2026-31 HCC RNI Project

Attachment 2.2

Development, Delivery, Operations and Maintenance

16 May 2025

Ausgrid

Acknowledgement of Country

The Ausgrid Group acknowledges and pays respect to the people of the Awabakal, Bahtabah, Biraban, Darkinjung, Mindaribba, Wanaruah and Worimi nations, as the Traditional Custodians of the land on which the Hunter-Central Coast REZ will be delivered. We honour all Aboriginal and Torres Strait Islander peoples for their unique ability to care for Country and deep spiritual connection to it. We honour Elders past, present and future, understanding their knowledge and wisdom ensures continuation of culture and traditional practices. We recognise and value the contributions of the Ausgrid Group's First Nations employees for sharing their knowledge and experiences, and for their continued work within the organisation to move us towards our future aspirations.

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Glossary

Acronym	Description
ADMS	Advanced distribution management system
AEMO	Australian Energy Market Operator
Antiene STSS	Formerly known as Eastern Hub STSS
BSP	Bulk supply point
GW	Gigawatt
HCC	Hunter Central Coast
LV	Low voltage
MW	Megawatt
OPGW	Optical fibre ground wire
REF	Review of Environmental Factors
REZ	Renewable energy zone
RNI	REZ network infrastructure
SCR	Short circuit ratio
Sandy Creek STSS	Formerly known as Muswellbrook STSS
STS	Subtransmission substation
STSS	Subtransmission switching station
ZS	Zone substation

1 Executive Summary

Ausgrid understands that the Hunter-Central Coast REZ (**HCC REZ**) is a key element of the NSW Government's policy for accelerating the energy transition and promoting clean energy development in the Hunter, while supporting its ongoing economic prosperity as we move to renewables from fossil fuels. To achieve the objects of the EII Act and the Roadmap, it is imperative that the HCC REZ Network Infrastructure (**HCC RNI**) Project is practically constructable and can be delivered on time, in a cost-effective way which maintains and enhances social licence, while minimising impact and genuinely engaging stakeholders and local communities. The HCC RNI wholly overlaps the Ausgrid distribution network. Ausgrid's proposal involves the augmentation of our existing 132 kV network in the Upper Hunter to deliver 1 GW of renewable energy transfer capacity to local loads and main grid connections from Muswellbrook to Newcastle.

In our proposal, Ausgrid has:

- Optimised how our existing network can be augmented for lowest cost and least impact to communities
- Obtained maximum benefit from the existing asset base by utilising existing network elements, easements and properties to the greatest extent possible, thereby minimising community impacts, reducing delivery times and maximising our social license compared to alternative solutions
- Provided for generator connections at more usable, lower cost voltages of 33, 66 or 132 kV, as compared to 330 kV connection alternatives – improving the viability of a wider range of generator proposals
- Facilitated usage of energy by Hunter homes and businesses – gaining greater engagement and reducing the loading on the main grid which is facing stresses from transporting renewable energy from REZs to locations away from the Hunter/Central Coast/Newcastle load areas
- Taken advantage of the REZ early works provisions to allow for a robust consideration of options without putting delivery dates at risk.
- Considered how the proposed transfer capacity could be cost effectively expanded if needed, and how these assets could integrate with later horizons for the HCC REZ.
- Developed a delivery program that enables Ausgrid to deliver these outcomes using purpose-built, time responsive implementation models which leverage our existing deep skillsets, capability and local knowledge, while supplementing our resources and capability where required to address the concentrated footprint and condensed timeframes of the HCC RNI Project.

This document describes Ausgrid's approach to developing, delivering operating and maintaining the HCC RNI Project to achieve the overall Project timeline and key milestones.

2 Project Overview

Ausgrid's proposed HCC RNI Project involves a major augmentation of Ausgrid's network in the Upper Hunter to achieve 1 GW of renewable energy transfer capacity by mid-2028.

This will require rebuilding existing overhead line corridors with new, higher capacity subtransmission lines, constructing new switching stations and augmenting existing substations to facilitate the connection of new renewable generation. Primary, secondary and telecommunications systems augmentations will also be required at various existing sites in the region to integrate with the new infrastructure.

