 - business owners and managers, and
 - relevant stakeholder infrastructure and utility asset authorities.
- community information displays
- print media notice
- online publication
- stakeholder meetings with individuals, community groups, businesses, authority representatives, and other stakeholders.

Consultation activities are intended to ensure a network developer, and their client are aware of potential community and stakeholder concerns so the activity can proceed in a timely manner with minimal or no impact on the community. The consultation that should be undertaken as part of the environmental assessment of this activity should meet the requirements of the *Code of Practice for Authorised Network Operators* (DPE 2015) (The Code).

Various aspects of the consultation regarding the activity may continue from concept through to assessment, detail design and construction, and as the new infrastructure is commissioned.

AUSCONNEX met with and discussed assessment and consultation requirements with Endeavour Energy (the ANO) prior to initiating the environmental assessment of the activity, and the assessment and consultation carried out in relation to the activity including REF environmental assessment reflects this ongoing consultation with the ANO.

Table 1 below details consultation undertaken to date and proposed regarding the activity and its assessment.

3.2 Statutory Notification Requirements

Under the *Electricity Supply Act 1995* (ES Act), a network operator, in this instance AUSCONNEX on behalf of Endeavour Energy (the Network Operator), is required to provide 40 days notification to the local council (Fairfield City Council) for proposed works (other than routine repairs or maintenance works) to provide the council the opportunity to comment on the activity.

Under the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP), Endeavour Energy is the determining authority for electricity developments under Part 5 of the EP&A Act. While the activity does not require the consent of Fairfield City Council, the T&I SEPP (Div 1, s 2.10, s2.11) requires 21 days notification to Council where works may impact upon roads or road

related infrastructure, or local heritage items. Works involving a substation also require 21 days notification to occupiers adjoining that land. In some instances, other public authorities need to be notified.

The activity will impact local Council roads during construction and potentially for maintenance, therefore Council has been notified of the activity. To reduce the potential for unexpected cumulative impacts and noting the activity is proposed to support the Davis Road Data Centres proposal, it is recommended that the NSW Department of Planning, Housing and Infrastructure (DPHI) be notified of the environmental assessment (**Table 1** and Appendix 3).

In accordance with the T&I SEPP and ES Act and noting the requirements of the Code, the stakeholders listed in Table 1 have and will be consulted regarding the activity and its assessment and are afforded the opportunity to provide comment or feedback. The feedback received will be noted and responded to appropriately regarding the design, construction and operation of the activity. Specific licences, permits and approvals that relate to the activity are also outlined in Table 3.

3.2.1.1 The Code of Practice for Authorised Network Operators

This activity is proposed to be assessed as a Class 4 Proposal in accordance with the requirements of Code. The routes traverse the Fairfield LGA through a single land use zone (E4 General Industrial) aside the LPT, therefore consultation has been undertaken with Fairfield City Council. Transport for NSW have also been consulted as the route under crosses the classified State LPT (SP2 Infrastructure land use zone).

Endeavour Energy is required by the Code to publish in a newspaper which circulates in the region of the activity location the detail of works proposed and associated impacts. Inviting members of the public to make submissions on the assessment of the activity. This draft assessment will also be published on the Endeavour Energy website. Details of any feedback received, and AUSCONNEX and Endeavour Energy's responses to this feedback, including any changes because of consultation feedback, will be included in the final environmental assessment, with copies of records of feedback and responses to the feedback included. Any publication of responses received should be mindful of maintaining the privacy of respondents. Table 1 details AUSCONNEX approach to the targeted assessment review consultation.

Pre-construction notification will be provided to potentially affected business adjacent the routes by letterbox drop. Notifying the affected business of the proposed activity and seeking comments to mitigate construction impacts prior to works commencing.

3.2.2 Other customer and stakeholder engagement

Because the routes traverse developed roads through an existing urban industrial commercial area, there are numerous underground and overhead utility infrastructure assets in service along the routes. Dial-before-you-dig searches and ground truthing have assisted to identify the numerous existing utility infrastructure asset owners and managers. AUSCONNEX have and continue to engage with these utility owners and managers to ensure the activity does not impact the various utility assets (see Table 1) by designing the activity to avoid impacts and ensuring construction can proceed without impacts.

Table 1: Engagement with relevant stakeholders (also see Table 3)

Stakeholder	Consultation requirement	Consultation carried out by or on behalf of, and timing	Purpose of consultation
Notification and consultation: Fairfield City Council (various local roads traversed and crossed)	ES Act	AUSCONNEX when designing and assessing the activity	To identify, review, consider and resolve matters associated with the construction of the activity in relation roads and related infrastructure assets. Design should meet roads authority engineering requirements relating to its infrastructure assets.
	T&I SEPP	The construction contractor prior to commencing construction works	To ensure prior and ongoing consultation with Council during construction process, noting applicable road occupancy license requirements
Notification/consultation and construction road occupancy license (ROL): Transport for NSW re Liverpool Parramatta Transitway (LPT) (under-crossed by the routes along Davis Road)	S138 - Roads Act 1993 T&I SEPP	AUSCONNEX when designing and assessing the activity	Design required to satisfy roads authority engineering requirements
		The construction contractor prior to commencing construction works	To ensure ongoing consultation with TfNSW during design and assessment, and throughout construction process
		The construction contractor during construction works	Construction contractor shall obtain TfNSW express approval and ROL prior to the under-crossing of LPT
LPT operator - Transit Systems NSW		AUSCONNEX when designing and assessing the activity	
		The construction contractor prior to commencing construction works	To ensure design and construction minimise impacts to public transport
		The construction contractor during construction works as required	

Stakeholder	Consultation requirement	Consultation carried out by or on behalf of, and timing	Purpose of consultation
Endeavour Energy		AUSCONNEX when designing and assessing the activity The construction contractor prior to commencing construction works The construction contractor during construction works as required	Obtain design/assessment approval prior to works commencing
Businesses etc. along and near the routes including Fairfield Sustainable Resource Centre (Council managed facility)	T&I SEPP	The construction contractor to provide construction notification prior to commencing construction works The construction contractor during construction works as required	Minimise potential impacts to businesses during construction
NSW Department of Planning		AUSCONNEX when designing and assessing the activity	Identify potential cumulative impacts and support/align with the Data Centres SSD application assessment
relevant Members of Parliament		AUSCONNEX when designing and assessing the activity	Minimise potential community concerns and ensure informed of activity should complaints be received
Utility infrastructure asset owners and managers	T&I SEPP	AUSCONNEX when designing and assessing the activity The construction contractor during construction works as required	Ensure no utility infrastructure asset impacts and meet utility owner/manager requirements regarding working near such assets and design implications

4.0 ACTIVITY ALTERNATIVES

4.1 Assessing Alternative Options

Noting the need for the Data Centres development that will be serviced by the proposed new underground powerlines, consideration was given to a range of route and construction methodology options. A summary discussion of the options review that was carried out is provided below.

4.2 Do Nothing (Maintain Current Supply Infrastructure)

The first option considered is the do-nothing option. This option involves no expenditure nor potential construction and operational impacts described and considered in this assessment. The do-nothing approach or option would not fulfil the objective for the development of the Data Centres. Specifically, the do-nothing option would not:

- increase the volume of data storage
- provide local data storage
- provide enhanced resilience through the distributed storage of data, and
- increase competition in the data storage market for the benefit of consumers.

The “do-nothing” option will not fulfil the objective of providing the significant electricity load demand and supply reliability for the proposed Data Centres development. Without the supply provided by the proposed activity, it is likely the Data Centres development would occur elsewhere, providing the associated social and economic benefits in another location.

Given the above, the ‘do nothing’ option is not considered a viable alternative.

4.3 Demand Options

Given the magnitude of the additional single point load demand of the proposed data, non-network demand management alternatives could not meet the significant Data Centres load required.

4.4 Distribution or Lower Transmission Voltage Supply Options

Due to the anticipated 180MVA Data Centres load, there are limited feasible electricity supply options. Traditional network options that would include high voltage electricity distribution, such as 11kV and 22kV and lower voltage electricity transmission such as 33kV and 66kV cannot efficiently meet the high electricity load and reliability demand of the Data Centres.

4.5 Network options

Dedicated high voltage 132kV electricity transmission supply is required to efficiently deliver adequate and reliable electricity supply to meet the Data Centres load demand.

The nearest 132kV substation is the Wetherill Park Zone Substation. The Wetherill Park Zone Substation is 1.6km from the Data Centres site via the most feasible direct roads route. The next nearest 132kV substation, the West Wetherill Park Transmission Substation, is approximately twice the distance from the Data Centres at approximately 2.4km directly east northeast (ENE) of the Data Centres and further by the shortest potentially feasible underground electricity transmission cables routes due to the various inherent route constraints of a developed urban industrial commercial area.

Three UG electricity transmission cables route options were considered from the Wetherill Park Zone Substation to the Data Centres property, including traversing along the LPT to Davis Road and accessing the Data Centres property with the underground cables along Frank Street and Kellaway Place through a private property at the cul-de-sac end of Kellaway Place. The preferred routes along Redfern (Walter) Street, Hassall Street, Widemere Road and Davis Road were identified as the most feasible considering the various inherent constraints. Whilst being of similar distance, other route options presented a range of more onerous or significant constraints relating to existing development and utilities, time consuming easement acquisition, and traffic and access management.

Route options assessment considered environmental attributes, electrical network requirements, design standards and guidelines, and likely community consultation and easement negotiation timing and costs.

4.6 Related Activities

Network development activity within the Endeavour Energy franchise area is typically related to other nearby development activity due to the interconnectedness of the electricity network. A single activity directly related to this activity is the Davis Road Data Centres (Cundall) development. This Data Centre development, that will be serviced exclusively by the activity being assessed herein is the subject of a current SSD Assessment (Application Number SSD-59416728) (Willowtree Planning, 2024). The activity being assessed herein will provide long term reliable electricity supply to the proposed Data Centres. Consultation as recommended herein should effectively mitigate any risks associated with this nearby related activity.

5.0 ENVIRONMENTAL LEGISLATION

The following section addresses the regulatory and statutory context of the proposed activity including its definition, land use permissibility, and compliance with the relevant environmental planning instruments (EPIs).

5.1 *Environmental Planning and Assessment Act 1979*

The EP&A Act is the primary legislation regulating land use planning in NSW. It provides the framework for the development of state and local planning instruments which, through their hierarchy, determine the statutory process for environmental impact assessment. This activity satisfies the definition of an activity under Part 5 of the EP&A Act, because it:

- may be carried out without development consent
- is not exempt development, and
- would be carried out on behalf of a determining authority and requires the approval of a determining authority.

Under Part 5 of the EP&A Act, activities require a determining authority to consider all matters affecting or likely to affect the environment by the proposed activity. AUSCONNEX, as a Level 3 Accredited Service Provider (ASP) are providing electricity network design services. Endeavour Energy is the Determining Authority under Division 5.1 of the EP&A Act, it being the ANO under the *Electricity Network Assets (Authorised Transactions) Act 2015*.

Endeavour Energy is carrying out development for the purposes of an electricity transmission or distribution network (within the meaning of State Environmental Planning Policy [Transport and Infrastructure] 2021) to be operated by the ANO. Endeavour Energy is a deemed public authority under Schedule 1(4) of the Environmental Planning and Assessment Regulation 2021 only for the purposes of being a determining authority for development for the purposes of an electricity transmission or distribution network operated or to be operated by the ANO. The proposed electricity network assets will be assigned or “gifted” to Endeavour Energy, the electricity distribution network service provider (DNSP) upon electrification.

5.1.1 NSW Environment and Planning Assessment Regulation 2021

Section 171 of the EP&A Regulation requires a determining authority to consider certain prescribed environmental factors (Section 171(2)). It also requires (Section 171(3)) that the determining prepare an environmental assessment that demonstrates how the environmental factors were considered. Those factors are considered within this assessment. Table 26 includes an itemised list of these factors for the activity.

Section 171(4) requires the assessment be published if the activity has a capital investment value of more than \$5 million, it requires a permit under certain other legislation (e.g. Heritage Act 1977) or if it is considered in the public interest to do so. This activity does not have a capital investment value of more than \$5 million, will not affect any heritage items and will be of limited interest to specific people or businesses such as those affected by construction activity. Consultation including construction notification and other management measures will address this latter aspect (see 3.0 Consultation).

5.2 Environmental Planning Instruments

EPIs regulate the permissibility to undertake an activity and the type of assessment process that is required. EPI is the generic term used to describe state environmental planning policies, regional environmental plans¹ and local environmental plans (LEPs). EPIs that apply to this development are outlined below.

The following EPIs that were considered for their relevance to the activity.

5.2.1 State Environmental Planning Policies

5.2.1.1 *State Environmental Planning Policy (Transport and Infrastructure) 2021*

State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) consolidates and updates the planning process for new infrastructure. Subject to certain exemptions the T&I SEPP allows development for the purpose of an electricity transmission or distribution network to be carried out by or on behalf of an electricity supply authority or public authority without consent on any land.

The activity falls within the scope of the T&I SEPP as being permissible without development consent. Consultation requirements under the T&I SEPP are addressed in Consultation above, whilst consultation and notification provisions are detailed in Table 1 above and Table 3 below.

5.2.1.2 *Other state environmental planning policies*

The activity does not trigger the relevant provisions of other recently consolidated State Environmental Planning Policies, including:

- *State Environmental Planning Policy (Resilience and Hazards) 2021*
- *State Environmental Planning Policy (Industry and Employment) 2021*
- *State Environmental Planning Policy (Biodiversity and Conservation) 2021*
- *State Environmental Planning Policy (Precincts – Western Parkland City) 2021*

5.2.1.3 *Local Environmental Plans (LEP)*

LEPs are developed by councils (they become law only after Ministerial approval) and guide planning decisions for a LGA. According to the NSW Department of Planning, LEPs, through zoning and development controls, allow councils to regulate the ways in which land is used. Council LEPs also list heritage items that are of local heritage significance. The Fairfield Local Environmental Plan 2013 applies to the routes, them exclusively traversing an E4 General Industrial land use zone.

Whilst the activity is considered generally consistent with the E4 land use zone objectives, the application of the T&I SEPP overrides the need to consider zoning controls, as developments covered by the T&I SEPP are permissible on any land without consent. However, the T&I SEPP provides consultation and notification provisions where activities are likely to substantially impact upon council-related infrastructure, or items of local heritage significance.

¹ The *Environmental Planning and Assessment Amendment Act 2008 No 36* repealed the power to make regional environmental plans. Regional environmental plans still in force are now considered to be state environmental planning policies.

5.3 Key Legislation

5.3.1 Biodiversity Conservation Act 2016

Section 1.7 of the EP&A Act provides that the Act is subject to the provisions of Part 7 of the *Biodiversity Conservation Act 2016* (BC Act) and Part 7A of the *Fisheries Management Act 1994*. The BC Act and FM Act contain additional requirements with respect to assessments, consents and approvals under the EP&A Act, concerning certain terrestrial and aquatic environments.

Where an activity being assessed under Part 5 is likely to significantly affect threatened species, s 7.8 of the BC Act requires that a species impact statement, or biodiversity development assessment report must be prepared by the proponent. Where there are other likely significant effects on the environment, then an environmental impact statement would instead be required.

With respect to a development being assessed under Part 5, s 7.2 of the BC Act provides that development or an activity is likely to significantly affect threatened species if:

- it is likely to significantly affect threatened species or ecological communities, or their habitats, or
- it is carried out in a declared area of outstanding biodiversity value.

Section 7.3 of the BC Act lists several factors to be considered in determining whether the proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. This includes, for example, whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The Schedules to the BC Act prescribe the following lists of species, ecological communities, and other matters relevant to this determination:

- Threatened species
- Threatened ecological communities
- Extinct species, species extinct in the wild and collapsed ecological communities
- Key threatening processes
- Protected animals, and
- Protected plants.

A desktop review, including a review of the associated Data Centres SSD BDAR (Narla, 2024) and a site inspection (see Appendix 2)

5.3.2 Electricity Supply Act 1995

Section 45 of the *Electricity Supply Act 1995* (ES Act) requires that works (other than routine repairs or maintenance works) must not be undertaken without a minimum of 40 days notification being provided to relevant local councils. Any submission must be considered by the ANO. Fairfield City Council have been notified.

5.3.3 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth) (EPBC Act)

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) requires the approval of the Commonwealth Minister for the Environment for actions that may

have a significant impact on Matters of National Environmental Significance (MNES). Approval from the Commonwealth is in addition to any approvals under NSW legislation.

The EPBC Act lists nine MNES which must be addressed when assessing the impacts of an activity. An assessment of how the activity may impact on MNES is provided in Table 2 below (see Appendix 5).

Table 2: Matters of national environmental significance consideration

Matter of national environmental significance	Impact
World heritage properties	There are no world heritage properties at the activity or near that would be affected
National heritage places	There are no national heritage places at the activity or near that would be affected
Wetlands of international importance	There are no Ramsar wetlands at the activity or near that would be affected
Commonwealth listed threatened species and ecological communities	The activity will not impact threatened species, populations or ecological communities listed by Commonwealth (or State) legislation (see 6.2).
Great Barrier Reef Marine Park	The activity would not result in any impacts to the Great Barrier Reef Marine Park.

The activity will be undertaken within the footprint of existing local paved roads and two adjoining developed properties. Given the activity would not significantly impact on MNES and is not to be carried out on Commonwealth land, the EPBC Act is not triggered and approval from the Commonwealth Minister for the Environment and Water is not required.

5.3.4 *Heritage Act, 1977* (Heritage Act)

The *Heritage Act 1977* (Heritage Act) provides for the protection of heritage items of local and state significance. Such items may include places, buildings, works, relics, moveable objects, or precincts with historical, scientific, cultural or aesthetic value to the state. Where works are likely to impact upon an item listed on the State Heritage Inventory (SHI), approval may be required under two sections of the Heritage Act:

- Section 60 permit application relating to impacts on items listed on the State Heritage Register
- Section 140 approval requiring an excavation permit for activities with potential to excavate or disturb a relic.

As described in 6.9 Non-Aboriginal heritage, there are no items listed on the SHI that would be impacted by the activity, therefore further assessment and a permit is not required. Further discussion of potential impacts and measures to minimise any potential for impacts to items of local heritage significance is provided in 6.9 Non-Aboriginal heritage.

5.3.5 *National Parks and Wildlife Act, 1974 (NPW Act)*

The *National Parks and Wildlife Act 1974* (NPW Act) provides for the management of all national parks, historic sites, nature reserves, reserves, Aboriginal areas and state game reserves. It also provides for the protection and care of native flora and fauna, and Aboriginal places and objects throughout NSW. Under the NPW Act it is an offence, without authorisation, to:

- Harm an Aboriginal object or place without consent
- Pick or harm any plant or animal that is protected or is a threatened species, population or ecological community or
- Damage any critical habitat, or habitat of a threatened species, an endangered population or an endangered ecological community or reserved land.

When an activity is likely to harm an Aboriginal object or place, approval under section 90 is required.

The NPW Act also serves to direct the management and protection of reserved land. In relation to utility installations, the Minister for the Environment may grant easements or rights of way through reserved land for the conveyance or transmission of electricity.

The activity site is not located on reserved land. Approval under the NPW Act is not required in respect of the activity.

As described in 6.8 Aboriginal heritage, based on a due diligence review of routes, the activity is not likely to impact upon Aboriginal objects.

5.3.6 *Protection of the Environment Operations Act 1997*

The *Protection of the Environment Operations Act 1997* (POEO Act) provides a framework for the licensing of certain activities and is administered by the Environment Protection Authority (EPA) (the primary environmental regulator for New South Wales). Under the POEO Act, the EPA is the Appropriate Regulatory Authority for Endeavour Energy.

Schedule 1 of the POEO Act lists activities that require an Environment Protection Licence to operate. An environment protection licence is not required for the activity as it do not fall within Schedule 1 of the POEO Act; however, the following restrictions apply:

- The proposal must not pollute waters
- Waste from the activity must not be wilfully or negligently disposed of in a manner that harms or is likely to harm the environment
- Waste must not be transported to a place that cannot lawfully be used as a waste facility for that waste
- There must be no litter in or on a public place or an open private place caused by workers, and
- Any environmental incident that involves actual or potential harm to the health or safety of human beings or to ecosystems must be reported to the Environment Protection Authority (EPA).

During construction, there is the potential for discharge to surface waters from excavation, and trenching activities. A number of management strategies are available prevent or mitigate the impacts of discharging to surface waters, including discharging water over grassed or well vegetated areas

away from waterways, or the effective use of filter bags and other management strategies in urban environments (see 6.3 Water Quality and Hydrology).

5.3.7 Roads Act 1993 (Roads Act)

The *Roads Act 1993* (Roads Act) provides for the ownership and management of public roads. Section 138 of the Roads Act requires the consent of the appropriate roads management authority for various works in respect of public roads and classified roads². Under Schedule 2 (5) (1) of the Roads Act Endeavour Energy is exempt from obtaining approval for works on or over an unclassified road other than a Crown road. However, works that require a connection to or crossing of a classified road must be approved by Transport for NSW (TfNSW). The activity is proposed to underbore the classified State LPT along Davis Road, triggering a Section 138 approval from TfNSW (see Table 1 and Table 3).

5.3.8 Waste Avoidance and Resource Recovery Act 2001 (WARR Act)

The objectives of the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act) are 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 instead of disposal as waste.

Waste disposal records will be maintained during the construction phase of the activity. Procedures would be implemented during construction to promote the objectives of the Act (see 6.5 Waste).

5.3.9 Summary of legislative requirements

Additional pieces of environmental legislation that apply to Endeavour Energy's network area were reviewed and considered not relevant in the preparation of this environmental assessment, including:

- *Biosecurity Act 2015 (NSW)*
- *Contaminated Land Management Act 1997 (NSW)*
- *Crown Lands Act 2016 (NSW)*
- *Fisheries Management Act 1994 (NSW)*
- *Local Government Act 1993 (NSW)*
- *Local Land Services Act 2013 (LLS Act)*
- *Mine Subsidence Compensation Act 1961 (NSW)*
- *National Greenhouse and Energy Reporting Act 2007 (NSW)*
- *Native Title Act 1993 (Commonwealth)*
- *Noxious Weeds Act 1993 (NSW)*
- *Rural Fires Act 1997 (NSW)*
- *Water Act 1912 (NSW)*
- *Water Management Act 2000 (NSW)*
- *Water NSW Act 2014*

² Classified Roads include main roads, highways, freeways, a controlled access road, a secondary road, a tourist road, a tollway, a transitway and State work.

- *Wilderness Act 1987 (NSW).*

Licences, permits, approvals and notifications required for the design and assessment, and construction, maintenance and operation of the activity are provided in Table 3 below.

Table 3: Licences, permits, approvals and notifications (also see Table 1 and Appendix 3)

Legislation	Authority	Requirement
<i>Electricity Supply Act 1995</i>	Local Council	The ES Act requires a minimum 40 days prior notification be provided to the local council for electricity network works other than for routine repairs or maintenance. AUSCONNEX provided Fairfield City Council notification of the proposed activity. The activity involves substantial new works
Roads Act 1993	Transport for NSW	Requires works in connection with or which cross a classified road be approved by Transport for NSW (and be subject to a Road Occupancy License). The activity will cross the classified State LPT
<i>State Environmental Planning Policy (Transport and Infrastructure) 2021</i>	Local Council	<p>21 days notification required:</p> <ul style="list-style-type: none"> • for works involving new or existing substations • works involving installation of a temporary structure • the enclosing of a public place that is under a council's management or control that is likely to cause disruption to traffic that is not minor or inconsequential, or • involves excavation that is not minor or inconsequential of the surface of, or a footpath adjacent to, a road for which a council is the roads authority. <p>The activity involves temporary structures along roads and road works with temporary managed restrictions to use</p>
<i>Water Act 1912 (NSW)</i>		An exemption applies for taking 3ML not involving water for consumption or supply, such as for temporary safe efficient construction excavation dewatering and not water taken for irrigation or town water supply. Noting groundwater ingress is not expected, excavation dewatering would take significantly less than this amount and not more than several thousand litres
<i>Water Management Act (NSW) 2000</i>	Water NSW	

6.0 ENVIRONMENTAL ASSESSMENT

This section describes the existing environment of the activity and assesses the potential impacts of the activity during construction, maintenance and operation. This section also prescribes the specific mitigation measures necessary to manage and control environmental impacts which consist of:

- specific mitigation measures prescribed in this assessment (to be implemented during the design, construction, operation phases of the activity or in combination)
- controls detailed in Endeavour Energy's Environmental Guideline Handbook.

Where there is an inconsistency, the proposal specific mitigation measures would prevail. Only specific mitigation measures are included in this assessment, where required to minimise potential impacts.

Once the detailed construction methodology is known, the principal construction contractor would be responsible for developing further mitigation measures as required to meet both legislative requirements and the commitments of this assessment. The Environmental Management section 8.0 outlines the requirements for preparing the activity specific CEMP.

6.1 Traffic and access

6.1.1 Existing environment

6.1.1.1 Road network

The local roads traversed by the routes within the Wetherill Park industrial area include

- Redfern (Walter) Street
- Hassall Street
- Widemere Road, and
- Davis Road.

These local roads are either two lane carriageways with adjacent parking lanes along either side (four lanes total width), or two-lane carriageways with no adjacent parking lanes (Widemere Road). The routes will commence from within the Zone Substation to traverse along both roadside parking lanes of carriageway edges.

Redfern (Walter) Street

Redfern (Walter) Street, an approximately 20m wide two-lane carriageway with an approximately 13m road pavement width has roadside street parking along either roadside. It descends north from the Wetherill Park Zone Substation location opposite the Frank Street traffic light intersection to veer 90 degrees right to the east to continue as Hassall Street. The verges are grassed, the eastern side featuring the driveways into the various small to medium industrial commercial businesses with a frontage to this roadside. Redfern Street's western side is adjacent a steeply inclined narrow approximately 16m wide parcel of land, above and west of which the LPT traverses in a north south direction.

Hassall Street

Hassall Street, which continues east from the northern end of Redfern Street to and east beyond its intersection with Widemere Road, is an approximately 19m wide two-lane carriageway with adjacent street parking along both roadsides and approximately 13m road pavement width. Hassall Street ascends slightly to the east to "T" intersect with Widemere Road/Hassall Street. The routes will

traverse along the roadside parking lanes. The roadside verges are grassed with driveways to the various small to medium industrial commercial businesses with frontages to both roadsides.

Widemere Road

Widemere Road intersects with Hassall Street at a four-lane non-traffic light “T” intersection. Widemere Road is an average 35m road with a 13m carriageway with no parking. It descends slightly from Hassall Street to and beyond the Davis Road intersection to continue as Reconciliation Drive beyond Prospect Creek to the Pemulwuy industrial area and beyond. The roadside verges are grassed with driveways to various small to medium industrial commercial businesses along the western verge. The Fairfield Sustainable Resource Centre adjoins to the east. Access near Widemere Road’s southern end is provided to an off-street heavy vehicle parking bay opposite the Widemere Road and Hassall Street intersection.

David Road

Davis Road is a 19m wide east west aligned two-lane road with a 13m carriageway with street parking. At its eastern end Davis Road commences at a four-lane “T” traffic light intersection with Widemere Road and the Data Centres site is 300m west. The State classified LPT (four way) crossing is a traffic light intersection approximately 120m west of the Widemere Road intersection. Both verges are grassed with driveway crossings to the various small to medium industrial commercial businesses along both roadsides.

6.1.1.2 Public Transport

The routes along the eastern end of Davis Road are proposed to underbore the LPT, which is a TfNSW classified road for buses only. The activity design and construction methodology require approval from TfNSW, a process which has been initiated by AUSCONNEX (see 3.0 **Consultation**). The activity construction works of underboring the LPT requires a section 138 Roads Act approval from TfNSW (see Table 3). Buses service the area and bus stops are located along Davis.

6.1.1.3 Vehicle Movement and Access

The existing local connector roads service the developed urban Wetherill Park industrial commercial area, which is considered the largest industrial area in the southern hemisphere with a commensurate volume of traffic. As would be expected, traffic volumes seem to vary to some extent during business hours, though they continue across what could be termed extended business hours to include the early morning and late afternoon evening shoulder periods. Some businesses also operate over either longer extended hours or 24 hours.

The route roads function as connector roads between the Wetherill Park/Smithfield Industrial area and surrounding suburbs. Widemere Road is the only north south connector road for approximately four to five kilometres to the east and west. Meaning it is an important connector road that would be sensitive to traffic disruption, particularly during business hours.

Transport in the area and to some extent the broader region is reliant on the local connector road network for medium and heavy vehicles, and for private vehicles accessing businesses, and public transport buses servicing the area. Pedestrian activity is moderate and is the only dedicated form of passive transport in the area.

Activity operation

Operation and maintenance access for the activity will be via the existing local roads network. These roads are suitable for this purpose and there are no significant access constraints anticipated in relation to either construction or operation of the activity. Assuming implementation of appropriate and approved temporary traffic management arrangements during construction, and during any future maintenance as required.

6.1.2 Potential impacts

Traffic flow and access

This assessment identified that whilst the potential for impacts will be temporary, traffic management is an important aspect requiring effective impact mitigation during construction. The construction works associated with the activity has the potential to disrupt traffic if not managed appropriately due to the connector road function of the various roads traversed by the routes.

There is ample on-street parking that is not anticipated to be significantly affected or reduced by the relatively small number of passenger construction vehicles required for the works and the transient staging proposed for the works. The medium to larger vehicle movements will generally be limited to drop off and pick-up and subject to appropriate traffic management. Therefore, parking requirements will be minimal and short term as the works transition along the routes and are not anticipated to significantly increase and affect traffic volumes or reduce parking availability.

Parking

The conduits for the cables are proposed to be installed along the outer parking lanes and outer carriageway lanes, affecting parking in short sections as the activity works progress in sections.

There are several dual lane traffic areas with no roadside parking along the routes, including the Davis Road and Widemere Road intersection to the LPT, and Widemere Road. Depending on the proximity of underground utilities elsewhere along the routes, underbore may be required instead of open trenching to avoid underground utilities.

Consultation is ongoing with TfNSW regarding underboring the LPT and with Fairfield City Council regarding works along the various local roads. Consultation has also commenced with the owners and managers of the various utility infrastructure assets located along the activities routes (see **Table 1**, **Table 3**, and **Appendix 3**). Comments received from these various stakeholders will be considered in finalising the activity design. Construction notification will also be provided to businesses along the routes prior to works commencing to minimise impacts to businesses.

Construction vehicles

Construction may require up to six vehicles at a given works section location along the routes at any given time. Construction vehicles would include light vehicles and one or two heavier vehicles such as trucks and excavators [for trenching]. Heavy vehicles using the route for construction are not expected to cause disruption to traffic, given heavy vehicle traffic currently frequents these roads and the roads are generally designed for high volumes of heavy vehicle traffic throughout the existing commercial industrial area.

Traffic Management

A TMP and TGS shall be prepared in accordance with the TfNSW *Traffic control at work sites Technical Manual* (TfNSW, 2023) or Australian Standard 1742.3 respectively and be subject to the relevant approvals and ROLs. The TMP and TGS shall detail allocated areas for staff parking, a plan or diagram which shows the traffic control arrangements for works along the routes, including temporary signage and traffic management device locations to warn and guide traffic through and around works areas.

Operation

During operation of the cables, the routes would be infrequently inspected as required for testing and general maintenance purposes. The inspection, testing and maintenance regime is not anticipated to cause impacts.

6.1.3 Environmental mitigation measures

Traffic and access impact mitigation measures for all phases of the activity are summarised in the table below.

Table 4 Traffic and access impact mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Consultation with various relevant stakeholders (see Table 1 , Table 3 and Appendix 3)	X	X	
Approved temporary traffic management, (traffic management plan), including for (justified and approved) out-of-hours works if required, to maintain traffic flow and minimise traffic and street parking impacts		X	
Pre-construction (not less than 14 days prior) notification provided to businesses along the routes	X	X	
Temporary access arrangements to properties would be implemented during trenching works, such as with steel plates		X	
Engage experienced lineal infrastructure construction contractor		X	
Limit excavation works to between 50m and 100m sections to reduce impacts on parking		X	
Where works are proposed to underbore the LPT, a classified State Road, consent is required under section 138(1) of the <i>Roads Act 1993</i> . A road occupancy license (ROL) must be obtained from TfNSW where works are proposed: <ul style="list-style-type: none"> on or crossing a classified Road to close a road or part of a road within 100m of traffic lights. 	X	X	
Access affected businesses shall also be provided with additional notification not less than 48 hours' prior to any proposed access changes to their properties		X	
Pedestrian traffic route shall be maintained during the works		X	

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Where there is a demonstrated and justified need to work outside standard construction hours, this should involve notification to Council, and adjacent and nearby businesses and be in accordance with an approved traffic management plan		X	
Reinstate roads post works in consultation with Fairfield City Council (regarding the local roads) and TfNSW (regarding the LPT underbore)		X	

6.1.4 Conclusion

The activity is not likely to significantly affect the environment in relation to traffic and access because:

- the construction period when access will be affected will be transient, localised and temporary or short term
- all works affecting the local area should be undertaken in accordance with an approved TMP and TGS
- given the small number of vehicles expected to be used for construction, it is unlikely this aspect of the works will result in any significant increase in traffic in the area
- once in operation, the activity will no impact on the local traffic
- mitigation measures outlined in above would readily and acceptably manage potential impacts.

6.2 Noise and vibration

The Environment Protection Authority *Draft Construction Noise Guideline 2020* (DCNG) outlines that a qualitative assessment is appropriate for short-term infrastructure projects or minor construction works where work is unlikely to result in significant noise impacts.

6.2.1 Existing environment

The routes predominantly traverse existing cleared paved carriageways and parking lanes of developed roads through a developed urban environment. A range of small, medium and large commercial and industrial business are present along the routes. The normal day time noise and vibration environment along the routes is primarily influenced by traffic flows and by commercial industrial development operations. There are no nearby typical sensitive receivers such as residences or school for example nearby. The nearest residential receivers are located more than 700m south of the routes with industrial commercial development continuous between. The few cafes and office environments of the various businesses could be considered the most sensitive receivers along the routes, noting ambient noise levels would be relatively high, the land use being exclusively industrial commercial in nature.

6.2.2 Potential impacts

6.2.2.1 Noise during construction

The construction work for this activity would be short term, temporary, and transitory in nature as works progress along the routes in section potentially concurrently at different locations. Construction works are generally expected to continue for not more than three to five days at any given location except for cable jointing which require up to ten days. Therefore, as construction works are unlikely to occur in any single location for greater than a three-week period, therefore as provided for by the DCNG, a qualitative assessment is sufficient for this activity.

The noise generating works of the activity will include:

- trenching and underbore by excavator to install cable conduits and joint bays
- heavy vehicle movements for plant, machinery, and materials delivery/pickup
- opening joint bays by excavator to install cables
- cable joining activities, which may require intermittent generator use (power/dewatering), and
- roadway reinstatement at the completion of works following commissioning and testing.

Most of the construction work will be undertaken during standard construction hours. However, noting the routes traverse roads within a busy or heavy traffic commercial industrial area, out-of-hours works may be required. Any out-of-hours works will be subject to the relevant roads management authority approval and conditions (see 6.1 Traffic and access). Because of the exclusively industrial commercial land use nature of the area that experiences high traffic volumes, including numerous large or heavy vehicles, there is a low risk of noise disturbance from traffic movements associated with the works, including out-of-hours works if required. Out-of-hours works may be required along parts of Widemere Road to mitigate traffic impacts. Consultation with Council and TfNSW is ongoing in relation to traffic impacts and the potential for out-of-hours works to be required (see 3.0 Consultation).

It could be reasonably expected that some business will operate twenty-four-hours and also on weekends. These businesses or areas may require some degree of noise mitigation for out-of-hours works despite the reduced noise disturbance sensitivity or potential of the industrial commercial area generally. This situation may also mean that business access for vehicles and pedestrians etc be always maintained or be immediately available when required (see 6.1 Traffic and Access). To mitigate this risk, in addition to notification to Council and TfNSW, the contractor will provide construction notification and appropriate ongoing notification to business prior to the works commencing and during works respectively as appropriate.

Reasonable and feasible noise impact mitigation measures, as suggested shall be implemented as appropriate. The measures provided are based on the generally reduced noise disturbance sensitivity of the identified receivers to noise impacts both during standard construction hours and out-of-hours, and their potential higher sensitivity to traffic and access disruption or impacts due to construction. To this end, pre-construction notification and ongoing consultation during construction will be key to mitigating noise, and traffic and access impacts to potentially affected businesses.

A generator will likely be required at each joint bay for the duration of cable joining works, and the generator will potentially operate for significant periods of the day. Being only associated with cable joining, it is not anticipated that out-of-hours works will be required for cable joining due to strategic joint bay locating where there is space available along the various roadside parking lanes to reduce traffic impacts. A internal combustion engine power pump may be required to operation intermittently during construction hours for dewatering purposes. Generators and pumps, like other machinery,

equipment, and vehicles will not be left running or idling unnecessarily, providing periods of respite. Other construction equipment associated with cable joining is unlikely to create significant noise impacts. Noise barriers may be required depending on the location of the various noise generating works along the routes and the potential for noise disturbance.

6.2.2.2 Vibration during construction

Vibration impacts associated with excavation are anticipated to be less than five days in duration at any location or section of the routes. Like noise impact mitigation, the potential sensitivity of the routes to traffic impacts may take precedence over noise impacts, given the reduced noise impact sensitivity of the routes.

Pre and post works dilapidation assessment and recordings are generally recommended to be carried out, particularly where vibration may reasonably be expected to impact utilities infrastructure assets or structures.

6.2.2.3 Noise and vibration during operation

The cables operation would not generate or contribute any additional noise or vibration to the surrounding environment.

6.2.3 Environmental mitigation measures

The Table below provides noise vibration impact mitigation measures for all phases of the activity.

