2026-31 HCC RNI Project

Attachment 5.2

Verification and Assessment Report

16 May 2025

Ausgrid

Independent Verification and Assessment

Hunter Central Coast RNI

Ausgrid

14 May 2025

→ The Power of Commitment

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Executive summary

The Hunter-Central Coast (HCC) Renewable Energy Zone (REZ) was formally declared by the Minister for Energy under section 19(1) of the Electricity Infrastructure Investment Act 2020 (EII Act) on 9 December 2022. Following a select tender process undertaken by EnergyCo in its role as the Infrastructure Planner (IP), Ausgrid was recommended in December 2024 as the preferred Network Operator to deliver, own and operate the HCC REZ Network Infrastructure (RNI).

The HCC RNI intends to deliver an additional 1 Gigawatt (GW) of network capacity and is expected to be delivered across three phases concluding in mid-2028.

The total capital forecast for the HCC RNI for Ausgrid is summarised in Table 1.

Table 1 Total capital forecast for the HCC RNI for Ausgrid ($Nominal and $Real 2025-26)

Cost element	$M (Nominal)	$M (Real 2025-26)
Direct and indirect costs	460.0	451.1
Risk provision	48.0	46.9
IP fee (EnergyCo component)	92.9	92.9
Rounding	-	(0.1)
Total	**600.9**	**590.8**

GHD's assessment of whether the capital forecast is prudent, efficient and reasonable for carrying out a network infrastructure project is detailed in the table below. In summary the base forecast for direct and indirect costs are based upon:

- The outcomes of competitive tendering processes that Ausgrid have undertaken for delivery packages related to transmission lines and substations, with tenders based upon a detailed scope definition
- The cost of free issue equipment related to these delivery packages based upon existing, or refreshed panel agreements
- Estimated cost for compensation for affected lots and land acquisition costs is supported by an estimate by Jones Lang Lasalle (JLL)
- Labour costs related to Ausgrid retained areas of responsibility based upon phased team labour rates including appropriate oncosts.

The base estimate elements are supported by tender outcomes or reasonable estimates that draw upon the scope definition and supported by price estimates. The estimate reflects the scope at its current level of definition and are required to deliver the project scope or to reduce risk.

Prudent risk provisioning has been included based upon an appropriate combination of deterministic and quantitative analysis utilising Monte Carlo simulation to allow for risk amount based upon P50 estimates.

After the application of risk provisions, the capital forecast represents a blend of Class 3 / 2 estimates representing the best available estimate at this stage of the project's development. The forecast is considered prudent, efficient and reasonable for carrying out the HCC RNI project or RNIP.

GHD also attempted to benchmark the Ausgrid's HCC RNI capital estimate against the recently updated AEMO's Transmission Cost Database (TCD) Tool. The TCD Tool is a strategic planning tool used by AEMO to identify projects in optimal development pathways in the Integrated System Plan (ISP). The TCD Tool includes a database of various standardised asset building blocks described at a high-level and functionality to compile and adjust estimates to reflect a given project scope and its characteristics. Combination of various asset building blocks in relevant quantities to match the given scope of work and series of project factor choices adjust the compiled capital estimate to reflect project specific attributes and risk exposures based on user inputs. The TCD Tool Class 5b and 5a estimates provide a ±50% and ±30% range of accuracy respectively.

The TCD Tool is not a distribution network infrastructure capex estimating tool and its database does not contain standardised asset building blocks that are granular and bespoke to match specific description of predominantly distribution network solutions proposed for HCC RNI. Therefore, GHD did not use the TCD Tool for benchmarking the overhead lines and the fibre optic communication lines included in the HCC RNI because of considerable difference between the proposed scope of work and the description in the available standardised asset building block in the TCD Tool.

The benchmarking performed covered substations only with the results summarised in section 10. This indicates alignment within the range of estimation accuracy within the TCD, apart from a marginally higher result from the TCD Tool which is outside the accuracy range from the TCD for the four brownfield station sites (Kurri Kurri, Rothbury, Singleton and Mitchell Line).

Benchmarking of substation estimate represents approximately 20% of the total cost estimate excluding the IP fee.

Table 2 Assessment summary

Cost element and GHD's assessment summary	Section reference	Revenue Proposal category	Total $M (Nominal)	Total $M (Real 2025-26)
Transmission line [redacted] of total transmission line costs are supported by a contract[1] with Genus following a competitive process based upon a comprehensive tender request. Free issue equipment is based upon the concept design priced under supply contracts. The remaining costs are required to cover activities not anticipated in the tender or are required to reduce project risks. Transmission line costs are based upon a comprehensive build up, supported by competitive tender results, panel supply contracts and estimates with a reasonable Basis of Preparation (BOP). The solution was developed by Ausgrid and accepted by EnergyCo. The adequacy of the solution to achieve 1GW of transfer capacity is outside the scope of this review. The tender was based upon asset quantities and corridor kms were based off early contract engagement, the RFT issued with the final result captured in the Bill of Materials (BOM) detailed within the contract. The costs reviewed are considered efficient and required to deliver the projects scope or reduce risk.	Section 0	Transmission Lines (direct)	195.5	191.7

[1] *Ausgrid and Genus have signed a Commitment Deed regarding the contract and will execute the final contract in line with execution of the Project Deed*

Cost element and GHD's assessment summary	Section reference	Revenue Proposal category	Total $M (Nominal)	Total $M (Real 2025-26)
Substations / switching stations (greenfield & brownfield) [redacted] of total substation costs are supported by a contract with John Holland following a competitive process based upon a comprehensive tender request. Free issue equipment is based upon the concept design priced under panel supply contracts. The remaining costs are required to cover activities not anticipated in the tender or are estimates for scope changes. Substation costs are based upon a comprehensive build up, supported by tender results, panel supply contracts and reasonable estimates. The solution has been developed by Ausgrid and accepted by EnergyCo. The adequacy of the solution to achieve 1GW of transfer capacity is outside the scope of this review. The tender was based upon final asset quantities were based off early contract engagement, the RFT issued with the result captured in the BOM detailed within the contract. The costs reviewed are considered efficient and required to deliver the projects scope or reduce risk.	Section 6.4	Substations (direct)	99.6	97.6
Owners costs Ausgrid labour costs to manage the retained areas of responsibility are detailed in section 4.1. The estimate is based upon required roles, phased according to the projects schedules with labour rates aligning with industry benchmarks. The activities and costs assessed were considered efficient and required to deliver the projects scope or reduce risk.	Section 6.5	Owners costs (indirect)	56.0	54.6
Community & social engagement The engagement forecast includes $16.8M of Ausgrid labour costs and a social licence program of $5.0M negotiated with EnergyCo. This strategy is currently in development. The forecast labour costs developed by Turner & Townsend (T&T) using first principles cost estimating and Ausgrid internal labour rates. The cost is based on Ausgrid's Community & Stakeholder Engagement Plan included within the Commitment Deed. The forecast community & social team consists of an average of 12 monthly FTEs and comprises a team structure consistent with typical engagement project team structures, phased in align with the projects schedule. The activities and costs assessed were considered prudent and efficient. These costs include $6.5M of labour costs associated with land acquisition making the cost element appear higher.	Section 6.6	Design, social licence and other (indirect)	24.4	24.1
Land acquisition Ausgrid's proposed concept design utilises existing transmission line easements with pole design falling within the width of these easements. No biodiversity offset costs are anticipated given that the existing easement corridor is the same under the proposed design and the proposed new switchyard at Muswellbrook will be constructed on Ausgrid's existing site.	Section 6.7	Land and easements (direct)	24.3	23.7