Ausgrid's solution involves the following activities, delivered in three stages:

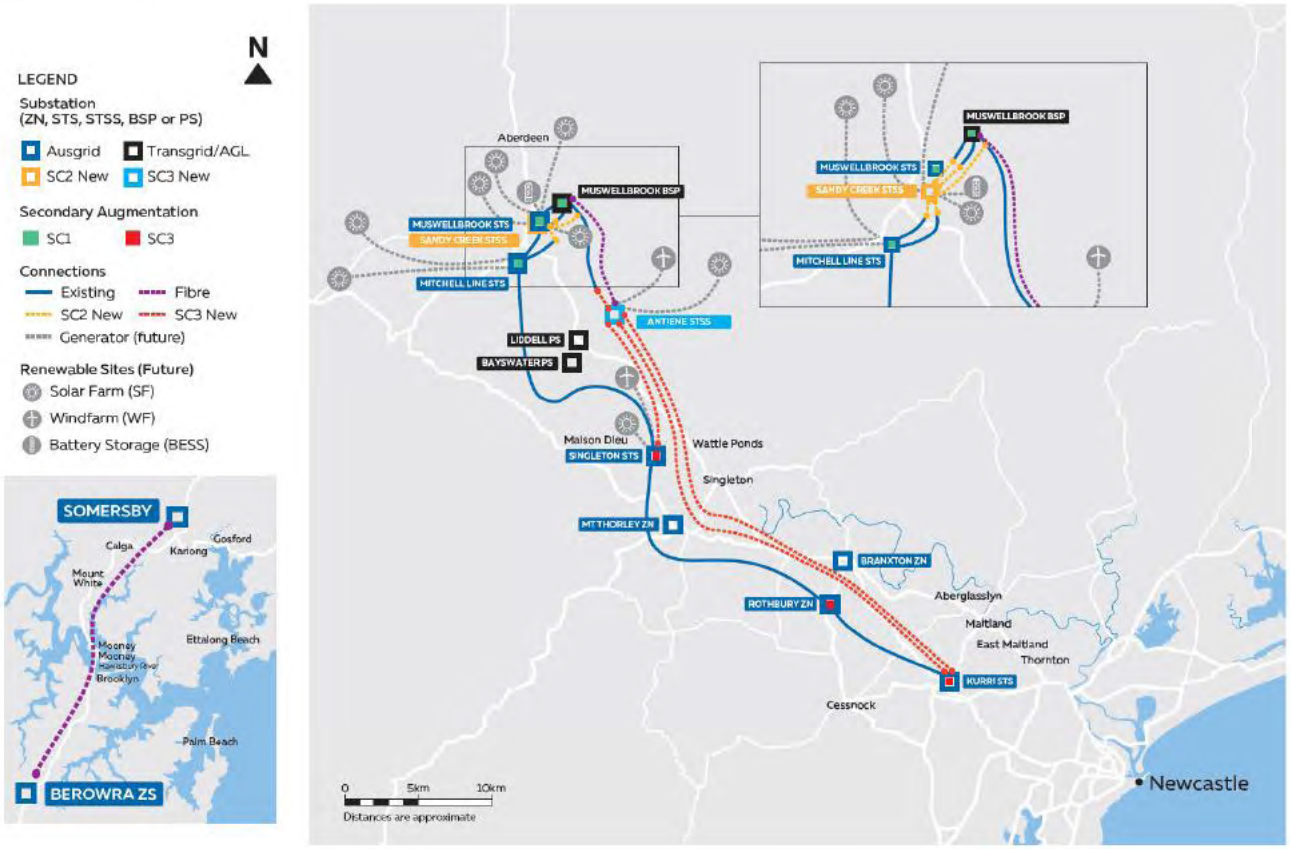
1) **Secondary Systems Modernisation:**
   - Upgrade of 132 kV feeder protection relays at various substations in the Upper and Lower Hunter Networks to meet contemporary compliance requirements with the National Electricity Rules
   - Upgrades of various substations in the Upper Hunter to enable Quality of Supply management.

