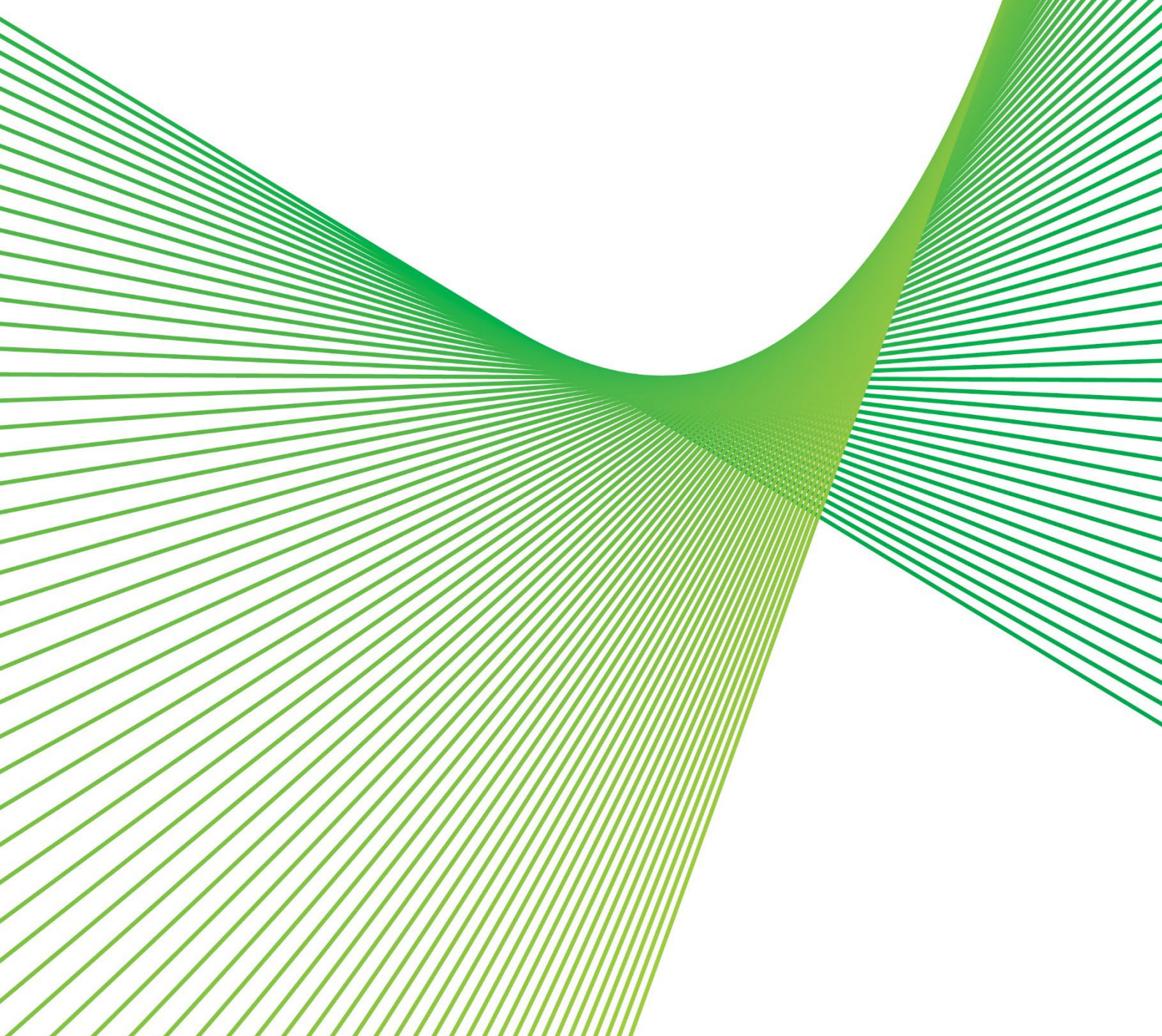


WaterNSW Fish River Water Supply Scheme

Technical working paper

December 2025



Contents

1. Scope of the memorandum	2
2. Project interface with the Scheme	3
3. Pipeline loading.....	4
3.1. Unsealed access tracks	4
3.1.1. Potential impacts at unsealed track interfaces.....	4
3.1.2. Proposed controls	4
3.2. Sealed Roads.....	4
3.2.1. Potential impacts associated with use of sealed roads.....	5
3.2.2. Proposed controls	5
3.3. Mount Piper construction compound	5
3.3.1. Potential impacts at the construction compound.....	5
3.3.2. Proposed controls	5
3.4. Construction at transmission structures	5
3.4.1. Potential impacts at construction and demolition areas	5
3.4.2. Proposed controls.....	6
4. Electrification of the metal pipeline	7
5. Restrictions to WaterNSW access and egress	8
6. Operation and decommissioning.....	9
7. Conclusion.....	10

Tables

Table 1.1: Potential impacts to the Scheme raised by WaterNSW and Transgrid's response. 2

Table 7.1: Revised mitigation measure revisions to manage potential impacts to the Scheme 10

Appendices

Appendix A Fish River Water Supply Scheme figures

1. Scope of the memorandum

This memo has been prepared to address concerns raised by WaterNSW in their response to the project's Environmental Impact Statement SSI-70279722 (15 September 2025) (EIS) and included in advice to the Secretary's Environmental Assessment Requirements (SEARs) (24 May 2024).