Cost element and GHD's assessment summary	Section reference	Revenue Proposal category	Total $M (Nominal)	Total $M (Real 2025-26)
Compensation for affected lots (required widened easements) and land acquisition costs is supported by an estimate by JLL. The estimates provided are considered to be the best available at this stage of the projects development and are required to deliver the projects scope.				
Enabling and ancillary works Enabling works are based upon robust estimation of quantities priced based upon previous project experience and Ausgrid rates. Ancillary works are based upon Ausgrid's estimate of minor works to be undertaken by Transgrid to facilitate connection to the NSW transmission network.	Section 6.8	Transmission lines and secondary systems (direct)	12.7	12.6
Design Ausgrid has retained design responsibilities delivering these services through a blend of contracted service providers and internal labour. Contract costs are supported by estimates from contractors and labour costs are based upon required resources, phased by the projects schedule.	Section 6.9	Design, social licence and other (indirect)	9.8	9.7
Harmonic filters Based upon engagement with EnergyCo a decision was taken that harmonic filters would be provided as part of Ausgrid's solution. The exact scope of harmonic filters on the HCC RNI is presently unknown due to uncertainty of what generators will connect to the HCC REZ, and the specific inverter technology that each generator will use. As a result, the cost of two harmonic filters and associated switch bays have been included based upon existing Ausgrid unit rates and non-binding market engagement	Section 6.10	Substations (direct)	9.0	8.6
Fiber optics/communication cables The forecast for cables is supported by a contract with Service Stream Mobile Communications following the results of a tender process.	Section 6.11	Communications (direct)	[redacted]	[redacted]
Secondary systems The estimate has been based on a detailed build-up of secondary system components and cost items using first principles cost estimating methods and Ausgrid internal labour rate.	Section 6.12	Secondary systems (direct)	4.7	4.6
Environment & planning The costs of environment and planning approvals has been prepared by Ausgrid based off experience from past projects.	Section 6.13	Design, social licence and other (indirect)	2.5	2.5
Other costs Other costs relate to progressing regulatory approvals, legal and insurance costs. Legal and insurance estimates are supported by external estimates and advice.	Section 6.14	Design, social licence and other (indirect)	[redacted]	[redacted]
Risk provision Ausgrid has been transparent in the development of risk provisions and has applied an appropriate combination of deterministic and quantitative analysis utilising Monte Carlo simulation to create a risk amount based upon P50 estimates.	Section 8	-	48.0	46.9

Cost element and GHD's assessment summary	Section reference	Revenue Proposal category	Total $M (Nominal)	Total $M (Real 2025-26)
Given that the base estimate is free of generalised risk provisioning, provision for identified risk is considered prudent.				
IP fee (EnergyCo component which will be treated as cost-pass through item in the revenue determination)	Section 9	-	92.9	92.9
Rounding			0.1	(0.1)
Total			**600.9**	**590.8**

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.2 and the assumptions and qualifications contained throughout the Report.

Glossary

AACE	Association for Advancement of Cost Engineering
ADSS	All-Dielectric Self-Supporting fibre optic cable
AEMO	Australian Energy Market Operator
ANS	Ancillary Network Services
ARTC	Australian Rail Track Corporation
ASL	AEMO Service Limited (Consumer Trustee)
AER	Australian Energy Regulator
BOM	Bill of Materials
BOP	Basis of Preparation
BSP	Bulk Supply Point
D&C	Design and Construct
DNSP	Distribution Network Service Providers
EIS	Environmental Impact Statement
EnergyCo	The Energy Corporation of NSW (Infrastructure Planner)
EOI	Expression of Interest
EPC	Engineering Procurement Construction
GW	Gigawatt
HCC	Hunter Central Coast
IP	Infrastructure Planner
ISP	Integrated System Plan
JLL	Jones Lang Lasalle
kV	Kilovolt
MW	Megawatt
NIP	Network Infrastructure Project
NO	Network Operator
OEM	Original Equipment Manufacturer
OPGW	Optical Pilot Ground Wire
PPI	Producer Price Index
RBA	Reserve Bank of Australia
REZ	Renewable Energy Zone
RIT-T	Regulatory Investment Test for Transmission
RNI	REZ Network Infrastructure
RNIP	REZ Network Infrastructure Project
SER	Supplementary Environmental Report
STS	Subtransmission Station
STSS	Subtransmission Switching Station
RFP	Request For Proposal

T&T	Turner & Townsend
TET	Transmission Efficiency Test
TCD	Transmission Cost Database
WPI	Wage Price Index

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1. Introduction

The HCC REZ was formally declared by the Minister for Energy under section 19(1) of the Electricity Infrastructure Investment Act 2020 on 9 December 2022, with a network infrastructure capacity of 1 GW. EnergyCo as the IP responsible for coordinating the development of the REZ released a Request for Proposals (RFP) to identify a suitable Network Operator for HCC RNI and Ausgrid was the selected Network Operator following a tender process.

1.1 Purpose of this report

This report details GHD's independent verification and assessment of Ausgrid's revenue proposal for delivering the HCC RNIP to support Ausgrid's submission to the Australian Energy Regulator (AER).

1.2 Scope and limitations

The AER is responsible for revenue determinations for Network Operators authorised or directed to carry out network infrastructure projects under the Electricity Infrastructure Investment Act 2020 (NSW) (EII Act) and Electricity Infrastructure Investment Regulation 2021 (NSW) (EII Regulation). The IP conducted a contestable process to select and procure the HCC RNI solution. Nevertheless, for non-contestable projects the AER in their November 2022 Transmission Efficiency Test (TET) and Revenue Determination Draft Guidelines indicates that revenue determination process would be based upon Chapter 6A of the National Electricity Rules (NER). Based upon this guidance GHD's scope of works is limited to independent verification and assessment of whether the:

- Basis of Preparation detailed in the capital forecasting methodology is reasonable
- Capital forecast is within ± 20 per cent the level of accuracy expected at this project stage considering the BOP and the level of support held / developed for each capital forecast component. With the accuracy and supportability of the resulting capital forecast assessed using a range of assurance techniques. These include validation against tender results, benchmarking against comparative projects, selection testing, recalculation, and alignment with industry practice
- Capital costs for development and construction for the network infrastructure project are prudent, efficient, and reasonable.