Table 5: Noise and vibration mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Comply with the Endeavour Energy <i>Environmental Guideline Handbook and the Draft Construction Noise Guideline</i> (NSW EPA, 2020)		X	X
The construction contractor to verify the presence of sensitive receivers, i.e. restroom, offices, 24-hour operations through construction notification process, and consider all reasonable and feasible responses and measures to minimise impacts	X	X	
All workers to be made aware of the presence of any identified sensitive receivers, i.e. restrooms, offices, 24-hour operations, and the need to avoid or minimise noise		X	

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
<p>Provide at least 14 business-days notification to affected receivers prior to starting works, unless it is emergency works or is individually discussed with the affected receivers face-to-face, and a written or electronic record of any agreement retained.</p> <p>The following information should be included in notification letters:</p> <ul style="list-style-type: none"> a description of the works and why they are required details of the noise generating works <ul style="list-style-type: none"> hours of works and duration what is being done to minimise the impacts, i.e. respite periods/during standard construction hours/out-of-hours 24-hour construction contact phone number. 		X	
Notify and consult with any potentially affected identified sensitive receivers (eg; restroom areas, offices) just prior to nearby works		X	
Plan the site layout to minimise movements that would activate audible reversing and movement alarms		X	
Where an ROL stipulates out-of-hours works, the works must meet the requirements of the <i>Environmental Guideline Handbook</i> , out-of-hours work criteria.		X	
Council should be notified of out-of-hours works prior to their commencement		X	
Provide information a free call 1800 number, email address and constructors website for people wanting more information or to report incidents		X	
Provide signage outside the worksite detailing who is undertaking the works and a 24-hour construction contact phone number and email/website address		X	
Have a documented complaints process, including an escalation procedure, so there is a clear process path to follow should a complainant continue to be dissatisfied	X	X	X
Undertake condition reports (dilapidation reports) of structures that may be at risk from vibration generating works	X	X	X

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Reinstate trenches, underbore open points, and joint bays as soon as practicable to minimise noise risk associated with road plates remaining in place		X	
Once installed pits lids and plates must be secure, and must not rock, vibrate or make noise. Impact absorbing material must be installed between pit lids and road surfaces to prevent noise nuisance		X	
Recess road plates flush with the road surface when in place for more than 2 nights on high traffic roads		X	
Do not leave vehicles, plant, or equipment idling when not in use or needed		X	
All plant and equipment will be operated and maintained in accordance with the manufacturer's specifications and not left idling when not in use.		X	X
Pre-cast joint bays may be required to reduce time of construction. In the unlikely event that joint bay construction or other works requires more than three weeks continuous works in a single location, a noise assessment and additional mitigation measures may be required. Construction contractor to engage specialist advice in such circumstances		X	
<p>Mains supply should be used at joint bays where practicable. Where mains supply is not reasonably attainable, low noise generators/pumps must be used at joint bays, only operated when required, and with noise barriers surrounding the generator/pump if required such as for out-of-hours works. Noise barriers must be:</p> <ul style="list-style-type: none"> placed close to the noise source continuous with no gaps break the line of sight between the source and receiver, and constructed of material sufficient to dampen or reduce noise from the source. 		X	

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Construction works should adopt Best Management Practice (BMP) and Best Available Economically Achievable Technology (BAEAT) as addressed in the DCNG. BMP includes factors discussed within this report and encouragement of a project objective to reduce noise emissions. BAEAT practices involve incorporating the most advanced and affordable technology to minimise noise emissions.	X	X	X

6.2.4 Conclusion

The activity is not likely to significantly affect the environment in relation to noise and vibration for reasons including:

- construction will be temporary and transitory
- is proposed along roads in an industrial commercial area where high background noise levels are typical, particularly during business hours
- potential noise impacts will be in accordance with the NSW EPA DCNG,
- the lack of what would be considered typical sensitive receivers such as residences or schools
- potential vibration impacts would comply with the Office of Environment and Heritage *Assessing Vibration: A Technical Guideline* (2006), and
- mitigation measures outlined above would adequately manage potential impacts.

6.3 Water Quality and Hydrology

6.3.1 Existing environment

The routes will traverse the existing impervious paved carriageways and parking lanes of the various developed road reserve areas which feature stormwater drainage infrastructure that drains to Prospect Creek below Prospect Reservoir. There are limited pervious surfaces to accept sediment polluted discharges or runoff. The stormwater drains via a concrete lined stormwater culvert located west of the western end of the route or via other stormwater drainage to Prospect Creek. These various watercourses range from first through to fourth Strahler order Prospect Creek.

6.3.1.1 Surface water

Being wholly within an older developed industrial commercial area, the potential for contamination from sources like industrial discharge and runoff is typically higher than could be expected from other developed areas, including more modern industrial commercial areas with onsite stormwater harvesting, treatment and drainage systems, and residential and natural areas.

Surface runoff along the route includes runoff from roadside verges or footpaths, driveways and carriageways.

6.3.1.2 Groundwater

Boreholes down to between 3m and 5m at five locations along the route for geotechnical assessment (Appendix 4) did not encounter groundwater. Based on the limited geotechnical assessment, it considered the depth to the groundwater level is likely to be deeper than the base of entry and exit pits and presumably trench bases.

6.3.2 Potential impacts

Without appropriate mitigation measures, there is potential for erosion and sediment pollution to occur due to civil excavation works disturbing soil as works progresses along the routes. This potential is mostly limited to the trenching and underbore stages of the works, with subsequent stages involving minimal excavation activity at joint bay and cable drive hole locations. An increase or change to the extent of impervious surfaces will not result from the activity, therefore local drainage flows will not be altered. Dewatering, which may be necessary after wet weather to allow work to continue, also has the potential to cause water pollution, particularly given the lack of pervious surface to accept runoff or discharges.

Erosion and sediment pollution controls and dewatering should be implemented accordance with the *Blue Book – Managing Urban Stormwater: Soils and Construction* (Landcom, 2004), Endeavour Energy's *Environment Guideline Handbook* (Endeavour Energy, 2024) and *Environmental Management Standard EMS0014 – De-watering worksites* (Endeavour Energy, 2020). Appropriate onsite treatment and testing of the water would be undertaken to remove sediment from the water prior to disposal or polluted water shall be disposed as liquid waste. An erosion and sediment control plan and dewatering plan should be developed by the construction contractor as part of their CEMP having regard for the extensive area of impervious surfaces along the routes. At the conclusion of earthworks, exposed soil surfaces should be stabilised to ensure no long-term erosion or sediment pollution due to the works, and post works stabilisation should be carried out progressively during construction.

Water quality along the routes could be impacted by spills of hydraulic oil and fuels from vehicles, plant and equipment carrying out works. Quantities of these substances would be minimised and stored in appropriately bunded and covered areas. Adequate storage and refuelling controls would be implemented to mitigate impacts. Plant and equipment would also be maintained appropriately to minimise the risk of leaks and spills.

6.3.2.1 Groundwater

Based on the geotechnical assessment (Appendix 4) findings, there is not anticipated to be any impacts on groundwater, nor is groundwater anticipated to affect trenching or underbore entry and exit pits. Mitigation measures are included for groundwater ingress in excavations if required, including dewatering or disposal as liquid waste as required. A dewatering licence under the *Water Act 1912* or *Water Management Act 2000* is not required, noting the less than three mega-litre exemption will apply.

6.3.2.2 Frac-Out Management Plan

"Frac-out" means the drilling fluid used for carrying out underboring is released or lost to the ground surface or elsewhere such as into waterways during the underbore process, and a frac-out management plan shall be developed and implement.

6.3.3 Environmental mitigation measures

Mitigation measures for hydrology quality are summarised in the table below for all phases of the activity.

Table 6 Water quality and hydrology impact mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Comply with relevant sections of the <i>Environmental Guideline Handbook</i> , the Blue Book, <i>EMS0008 Environmental incident response and management</i> , <i>EMS0014 De-watering worksites</i> , <i>EMS0001 Environmental impact assessment and environmental management plans</i> , and the project specific erosion and sediment control plan		X	X
All workers to be made aware of any sensitive or no-go areas, the extensive areas of impervious surfaces prone to runoff, and the need to prevent water quality impacts		X	
Regularly inspect and maintain sediment controls consistent with environmental conditions, particularly during rainfall periods		X	
Temporary erosion and sediment controls to be removed as works completed and areas stabilised or rehabilitation is completed		X	X
All spoil to be kept in a truck, skip bin or liquid waste truck during trench and underbore works. Any stockpiling on site is to be short term and minimal and subject to consultation with the relevant roads' authority	X	X	
Capture underbore slurry using a wet-vac and avoid discharge to the environment causing water pollution		X	
Any groundwater or surface water ingress into excavations will require basic turbidity testing prior to discharge, including application of flocculant to reduce turbidity if required. Environmental Specialist advice should be sought regarding dewatering procedures and requirements if unsure. Disposal as liquid waste by a liquid waste contractor may be required if turbidity excessive. Refer to <i>EMS0014 De-watering worksites</i>		X	
A frac-out management plan (FOMP) is required to undertake underboring.			

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
<p>FOMP shall include at a minimum, measures:</p> <ul style="list-style-type: none"> to monitor and control drilling fluid pressure to utilise inert and biodegradable drilling fluids where practical to lower environmental risk to track the location of the drill head to target and respond to any potential frac outs immediately to ensure incident response procedures for the activity are relative to the risk(s) identified and will be effectively in place in accordance with Endeavour Energy Environmental Management Standard <i>EMS 0008 Environmental incident response and management</i>, and the exit of the drill head at the exit pit is planned and in a controlled environment where all drill fluids are contained, controlled and recovered from the designated work area. 			
Prior to the commencement of any underbore work, a FOMP consistent with the complexity of the bore and sensitivity of the environment must be developed (see above for minimum requirement) and all workers are familiar with its implementation		X	
Store oils and fuels in accordance with the <i>Environmental Guideline Handbook</i>		X	X
Control measures will be implemented to manage risks associated with the handling of fuel through using spill trays when undertaking in field re-fuelling		X	X
Ensure appropriate spill response equipment is readily available, and all workers are familiar with its location and use		X	X

6.3.4 Conclusion

The activity is not considered likely to significantly impact the hydrology of the environment due to:

- construction related impacts being minimal, short term, localised and transient

- operation of the activity not directly impacting water quality or hydrology (noting these requirements apply to fault and emergency maintenance works regarding not causing pollution)
- potential water quality and hydrology impacts being managed in accordance with the *Blue Book – Managing Urban Stormwater: Soils and Construction* (Landcom 2004), *Environmental Guideline Handbook*, and project specific Erosion and Sediment Control Plan
- the mitigation measures outlined above being reasonably expected prevent or reduce impacts.

6.4 Geology and Soil

6.4.1 Existing environment

According to the Soil Landscapes of Central and Eastern NSW (State Government of NSW and NSW Department of Climate Change, Energy, the Environment and Water 2024) and the geotechnical assessment (Appendix 4) commissioned for the activity, the routes feature the South Creek (SC) and Blacktown (BT) Soil landscapes.

The South Creek (SC) soil landscape occupies a short section of the routes at the western end of Davis Road. This landscape typically includes floodplain, valley flat, and drainage depression landscapes and landforms. According to the Department of Planning, Industry and Environment (2020), this landscape is prone to flooding, seasonal waterlogging, water erosion, surface movement, and is associated with permanently high-water tables.

The remainder of the routes feature the Blacktown (BT) soil landscape which is characterised by gently undulating rises on Wianamatta Group shales with local relief of 30m. Blacktown (BT) soils are moderately erodible, with topsoils bt1 (friable brownish black loam) and bt2 (hardsetting brown clay loam) being generally hard setting with significant fine sand and silt contents, offset by moderate amounts of organic matter.

Road pavement and road excavation for trenching are typically achievable using conventional earthwork machinery. There would on average be approximately 25 to forty 40 cubic metres of soil disturbed at any one time [assuming approximate 50m standard dimension open trench sections], potentially causing minor soil instability for the brief period when the trench is open. Excavated spoil will be placed directly into trucks or skip bins and removed from site if not suitable for reuse. A project specific erosion and sediment control plan should be prepared as part of the CEMP.

According to the geotechnical assessment for the activity (see Appendix 4), and as would be reasonable to expect given route traverses a developed roads route. The subsurface conditions consist of topsoil or possible fill down to between 200 and 400mm below existing ground level. Natural stiff to very stiff silty clay/sandy clay extends from below this down to between 2.8 to 4.2m below existing ground level. Extremely weathered shale was identified below this to the borehole limits of between 3 to five 5m below existing ground level.

Given the elevation of the land and distance from the coast, the activity site is not likely to contain actual or potential acid sulfate soils. This was confirmed by reviewing NSW Government SEED viewer acid sulfate soil mapping (State Government of NSW and NSW Department of Climate Change, Energy, the Environment and Water 1998).

If cable faults occur during operation, a small worksite would typically be established to excavate, uncover and repair the fault. Works shall comply with the *Environmental Guideline Handbook* for the operational phase.

6.4.2 Potential impacts

As detailed in 6.6 Air quality, 6.3 Water Quality and Hydrology, 6.5 Waste, and 6.10 Contamination. The potential impacts of the proposed activity relating to geology and soil include the potential for soil erosion and sediment transport causing water pollution and causing or encountering soil contamination during the activity.

6.4.2.1 Soil erosion and sediment transport

Soil erosion and sediment transport associated with trench and underbore open point excavation works could lead to or cause water pollution if erosion and sediment controls are not implemented and maintained appropriately for the duration of works. Similarly, in the absence of appropriate controls, underbore works could also cause or result in sediment transport or discharge due to underbore generation of drill mud. Appropriate restoration is also required immediately following completion of works to ensure water pollution does not occur.

6.4.2.2 Soil contamination

Soil contamination could either be caused or encountered during the proposed construction works. Chemical spills from machinery and equipment could occur during the works. Noting the likely presence of fill materials along the developed route and that contamination associated with or from surrounding land uses, it is possible that contaminated soil may be encountered during construction works.

6.4.3 Environmental mitigation measures

Mitigation measures are summarised in the table below for all phases of the activity.

Table 7 Construction and operation geology and soil impact mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Comply with and ensure appropriate erosion and sediment control are implemented in accordance with the Blue Book and Endeavour Energy's <i>Environmental Guideline Handbook</i> (Endeavour Energy, 2024)		X	X
Areas of construction and maintenance disturbance will be minimised as much as possible		X	X
Use water sprays to dampen (not saturate to cause runoff) disturbed surfaces and stockpiles at site, at material transfer points and during construction and demolition generally.		X	
Disturbed areas will be restored and stabilised as soon as possible following completion of construction and maintenance activities		X	X
In accordance with a frac-out management plan and waste disposal plan, underboring and drill mud will be managed appropriately to prevent pollution		X	

Avoid or minimise stockpiling on site. All spoil to be tipped into a truck or skip bin.	X	
The requirements of Endeavour Energy's Environmental Guideline Handbook shall be implemented to ensure the most appropriate beneficial reuse or disposal method for any surplus excavated materials	X	X
An unexpected contamination finds procedure shall apply for the construction works	X	
Endeavour Energy's Environmental Management Standard <i>EMS 0013 Spoil and Imported Material Management</i> (Endeavour Energy, 2024) will be consulted to determine the most appropriate beneficial reuse or disposal method for any surplus excavated materials	X	X

6.4.4 Conclusion

The activity is not anticipated to have any adverse impacts on the soils and geology of the environment or be affected by the soils and geology of the environment. Given the mitigation measures outlined in this assessment, the overall environmental risk is considered low.

6.5 Waste

6.5.1 Existing environment

The routes predominantly traverse the paved carriageway and parking lane of developed roads that are anticipated to consist of compacted road construction materials. As noted above, the geotechnical assessment (Appendix 4) found possible fill down to between 200 and 400mm below existing ground level. Natural stiff to very stiff silty clay/sandy clay extending below this down to between 2.8 to 4.2m below ground level, and extremely weathered shale below this down to between 3m to five 5m.

The activity will generate limited types of waste, some of which may be reused or recycled, whilst other waste will require disposal. Spoil requiring reuse or disposal followed by underbore slurry requiring disposal will be the most abundant waste materials generated during construction. Minimal waste would typically be generated during the operational phase, typically in the event of maintenance or emergency works.

All waste would be re-used where possible or otherwise managed in accordance with the NSW *Waste Classification Guidelines*, with disposal records retained. Endeavour Energy's Environmental Management Standard *EMS 0007 Waste Management* and Environmental Guidelines Handbook shall also apply to the activity.

6.5.2 Potential impacts

Waste that will require management, or reuse, recycling, or disposal includes:

- bitumen, concrete, and asphalt from removal of existing hard surfaces (ay be recycled or disposed
- excavated spoil material (may be reused, recycled, or disposed)

- underbore waste (unsuitable for re-use)
- building waste (packaging material, scrap metal, plastic pipe and wrapping, cardboard)
- timber cable drums and pallets, and
- limited other general waste.

Noting the geotechnical assessment encountered limited material likely to be fill, and otherwise encountered silty clay/sandy clay and extremely weathered shale. It is anticipated that excavated spoil will generally be suitable for reuse on site for backfilling or for approved reuse. Any soil identified as virgin excavated natural material (VENM) or excavated natural material (ENM) will likely be reused for backfill or at approved reuse sites. The conditions of the relevant planning approval must be verified as in place to accept reuse fill. A copy of the relevant environmental planning consent shall be retained on record for audit purposes. Excess spoil shall otherwise be disposed at an appropriately licensed facility or recycled through an appropriately licensed soil recycler, with records of disposal retained. Underbore slurry waste (see also 6.3 Water Quality and Hydrology and **Table 6** re frac-out management) will be disposed at a licensed waste facility, with records of disposal retained.

Any soil suspected of being contaminated shall be stored and sampled separately then disposed to an appropriately licensed waste facility as required, with records of disposal retained.

During operation of the activity, waste generation would be minimal to nil except in the unlikely event of a cable fault or failure requiring repair works.

6.5.3 Environmental mitigation measures

Waste impact mitigation measures for all phases of the activity are summarised in the table below.

Table 8 Impact mitigation measures for waste materials

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Comply with the <i>Environmental Guideline Handbook</i> , Endeavour Energy's Environmental Management Standard <i>EMS 0007 Waste Management</i> , and Endeavour Energy's Environmental Management Standard <i>EMS 0007 Waste Management</i>	X	X	X
Classify wastes to determine licensing, waste tracking and disposal requirements and retain disposal records		X	X
Segregate and label waste to improve recycling opportunities, avoid cross contamination and reduce disposal costs		X	X
Waste material generated on site will not be left on site once the works have been completed and as they progress		X	X

Where possible, reuse, recycle, or return wastes materials to the supplier, including metal components and packaging, i.e. cable drums and pallets.	X	X
Reuse VENM and ENM where options are available. Ensure that:		
<ul style="list-style-type: none"> a valid waste classification certificate is available and the reuse meets the conditions of the planning approval for that site. 	X	X
Where excavated spoil is suspected to be contaminated, works will immediately cease, and the Project Manager and AUSCONNEX notified. Spoil suspected of being contaminated will be tested to provide a waste classification for disposal	X	X
Ensure a spill kit is readily available, and workers are familiar and confident with its location and use.	X	X

6.5.4 Conclusion

The waste associated with the activity is not considered likely to significantly impact the environment due to:

- all waste being either re-used or managed in accordance with the *NSW Waste Classification Guidelines*
- the mitigation measures outlined above being suitable to manage potential waste impacts.

6.6 Air quality

6.6.1 Existing environment

Air pollution includes emission of odours, smoke, fuel or any other substances to the air. There are many substances in the air which may impair human health as well as the health of plants and animals or reduce visibility. Impacts from pollutants are governed by the intensity of pollutant discharges, type of discharges and the prevalent weather conditions.

The National Environment Protection Measure for Ambient Air Quality – Key air pollutants include carbon monoxide, nitrogen dioxide, lead, sulphur dioxide, photochemical smog and fine particles. Photochemical smog (as ozone) and, to a lesser extent, fine particles remain significant issues in NSW, particularly in the higher population centres.

The existing (background) air quality environment is highly influenced by the urban commercial and industrial activities occurring in the vicinity of the activity. Influences of existing air quality include emissions from transportation, major industry, commercial operations and domestic activities.

With the activity traversing through the large and developed Wetherill Park industrial commercial area, there are high levels of heavy vehicle and commuter traffic during the day, reducing in the evening. There are also several sources of industrial air emissions in the vicinity of the activity.

6.6.2 Potential impacts

Direct potential impacts to local air quality from the activity would be limited to dust from excavation, and emissions from vehicles, plant and equipment undertaking construction. Direct emissions from the operation of the activity would be minimal and only related to infrequent inspection and maintenance, and unlikely emergency repairs. There will not likely be any odour impact associated with the activity.

Exhaust emissions are likely to include nitrogen oxides, carbon monoxide, sulphur oxides, hydrocarbons and total suspended particulates. All vehicles, plant and equipment will be fitted with approved exhaust systems and be maintained in accordance with manufacturer specifications to maintain vehicle emissions within typical and accepted standards.

Impacts to air quality could be associated with construction. Works that may generate dust include wind erosion of exposed surfaces, movement of topsoil during excavations and disturbance of stockpiles, movement of vehicles and equipment over unsealed roads, trenching, boring, saw cutting, rock breaking and site preparation. Appropriate mitigation measures (described below) would be implemented to ensure the amount of dust and emissions generated is minimal or nil and would not affect the surrounding environment.

To manage dust, an erosion and sediment control plan (ESCP) for the activity construction works will be developed for implementation by the construction contractor prior to works commencing. The ESCP must be produced in accordance with the *Blue Book – Managing Urban Stormwater: Soils and Construction* (Landcom, 2004) (the Blue Book), Endeavour Energy's *Environmental Guidelines Handbook*, and *Endeavour Energy Environmental Management Standard (EMS001) Environmental Impact Assessment and Environmental Management Plans* (Endeavour Energy, 2024). Worksites should be inspected for compliance with the ESCP during the construction phase.

During operation, if faults occur on a cable or circuit, a small work site would be established to excavate, uncover and repair the fault. Dust and other emissions may result from excavation associated with cable fault repair. To mitigate this risk during the operational phase, all inspection, maintenance and repair works would comply with the relevant Endeavour Energy environmental management standards and the *Environmental Guideline Handbook*.

Being a developed industrial commercial area. The sensitivity of surrounding receivers, i.e. the businesses operating along the route, is somewhat less than would be the case were the route traversing a residential area, such as where out of hours works are required for example. However, there remains the potential that restroom, office/admin areas, or specific processes or activities could be sensitive to impacts such as dust etc. Construction notification and the CEMP shall address this aspect if identified and required.

6.6.3 Environmental mitigation measures

Mitigation measures are summarised in the table below for all phases of the activity.

Table 9 Construction and operation air quality impact mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation

Comply with Erosion and sediment control requirements (see Water Quality and Hydrology next) and <i>Environmental Guideline Handbook</i> (Endeavour Energy, 2024)	X	
All workers to be made aware of the presence of identified sensitive receivers, i.e. restroom, office, sensitive processes in the area, and the need to avoid impacts, i.e. reduce dust and other emissions.	X	
Dust levels shall be monitored and responded to accordingly during construction works	X	X
Use water sprays to dampen (not saturate to cause runoff) disturbed surfaces and stockpiles at site, at material transfer points and during construction and demolition generally.	X	
Visually monitor dust levels during works. If dust is leaving site, is causing a safety issue, or complaints are being received, suspend works and consider mitigation options and/or substitute with an alternate process.	X	
Use dust collection devices (such as a vacuum) on construction and rock breaking equipment where available and practicable.	X	
Avoid or minimise stockpiling on site. All spoil to be tipped into a truck (covered during transport) or skip bin and covered if required.	X	
Position vehicles, plant, and equipment where the fumes will least affect receivers, where relevant and practicable.	X	X
All vehicles and machinery will be well maintained according to manufacturer requirements to ensure emissions are kept within acceptable limits	X	X
Do not leave vehicles, plant, or equipment idling when not in use or needed.	X	X

6.6.4 Conclusion

The activity is not likely to significantly affect the air quality of the environment due to:

- construction related impacts being minimal, localised and transient, and short-term
- operation of the activity not directly impacting air quality, and
- the mitigation measures outlined above being reasonably expected prevent or reduce impacts.

6.7 Flora and fauna

6.7.1 Existing environment

A desktop assessment and field inspection were undertaken along the route. A review of NSW Dept. of Planning and Environment Bionet Atlas of NSW Wildlife Database and the Commonwealth Department of Environment Protected Matters Search Tool was undertaken to identify threatened species, populations, communities and migratory species likely to occur within the area of the activity (see Appendix 5). The desktop review indicated threatened faunal species have previously been recorded near the routes at various locations.

The flora and fauna adjacent the routes consists of limited native and exotic landscape plantings mostly in adjacent property frontages that will not be impacted by the works. There is no vegetation along the paved carriageway routes. Fauna, predominantly including birds may utilise the area to some degree due to the landscape plantings in adjacent properties.

Prospect Reservoir features larger areas of more dense vegetation to the north beyond an area of industrial commercial land use north of the routes. The nearest native vegetation patches are these remaining along Prospect Creek, from 120m and more northeast and north of the routes. This vegetation includes the mapped Plant Community Type (PCT ID 4320) Coastal Valleys Swamp Oak Riparian Forest overlapped by the NSW BC Act endangered ecological community listed Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.

6.7.2 Potential impacts

This assessment, including field inspection, concluded that works along the route are unlikely to impact any species of flora and fauna. Due to the activity being limited to the paved carriageways and parking lanes of the various developed road reserves and other existing clear areas within an industrial commercial area.

Impacts to flora and fauna have been avoided, including avoiding tree removal, because the routes exclusively traverse the paved carriageways and parking lanes of the various developed road reserves and maintained clear areas. Potential root zone interference of two relatively isolated medium size street trees located in the roadside verge area of Widemere Road are being avoided by slight trench realignment. Trench excavation realignment will provide an adequate buffer of more than four metres to these trees (*6.7.2.3 Structural tree root zone encroachment and vegetation removal*).

6.7.2.1 Noise impacts

While the construction phases of the activity (along with its ancillary activities) may cause temporary disturbance to animals, the impacts from noise emissions are likely to be localised or close to the activity (up to 100m) and are not likely to have a significant, long-term, impact on wildlife populations, particularly as they will not be significant relative to existing ambient traffic and industrial commercial area noise emissions.

6.7.2.2 Fragmentation and connectivity

Construction along the existing paved carriageways and parking lanes of the various developed road reserves would not result in additional fragmentation or any edge effects to flora or fauna.

6.7.2.3 Structural tree root zone encroachment and vegetation removal

As note previously, re-alignment of a route section along the eastern side of Widemere Road will increase the buffer distance to two adjacent trees to create a tree protection zone. The tree protection zones shall be mapped against the routes alignment, noted in detail designs and in the CEMP.

Non-destructive or hand digging works adjacent the tree protection zone shall note the size of roots and extent (depth) of root material, to provide a preliminary assessment of the likelihood of safely passing the trees. Roots larger than 40mm, if encountered shall not be cut or damaged. If the works require cutting roots larger than 40mm to proceed, the advice of a suitably qualified Arboriculturist shall be sought prior to works proceeding.

Where an Arboriculturist determines tree removal is required, the construction contractor will discuss civil alternatives and their feasibility with an Arboriculturist. If there are no other feasible alternatives, the contractor is to inform AUSCONNEX and Endeavour Energy of the tree removal requirement so a review can be undertaken with respect to additional environmental and community impacts. Prior to the removal of any trees, AUSCONNEX and Endeavour Energy is to be satisfied the above due diligence process has been suitably followed.

6.7.3 Environmental mitigation measures

Impact mitigation measures for flora and fauna for all phases of the activity are summarised in the table below.

Table 10 Impact mitigation measures for flora and fauna for all phases of the activity

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Comply with the <i>Environmental Guidelines Handbook</i>		X	
All workers to be made aware of the presence of the Widemere Road Tree Protection Zone (TPZ) and this area shall be noted in the detailed design and CEMP (see below and last)	X	X	
Several impact mitigation measures shall apply to avoid impacts on the root systems of trees, including:			
1. marking out of TPZ when works are in proximity of a tree, i.e. Widemere Road			
2. utilising non-destructive means (hand-digging, hydro-vac, air knife) when working adjacent the TPZ	X	X	
3. consider horizontal directional drilling or other techniques (see 2 above) to avoid the root systems of large trees			
4. seeking Arboriculturist advice where roots greater than 40mm need to be cut or impacted.			

Keep storage areas, stockpiles, vehicle parking, and access ways clear of trees and adjacent plantings. Works shall be confined to the paved road surface or roadside verge, assuming pedestrian and bicycle access is otherwise maintained	X	□
Comply with any Tree Safety Management Plan when undertaking vegetation pruning/ removal and maintenance works. Minor branches only can be pruned		X
Vegetation clearing is not permitted without further assessment	X	
Keep to designated roads and access ways	X	X
Endeavour Energy has a general biosecurity duty to ensure the biosecurity risks posed by weeds, pathogens, and other invasive species are prevented, eliminated, or minimised, and that the risk of importing additional weeds, pathogens, and pest species to the activity site is appropriately managed		
A site induction program to ensure that all construction, operation and maintenance staff and contractors are aware of the need to, and how to ensure biosecurity and avoid and protect vegetation outside proposal site		
Cover excavations when left overnight or for extended periods, provide an escape route for fauna from excavations (eg: log or stick extending to top of excavation), and always inspect excavations for fauna at the commencement of works.	X	X
Contact local wildlife rescue organisations (WIRES) or an ecologist for the rescue or care of native wildlife (refer <i>Environmental Guideline Handbook</i>)	X	X

6.7.4 Conclusion

The activity is not likely to significantly affect the environment in relation to flora and fauna for reasons including:

- the activity does not involve vegetation clearing
- potential impacts to flora and fauna from the activity have been avoided through the routes selection
- the routes are located within existing roads and cleared areas which eliminates the need for tree removal and disruption of habitat

- Arboricultural investigations may be required to confirm the activity is unlikely to significantly impact upon any large or mature street tree plantings along the routes (based on and reflected in detail design and CEMP)
- no impacts are expected to any matters of National Environmental Significance and a referral to the Commonwealth Department of Environment is not required regarding threatened species or communities, and
- mitigation measures outlined above are considered to adequately manage potential impacts.

6.8 Aboriginal heritage

6.8.1 Existing environment

The routes mostly traverse paved carriageways and parking lanes of developed roads within the Deerubbin Local Aboriginal Land Council (LALC) area within Wetherill Park.

An Aboriginal heritage due diligence review was carried out in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010). The due diligence included a review of DPE's Aboriginal Heritage Information Management System (AHIMS) (see **Figure 4** and Appendix 6), the Commonwealth Department of Climate Change, Energy, the Environment and Water Protected Matters Search Tool (see Appendix 6), and field inspection along the routes (see Appendix 2). As detailed below, the due diligence found that no Aboriginal areas or objects are likely to be harmed due to:

- the activity being proposed along disturbed paved roads and disturbed developed cleared properties, and
- There being no records of Aboriginal areas or objects along the routes.

The relatively numerous registered Aboriginal sites previously identified to the north of the area of the activity are around Prospect Reservoir and (see Appendix 6) indicating the broader area was occupied and used by Aboriginal people. The known sites being around the Reservoir and Prospect Creek likely reflects the investigations carried out to date because of the heritage significance of the Reservoir, its ongoing use and development and because of other development activity nearby.

The routes traverse the paved carriageways and parking lanes of the various developed road reserves and the developed properties at the routes ends that have previously been disturbed. Previous disturbance, which is clear and observable, has occurred along the entire routes due to road and associated utilities construction necessary to service the urban industrial commercial area. The properties at the ends of the routes are also clearly and obviously disturbed due to there current previous uses. The disturbance activities have included though are not limited to construction of roads, tracks, buildings and structures, installation of utilities infrastructure, and clearing of vegetation. All resulting in significant disturbance and modification of the ground surface and below to varying depths from excavation and filling. Topsoil is not present or at least not visible, and rock /clay subgrade is also not visible along the routes.

Table 11 AHIMS sites recorded proximal the routes, including their proximity to the routes, current site status, and likelihood of harm due to the activity (see Figure below)

Site Name (AHIMS ID No.)	Proximity	Site Status	Likelihood of Harm
PH1 (45-5-2746)	210m north	valid	N/A
PB4 (Prospect Reservoir) (45-5-3264)	370m north northwest	valid	N/A
Prospect Pipehead (PP) 3 (45-5-3952)	490m north northwest	valid	N/A
PP2; Prospect Reservoir (45-5-0869)	490m north northwest	valid	N/A
Archaeological Test Area 1 (45-5-2978)	530m north northeast	valid	N/A
Prospect Hill 1 (45-5-2447)	600m north northeast	valid	N/A

REDACTED

Figure 4: Registered AHIMS sites nearest the routes

6.8.2 Potential impacts

No known Aboriginal areas or objects will be impacted by the activity, and the activity does not involve disturbing previously undisturbed ground or clearing vegetation. The previous apparent development

disturbance of the routes and area more broadly means the presence of Aboriginal objects along the routes, it being mostly developed sealed roads and otherwise including developed industrial commercial properties, is unlikely.

The location of registered Aboriginal sites is often in areas of little or no previous development or disturbance, though not exclusively, with disturbance itself sometimes revealing objects or areas. The presence of registered areas or objects is not necessarily an indication of the significance of sites or areas in a regional context, nor does it reflect the absence of artefacts adjacent or elsewhere. Registered Aboriginal sites mapping is often misleading and can suggest an absence of artefacts in other areas, whereas it is likely due to a lack detailed investigation more broadly, with detailed investigation typically focused on proposed development areas only. This is likely reflected by the AHIMS site records for the subject area and surrounds.

Therefore, consideration of the potential for Aboriginal areas or objects to be along the routes is required regardless of apparent disturbance and whether database searches indicate the existence of known Aboriginal objects or areas.

Aboriginal objects are often associated with specific landscape features due to Aboriginal people's everyday activities and traditions. The routes are not located near landscape features that typically retain evidence of activity such as are rock shelters or a cave mouth, sand dunes, waterways, waterholes, old growth trees and wetlands. It is possible that these landscape features may have been present in the area of the activity in the past, however if they were present they are no longer due to the industrial commercial land use development of the routes and the area more broadly.

Notwithstanding this due diligence finding, if potential Aboriginal objects are identified during the activity, works in that area or location shall cease, access restricted, and the construction contractor Project Manager and Environmental Specialist shall be contacted to investigate and manage or respond to the find appropriately.

Given the activity will not impact on any known Aboriginal areas or objects, is located on disturbed land, comprises no sensitive landscape features, and disturbance is clear and observable, and visual inspection did not reveal any new Aboriginal areas or objects. The likelihood of Aboriginal objects occurring along the relatively narrow routes is nil or low. Based on this due diligence finding, it has been concluded that more detailed investigation (and an AHIP application) was not required.

6.8.3 Environmental mitigation measures

Aboriginal heritage impact mitigation measures for all phases of the activity are summarised in the table below.

Table 12 Impact mitigation measures for Aboriginal heritage

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Comply with the Heritage section of the Environmental Guideline Handbook, i.e. implement an unexpected heritage finds procedure, ensuring all workers are aware of their responsibility to not harm Aboriginal areas or objects		X	X

6.8.4 Conclusion

The activity is not likely to significantly affect Aboriginal heritage in the environment for reasons including that:

- the activity would not impact any known Aboriginal sites
- there are no known Aboriginal areas or objects along the routes
- the activity is not proposed on undisturbed land
- the activity does not comprise works on any undisturbed sensitive landscape features
- a visual inspection of the route did not reveal any Aboriginal heritage areas or objects, and
- mitigation measures outlined above, including implementing an unexpected finds procedure are considered adequate to manage potential impacts.

6.9 Non-Aboriginal heritage

6.9.1 Existing environment

A desktop review was conducted of the *Australia's World Heritage List* (Commonwealth DCCEEW, 2024a), *Australian Heritage Database* (DCCEEW, 2024b), NSW State Heritage Inventory (Heritage NSW, 2024), and Schedule 5 listings of the *Fairfield Local Environment Plan 2013*, *Cumberland Local Environment Plan 2021*, and the *Blacktown Local Environmental Plan 2015*. These search results did not identify any local, State or National heritage items listed along the routes. The nearest heritage item curtilage, *Prospect Reservoir and surrounding area*, including *Pipehead, water supply canal and associated works* are at least 250m north and northeast of the routes. See Table 13. Four local heritage listed items were identified from approximately 550m and further southwest, south and east southeast of the routes. The activity will not impact these or any known heritage items.

Table 13 The nearest historic heritage listed items identified from 550m and further southwest and south of the routes

Location	Heritage listing	Heritage item
Reservoir Road, Prospect / Davis Road, Wetherill Park (from 250m NW & N of the routes)	Heritage Act - s.170 NSW State agency heritage register / Prospect Reservoir and surrounding area (SHR Listing No. 01370) / <i>Blacktown Local Environment Plan 2015</i> (Listing No. 1988)	Prospect Reservoir and surrounding area, covering an area of 1320 hectares, is Sydney's largest reservoir and stores water conveyed from Warragamba Dam, the Upper Nepean Dams (Cataract, Cordeaux, Avon and Nepean) and if necessary, from the Shoalhaven Scheme, for supplying the larger component of the water distribution system of the Sydney metropolis. It is historically significant at the state level as it is a central element of the Sydney water supply system. As a part of the Upper Nepean Scheme, it has continued to supply water to Sydney for over 120 years, and generally continues to operate in the same as it was originally constructed, reflecting the inventive and progressive nature of its design and construction ³ .

³ <https://www.hms.heritage.nsw.gov.au/App/Item/ViewItem?itemId=5045336>

Frank Street (primary), Bowden Street (alternate), Parkes Street (alternate), Palmer Street (alternate), Guildford (Pemulwuy) (from >250m NE of the routes)	<i>Cumberland Local Environmental Plan 2021 (State Listing No. I01629)</i>	Pipehead, water supply canal and associated works (see Prospect Reservoir listing)
300 Victoria Street (ridgetop), Wetherill Park (550m S of the routes)	<i>Fairfield Local Environment Plan, 2013 (Local Listing No. I101)</i>	Victoria Street, Wetherill Park Bunya pines
363–365 Victoria Street (550m SW of the routes)	<i>Fairfield Local Environment Plan, 2013 (Local Listing No. I102)</i>	Wetherill Park Monastery

6.9.2 Potential impacts

The routes traverse the paved carriageways and parking lanes of the various developed road reserves and the properties at either end of the routes. These areas are considered disturbed area and are remote from the nearest heritage listed items. Due to the previous disturbance and the routes remote location relative the known surrounding heritage items, it is concluded that any historic heritage items would be unexpectedly found and potentially unintentionally impacted by the activity.

6.9.3 Environmental mitigation measures

The table below provides historic heritage impact mitigation measures for all phases of the activity.

Table 14 Impact mitigation measures for Historic heritage

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Comply with the Heritage section of the <i>Environmental Guideline Handbook</i> , i.e. implement an unexpected [heritage] finds procedure, ensuring all workers are aware of their responsibility to not harm heritage items		X	X
If human remains are uncovered, works must immediately cease, and the NSW Police department and Endeavour Energy are to be notified		X	

6.9.4 Conclusion

The activity is not likely to affect the environment in relation to historic heritage because:

- there are no known non-Aboriginal items along the routes
- the activity would not affect known non-Aboriginal heritage items
- The mitigation measures outlined above would adequately manage potential impacts.

6.10 Contamination

6.10.1 Existing environment

Based on a desktop review of the routes and surrounds there is a single adjacent registered contaminated site (NSW Environment Protection Authority (EPA), 2024). The contaminated property, located at the intersection of (189) Hassall Street and Widemere Road, Wetherill Park and known as Fairfield Sustainable Resource Centre (comprising Lot 1, DP515773, Lot 34, DP657040, Lots 35 & 37, DP3082) is a notified contaminated site listed as being under assessment on the NSW EPA contaminated sites list (8 November 2024). The routes traverse Widemere Road adjacent to the west of this site. The Cleanaway (Formerly Nationwide Oil) Wetherill Park property at 2 Wenban Place (6 Davis Road), Wetherill Park (Lot 1, DP873966) is a notified contaminated site listed as being regulated under the *Contaminated Land Management Act 1997* (8 November 2024). This property is located approximately 150m west of the western extent of the routes. Whilst these two sites are anticipated to be an adequate distance from the routes, their existence as contaminated sites shall be noted in the design, the CEMP and inductions. Being proposed within an industrial commercial area, there is otherwise a higher-than-average potential for contamination to be encountered during the works.