WaterNSW considers the project poses substantial risks to the Fish River Water Supply Pipeline (the "Scheme") during construction and operation. Table 1.1 identifies WaterNSW concerns with the project interface and the location of Transgrid's response:

Table 1.1: Potential impacts to the Scheme raised by WaterNSW and Transgrid's response.

WaterNSW issue	Location	Transgrid response summary
Loading over the Scheme's pipelines	Compounds and access tracks	Asset protection controls and monitoring requirements are provided in sections 3.1.2 and 3.3.2
Damage from vibration (access tracks and construction activities at structures)	At structures and where access tracks cross the Scheme	Controls are included in section 3.4.2
Electrification of the Scheme's metal pipeline	All areas	Refer section 4
Restrictions to WaterNSW access and egress	All areas	Refer section 5

Proposed project amendments are presented in the Amendment Report (Transgrid, 2025). The footprint changes proposed are minor and do not change the project's interface with the Scheme. There are no additional impacts to the Scheme resulting from the proposed project amendments.

2. Project interface with the Scheme

The Scheme draws water from Oberon Dam and Duckmaloi Weir to provide water to Oberon and Lithgow councils for domestic and industry use, about 230 properties along its route and to Wallerawang and Mount Piper power stations. It also supplements supplies in the upper Blue Mountains.

In the vicinity of the project, the Scheme is located underground from Wallerawang through to Mount Piper, including a spur alignment to the reservoir located north of Bray's Lane (refer Appendix A). Information provided within WaterNSW's submission notes that the Scheme is thought to be buried at "shallow" depth, where the metal pipeline crosses proposed access tracks (particularly Access Point 4 off Brays Lane) and at construction compound 1. The depth of cover has not been confirmed at interface locations near Access Point 4. The presence of services and monitoring points along and adjacent to the Scheme's pipeline is also noted. In this document, a reference to the "Scheme" includes these service and monitoring points.

The Scheme interfaces with the project in a number of locations (refer Appendix A):

- at unsealed access tracks (section 3.1)
- at sealed roads (section 3.2)
- at construction compound construction compound1 (section 3.3)
- near to construction areas for new structure foundations (section 3.4).

As noted within the project's revised Traffic and Transport Assessment Report (TTA), the project's construction compounds and access tracks will be used throughout the construction period by a variety of vehicles. These will include:

- vehicles:
 - light vehicles (e.g. 4WD utes)
 - heavy and medium rigid vehicles
 - articulated vehicles
 - mobile cranes
- plant machinery (tracked and wheeled):
 - excavators
 - skid steers
 - dump trucks
 - drill rigs.

The heaviest vehicle identified would be the delivery vehicle for the drill rig, which has a maximum weight of about 160 tonnes.

Construction compounds will be primarily used to store construction materials such as tower steel, poles, insulators, and fittings. Office and associated buildings, as well as storage containers will be situated in the compounds. These areas may also be used for short-term parking of construction vehicles.

Construction of new transmission structures, including foundation and demolition methods are provided within the EIS (refer section 3.5.3). Transgrid have since confirmed that bored piling will be the preferred method and impact piling will not be used (refer section 3.4.2 of the Submissions Report (Transgrid, 2025)).

The above interfaces of the Scheme with the project are considered in the following sections.

3. Pipeline loading

3.1. Unsealed access tracks

The pipeline extends under unsealed access tracks in multiple locations (refer Appendix A) including access tracks near Access Point 4 shown in Appendix A. Other locations include access tracks to the north of Compound C1 and south of Mt Piper 330kV substation. WaterNSW uses unsealed tracks owned by Energy Australia, Centennial Coal and Greenspot to access and maintain their assets. There are no shared access tracks within the Gardens of Stone SCA.

3.1.1. Potential impacts at unsealed track interfaces

Potential impacts to the pipeline at these interfaces include:

- loading from vehicles and machinery driving over the pipeline
- vibration from vehicles and machinery using access tracks nearby and where they cross over the pipeline
- erosion of surface cover resulting in reduced cover over the pipeline
- sedimentation potentially covering service and maintenance points
- wear and tear on access tracks affecting WaterNSW access.

In general, vibration levels from trucks and other heavy construction vehicles driving on access tracks is typically low compared to other vibration-intensive construction activities. Using the US Federal Transit Administration Noise Impact Assessment Manual (FTA Report No. 0123, US Federal Transit Administration, 2018), a vibration level of 20mm/s at two metres horizontal distance from a loaded truck movement (GHD, 2025) was identified.

3.1.2. Proposed controls

Controls would be considered as part of the project's CEMP and sub plans including the Soil and Water Management Plan (mitigation measure W1), Traffic and Transport Management Plan (mitigation measure T1), Emergency Management Plan (mitigation measure LU7) and the Noise and Vibration Management Plan (mitigation measure NV1)(refer to Appendix B).

Impacts to the Scheme will be managed by implementing the revised mitigation measures outlined in Table 7.1. Potential impacts during operation will be managed in accordance with Transgrid's Environmental Management System.

3.2. Sealed Roads

The pipeline extends under the following sealed roads which are proposed to be used for the project, as shown in Appendix A:

- existing sealed access road into former Wallerawang Power Station site located adjacent to construction compound C2
- Brays Lane at access point 4.

When using sealed roads, vehicles will obey road rules.

3.2.1. Potential impacts associated with use of sealed roads

Potential impacts for construction traffic on the local road network have been identified in the revised Technical Report 8 – Traffic and Transport Impact Assessment (Appendix D of Submissions Report (Transgrid, 2025) and Table 5.4 in the Submissions Report (Transgrid, 2025).