The following is considered out of scope:

- As detailed by the TET, revenue determinations made under the EII Act will not consider the prudency of the authorised network option against other potential network options.

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The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

2. Our methodology and materiality

2.1 Methodology

GHD has used several verification approaches to assess whether the capital forecast is prudent, efficient and reasonable. In considering the forecast, GHD relied upon a bottom-up assessment of forecast elements to determine the extent to which it is supported by appropriate evidence. This was followed by a limited top-down Class 5 estimate compilation using the AEMO's TCD Tool to benchmark against Ausgrid's mature project estimate for select network elements.

The bottom-up approach considered the reliability of evidence used to support forecast elements and the approach applied depended on the nature of the cost element and included a combination of:

- Reliance on the results of Ausgrid's competitive tendering processes supported by appropriate documentary evidence
- Recalculation and validation against supporting evidence supplied by third parties. Including:
    - Verification of actual costs incurred and forecasted costs by reviewing supporting documentation on a selection basis to confirm the amount, period / scope covered and that the costs only relate to the HCC RNI
    - Verification of estimates based upon recalculation and verification of underlying assumptions to:
        - Regulatory charges where relevant
        - Cost estimates provided by third parties.
- Internal labour was considered based upon a review of the reasonableness of the team structure and size, scheduled hours and position rates applied.

2.2 Materiality

When considering individual cost elements, GHD considers any cost under $1M (0.16% of total capital forecast) as immaterial.

When considering cost elements that are supported by a large number of cost items, GHD has made a selection of the most material cost items. Where we have done so this is indicated in the body of the report.

3. Ausgrid's HCC RNI scope

The scope of the Ausgrid's HCC RNI is detailed in the draft Project Deed to be executed with EnergyCo. The proposed solution developed by Ausgrid and accepted by EnergyCo is detailed in the Figure 1.

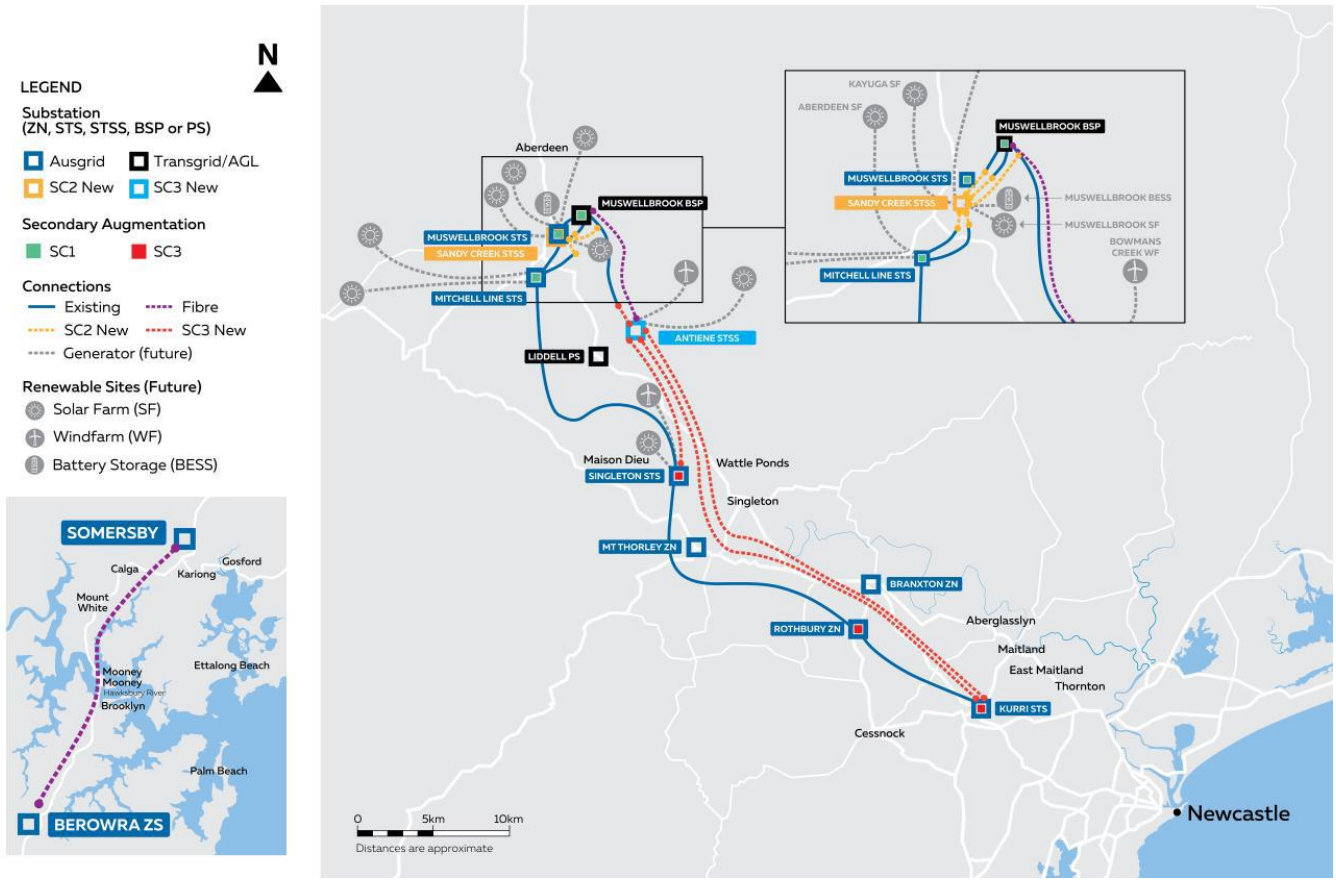

Figure 1 Proposed HCC RNI Solution

The scope includes:

- 1GW of new renewable generation transfer capacity to be delivered in three phases:
    - Upper Hunter secondary systems modernisation that frees up currently available 350MW network capacity
    - Muswellbrook network rearrangement and Singleton to Kurri Kurri 132kV link (630MW cumulative)
    - Antiene 132kV switching station and Antiene to Singleton 132kV link (1GW cumulative)
- 85km of existing Ausgrid transmission corridor to be upgraded with 132kV higher capacity lines between Kurri Kurri and Antiene STSS (9JH and 9PJ), between Sandy Creek STSS and Transgrid's Muswellbrook BSP (95U (2) and 95M), and around nearby sites (95U, 955, KU12 and 6019)
- Two new 132kV switching stations (Sandy Creek STSS adjacent to existing site and Antiene STSS near Hebden)
- Two existing 132kV substation upgrades (Kurri Kurri and Rothbury)

- 15km of new underground fibre optic between Antiene STSS and Muswellbrook BSP
- Replacing 30km of overhead fibre optic (OPGW) on existing 95Z overhead line between Berowra and Somersby.