The (CEMP) shall document procedures for management of unexpected contamination with general environmental controls. The CEMP should also document procedures for general environmental controls to be implemented during construction activities that will mitigate potential human health risk and environment harm from unexpected contamination.

6.10.2 Potential impacts

There is no direct evidence to indicate that the routes are contaminated. However, noting contaminated sites are known adjacent and nearby, and the area has been subject to industrial commercial land use for many years, there is potential for unexpected contaminant finds. Works shall proceed with appropriate controls to reasonably mitigate the risk of harm to human health and the environment. Indicators of contamination shall be discussed with workers at site inductions and daily pre-start meetings, and the design and CEMP shall note the known contaminated sites and the potential otherwise to remind intrusive workers to be vigilant in their assessment of identifying potential contamination. This shall be consistent with Endeavour Energy's Environmental Management Standard *EMS 0013 Spoil and Imported Material Management* (Endeavour Energy, 2024).

If asbestos or other contaminants are encountered in soil or otherwise, such as associated with existing utility assets or otherwise during construction, works shall cease, access be restricted and the contaminant managed and disposed in accordance with the Environmental Guidelines Handbook and NSW EPA *Waste Classification Guidelines* (NSW EPA 2014), including retaining any waste disposal records.

Similarly, if acid sulfate soils are encountered, the work would need to be undertaken consistent with the Environmental Guidelines Handbook. Alternatively, it may be necessary to prepare and comply with a site-specific acid sulphate soil management plan (ASSMP). Disposal records shall be retained.

Soil quality may be affected by spills of hydraulic oil and fuels from vehicles, plant and equipment. The extent could be expected to be localised with appropriate controls minimising the potential for contamination to occur. Quantities of these products would be minimal and would be stored in a suitably bunded and covered area. Adequate storage and refuelling controls shall be implemented to mitigate impacts. Vehicles, plant and equipment should be maintained to minimise the potential for leakages. Any accidentally contaminated soil would be excavated, stockpiled, chemically classified for disposal and transported to an appropriately licensed waste facility with disposal records retained.

If unexpected contamination is identified during construction, the works would cease, access restricted and the Project Manager or Environmental Officer contacted to determine the nature and extent of the contamination.

6.10.3 Environmental mitigation measures

Contamination mitigation measures for all phases of the activity are summarised in the table below.

Table 15 Impact mitigation measures for contamination

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Comply with <i>Environmental Guideline Handbook (Endeavour Energy, 2024)</i> and NSW EPA <i>Waste Classification Guidelines</i> (NSW EPA 2014)	X	X	X
Workers to remain vigilant during intrusive works to identify potential contamination		X	X
Ensure suspected contaminated spoil is segregated from clean spoil to reduce disposal costs		X	
Undertake testing to determine the waste classification and subsequent storage, transport, tracking, licensing and disposal requirements. Disposal records shall be retained.	X	X	
Provide a secure and bunded area for the storage of fuel, oil or chemicals. This area would be imperviously bunded with a capacity to contain not less than 110% of the volume of the largest container		X	

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Temporarily store excavated known or suspected contaminated spoil in a covered, lined/ sealed skip or bulk storage bag or sealed container on-site for classification prior to disposal off site. Where there are site restrictions for on-site storage, store offsite. If storing more than 5 tonnes of spoil, use a licensed storage facility		X	
If suspected contamination is found, stop work immediately, restrict access and notify: <ul style="list-style-type: none"> • your supervisor • The Project Manager and Environmental Officer and • the safety advisor for WHS requirements. 		X	
Any person handling the waste is trained in handling Scheduled Chemicals and methods of containing Scheduled Chemical spills and wears Personal Protective Equipment (PPE)		X	X
All packages / storage containers are clearly labelled and maintained in good order		X	X
Prior to construction, nominate and sign post a refuelling area and have spill response equipment at hand	X	X	
If asbestos is encountered in soil, old conduits, or joint bays during construction, works shall cease, access restricted and the asbestos managed and disposed of in accordance with the <i>Environmental Guideline Handbook</i> and NSW EPA <i>Waste Classification Guidelines 2014</i>		X	X
Unexpected finds procedure shall apply if acid sulphate soils are encountered in accordance with the <i>Acid Sulfate Soils Assessment Guidelines 1998</i> , the <i>Environmental Guideline Handbook</i> , and NSW EPA <i>Waste Classification Guidelines 2014</i>	X	X	

6.10.4 Conclusion

The activity is not considered likely to significantly impact the environment or be impacted in relation to contamination due to:

- there being no known contamination along the routes or nearby
- contamination would be managed in accordance with relevant Endeavour Energy and DPE contamination guidelines, and
- mitigation measures outlined above would readily manage potential impacts.

6.11 Electric and magnetic fields

6.11.1 Existing Environment

The routes traverse the paved carriageways and parking lanes of the various developed road reserves through a commercial industrial area, therefore the routes do not feature typical potentially sensitive receivers such as residences or schools nearby.

Electric and magnetic fields (EMF) are part of the natural environment and are present in the Earth's core and the atmosphere. EMF is also produced wherever electricity or electrical equipment is in use. Powerlines, electrical wiring, household appliances and electrical equipment all produce EMF.

The electric field is proportional to the voltage (which can be considered as the pressure with which electricity is pushed through the wires). The magnetic field is proportional to the current, that is, to the amount of electricity flowing through the wires. Both electric and magnetic fields are also dependent on the source geometry (i.e. conductor heights, cable depths, phase separations and so on). All fields decrease rapidly with distance from the source. Generally, the smaller the object or closer the conductors producing the field, the more rapidly the field would decrease with distance from the source. Network operators are aware of concerns in the community and those of some scientists regarding the possibility of adverse health effects from exposure to EMF.

Research has been extensively reviewed over the last 30 years by Australian and international inquiries and expert panels established for the purpose of determining whether human exposure to EMF is or is not related to adverse health effects.

There is scientific consensus that health effects have not been established, however the possibility cannot be ruled out. Some scientists argue there is need for ongoing high quality scientific research to give better answers to the questions which have been raised. Others hold the view that no further research is required, and that EMF should not be regarded as a risk to health.

It is well accepted by scientists that no study considered in isolation would provide a meaningful answer to the question of whether EMF can contribute to adverse health effects or not. To make an informed conclusion from all the research, it is necessary to consider the science in its totality. Over many years, governments and regulatory agencies around the world have commissioned independent scientific review panels to provide such an overall assessment. The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), as part of the Health and Ageing Portfolio, is a Federal Government agency charged with responsibility for protecting the health and safety of people, and the environment, from EMF.

ARPANSA advises that:

"On balance, the scientific evidence does not indicate that exposure to 50 Hz EMFs found around the home, the office or near power lines is a hazard to human health."

"... the majority of scientists and Australian radiation health authorities in particular, do not regard chronic exposure to 50 Hz electric and magnetic fields at the levels commonly found in the environment as a proven health risk. Moreover, the evidence we have is inconclusive and does not allow health authorities to decide whether there is a specific

magnetic field level above which chronic exposure is dangerous or compromises human health.”

“At the present time there is no evidence that exposure to electric fields is a health hazard (of course excluding electric shock).”

There are currently no Australian standards regulating exposure to these fields. The National Health and Medical Research Council has issued interim guidelines on limits of exposure to 50/60 Hz electric and magnetic fields. These guidelines are aimed at preventing immediate health effects resulting from exposure to these fields. The recommended magnetic field exposure limit for members of the public (24-hour exposure) is 0.1 milliTesla (1,000 mG - milligauss) and for occupational exposure (whole working day) is 0.5 milliTesla (5,000 mG).

NSW Network Operators generally operate their powerlines, substations, and other electrical infrastructure well within these interim guideline limits.

NSW Network Operators generally have a policy of providing balanced and accurate information, operate their electrical power system prudently within Australian health guidelines, and closely monitor scientific research on the EMF health issue.

6.11.2 EMF health guidelines

The two internationally recognised exposure guidelines are:

- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 2010, and
- International Committee on Electromagnetic Safety, Institute of Electrical and Electronics Engineers (IEEE) in the USA 2002.

ARPANSA's advice is that *“The ICNIRP ELF guidelines are consistent with ARPANSA's understanding of the scientific basis for the protection of people from exposure to ELF EMF”*.

The following table summarises the magnetic field exposure Reference Levels for IEEE and ICNIRP.

Table 16: Magnetic field Reference Levels at 50Hz for IEEE and ICNIRP

	IEEE 2002	ICNIRP 2010
GENERAL PUBLIC		
Exposure general	Not specified	2,000 mG
Exposure to head and torso	9,040 mG	Not specified
Exposure to arms and legs	758,000 mG	Not specified
OCCUPATIONAL		
Exposure general	Not specified	10,000 mG
Exposure to head and torso	27,100 mG	Not specified
Exposure to arms and legs	758,000 mG	Not specified

6.11.3 Prudent avoidance

Since the late 1980s, many reviews of the scientific literature have been published by authoritative bodies. There have also been several Inquiries such as those by Sir Harry Gibbs (Gibbs, et al, 1991) in NSW and Professor Hedley Peach (Peach, et al, 1992) in Victoria. These reviews and inquiries have consistently found that:

- adverse health effects have not been established,
- the possibility cannot be ruled out, and
- if there is a risk, it is more likely to be associated with the magnetic field than the electric field.

Both Gibbs and Peach recommended a policy of prudent avoidance, which Gibbs described in the following terms:

“... [doing] whatever can be done without undue inconvenience and at modest expense to avert the possible risk ...”

Prudent avoidance does not mean there is an established risk that needs to be avoided. It means that if there is uncertainty, then there are certain types of avoidance (no cost / very low-cost measures) that could be prudent. These recommendations have been adopted by the ENA and electricity transmission and distribution network operators generally.

6.11.4 Energy Network Australia position

Energy Networks Australia (ENA) is the peak national body for Australia’s energy networks. ENA represents gas and electricity distribution, and electricity transmission businesses in Australia on a range of national energy policy issues.

ENA is committed to taking a leadership role on relevant environmental issues including power frequency EMF. ENA and its members are committed to the health and safety of the community, including their own employees.

The ENA's position is that adverse health effects from EMF have not been established based on findings of science reviews conducted by credible authorities. ENA recognises that some members of the public nonetheless continue to have concerns about EMF and is committed to addressing this through the implementation of appropriate policies and practices.

ENA is committed to a responsible resolution of the issue where government, the community and the electricity supply industry have reached public policy consensus consistent with the science.

Policy statement:

1. ENA recommends to its members that they design and operate their electricity generation, transmission and distribution systems in compliance with recognised international EMF exposure guidelines and to continue following an approach consistent with the concept of prudent avoidance.
2. ENA will closely monitor engineering and scientific research, including reviews by scientific panels, policy and exposure guideline developments, and overseas policy development, especially regarding the precautionary approach.
3. ENA will communicate with all stakeholders including assisting its members in conducting community and employee education programs, distributing information material including newsletters, brochures, booklets and the like, liaising with the media and responding to enquiries from members of the public.
4. ENA will cooperate with any bodies established by governments in Australia to investigate and report about power frequency electric and magnetic fields.

6.11.5 Cumulative impact

Adding magnetic fields from multiple sources is a complex and dynamic exercise. In the residential environment there is already multitude of sources such as existing power lines, service lines, household electricity wiring, electric appliances and water pipes. Each of these sources has a unique magnetic field profile which changes over time depending on the nature of the source and load it is carrying. This is further complicated by the fact that magnetic fields are vectors that have direction as well as size.

While attempting to define the exact field at a particular point in time is therefore problematic, it can be shown that the addition of two magnetic fields with random orientation is slightly less than the root-sum-of squares. In practice this means that one field must be only slightly larger than the other to dominate the average result. For example, if one field is half the size of the other field, it makes only a 10% difference to the total. For this reason, it is common practice when calculating fields from a cable (where this is the dominant source), to calculate the field from the cable and ignore other sources.

Noting the predicted time weighted average magnetic fields at the nearest part of residences from the cables are within the range of typical background levels, and there are no residences, schools or other typical sensitive receivers proximal the route. Exposure within the nearest residences or other receptors along the routes will in many cases be dominated by existing sources within the building.

Cumulative impact considerations do not change the conclusions that the project will comply with relevant guidelines and the principles of prudent avoidance.

6.11.6 Magnetic field calculations

A specialist EMF assessment is not considered necessary due to the routes not being near, as gauged by reasonable prudent avoidance distances, to the nearest potentially sensitive receptors which may be offices in adjoining businesses.

6.11.7 Potential impacts

The activities incorporation of prudent EMF avoidance measures into the standard design or layout of the cables in the trench and routes selected.

The design of the activity is consistent with Gibbs Inquiry (1991) in that it has minimised the magnetic field as far as technically reasonable and within the context of "...[doing] whatever can be done without undue inconvenience and at modest expense to avert possible risk [to health]".

Given there are no sensitive residential receivers nearby and that the next nearest receivers would be office employees more than 50m from the activity, it is unlikely the new cables will expose sensitive receivers to additional EMF beyond background levels in the environment.

6.11.8 Environmental mitigation measures

Mitigation measures for all phases of the activity are summarised in **Table 17**.

Table 17: EMF mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Implement no cost and very low-cost measures to reduce magnetic field exposure, including where relevant: <ul style="list-style-type: none"> • using a compact phase configuration (e.g. trefoil), and • using optimum phase arrangement, and • allowing for spare conduits; where installed to be arranged in the optimal phase arrangement, namely inverted trefoil. 	X	X	
Within the carriageway locate cables to minimise exposure as far as reasonably practicable (with potential increased temporary construction impacts).	X	X	

Mitigation measures	Implementation of mitigation measures		
The activity will comply with all relevant national and international guidelines	X	X	X
Select cable routes to avoid potentially sensitive receivers as much as practicable to minimise exposure (with potential increased temporary construction impacts).	X	X	

6.11.9 Conclusion

The activity is not likely to significantly affect the environment in relation to EMF for reasons including:

- the activity would meet all relevant international health guidelines, including the, ICNIRP Guideline, and IEEE Standard
- Several mitigation measures are proposed as detailed above which will substantially reduce the potential magnetic field exposure
- the proposed mitigation measures are consistent with the prudent avoidance and precautionary policies and advice of the ENA, ARPANSA and WHO, and
- the routes do not traverse in the vicinity of potential sensitive receivers such as residential dwellings along.

6.12 Visual and aesthetics

6.12.1 Existing environment

The routes mostly traverse existing cleared paved carriageways and parking lanes of developed roads through a developed urban industrial commercial environment. A range of small, medium and large commercial and industrial business are present adjacent the routes and beyond. The existing visual environment of the routes consists of these existing local connector roads servicing established industrial, commercial and warehouse buildings, with overhead utilities infrastructure in a large typical developed urban commercial industrial area. The area features minimal planted roadside vegetation, including planted shrubs and some canopy trees, an exotic grassed nature strip and concrete footpath. The local connector roads experience high traffic volumes, particularly during business hours and during the shoulder periods either side in the morning and afternoon/evening servicing the surrounding commercial industrial area. The topography is relatively level with a slight rise up Widemere Road to Hassall Street and a more pronounced rise to the Wetherill Park Zone Substation along Redfern Street. The area offers no view of water or other significant views or vista.

6.12.2 Potential impacts

Potential visual impact may be determined based on the visual sensitivity of the site and the magnitude of changes. It is considered that the site has a low visual sensitivity, being a highly developed urban industrial commercial warehouse area featuring or dominated by local roads and road related utility infrastructure assets.

6.12.2.1 Short term visual impact

The construction stage of the activity would cause a temporary short-term visual impact or change to local views due to the presence of machinery, plant, equipment, and civil works machinery or vehicle, temporarily open trenches and exposed soil.

This type of impact or change would vary throughout construction, with the early civil works stage involving trenching, conduit and joint bay installation, and backfilling being the most visually prominent and extending in relatively short stages or sections along the routes. Later stages including cable installation and joining, testing and commissioning will be less visually intrusive.

As construction impacts would be temporary or short term and transient, and adjoining businesses would be notified regarding construction activity, the overall impact during construction is not expected to be significant. Disturbed areas would be reinstated and restored as soon as practicable to effectively ameliorate any short-term visual impact.

6.12.2.2 Long term visual impact

Being underground, the activity will have no long-term visual impact as there will no long-term visual change. The cable connections at either end of the routes will be within private properties with similar electrical infrastructure and will therefore not materially affect any views or vistas.

Once constructed, the activity would not affect access to businesses, or to recreational locations that could be accessed via the routes. The activity will require minimal maintenance, reducing the need for plant and equipment along the routes. Maintenance work would be incorporated into Endeavour Energy's existing underground cables maintenance program.

6.12.3 Environmental mitigation measures

Visual impact mitigation measures for all phases of the activity are summarised in the table below.

Table 18 Visual impact mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Notify affected stakeholders regarding the activity prior construction	X	X	
Construction will be short term in particular location as it progresses along routes		X	
The cables would be installed underground within existing roadways etc	X	X	X
Temporarily reinstate the roadways during works and permanently restore the roadways post works to a suitable condition		X	

6.12.4 Conclusion

The activity is not likely to significantly affect the relatively low visual and aesthetic value of the environment because:

- the cables would be installed underground
- overhead connections or works will be in an infrastructure compounds with similar overhead or above ground components
- the routes are along existing developed paved roads, and
- mitigation measures outlined above would adequately manage potential visual impacts in this environment.

6.13 Bush fire

6.13.1 Existing environment

The routes predominantly traverse existing cleared paved carriageways and parking lanes of developed roads through a developed urban industrial commercial environment, with limited or sparse landscaping vegetation including generally isolated canopy tree species along some sections of the routes. There are limited areas of interconnected planted vegetation that consists of isolated individual trees and shrubs or small patches of several trees or shrubs. The routes traverse approximately 180m from bushfire prone vegetation buffer lands and 280m from Category One and Category Three Bushfire Prone lands that surround Prospect Reservoir and follow Prospect Creek downstream of the Reservoir in smaller patches to the north and northeast respectively.

6.13.2 Potential impacts

The risk of causing a bush fire is primarily associated with construction and maintenance activities, not the inherent nature of the proposed infrastructure. The main risks constitute:

- undertaking various kinds of 'hot work' where naked flames are used, such as welding, use of blowtorches, and use of gas torches for shrinking heat shrink components, and
- use of machinery with the potential to generate sparks, such as jack hammers, rock saws, and angle grinders.

Hot works are restricted during total fire bans and require risk assessments and precautions to be put in place to minimise the risk of causing a bush fire. These precautions would apply to construction and maintenance for the life of the activity.

The risk from bushfire is relatively low as the routes are buffered to the nearest bushfire prone lands by more than 250m with industrial commercial buildings between.

6.13.3 Environmental mitigation measures

Mitigation measures for bushfire for all phases of the activity are summarised in the table below.

Table 19 Impact mitigation measures for bush fires

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Comply with Total fire ban restrictions		X	X

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Any hot works during a total fire ban must be in accordance with a Clause 6 Exemption if required. This includes grinding, welding, brazing, oxy-cutting, heat treatment or processes that generate heat or continuous streams of sparks. The construction contractor must obtain exemptions for hot works		X	X
Hot works areas are to be clear of combustible matter by not less than 3m. Adequate firefighting equipment must pre-deployed to be available nearby immediately at hand		X	X
The CEMP shall include provisions for bushfire protection measures, including an emergency management plan for how to respond to bushfire		X	
Site induction for contractors working on the activity will include general bushfire protection measures and requirements		X	
Electrical equipment, plant, and equipment must be maintained in operational order to prevent any potential sparks		X	X
Monitor bushfire risk status and be vigilant regarding nearby bushfires		X	X
The project will be constructed and maintained in accordance with EE Company Procedure GAM 0011		X	X

6.13.4 Conclusion

The activity is not likely to significantly affect the risk of bush fire for reasons including:

- the activity is not located within or near bush fire prone land
- during a total fire ban, no open fires or hot works would be undertaken unless in accordance with a Clause 6 Exemption granted by the NSW RFS
- the routes traverse cleared paved carriageways and parking lanes of developed roads through a developed urban environment and the adjacent surrounding area does not feature large tracts or areas of interconnected bushland

- that the mitigation measures outlined above will manage potential impacts.

6.14 Landuse

6.14.1 Existing environment

The routes are located within the Fairfield LGA. The *Fairfield Local Environmental Plan 2013* applies to the routes, including the local roads and the two properties traversed being zoned E4 General Industrial land use. The LPT area underbored by the activity is land use zoned SP2 Infrastructure.

The roads and properties traversed by the routes are listed and discussed above at **Feeder Routes** and Error! Reference source not found.. The Error! Reference source not found. aspect being considered the most significant as identified by this assessment and requiring appropriate impact mitigation measures. The adjacent land uses with frontages to the various roads include industrial, commercial, and warehouse type developments (see **Appendix 2**). These vary from smaller individual factory units to multi-unit complexes, to larger warehouse type developments as detailed in the Table below. Other development types include limited cafes or food outlets to service the area. As discussed previously, there are no typical sensitive receivers such as residences, schools or otherwise. Business offices and food outlets are the nearest potentially sensitive receivers to the routes, and these are not nearby. The nearest being more than 50m from the routes. An overhead dual circuit 132kV lattice tower type transmission powerline traverses the southern side of Davis Road from west to east, from the West Wetherill Park Transmission Substation at 3 Potter Close to the Wetherill Park Zone Substation in Redfern (Walter) Street. The Fairfield Sustainable Resource Centre facility has a frontage to the east of Widemere Road with driveway accesses off Widemere Road.

Table 20: Land uses adjacent to the proposed routes (also see Appendix 2)

Land use	Location
Small to medium sized industrial commercial business enterprises	Eastern side of Redfern (Walter) Street, northern side of Hassall Street and eastern side of Widemere Road
Medium to large industrial commercial warehouse and distribution enterprises	Both sides of Davis Road including the ex-Reservoir Distribution Centre site being redeveloped as the Davis Road Data Centres
SP2 Infrastructure land use zoning applies to the LPT route	Adjacent west of Redfern (Walter) Street, crossing Frank Street opposite the Wetherill Park Zone Substation and continuing north to cross Davis Road near its eastern end

6.14.2 Potential impacts

The activity is consistent with current land uses including with the *Fairfield Local Environmental Plan 2013* land use zone E4 General Industrial and SP Infrastructure objectives. Being consistent with current land uses and being benign once constructed and operational, the underground electricity utility asset will not impact current or future land uses. The activity will support or positively contribute to current and future land uses by providing reliability of electricity supply to the proposed Data Centres development without compromising or affecting supply reliability to existing land uses.

Temporary or short-term minor impacts to road use during the construction phase of the activity are anticipated (see 6.1 Traffic and access) and will include:

- minor traffic disruption due to construction activity and the need for temporary traffic management arrangements during construction along local roads
- temporary transient reduction of available roadside parking opportunities along local roads
- a negligible increase in vehicle traffic due to construction vehicle activity
- noise from construction activity (Noise and vibration. [p. 32], and
- temporary visual changes from construction activity (6.12 Visual and aesthetics).

The activity would not have a significant impact on existing land uses. The access roads and underground power cables beneath would not form a physical barrier. People, vehicles, plant and machinery would continue to be able to move along and across the routes once the underground power cables are completed and commissioned.

As stated previously, pre and post works dilapidation assessment and record are generally recommended to be carried out, particularly where vibration or construction machinery strikes or otherwise could impact utilities infrastructure assets or structures.

6.14.3 Environmental mitigation measures

Land use impact mitigation measures for all phases of the activity are summarised in the table below.

Table 21: Land use mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Dial-Before-You-Dig search and notification to relevant utility infrastructure asset owners/managers	X	X	X
Consult with affected stakeholders regarding the activity	X	X	
Undertake condition reports (dilapidation reports) of structures that may be at risk machinery strike etc	X	X	X
The route should be left in a tidy condition at the conclusion of construction activities			
Provide information via a free call 1800 number, email address or constructors website for those wanting more information	X	X	

6.14.4 Conclusion

The activity is not likely to significantly affect the environment in relation to land use for reasons including:

- that construction related impacts would be minor, localised and short-term or temporary

- that a reliable supply of electricity would allow existing and future land uses to continue and be developed
- that the impact mitigation measures recommended above are expected to adequately manage potential impacts.

6.15 Social and Economic

6.15.1 Existing environment

The routes traverse local roads through the Wetherill Park Industrial area in the Fairfield LGA. The land adjacent and accessed by these local roads' features industrial commercial type developments of varying size or scale.

6.15.2 Assessment of impact

The activity will ensure reliability of electrical supply to the proposed Data Centres, resulting in a positive economic and social impact or benefit for the community.

By reducing the probability of power shortages and failure, the activity is reducing the associated economic risks, including equipment damage and productivity losses resulting from interruption of industrial commercial activities in the area.

Construction projects such as this create opportunities for suppliers, contractors and consultants which creates flow on benefits for local communities. Discretionary spending by civil contractors during the construction period would benefit the local area.

Short term impacts on the community during the construction phase include a minor increase in traffic, temporarily altered traffic conditions, temporary property access arrangements and construction noise. The proposed consultation and notification process, as discussed in **Consultation** details how stakeholders can influence the activity for the benefit of the community.

Due to the localised and short-term nature of the construction works aspect and the positive social and economic contribution of the development being supported by the activity, the potential for negative socio-economic impacts from the activity are minimal and short term, such as the implications of temporary minor traffic disruption and minor temporary parking restrictions. As stated previously, once constructed, and commissioned or operational, the activity will be benign in terms of community impacts and will have a positive social and economic impact by supporting development and providing reliable electricity supply to the community.

6.15.3 Environmental mitigation measures

Mitigation measures for all phases of the activity are summarised in Table 22 below.

Table 22 Social and economic mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation

Traffic, noise and EMF impact mitigation measures would be implemented to reduce potential impacts on the surrounding community.	X	X	X
Signs and barriers would be erected around construction work sites, where appropriate, to minimise the possibility of personnel injuries and prevent placing the public at risk and provide site contact details during construction works		X	
Stakeholder consultation and pre-works notification	X	X	

6.15.4 Conclusion

The activity is not likely to significantly affect the environment in relation to social or economic impacts for reasons including:

- construction related impacts would be localised, minor, and short-term or temporary
- once operational, the benign nature of the activity means there will be no negative socio-economic impacts associated with the activity,
- a more reliable electricity supply reduces associated economic risks such as damage to equipment and productivity losses resulting from short term interruption of commercial activities, and
- that the mitigation measures outlined above would reasonably and adequately manage potential impacts.

6.16 Cumulative Impacts

The interaction of elements or aspects of the activity with other existing or proposed developments in the area can result in cumulative impacts.

Undertaking an inspection of the activity area, carrying out a review of current development applications and recent development approvals, and undertaking consultation and notification with relevant stakeholders during the design and environmental assessment process is required to identify potential cumulative impacts. Carrying out timely construction notification can also identify activities that may have cumulative impacts. Due to the surrounding developed land uses, and the interconnected nature of the electricity network, Endeavour Energy, other utility asset managers, and developers may have electricity network and non-network projects with flow on effects.

Activities with potentially cumulative impacts may include:

- The Davis Road Data Centres
- other utilities development and maintenance activities
- commercial developments and redevelopments.

6.16.1 Assessment of impact

6.16.1.1 Construction

Being an existing developed industrial commercial area, it is not anticipated that there will be any significant redevelopment surrounding that will result in cumulative impacts. Field inspection of the route, and reviews of the Fairfield City Council development application tracker and the NSW Planning Portal did not identify any existing or proposed activities likely to result in cumulative impacts.

Development of the Davis Road Data Centres will involve potentially simultaneous construction activity. However, activities associated with this development will be mostly internal the Data Centres site and can be expected to be appropriately mitigated. Construction vehicle activity associated with the Data Centres could be expected to increase traffic movements. However, considering that appropriate traffic management will apply to this proposed development and the Data Centres development, and high overall traffic volumes or movements through the existing industrial commercial area are typical. The potential cumulative increase in traffic movements is not anticipated to be significant.

6.16.1.2 Operation

In terms of cumulative impacts associated with operation of the activity, it is itself relatively benign.

6.16.2 Environmental mitigation measures

Mitigation measures for all phases of the activity are summarised in Table 23 below.

Table 23 Cumulative impacts mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design/ Enviro. Assessment	Construction	Operation
Site Inspection/monitoring	X	X	
Current/recent development applications and approvals review	X		
Current/recent development applications and approvals review	X	X	

6.16.3 Conclusion

The activity is not likely to significantly affect the environment in relation to cumulative impacts for reasons including:

- construction related impacts associated with the activity would be appropriately mitigated to be localised, minor, and short-term or temporary

- the construction related impacts associated with the nearest known development, the Davis Road Data Centres development, will mostly be within the Data Centres site and the potential external impact, traffic and access, would be appropriately managed as part of the Data Centres development
- the benign nature of the activity means there will be no cumulative impacts associated with the activity in operation, and
- that the mitigation measures outlined above would reasonably and adequately manage potential impacts.

6.17 Summary of Environmental Mitigation Measures

The environmental mitigation measures outlined in this document would be incorporated into the project specific CEMP. These safeguards would minimise any potential adverse impacts arising from the proposed works on the surrounding environment. The mitigation measures are summarised in the table below.

Table 24. Summary of Environmental Impact Mitigation Measures

Aspect	Environmental Mitigation Measure	Description
General	<ul style="list-style-type: none"> Maintain and retain complaints register, including details of the complainant, date, time, person receiving complaint, complainant's contact number [if willing to provide], person referred to, time of verbal response, details and timeframe for rectification and written response where appropriate 	During works
General	<ul style="list-style-type: none"> All environmental mitigation measures must be incorporated within the Construction Environmental Management Plan (CEMP) and associated sub-plans for the activity 	Pre-works
General	<ul style="list-style-type: none"> The installation, and inspection and maintenance requirements for all erosion and sediment control measures will be specified in the CEMP Inspections shall be undertaken immediately following rainfall events that cause run-off, and otherwise weekly or as required during periods of no rain. 	Pre-works and during works as required
General	<ul style="list-style-type: none"> Environmental awareness training must be provided to all field personnel, contractors, and subcontractors 	Pre-works and during works as required
General	<ul style="list-style-type: none"> Undertake condition reports (dilapidation reports) of structures that may be at risk from vibration generating works 	Pre, during and post works
Safety and hazards	<ul style="list-style-type: none"> Safety signage, barriers, fencing, etc. shall be placed around construction areas, and these will be inspected and maintained appropriately to ensure they are in good working order Recommendations of the Traffic Management Plan will be implemented during the construction works Any open holes that will be unattended at any time must be covered and fenced to prevent access All works will be undertaken in accordance with SafeWork NSW requirements, Endeavour Energy standards and procedures and any other applicable requirements The Construction Project Manager shall carry out dial before you dig searches prior to works commencing on site. 	Pre-works and during works and operation
Licences, Permits, Approvals and Notifications	<ul style="list-style-type: none"> Notification to Fairfield City Council and occupiers of adjoining land in accordance with clause 2.45 of State Environmental Planning Policy (Transport and Infrastructure) 2021 Roads Occupancy License must be obtained from TfNSW in relation to the LPT (Liverpool Parramatta Transitway) underbore 	<p>21 days prior to works commencing</p> <p>Pre-works</p>
Traffic and Access	<ul style="list-style-type: none"> Consultation with various relevant stakeholders Approved temporary traffic management, (traffic management plan), including for (justified and approved) out-of-hours works if required, to maintain traffic flow and minimise traffic and street parking impacts Pre-construction (not less than 14 days prior) notification provided to businesses along the routes Temporary access arrangements to properties would be implemented during trenching works, such as with steel plates Engage experienced lineal infrastructure construction contractor Limit excavation works to between 50m and 100m sections to reduce impacts on parking Where works are proposed to underbore the LPT, a classified State Road, consent is required under section 138(1) of the <i>Roads Act 1993</i>. A road occupancy license (ROL) must be obtained from TfNSW where works are proposed Access affected businesses shall also be provided with additional notification not less than 48 hours' prior to any proposed access changes to their properties Pedestrian traffic route shall be maintained during the works Where there is a demonstrated and justified need to work outside standard construction hours, this should involve notification to Council, and adjacent and nearby businesses and be in accordance with an approved traffic management plan Reinstate roads post works in consultation with Fairfield City Council (regarding the local roads) and TfNSW (regarding the LPT underbore) 	Pre-works and during works

Aspect	Environmental Mitigation Measure	Description
	<ul style="list-style-type: none"> A traffic management plan (TMP) for the construction phase would be required to be completed prior to works commencing. The TMP would outline requirements for the safe and continued use of local transport corridors during construction. 	
Noise and Vibration	<ul style="list-style-type: none"> Comply with the Endeavour Energy <i>Environmental Guideline Handbook and the Draft Construction Noise Guideline</i> (NSW EPA, 2020) The construction contractor to verify the presence of sensitive receivers, i.e. restroom, offices, 24-hour operations through construction notification process, and consider all reasonable and feasible responses and measures to minimise impacts All workers to be made aware of the presence of any identified sensitive receivers, i.e. restrooms, offices, 24-hour operations, and the need to avoid or minimise noise Provide at least 14 business-days notification to affected receivers prior to starting works, unless it is emergency works or is individually discussed with the affected receivers face-to-face, and a written or electronic record of any agreement retained Notify and consult with any potentially affected identified sensitive receivers (eg; restroom areas, offices) just prior to nearby works Plan the site layout to minimise movements that would activate audible reversing and movement alarms Where an ROL stipulates out-of-hours works, the works must meet the requirements of the <i>Environmental Guideline Handbook</i>, out-of-hours work criteria Council should be notified of out-of-hours works prior to their commencement Provide information a free call 1800 number, email address and constructors website for people wanting more information or to report incidents Provide signage outside the worksite detailing who is undertaking the works and a 24-hour construction contact phone number and email/website address Have a documented complaints process, including an escalation procedure, so there is a clear process path to follow should a complainant continue to be dissatisfied Undertake condition reports (dilapidation reports) of structures that may be at risk from vibration generating works Reinstate trenches, underbore open points, and joint bays as soon as practicable to minimise noise risk associated with road plates remaining in place Once installed pits lids and plates must be secure, and must not rock, vibrate or make noise. Impact absorbing material must be installed between pit lids and road surfaces to prevent noise nuisance Recess road plates flush with the road surface when in place for more than 2 nights on high traffic roads Do not leave vehicles, plant, or equipment idling when not in use or needed Noting the need to manage traffic impacts and the lack of typical sensitive receivers, out-of-hours works hours may be undertaken where the following requirements are met including justification for out of hours works. Out-of-hours works notification must be provided 14 days prior to: <ul style="list-style-type: none"> Neighbours (and other sensitive receivers) adjacent to the works, the local council and the NSW Environment Protection Authority (EPA). Where the works are required to take place in the vicinity of access ways or driveways, consultation with individual business would be undertaken to advise businesses of the planned timing of the works 14 days and 1 day prior All plant and equipment will be operated and maintained in accordance with the manufacturer's specifications and not left idling when not in use Pre-cast joint bays may be required to reduce time of construction. In the unlikely event that joint bay construction or other works requires more than three weeks continuous works in a single location, a noise assessment and additional mitigation measures may be required. Construction contractor to engage specialist advice in such circumstances Mains supply should be used at joint bays where practicable. Where mains supply is not reasonably attainable, low noise generators/pumps must be used at joint bays, only operated when required, and with noise barriers surrounding the generator/pump if required such as for out-of-hours works Construction works should adopt Best Management Practice (BMP) and Best Available Economically Achievable Technology (BAEAT) as addressed in the DCNG. BMP includes factors discussed within this report and encouragement of a project objective to reduce noise emissions. BAEAT practices involve incorporating the most advanced and affordable technology to minimise noise emissions. 	During works

Aspect	Environmental Mitigation Measure	Description
Water Quality and Hydrology	<ul style="list-style-type: none"> Comply with relevant sections of the <i>Environmental Guideline Handbook</i>, the Blue Book, <i>EMS0008 Environmental incident response and management</i>, <i>EMS0014 De-watering worksites</i>, <i>EMS0001 Environmental impact assessment and environmental management plans</i>, and the project specific erosion and sediment control plan All workers to be made aware of any sensitive or no-go areas, the extensive areas of impervious surfaces prone to runoff, and the need to prevent water quality impacts Regularly inspect and maintain sediment controls consistent with environmental conditions, particularly during rainfall periods Any soil tracked on the roadways will be swept up on a regular basis Temporary erosion and sediment controls to be removed as works completed and areas stabilised or rehabilitation is completed All spoil to be kept in a truck, skip bin or liquid waste truck during trench and underbore works. Any stockpiling on site is to be short term and minimal and subject to consultation with the relevant roads' authority Capture underbore slurry using a wet-vac and avoid discharge to the environment causing water pollution Noting most of the route is paved or impervious, resulting in higher potential for sediment run-off to discharge to stormwater, excavation works footprints should be limited to the minimum possible Any groundwater or surface water ingress into excavations will require basic turbidity testing prior to discharge, including application of flocculant to reduce turbidity if required. Environmental Specialist advice should be sought regarding dewatering procedures and requirements if unsure. Disposal as liquid waste by a liquid waste contractor may be required if turbidity excessive. Refer to <i>EMS0014 De-watering worksites</i> A frac-out management plan (FOMP) is required to undertake underboring Prior to the commencement of any underbore work, a FOMP consistent with the complexity of the bore and sensitivity of the environment must be developed (see above for minimum requirement) and all workers are familiar with its implementation Store oils and fuels in accordance with the <i>Environmental Guideline Handbook</i> Ensure appropriate spill response equipment is readily available, and all workers are familiar with its location and use Control measures will be implemented to manage risks associated with the handling of fuel through using spill trays when undertaking in field re-fuelling. 	During works
Geology and Soil	<ul style="list-style-type: none"> Risks associated with erosion and sediment will be managed in accordance with the <i>Environmental Guideline Handbook</i> and <i>The Blue Book – Managing Urban Stormwater: Soils and Construction</i> (Landcom 2004) Areas of construction and maintenance disturbance will be minimised as much as possible Use water sprays to dampen (not saturate to cause runoff) disturbed surfaces and stockpiles at site, at material transfer points and during construction and demolition generally Disturbed areas will be restored and stabilised as soon as possible following completion of construction and maintenance activities In accordance with a frac-out management plan and waste disposal plan, underboring and drill mud will be managed appropriately to prevent pollution Avoid or minimise stockpiling on site. All spoil to be tipped into a truck or skip bin An unexpected contamination finds procedure shall apply for the construction works. Endeavour Energy's Environmental Management Standard <i>EMS 0013 Spoil and Imported Material Management</i> (Endeavour Energy, 2024) will be consulted to determine the most appropriate beneficial reuse or disposal method for any surplus excavated materials 	During works
Waste	<ul style="list-style-type: none"> All waste generated during construction will be reused if appropriate, or removed, transported, and disposed from site in accordance with the NSW Environment Protection Authority's Waste Classification Guidelines (EPA 2014) and the POEO Act <p>Measures to prevent adverse impacts in relation to generated waste will include:</p> <ul style="list-style-type: none"> Waste mitigation and management strategies will be documented in the CEMP and in accordance with Endeavour Energy's Environmental Management Standard <i>EMS 0007 Waste Management</i> Classify wastes to determine licensing, waste tracking and disposal requirements and retain disposal records Segregate and label waste to improve recycling opportunities, avoid cross contamination and reduce disposal costs Waste material generated on site will not be left on site once the works have been completed and 	During works and operation