3.2.2. Proposed controls

Controls would be considered as part of the project's CEMP and sub plans including the Traffic and Transport Management Plan (mitigation measure T1), Emergency Management Plan (mitigation measure LU7) and the Noise and Vibration Management Plan (mitigation measure NV1) (refer to Appendix B).

3.3. Mount Piper construction compound

The pipeline extends under a proposed compound area near Transgrid's Mount Piper substation (Appendix A). Transgrid note that WaterNSW also uses the track through the compound to access and maintain their assets. This section covers the compound area, where it intersects with the Scheme.

3.3.1. Potential impacts at the construction compound

The risks to the pipeline at the compound include:

- loading of vehicles and machinery on the pipeline (point loads)
- vibration from moving vehicles
- placement of buildings, materials, or stockpiles over the pipeline, potentially limiting access to the pipeline for WaterNSW
- emergency access through the compound (access to pipeline).

3.3.2. Proposed controls

Controls would be considered as part of the project's CEMP and sub plans including the Soil and Water Management Plan (mitigation measure W1), Traffic and Transport Management Plan (mitigation measure T1), Emergency Management Plan (LU7) and the Noise and Vibration Management Plan (NV1) (refer to Appendix B).

Impacts to the Scheme will be managed by implementing the revised mitigation measures outlined in Table 7.1. Potential impacts during operation will be managed in accordance with Transgrid's Environmental Management System.

3.4. Construction at transmission structures

The pipeline extends near areas where construction of new transmission structures and removal of redundant transmission structures will be taking place. To enable safe construction activities, a construction pad will be installed at each new structure location. The closest transmission structures to the pipeline are 13D, 14A, 13A and redundant structure 94E located approximately 35m metres, 61 metres, 35 metres and 57 metres away from the Scheme, respectively (refer Appendix A). There are no construction activities associated with structures within and adjacent to the Mount Piper substation (refer Appendix A).

3.4.1. Potential impacts at construction and demolition areas

The risks to the pipeline at these locations include:

- earthworks while preparing work areas (vibration)
- foundation drilling/boring works (vibration)
- erosion of soil (ground movement)

A reservoir and dosing tank are located approximately 160 metres to the south west of transmission structure 15D. The nearest transmission structure is approximately 35 metres from the Scheme.

In general, construction activities that have the potential to generate ground borne vibration are outside the safe working distances from structures (including the pipeline) as detailed in the Technical Report 10 - Noise and Vibration Impact Assessment Report.

Typical construction-induced ground borne vibration is primarily in the form of surface waves, which carry much of the vibrational energy. British Standard BS 7385-2:1993 Evaluation and Measurement for Vibration in Buildings notes that structures below ground are known to sustain higher levels of vibration and are very resistant to damage, unless in very poor condition.

Guideline values to evaluate the effects of vibration on buried pipework is provided in German Standard DIN 4150-3. Typical reference distance vibration levels for construction equipment listed in Technical Report 10 – Noise and Vibration Impact Assessment have been sourced from the *Environmental Noise Management Manual* (ENMM) (2001), British Standard *BS 5228.1 Code of Practice for noise and vibration control on construction and open sites: Part 2 Vibration* and the *Construction Noise and Vibration Guideline (Roads)* (TfNSW, 2024). The typical reference distance vibration level for bored piling at a 10 metre horizontal distance is about 7.4mm/s. Using the ENMM (2001) as a basis for estimating vibration levels at distance from construction activity, estimates for bored piling at 20 and 50 metres are 4.3 and 2.1 mm/s respectively (GHD, 2025).

Based on the guideline values for vibration on buried metal pipework (German Standard DIN 4150-3) and the proximity of the nearest transmission structure to the Scheme, the risk of damage from nearby construction activities (including bored piling, excavation, and earthworks) is considered to be low and below the estimated vibration guideline values.

3.4.2. Proposed controls

Impacts to the Scheme will be managed by implementing the revised mitigation measures outlined in Table 7.1. Potential impacts during operation will be managed in accordance with Transgrid's Environmental Management System.

4. Electrification of the metal pipeline

Low Frequency Induction (LFI) and Earth Potential Rise (EPR) are well documented, and common risks where a high-voltage transmission line is co-located with a metallic pipeline. These risks are not unique to the project and mitigation measures are considered standard engineering practice.

Transgrid acknowledges the potential electrification risk to the Scheme caused by the proximity of the pipeline to overhead transmission lines which may result in hazardous LFI or EPR voltages on the metal pipeline. As part of the design process, Transgrid conducted a detailed risk assessment which considered the risk of electrification to the Scheme.

The pipeline crosses under the existing transmission Line 94E at transmission structures 32 and 31 and transmission Line 70/71 at transmission structures 23 to 24 near Mount Piper substation (refer Appendix A). As the project would not alter the pipeline's perpendicular orientation relative to either the existing or new transmission lines, the risk of electrification due to LFI remains unchanged from the existing situation.

The risk of EPR is dependent on the location of the transmission structures. The pipeline would maintain the required 30 metre minimum separation from all new transmission structures, as required by Transgrid's Easement Guidelines. Consequently, the risk of electrification is considered negligible. No mitigation measures are therefore required for risk from either LFI or SPR.

5. Restrictions to WaterNSW access and egress

During construction, the project's activities include vehicle movements, parking, material laydown, and transmission line construction. These activities have potential to restrict access and egress for regular maintenance or emergency maintenance purposes as required by WaterNSW.

WaterNSW owns Lot 1 DP 567915 which is within the project footprint. Located on this lot are infrastructure and easements related to the Scheme.