Further details the scope and the delivery activities:

"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; and*
- *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 132kV link; and*
- *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 132kV Antiene STSS near Hebden;*
- *Antiene STSS to Singleton 132kV link; and*
- *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".* [2]

Note – this 81km during the assessment was revised to 85km

[2] Attachment 2.2 Development, Delivery, Operations and Maintenance P7

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4. Sourcing strategy and procurement

Ausgrid decided to retain overall project management responsibility for the project. This includes design elements, equipment sourcing through existing panel agreements and coordination / interface responsibilities between the five delivery packages that were awarded through competitive tendering processes.

Ausgrid's description of the procurement process and key controls for tendering of delivery packages is consistent with industry practice.

The deliverables retained by Ausgrid would be sourced from existing panel contracts, including the:

- Engineering Services Panel – Contracts with top-tier engineering firms on the east-coast of Australia who provide specialist engineering advice in the electrical, civil and structural, geotechnical and mechanical design
- Overhead Services Panel – Consisting of Genus, Service Stream and other contractors
- Civil Works Panel – A number of tier three contracting firms that have long standing relationships and proven delivery capability in Ausgrid substations and more broadly across the Ausgrid network.

4.1 Ausgrid retained responsibilities

Based upon the delivery strategy, retained Ausgrid responsibilities include:

Project management

- Project management
- Procurement
- Environmental approvals and land acquisition
- Design (Brownfield substations and transmission lines).

Transmission substations

- Termination and commissioning of Fibre Kiosk
- Electrical installation and commissioning
- Remote end protection upgrades
- Power quality metering at various sites
- Contractor commissioning oversight.

Transmission mains

- Transformer cable terminations

Upper Hunter and Northern Regions

- Substation technician support

- Relocation of approximately 20km of distribution assets
- 11kV supply into Antiene

4.2 Delivery packages and procurement

Ausgrid has proposed a blended model for delivery, with Ausgrid retaining responsibility for the activities detailed in earlier section, and awarding five delivery packages as follows:

Contract 1 – Transmission lines rebuild

The contract for the 85km of transmission line rebuild and OPGW between Somersby to Berowra was awarded to Genus. This followed a competitive tender process of three organisations, narrowed from four that responded to the Expression of Interest (EOI).

Contract 2 – Greenfield switching stations

The contract for civil and electrical construction / commissioning and control room procurement for the Sandy Creek STSS and Antiene STSS was awarded to John Holland. This followed a competitive tender process of three organisations, narrowed from four that responded to the EOI.

Contract 3 – Underground fibre optic

The contract for underground fibre laying was awarded to Service Stream. This followed a competitive tender process of two organisations.

Contracts 4 and 5 – Civil works at brownfield substations

The contracts for civil works at brownfield substations at Kurri Kurri and Rothbury was awarded to Gongues. This followed a competitive tender process of five organisations.

In a number of cases Ausgrid has taken the opportunity to seek reduced pricing on existing panel agreements where the procurement volume warranted a price check.

4.3 Sourcing strategy and procurement conclusion

The sourcing strategy selected is considered appropriate given the level of infrastructure activity with many organisations in the power sector moving away from Engineering Procurement and Construction (EPC) contracts to retaining some degree of central risk management through D&C or Incentivised Target Cost arrangements.

The summary of procurement / tender activities provided by Ausgrid indicates the presence of appropriate market testing for the five delivery packages.

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5. HCC RNI project summary and capex forecast

The HCC RNIP will be delivered over three phases with Ausgrid retaining project management responsibility, design, sourcing of equipment under existing panel contracts, splitting delivery across five contracts further detailed in section 4.2.

Table 3 provides a high-level summary of the capex forecast.

Table 3 HCC RNIP capex forecast summary ($ Nominal)

Cost element	Section reference	$M
Direct and indirect costs	Sections 6 & 7	460.0
Risk provision	Section 8	48.0
IP fee (EnergyCo component)	Section 9	92.9
Total		**600.9**

6. Ausgrid direct and indirect capex forecast

6.1 Overview

As detailed in section 4.1, Ausgrid has retained overall responsibility for project delivery, tendering five delivery packages which will be supplied free issue equipment.

The table below summarises Ausgrid's direct and indirect capex forecast with GHD's assessment included in the following sections. These forecasts include Ausgrid labour that has been separately considered in Section 7.

Table 4 Ausgrid direct and indirect capex forecast summary ($ Nominal)

Cost element	Section reference	$M
Transmission lines	Section 0	195.5
Substations / switching stations (greenfield & brownfield)	Section 6.4	99.6
Owners costs	Section 7.3	56.1
Stakeholder and community engagement	Section 6.6	24.4
Land acquisition	Section 6.7	24.3
Enabling and ancillary works	Section 6.8	12.7
Design	Section 6.9	9.8
Harmonic filters	Section 6.10	9.0
Underground fibre optic	Section 6.11	[redacted]
Secondary systems	Section 6.12	4.7
Environment & planning	Section 6.13	2.5
Other costs	Section 6.14	[redacted]
Total		**460.0**

6.2 Escalation

Across the above cost elements escalation factors have been applied to forecast price changes that may occur during the projects delivery. In total these represent $11.5M or 2.5% of the base cost excluding the risk contingency.

Ausgrid supplied a report from T&T's economics team to support escalation factors and this report indicates:

- A general escalation index was applied to all base line cost, which was estimated in 2023-24FY dollar term, except for the John Holland, Genus, and Gongues costs. This forecast was based on data published by the Australian Bureau of Statistics with consideration of the pipeline of major NSW infrastructure projects (Producer Price Index (PPI)).
- The Gongues escalation serves as a buffer to accommodate potential contract price increases from Gongues and expected timing of the execution of the Project Deed.
- The contract prices provided by John Holland and Genus already includes provision for escalation; therefore, no escalation was applied to John Holland and Genus contract costs.

The annual escalation factors applied are detailed in the table below.

Table 5 Annual escalation factors applied

Cost element	FY24-25	FY25-26	FY26-27	FY27-28	FY28-29
General escalation index	4.0%	3.6%	3.8%	3.9%	4.0%
Gongues escalation index	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
JHG & Genus escalation index	0.0%	0.0%	0.0%	0.0%	0.0%

[redacted]

The PPI for the last two quarters of 2024 was 3.8% aligning with the flat line forecast proposed by T&T. GHD notes the comments made with respect to the increase demand in the infrastructure sector.

Labour cost forecasts are normally based upon the Wage Price Index (WPI) for the construction sector in New South Wales (NSW) noting that Enterprise Bargaining Agreement typically lag behind the WPI. Over the twelve months to the December 2024 quarter, the WPI rose 3.2% which is marginally lower than the general escalation index applied.