Aspect	Environmental Mitigation Measure	Description
	<p>as they progress along the route</p> <ul style="list-style-type: none"> Where possible, reuse, recycle, or return wastes materials to the supplier, including metal components and packaging, i.e. cable drums and pallets Reuse VENM and ENM where options are available Where excavated spoil is suspected to be contaminated, works will immediately cease, and the Project Manager notified. Spoil suspected of being contaminated will be tested to provide a waste classification for disposal Ensure a spill kit is readily available, and workers are familiar and confident with its location and use. 	
Air Quality	<ul style="list-style-type: none"> Comply with Erosion and sediment control requirements (see Water Quality and Hydrology next) and <i>Environmental Guideline Handbook</i> (Endeavour Energy, 2024) All workers to be made aware of the presence of identified sensitive receivers, i.e. restroom, office, sensitive processes in the area, and the need to avoid impacts, i.e. reduce dust and other emissions Dust levels shall be monitored and responded to accordingly during construction works Use water sprays to dampen (not saturate to cause runoff) disturbed surfaces and stockpiles at site, at material transfer points and during construction and demolition generally Visually monitor dust levels during works. If dust is leaving site, is causing a safety issue, or complaints are being received, suspend works and consider mitigation options and/or substitute with an alternate process Use dust collection devices (such as a vacuum) on construction and rock breaking equipment where available and practicable Avoid or minimise stockpiling on site. All spoil to be tipped into a truck or skip bin Position vehicles, plant, and equipment where the fumes will least affect receivers, where relevant and practicable Do not leave vehicles, plant, or equipment idling when not in use. 	During works
Flora and Fauna	<ul style="list-style-type: none"> Comply with the <i>Environmental Guidelines Handbook</i> All workers to be made aware of the presence of the Widemere Road Tree Protection Zone (TPZ) and this area shall be noted in the detailed design and CEMP (see below and last) Keep to designated roads and access ways Vegetation clearing is not permitted without further assessment Minimise disturbance of the soil during vegetation removal to reduce the risk of erosion and sediment movement from the proposal site to elsewhere within the catchment Endeavour Energy has a general biosecurity duty to ensure the biosecurity risks posed by weeds, pathogens, and other invasive species are prevented, eliminated, or minimised, and that the risk of importing additional weeds, pathogens, and pest species to the activity site is appropriately managed A site induction program to ensure that all construction, operation and maintenance staff and contractors are aware of the need to, and how to ensure biosecurity and avoid and protect vegetation outside proposal site Cover excavations when left overnight or for extended periods, provide an escape route for fauna from excavations (eg: log or stick extending to top of excavation), and always inspect excavations for fauna at the commencement of works Should an unexpected threatened species be identified during the project, works should cease, and WIRES or an ecologist contacted as appropriate following discussion with the project manager 	During works and operation
Aboriginal Heritage	<ul style="list-style-type: none"> Comply with the Heritage section of the Environmental Guideline Handbook, i.e. implement an unexpected [heritage] finds procedure, ensuring all workers are aware of their responsibility to not harm heritage items If human remains are uncovered, works must immediately cease, and the NSW Police department and Endeavour Energy are to be notified 	During works
Non-Aboriginal Heritage	<ul style="list-style-type: none"> Comply with the Heritage section of the Environmental Guideline Handbook, i.e. implement an unexpected [heritage] finds procedure, ensuring all workers are aware of their responsibility to not harm heritage items If human remains are uncovered, works must immediately cease, and the NSW Police department and Endeavour Energy are to be notified 	During works

Aspect	Environmental Mitigation Measure	Description
Contamination	<ul style="list-style-type: none"> Comply with <i>Environmental Guideline Handbook (Endeavour Energy, 2024)</i> and NSW EPA <i>Waste Classification Guidelines</i> (NSW EPA 2014) Workers to remain vigilant during intrusive works to identify potential contamination Ensure suspected contaminated spoil is segregated from clean spoil to reduce disposal costs Undertake testing to determine the waste classification and subsequent storage, transport, tracking, licensing and disposal requirements. Disposal records shall be retained Provide a secure and bunded area for the storage of fuel, oil or chemicals. This area would be imperviously bunded with a capacity to contain not less than 110% of the volume of the largest container Temporarily store excavated known or suspected contaminated spoil in a covered, lined/ sealed skip or bulk storage bag or sealed container on-site for classification prior to disposal off site. Where there are site restrictions for on-site storage, store offsite. If storing more than 5 tonnes of spoil, use a licensed storage facility If suspected contamination is found, stop work immediately, restrict access and notify Any person handling the waste is trained in handling Scheduled Chemicals and methods of containing Scheduled Chemical spills and wears Personal Protective Equipment (PPE) All packages / storage containers are clearly labelled and maintained in good order Prior to construction, nominate and sign post a refuelling area and have spill response equipment at hand If asbestos is encountered in soil, old conduits, or joint bays during construction, works shall cease, access restricted and the asbestos managed and disposed of in accordance with the <i>Environmental Guideline Handbook</i> and NSW EPA <i>Waste Classification Guidelines 2014</i> Unexpected finds procedure shall apply if acid sulphate soils are encountered in accordance with the <i>Acid Sulfate Soils Assessment Guidelines 1998</i>, the <i>Environmental Guideline Handbook</i>, and NSW EPA <i>Waste Classification Guidelines 2014</i> It is intended to reuse surplus spoil beneficially on site Endeavour Energy <i>EMS 0013 Spoil and Imported Material Management</i> will be consulted to determine the most appropriate beneficial reuse or disposal method for excavated materials In the event of encountering any suspected contamination in the work area, it will be separated and contained on site until it can be classified in accordance with the EPA (2014) <i>Waste Classification Guidelines</i>, and then disposed of at a facility that is lawfully able to accept the waste Control measures will be implemented to manage risks associated with the handling of fuel by using spill trays or similar when undertaking in field re-fuelling Spill kits will be available at hand at all work sites, and all persons undertaking construction works will be made aware of the location of spill kits, and applicable incident response procedures Sediment and erosion control will be established and maintained in accordance with The Blue book to minimise potential impacts on receiving watercourses 	Design /assess, during works
Electric and Magnetic Fields	<ul style="list-style-type: none"> Implement no cost and very low-cost measures to reduce magnetic field exposure The activity will comply with all relevant national and international guidelines The activities routes will not traverse near sensitive receivers, minimising any potential residual EMF exposure risk 	Design/assess
Visual/Aesthetic	<ul style="list-style-type: none"> Notify affected stakeholders regarding the activity prior construction Construction will be short term in particular location as it progresses along routes The cables would be installed underground within existing roadways Temporarily reinstate the roadways during works and permanently restore the roadways post works to a suitable condition 	Design/assess, during works
Bushfire	<ul style="list-style-type: none"> Comply with Total fire ban restrictions, including obtain permits for hot works as required Any hot works during a total fire ban must be in accordance with a Clause 6 Exemption if required. This includes grinding, welding, brazing, oxy-cutting, heat treatment or processes that generate heat or continuous streams of sparks. The construction contractor must obtain exemptions for hot works Hot works areas are to be clear of combustible matter by not less than 3m. Adequate firefighting equipment must pre-deployed to be available nearby immediately at hand The CEMP shall include provisions for bushfire protection measures, including an emergency management plan for how to respond to bushfire 	During works

Aspect	Environmental Mitigation Measure	Description
	<ul style="list-style-type: none"> Site induction for contractors working on the activity will include general bushfire protection measures and requirements Electrical equipment, plant, and equipment must be maintained in operational order to prevent any potential sparks Monitor bushfire risk status and be vigilant regarding nearby bushfires Works that have the potential to generate heat and sparks will be restricted on days of declared catastrophic fire danger The project will be constructed and maintained in accordance with EE Company Procedure GAM 0011. 	
Land Use	<ul style="list-style-type: none"> Dial-Before-You-Dig search and notification to relevant utility infrastructure asset owners/managers Consultation regarding the proposed works and schedule will be undertaken directly with potentially effected neighbours Undertake condition reports (dilapidation reports) of structures that may be at risk machinery strike etc The route should be left in a tidy condition at the conclusion of construction activities Provide information via a free call 1800 number, email address or constructor's website for those wanting more information. 	Pre-works, during works, and during operation
Social and Economic	<ul style="list-style-type: none"> Management of construction traffic in the vicinity of construction works, including communication with effected residents, and road users Consultation with various relevant stakeholders Pre-construction notification provided to businesses along the routes Signs and barriers would be erected around construction work sites, where appropriate, to minimise the possibility of personnel injuries and prevent placing the public at risk and provide site contact details during construction works 	Pre-works, during works, and during operation
Cumulative	<ul style="list-style-type: none"> Site Inspection (design/assess) / monitoring (during works) Current/recent development applications and approvals review Current/recent development applications and approvals review. 	Design/assess, pre-works and during works

7.0 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

Ecologically sustainable development (ESD) is an attempt to provide the best outcomes for the human and natural environments both now and into the indefinite future. One of the most often cited definitions of sustainability is development that "meets the needs of the present without compromising the ability of future generations to meet their own needs". Sustainability relates to the continuity of economic, technical, social, institutional, and environmental aspects of human society, as well as the non-human environment.

The existing environment has been described throughout the **6.0 Environmental Assessment** section of this assessment for the various aspects of the natural environment assessed as part of this proposed activity.

The activity has been assessed against the following four principles of ESD listed in the *Protection of the Environment Administration Act 1991*.

The four principles of ESD are:

- The precautionary principle: section 6(2)(a)(i)(ii)
- The principle of inter-generational equity: section 6(2)(b)
- The principle of biological diversity and ecological integrity: section 6(2)(c)
- The principle of improved valuation of environmental resources: section 6(2)(d)(i)(ii)(iii).

An assessment of the proposal against the principles is provided below.

7.1 Precautionary Principle

The precautionary principle states that:

'If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.'

In the application of the precautionary principle, public and private decisions should be guided by:

1. *careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and*
2. *an assessment of the risk weighted consequence of various options.'*

For the precautionary principle to be applicable, two pre-conditions must be satisfied; *"first it is not necessary that serious or irreversible environmental damage has actually occurred – it is the threat of such damage that is required. Secondly, the environmental damage threatened must attain the threshold of being serious or irreversible"*⁴.

If there is no threat of serious or irreversible environmental damage, there is no basis upon which the precautionary principle can apply.

Environmental investigations, including site-based surveys completed for ecological, and Aboriginal heritage due diligence assessments, have been undertaken during the preparation of this assessment to ensure that the potential environmental impacts are understood with a high degree of certainty. The

⁴ Telstra Corporation Limited v Hornsby Shire Council [2006] NSWLEC 133, Preston CJ at 129

spatial scale of impacts would be local and isolated to the immediate area of the activity. Therefore, it can be concluded that this proposal will not result in a threat of serious or irreversible damage.

Mitigation measures have also been proposed in this assessment to minimise the identified potential impacts of the activity. A Construction Environmental Management Plan (CEMP) will be developed and implemented as a precautionary measure, and no mitigation measures have been deferred due to a lack of scientific certainty. The activity is therefore consistent with the precautionary principle.

7.2 Principle of Inter-Generational Equity

The principle of inter-generational equity states that:

'The present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.'

To the extent possible, all environmental impacts and appropriate mitigation measures have been identified. The proposal would not harm the health, diversity, and productivity of the environment to such an extent that future generations would not be able to benefit.

The proposal is therefore consistent with the principle of inter-generational equity.

7.3 Principle of Biological Diversity and Ecological Integrity

The principle of biological diversity and ecological integrity states that:

'Conservation of biological diversity and ecological integrity should be a fundamental consideration.'

The activity comprises the construction operation, and maintenance of new dual circuit (two) underground 132kV electricity cables along existing roads and previously cleared land that remains predominately cleared aside exotic grass and landscape plantings. A flora and fauna assessment (see 6.7 **Flora and fauna**) carried out as part of this assessment concluded there are not likely to be any significant impacts to threatened species or ecological communities due to the activity. Impacts upon the ecological integrity would therefore be negligible.

7.4 Improved Valuation of Environmental Resources

The principle of improved valuation of environmental resources states that:

'Environmental factors should be included in the valuation of assets and services such as:

- Polluter pays – that is, those who generate pollution and waste should bear the cost of containment, avoidance and abatement.
- The users of goods and services should pay prices based on the full life cycle of costs of providing those goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.
- Environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms that enable those best placed to maximise benefits or minimise cost to develop their own solutions and responses to environmental problems.'

The activity has been designed considering the least possible impact on the environment. All costs associated with the containment, avoidance and abatement of pollution have been factored into the design for construction and operation of the activity. The activity will have the positive benefit of supporting the Data Centres development within the industrial commercial area, creating regional economic opportunities and job growth in the area.

8.0 ENVIRONMENTAL MANAGEMENT

8.1 Introduction

A Construction Environmental Management Plan (CEMP) outlines the environmental objectives of an activity, the environmental mitigation measures to be implemented, the timing of implementation, responsibilities for implementation and management, and a review process to determine the effectiveness of the strategies.

The construction contractor(s) are required to develop a project-specific CEMP that addresses the scope of works to be undertaken. The CEMP shall detail how the works will be undertaken to comply with all environmental laws, AUSCONNEX and Endeavour Energy's environmental standards and policies, and the environmental mitigation measures described in this assessment.

The key objectives of the CEMP would include:

- Ensuring that the works are carried out in accordance with legislative requirements and relevant non-statutory policies.
- Ensuring that the works are carried out in accordance with the requirements detailed in this assessment, including all requirements outlined in any relevant approvals, permits or licences and the mitigation measures described in this assessment (see **6.0 Environmental Assessment**).
- Ensuring that employees engaged to undertake the works comply with the conditions detailed in the CEMP.
- Identifying management responsibilities and reporting requirements to demonstrate compliance with the CEMP.

If a particular aspect of the activity falls outside the scope of the assessment and CEMP, and it would increase the environmental impact, the activity is not permitted to continue without an appropriate environmental assessment under the EP&A Act.

8.2 Construction Environmental Management Plan

The construction activity would be undertaken by a contractor that would be required to comply with the scope and mitigation measures detailed in this assessment once determined by Endeavour Energy. The detailed construction methodology is typically confirmed at contract award and during the detailed design phase of the activity, with the impact mitigation measures detailed herein included in the approved contractor CEMP.

All incidents at sites shall be reported to AUSCONNEX immediately in accordance with Endeavour Energy Environmental Management Standard *EMS 0008 Environmental incident response and management* (Endeavour Energy 2019). The contractor will be solely responsible for incident response and/or remediation of sites to pre-existing conditions in consultation with AUSCONNEX and the relevant landowner/manager or asset owner/manager. The findings of this assessment must be considered in development of the contractor's activity specific CEMP, including detail regarding site works locations, staging and site compounds or storage areas prior to works commencing.

8.3 Implementation of the CEMP

The CEMP is a working document and shall be amended should strategies initially implemented be found to be inadequate to manage environmental impacts or changes require alternate measure, though are not so significant as to trigger further environmental assessment. The CEMP would typically:

- Establish environmental goals and objectives
- Detail the conditions of approval
- List actions, timing and responsibilities for implementation that arise from the mitigation measures recommended in this assessment
- Detail statutory requirements
- Provide a framework for reporting on relevant matters on an ongoing basis
- Detail training requirements for personnel in environmental awareness and best practice environmental management systems
- Outline emergency procedures, including contact names and corrective actions
- Detail process surveillance and auditing procedures
- List complaint handling procedures
- Detail quality assurance procedures.

8.3.1 Auditing schedule of the CEMP

Auditing of the activity would be undertaken to establish whether the contractor is conducting works in accordance with their current environmental management plans and whether the management plans are an effective tool to control adverse environmental impacts.

The following are proposed to achieve the audit's purpose:

- Review the on-site implementation of the contractor's CEMP
- Review the documentation process to determine if planned works have received endorsement to proceed
- Monitor the compliance of construction works with the project determination and environmental legislation
- Review the outcomes of any previous audit(s) and determine if there has been any change in the environmental performance of the construction contractor
- Identify opportunities to improve on-site environmental management practices.

The benefits of conducting the environmental audit are to allow:

- Feedback on the CEMP implementation process to assist both the contractor and project manager to improve the future preparation of site environmental management documentation

- Improve the planning of construction projects through documentation and impact assessment to ensure best environmental management practices are implemented on site
- Improve environmental management processes on site.

9.0 CONSIDERATION OF ENVIRONMENTAL FACTORS

In accordance with section 5.5 of the EP&A Act and clause 171 of the EP&A Reg, when assessing the environmental impact of an activity on the environment, the assessment must consider the factors which are listed below in Table 25 and Table 26 below.

Table 25 Environmental Planning and Assessment Act 1979, Section 5.5 requirements

Requirement	Section Reference
For the purpose of attaining the objects of this Act relating to the protection and enhancement of the environment, a determining authority in its consideration of an activity shall, notwithstanding any other provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.	2.0 Description of the Activity, 6.0 Environmental Assessment, 7.0 Ecologically Sustainable Development and 8.0 Environmental Management
Without limiting the above, a determining authority shall consider the effect of an activity on any wilderness area (within the meaning of the Wilderness Act 1987) in the locality in which the activity is intended to be carried on	N/A – there are no wilderness areas within or close to the area of the activity

Table 26. Environmental Planning and Assessment Regulation 2021, Clause 171 checklist

Clause 171 factors	REF section considering the factors
Impact on a community	3.0 Consultation, 6.1 Traffic and access, 6.2 Noise and vibration, 6.11 Electric and magnetic fields, 6.12 Visual and aesthetics, 6.14 Landuse and 6.15 Social and Economic
Transformation of a locality	6.12 Visual and aesthetics and 6.14 Landuse
Impact on the ecosystem of the locality	6.7 Flora and fauna
Reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality	6.12 Visual and aesthetics and 6.14 Landuse
Effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations	6.2 Noise and vibration, 6.4 Geology and Soil, 6.7 Flora and fauna, 6.8 Aboriginal heritage, 6.9 Non-Aboriginal heritage, 6.12 Visual and aesthetics, 6.14 Landuse and 6.15 Social and Economic
Impact on the habitat of protected fauna	6.7 Flora and fauna

Endangering any species of animal, plant or other form of life, whether living on land, in water or in the air	6.7 Flora and fauna
Long-term effects on the environment	6.0 Environmental Assessment
Degradation of the quality of the environment	6.0 Environmental Assessment
Risk to the safety of the environment	6.10 Contamination and 7.1 Precautionary Principle
Reduction in the range of beneficial uses of the environment	6.14 Landuse, 6.15 Social and Economic, and 7.0 Ecologically Sustainable Development
Pollution of the environment	6.3 Water Quality and Hydrology, 6.5 Waste, and 6.10 Contamination
Environmental problems associated with the disposal of waste	6.5 Waste
Increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply	3.0 Scope of Works and 7.4 Improved Valuation of Environmental Resources
Cumulative environmental effect with other existing or likely future activities	6.16 Cumulative Impacts
Impact on coastal processes and coastal hazards, including those under projected climate change conditions	7.0 Ecologically Sustainable Development

10.0 CONCLUSIONS AND RECOMMENDATIONS

This assessment has been prepared to assess the environmental impacts associated with the activity of constructing, operating and maintaining the proposed new dual circuit (two) underground 132kV electricity cables (the activity). Endeavour Energy is a determining authority as defined in the EP&A Act. As such, the activity does not require consent under Part 4 of the EP&A Act. The activity has been assessed under Part 5, Division 5.1 of the EP&A Act.

The activity complies with the provisions of section 5.5 of the EP&A Act and clause 171 of the EP&A Reg as shown in 9.0 **Consideration of Environmental Factors**.

Several recommendations have been provided to avoid and mitigate the potential impact the activity, particularly in relation to Error! Reference source not found. and 6.2 **Noise and vibration**. This Project has been identified as a Class 4 Proposal under the Code and is considered unlikely to have a significant impact on the environment. Preparation of an EIS is therefore not required, and a REF environmental assessment is considered satisfactory.

Being the determining authority for the activity, Endeavour Energy should prepare a decision statement and make a formal determination.

All works shall be undertaken in accordance with this assessment, including the mitigation measures provided (see 6.0 **Environmental Assessment**), any Decision Statement issued in relation to this assessment, the associated CEMP and any other specific mitigation measures that are otherwise developed for this project.

The activity and its associated environmental impacts are unlikely to have a significant impact on the environment. The activity would ensure the reliable supply of electricity for the development of the Davis Road Data Centres whilst ensuring the reliability of the local electricity network and the overall network capacity. Placing Endeavour Energy in a better position to meet customers' future electricity needs to maximise the electricity networks' social and economic benefits, whilst minimising any adverse environmental impacts.

11.0 REFERENCES

Australian Government, 2024, *Security of Critical Infrastructure Act 2018*, No. 29, 2018, 20 October 2023.

CBRE, 2024, *Global Data Center Trends 2024* | CBRE, <https://www.cbre.com/insights/reports/global-data-center-trends-2024>

Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW), 2024, *Protected Matters Search Tool*, <https://pmst.awe.gov.au/#/map?lng=131.52832031250003&lat=-28.6905876542507&zoom=5&baseLayers=Imagery,ImageryLabels>, Accessed December, 2024

Commonwealth DCCEEW, 2024a, *Australia's World Heritage List*, <https://www.dcceew.gov.au/parks-heritage/heritage/places/world-heritage-list>, Accessed December 2024.

Commonwealth DCCEEW, 2024b, *Australia's National Heritage List*, <https://www.dcceew.gov.au/parks-heritage/heritage/places/national-heritage-list>, Accessed December 2024.

DECCW, 2010b, *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*, DECCW, 13 September 2010.

Endeavour Energy, 2023, *Consultation Protocol for Review of Environmental Factors for Class and Class 5 Activities; In accordance with the NSW Code of Practice for Authorised Network Operators, 2015* <https://www.endeavourenergy.com.au/__data/assets/pdf_file/0022/70618/Consultation-Protocol-for-REF-for-Class-4-and-5.docx.pdf>.

Endeavour Energy, 2024, *Environmental Guidelines Handbook, April 2024*, <https://www.endeavourenergy.com.au/asp/webengine/au/com/ee/asp/Standards/Sections/Action!_gen_call_openSubSectionDetails>.

Endeavour Energy, 2024, *Endeavour Energy Environmental Management Standard (EMS001) Environmental Impact Assessment and Environmental Management Plans*, Document No. EMS 0001_Issues am8 Amendment No. Rev 08, October 2023 <https://www.endeavourenergy.com.au/asp/webengine/au/com/ee/asp/Standards/Sub_Section/Action!_gen_call_openSubSectionDetails>.

Endeavour Energy, 2020, *Environmental Management Standard (EMS0014) – De-watering worksites*, September 2020 <https://www.endeavourenergy.com.au/asp/webengine/au/com/ee/asp/Standards/Sub_Section/Action!_gen_call_openSubSectionDetails>.

Endeavour Energy, 2019, *Environmental Management Standard EMS 0008 Environmental incident response and management*, Amendment No 8, 15 July 2019 <https://www.endeavourenergy.com.au/asp/webengine/au/com/ee/asp/Standards/Sections/Action!_gen_call_openSubSectionDetails>.

Endeavour Energy, 2024, *Environmental Management Standard EMS 0013 Spoil and Imported Material Management*, Document No. EMS 0013, Amendment No. 3, 29 May 2024 <https://www.endeavourenergy.com.au/asp/webengine/au/com/ee/asp/Standards/Sub_Section/Action!_gen_call_openSubSectionDetails>.

Fairfield City Council 2013, *Fairfield Local Environmental Plan 2013*, Fairfield City Council, 24 May 2024.

- Heritage NSW, 2024, *State Heritage Inventory*,
<https://www.environment.nsw.gov.au/topics/heritage/search-heritage-databases/state-heritage-inventory>, Accessed December 2024.
- Landcom 2004, *Managing Urban Stormwater: Soils and Construction*, 4th edition.
- Narla Environmental Pty Ltd, 2024, *Biodiversity Development Assessment Report - Project Blue Tongue at 3 Davis Road, Wetherill Park*, February 2024
- NSW Environment Protection Authority 2020, *Environment Protection Authority Draft Construction Noise Guideline*, November 2020
- NSW Environment Protection Authority, 2014, *Waste Classification Guidelines*, 2014.
- NSW Environment Protection Authority, 2024, *List of NSW contaminated sites notified to EPA*,
<https://www.epa.nsw.gov.au/your-environment/contaminated-land/notified-and-regulated-contaminated-land/list-of-notified-sites>, Accessed December 2024.
- Office of Environment and Heritage, 2006, *Assessing Vibration: A Technical Guideline*, 2006
- State of NSW through Transport for NSW 2023, *Traffic control at work sites Technical Manual*, 28 February 2022
- State Government of NSW and NSW Department of Climate Change, Energy, the Environment and Water 2024, *Soil Landscapes of Central and Eastern NSW*, accessed from The Sharing and Enabling Environmental Data Portal [<https://datasets.seed.nsw.gov.au/dataset/8a20716a-0b73-4394-8223-313717373df2>], date accessed 2024-12-04.
- State Government of NSW and NSW Department of Climate Change, Energy, the Environment and Water 1998, *Acid Sulfate Soils Risk*, accessed from The Sharing and Enabling Environmental Data Portal [<https://datasets.seed.nsw.gov.au/dataset/1eb85cf2-ca9d-4170-8ed2-7b54c45e00c2>], date accessed 2024-12-04.
- Willowtree Planning Pty Ltd, 2024, *Environmental Impact Statement: Davis Road Data Centre (Cundall) - Project Blue Tongue, 3 Davis Road, Wetherill Park, Lot 1, DP 864615*, 21 February 2024

APPENDICES

Appendix 1. UG power cables design

N

MGA56 GDA2020

SITE PLAN LEGEND

132kV FDR 23U TRENCHING

132kV FDR 23X TRENCHING

EXISTING UG MAINS

EXISTING OH CONDUCTOR

EXISTING UG JEMENA GAS - 100mm ST

1050kPa - BYDA

EXISTING UG SYDNEY WATER WATERMAIN - BYDA

EXISTING UG SYDNEY WATER SEWERMAIN - BYDA

EXISTING UG TELSTRA/NBN - TYPICAL 100mm PVC DUCT - BYDA

EXISTING UG TNSW ITS/COMMS - BYDA

TRANSGRID RESISTIVE COVENANT/30m CLEARANCE ZONE

EXISTING PILLAR LOCATION

EXISTING COLUMN LOCATION

EXISTING SUBSTATION LOCATION

EXISTING DUCTS

EXISTING LANTERN

EXISTING POLE

EXISTING POLE SUBSTATION

UG ALIGNMENT POINTS (CO-ORDINATES IN GDA2020 MGA56)		
POINT OF INTEREST	EASTING	NORTHING
CENTRE OF JOINT BAY - FDR 23U JB1	TBA	TBA
CENTRE OF EARTH PIT - FDR 23U JB1	TBA	TBA
CENTRE OF FIBRE PIT - FDR 23U JB1	TBA	TBA
CENTRE OF JOINT BAY - FDR 23X JB1	TBA	TBA
CENTRE OF EARTH PIT - FDR 23X JB1	TBA	TBA
CENTRE OF FIBRE PIT - FDR 23X JB1	TBA	TBA

WORKS COMPLETED/FIELD BOOK

CONSTRUCTED BY: _____

WORKS COMPLETED: _____

SIGNATURE: _____ DATE: _____

INSPECTED BY: _____

SIGNATURE: _____ DATE: _____

ASSET RECORDING

1. _____

OP: _____

CONTACT NO: _____

HEAVY COPYRIGHT THAT ASSETS MARKED AS BUILT ON THIS DRAWING HAVE BEEN RECORDED AS PER ENDEAVOUR ENERGY STANDARDISED ASSET.

SIGNATURE: _____

DATE: _____

CERTIFIED BY ENDEAVOUR ENERGY

Amendment: _____

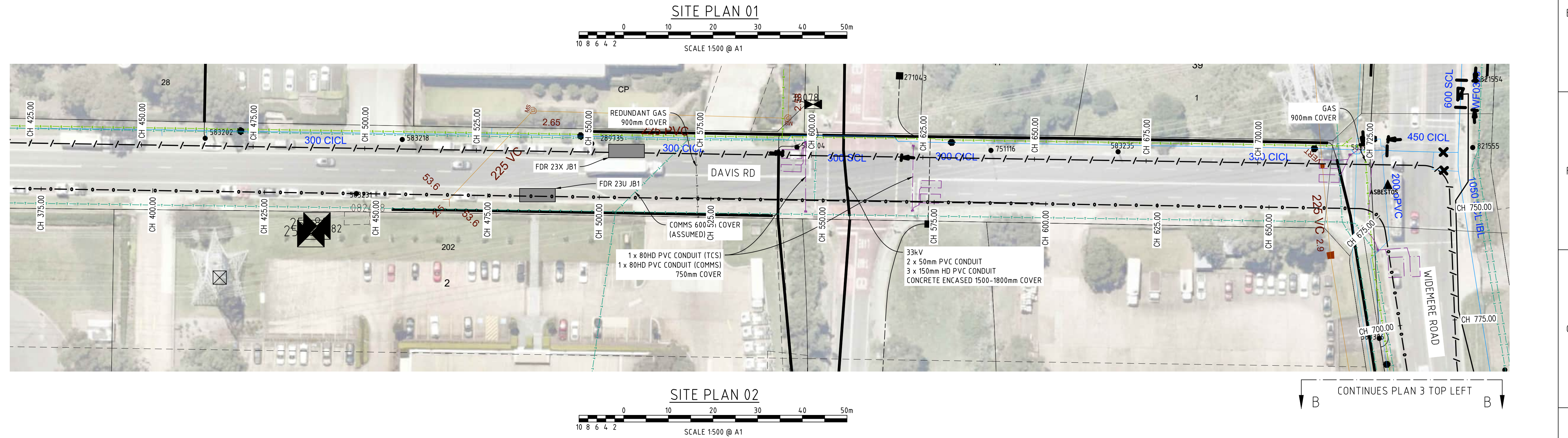
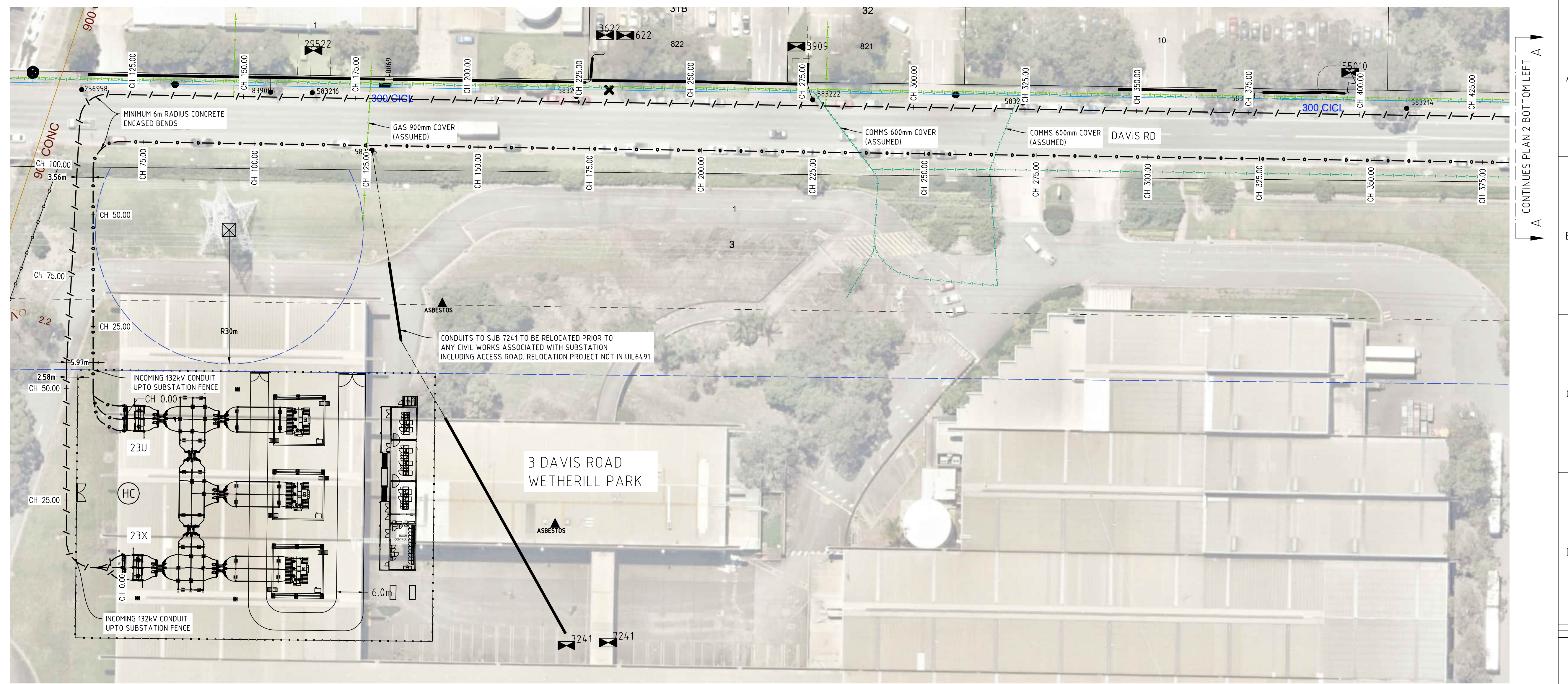
Date Approved: _____

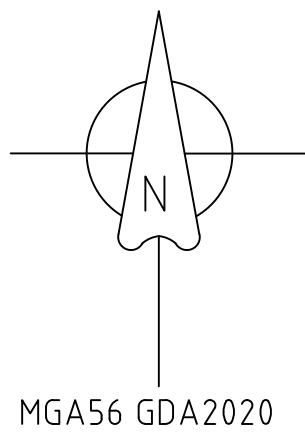
Examiner's Signature: _____

Print Name: _____

This Certification is issued subject to Endeavour Energy's Standard Certification Terms

Cadastre: © Land and Property Information 2016





SITE PLAN LEGEND

- 132kV FDR 23U TRENCHING
- 132kV FDR 23X TRENCHING
- EXISTING UG MAINS
- EXISTING OH CONDUCTOR
- EXISTING UG JEMENA GAS - 100mm ST 1050kPA - BYDA
- EXISTING UG SYDNEY WATER WATERMAIN - BYDA
- EXISTING UG SYDNEY WATER SEWERMAIN - BYDA
- EXISTING UG TELSTRA/NBN - BYDA
- EXISTING PILLAR LOCATION
- EXISTING COLUMN LOCATION
- EXISTING SUBSTATION LOCATION
- EXISTING DUCTS
- EXISTING LANTERN
- EXISTING POLE
- EXISTING POLE SUBSTATION

UG ALIGNMENT POINTS (CO-ORDINATES IN GDA2020 MGA56)		
POINT OF INTEREST	EASTING	NORTHING
CENTRE OF JOINT BAY - FDR 23U JB2	TBA	TBA
CENTRE OF EARTH PIT - FDR 23U JB2	TBA	TBA
CENTRE OF FIBRE PIT - FDR 23U JB2	TBA	TBA
CENTRE OF JOINT BAY - FDR 23X JB2	TBA	TBA
CENTRE OF EARTH PIT - FDR 23X JB2	TBA	TBA
CENTRE OF FIBRE PIT - FDR 23X JB2	TBA	TBA

WORKS COMPLETED/FIELD BOOK

CONSTRUCTED BY: _____

WORKS COMPLETED: _____

SIGNATURE: _____ DATE: _____

INSPECTED BY: _____

SIGNATURE: _____ DATE: _____

ASSET RECORDING

I: _____

OF: _____

CONTACT No: _____

NOTE: I HEREBY CERTIFY THAT ASSETS MARKED AS BUILT ON THIS DRAWING HAVE BEEN RECORDED AS PER ENDEAVOUR ENERGY STANDARDISED ASSET TAGS.