Transgrid has consulted with its construction contractor and outlined the need for WaterNSW to retain safe and unrestricted access to all its assets, including Lot 1, for the duration of construction works. Mitigation measure LU7 has been revised to ensure this requirement. For shared access tracks, Transgrid will coordinate with WaterNSW to maintain safe access.

Transgrid also confirms a dedicated Community and Stakeholder Representative will be appointed by the construction contractor for the duration of the works to allow for proper coordination and provide a safe working environment for all parties. In addition, and at all times, Transgrid will maintain a Community and Stakeholder Engagement manager for direct contact between our organisations.

6. Operation and decommissioning

The assets will be operated under Transgrid's accredited Environmental, Health & Safety and Quality Management Systems. During operation, Transgrid will require intermittent access by maintenance crews for routine and emergency activities. These typically involve light vehicles and occasionally, heavy maintenance plant. The project's design includes an associated easement which is dictated by Transgrid's easement guidelines. If, during the asset's operation, non-routine works are required, this will trigger an environmental assessment which will include stakeholder engagement. WaterNSW will be made aware of any major works that may impact the pipeline throughout the asset's life.

7. Conclusion

Table 7.1 outlines the mitigation measures which are considered to address the general safeguards recommended by WaterNSW. This includes a number of mitigation measures outlined in the EIS which have been revised to include specific mention of mitigation of impacts on the Scheme. The changes to these mitigation measures are where relevant to the Scheme are shown in **red**. Other elements of these measures have been revised since the EIS however they were not revised as a result of the consideration of the Scheme.

A full list of revised mitigation measures to be implemented on the project is found in Appendix B of the Submissions Report (Transgrid, 2025).

Table 7.1: Revised mitigation measure revisions to manage potential impacts to the Scheme

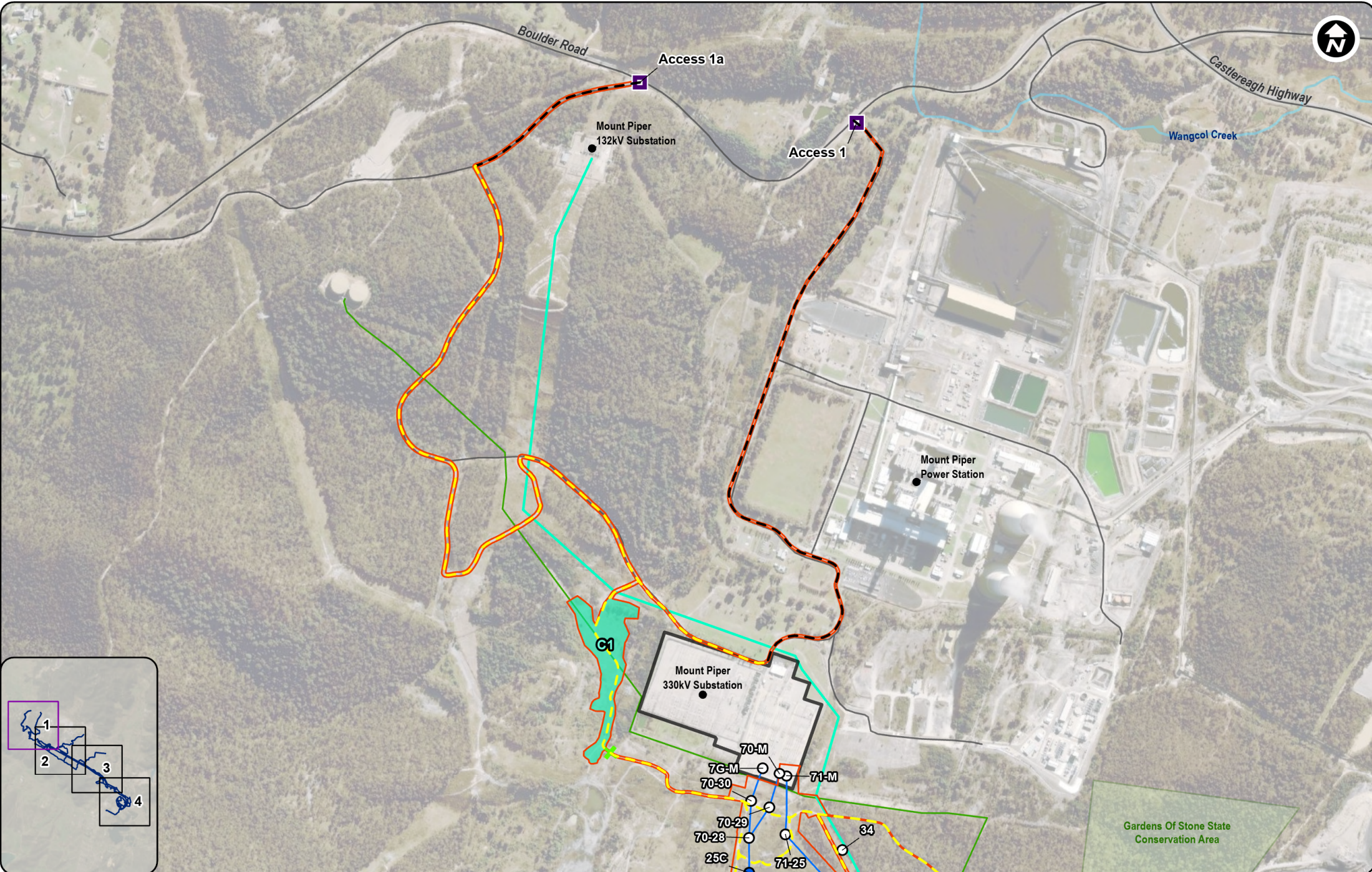
ID	Mitigation measure
NV1	A Construction Noise and Vibration Management Plan (CNVMP) will be developed in consultation with NSW EPA and implemented as part of the CEMP. The CNVMP will generally follow the approach outlined in the ICNG and include: • identification of sensitive receivers, including sensitive threatened fauna and their nearby habitats in consultation with a qualified ecologist, and heritage structures (ie Wallerawang Rail Bridges over Cocks River (SHR #01064), the St John the Evangelist Church (SHR #01702, LEP#1112), Braemai (LEP #1193)) and underground utilities including the Fish River Water Supply Scheme. • an updated construction noise and vibration assessment based on final construction staging, compound locations and details, selected equipment types and proposed OOHV periods • all potentially high noise and vibration generating activities associated with the construction of the project • standard and additional mitigation measures to manage identified impacts as required in accordance with the <i>Construction Noise and Vibration Guideline (Roads)</i>, including safe working distances when working near heritage structures to avoid vibration damage and measures to protect underground utilities including the Fish River Water Supply Scheme. • a monitoring program to assess performance against relevant noise and vibration criteria • arrangements for consultation with affected neighbours and sensitive receivers where exceedances are predicted of NMLs, including notification and complaint handling procedures • details of the process and actions to be taken in the event of non-compliance with noise and vibration criteria.
NV6	Where vibration intensive activities are planned within vibration minimum working distances (including for sensitive or heritage structures and buried infrastructure), reasonable and feasible mitigation measures will be implemented. These measures will include, and not be limited to: • pre- and post-construction condition surveys of vibration sensitive receivers within the recommended safe working distances prior to construction works • alternative construction methods and equipment with lower source vibration levels will be investigated and implemented, where feasible, this will include consultation with a suitably qualified heritage specialist for any potential vibration impacts on heritage structures • schedule the use of vibration-sensitive equipment during the least sensitive times of the day