GHD notes the AER Final Position Paper on the Regulatory Treatment of Inflation December 2020. This details that the AERs approach to estimate expected inflation uses a 10-year average of the Reserve Bank of Australia's (RBA) headline rate forecasts for 1 and 2 years ahead, and the mid-point of the RBA's target band—2.5 per cent—for years 3 to 10.

The application of escalation is considered prudent to account for potential price / cost increases.

6.3 Transmission lines

As detailed in section 4.2, the transmission line package was awarded to Genus following a competitive tendering process.

The transmission line scope that Genus responded to is detailed in Ausgrid's HCC RNI Transmission Line Scope Version 3.1 – 1 December 2024, in summary the scope includes:

"The work (known as the "Works") comprises the rebuilding of transmission line corridors between:

- *Kurri Kurri and a new substation on Hebden Road, Hebden known as Eastern Hub Sub Transmission Switching Station (STSS); and*
- *a new substation known as Muswellbrook STSS to Transgrid's Muswellbrook Bulk Supply Point (BSP)".* [3]

"Circuits will comprise of:

- *Replacement of OPGW on existing 132kV circuit 95Z between Berowra and Somersby.*
- *One new 132kV circuit between Kurri STS and Eastern Hub STSS (Feeder 9JH).*
- *One new 132kV circuit between Kurri STS and new Eastern Hub STSS (Feeder 9PJ).*
- *One new 132kV circuit between Muswellbrook STS and a new tee-point outside Transgrid's Muswellbrook BSP (Feeder (95U(2)).*
- *Rebuilding of 132kV circuit 95M between Muswellbrook STS and a structure outside Transgrid's Muswellbrook BSP.*
- *Rebuilding of 132kV circuit 95U between new Singleton STS and Eastern Hub STSS.*
- *Rebuilding of approximately 8km 132kV circuit 955 between Gouldsville Rd, Gouldsville and Singleton STS.*
- *Rebuilding of 66kV circuit KU12 between the Golden Highway and Branxton ZS.*
- *Rebuilding of approximately 3km 66kV circuit 6019 between Mt Thorley ZS and Gouldsville Rd, Gouldsville".* [4]

Note Muswellbrook STS referred to above is the Sandy Creek STSS and Eastern Hub STSS referred to above is the Antiene STSS.

The table below provides a summary of the transmission line capex forecast.

Table 6 Transmission line capex forecast summary ($ Nominal)

Cost element	Section reference	$M
Contractor services	Section 6.3.1	[redacted]
Equipment	Section 6.3.2	[redacted]
Other	Section 6.3.3	5.0
Ausgrid labour	Section 7	2.3
Subtotal		*193.8*
Escalation		1.7
Total		**195.5**

[3] Ausgrid's HCC REZ Transmission Line Scope Version 3.1 – 1 December 2024 P9
[4] Ausgrid's HCC REZ Transmission Line Scope Version 3.1 – 1 December 2024 P9

6.3.1 Contractor services – transmission line packages

As discussed in section 4 Ausgrid decided to retain overall project management responsibility to the HCC RNI delivery but decided to tender five delivery packages. The tender for the transmission line package was won by Genus.

The table below summarises GHD's considerations related to transmission lines.

Table 7 Verification and assessment of transmission line package costs ($ Nominal)

<table>
<tr><th>Cost element</th><th>GHD consideration</th><th>$M</th></tr>
<tr><td>Genus BoQ</td><td rowspan="2">As detailed in section 4.2, Ausgrid carried out a competitive tender related to transmission lines.
GHD:
– Reviewed the scope of the RFT issued during this competitive tender to determine alignment with the HCC RNIP scope definition. Final quantities of asset and corridor kms were based off early contract engagement, the RFT issued with the final result captured in the BOM detailed within the contract.
– Agreed the cost estimate to the contract[5] Ausgrid Contract Number: AOP000597 Engineering and Construction Contract for [redacted] (As at the time of report drafting).</td><td>[redacted]</td></tr>
<tr><td>Genus BoQ performance bonus</td><td>[redacted]</td></tr>
<tr><td>Water crossing treatments</td><td>Not considered material</td><td>[redacted]</td></tr>
<tr><td>Removal of pads associated with existing concrete poles.</td><td>The tender specifications that Genus responded to detailed [redacted] This was not included in the original tender and is considered prudent given landholder feedback discussed with Ausgrid.
<table><tr><th>Task</th><th>Units</th><th>Cost per unit ($)</th><th>$M</th></tr><tr><td>Pads [redacted]</td><td>[redacted]</td><td>[redacted]</td><td>[redacted]</td></tr></table># Agreed to tender response price schedules</td><td>[redacted]</td></tr>
<tr><td>Removal of access tracks, pads and water crossings</td><td>Post tender, further refinement of the scope identified the need to provision for removal of temporary works required for construction. Overall, the provision is not considered material but is considered prudent.
<table><tr><th>Task</th><th>Units</th><th>Cost per unit ($)</th><th>$M</th></tr><tr><td>Access tracks [redacted]
(Tender assumption, access tracks remain however landowners might enforce requirement to remove access tracks)</td><td>[redacted]</td><td>[redacted]</td><td>[redacted]</td></tr><tr><td>Pads [redacted]</td><td>[redacted]</td><td>[redacted]</td><td>[redacted]</td></tr><tr><td>Removal of access track in swampy areas as required under REF</td><td>[redacted]</td><td>[redacted]</td><td>[redacted]</td></tr></table></td><td>[redacted]</td></tr>
</table>

[5] *Ausgrid and Genus have signed a Commitment Deed regarding the contract and will execute the final contract in line with execution of the Project Deed*

Cost element	GHD consideration				$M
	Water crossings rock culvert (REF will require removal of water crossing)	[redacted]	[redacted]	[redacted]	
	Total			[redacted]	
Stringing (standard stringing requirement)	The tender included an assumption that 97% of the stringing would be by helicopter. Further scope scrutiny considering the proximity to existing infrastructure has seen this assumption fall to 80%. As a result, an allowance for the stringing cost differential has been created.				[redacted]
	Task			**$M**	
	If Ausgrid doesn't approve helicopter stringing, conventional stringing is required for: [redacted] This accounts for [redacted] of the total 85km agreed to the below. [redacted] Thus [redacted] conventional stringing. Genus estimating (allowed [redacted] Extracted from Schedules included in the Genus contract: [redacted]			[redacted]	
Total					[redacted]

6.3.2 Equipment – transmission line

As discussed in section 4.14, Ausgrid is providing free issue equipment to contractors for the completion of their delivery packages. Table 8 details the free issue equipment forecast at [redacted].

GHD made a selection of all items greater than $1M from this estimate and traced units back to the concept design and the unit rate back to contracted price schedules. This represents [redacted] of the total population, the remaining [redacted] made up of items ranging from $23K to <$1M represent approximately [redacted] of direct and indirect costs.