SIGNATURE: _____

DATE: _____

CERTIFIED BY ENDEAVOUR ENERGY

Amendment: _____

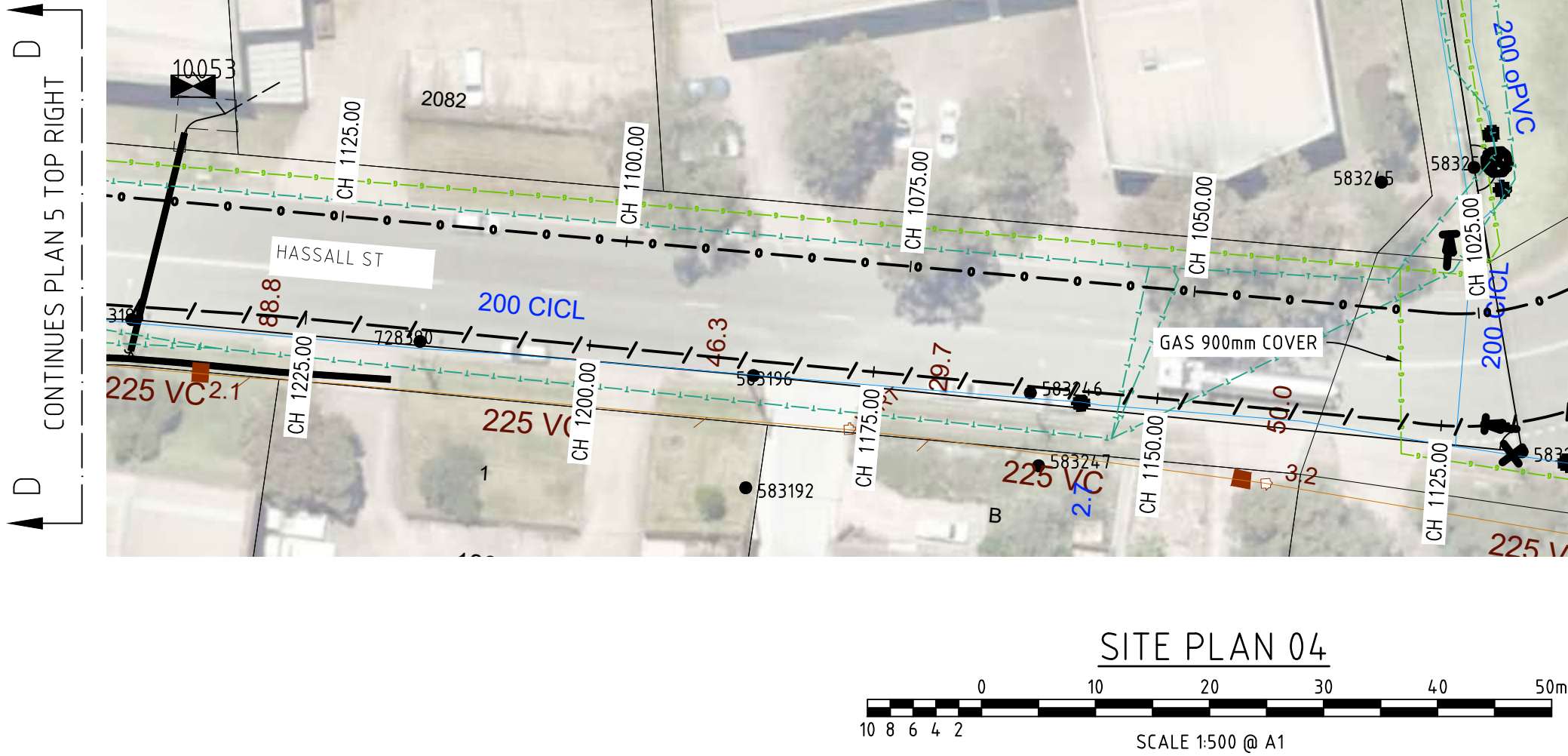
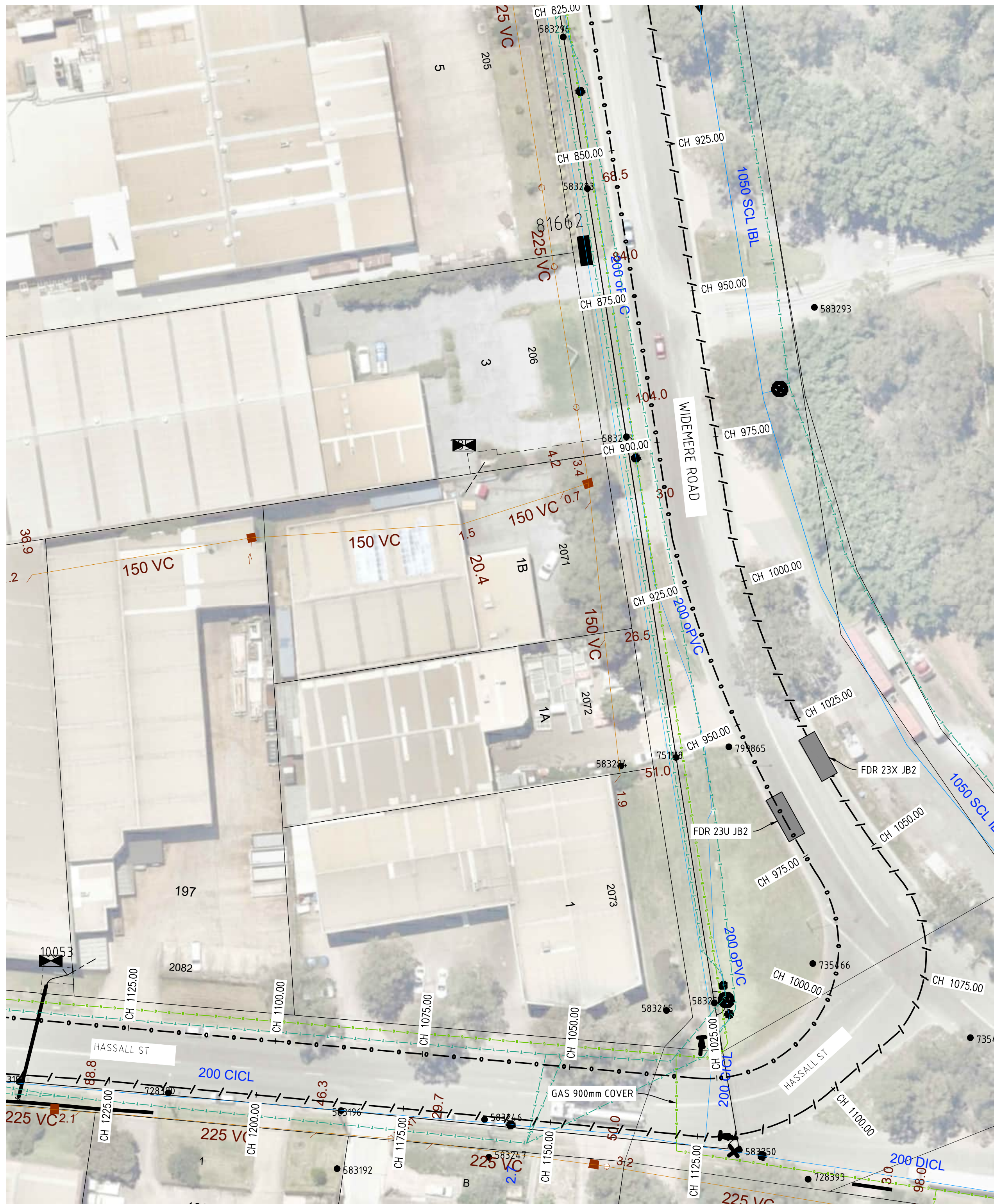
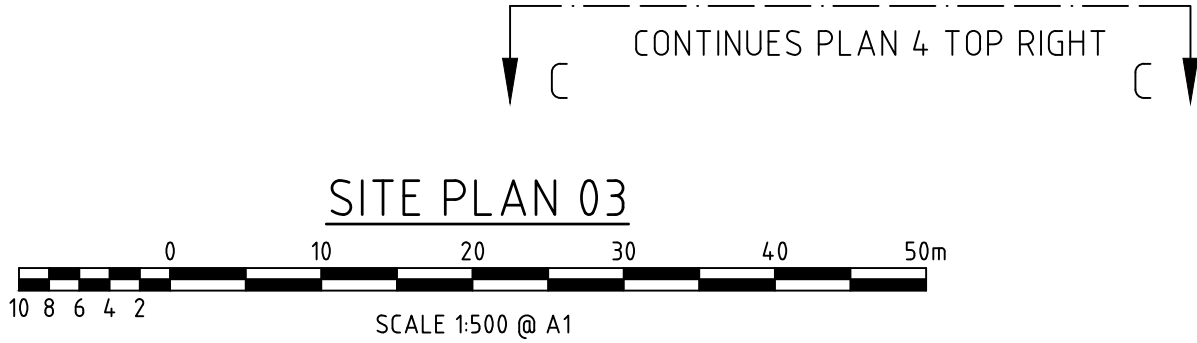
Date Approved: _____

Examiner's Signature: _____

Print Name: _____

This Certification is issued subject to Endeavour Energy's Standard Certification Terms

Cadastre: © Land and Property Information 2016



PRE-CERTIFICATION DRAWING ISSUES		
DATE	DESCRIPTION	REV
02/04/24	INTERNAL ISSUE FOR DISCUSSION AND COMMENTS	00
17/04/24	SUBMITTED FOR PROPOSED METHOD OF SUPPLY	00



© THIS DRAWING AND THE COPYRIGHT THEREIN IS THE PROPERTY OF ENDEAVOUR ENERGY AND MAY NOT BE COPIED, REPRODUCED, DISTRIBUTED, LOANED OR USED WITHOUT THE WRITTEN CONSENT OF ENDEAVOUR ENERGY

REFERENCE DRAWING'S		WORK ORDERS	
		GENERAL	
		OVERHEAD	
		UNDERGROUND	
		SUBSTATIONS	

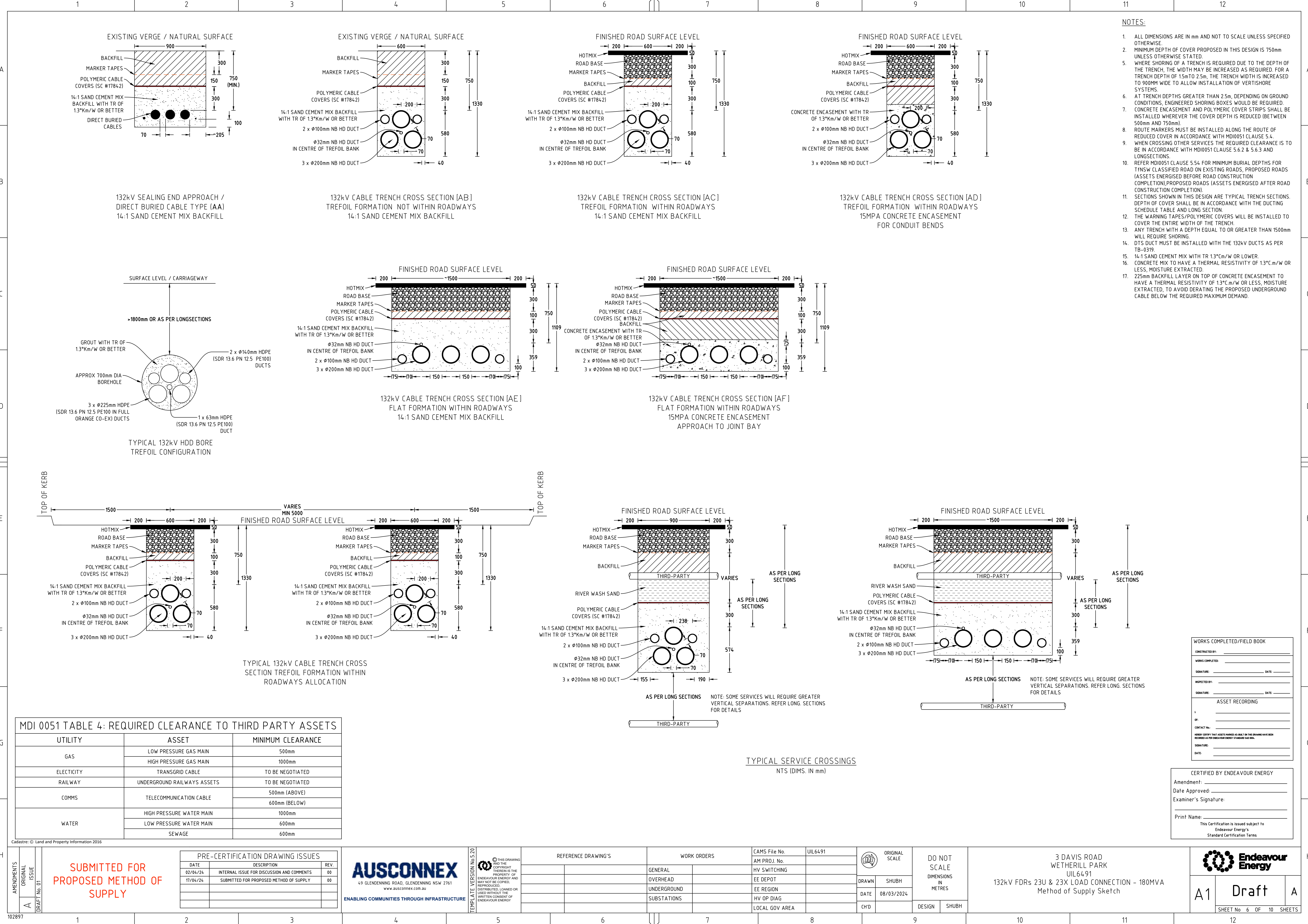
CAMS File No.	UIL6491
AM PROJ. No.	
HV SWITCHING	
EE DEPOT	
EE REGION	
HV OP DIAG	
LOCAL GOV AREA	

ORIGINAL SCALE	
DRAWN	SHUBH
DATE	08/03/2024
CHD	

DO NOT SCALE DIMENSIONS IN METRES	
DESIGN	SHUBH

3 DAVIS ROAD
WETHERILL PARK
UIL6491
132kV FDRS 23U & 23X LOAD CONNECTION - 180MVA
Method of Supply Sketch

Endeavour Energy		
A1	Draft	A
SHEET No 3 OF 10 SHEETS		



- NOTES:
1. ALL DIMENSIONS ARE IN mm AND NOT TO SCALE UNLESS SPECIFIED OTHERWISE.
 2. MINIMUM DEPTH OF COVER PROPOSED IN THIS DESIGN IS 750mm UNLESS OTHERWISE STATED.
 5. WHERE SHORING OF A TRENCH IS REQUIRED DUE TO THE DEPTH OF THE TRENCH, THE WIDTH MAY BE INCREASED AS REQUIRED. FOR A TRENCH DEPTH OF 1.5m TO 2.5m, THE TRENCH WIDTH IS INCREASED TO 900MM WIDE TO ALLOW INSTALLATION OF VERTISHORE SYSTEMS.
 6. AT TRENCH DEPTHS GREATER THAN 2.5m, DEPENDING ON GROUND CONDITIONS, ENGINEERED SHORING BOXES WOULD BE REQUIRED.
 7. CONCRETE ENCASEMENT AND POLYMERIC COVER STRIPS SHALL BE INSTALLED WHEREVER THE COVER DEPTH IS REDUCED (BETWEEN 500mm AND 750mm).
 8. ROUTE MARKERS MUST BE INSTALLED ALONG THE ROUTE OF REDUCED COVER IN ACCORDANCE WITH MDI0051 CLAUSE 5.4.
 9. WHEN CROSSING OTHER SERVICES THE REQUIRED CLEARANCE IS TO BE IN ACCORDANCE WITH MDI0051 CLAUSE 5.6.2 & 5.6.3 AND LONGSECTIONS.
 10. REFER MDI0051 CLAUSE 5.5.4 FOR MINIMUM BURIAL DEPTHS FOR TNSW CLASSIFIED ROAD ON EXISTING ROADS, PROPOSED ROADS (ASSETS ENERGISED BEFORE ROAD CONSTRUCTION, PROPOSED ROADS (ASSETS ENERGISED AFTER ROAD CONSTRUCTION COMPLETION).
 11. SECTIONS SHOWN IN THIS DESIGN ARE TYPICAL TRENCH SECTIONS. DEPTH OF COVER SHALL BE IN ACCORDANCE WITH THE DUCTING SCHEDULE TABLE AND LONG SECTION.
 12. THE WARNING TAPES/POLYMERIC COVERS WILL BE INSTALLED TO COVER THE ENTIRE WIDTH OF THE TRENCH.
 13. ANY TRENCH WITH A DEPTH EQUAL TO OR GREATER THAN 1500mm WILL REQUIRE SHORING.
 14. DTS DUCT MUST BE INSTALLED WITH THE 132kV DUCTS AS PER TB-0319.
 15. 14:1 SAND CEMENT MIX WITH TR 1.3°Cm/W OR LOWER.
 16. CONCRETE MIX TO HAVE A THERMAL RESISTIVITY OF 1.3°Cm/W OR LESS, MOISTURE EXTRACTED.
 17. 225mm BACKFILL LAYER ON TOP OF CONCRETE ENCASEMENT TO HAVE A THERMAL RESISTIVITY OF 1.3°Cm/W OR LESS, MOISTURE EXTRACTED. TO AVOID DERATING THE PROPOSED UNDERGROUND CABLE BELOW THE REQUIRED MAXIMUM DEMAND.

MDI 0051 TABLE 4: REQUIRED CLEARANCE TO THIRD PARTY ASSETS		
UTILITY	ASSET	MINIMUM CLEARANCE
GAS	LOW PRESSURE GAS MAIN	500mm
	HIGH PRESSURE GAS MAIN	1000mm
ELECTICITY	TRANSGRID CABLE	TO BE NEGOTIATED
RAILWAY	UNDERGROUND RAILWAYS ASSETS	TO BE NEGOTIATED
COMMS	TELECOMMUNICATION CABLE	500mm (ABOVE)
		600mm (BELOW)
WATER	HIGH PRESSURE WATER MAIN	1000mm
	LOW PRESSURE WATER MAIN	600mm
	SEWAGE	600mm

AMENDMENTS

ORIGINAL

ISSUE

DRAFT No. 01

102897

1

2

3

4

5

6

7

8

9

10

11

12

PRE-CERTIFICATION DRAWING ISSUES

DATE	DESCRIPTION	REV
02/04/24	INTERNAL ISSUE FOR DISCUSSION AND COMMENTS	00
17/04/24	SUBMITTED FOR PROPOSED METHOD OF SUPPLY	00

AUSCONNEX

4/9 GLENDENNING ROAD, GLENDENNING NSW 2761

www.ausconnex.com.au

ENABLING COMMUNITIES THROUGH INFRASTRUCTURE

© THIS DRAWING AND THE COPYRIGHT THEREIN IS THE PROPERTY OF ENDEAVOUR ENERGY AND MAY NOT BE COPIED, REPRODUCED, DISTRIBUTED, LOANED OR USED WITHOUT THE WRITTEN CONSENT OF ENDEAVOUR ENERGY

REFERENCE DRAWING'S		WORK ORDERS		CAMS File No.	UIL6491
		GENERAL		AM PROJ. No.	
		OVERHEAD		HV SWITCHING	
		UNDERGROUND		EE DEPOT	
		SUBSTATIONS		EE REGION	
				HV OP DIAG	
				LOCAL GOV AREA	

ORIGINAL SCALE

DO NOT SCALE DIMENSIONS IN METRES

DESIGN

SHUBH

3 DAVIS ROAD

WETHERILL PARK

UIL6491

132kV FDRS 23U & 23X LOAD CONNECTION - 180MVA

Method of Supply Sketch

Endeavour Energy

A1

Draft

A

SHEET No 6 OF 10 SHEETS

WORKS COMPLETED/FIELD BOOK

CONSTRUCTED BY: _____

WORKS COMPLETED: _____

SIGNATURE: _____ DATE: _____

INSPECTED BY: _____

SIGNATURE: _____ DATE: _____

ASSET RECORDING

OP: _____

CONTACT No: _____

NOTE: CERTIFY THAT ASSETS NAMED AS SHOWN ON THIS DRAWING HAVE BEEN RECORDED AS PER ENDEAVOUR ENERGY STANDARDING AND LOG.

SIGNATURE: _____

DATE: _____

CERTIFIED BY ENDEAVOUR ENERGY

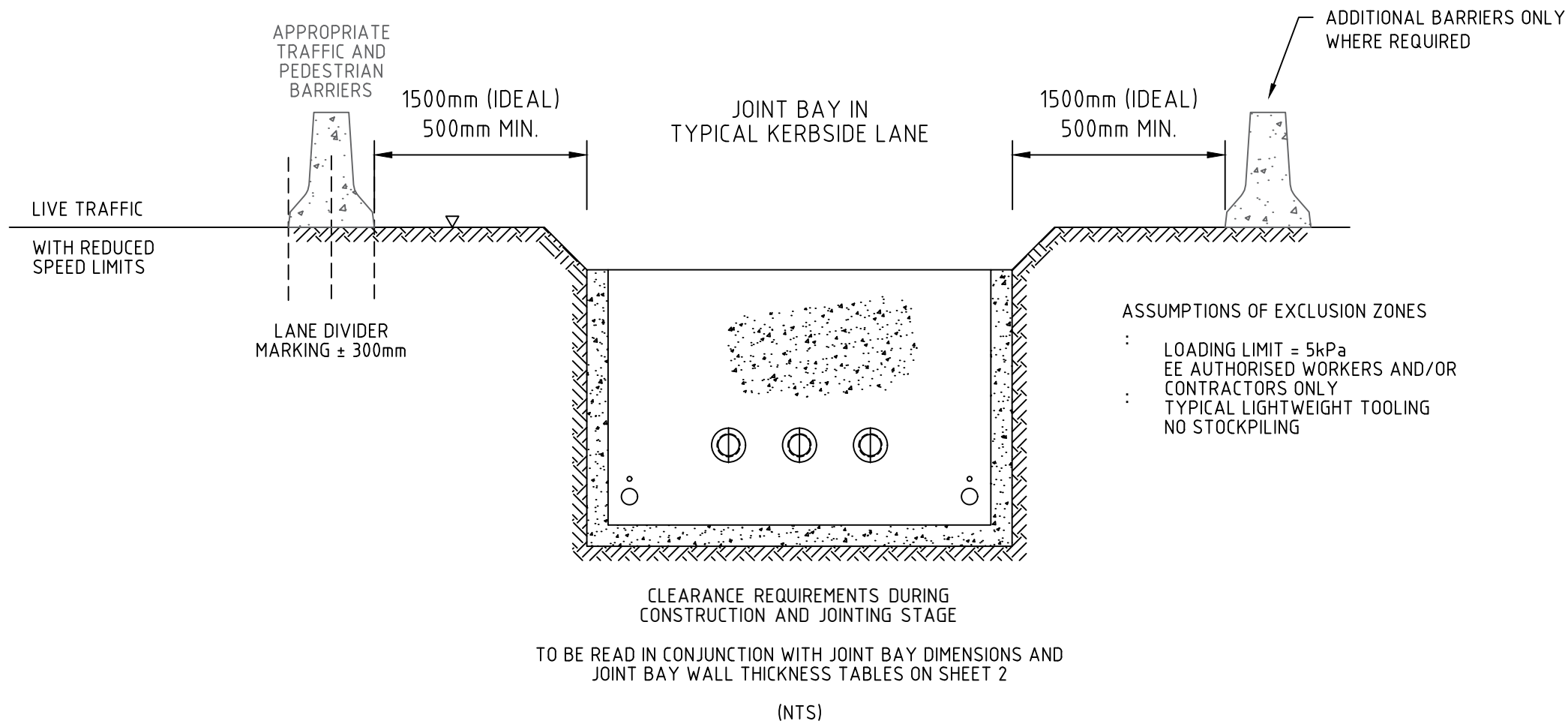
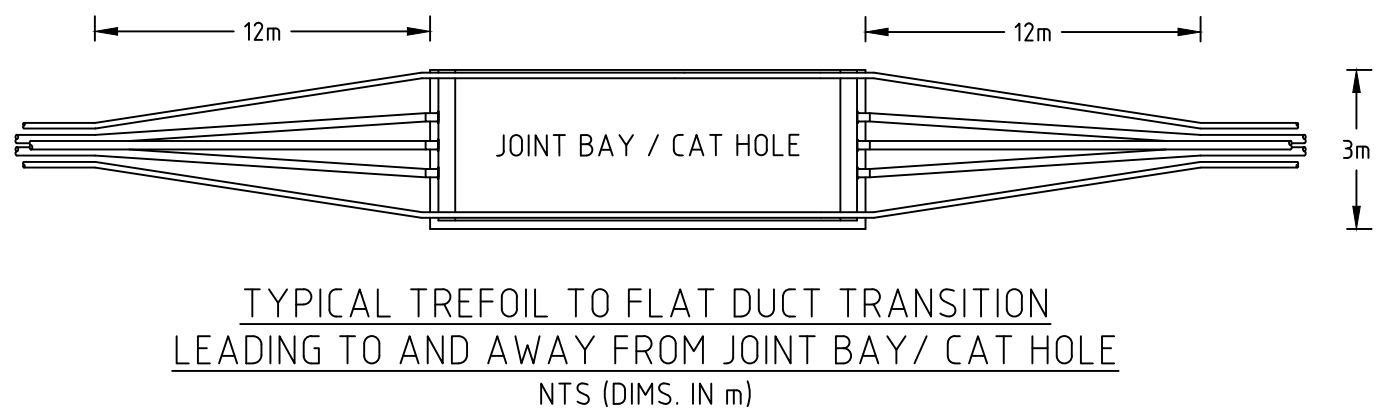
Amendment: _____

Date Approved: _____

Examiner's Signature: _____

Print Name: _____

This Certification is issued subject to Endeavour Energy's Standard Certification Terms


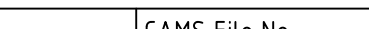




FOR JOINT BAY DETAILS REFER TO EE DRAWING G297281 FOR 132KV

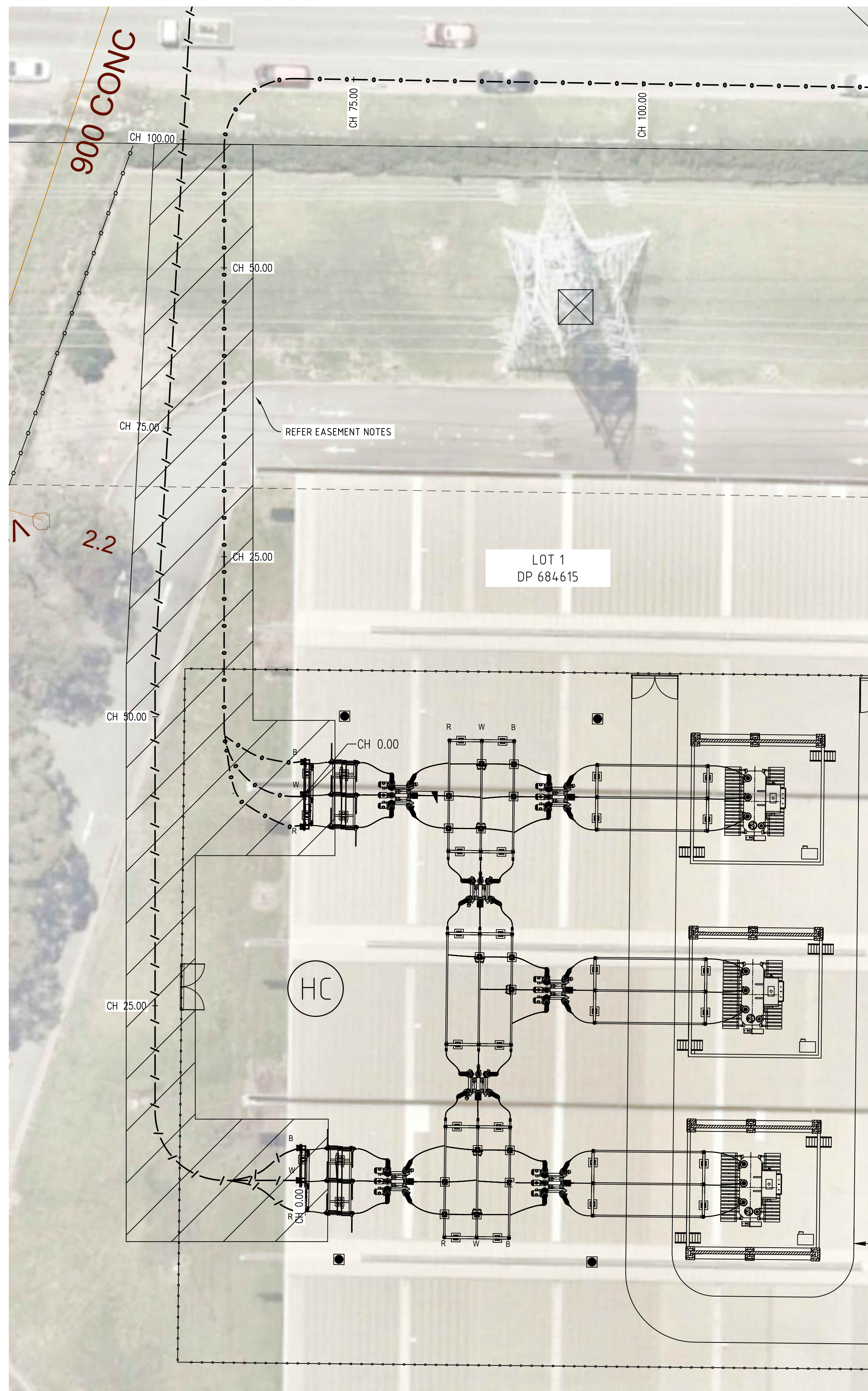
WORKS COMPLETED/FIELD BOOK	
CONSTRUCTED BY: _____	
WORKS COMPLETED: _____	
SIGNATURE: _____	DATE: _____
INSPECTED BY: _____	
SIGNATURE: _____	DATE: _____
ASSET RECORDING	
I: _____	
OR: _____	
CONTACT No: _____	
HENDRY CERTIFY THAT ASSETS NAMED AS ABOVE ON THIS DRAWING HAVE BEEN	
RECORDED AS PER ENDEAVOUR ENERGY STANDARDISED ASSET.	
SIGNATURE: _____	DATE: _____

CERTIFIED BY ENDEAVOUR ENERGY	
Amendment: _____	
Date Approved: _____	
Examiner's Signature: _____	
Print Name: _____	
This Certification is issued subject to Endeavour Energy's Standard Certification Terms	

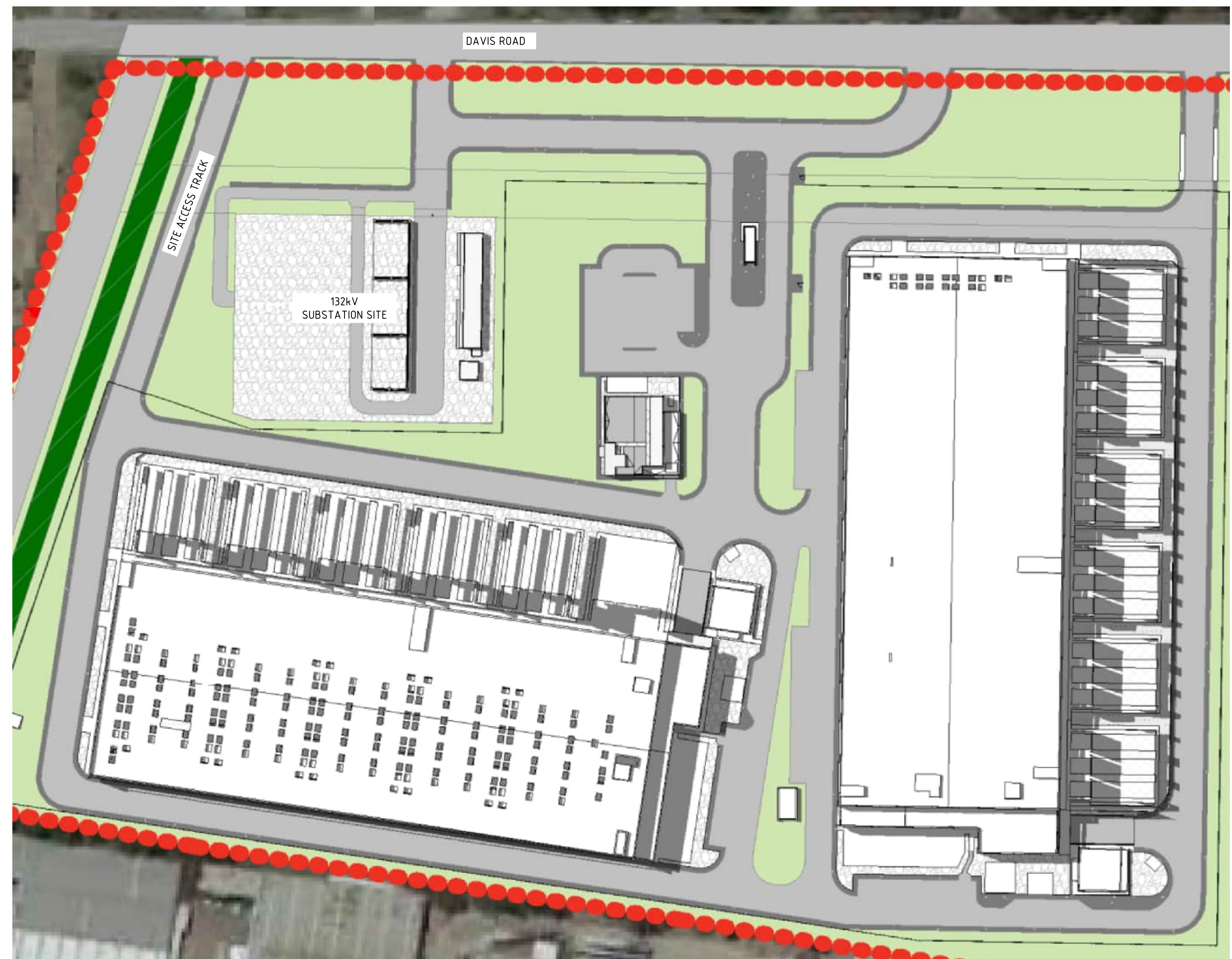
Cadastre: © Land and Property Information 2016

AMENDMENTS	ORIGINAL ISSUE	DRAFT No. 01	SUBMITTED FOR PROPOSED METHOD OF SUPPLY	PRE-CERTIFICATION DRAWING ISSUES			 AUSCONNEX 4/9 GLENDENNING ROAD, GLENDENNING NSW 2761 www.ausconnex.com.au ENABLING COMMUNITIES THROUGH INFRASTRUCTURE		REFERENCE DRAWING'S		WORK ORDERS		CAMS File No.	UIL6491	 ORIGINAL SCALE	DO NOT SCALE DIMENSIONS IN METRES	3 DAVIS ROAD WETHERILL PARK UIL6491 132kV FDRs 23U & 23X LOAD CONNECTION - 180MVA Method of Supply Sketch			A1	Draft	A	SHEET No 8 OF 10 SHEETS
				DATE	DESCRIPTION	REV.			GENERAL OVERHEAD UNDERGROUND SUBSTATIONS	HV SWITCHING EE DEPOT EE REGION HV OP DIAG LOCAL GOV AREA	DRAWN	SHUBH 08/03/2024	DESIGN	SHUBH									
				02/04/24	INTERNAL ISSUE FOR DISCUSSION AND COMMENTS	00																	
				17/04/24	SUBMITTED FOR PROPOSED METHOD OF SUPPLY	00																	

N.T.S



N.T.S



1. AN EASEMENT FOR UNDERGROUND CABLES, AN EASEMENT FOR UNDERGROUND COMMUNICATION CABLE AND AN EASEMENT FOR COMMUNICATION EQUIPMENT IS TO BE CREATED IN FAVOUR OF ENDEAVOUR ENERGY PRIOR TO ENERGISATION OR ANY COMMISSIONING WORKS WITHIN LOT 1 DP 864615
2. ACCESS TO PRIVATE SUBSTATION AND RIGHT OF WAY FOR UNDERGROUND FEEDERS IS OFF DAVIS ROAD.

Appendix 2. Site photographs

Activity routes photos

Figure 1: Redfern (Walter) Street opposite the Wetherill Park Zone Substation end of the activity routes, facing north (at left) through east to south (at right) to the Frank Street LPT intersection at far right	2
Figure 2: Redfern (Walter) Street section of the activity routes facing north (at left) through east to south (at right); LPT route at rear atop embankment.....	2
Figure 3: Northern end of Redfern (Walter) Street near western end of Hassall Street facing south up Redfern (Walter) Street with LPT route at right atop embankment	3
Figure 4: Western end of Hassall Street continuing to Redfern (Walter) Street at right	4
Figure 5: Intersection of Hassall Street (at left) with Widemere Road (at centre) facing west (left) through north to northeast.....	5
Figure 6: Intersection of Widemere Road (at left to centre) with Hassall Street (west section) continuing at right to the west and centre to background to the east. The Widemere Road truck parking bay area is at left opposite the Hassall Street intersection	6
Figure 7: Widemere Road at left (north) to right (south) with the Widemere Road/Hassall Street truck parking bay beyond	7
Figure 8: Widemere Road at left (south) to right (right) near its traffic light intersection with Davis Road continuing west	7
Figure 9: From Davis Road facing north along the Liverpool Parramatta Transitway traffic light intersection	8
Figure 10: East northeast along Davis Road towards the Liverpool Parramatta Transitway traffic light intersection	9
Figure 11: East through north to west along Davis Road, the eastern end of the Data Centres property is at centre and continuing to right	10
Figure 12: West southwest along Davis Road towards the Data Centres property.....	11



Figure 1: Redfern (Walter) Street opposite the Wetherill Park Zone Substation end of the activity routes, facing north (at left) through east to south (at right) to the Frank Street LPT intersection at far right



Figure 2: Redfern (Walter) Street section of the activity routes facing north (at left) through east to south (at right); LPT route at rear atop embankment



Figure 3: Northern end of Redfern (Walter) Street near western end of Hassall Street facing south up Redfern (Walter) Street with LPT route at right atop embankment



Figure 4: Western end of Hassall Street continuing to Redfern (Walter) Street at right



Figure 5: Intersection of Hassall Street (at left) with Widemere Road (at centre) facing west (left) through north to northeast



Figure 6: Intersection of Widemere Road (at left to centre) with Hassall Street (west section) continuing at right to the west and centre to background to the east. The Widemere Road truck parking bay area is at left opposite the Hassall Street intersection



Figure 7: Widemere Road at left (north) to right (south) with the Widemere Road/Hassall Street truck parking bay beyond



Figure 8: Widemere Road at left (south) to right (right) near its traffic light intersection with Davis Road continuing west



Figure 9: From Davis Road facing north along the Liverpool Parramatta Transitway traffic light intersection



Figure 10: East northeast along Davis Road towards the Liverpool Parramatta Transitway traffic light intersection



Figure 11: East through north to west along Davis Road, the eastern end of the Data Centres property is at centre and continuing to right



Figure 12: West southwest along Davis Road towards the Data Centres property at left

Appendix 3. Environmental assessment notification and consultation

NOTIFICATION OF PROPOSED ELECTRICITY WORKS: [UIL6491_SYD067_Two 132KiloVolt UNDERGROUND POWER CABLES AT WETHERILL PARK.](#)

Monday, 26 May 2025

Dear Business Owner/Manager,

NOTIFICATION OF ELECTRICAL WORKS: To continue to provide a safe and reliable electricity supply, AUSCONNEX is upgrading electrical assets in Wetherill Park. In accordance with Electricity Supply Act 1995 - Section 45 and State Environmental Planning Policy (Infrastructure) 2007 (NSW), notice is hereby given of the works to be carried out. (also see attached)

The proposed works will involve.

- [Installation of two 132KiloVolt underground power cables in roadway from Wetherill Park Zone substation to 3 Davis Rd, Wetherill Park.](#)
- [Details as per the concept sketch attached.](#)

Work commence date is yet to be determined, with the project currently in design and assessment stage.

Attached is a copy of the concept sketch for your perusal.

The draft environmental assessment is available for review upon request or can be viewed on the AUSCONNEX website ([link](#)).

Should you wish to comment or query the activity, please provide a response to the email or postal address below within – prior to close of business (5pm) 16 June 2025. In reply, please quote the reference number: [UIL6491_SYD067_2x 132KV FEEDERS WETHERILL PARK.](#)

This notice is not in relation to power outages as you will be contacted in the future by the construction contractor when necessary.

AUSCONNEX will take steps to minimise the impact of our works during the construction period.

AUSCONNEX



[ausconnex.com.au](https://www.ausconnex.com.au)

Ravin Chauhan
Electrical Design Lead

M: 0456 016 374

E: ravin.chauhan@ausconnex.com.au

A: [49 Glendenning Road, Glendenning 2761](#)

ENABLING COMMUNITIES THROUGH INFRASTRUCTURE



Appendix 4. *Geotechnical Assessment for Endeavour Energy, 3 Davis Road, Wetherill Park,*
Report No. 24/3298A, Project No. 32819/9186D-G, October 2024

GEOTECHNICAL ASSESSMENT

FOR

ENDEAVOUR ENERGY

3 Davis Road, Wetherill Park

Report No: 24/3298A

Project No: 32819/9186D-G

October 2024

Table of Contents

1. Introduction	2
1.1. Background.....	2
1.2. Under Boring Design.....	3
1.3. Causes of Ground Settlement during Under Boring.....	4
2. Stability Analysis	5
2.1. Retaining Entry and Exit Pits.....	5
2.2. Stability of the Under-bore.....	6
3. Settlement Analysis	6
3.1. Empirical Method for Settlement Calculations	6
3.2. Estimates of Ground Settlements	7
4. Settlement Monitoring	8
5. Conclusion.....	9

APPENDIX A –Geotechnical Investigation by STS Geotechnics Report No. 24/2776

APPENDIX B – HDD Profile by Underbore Solutions

APPENDIX C – Ground Settlement Calculation Results

1. INTRODUCTION

At the request of ENDEAVOUR ENERGY (The Client), STS Geotechnics Pty Ltd (STS) has prepared this ground surface settlement report at two specific two section that provided in Davis Road on intersection with Liverpool-Parramatta Transitway, Wetherill Park (the Site).