ID	Mitigation measure
	• sequence operations to avoid or minimise concurrent vibration intensive activities • vibration monitoring will be carried out at the start of work to determine actual vibration levels at the receiver • work will cease if the monitoring indicates vibration levels are likely to, or do, exceed the relevant criteria • where potential vibration impacts relate to buried infrastructure, measures to protect the buried infrastructure will be developed in consultation will be undertaken with asset owners. These measures may include traffic management, construction equipment selection, construction bench siting and the placement of additional cover, plating or bog mats. Where vibration intensive activities are proposed in the vicinity of historical mine workings (including but not limited to transmission tower locations 23D to 25D), geotechnical investigations and consultation with mine operators will be undertaken to consider the potential impacts associated with ground vibration generated by equipment during the project's construction.
T1	A Traffic and Transport Management Plan (TTMP) will be developed and implemented as part of the CEMP, in consultation with relevant stakeholders. The plan will detail processes and responsibilities to minimise traffic disruptions and delays, to identify and to respond to changes to road access. The TTMP will include: • Consultation and approval of road designs from Lithgow City Council for any proposed minor road work, such as a passing bay on the shoulder of Brays Lane. The need for a passing bay will be determined in consultation with relevant road authorities. • Maps of designated and approved heavy vehicle routes for heavy vehicles and oversize and overmass movements. • Traffic and transport permitting requirements, including oversize and overmass movements permits and road occupancy licences. • Planning for heavy vehicle routes to access point 12 via Heel Street, as well as the alternate heavy vehicle route for access points 4 and 5, which are to be confirmed through consultation with Lithgow City Council. • Transmission line stringing across the Main Western Rail Line to be undertaken within scheduled rail shutdown period (ie, planned rail maintenance) or as agreed with the appropriate rail authority. • Road closures (partial or full) will be planned during the road network off-peak periods, where possible. • A drivers' code of conduct for heavy vehicle safety. • Requirements for drivers operating heavy vehicles on public roads. • Measures to ensure the efficient delivery of equipment and construction materials. • Traffic control measures at construction access points and intersections, including: - left-in/ left-out turn movements at the Karawatha Drive/Castlereagh Highway intersection, including details of required signage for this arrangement to construction vehicles only - signage to prohibit the use of the unsealed track located south of the Karawatha Drive/Castlereagh Highway intersection - internal site traffic management to ensure only one 19 metre articulated vehicle arrives and departs at any one time on Karawatha Drive - traffic control at the Frankfort Road/Boulder Road intersection, including the requirements for obtaining a road occupancy licence