2) **Muswellbrook Network Rearrangement including new Sandy Creek STSS:**
   - Construction of a new 132 kV Sandy Creek subtransmission switching station (**STSS**) adjacent to our existing Muswellbrook site
   - Rearrangement of the Muswellbrook 132 kV feeder network
   - Rebuilding of 4 km of existing subtransmission line between Sandy Creek STSS and Muswellbrook Bulk Supply Point (**BSP**)
   - Singleton to Kurri 13 2kV link
   - Installation of approximately 30 km of optical fibre ground wire (**OPGW**) on existing overhead structures between Berowra and Somersby to provide a secure Ausgrid comms path between the HCC RNI and our Network Control Centre in Sydney.

3) **New Antiene STSS and lines:**
   - Construction of a new 132 kV Antiene STSS near Hebden
   - Antiene STSS to Singleton 132 kV link
   - Rebuilding of 81 km of existing subtransmission line to double or triple circuit between Kurri Subtransmission Substation (**STS**) and Antiene STSS, and reconfiguration of the underlying 66 kV network.

All network augmentations, including both substation and feeder works, will be undertaken while a secure electricity supply is maintained to customers.

Figure 1: Ausgrid's HCC RNI solution



3 Overall approach

Ausgrid has undertaken significant analysis in selecting its strategies for the development, delivery, operation and maintenance of the HCC RNI. We have assessed all design, procurement and construction options to arrive at a tailored strategy that would best position the Project for success.

Ausgrid's strategy comprises the following key features:

Table 1: Features of Ausgrid's Development, Delivery, Operations and Maintenance Strategy

Feature	Rationale
Alignment to existing corridors	• Growing concern nationally on new transmission infrastructure impacting existing landowners and community • Properties along our existing alignment have developed around existing infrastructure • Ability to minimise impact on communities in the Hunter, especially considering parallel projects in the region.
Ausgrid-led design	• Tight timeframes require critical path activities commence at the earliest possible date • Staged procurement of Project by EnergyCo allows design works to occur in parallel with gated approval process. • Proven internal design capability with available capacity in most disciplines • High engagement levels towards the HCC REZ across Ausgrid

Feature	Rationale
Ausgrid-led procurement	• Tight timeframes, need start critical path activities at the earliest date • Broad range of established panel contracts for supply of the majority of long lead equipment required on the Project
Blended construction strategy	• Internal distribution lineworker and substation technician capacity available in the required construction periods. • Previous project success at internal delivery of electrical construction packages. • Established panels of local civil contractors. • High engagement levels towards the HCC REZ across Ausgrid • Recognition that the greenfield substation and transmission line scopes were best constructed by experienced Tier 1 / 2 contractors. • Early market engagement identified strong market appetite to partner with Ausgrid and EnergyCo.
Rigorous project controls	• Need for greater certainty of on-time on-budget delivery. • Facilitates accurate and timely reporting internally and to EnergyCo
Application of existing operations and maintenance strategies to the HCC RNI	• Consistency of HCC RNI with Ausgrid's existing infrastructure • Proven asset management systems • Proven local workforce • Marginal incremental O&M workload due to the HCC REZ.

3.1 Development and Delivery Phase

Ausgrid understands the complexities in delivering a project of this scale. This plan considers each of the key project components and seeks to expedite critical items to achieve overall timeline and critical milestones.

3.1.1 Construction

The key elements of the Delivery Phase are:

- **Muswellbrook 132 kV Feeder Network Rearrangement**: To maximise power transfer from the Ausgrid network to Muswellbrook BSP, rearrangement of the 132 kV feeder network is proposed. Approximately 4 km of existing subtransmission line corridors would be rebuilt to double circuit subtransmission lines.
- **New Sandy Creek STSS**: The Muswellbrook 132 kV STS busbar cannot accommodate the reconfiguration of the 132 kV supply network to Muswellbrook BSP. Ausgrid intends to address this by constructing a new Sandy Creek 132 kV STSS adjacent to the existing Muswellbrook STS.
- **Kurri STS 132 kV Busbar Extension**: Additional 132 kV feeder bays are proposed to connect the new 132 kV feeders to the Antiene STSS, it is proposed to extend the western side of the 132 kV busbar to accommodate the new circuits and rearrangement of other connections to ensure appropriate segregation.
- **Mt Thorley 66 kV Network Rearrangement**: Reconfiguration of the 66 kV network supplied from Mt Thorley 66 kV ZS is proposed, to ensure appropriate segregation is achieved between adjacent circuits.
- **New Antiene STSS**: A new 132 kV STSS is proposed on a site selected on Hebden Road, Liddell. The Antiene STSS will facilitate connection of proposed generation and storage proposals, and interconnection to the existing 132 kV Lower Hunter subtransmission network.
- **Antiene STSS 132 kV Feeder Connections**: To enable 600 MW power transfer from the Antiene STSS to Newcastle BSP, new 132 kV connections are proposed from the Antiene STSS to Kurri 132 kV STS which would drive the rebuilding of existing 132 kV and 66 kV feeder corridors to accommodate additional circuits. The new overhead mains would be in easements where possible. Approximately 81 km of existing subtransmission line corridors would be rebuilt to double or triple circuit subtransmission lines.
- **Antiene STSS to Muswellbrook BSP Fibre Optics**: Two new underground fibre optic circuits will be built between Antiene STSS to Muswellbrook BSP, the route distance is approximately 13 km, which will substantially be installed within public land or existing subtransmission corridors.
- **Muswellbrook BSP Fibre Marshalling Kiosk**: A new Fibre Marshalling Kiosk is proposed to be established at Transgrid's Muswellbrook BSP, this will facilitate connection of new and existing fibre optics.
- **Secondary Systems Upgrades**: Upgrade of 132 kV feeder protection relays at various substation in the Upper and Lower Hunter Networks to meet compliance requirements with the National Electricity Rules.

- **New Inductor at Rothbury Zone Substation**: A new 132 kV series reactor to balance power flows between Antiene STSS and Kurri STS.
- **Berowra to Somersby OPGW and ADSS**: Replacement of approximately 30 km of Overhead Earthwire (OHEW) with OPGW and All-Dielectric Self Supporting fibre (ADSS) on existing overhead structures between Berowra and Somersby, to provide a secure Ausgrid owned communications path between the HCC RNI and our Network Control Centre in Sydney.

All network augmentations, including both substation and feeder works, will be undertaken while a secure electricity supply is maintained to customers.

3.1.2 Construction staging

Ausgrid's proposed construction staging seeks to:

- deliver the project as quickly and as safely as possible
- ensure that customers electricity supplies are not interrupted unnecessarily
- manage the efficient use of resources
- manage the impact to the environment
- not unduly impact sensitive receivers.

Table 2 provides an overview of the works associated with each stage and the associated estimated delivery timeframes.

Table 2: Proposed construction staging

Stage	Description
Stage 1 January 2024 – December 2025	Commence all early works activities: • Commence concept design. • Confirm downstream head contractors and suppliers for the delivery of the works. • Finalise environmental studies.
Stage 2 January 2025 – December 2025	Continue early works activities: • Property, easement and RoW acquisitions • Commence site surveys and property management plans. • Community engagement, provide statutory notifications and perform community and council meetings • Third party stakeholder engagement and early application for approvals. • Commence detailed design. • Commence procurement of long lead time equipment. • Strategic relocation of 132 kV and 66kV subtransmission circuits (e.g. 6022, 95R and 96E) • Relocation of 11kV and LV circuits from subtransmission corridors. • Commence fibre lead-ins across network • Exhibit draft REF, consolidate feedback and determine REF. • Issue construction commence notifications.

Stage	Description
	• Mobilise subtransmission line construction laydowns and mobilise substation sites at Antiene STSS and Sandy Creek STSS.
Stage 3 January 2026 – June 2026	• Commence construction at Sandy Creek STSS, Antiene STSS, Kurri STS and Rothbury ZS. • Muswellbrook BSP construct fibre marshalling kiosk. • Build new underground fibre link between Antiene STSS and Muswellbrook BSP. • Replace poles along 95Z corridor. • Rebuild 95M corridor between Muswellbrook BSP and Sandy Creek STSS. • Rebuild KU12_E corridor between Kurri STS and Branxton ZS. • 11kV and LV relocations complete
Stage 4 July 2026 – December 2026	• Establish temporary supply to Branxton ZS. • Rebuild 95U corridor between Antiene STSS and Singleton STS. • Rebuild KU12_W corridor between Branxton ZS and Mt Thorley ZS. • Kurri STS extension complete, connect new busbar into network. • Rothbury ZS civils complete.
Stage 5 January 2027 – June 2027	• Finish rebuild 95U corridor . • Finish rebuild KU12_W corridor • Replace OHEW with OPGW along 95Z corridor. • Relocate 95L. • Establish temporary supply to Rothbury ZS.