We understand that a trenchless under-bore for the 132kV Route is proposed. The Underbore will be of 700mm diameter and the shallowest point beneath Liverpool-Parramatta Transitway is about 3.77m for Section A and 3.53 for Section B (Appendix B). The Underboring will be completed by Horizontal Directional Drilling (HDD).

Estimates of ground/ road surface settlements during the proposed underboring are required to ascertain if proposed underboring will adversely affect the stability of Davis Road. The settlement estimates are based on the review of the proposed underbore design and the borehole information from the Geotechnical Investigation (GI) report prepared by STS Geotechnics Pty Ltd, project No. 32819/9054D-G dated October 2024 (Appendix A)

1.1. Background

Based on the information in the GI Report, Borehole BH4 is located near the two-section proposed underbore locations. The subsurface profiles provided in Appendix A are summarized below in Table 1.

Table 1: Subsurface profiles encountered in borehole

			Topsoil/Fill		Very Stiff Silty/Sandy Clay		Weathered Shale	
Borehole	Final Depth (mBEGl)	Approx Surface RL (mAHD)	Top of the Layer (mBEGl)	RL (mAHD)	Top of the Layer (mBEGl)	RL (mAHD)	Top of the Layer (mBEGl)	RL (mAHD)
BH4	5.00	34.30	0.00	34.30	0.20	34.1	3.60	30.70

A generalized geotechnical model consisting of three geotechnical units is recommended for these two proposed under bore alignment. Each Geotechnical Unit represents soil and/or bedrock with similar engineering properties. The generalised Geotechnical Model for the proposed under bore alignment is presented below in Table 2. For more detailed descriptions of the subsurface conditions, refer Appendix A.

Table 2: Generalised geotechnical model.

Unit	Generalised Description	Depth of the layer (m BEGL) ¹
1	TOPSOIL/Fill: Silty CLAY: low plasticity, grey/brown, with grass and root	0
2	Very Stiff Silty CLAY: low to medium plasticity, brown/grey, trace of gravels	0.2 to 3.6
3	SHALE: very low strength	3.6 to 5.0

¹Metres below existing ground level

No groundwater was encountered in the boreholes.

Assessed strength parameters in terms of cohesion and internal friction angle as well as modulus for each Geotechnical Unit are presented below in Table 3.

Table 3: Recommended material properties.

Unit	Generalised Description	Unit Weight (γ) (kN/m ³)	Undrained Cohesion (kPa)	Effective Cohesion (kPa)	Effective Friction Angle (deg)	Effective Young's Modulus (MPa)	Poisson's Ratio
1	Topsoil	15.0	5	0	20	1	0.30
2	Very Stiff Silty Clay	19.0	150	7.5	28	30	0.30
3	Weathered Shale	22.0	-	30	28	80	0.25

1.2. Under Boring Design

Design details of the proposed under bore are presented below in Table 4.

Table 4: Details of proposed under bore.

Number of Under bore	2 (Section A and Section B)
Depth to Under Bore Axes from existing Ground Surface	1.0 m to 4.1 m
Under bore Diameter & (Length)	700mm & (80m) ¹
Depth to Groundwater Level	ND
Under boring Method	Horizontal directional drilling (HDD)
Predominant Material to be bored through	Very stiff silty clay and weathered shale

¹Refer to Appendix B for more details

It is anticipated that the proposed underboring using the HDD method will encounter residual soils and very low strength weathered shale. Based on the subsurface materials expected along the two proposed underbores alignment, we assess that the HDD method is suitable for boring, provided that:

1. The under-bore is continuously supported by appropriately designed drilling fluid.
2. Annular space between under bore and product conduit is grouted.
3. Ground settlements during after drilling are monitored to ensure the settlements are within the tolerable limits for stability of the ongoing operation of the Davis Road. Appropriate remedial actions can be taken if required.

The HDD process is made up of the following stages:

1. Selection of the bore path.
2. Excavation of the entry and exit pits.
3. Drilling a pilot bore along the pre-determined bore path from the entry pit to exit pit.
4. Staged reaming to enlarge pilot hole to required size.
5. Installation of the product conduits or pipe by pulling through pre-reamed under bore.
6. Grouting the annular space between under bores and product conduits.

The HDD will commence at the entry pit and terminate at the exit pit. We understand that the entry and exit pits for the proposed under bore will be about 1.0 m, below the existing ground surface. Therefore, the sub-surface materials to be excavated will comprise residual silty clays and weathered shale. It is our assessment that conventional earthmoving equipment, such as excavator, should be adequate to excavate entry and exit pits.

Based on the observations made during site drilling, the depth to the groundwater level is likely to be deeper than the base of entry and exit pits. Although fluctuations in the level of groundwater and/or seepage might occur due to variations in rainfall and/or other factors, we do not anticipate significant groundwater inflow during entry and exit pits excavation. A simple sump and pump method should be able handle any minor seepage that may occur. However, in the unlikely event significant groundwater inflow occurs during entry and exit pits excavations, we work should cease until geotechnical advice is obtained.

1.3. Causes of Ground Settlement during Under Boring

Ground surface settlements that occur during under boring are normally due to one or more of the following reasons:

- ***Densification of soils due to vibration during under boring.***

If operated by an appropriately trained and skilled operator, the HDD method will experience only minor vibration. The weathered shale is unlikely to densify due to vibration during the boring process. Additionally, the silty clay overlying the bore is also unlikely to densify during drilling.

- ***Consolidation settlement due to site dewatering.***

As the depth to groundwater level is assessed to be deeper than the proposed invert levels of the entry and exit pits as well as the proposed under-bore invert level, it is anticipated that the proposed works can be completed without the need for dewatering. Although, minor seepage because of rainfall might be encountered, removal of this water will likely not result in significant changes to the effective stress in the soils. Therefore, consolidation settlement of the clay due to dewatering is unlikely.

- ***Ground loss during under boring operations.***

Surface settlements can be caused by ground loss associated with ground squeezing, running or flowing of excavated soils into the under bore and loss due to the size of over cuts. The magnitudes of these losses are largely dependent on the type and strength of the materials through which under boring is carried out, size and depth of the under-bore, capabilities and appropriateness of the under boring equipment and the skill of operators.

2. STABILITY ANALYSIS

2.1. Retaining Entry and Exit Pits

The excavation faces for entry and exit pits are likely to be vertical and it is unlikely that vertical cut faces can be maintained in soils for the long term.

Excavation face for the entry exit pits need to be battered at 1 Vertical to 2 Horizontal or retained by an engineered retaining structures.

Appropriate retaining structures may include trench boxes and/or steel plates with struts. The pressure distribution on such retaining structures may be assumed to be rectangular in shape and estimated as follows:

$$p_h = 0.4\gamma H \quad (1)$$

Where,

- p_h = Horizontal active pressure (kN/m²)
- γ = Total density of materials to be retained (19.0kN/m³)
- H = Retained height (m)

The above estimate of earth pressure is based on the assumptions that ground level behind the retaining structure is horizontal and groundwater level is lower than the base of excavations.

If retained materials are subjected to other surcharge loads (structures and traffic in the vicinity of the site) and/or groundwater level is shallower than the base of excavations, additional earth pressures resulting from surcharge loads and groundwater should also be allowed for in design of retaining structures.

2.2. Stability of the Under-bore

For Silty Clay (Unit 2) and shale (Unit 3) anticipated along proposed under bore alignment, the ground loss depends mainly on Overload Factor, N defined as follows (Reference 2):

$$N = (\gamma H + \sigma_s + \sigma_t) / c_u \quad (2)$$

Where,

- γ = Unit weight of soils/rock overlying under bore (kN/m³)
- H = Depth to under bore axis (m)
- σ_s = Surcharge on ground surface (kPa)
- σ_t = Internal support pressure on under bore (kPa)
- c_u = Undrained shear strength/cohesion (kPa)

An Overload Factor of 3.0 or less generally indicates that the under-bore face stability is generally ensured, and an Overload Factor of more than 6 generally indicates an unstable under bore face. The Overload Factor for the proposed under bore is estimated to be less than 1 even when making the following assumptions:

- The entire soil overlying the under bores is assumed to have undrained shear strength of 40kPa (conservative assumption)
- Under bore is not provided with any internal support and
- Road is subjected to traffic surcharge of 20.0 kPa.

Since the Overload Factor is less than 3, and the HDD is operated by a skilled and experienced operator, the faces of the of the proposed under bore are likely to remain stable, and ground disturbance due to the proposed under boring is unlikely to emerge to the ground surface of Davis Road.

3. SETTLEMENT ANALYSIS

3.1. Empirical Method for Settlement Calculations

Surface settlements due to under boring can be calculated by using the method developed by O'Reilly and New [Reference 1]. The maximum settlement occurs directly above the centreline of the under bore, and the settlement decreases with the distance from the pipe centreline. Schematic diagram of settlement profile is shown in Figure 1.

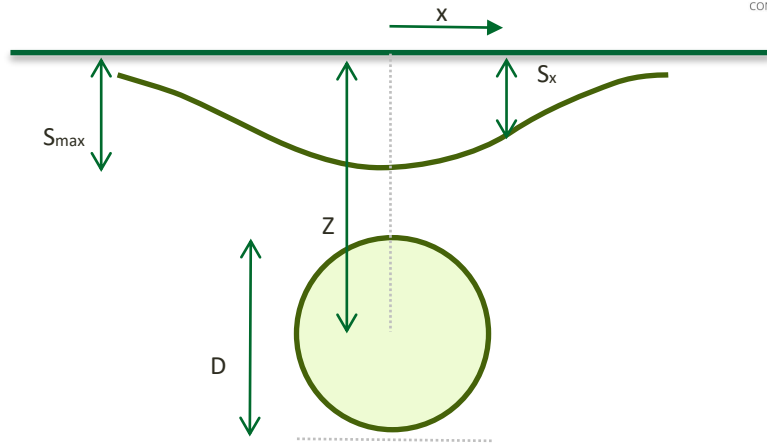


Figure 1: Schematic diagram of settlement profile [Reference 3]

The equation for determining maximum settlement at the surface is defined by the following equation:

$$S_{max} = \frac{V_s}{\sqrt{2\pi}i} \quad (3)$$

Where;

- S_{max} = Maximum settlement directly above the centreline
- V_s = Volume of the settlement profile per unit length of the under bore
- i = Parameter defining the width of the settlement profile (influence zone)
 - $i = 0.43Z + 1.1 \text{ (m)}$ (for cohesive soils)
 - $i = 0.28Z - 0.12 \text{ (m)}$ (for cohesionless soils)

Volume of the settlement profile, V_s can be expressed as a proportion of the excavated or replaced soil volume (V_{exc}). Where V_s/V_{exc} = Ground loss during boring operations.

The settlement profile (influence zone) along the horizontal direction (x) from the centreline can be determined from:

$$S_x = S_{max} e^{-\frac{x^2}{2i^2}} \quad (4)$$

According to Peck [Reference 2], the settlement approaches zero at $2.5i$. Therefore, the total width of the influence zone can be estimated to be $5i$.

3.2. Estimates of Ground Settlements

As noted above, an appropriately skilled and experienced operator should ensure minimal vibration and ground losses during the under boring. Furthermore, because the HDD process includes continuous grouting this will prevent ground loss and collapse of the under-bore. Therefore, it is our assessment that the volume loss experienced will be about 2.0%.

However, potential variations in nature of materials encountered and lapses in drilling operations may result in some greater ground losses around the under-bore. Therefore, to assess possible ground settlements under exceptionally adverse but unlikely circumstances, ground settlements have also been estimated for volume losses of 5.0% and 10.0%.

The depth to the centre of the proposed underbore varies within the existing Liverpool-Parramatta Transitway Level, ranging from 3.77 m to 4.11 m for Section A and from 3.53m to 3.88m for Section B. The settlement due to the underbore at the shallowest depth of 3.77m for Section A and 3.53m for Section B will be largest (Appendix B). Therefore, ground deformations at the shallowest point of excavation were considered in this report.

Estimates of maximum ground settlement and width of the settlement profile are provided in Table 5. For the details of under bore presented in Table 5, a commercially available computer program "GEO5 - Ground Loss" [Reference 4] was used to estimate ground surface settlement profiles. Settlement results were later validated with the hand calculations (empirical method) outlined in Section 3.1.

Table 5: Estimates of maximum ground settlement and with of influence zone

Analysis Location	Depth to Invert Level of Under Bore from Road Surface (m)	Indicative Volume Loss (%)	Maximum Settlement at Road Surface (mm)	Settlement Profile Width at Road Surface (m)
Section A	3.77	2	1.6	15.08
		5	4.1	15.08
		10	8.1	15.08
Section B	3.53	2	1.7	14.12
		5	4.3	14.12
		10	8.7	14.12

Indicative graphical settlement profiles (influence zones) along the horizontal direction for volume losses of 2%, 5% and 10% are presented in Appendix C. The results presented in Table 5 indicate that the maximum surface settlement under normal circumstances could be approximately 1.6 mm for Section A and 1.7 mm for Section B.

Under highly unlikely extreme circumstances of ground loss 5% and 10%, maximum surface settlement of 4.1 mm and 8.1 mm for Section A and surface settlement of 4.3 and 8.7 mm for Section B may be experienced.

4. SETTLEMENT MONITORING

We are not aware of the magnitude of ground settlement that can be tolerated without adversely impacting the performance of Liverpool-Parramatta Transit Way. We anticipate Transport for New South Wales (TfNSW) will specify the tolerable settlements for

protection of their assets. However, if an experienced operator is engaged, ground loss will be minimized. Based on our settlement analysis estimates, it is unlikely to affect the road surfaces. Our calculations indicate that settlements are below 4 mm with a 2% ground loss under normal circumstances, leading us to conclude that the consequences of such an event are insignificant. Our experience suggests that ground settlements of up to 4 mm typically do not impact the functionality of the road pavement.

We consider the HDD method is appropriate for the proposed under boring provided, ground surface settlements are monitored regularly to ensure any settlements exceeding tolerable maximum level are detected, and appropriate remedial measures can be implemented.

We suggest that a check survey is carried out prior to, during and after the under boring to confirm that the ground movements are within agreed limits. This survey should be carried out in areas deemed most susceptible to settlements. Areas within about 5 m radius around the under bore head are considered most susceptible to settlements.

5. CONCLUSION

The assessments and recommendations presented in this report are appropriate for sub-surface profiles detailed in Appendix A. However, if site conditions encountered during under boring differ from those described in Appendix A, the proposed assessments and recommendations may require modification. Therefore, we recommend STS is contacted for further advice if sub-surface conditions differ from those assumed in this report. It is recommended that an experienced Geotechnical Engineer from STS inspect the under boring so that additional advice can be provided if unfavourable sub-surface conditions, advice regarding excavation stability or groundwater are encountered during boring.

If you have any questions, please do not hesitate to contact the undersigned.

Yours faithfully,

Author



*Masoud Haghparsat
PhD, MEng, BE
Senior Geotechnical Engineer
STS Geotechnics Pty Limited*

Reviewed by



*Mrigesh Tamang
MIE Aust, CPEng, NER, APEC Engineer, IntPE(Aust)
Senior Geotechnical Engineer/ Manager
STS Geotechnics Pty Limited*

References

- [1] O'Reilly, M. P., & New, B. M. (1982). *Settlements above tunnels in the United Kingdom-their magnitude and prediction* (No. Monograph).
- [2] Peck, B. B. (1969). Deep excavation and tunnelling in soft ground, State of the art volume. In *7th ICSMFE* (Vol. 4, pp. 225-290).
- [3] Ahmed, A., Islam, M. A., Alam, M. Z., & Quazi, H. S. (2023). Surface settlement induced by horizontal directional drilling. *Underground Space*, 8, 94-108.
- [4] Fine Ltd, 2009, "Settlement Analysis, Settlement Prediction and Building Damage Assessment", Website, <http://www.groundloss.com/theory/>.

APPENDIX A – Geotechnical Investigation Report by
STS Geotechnics Report No. 24/2776

GEOTECHNICAL INVESTIGATION

FOR

ENDEAVOUR ENERGY

3 Davis Road, Wetherill Park

Report No: 24/2776

Project No: 32819/9054D-G

October 2024

Table of Contents

1.	Introduction.....	2
2.	Nature of the Investigation	2
2.1.	Fieldwork	2
2.2.	Laboratory Testing.....	2
3.	Subsurface conditions	3
3.1.	Site Geology.....	3
3.2.	Subsurface profile.....	4
3.3.	Laboratory Testing Results	5
4.	Stability Analysis	8
4.1.	Retaining Entry and Exit Pits.....	8
4.2.	Potential for Ground Settlement during Proposed Under-Boring.....	8
4.3.	Causes of Ground Settlement	9
5.	Recommendations.....	10

NOTES RELATING TO GEOTECHNICAL REPORTS

DRAWING NO. 24/2776– BOREHOLE LOCATIONS

APPENDIX A – BOREHOLE LOGS AND EXPLANATION SHEETS,

APPENDIX B – LABORATORY TEST RESULTS

1. INTRODUCTION

At the request of Endeavour Energy (The Client), STS Geotechnics Pty Ltd (STS) has undertaken a geotechnical investigation at 3 Davis Road, Wetherill Park (the Site).

We understand that a trenchless under-bore for the 132kV Route is proposed. A geotechnical investigation was required to assess sub-surface conditions along the proposed under-bore alignment.

The purpose of the investigation was to determine:

- Site conditions and regional geology,
- interpretation of subsurface conditions, summary of the main geotechnical issues for the proposed under-bore,
- Appropriate laboratory testing for strength and soil aggressiveness to steel and concrete.
- Comment on the suitability of the subsurface conditions for the proposed under-boring.
- The main likely geotechnical issues for the proposed under-bore.

The investigation was undertaken as outlined in STS's proposal referenced P24-405 dated August 20, 2024.

2. NATURE OF THE INVESTIGATION

2.1. Fieldwork

The fieldwork consisted of drilling five (5) boreholes numbered BH1 to BH5 at locations nominated by the client and shown on Drawing No. 24/2776. The boreholes were drilled using a utility mounted Landcruiser drilling. Soil strengths were determined by undertaking regular Dynamic Cone Penetration Tests (DCP) adjacent to the borehole locations. Drilling operations were supervised by one of STS's geotechnical engineers who also logged the subsurface conditions encountered.

The subsurface conditions observed are recorded on the borehole logs given in **Appendix A**. An explanation of the terms used on the logs is also given in **Appendix A**. Notes relating to geotechnical reports are also attached.

2.2. Laboratory Testing

To assess the soils for their aggressiveness, five (5) selected representative soil samples were tested to determine the following:

- pH,
- Sulphate content (SO₄),
- Chloride content (CL), and
- Electrical Conductivity (EC)

To assist with determining the plasticity of the subsurface soils, five (5) Atterberg limit/linear shrinkage tests were carried out on representative soil samples.

To assist with determining the thermal properties of the subsurface soils, thermal resistivity tests were conducted on five (5) representative undisturbed samples.

Detailed test reports are given in **Appendix B**.

3. SUBSURFACE CONDITIONS

3.1. Site Geology

The Perth geological series sheet at a scale of 1:100,000 indicates that the site is underlain by Triassic Age Bringelly Shale within the Wianamatta Group of rocks. Rocks in this formation typically comprise shale, carbonaceous claystone, laminite, lithic sandstone, rare coal. The site is located near the geological boundary of Cenozoic Age deposits that comprise medium grained sand clay, silt.



Figure 1: Extract from geological map

3.2. Subsurface profile

When assessing the subsurface conditions across a site from a limited number of boreholes, there is the possibility that variations may occur between test locations. The data derived from the site investigation programme are extrapolated across the site to form a geological model and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour regarding the proposed development. The actual condition at the site may differ from those inferred, since no subsurface exploration programme, no matter how comprehensive, can reveal all subsurface details and anomalies, particularly on a site such as this where there has been previous development.

The subsurface conditions consist of topsoil, possible fill, natural silty clay/sandy clay and extremely weathered shale. Detailed subsurface conditions are given in **Appendix B** and summarised in **Table 1**. The depths given in Table 1 are below existing ground level (BEGL). RLs for each unit are shown on the borehole logs.

Table 1: Subsurface profiles encountered in boreholes.

Borehole	Final Depth (mBEGl)	Approx Surface RL (mAHD)	Topsoil/Fill		Stiff Silty/Sandy Clay		Very Stiff Silty/Sandy Clay		Weathered Shale	
			Top of the Layer (mBEGl)	RL (mAHD)	Top of the Layer (mBEGl)	RL (mAHD)	Top of the Layer (mBEGl)	RL (mAHD)	Top of the Layer (mBEGl)	RL (mAHD)
BH1	5.00	52.95	0.00	52.95	0.20	52.75	1.50	51.45	-	-
BH2	3.00	41.00	0.00	41.00	-	-	0.20	40.80	2.80	38.20
BH3	5.00	37.16	0.00	37.16	-	-	0.20	36.96	4.00	33.16
BH4	5.00	41.11	0.00	41.11	-	-	0.20	40.91	3.60	37.51
BH5	5.00	44.91	0.00	44.91	0.40	44.51	1.00	43.91	4.20	40.71

A generalized geotechnical model consisting of four (4) geotechnical units is recommended for the proposed alignment. Each Geotechnical Unit represents soil and/or bedrock with similar engineering properties. The generalised Geotechnical Model for the proposed alignment is presented below in Table 2. For more detailed descriptions of the subsurface conditions, refer **Appendix B**.

Table 2: Generalised geotechnical model

Unit	Generalised Description	Depth to the top of the layer (m BEGL)
1	TOPSOIL/Fill: Silty CLAY: low plasticity, grey/brown, with grass and root	0
2	Stiff Silty/Sandy CLAY : low to medium plasticity, dark brown, trace of gravels	0.2 to 0.4
3	Very Stiff Silty/Sandy CLAY: low to medium plasticity, brown/grey, trace of gravels	0.2 to 1.5
4	SHALE: very low strength, extremely weathered (XW)	2.8 to 4.2

No groundwater was encountered in the boreholes. No long-term groundwater level monitoring was carried out.

The assessed strength parameters for each generalised Geotechnical Unit are presented below in **Table 3**.

Table 3: Recommended material properties

Unit	Generalised Description	Unit Weight (γ) (kN/m ³)	Undrained Cohesion (kPa)	Effective Cohesion (kPa)	Effective Friction Angle (deg)	Effective Young's Modulus (MPa)	Poisson's Ratio
1	Topsoil	15.0	5	0	20	1	0.30
2	Stiff Silty/Sandy Clay	18.0	75	5	26	15	0.30
3	Very Stiff Silty/ Sandy Clay	19.0	150	7.5	28	30	0.30
4	Shale XW	22.0	-	30	28	80	0.25

3.3. Laboratory Testing Results

3.3.1 Soil Plasticity

Five (5) Atterberg limit tests were carried out on representative samples retrieved from the site. The detailed test report is attached and summarise in **Table 4**.

Table 4: Atterberg Limits results

Borehole	Depth (m)	Soil Description	Liquid Limit (%)	Plastic Limit (%)	Plastic Index(%)
BH1	1.0 – 1.5	Silty CLAY, red brown (CH)	58	21	21
BH2	1.5 – 2.0	Silty CLAY, brown (CI)	44	21	21
BH3	2.0 – 2.5	Silty CLAY, dark grey (CI)	45	19	19
BH4	3.8 – 4.3	Silty CLAY, Grey brown (CI)	41	21	21
BH5	2.5 – 3.0	Silty CLAY, red brown (CL)	31	15	15

3.3.2 Soil Aggressivity and Salinity

The aggressiveness or erosion potential of an environment in building materials, particularly concrete and steel is dependent on the levels of soil pH and the types of salts present, generally sulphates and chlorides. To determine the degree of aggressiveness, the test values obtained are compared to Tables 6.4.2 (C) and 6.5.2 (C) in AS2159 – 2009 Piling – Design and Installation. The test results are summarised in **Table 5**.

Table 5 – Soil Aggressiveness Summary

Sample No.	Location	Depth (m)	pH	Sulfate (mg/kg)	Chloride (mg/kg)	Electrical Conductivity (dS/m)	
						EC _{1:5}	EC _e
S1	BH1	1.0-1.5	4.7	580	310	0.247	2.5
S2	BH2	1.5-2.0	6.2	80	730	0.295	3.0
S3	BH3	2.0 – 2.5	6.9	100	70	0.083	0.8
S4	BH4	3.8 – 4.3	6.5	800	590	0.242	2.4
S5	BH5	2.5 – 3.0	6.8	70	670	0.257	2.6

The soils on the site are low permeability and above groundwater. Therefore, soil conditions are considered appropriate (AS2159).

A review of the durability aspects indicates that:

- pH : minimum value of 4.7
- SO₄ : maximum value of 800 mg/kg (ppm) < 5000 ppm
- Cl : maximum value of 670 mg/kg (ppm) < 5000 ppm
- EC_e : maximum value of 3.0 dS/m

In accordance with AS2159-2009, the exposure classification is mild for concrete and non-aggressive for steel. In accordance with AS2870-2011 the classification is A2.

Reference to DLWC (2002) “Site Investigations for Urban Salinity” indicates that EC_e values of 0.8 to 3.0 dS/m are consistent with the presence of Slightly saline soils.

3.3.1 Thermal Resistivity test

To assess the material's ability to resist heat flow, five (5) thermal resistivity test were carried out in accordance with the procedures given in ASTM D5334-23. The test results are detailed in the **Table 6**.

Table 6 – Thermal Resistivity (TR) Test Summary

Location	Depth (m)	Moisture Content (%)*	TR Resistivity (mK/W)	TR Conductivity (W/mK)
BH1	1.0 – 1.2	10.1	0.555	1.802
		9.3	0.568	1.761
		8.0	0.680	1.471
		3.9	0.995	1.005
		0.0	1.126	0.888
BH2	1.5 – 1.7	13.9	0.758	1.319
		12.3	0.779	1.284
		7.8	0.962	1.040
		3.3	1.080	0.926
		0.0	1.462	0.684
BH3	2.0 – 2.2	17.2	0.590	1.695
		16.0	0.648	1.543
		12.4	0.821	1.218
		5.4	1.126	0.888
		0	1.503	0.665
BH4	3.8 – 4.0	11.7	0.551	1.815
		10.9	0.569	1.757
		7.8	0.641	1.560
		0	1.336	0.749
BH5	2.5 – 2.7	21.5	0.660	1.515
		20.6	0.682	1.466
		15.5	0.828	1.208
		8.0	1.312	0.762
		0.0	1.883	0.531

*The initial step of the thermal resistivity (TR) test has been conducted at the field moisture content

4. STABILITY ANALYSIS

4.1. Retaining Entry and Exit Pits

Based on the ground conditions, Residual soils are anticipated to be predominantly stiff to very stiff silty clay soils with some layers of gravel layers. It is our assessment that conventional earthmoving equipment, such as a backhoe or an excavator will be adequate to excavate the entry and exit pits.

The excavation faces for entry and exit pits are likely to be vertical and it is unlikely that vertical cut faces could be maintained in soils for long term during entry and exit pit excavations.

Excavation faces for the entry exit pits would need to be battered at 1 Vertical to 2 Horizontal or retained by engineered retaining structures.

Appropriate retaining structures may include trench boxes and/or steel plates with struts. The pressure distribution on such retaining structures may be assumed to be rectangular in shape and estimated as follows:

$$p_h = 0.4\gamma H$$

Where,

- p_h = Horizontal active pressure (kN/m²)
- γ = Bulk density of materials to be retained
- H = Retained height (m)

The above estimate of earth pressure is based on the assumptions that ground level behind the retaining structure is horizontal, and groundwater level is lower than the base of excavations.

If retained materials are subjected to other surcharge loads (structures and traffic in the vicinity of the site) and/or groundwater level is shallower than the base of excavations, additional earth pressures resulting from surcharge loads and groundwater should also be allowed for in design of retaining structures.

4.2. Potential for Ground Settlement during Proposed Under-Boring

Assuming stiff/ very stiff Silty Clay (Unit 2 & 3) and Shale XW (Unit 4) will be encountered along the proposed under-bore alignment, which we assume is about 3 metres BEGL, the ground loss depends mainly on Overload Factor, N defined as follows:

$$N = (\gamma H + \sigma_s + \sigma_t)/c_u$$

Where,

- γ = Unit weight of soils/rock overlying under-bore (kN/m^3)
- H = Depth to under-bore axis (m)
- σ_s = Surcharge on ground surface (kPa)
- σ_t = Internal support pressure on under-bore (kPa)
- c_u = Undrained shear strength/cohesion (kPa)

An Overload Factor of 3.0 or less generally indicates that the under-bore face stability is generally ensured, and an Overload Factor of more than 6 generally indicates an unstable under-bore face. The Overload Factor for the proposed under-bore is estimated to be less than 1 even when making the following assumptions for the worst-case scenario:

- The critical depth of under-bore is 3.0 m below ground surface.
- Silty Clay overlying the under-bores is assumed to have undrained shear strength of 40 kPa (very conservative assumption)
- Under-bore is not provided with any internal support and
- There is a traffic surcharge of 20 kPa.

Since the Overload Factor is less than 3, and the Horizontal Directional Drilling (HDD) will be operated by a skilled and experienced operator, the faces of the of the proposed under-bore are likely to remain stable and ground disturbance due to the proposed under-boring is unlikely to be reflected at the ground surface of Road.

4.3. Causes of Ground Settlement

It is crucial that the potential surface settlements resulting from the proposed under-boring is determined once the final designs have been completed. Ground surface settlements that occur during under-boring are normally due to one or more of the following reasons:

- ***Densification of soils due to vibration***

If operated by an appropriately trained and skilled operator, the proposed HDD method will experience only minor vibration. Silty clays are unlikely to densify due to minor vibration while under-boring. Therefore, ground settlement caused by densification of soils in the vicinity of the proposed under boring is assessed to be insignificant.

- ***Consolidation settlement due to site dewatering.***

As the depth to groundwater level is assessed to be deeper than the proposed invert levels of the entry and exit pits as well the proposed under-bore invert level, it is anticipated that the proposed works can be completed without the need for dewatering. Although, minor seepage because of rainfall might be encountered, removal of this water will likely

not result in significant changes to the effective stress in the soils. Therefore, consolidation settlement of the clay due to dewatering is unlikely.

- **Ground loss.**

Surface settlements can be caused by ground loss associated with ground squeezing, running or flowing of excavated soils into the under-bore and loss due to the size of over cuts. The magnitudes of these losses are largely dependent on the type and strength of the materials through which under-boring is carried out, size and depth of the under-bore, capabilities and appropriateness of the under-boring equipment and the skill of operators.

5. RECOMMENDATIONS

Based on the results of the geotechnical investigation, the proposed under boring is likely encounter stiff/very stiff silty clay and extremely weathered shale. However, it should be noted that the design for the under boring has not been finalised, and therefore, the depth of the under boring profile remains unknown. No groundwater was encountered in the investigation. Minor water seepage can occur following periods of heavy rainfall. However, this is unlikely to impact the under-bore.

Soil parameters are provided in **Table 3** should the client wish to undertake numerical geotechnical analysis. Once the cross-section and details of the buried pipe are received, STS can provide this service.

These parameters can be used to examine the stability of the entry and exit pits and predict subsurface settlements. However, if site conditions encountered during the under boring operation differ from those described in **Appendix B**, recommendations may require revision.

If you have any questions, please do not hesitate to contact the undersigned.

Author

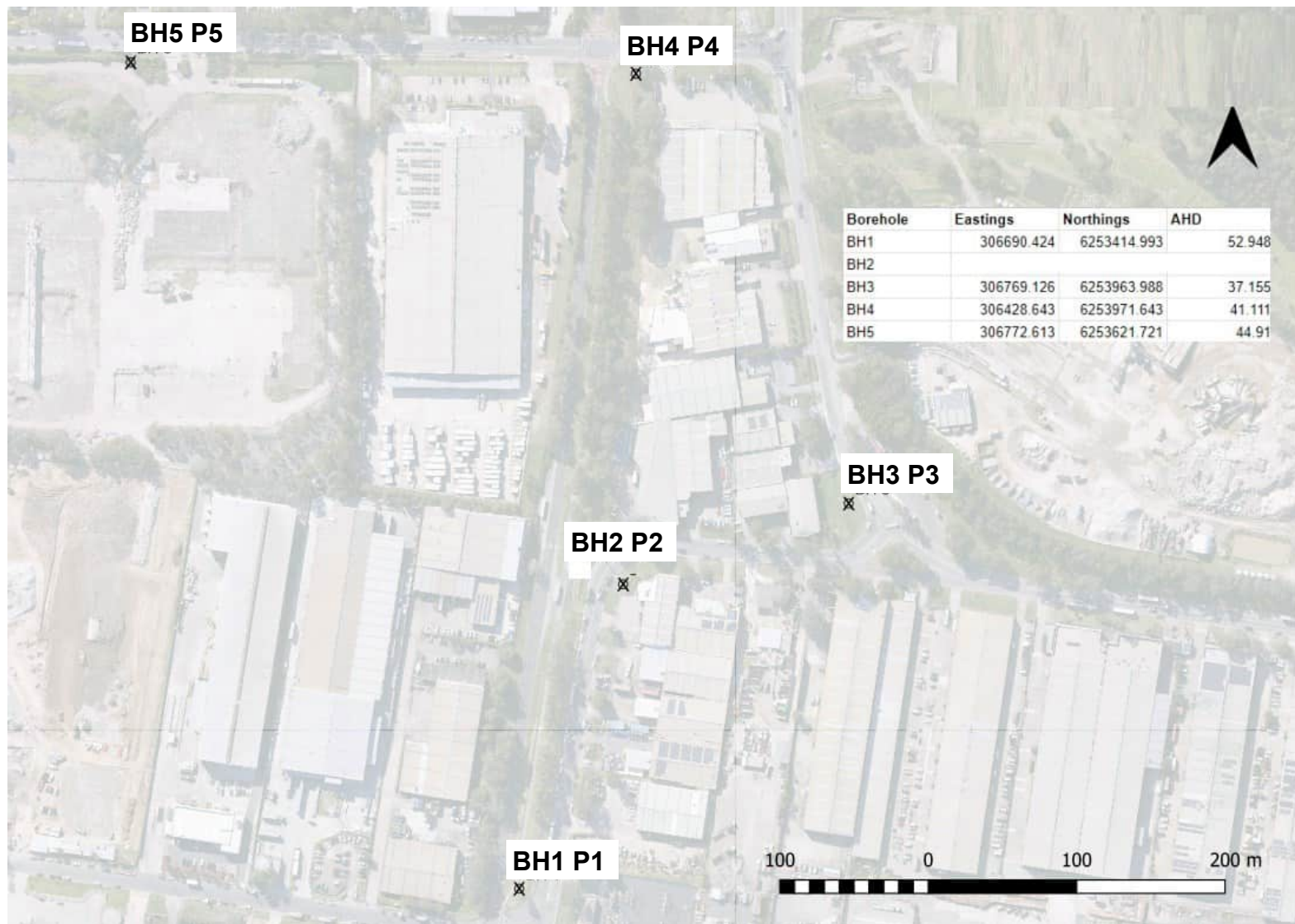


*Masoud Haghparast
Ph.D
Geotechnical Engineer
STS Geotechnics Pty Limited*

Reviewed by



*Mrigesh Tamang, BE, MEng,
MIE Aust, CEng, NER, APEC Engineer, IntPE(Aust)
Senior Geotechnical Engineer
STS Geotechnics Pty Limited*



Borehole and Penetrometer Locations

Client:	Endeavour Energy	Project No.	32819/9054D	Date:	September 2024
Site Address:	3 Davis Road, Wetherill Park	Drawing No.	24/2775	Scale:	Unknown
Work:	Geotechnical Investigation	Revision No.	0		

APPENDIX A – STS BOREHOLE LOGS AND EXPLANATION SHEETS

GEOTECHNICAL LOG - NON CORE BOREHOLE



Client: Endeavour Energy
Project: 3 Davis Road, Wetherill Park
Location: Refer to Drawing No. 24/2776

Project: 32819/9054D-G
Date : September 10, 2024
Logged: EJ Checked By: MT

BOREHOLE NO.: BH 1
Sheet 1 of 1

W A T E R L E V E L	S A M P L E S	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT Soil Name, grain size /plasticity, colour; secondary constituents (Inc. Description) , minor constituents including other remarks	S Y M B O L	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	M O I S T U R E
			TOPSOIL: SILTY CLAY: low plasticity, grey, brown, trace of gravel	CL	-	D
			SILTY CLAY: low to medium plasticity, dark brown, trace of gravel (Possible Fill)	CL/CI	STIFF	<PL
			SILTY CLAY: low plasticity, red brown, trace of gravel	CL	STIFF	<PL
	U50	1.0				
		2.0			VERY STIFF	
		3.0				
		4.0				
		5.0	BOREHOLE DISCONTINUED AT 5.0 M			
D - disturbed sample U - undisturbed tube sample B - bulk sample WT - level of water table or free water N - Standard Penetration Test (SPT) S - jar sample				Contractor: STS Equipment: Utility Mounted Drilling Rig Hole Diameter (mm): 100 Angle from Vertical (°): Drill Bit: Spiral		
NOTES: See explanation sheets for meaning of all descriptive terms and symbols						

GEOTECHNICAL LOG - NON CORE BOREHOLE



Client: Endeavour Energy
Project: 3 Davis Road, Wetherill Park
Location: Refer to Drawing No. 24/2776

Project: 32819/9054D-G
Date: September 10, 2024
Logged: EJ Checked By: MT

BOREHOLE NO.: BH 2
Sheet 1 of 1

W A T E R L E	S A M P L E S	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT Soil Name, grain size /plasticity, colour; secondary constituents (Inc. Description) , minor constituents including other remarks	S Y M B O L	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	M O I S T U R E
			TOPSOIL: CLAYEY SILT: low plasticity, dark brown, with grass and roots	CL	-	D
			SILTY CLAY: low to medium plasticity, dark brown, trace of gravel (Possible Fill)	CL/CI	VERY STIFF	<PL
		1.0	SILTY CLAY: medium plasticity, grey with angular ironstone gravel	CI	VERY STIFF	<PL
	U50					
		2.0				
		3.0	EXTREMELY WEATHERED SHALE: very low strength		-	D
			AUGER REFUSAL AT 3.0 M ON EXTREMELY WEATHERED SHALE			
		4.0				
		5.0				
D - disturbed sample U - undisturbed tube sample B - bulk sample WT - level of water table or free water N - Standard Penetration Test (SPT) S - jar sample				Contractor: STS Equipment: Utility Mounted Drilling Rig Hole Diameter (mm): 100 Angle from Vertical (°): Drill Bit: Spiral		
NOTES: See explanation sheets for meaning of all descriptive terms and symbols						