Table 8 Free issue transmission equipment (greater than $1M) ($ Nominal)

Description/details	Voltage	Quantity	Unit price ($)	$M
Conductor - Olive	132kV	[redacted]		
Stand-off insulator	132kV			
Steel - 32m/120kN	Poles			

Description/details	Voltage	Quantity	Unit price ($)	$M
Steel - 28m/120kN	Poles			
Steel - 32m/120kN-Termination	Poles			
Steel - 30m/120kN	Poles			
Suspension Structure	Line Fittings			
Steel - 32m/200kN	Poles			
Long rod insulator	132kV			
OPGW - 72F	132kV			
Steel - 32m/80kN	Poles			
Steel - 32m/300kN	Poles			
Items less than $1.0M				
Total				

- Agreed to contract price schedules

* Total number of poles within the [redacted] compared to total number in [redacted] Difference of [redacted] poles consider immaterial

~ Ausgrid upon GHD request provided an analysis of scoped quantities, noting stand-off insulator were underestimated by [redacted] and long rod insulators underestimated by [redacted] which ~ represents a [redacted] underestimate which is not considered material

6.3.3 Other – transmission line

The following table details the costs related to the transmission line scope other than contracted services and equipment.

Table 9 Verification and assessment of other transmission line costs ($ Nominal)

Cost element	GHD consideration	$M
Third Party Approval	Not material but represents rail corridor access costs based upon ARTC published rates.	[redacted]
Condition Survey of line 95Z	Proportions of this feeder are 50 to 60 years old and condition assessment [redacted] of structures required to confirm condition for new conductors installation. This is an opportunistic risk reduction activity that is considered prudent.	[redacted]

Description	Rate ($)	Quantity (road/rail crossings)	$
ARTC Interface Manager – who arranges the possession and facilitates review of safety documentation.			
Possession costs			
Crossing review process per crossing			
Items less than $100K			
Total			

Item Description	$
2 structures/day x 3men/day. Assumed [redacted] structures along [redacted]	[redacted]

<table>
<tr><th>Cost element</th><th>GHD consideration</th><th>$M</th></tr>
<tr><td></td><td>
<table>
<tr><td>3 men * 8hr * [redacted] so materially correct.</td><td></td></tr>
<tr><td>Items less than $50K</td><td>[redacted]</td></tr>
<tr><td>Total</td><td>[redacted]</td></tr>
</table>
</td><td></td></tr>
<tr><td>Landscaping - Bulk Earthworks</td><td>Discussion with Ausgrid indicate that crossings under Transgrid's lines requires excavation to ensure the required safety clearances. This estimate has been based upon easement measurements and Transgrid span sag based upon their tower model. Rates are based upon information provided by John Holland
<table>
<tr><th>Item Description</th><th>Qty</th><th>Unit</th><th>Rate</th><th>$</th></tr>
<tr><td>Bulk excavation</td><td rowspan="4">[redacted]</td><td>m3</td><td rowspan="5">[redacted]</td><td rowspan="5">[redacted]</td></tr>
<tr><td>Assume extra/over for excavation to rock, allowed [redacted]</td><td>m3</td></tr>
<tr><td>Disposal to General Solid Waste landfill (Non VENM)</td><td>ton</td></tr>
<tr><td>Re-establish vegetation/grasses</td><td>m2</td></tr>
<tr><td colspan="2">Items less than $50K</td></tr>
<tr><td colspan="4">Total</td></tr>
</table>
</td><td>[redacted]</td></tr>
<tr><td>Railway access coordinators</td><td>The cost of rail corridor assesses coordinators not anticipated at tender. The rate is based upon [redacted] by 8hr
<table>
<tr><th>Railway access coordinators</th><th>Qty</th><th>Rate ($)</th><th>$</th></tr>
<tr><td>6019
(2.5km inside railway corridor - - 3 days boring, 3 days assembly, pole every [redacted] 2 day demo)</td><td rowspan="4">[redacted]</td><td rowspan="4">[redacted]</td><td rowspan="4">[redacted]</td></tr>
<tr><td>Ku12_E
(1.4km - 3 days boring, 3 days assembly, pole every [redacted] 2 day demo,)</td></tr>
<tr><td>Crossings
(6 days for demo and string)</td></tr>
<tr><td>Total</td></tr>
</table>
</td><td>[redacted]</td></tr>
<tr><td>Boring next to Jemena/Telstra assets</td><td>Not material</td><td>0.2</td></tr>
<tr><td>Total</td><td></td><td>[redacted]</td></tr>
</table>

6.3.4 Transmission line conclusion

[redacted] of total transmission line costs are supported by a contract[6] with Genus following a tender process based upon a comprehensive tender request. Free issue equipment is based upon the concept design priced under supply contracts, the remaining costs are required to cover activities not anticipated in the tender or are required to reduce project risks.

Transmission line costs are based upon a comprehensive build up, supported by competitive tender results, panel supply contracts and estimates with a reasonable BOP.

The solution has been developed by Ausgrid and accepted by EnergyCo. The tender was based upon quantities / kms were based off early contract engagement, the RFT issued with the result captured in the BOM detailed within the contract.

The costs reviewed are considered efficient and required to deliver the projects scope or reduce risk.

6.4 Substations / switching stations

As detailed in section 4.24.2 the contract for:

- Civil and electrical construction / commissioning and control room procurement for the Sandy Creek STSS and Antiene STSS was awarded to John Holland
- Civil works at brownfield substations at Kurri Kurri and Rothbury was awarded to Gongues.

The table below summarises contracted package and Ausgrid direct and indirect costs related to these activities.

Table 10 Green and brownfield switching stations / substations forecast summary ($ Nominal)

Cost element	Section reference	$M
Contractor services – greenfield switching stations	Section 6.4.1	[redacted]
Contractor services – brownfield substation stations	Section 6.4.2	
Equipment – greenfield switching stations	Section 6.4.3	
Equipment – brownfield substation stations	Section 6.4.4	
Other – greenfield switching stations	Section 6.4.5	0.7
Other – brownfield substation stations	Not material	0.2
Ausgrid labour	Section 7	2.4
Rounding		0.2
Subtotal		*97.7*
Escalation		1.9
Total		**99.6**

6.4.1 Contractor services – greenfield switching station package

As discussed in section 4.14 Ausgrid decided to retain overall project management responsibility to the HCC RNI delivery but decided to tender five delivery packages.

[6] *Ausgrid and Genus have signed a Commitment Deed regarding the contract and will execute the final contract in line with execution of the Project Deed*

The tender for the greenfield switching station was won by John Holland.