Stage 6
July 2027 – December 2027
	• Rebuild out-of-service 66kV line along Golden Highway.
	• Rebuild 6019 between Mt Thorley ZS and Gouldsville Road.
	• Rebuild 955 corridor between Singleton STS and Mt Thorley ZS.
	• Complete 66kV rearrangements at Mt Thorley ZS and Putty Rd.
	• Commission 955 and Rothbury ZS reactor.
	• Commence transfer of 132 kV circuits and commissioning of Sandy Creek STSS:
	  ○ Transfer 95F, 9PG and Muswellbrook STS TX3 to Muswellbrook STSS.
	  ○ Transfer 9PM and 95M
	  ○ Transfer 95H, 9PF and Muswellbrook STS TX1 to Muswellbrook STSS.

Stage 7
January 2028 – July 2028
	• Finish bulk subtransmission corridor rebuilds.
	• Complete transfer of 132 kV circuits and commissioning of Antiene STSS:
	  ○ Transfer 9JH and 9PJ to Antiene STSS
	  ○ Transfer 9PL to Antiene STSS
	• Transfer final circuit 95U(1,2,3) to Sandy Creek STSS and Antiene STSS.

3.1.3 Packaging of construction works

Ausgrid will utilise a combination of self-performance and external subcontractors to construct the HCC RNI. This is summarised in Table 3

Table 3: Proposed packaging of works

Scope	Party
Subtransmission Line Rebuilds	Genus
Greenfield Substations	John Holland Group
Underground Fibre Optic Cables	Service Stream
Brownfield Substations – Civil Works	Gongues
Brownfield Substations – Electrical Works	Ausgrid
Remote End Secondary System Replacements	Ausgrid
Ancillary Works	Transgrid
Distribution Relocation Works	Ausgrid
Fibre lead-in works	Ausgrid

3.2 Operations and Maintenance Phase

Ausgrid will apply our proven and established Asset Management System (AMS) to the ongoing operations and maintenance of the HCC RNI. Our AMS will be applied across all levels of the organisation to align and deliver Ausgrid's vision. Ausgrid's Asset Management Objectives are illustrated in Figure 2.

Figure 2: Ausgrid's asset management objectives

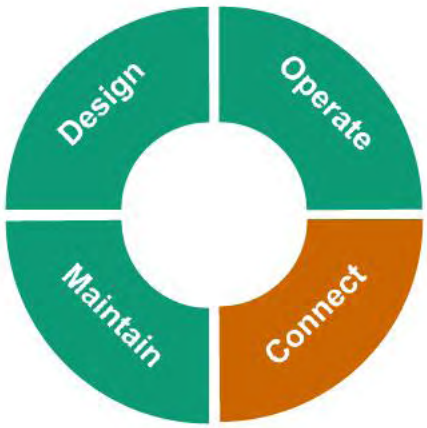
This approach also ensures we comply with the National Electricity Objective and our regulatory and legal requirements, such as WHS Act 2011 and associated regulations, the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW), the National Electricity Law (NEL) and the Electricity Supply Act 1995 (NSW).

Our asset management system, certified to ISO 55001:2014 adheres to our licence conditions.

Operation of the HCC RNI will be conducted via our existing Control Centre in Newcastle, with full redundancy afforded via our Sydney Control Room.

Our Asset Management System utilises Failure Mode and Criticality Analysis (FMECA) on each asset to develop clear Reliability Centred Maintenance (RCM) strategies and plans for the HCC REZ. Our RCM approach will be extended to all HCC assets, alongside a tried and tested defect identification, assessment and treatment regimes, and formal Network Maintenance Standards to ensure HCC assets are maintained efficiently and effectively to deliver a high performing, cost effective and resilient asset.

Figure 3: Ausgrid's O&M approach to REZ Network Infrastructure



Routine and cyclic maintenance will be delivered through a blended approach, as used by Ausgrid for our current assets. Our approach enables highly skilled Ausgrid electrical workers to be utilised when and where required, with high-volume tasks requiring a lower skill base to be delivered safely and efficiently by contracted resources. Contractors would also be used to deliver specific non-electrical work, for example vegetation management or graffiti removal. All contract support required to maintain the HCC assets already exists through Ausgrid's mature panels and direct engagement relationships.