GEOTECHNICAL LOG - NON CORE BOREHOLE



Client: Endeavour Energy
Project: 3 Davis Road, Wetherill Park
Location: Refer to Drawing No. 24/2776

Project: 32819/9054D-G
Date: September 10, 2024
Logged: EJ Checked By: MT

BOREHOLE NO.: BH 3
Sheet 1 of 1

W A T E R L E	S A M P L E S	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT Soil Name, grain size /plasticity, colour; secondary constituents (Inc. Description) , minor constituents including other remarks	S Y M B O L	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	M O I S T U R E
			TOPSOIL: SILTY CLAY: low plasticity, brown, with grass and roots	CL	-	D
			SILTY CLAY: low to medium plasticity, dark brown (Possible Fill)	CL/CI	VERY STIFF	<PL
		1.0				
		2.0				
		3.0				
		4.0	SILTY CLAY: medium to high plasticity, brown grey, trace of some ironstone gravel	CL/CH	VERY STIFF	<PL
			EXTREMELY WEATHERED SHALE: very low strength	-	-	D
			WEATHERED SHALE: grey, distinctly weathered, very low strength	-	-	D
		5.0	BOREHOLE DISCONTINUED AT 5.0 M ON WEATHERED SHALE			
D - disturbed sample U - undisturbed tube sample B - bulk sample WT - level of water table or free water N - Standard Penetration Test (SPT) S - jar sample				Contractor: STS Equipment: Utility Mounted Drilling Rig Hole Diameter (mm): 100 Angle from Vertical (°): Drill Bit: Spiral		
NOTES: See explanation sheets for meaning of all descriptive terms and symbols						

GEOTECHNICAL LOG - NON CORE BOREHOLE



Client: Endeavour Energy
Project: 3 Davis Road, Wetherill Park
Location: Refer to Drawing No. 24/2776

Project: 32819/9054D-G
Date : September 10, 2024
Logged: EJ Checked By: MT

BOREHOLE NO.: BH 4
Sheet 1 of 1

W A T E R L E	S A M P L E S	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT Soil Name, grain size /plasticity, colour; secondary constituents (Inc. Description) , minor constituents including other remarks	S Y M B O L	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	M O I S T U R E
			TOPSOIL: SILTY CLAY: low plasticity, grey/brown	CL	-	D
			SILTY CLAY: low plasticity, brown, trace of gravel	CL	VERY STIFF	<PL
		1.0				
		2.0				
		3.0				
		4.0	EXTREMELY WEATHERED SHALE, very low strength	-	-	D
		5.0	BOREHOLE DISCONTINUED AT 5.0 M			
D - disturbed sample U - undisturbed tube sample B - bulk sample WT - level of water table or free water N - Standard Penetration Test (SPT) S - jar sample				Contractor: STS Equipment: Utility Mounted Drilling Rig Hole Diameter (mm): 100 Angle from Vertical (°): Drill Bit: Spiral		
NOTES: See explanation sheets for meaning of all descriptive terms and symbols						

GEOTECHNICAL LOG - NON CORE BOREHOLE



Client: Endeavour Energy
Project: 3 Davis Road, Wetherill Park
Location: Refer to Drawing No. 24/2776

Project: 32819/9054D-G
Date : September 10, 2024
Logged: EJ Checked By: MT

BOREHOLE NO.: BH 5
Sheet 1 of 1

W A T E R L E	S A M P L E S	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT Soil Name, grain size /plasticity, colour; secondary constituents (Inc. Description) , minor constituents including other remarks	S Y M B O L	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	M O I S T U R E
			TOPSOIL: SILTY CLAY: low plasticity, brown, trace of gravel	CL	-	D
			SANDY CLAY: low plasticity, red/brown, trace of gravel	CL	STIFF	<PL
		1.0			VERY STIFF	
		2.0				
	U50	3.0				
		4.0				
		5.0	EXTREMELY WEATHERED SHALE: very low strength	-	-	D
			BOREHOLE DISCONTINUED AT 5.0 M			
D - disturbed sample U - undisturbed tube sample B - bulk sample WT - level of water table or free water N - Standard Penetration Test (SPT) S - jar sample				Contractor: STS Equipment: Utility Mounted Drilling Rig Hole Diameter (mm): 100 Angle from Vertical (°): Drill Bit: Spiral		
NOTES: See explanation sheets for meaning of all descriptive terms and symbols						

Dynamic Cone Penetrometer Test Report

Project: 3 DAVIS ROAD, WETHERILL PARK

Project No.: 32819/9054D

Client: ENDEAVOUR ENERGY

Report No.: 24/2775

Address: 49 Glendenning Road, Glendenning

Report Date: 17/09/2024

Test Method: AS 1289.6.3.2

Page: 1 of 1

Site No.	P1	P2	P3	P4	P5	
Location	Refer to Drawing No. 24/2776	Refer to Drawing No. 24/2776	Refer to Drawing No. 24/2776	Refer to Drawing No. 24/2776	Refer to Drawing No. 24/2776	
Date Tested	10/9/2024	10/9/2024	10/9/2024	10/9/2024	10/9/2024	
Starting Level	Surface Level	Surface Level	Surface Level	Surface Level	Surface Level	
Depth (m)	Penetration Resistance (blows / 150mm)					
0.00 - 0.15	10	20	25	5	5	
0.15 - 0.30	9	20	25	10	10	
0.30 - 0.45	10	15	Refusal	14	9	
0.45 - 0.60	9	Refusal		20	9	
0.60 - 0.75	7			14	9	
0.75 - 0.90	6			Refusal	6	
0.90 - 1.05	5				4	
1.05 - 1.20	6				9	
1.20 - 1.35	5				14	
1.35 - 1.50	5				16	
1.50 - 1.65	7				20	
1.65 - 1.80	11				Refusal	
1.80 - 1.95	6					
1.95 - 2.10	10					
2.10 - 2.25	12					
2.25 - 2.40	16					
2.40 - 2.55	16					
2.55 - 2.70	Refusal					
2.70 - 2.85						
2.85 - 3.00						
3.00 - 3.15						
3.15 - 3.30						
3.30 - 3.45						
3.45 - 3.60						
3.60 - 3.75						

Remarks: * Pre drilled prior to testing



Approved Signatory.....

Technician: EJ

Mrigesh Tamang

APPENDIX B –LABORATORY TEST RESULTS

Atterberg Limits and Linear Shrinkage Report

Project: Davis Street, WETHERHILL PARK

Project No.: 32819

Client: AUSCONNEX

Report No.: 24/2916

Address: 49 Glendenning Road, Glendenning 2761

Report Date: 27/09/2024

Test Method: AS1289.3.1.2,3.2.1,3.1.1,3.4.1,2.1.1

Page: 1 Of 2

Sampling Procedure: AS 1289.1.2.1 Clause 6.5.3 - Power Auger Drilling (Not covered under NATA Scope of Accreditation)

STS / Sample No.	9128D-L/1	9128D-L/2	9128D-L/3	9128D-L/4	9128D-L/5	
Sample Location	BH1	BH2	BH3	BH4	BH5	
Material Description	Silty CLAY, red brown (CH)	Silty CLAY, brown (CI)	Silty CLAY, dark grey (CI)	Silty CLAY, Grey brown (CI)	Silty CLAY, red brown (CL)	
Depth (m)	1 - 1.5	1.5 - 2.0	2 - 2.5	3.8 - 4.3	2.5 - 3.0	
Sample Date	11/09/2024	11/09/2024	11/09/2024	11/09/2024	11/09/2024	
Sample History	Oven Dried	Oven Dried	Oven Dried	Oven Dried	Oven Dried	
Method of Preparation	Dry Seived	Dry Seived	Dry Seived	Dry Seived	Dry Seived	
Liquid Limit (%)	58	44	45	41	31	
Plastic Limit (%)	21	21	19	21	15	
Plasticity Index	37	23	26	20	16	
Linear Shrinkage (%)	15.0	12.5	13.0	10.5	8.0	
Mould Size (mm)	150	127	127	127	149	
Crumbing	N	N	N	N	N	
Curling	Y	N	N	N	N	

Remarks:

Approved Signatory.....

Technician: DS/TG

#N/A

Moisture Content of Soil and Aggregate Samples

Project: Davis Street, WETHERHILL PARK

Project No.: 32819

Client: AUSCONNEX

Report No.: 24/2916

Address: 49 Glendenning Road, Glendenning 2761

Report Date: 27/09/2024

Test Method: AS1289.2.1.1

Page: 2 Of 2

Sampling Procedure: AS 1289.1.2.1 Clause 6.5.1 - Hand Excavated Pit or Trench (Not covered under NATA Scope of Accreditation)

STS / Sample No.	9128D-L/1	9128D-L/2	9128D-L/3	9128D-L/4	9128D-L/5	
Sample Location	BH1	BH2	BH3	BH4	BH5	
Material Description	Silty CLAY, red brown (CH)	Silty CLAY, brown (CI)	Silty CLAY, dark grey (CI)	Silty CLAY, Grey brown (CI)	Silty CLAY, red brown (CL)	
Depth (mm)	1 - 1.5	1.5 - 2.0	2 - 2.5	3.8 - 4.3	2.5 - 3.0	
Sample Date	11/09/2024	11/09/2024	11/09/2024	11/09/2024	11/09/2024	
Moisture Content (%)	18.1	19.3	19.7	14.1	21.6	

Remarks:

Approved Signatory.....

Technician: TG

#N/A

Thermal Resistivity with Dry out Curve

Project Name & Location: 3 Davis Rd., Wetheril Park

Project Number: 32819/9054D-G

Client: Ausconnex

Report Number: 24/2918

Client Address:

Report Date: 27/09/2024

Material description: Silty Clay

Sample Location: BH1

Depth of Sample(m): 1-1.2

Sampling Method: thin-walled sampling

Specimen Dimensions(mm): D:50, L>150

Date Sampled: 10/9/2024

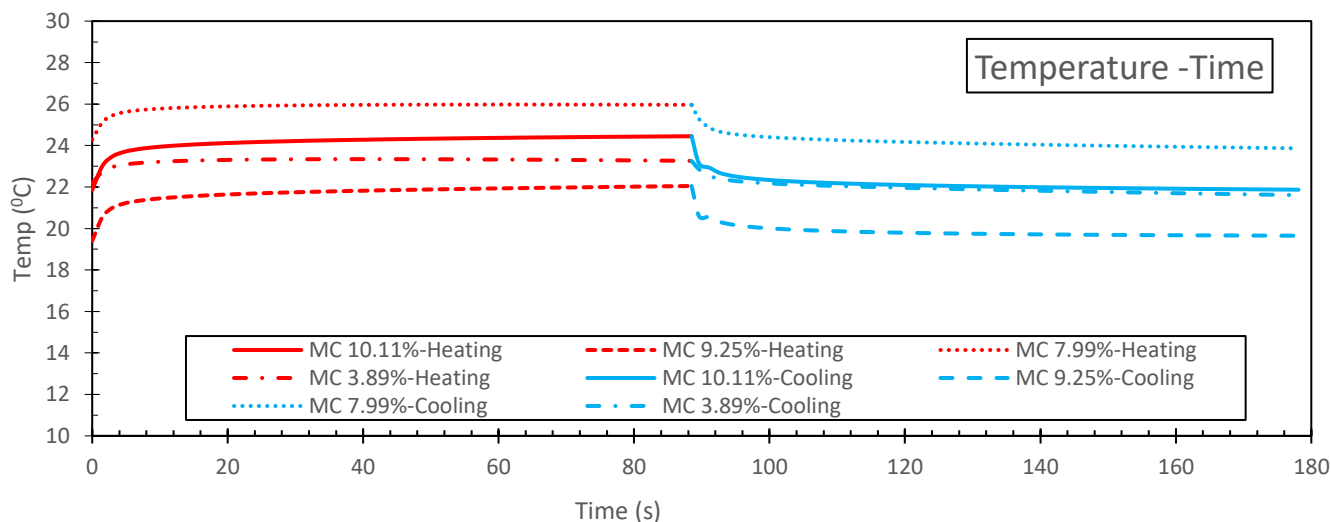
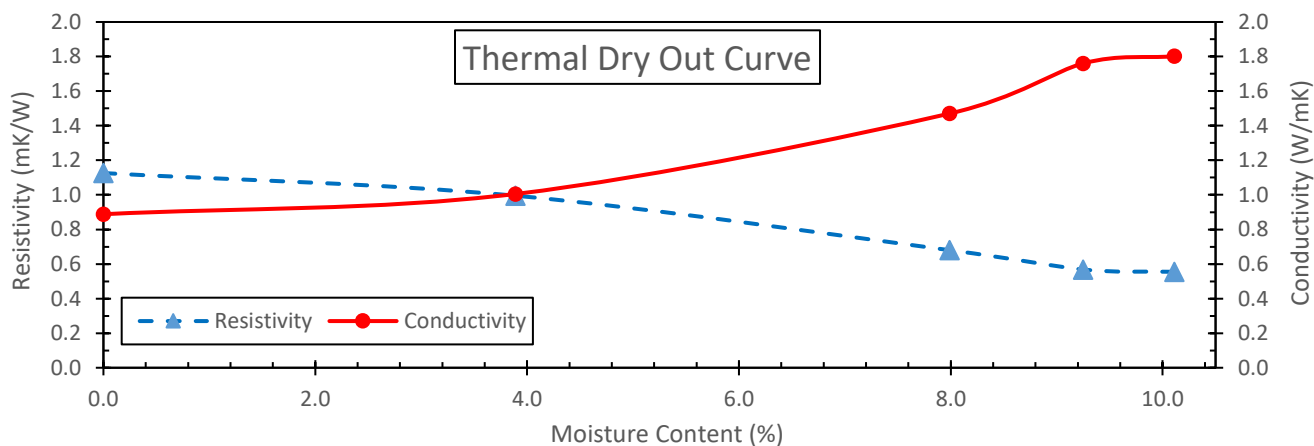
Test Method for Moisture Content: AS 1289.2.1.1

Date Tested: 25/09/2024-27/09/2024

Test Method for TR: ASTM D5334-23

RESULT

Moisture Content:	(%)	10.1	9.3	8.0	3.9	0.0
Dry Density:	(t/m ³)	-				
Starting Temp:	(°C)	21.9	19.4	24.3	22.2	19.9
Resistivity:	(mK/W)	0.555	0.568	0.680	0.995	1.126
Conductivity:	(W/mK)	1.802	1.761	1.471	1.005	0.888



Tested By: MH

Approved Signatory:

Manager- Mrigesh Tamang

Thermal Resistivity with Dry out Curve

Project Name & Location: 3 Davis Rd., Wetherill Park

Project Number: 32819/9054D-G

Client: Ausconnex

Report Number: 24/2918

Client Address:

Report Date: 27/09/2024

Material description: Silty Clay

Sample Location: BH2

Depth of Sample(m): 1.5-1.7

Sampling Method: thin-walled sampling

Specimen Dimensions(mm): D:50, L>150

Date Sampled: 10/9/2024

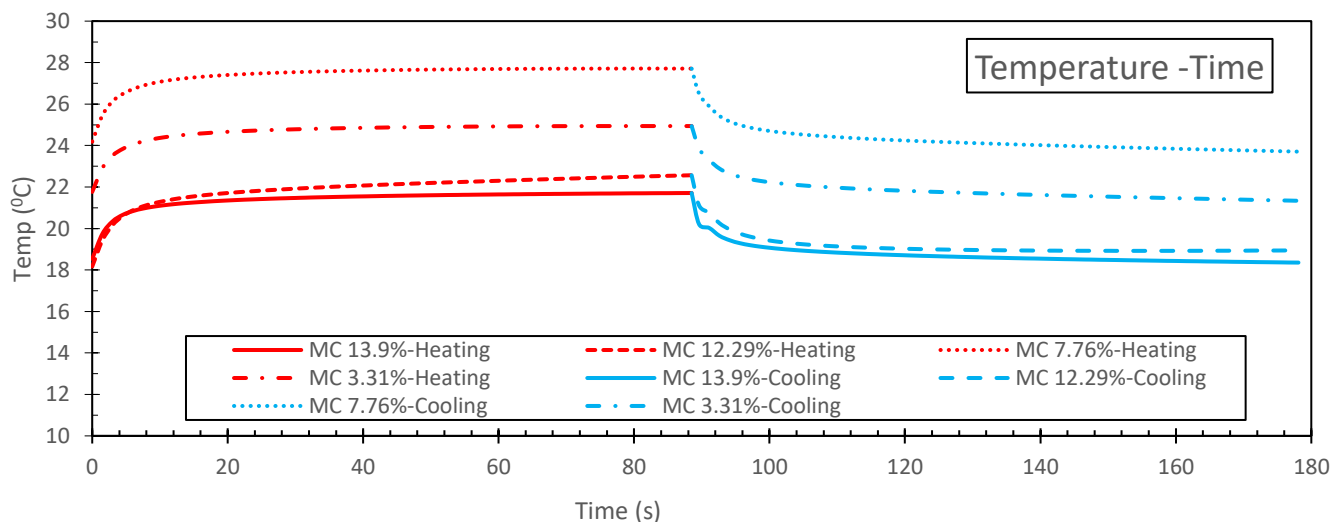
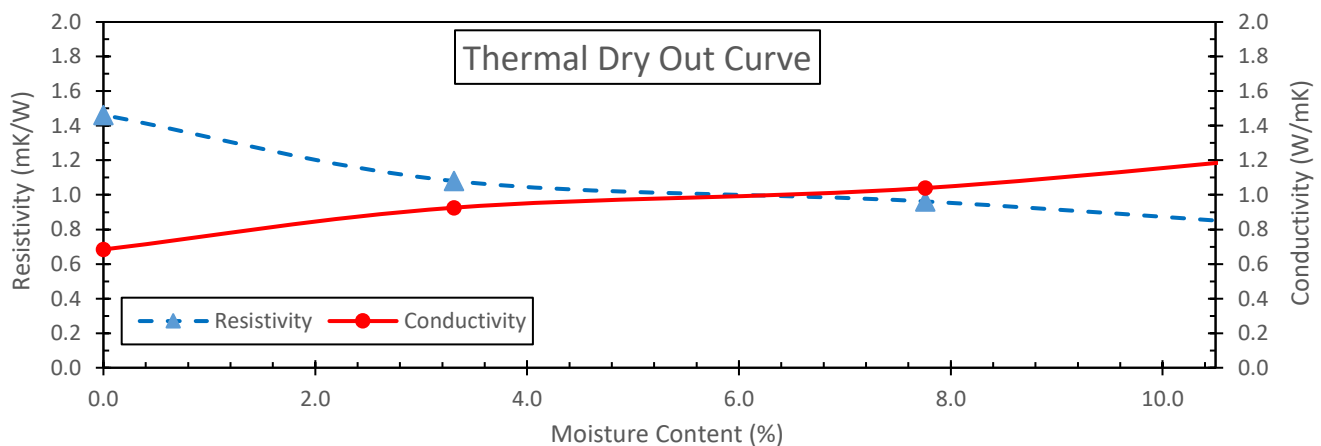
Test Method for Moisture Content: AS 1289.2.1.1

Date Tested: 25/09/2024-27/09/2024

Test Method for TR: ASTM D5334-23

RESULT

Moisture Content:	(%)	13.9	12.3	7.8	3.3	0.0
Dry Density:	(t/m ³)	1.98				
Starting Temp:	(°C)	18.5	18.2	24.2	21.8	22.3
Resistivity:	(mK/W)	0.758	0.779	0.962	1.080	1.462
Conductivity:	(W/mK)	1.319	1.284	1.040	0.926	0.684



Tested By: MH

Approved Signatory:

Manager- Mrigesh Tamang

Thermal Resistivity with Dry out Curve

Project Name & Location: 3 Davis Rd., Wetheril Park

Project Number: 32819/9054D-G

Client: Ausconnex

Report Number: 24/2918

Client Address:

Report Date: 27/09/2024

Material description: Silty Clay

Sample Location: BH3

Depth of Sample(m): 2-2.2

Sampling Method: thin-walled sampling

Specimen Dimensions(mm): D:50, L>150

Date Sampled: 10/9/2024

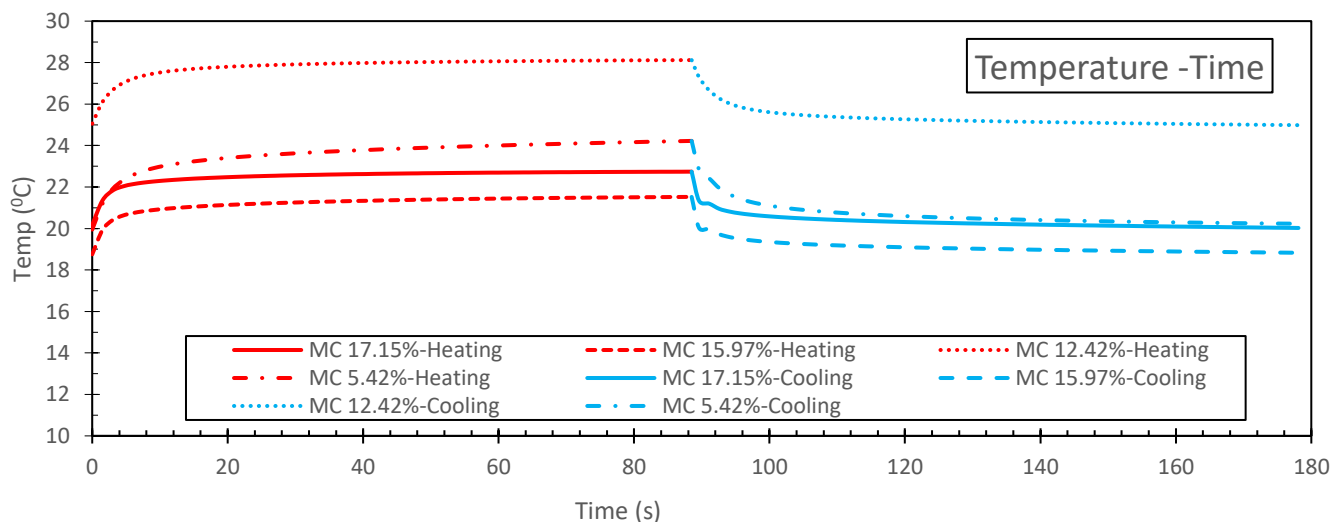
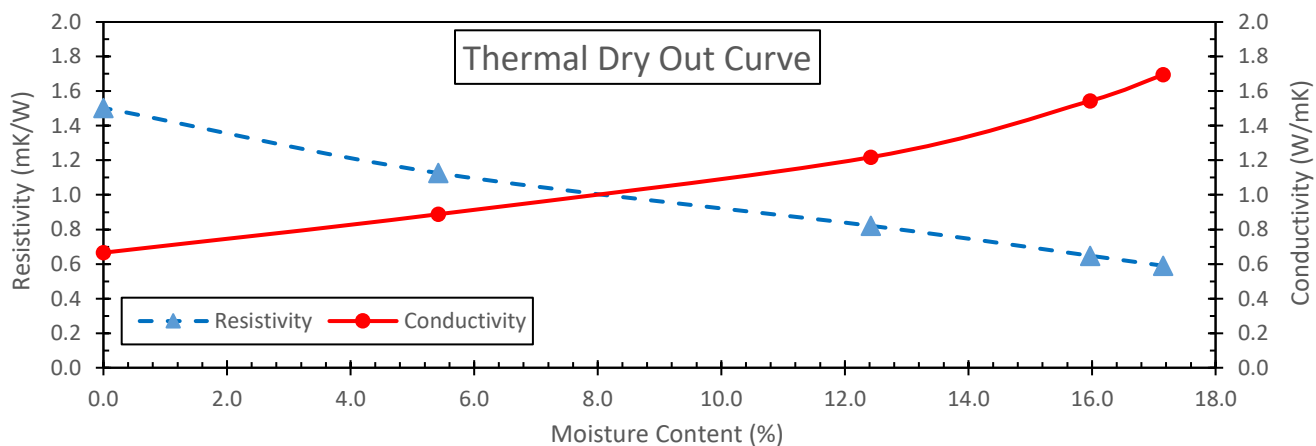
Test Method for Moisture Content: AS 1289.2.1.1

Date Tested: 25/09/2024-27/09/2024

Test Method for TR: ASTM D5334-23

RESULT

Moisture Content:	(%)	17.2	16.0	12.4	5.4	0.0
Dry Density:	(t/m ³)	2.01				
Starting Temp:	(°C)	20.2	18.8	25.1	19.9	27.7
Resistivity:	(mK/W)	0.590	0.648	0.821	1.126	1.503
Conductivity:	(W/mK)	1.695	1.543	1.218	0.888	0.665



Tested By: MH

Approved Signatory:

Manager- Mrigesh Tamang

Thermal Resistivity with Dry out Curve

Project Name & Location: 3 Davis Rd., Wetheril Park

Project Number: 32819/9054D-G

Client: Ausconnex

Report Number: 24/2918

Client Address:

Report Date: 27/09/2024

Material description: Silty Clay

Sample Location: BH4

Depth of Sample(m): 3.8-4.0

Sampling Method: thin-walled sampling

Specimen Dimensions(mm): D:50, L>150

Date Sampled: 10/9/2024

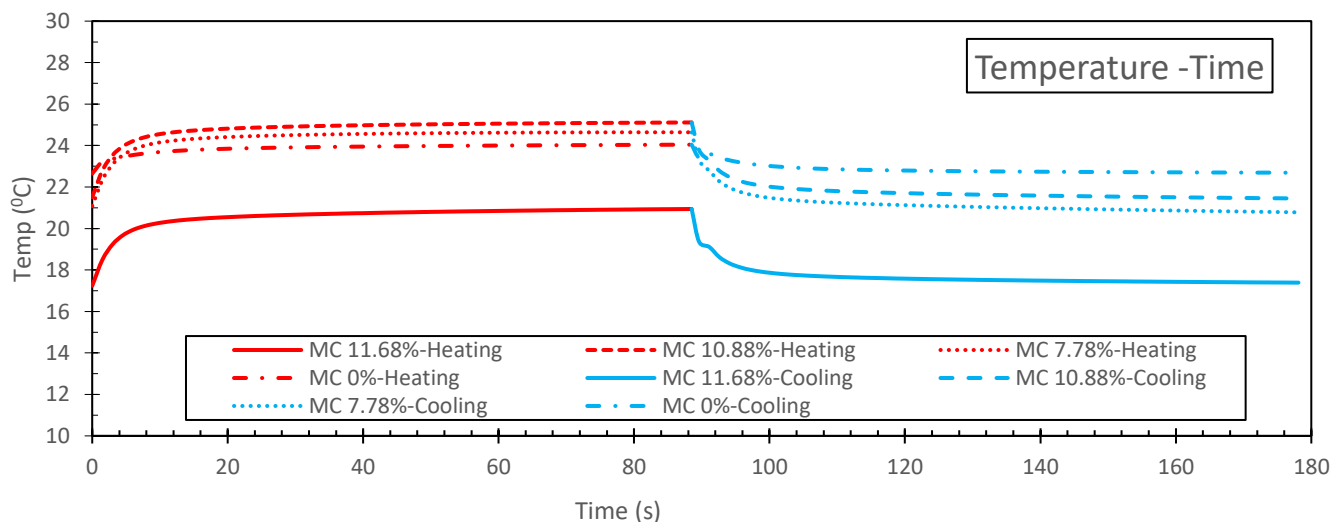
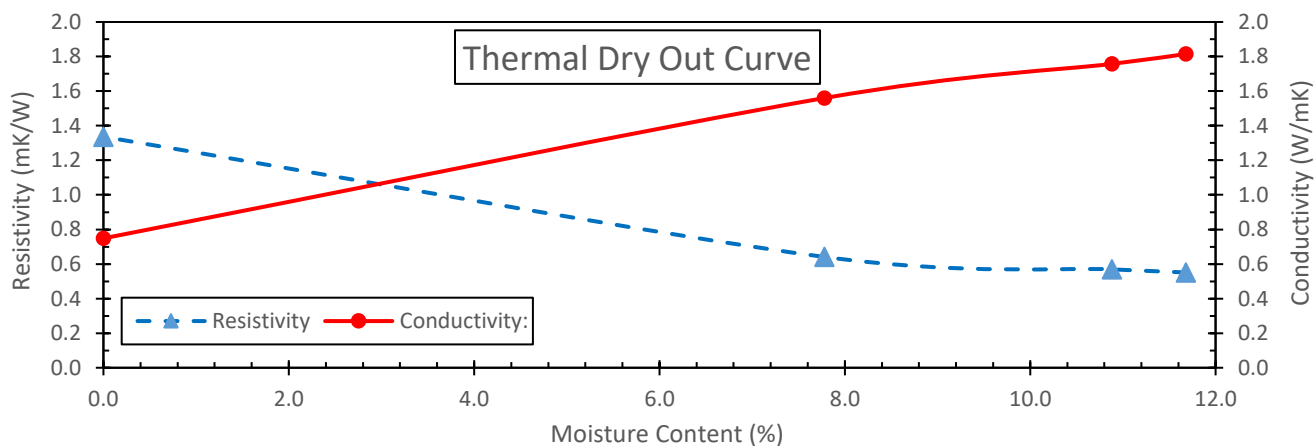
Test Method for Moisture Content: AS 1289.2.1.1

Date Tested: 25/09/2024-27/09/2024

Test Method for TR: ASTM D5334-23

RESULT

Moisture Content:	(%)	11.7	10.9	7.8	0.0	
Dry Density:	(t/m ³)	2.16				
Starting Temp:	(°C)	17.2	21.5	21.1	22.6	
Resistivity:	(mK/W)	0.551	0.569	0.641	1.336	
Conductivity:	(W/mK)	1.815	1.757	1.560	0.749	



Tested By: MH

Approved Signatory:

Manager- Mrigesh Tamang

Thermal Resistivity with Dry out Curve

Project Name & Location: 3 Davis Rd., Wetherill Park

Project Number: 32819/9054D-G

Client: Ausconnex

Report Number: 24/2918

Client Address:

Report Date: 27/09/2024

Material description: Silty Clay

Sample Location: BH5

Depth of Sample(m): 2.5-2.7

Sampling Method: thin-walled sampling

Specimen Dimensions(mm): D:50, L>150

Date Sampled: 10/9/2024

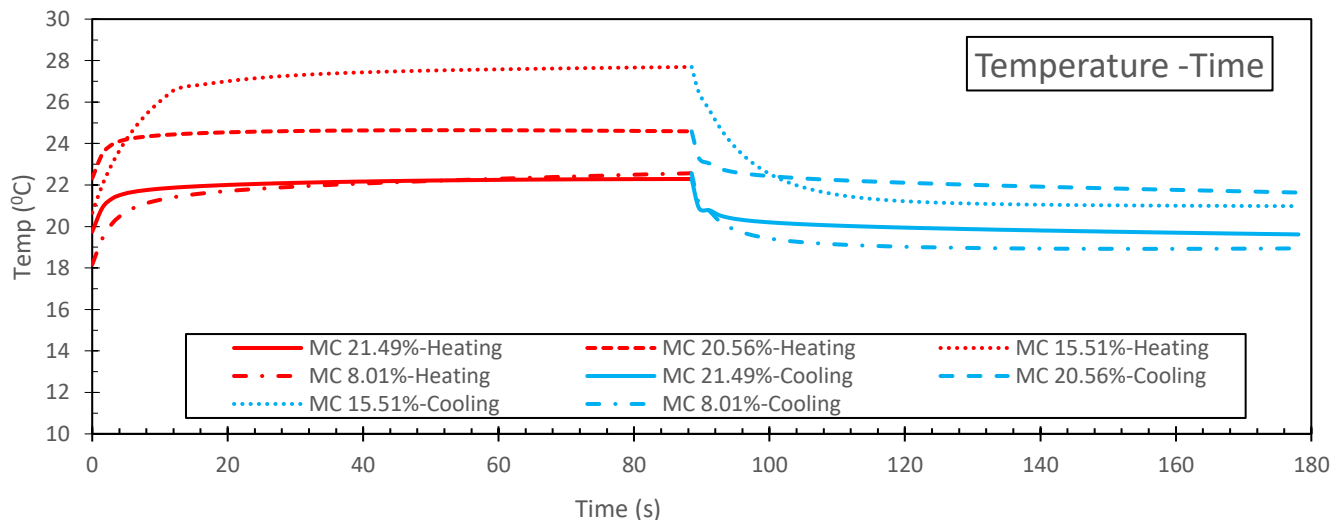
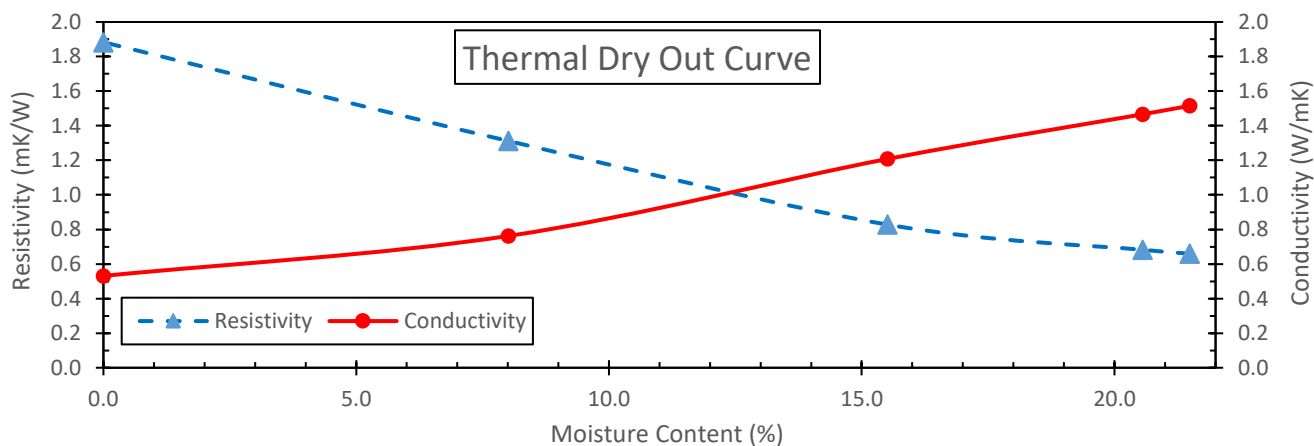
Test Method for Moisture Content: AS 1289.2.1.1

Date Tested: 25/09/2024-27/09/2024

Test Method for TR: ASTM D5334-23

RESULT

Moisture Content:	(%)	21.5	20.6	15.5	8.0	0.0
Dry Density:	(t/m ³)	1.78				
Starting Temp:	(°C)	19.8	22.3	20.7	18.2	23.1
Resistivity:	(mK/W)	0.660	0.682	0.828	1.312	1.883
Conductivity:	(W/mK)	1.515	1.466	1.208	0.762	0.531



Tested By: MH

Approved Signatory:

Manager- Mrigesh Tamang



CERTIFICATE OF ANALYSIS

Work Order	: ES2430697	Page	: 1 of 4
Client	: STS Geotechnics	Laboratory	: Environmental Division Sydney
Contact	: ENQUIRES STS	Contact	: Customer Services ES
Address	: Unit 14/1 Cowpasture Place Wetherill Park 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 30055, 32819	Date Samples Received	: 18-Sep-2024 10:30
Order number	: 2024-359	Date Analysis Commenced	: 20-Sep-2024
C-O-C number	: ----	Issue Date	: 24-Sep-2024 11:30
Sampler	: AB, MH		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 8		
No. of samples analysed	: 8		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

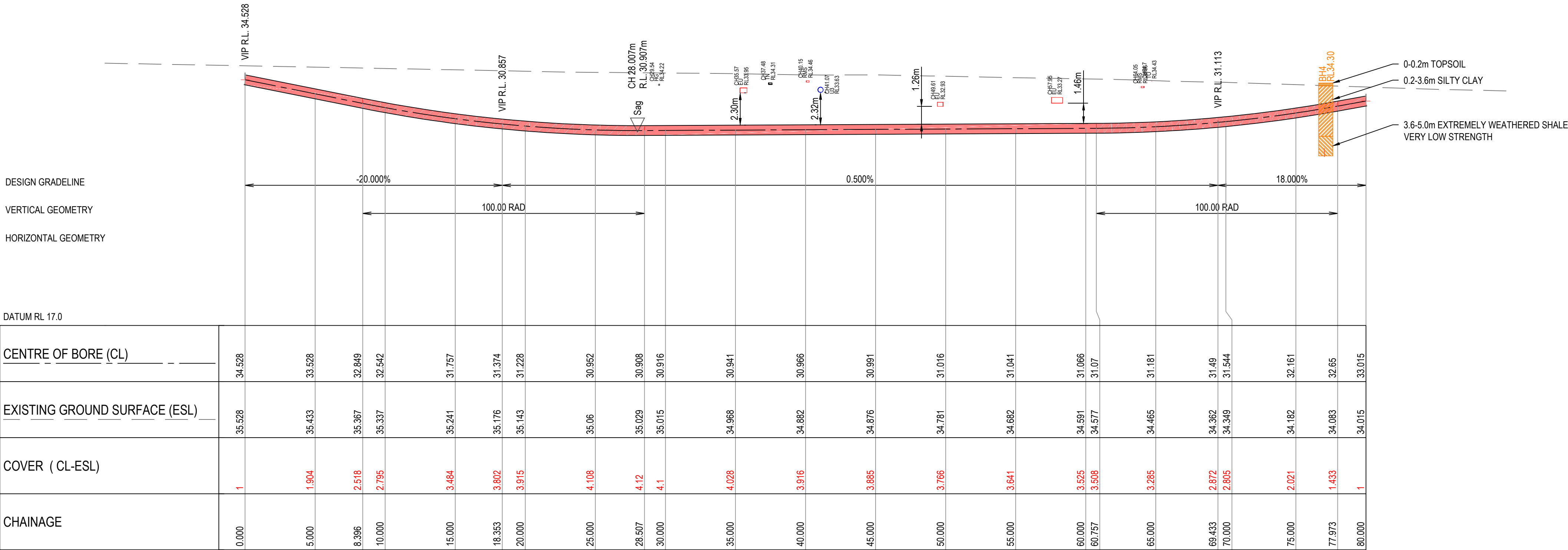
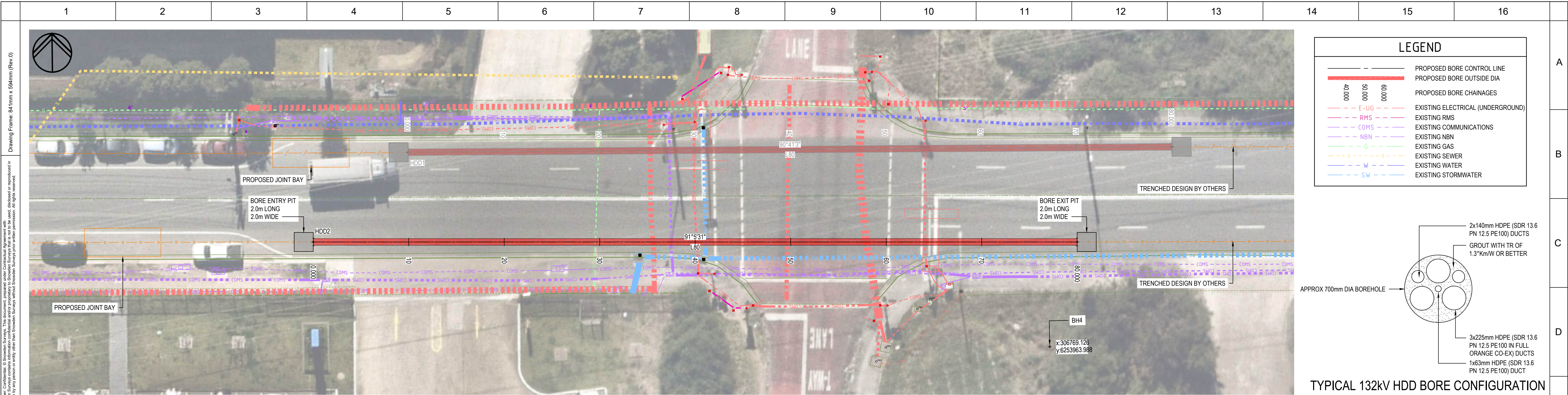
Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	30055/9773	30055/9774	30055/9775	32819/S1 - 1-1.5 M	32819/S2 - 1.5-2 M
Sampling date / time					17-Sep-2024 00:00	17-Sep-2024 00:00	17-Sep-2024 00:00	10-Sep-2024 00:00	10-Sep-2024 00:00
Compound	CAS Number	LOR	Unit		ES2430697-001	ES2430697-002	ES2430697-003	ES2430697-004	ES2430697-005
				Result	Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		4.9	5.5	5.2	4.7	6.2
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		145	166	260	247	295
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		13.3	15.0	14.9	0.7	0.1
ED040S : Soluble Sulfate by ICPAES									
Sulfate as SO4 2-	14808-79-8	10	mg/kg		180	130	210	580	80
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	10	mg/kg		----	----	----	310	730



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	32819/S3 - 3.8-4.3 M Received as "32819/S3 - 2-2.5 M"	32819/S4 - 2-2.5 M Received as "32819/S4 - 3.8 - 4.3 M"	32819/S5 - 2.5-3 M	----	----
Sampling date / time					10-Sep-2024 00:00	10-Sep-2024 00:00	10-Sep-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2430697-006	ES2430697-007	ES2430697-008	-----	-----	
				Result	Result	Result	----	----	
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit	6.9	6.5	6.8	----	----	
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm	83	242	257	----	----	
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%	0.5	0.7	0.5	----	----	
ED040S : Soluble Sulfate by ICPAES									
Sulfate as SO4 2-	14808-79-8	10	mg/kg	100	800	70	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	10	mg/kg	70	590	670	----	----	

APPENDIX B – HDD Profile by Underbore Solutions



Filename: C:\Users\dchapman\OneDrive - Stowden Surveys\1048 - UIL6491_SYD067CAD\1048-DWG-CIV-0001.dwg
Model used for this document: M1 SEWER CROSSING

REVISIONS	No.	Description	By	Date (dd/mm/yy)					
	A	ISSUED FOR REVIEW	DC	03.10.2024					
	B	ISSUED FOR REVIEW	DC	25.10.2024					
REVIEW		CONTRACTOR:		PROVIDER:		SCALE:		UIL6491_SYD067 DAVIS ROAD AND TRANSIT WAY HDD	
CERTIFICATION STAMP:		Contract:		Contract:		Classification:		Drawing Title: FEEDER ALIGNMENTS BORE 02 ALIGNMENT PLAN AND LONGITUDINAL SECTION	
								Design: D.CHAPMAN Facility Code: GDA2020 MGA56 Drawing No: 1048-DWG-CIV-0002	
								Checked: D.GUNNEL Work Area: DRG Discipline: CIVIL Revision: B	

APPENDIX C – Ground Settlement Calculation Results



Analysis of ground loss

Input data (Stage of construction 1)

Project : 3 Davis Road, Wetherill Park
Customer : ENDEAVOUR ENERGY
Author : MH
Date : 6/11/2024
Project ID : 32819
Project number : 9186D-G

Global settings

Analysis carried out according to theory : Volume loss

Shape of settlement trough : Gauss

Settings of the stage of construction

Analysis performed with default values of settings for masonry buildings.