Table 11 Verification and assessment of greenfield switching station package cost ($ Nominal)

<table>
<tr><th>Cost element</th><th>GHD consideration</th><th>$M</th></tr>
<tr><td>John Holland contract</td><td>As detailed in section 4.24.2, Ausgrid carried out a competitive tender related to substations. GHD reviewed the scope of the RFT issued during this competitive tender to determine alignment with the HCC RNI scope definition. Final quantities were based off early contract engagement, the RFT issued with the result captured in the BOM detailed within the contract.

Ausgrid Contract Number: AOP000598 – Agreed to tender validation letter from John Holland 6 December 2024.</td><td rowspan="4"></td></tr>
<tr><td>John Holland performance bonus</td><td>Not material</td></tr>
<tr><td>Access tracks</td><td>Not considered material – Based upon internal calculation that considers area to be cleared, and access tracks established.</td></tr>
<tr><td>Vegetation screening</td><td>Not considered material – Based upon internal calculation of costs to establish vegetation screening around substations</td></tr>
<tr><td>Rock & asbestos at Sandy Creek</td><td>Based upon internal calculation of costs to remove rock and asbestos at Sandy Creek. The requirement is based upon the results of surveys post tender with rates based upon the John Holland contract.

<table>
<tr><th>Item Description</th><th>Qty</th><th>Unit</th><th>Rate ($)</th><th>$</th></tr>
<tr><td colspan="5">Removal and Disposal of asbestos</td></tr>
<tr><td colspan="5">[redacted] cubic m of restricted solid waste (GSW asbestos). Cost to remove and dispose.</td></tr>
<tr><td>Removal of restricted solid waste (GSW asbestos)</td><td>[redacted]</td><td>m3</td><td>[redacted]</td><td>[redacted]</td></tr>
<tr><td>Disposal to GSW asbestos</td><td>[redacted]</td><td>ton</td><td>[redacted]</td><td>[redacted]</td></tr>
<tr><td colspan="5">Rock excavation and disposal</td></tr>
<tr><td colspan="5">Excavation in rock with [redacted] per day in delay costs</td></tr>
<tr><td>Excavation to rock</td><td>[redacted]</td><td>m3</td><td>[redacted]</td><td>[redacted]</td></tr>
<tr><td>Delay cost @ [redacted]</td><td>[redacted]</td><td>day</td><td>[redacted]</td><td>[redacted]</td></tr>
<tr><td>Total</td><td></td><td></td><td></td><td>[redacted]</td></tr>
</table>
</td></tr>
<tr><td>Total</td><td></td><td>[redacted]</td></tr>
</table>

6.4.2 Contractor services – brownfield substation packages

As discussed in section 4.14 Ausgrid decided to retain overall project management responsibility to the HCC RNI delivery but decided to tender five delivery packages.

The tender for the civil works at the brownfield Kurri Kurri substation was won by Gongues Constructions. Ausgrid notes that the scope did not include the works at Rothbury, rather a larger scope at Singleton. During a value engineering workshop midway through the competitive tender phase Ausgrid pivoted the scope. At that time Ausgrid had already completed the market engagement for the civil scope at Singleton, coincidently also won by Gongues. Ausgrid used T&T to estimate the cost of civil works at Rothbury, detailed in the table below.

Table 12 Verification and assessment of brownfield switching station package cost

Cost element	GHD consideration	$M
Kurri Kurri	Gongues supplied a tender clarification letter on the 4th of June 2024 noting delays to the EnergyCo's revised program and the need to update pricing. An email from Gongues 9th of October 2024 updates the lump sum price to [redacted] up from the tender submission of [redacted] which was sighted by GHD.	[redacted]
Rothbury	Based upon interview results with Ausgrid it was determined that the original project scope proposed a second brownfield substation augmentation at Singleton. Following a value assessment, and though discissions with EnergyCo some environmental challenges were identified with this option. To resolve these issues Rothbury was proposed instead as Ausgrid had available land. A Quantity Surveyor was used to review the scope with the results indicating that Rothbury was approximately [redacted] Kurri Kurri scope. GHD sighted the Quantity Surveyor estimate and notes that this rough estimation process likely underestimates the cost due to the fixed nature of mobilisation costs. However, this would not be material.	
Rounding		0.1
Total		[redacted]

6.4.3 Equipment – greenfield switching station

The cost elements for greenfield switching station equipment is presented in Table 13.

Table 13 Verification and assessment of greenfield switching station equipment forecast ($ Nominal)

Cost element	GHD consideration	$M
Free issue equipment	Only equipment greater than $500K have been selected representing [redacted] of the total. [redacted]	[redacted]

Details	Quantity	Unit Price ($)	$
132kV outdoor dead-tank switchgear 3 pole – SF6 2500A	[redacted]		
132kV outdoor disconnectors and earthing switches – 2500A			
132kV Copper XLPE Cables 800mm2			
Items less than $500K			
Total			

- Agreed to contract price schedules taking into account price adjustment factors

* - Agreed to contract price schedules taking into account price adjustment factors noting immaterial price difference that have resulted due to price adjustment factors that have occurred since the estimate was developed.

Details	Quantity	Unit Price ($)	$
132kV outdoor dead-tank switchgear 3 pole – SF6 2500A	[redacted]		
132kV outdoor disconnectors and earthing switches – 2500A			

<table>
<tr><th>Cost element</th><th>GHD consideration</th><th>$M</th></tr>
<tr><td></td><td>
<table>
<tr><td>Items less than $500K</td><td>[redacted]</td></tr>
<tr><td>Total</td><td>[redacted]</td></tr>
</table>
* - Agreed to contract price schedules taking into account price adjustment factors noting immaterial price difference that have resulted due to price adjustment factors that have occurred since the estimate was developed.
~ Agreed to scope BoM</td><td></td></tr>
<tr><td>Free issue secondary systems</td><td>Large list of relay types ranging from $500 to $150K. For the purposes of analysis and verification only those greater than $100K have been included below. This represents [redacted] of the total forecast.
<table>
<tr><th>Relay Type</th><th>Quantity</th><th>Unit Price ($)</th><th>$</th></tr>
<tr><td colspan="4">SANDY CREEK STSS</td></tr>
<tr><td>L90-UE3-HKH-F8L-H6A-LXX-N6U-S67-UXX-W7K</td><td colspan="3" rowspan="6">[redacted]</td></tr>
<tr><td>POWER QUALITY SENSOR (three-phase set)</td></tr>
<tr><td>Siemens 7SL86
Product code
Short: P1C894234</td></tr>
<tr><td>PQ Meter</td></tr>
<tr><td>Items below $100K</td></tr>
<tr><td>TOTAL SP2</td></tr>
</table>
- Agreed to external quote
* - Agreed to contract price schedules taking into account price adjustment factors noting immaterial price difference that have resulted due to price adjustment factors that have occurred since the estimate was developed.
@- Agreed to contracted price schedule
<table>
<tr><th>Relay Type</th><th>Quantity</th><th>Unit Price ($)</th><th>$</th></tr>
<tr><td colspan="4">ANTIENE STSS</td></tr>
<tr><td>L90-UE3-HKH-F8L-H6A-LXX-N6U-S67-UXX-W7K</td><td colspan="3" rowspan="6">[redacted]</td></tr>
<tr><td>POWER QUALITY SENSOR</td></tr>
<tr><td>Siemens 7SL86
Product code
Short: P1C894234</td></tr>
<tr><td>PQ Meter –</td></tr>
<tr><td>Items below $100K</td></tr>
<tr><td>TOTAL SP3</td></tr>
</table>
- Agreed to external quote
* - Agreed to contract price schedules taking into account price adjustment factors noting immaterial price difference that have resulted due to price adjustment factors that have occurred since the estimate was developed.
@- Agreed to contracted price schedule</td><td>[redacted]</td></tr>
<tr><td>HV cables</td><td>132kv copper XLPE cables; [redacted] runs with 3 cables per run [redacted]
- Agreed to contract price schedules taking into account price adjustment factors</td><td rowspan="3">[redacted]</td></tr>
<tr><td>Storage</td><td>Not material</td></tr>
<tr><td>Total</td><td></td></tr>
</table>