Ausgrid's existing Design, Operations and Maintenance strategies can be applied directly to the HCC RNI.

4 Resourcing strategy

Ausgrid is committed to helping deliver the NSW Government's Electricity Infrastructure Roadmap. In order to enable this, in 2023 Ausgrid established a new Transmission Delivery & Growth group. Our HCC RNI Project team will report to the HCC Project Director who sits within the Transmission Delivery & Growth group, with primary accountability for the delivery of the HCC RNI Project.

Our team is and will be dedicated to the HCC RNI Project, with many members permanently assigned to HCC roles since mid-2023. This team was deeply involved in preparing the proposal to EnergyCo to provide continuity between the proposal phase and execution of the Project. Our team is enthusiastic, focused on this specific project, and strongly backed by Ausgrid's senior leadership.

Through its Resource Planning function, Ausgrid is continually refining resourcing levels across the organisation to align with medium- and long-term work forecasts. Ausgrid has incorporated the internal resourcing needs of the HCC RNI Project into its workforce plan and, upon receipt of the Revenue Determination, Ausgrid expects to only make small adjustments to its field and engineering resourcing levels for the current regulatory period.

4.1 Strategy for obtaining and retaining key resources across key stages

4.1.1 Development and Delivery phases

Ausgrid has filled all key roles from internal resources for the Development and Delivery phases, and we are confident of managing the modest additional recruitment required for new roles yet to be recruited, noting these represent less than 1% of Ausgrid's typical recruitment workload in a year.

4.1.2 Operations and Maintenance Phase

Ausgrid can readily service the ongoing asset management, operation and maintenance of the HCC RNI by leveraging the same established systems and resources currently used across our existing network. The HCC RNI equates to an increase in Ausgrid's asset base of only 2%. Ausgrid's broader strategies for resource planning and skills retention, including ongoing graduate and apprenticeship programs, leave it well placed to make the subtle adjustments to its resourcing levels over the medium term to meet the small incremental resourcing requirements of the HCC RNI.

5 Interface management

5.1 Overview

The majority of interfaces will involve the new overhead lines crossing over assets or traversing through operational land owned by a third-party. These interfaces will need to be designed and constructed in accordance with relevant design standards and guidelines, while also ensuring they minimise interference with the third-party's operations.

The project team will adopt a proactive approach to engage with the relevant third parties throughout development, construction and delivery. All interfaces between the project and third-party will be identified and case-by-case requirements will be documented. A systematic review and approval process will be undertaken to ensure the final construction is compliant.

5.2 Interface management methodology

Ausgrid's interface methodology for all key interfaces is provided in Table 4.

Table 4: General interface methodology

Interface process	Details	Relevant third-party
Interface schedule	An interface schedule will be developed based on the interfaces identified in this plan and any additional interfaces that arise	• All
Early interaction	Upon execution of the Commitment Deed, Ausgrid initiated first contact with significant stakeholders. This involved "Project Launch" interactions, whereby Ausgrid provided details of the project, identified volume of touch points, established an agreed interaction regime, confirmed anticipated requirements and approval processes, and subsequently agreed on meeting and delivery schedules.	• All
Interface / design meetings	Regular interface meetings will be held, generally monthly, with key stakeholders to review the status of the interface, deal with interface issues identified on the interface schedule and manage new items identified by the parties. Design meetings will be held as and when required, to ensure third parties are involved and informed every step of the way through the design development process.	• Transgrid • ARTC • TfNSW • Mine owners • Other railway owners
Safety in design workshops	As part of the design development process, safety in design workshops will be held with relevant stakeholders, as applicable.	• Transgrid • ARTC • TfNSW • Mine owners
Risk workshops	Risk workshops involving all relevant stakeholders will be scheduled throughout delivery of the project and the risk register will be updated after each workshop and on regular intervals by the Project Director.	• Transgrid • ARTC • TfNSW • Mine owners
Design submissions	Relevant design drawings will be issued to third-party stakeholders for review, comment and acceptance. This may be an iterative	• Transgrid