ID	Mitigation measure
	- traffic management at Brays Lane and Main Street during stringing works, including the requirements for obtaining a road occupancy licence. • Measures to reduce construction traffic movements at Brays Lane/Castlereagh Highway. This will include reducing trips taken by personnel and contractors, such as carpooling and shuttle bus services. • Measures to monitor construction traffic movements occurring to and from the project footprint and between work areas, including the consideration of: - Recording of vehicle entry and exit movements to ensure they are within the project's worst case peak traffic generation estimates - Undertaking visual traffic inspection during peak hours to identify any unacceptable queuing. • Measures for the protection of underground and above ground services and utilities, which may include speed restrictions to reduce dynamic loading and vibration and establishing designated crossing points for access tracks. • Consultation with other relevant project proponents to consider cumulative traffic impacts and identify the need for project-specific mitigation measures. • Visual monitoring of the road shoulder condition will be undertaken at the intersection of Karawatha Drive / Castlereagh Highway intersection during the construction period to ensure surface degradation does not occur, should vehicles inadvertently track off the sealed carriageway.
LU2	Pre-condition assessments of assets, infrastructure and the general condition of the land, asset or infrastructure at risk of impact during construction within the project footprint will be completed. Requirements for rectification or rehabilitation will be agreed or determined with the asset owner or landowner.
LU7	The location of all utilities and services, and requirements for access to, diversion, protection and/or support of utilities will be confirmed prior to construction and included on all site plans, including WaterNSW Fish River Water Supply Scheme pipeline. This will include (as required) undertaking utilities investigations, including intrusive investigations, and consultation and agreement with asset owners and service providers. In the event that service interruptions are required, notice will be given by the relevant asset owner. The Emergency Management Plan will include communication and reporting of incidents on utilities to the relevant asset owner.
W1	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP. The SWMP will include: • an outline of relevant legislation, policies and guidelines relevant to the handling and storage of hazardous materials • ESCPs prepared in consultation with a CPESC, or Registered Soil Practitioner (RSP_ESC), or similarly qualified professional • detail on processes such as regular inspection, monitoring, auditing and maintenance of erosion and sediment controls, roles and responsibilities and measures to manage potential soil and water quality impacts during construction • hold points for installation of erosion and sediment controls • measures to minimise the potential for chemical spills, including storage in bunded areas • outline of the frequency and type of water quality monitoring, if required, in relation to sensitive environments and high risk landforms.

ID	Mitigation measure
	The SWMP and ESCP will be prepared in accordance with the principles and requirements, in the following publications: • Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom, 2004), Volume 2A (DECC, 2008) and Volume 2C (DECC, 2008a) • Best Practice Erosion and Sediment Control (IECA, 2008) • Guidelines for controlled activities on waterfront land (DPE 2022).

Appendix A Fish River Water Supply Scheme figures



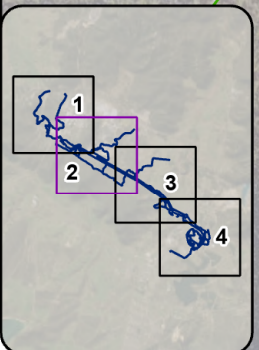
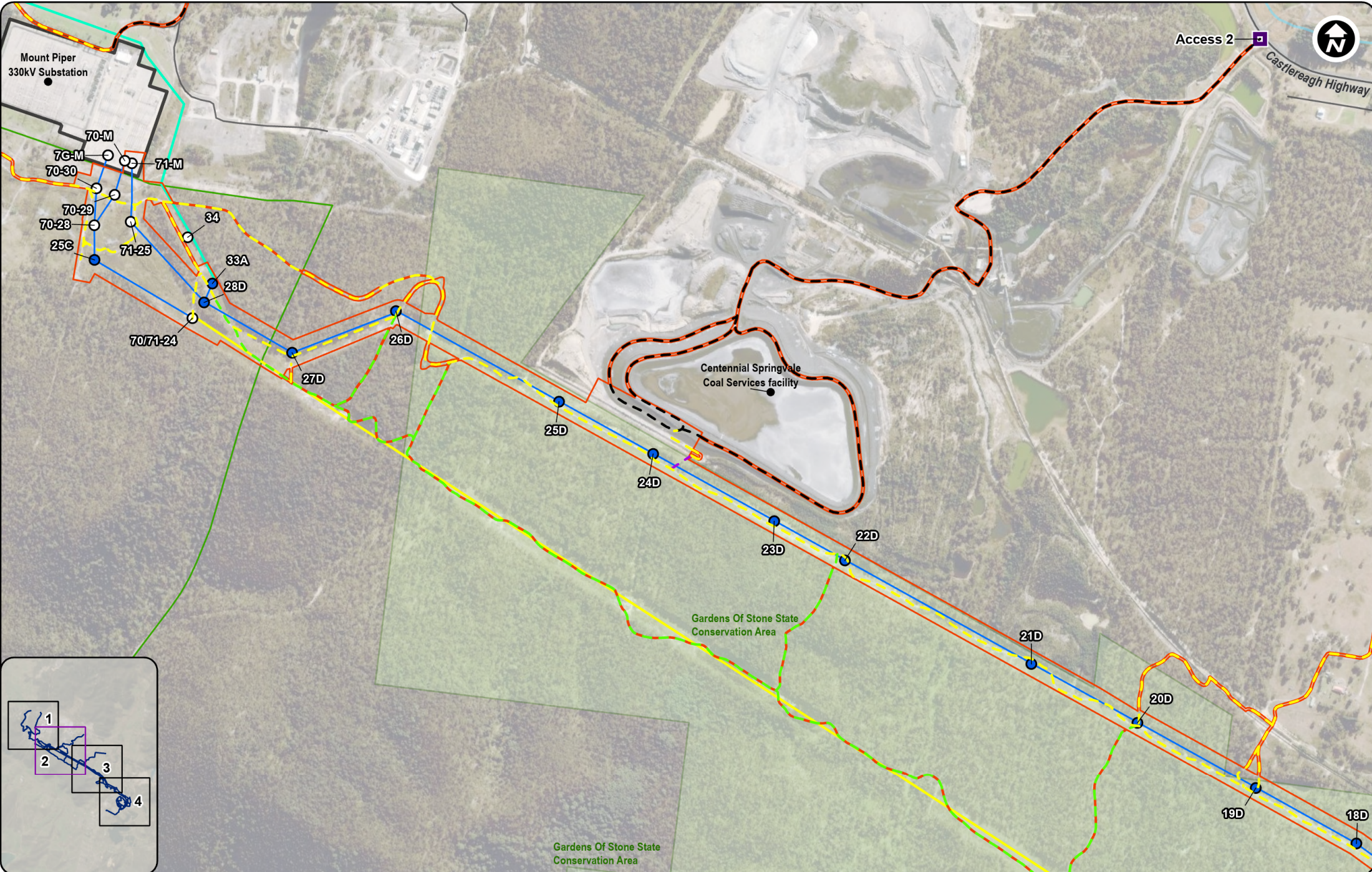
- Project components**
- Amended project footprint
 - Existing substation
 - New and adjusted transmission line
 - Existing 132kV transmission line to be retained