Geometry

No.	New excavation	Description	Coordinate x[m]	Depth z[m]	Radius r [m]	Area A [m ²]
1	Yes	Section A	0.00	3.77	0.35	0.38

No.	Description	Trough param. k [-]	Volume loss VL [%]
1	Section A	0.50	2.00

Verification No. 1 (Stage of construction 1)

Overall results

Depression computed at terrain surface.

Max. settlement $s_{\max} = 1.6$ mm

Max. horizontal deformation $h_{\max} = 0.5$ mm

Begin of settlement trough $x_1 = -7.54$ m

End of settlement trough $x_2 = 7.54$ m

Length of settlement trough $l = 15.08$ m

Input data (Stage of construction 2)

Geometry

No.	New excavation	Description	Coordinate x[m]	Depth z[m]	Radius r [m]	Area A [m ²]
1	Yes	Section A	0.00	3.77	0.35	0.38

No.	Description	Trough param. k [-]	Volume loss VL [%]
1	Section A	0.50	5.00

Verification No. 1 (Stage of construction 2)

Overall results

Depression computed at terrain surface.

Max. settlement $s_{\max} = 4.1$ mm

Max. horizontal deformation $h_{\max} = 1.4$ mm

Begin of settlement trough $x_1 = -7.54$ m

End of settlement trough $x_2 = 7.54$ m

Length of settlement trough $l = 15.08$ m



Input data (Stage of construction 3)

Geometry

No.	New excavation	Description	Coordinate x[m]	Depth z[m]	Radius r [m]	Area A [m²]
1	No	Section A	0.00	3.77	0.35	0.38

No.	Description	Trough param. k [-]	Volume loss VL [%]
1	Section A	0.50	10.00

Verification No. 1 (Stage of construction 3)

Overall results

Depression computed at terrain surface.
Max. settlement s_{max} = 8.1 mm
Max. horizontal deformation h_{max} = 2.7 mm
Begin of settlement trough x_1 = -7.54 m
End of settlement trough x_2 = 7.54 m
Length of settlement trough l = 15.08 m



Analysis of ground loss

Input data (Stage of construction 1)

Project : 3 Davis Road, Wetherill Park
Customer : ENDEAVOUR ENERGY
Author : MH
Date : 6/11/2024
Project ID : 32819
Project number : 9186D-G

Global settings

Analysis carried out according to theory : Volume loss

Shape of settlement trough : Gauss

Settings of the stage of construction

Analysis performed with default values of settings for masonry buildings.

Geometry

No.	New excavation	Description	Coordinate x[m]	Depth z[m]	Radius r [m]	Area A [m ²]
1	Yes	Section B	0.00	3.53	0.35	0.38

No.	Description	Trough param. k [-]	Volume loss VL [%]
1	Section B	0.50	2.00

Verification No. 1 (Stage of construction 1)

Overall results

Depression computed at terrain surface.

Max. settlement $s_{\max} = 1.7$ mm

Max. horizontal deformation $h_{\max} = 0.6$ mm

Begin of settlement trough $x_1 = -7.06$ m

End of settlement trough $x_2 = 7.06$ m

Length of settlement trough $l = 14.12$ m

Input data (Stage of construction 2)

Geometry

No.	New excavation	Description	Coordinate x[m]	Depth z[m]	Radius r [m]	Area A [m ²]
1	Yes	Section B	0.00	3.53	0.35	0.38

No.	Description	Trough param. k [-]	Volume loss VL [%]
1	Section B	0.50	5.00

Verification No. 1 (Stage of construction 2)

Overall results

Depression computed at terrain surface.

Max. settlement $s_{\max} = 4.3$ mm

Max. horizontal deformation $h_{\max} = 1.5$ mm

Begin of settlement trough $x_1 = -7.06$ m

End of settlement trough $x_2 = 7.06$ m

Length of settlement trough $l = 14.12$ m



Input data (Stage of construction 3)

Geometry

No.	New excavation	Description	Coordinate x[m]	Depth z[m]	Radius r [m]	Area A [m²]
1	No	Section B	0.00	3.53	0.35	0.38

No.	Description	Trough param. k [-]	Volume loss VL [%]
1	Section B	0.50	10.00

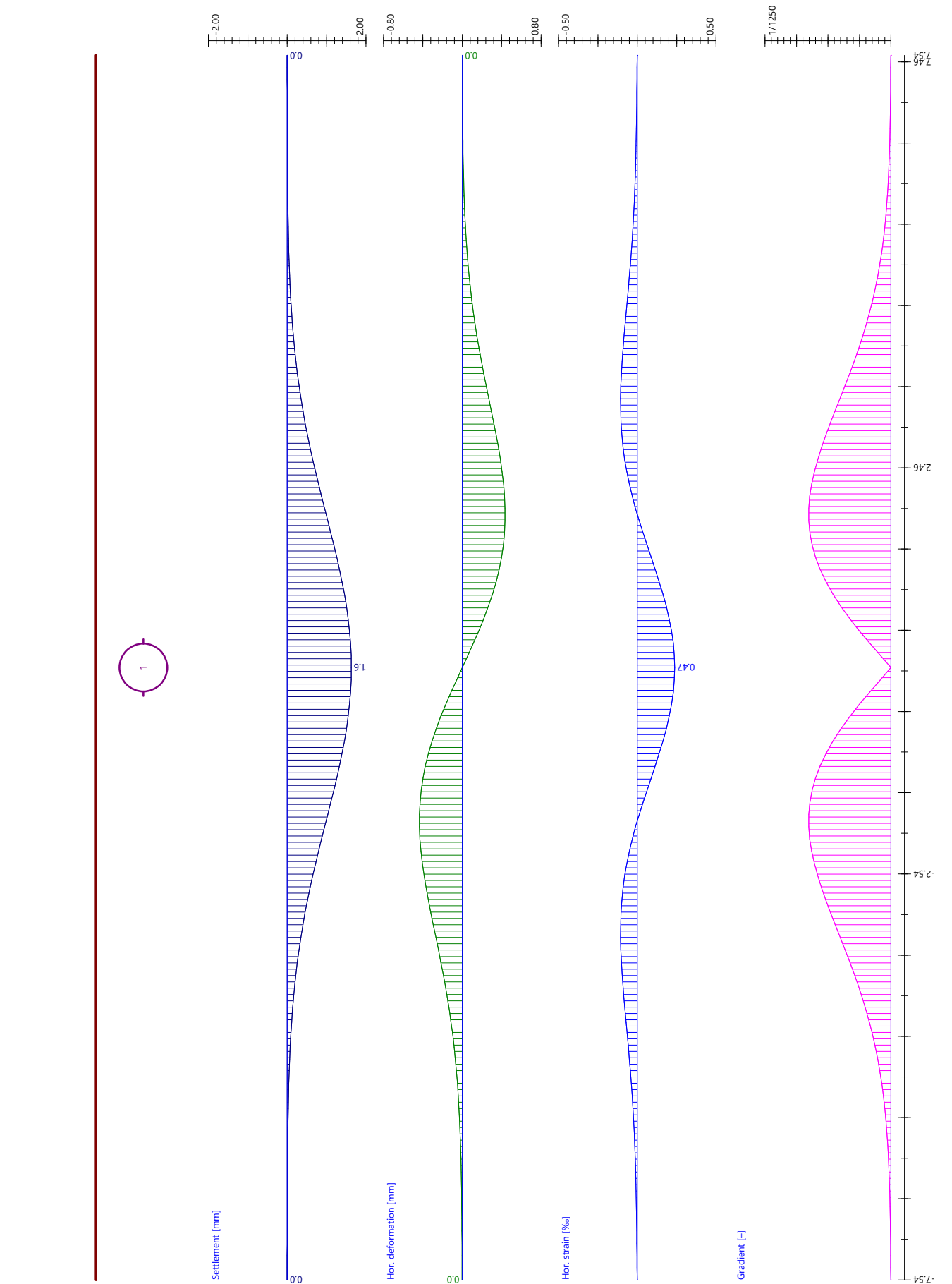
Verification No. 1 (Stage of construction 3)

Overall results

Depression computed at terrain surface.
Max. settlement $s_{max} = 8.7 \text{ mm}$
Max. horizontal deformation $h_{max} = 2.9 \text{ mm}$
Begin of settlement trough $x_1 = -7.06 \text{ m}$
End of settlement trough $x_2 = 7.06 \text{ m}$
Length of settlement trough $l = 14.12 \text{ m}$

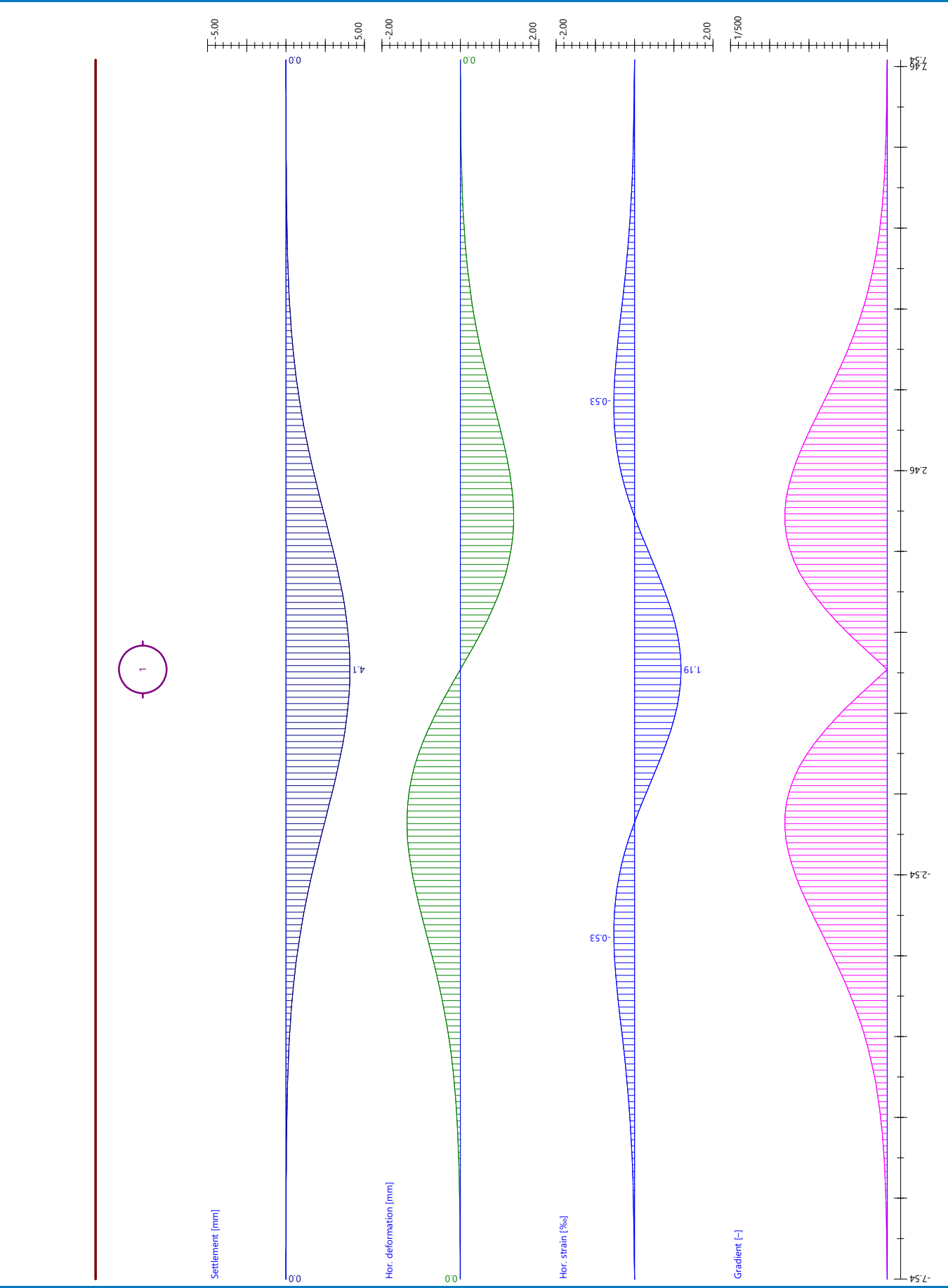
Name :

Stage - analysis : 1 - 1



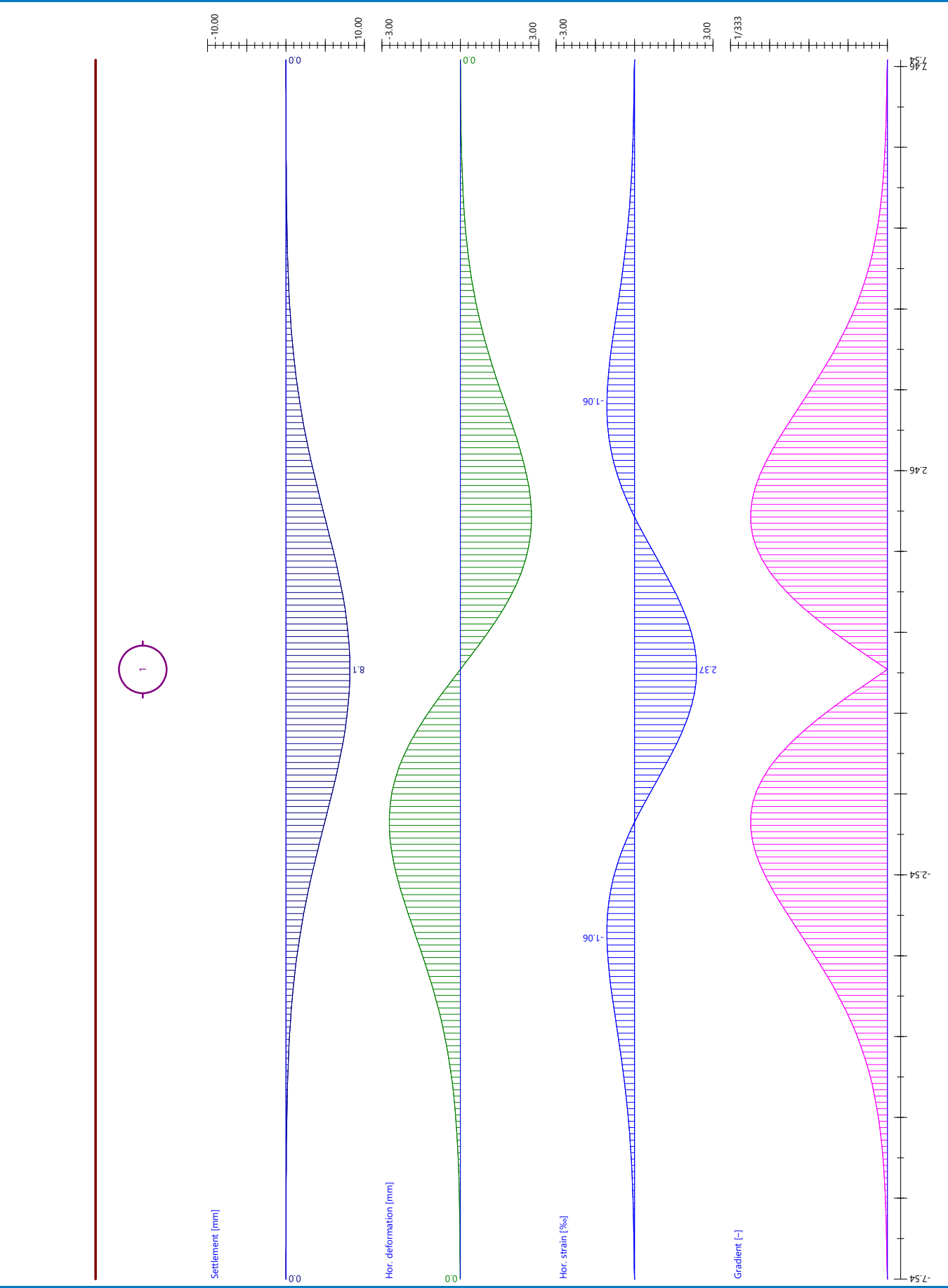
Name :

Stage - analysis : 2 - 1



Name :

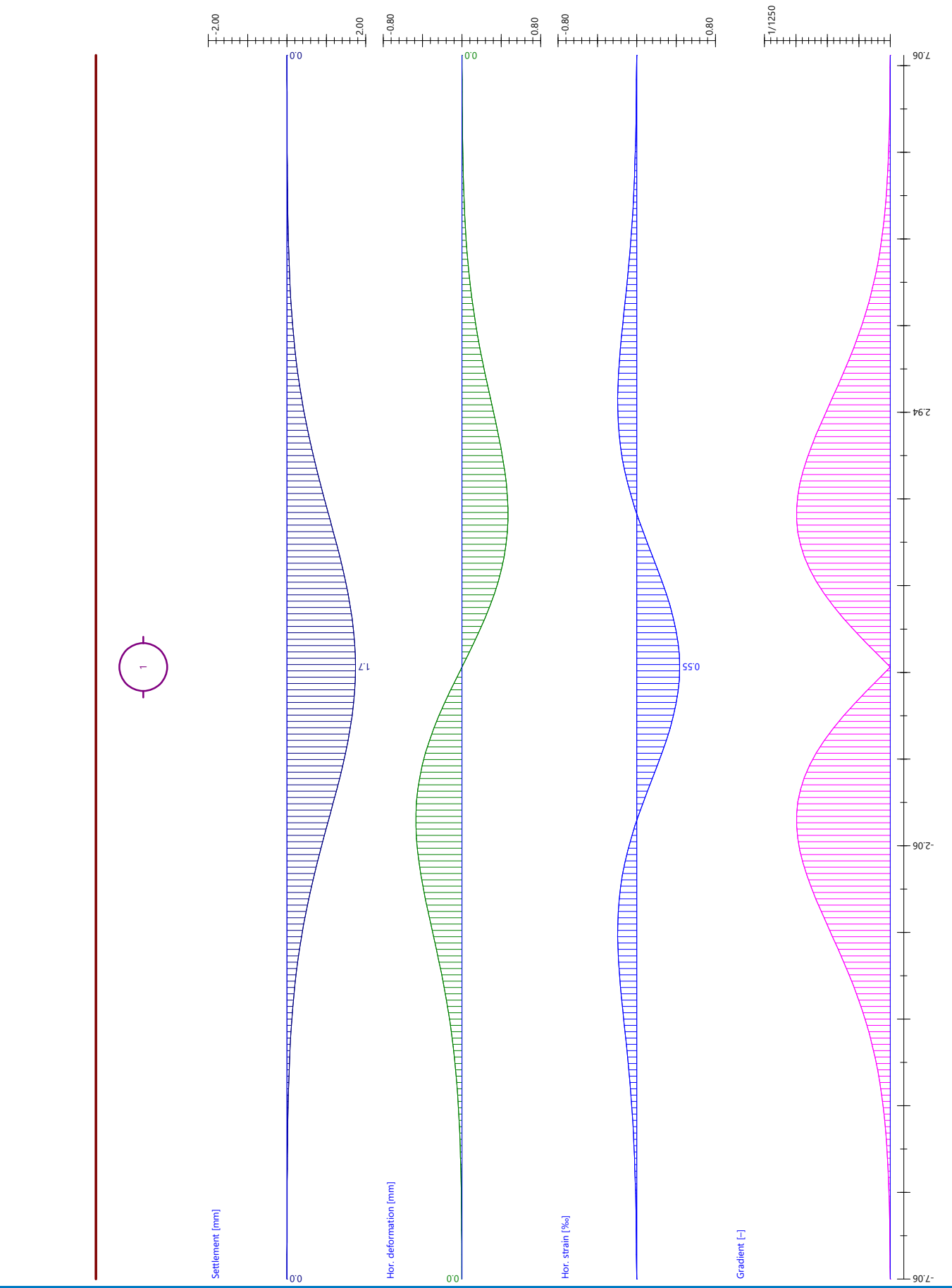
Stage - analysis : 3 - 1





Name :

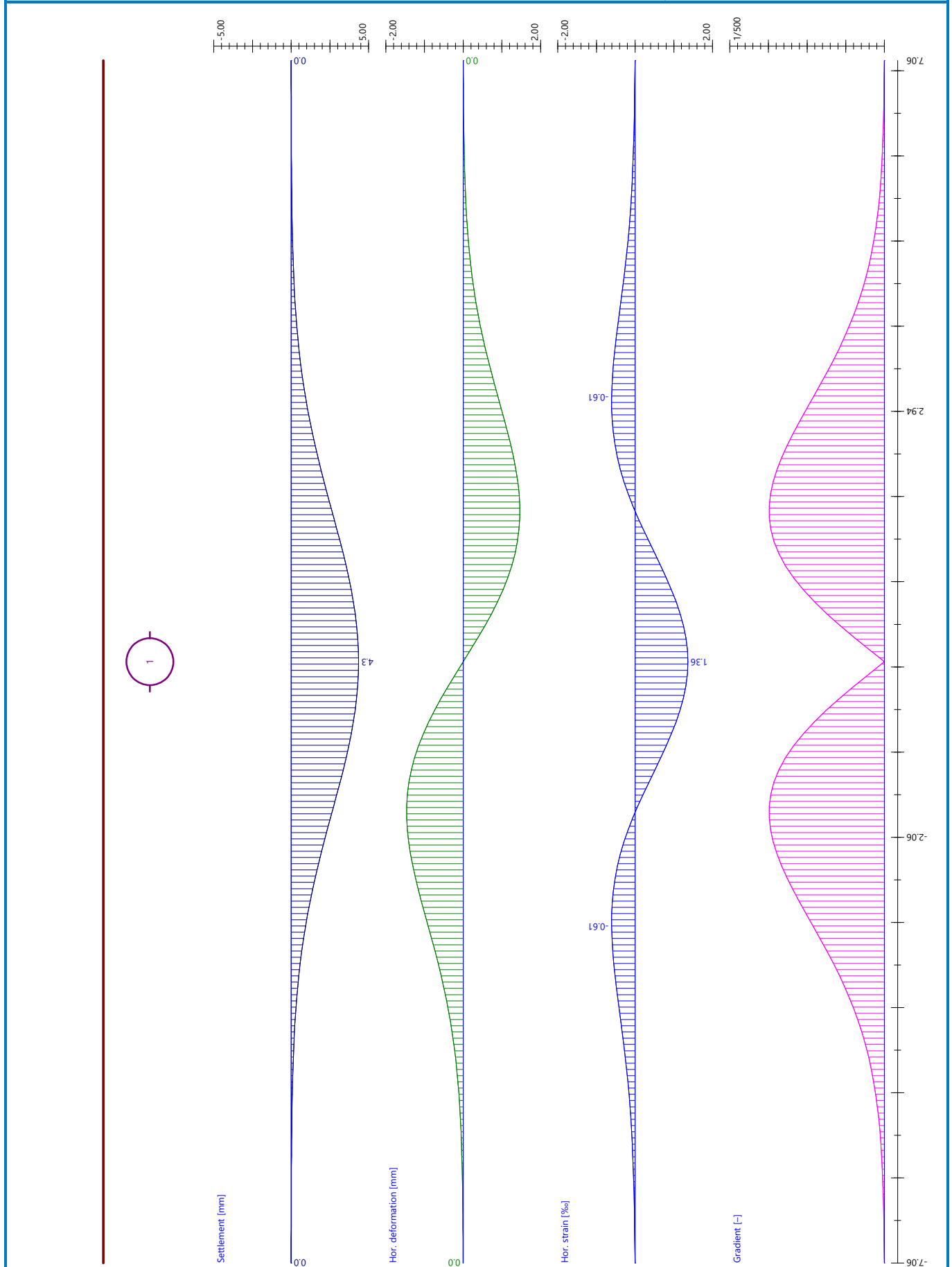
Stage - analysis : 1 - 1





Name :

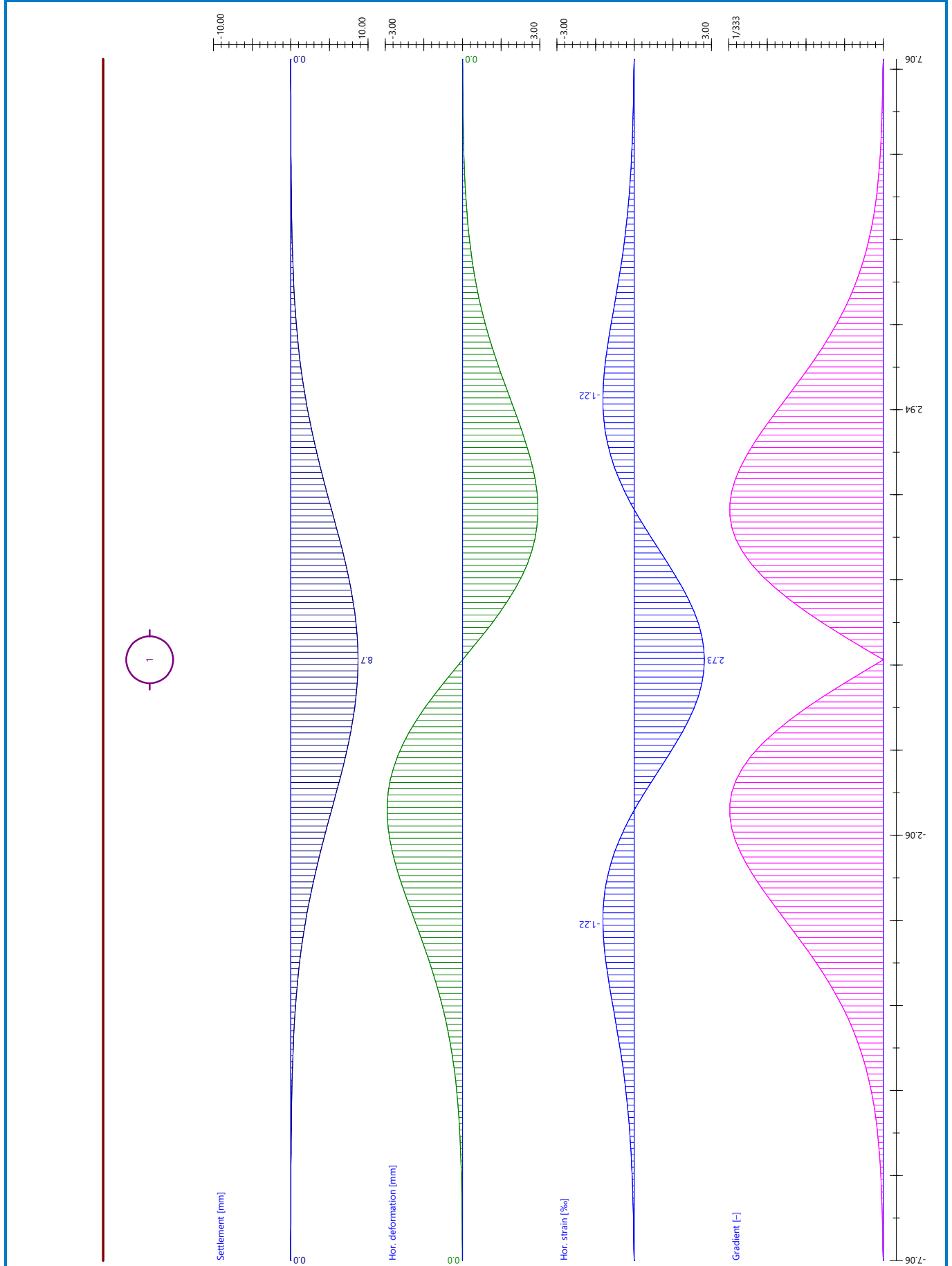
Stage - analysis : 2 - 1






















Name :

















Stage - analysis : 3 - 1




Appendix 5. NSW Bionet Species Sightings Search result and Environmental Protection and Biodiversity Conservation Act Matters of National Environmental Significance search result

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Entities in selected area [North: -33.79 West: 150.86 East: 150.96 South: -33.89] returned a total of 1,105 records of 34 species.
Report generated on 10/12/2024 7:52 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Common status	Records	Info
Animalia	Amphibia	Hylidae	3166	<i>Litoria aurea</i>		Green and Golden Bell Frog	E1,P	V	17	
Animalia	Aves	Apodidae	0334	<i>Hirundapus caudacutus</i>		White-throated Needletail	V,P	V,C,J,K	1	
Animalia	Aves	Accipitridae	0225	<i>Hieraaetus morphnoides</i>		Little Eagle	V,P		11	
Animalia	Aves	Accipitridae	0230	^^ <i>Lophoictinia isura</i>		Square-tailed Kite	V,P,3		1	
Animalia	Aves	Scolopacidae	0168	<i>Gallinago hardwickii</i>		Latham's Snipe	V,P	V,J,K	1	
Animalia	Aves	Cacatuidae	0268	^^ <i>Callocephalon fimbriatum</i>		Gang-gang Cockatoo	E1,P,3	E	2	
Animalia	Aves	Cacatuidae	0270	^ <i>Lophochroa leadbeateri</i>		Pink Cockatoo	V,P,2	E	1	
Animalia	Aves	Psittacidae	0260	<i>Glossopsitta pusilla</i>		Little Lorikeet	V,P		4	
Animalia	Aves	Psittacidae	0309	<i>Lathamus discolor</i>		Swift Parrot	E1,P	CE	18	
Animalia	Aves	Psittacidae	0302	^^ <i>Neophema pulchella</i>		Turquoise Parrot	V,P,3		2	
Animalia	Aves	Strigidae	0246	^^ <i>Ninox connivens</i>		Barking Owl	V,P,3		2	
Animalia	Aves	Strigidae	0248	^^ <i>Ninox strenua</i>		Powerful Owl	V,P,3		7	
Animalia	Aves	Tytonidae	0250	^^ <i>Tyto novaehollandiae</i>		Masked Owl	V,P,3		3	
Animalia	Aves	Neosittidae	0549	<i>Daphoenositta chrysoptera</i>		Varied Sittella	V,P		4	
Animalia	Aves	Artamidae	8519	<i>Artamus cyanopterus</i>		Dusky Woodswallow	V,P		3	
Animalia	Mammalia	Dasyuridae	1008	<i>Dasyurus maculatus</i>		Spotted-tailed Quoll	V,P	E	1	
Animalia	Mammalia	Phascolarctidae	1162	<i>Phascolarctos cinereus</i>		Koala	E1,P	E	1	

Animalia	Mammalia	Pteropodidae	1280	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V,P	V	333	
Animalia	Mammalia	Emballonuridae	1321	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V,P		1	
Animalia	Mammalia	Molossidae	1329	<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V,P		19	
Animalia	Mammalia	Vespertilionidae	1372	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V,P		7	
Animalia	Mammalia	Vespertilionidae	1357	<i>Myotis macropus</i>	Southern Myotis	V,P		8	
Animalia	Mammalia	Vespertilionidae	1361	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V,P		7	
Animalia	Mammalia	Miniopteridae	1346	<i>Miniopterus australis</i>	Little Bent-winged Bat	V,P		4	
Animalia	Mammalia	Miniopteridae	3330	<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V,P		31	
Animalia	Gastropoda	Camaenidae	1006	<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail	E1		74	
Plantae	Flora	Apocynaceae	10896	<i>Marsdenia viridiflora subsp. viridiflora</i>	Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	E2		46	
Plantae	Flora	Fabaceae (Faboideae)	3007	<i>Pultenaea parviflora</i>		E1	V	25	
Plantae	Flora	Fabaceae (Faboideae)	3008	<i>Pultenaea pedunculata</i>	Matted Bush-pea	E1		2	
Plantae	Flora	Fabaceae (Mimosoidae)	3860	<i>Acacia pubescens</i>	Downy Wattle	V	V	250	
Plantae	Flora	Myrtaceae	4007	<i>Callistemon linearifolius</i>	Netted Bottle Brush	V,3		1	
Plantae	Flora	Myrtaceae	4134	<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	V	V	1	
Plantae	Flora	Thymelaeaceae	6965	<i>Pimelea curviflora var. curviflora</i>		V	V	2	

Plantae	Flora	Thymelaeaceae	6190	<i>Pimelea spicata</i>	Spiked Rice-flower	E1	E	215	
---------	-------	---------------	------	------------------------	--------------------	----	---	-----	---



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 10-Dec-2024

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	52
Listed Migratory Species:	12

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <https://www.dcceew.gov.au/parks-heritage/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	23
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	11
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community may occur within area
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically Endangered	Community likely to occur within area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community may occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community may occur within area

Listed Threatened Species

[Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat likely to occur within area
Erythrorhynchus radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area
FISH		
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
FROG		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat may occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
MAMMAL		

Scientific Name	Threatened Category	Presence Text
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Notamacropus parma		
Parma Wallaby [89289]	Vulnerable	Species or species habitat may occur within area
Petauroides volans		
Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area
Petaurus australis australis		
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
PLANT		
Acacia bynoeana		
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area
Acacia pubescens		
Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Allocasuarina glareicola [21932]	Endangered	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Genoplesium baueri Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid [7528]	Endangered	Species or species habitat may occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area
Persoonia nutans Nodding Geebung [18119]	Endangered	Species or species habitat may occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat may occur within area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat likely to occur within area
Pomaderris brunnea Rufous Pomaderris, Brown Pomaderris [16845]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat likely to occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat may occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area

REPTILE		
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species	[Resource Information]	
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area

Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area

Migratory Wetlands Species

Scientific Name	Threatened Category	Presence Text
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands	[Resource Information]
The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.	
Commonwealth Land Name	State
Communications, Information Technology and the Arts - Australian Postal Corporation	
Commonwealth Land - Australian Postal Corporation [14602]	NSW

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Rostratula australis as Rostratula benghalensis (sensu lato)		
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Sterna striata		
White-fronted Tern [799]		Migration route may occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Clearance of 6.3ha of Cumberland Plain Woodland for industrial subdivision cnr of Old Walgrove and W	2004/1445	Not Controlled Action	Completed
Concrete Batching Plant and Associated Facilities	2005/2067	Not Controlled Action	Completed
Electricity Substation at Old Wallgrove Road	2005/2220	Not Controlled Action	Completed
gas main installation from Eastern Creek to Erskine Park	2005/2235	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Mountain View Classrooms Construction	2001/306	Not Controlled Action	Completed
Residential development at Doonside Crescent Woodcroft, Blacktown LGA	2004/1378	Not Controlled Action	Completed
Subdivision of Residential Lands, Greystanes Estate, western Sydney	2001/499	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Wonderland Business Park Precinct, Stage 1, Lot D1	2004/1626	Not Controlled Action	Completed
Not controlled action (particular manner)			
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval

Bioregional Assessments			[Resource Information]
SubRegion	BioRegion	Website	
Sydney	Sydney Basin	BA website	

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact us](#) page.

[© Commonwealth of Australia](#)

Department of Climate Change, Energy, the Environment and Water

GPO Box 3090

Canberra ACT 2601 Australia

+61 2 6274 1111

**Appendix 6. NSW Department of Planning and Environment Aboriginal Heritage Information
Management System (AHIMS) search result (November 2024)**

REDACTED



artefact

Artefact Heritage and Environment

ABN 73 144 973 526

Suite 56, Jones Bay Wharf

26-32 Pirrama Road

Pymont NSW 2009 Australia

+61 2 9518 8411

office@artefact.net.au

www.artefact.net.au