Interface process	Details	Relevant third-party
	process to ensure that multiple stakeholders within a third-party are satisfied that risks and issues are resolved and the design in compliance with relevant standards, and land use.	• ARTC • TfNSW • Mine owners
Coordination committee	Where applicable, a coordination committee established to raise opportunities and issues leading to construction. This may be particularly pertinent where there is a large volume of touch points with a single third-party, ensuring the smooth approval process and identifying bottlenecks in advance and escalating early if required.	• Transgrid • ARTC • TfNSW • Mine owners
Pre-works submissions and sign-offs	Ahead of construction, Ausgrid and its contractors will issue the relevant construction plans, methodologies, traffic management plans, safety plans, confirming staff training and verification of competency are required to gain access. Specific interface plans will be developed for instances where project activities physically interface with other stakeholders or other projects to ensure documented mapping of how those activities will roll out, identify key responsibilities and accountabilities, ensure protection of the safety of the public, workers and operations, and define a transparent and pre- agree process. No activities will proceed without the right level of documented planning.	• Transgrid • ARTC • TfNSW • Mine owners
Corridor access meetings	Ausgrid and its contractors will attend, as required, a third-party's corridor access meetings, ensuring that critical crossings are on the agenda are included on corridor shut-down programs. Ausgrid's construction programs will be adjusted to meet the quarterly (or otherwise) corridor shutdowns.	• ARTC • Mine owners (railways, conveyors)
Reporting during the works	Ausgrid and its contractors will provide regular updates to third parties on construction forecast and progress.	• TfNSW • ARTC • Mine owners
As built submissions and compliance inspection/agreement	Following completion of the works, Ausgrid will meet with third-party representatives to inspect the completed works, provide as-built drawings and progressively close-out interfaces.	• TfNSW • ARTC • Mine owners

6 Performance and production controls

Ausgrid will implement a range of performance and production control initiatives across Project delivery.

6.1 Embedded Project Management Office

Ausgrid recognises that this Project is larger, more complex and higher profile than those it typically delivers. As such, Ausgrid will establish an embedded Project Management Office (PMO) in its Project structure to support prudent Project delivery.

This PMO will consist of contract administration, project controls, finance & reporting, and administration roles to provide the Project management team with the additional resourcing required to manage a project of this scale.

During the Commitment Deed phase, Ausgrid will establish this team with the intent to be fully operational by the commencement of the Delivery Deed. During its establishment phase, Ausgrid will leverage the same external expertise that supported our bid phase, to establish the processes and practices for ongoing project cost, schedule, risk, quality and communications management.

This embedded PMO will lead the production of project reporting, support prompt contract claims assessment, record as-built project status, and support the compilation and analytics of project data to track and measure performance.

6.2 Contract performance incentives

[redacted]

6.3 Site-based quality management

Each subcontract and internal construction package will deploy Ausgrid's proven quality management systems to maximise the quality of delivered assets, reduce rework, and enhance operational reliability over the asset life.

These quality systems will include the use of a structured set of Inspection & Test Plans (ITPs), controlled drawing registers, non-conformance tracking and remediation process, and controlled defects registers. All subcontractors will have quality management systems certified to ISO 9001.Upon commissioning of each asset, as-built asset details will be recorded and uploaded into corporate asset management systems in alignment with Ausgrid's established standards, enabling a full tracking of asset condition from inception through the entire life of the asset.

Ausgrid will invest in prudent on-site supervision throughout construction. This will enable the performance of hold and witness points, safety and environmental compliance inspection, and ongoing measurement of works throughout delivery.

6.4 Brand and reputation tracking

Ausgrid undertakes two forms of brand and reputation surveys to measure our ongoing brand tracking results, allowing us to evaluate the performance of and inform future marketing activity and aid strategic decision-making.

In November 2023, Ausgrid ran foundational Brand Tracking to establish baseline measures on awareness, familiarity and perceptions of key associations that influence reputation. These brand performance metrics will continue to be measured on a quarterly basis, with future monitoring surveys including 600 participants per wave.

Ausgrid leverages RepTrak to measure reputation among the informed general public (those who are very or somewhat familiar with a company) who reside within our network area.

This ongoing research will aid our ability to develop the right communications and marketing activities to build brand reputation and social licence through the Project and broader corporate activities.