- Construction compound
- New culvert crossing for access
- Fish river pipeline
- Access point
- Transmission structure

- Existing transmission structure to be reused
- Access tracks – existing to be used with no upgrades
- Access tracks – upgrade and widen

- Existing environment**
- Gardens of Stone SCA
 - Roads
 - Watercourse

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Project components

- Amended project footprint
- Existing substation
- New and adjusted transmission line
- Existing 132kV transmission line to be retained
- Existing 330kV transmission line to be retained

Fish river pipeline

- Access point
- Transmission structure
- Existing transmission structure to be reused

Access tracks

- Access tracks – existing to be used with no upgrades
- Access tracks – minor upgrades as required (light vehicles only)
- Access tracks – new
- Access tracks – upgrade and widen

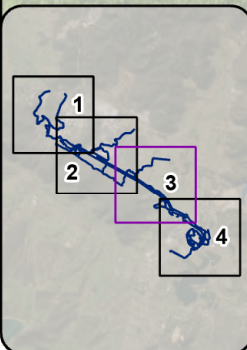
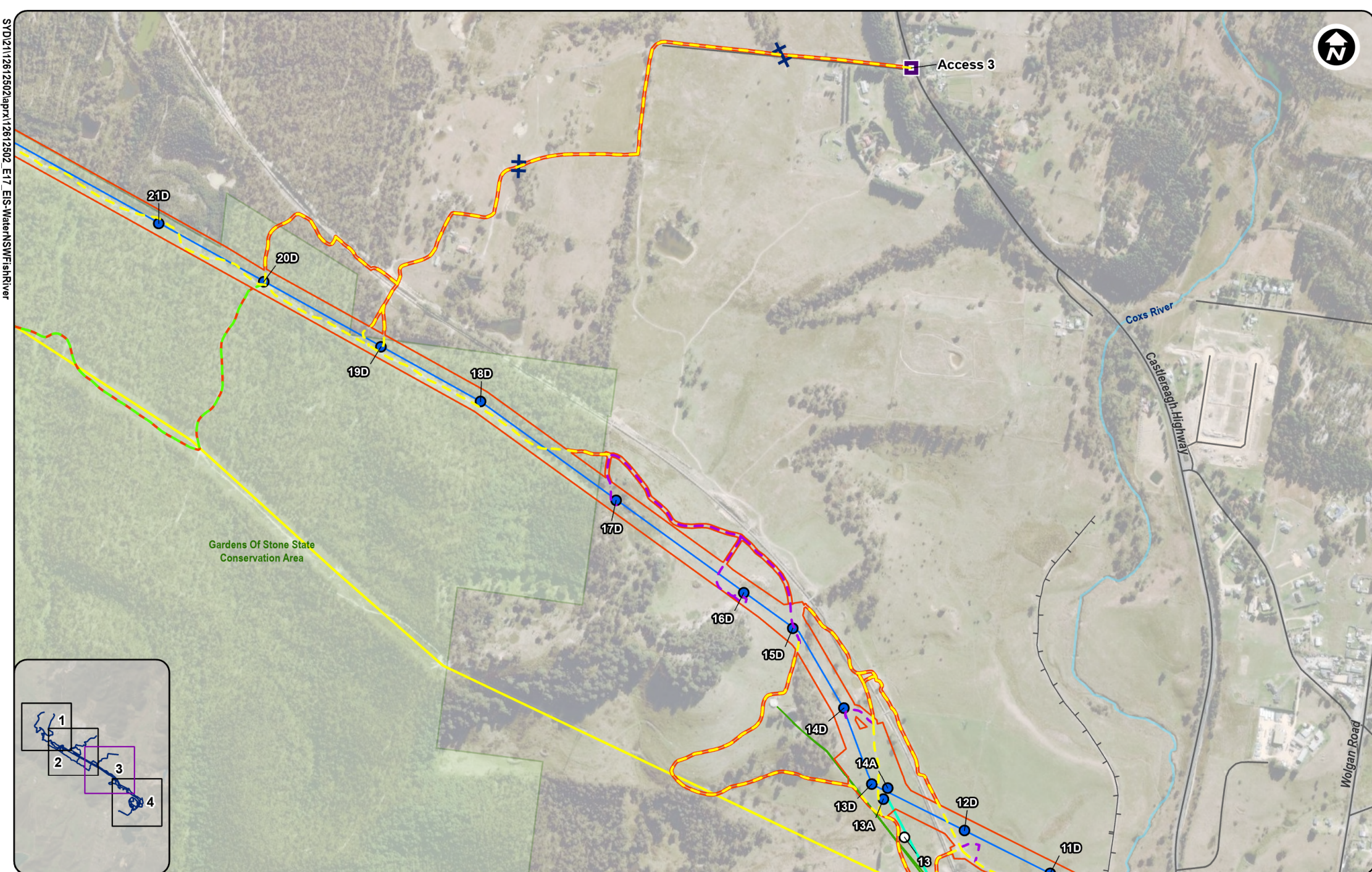
Existing environment

- Gardens of Stone SCA
- Roads
- Watercourse

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Project components

- Amended project footprint
- New and adjusted transmission line
- Existing 132kV transmission line to be retained
- Existing 330kV transmission line to be retained

Legend

- Upgraded culvert crossing
- Fish river pipeline
- Access point
- Transmission structure
- Existing transmission structure to be reused

Access tracks

- Access tracks – minor upgrades as required (light vehicles only)
- Access tracks – new
- Access tracks – upgrade and widen

Existing environment

- Gardens of Stone SCA
- Roads
- Railway
- Watercourse

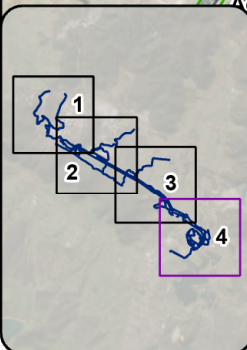
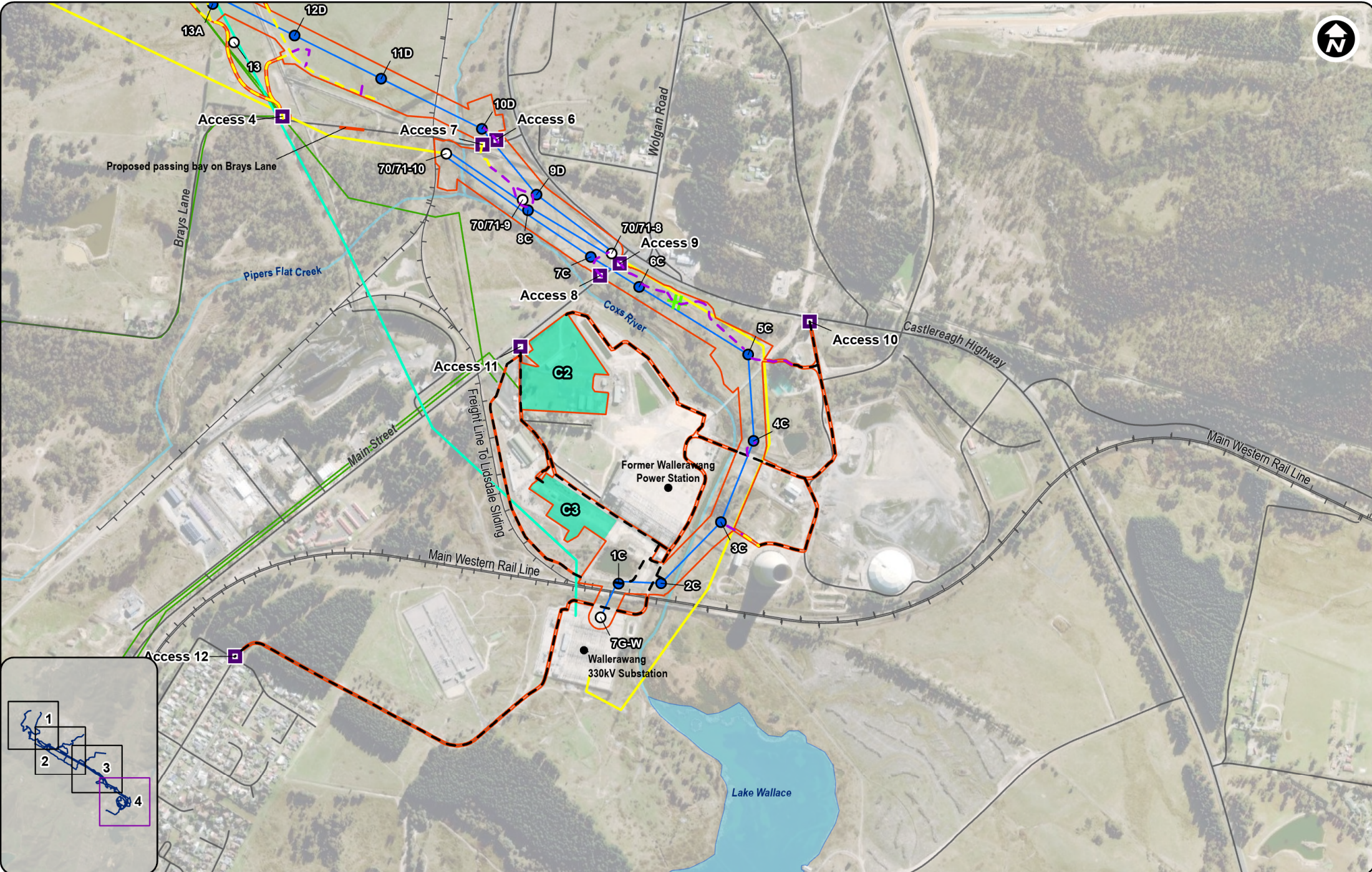
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Project components

- Amended project footprint
- New and adjusted transmission line
- Existing 132kV transmission line to be retained
- Existing 330kV transmission line to be retained

Construction compound

- New culvert crossing for access
- Fish river pipeline
- Access point
- Transmission structure

Existing transmission structure to be reused

- Access tracks – existing to be used with no upgrades
- Access tracks – new
- Access tracks – upgrade and widen

Roads

- Railway
- Watercourse

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