6.4.4 Equipment – brownfield substation

The cost elements for brownfield switching station equipment are presented in the table below.

Table 14 Verification and assessment of brownfield station equipment forecast ($ Nominal)

<table>
<tr><th>Cost element</th><th>GHD consideration</th><th>$M</th></tr>
<tr><td>Kurri Kurri internal works</td><td>Long list of materials ranging from $2 to $200K. For the purpose of analysis only those greater than $100K have been detailed. [redacted] of total).
The estimate prepared for Kurri Kurri internal works was based on standard design drawings from similar scope of work, as there were no design drawings available at the time the cost estimate was prepared. The below unit quantities and unit prices have been agreed to supporting drawings and rate costs.
<table><tr><th>Description</th><th>Units Per Assembly</th><th>Total Quantity</th><th>Unit Price ($)</th><th>Total ($)</th></tr><tr><td>Low Level Bus Supports Installed Complete</td><td colspan="4" rowspan="5">[redacted]</td></tr><tr><td>132 kV/110kV CVT for power quality measurement and syncon</td></tr><tr><td>Insulators</td></tr><tr><td>Items less than $100K</td></tr><tr><td>Total</td></tr><tr><td colspan="4">* - Contract price schedules taking into account price adjustment factors shows [redacted] which is an immaterial difference</td><td></td></tr></table></td><td>[redacted]</td></tr>
<tr><td>Rothbury internal works</td><td>Not considered material but consists of a long list of materials ranging from $2 to $200K. For analysis only those greater than $100K have been detailed. ([redacted] of total).
<table><tr><th>Description</th><th>Units Per Assembly</th><th>Total Quantity</th><th>Unit Price ($)</th><th>$</th></tr><tr><td>66kV Racks</td><td>[redacted]</td><td>[redacted]</td><td>[redacted]</td><td>[redacted]</td></tr></table></td><td>[redacted]</td></tr>
<tr><td>Free issue equipment Kurri Kurri</td><td>For the purposes of the analysis only items greater than $100K have been shown. [redacted] of total)
<table><tr><th>Details</th><th>Quantity</th><th>Unit Price ($)</th><th>$</th></tr><tr><td>132kV outdoor dead-tank switchgear 3 pole - SF6 3150A</td><td colspan="3" rowspan="5">[redacted]</td></tr><tr><td>132kV outdoor disconnectors and earthing switches - 3150A</td></tr><tr><td>132kV/110V MVT's</td></tr><tr><td>Items less than $100K</td></tr><tr><td>Total</td></tr><tr><td colspan="4"># - Agreed to contract price schedules taking into account price adjustment factors</td></tr></table></td><td>[redacted]</td></tr>
<tr><td>Free issue secondary systems Kurri Kurri</td><td>Not considered material, but consists of a long list of materials ranging from $1K to $134K. For the purpose of analysis only those greater than $100K have been detailed. [redacted] of total)</td><td>[redacted]</td></tr>
</table>

Cost element	GHD consideration	$M
	Relay Type / Quantity / Unit Price ($) / $ Power quality sensor [redacted] Items less than $100K [redacted] Total [redacted]	
Free issue equipment Rothbury	Details / Quantity / Unit Price ($) / $ Substation Feeder Bay line 3-phase reactor banks for 2 feeders, 132kV, 5.56mH, 1600A, 7% [redacted] 132kV live-tank switchgear 3 poles Non SF6 1600A [redacted] Items less than $100K [redacted] TOTAL [redacted] # - Agreed to contract price schedules taking into account Fx adjustment factors	[redacted]
Free issue secondary systems Rothbury	Not material	[redacted]
Rounding		0.1
Total		[redacted]

6.4.5 Other – greenfield switching stations

Other cost items related to greenfield switching stations is provided in the table below.

Table 15 Verification and assessment of greenfield switching station other costs forecast ($ Nominal)

Cost element	GHD consideration	$M
HV cable 132kV terminations	Not material	0.1
Communication system	Not material	0.1
Ancillary works	Demolition of the existing 132kV busbar and foundations at Sandy Creek STS	0.5
Total		**0.7**

6.4.6 Switching station / substation conclusion

[redacted] of total substation costs are supported by a contract with John Holland following a tender process based upon a comprehensive tender request. Free issue equipment is based upon the concept design priced under panel supply contracts, the remaining costs are required to cover activities not anticipated in the tender or are estimates for scope changes.

Substation costs are based upon a comprehensive build up, supported by tender results, panel supply contracts and reasonable estimates. The solution has been developed by EnergyCo which is outside the scope of this

review. Final quantities were based off early contract engagement, the RFT issued with the result captured in the BOM detailed within the contract.

The costs reviewed are considered efficient and required to deliver the projects scope or reduce risk.

6.5 Owners costs

As detailed in section 4.1, Ausgrid has retained a range of responsibilities and the majority of these costs relate to Ausgrid labour that has been detailed in section 7.3. Based upon the work completed in section 7 the Owner's cost is prudent, efficient and reasonable.

Table 16 Owners cost forecast summary ($ Nominal)

Cost element	Section reference	$M
Ausgrid labour	Section 7	51.4
Other	Not material	0.4
Subtotal		*51.8*
Escalation		4.2
Total		**56.0**

6.6 Stakeholder and community engagement

All power transmission related projects require a degree of stakeholder and community engagement to ensure there is social licence for the project.

The table below provides a high-level summary of engagement cost forecasts.

Table 17 Stakeholder and community engagement cost forecast summary ($ Nominal)

Cost element	Section reference	$M
Contractor services	Section 6.6.1	6.0
Ausgrid labour	Section 7	16.8
Subtotal		*22.8*
Escalation		1.6
Total		**24.4**

6.6.1 Contractor services – stakeholder and community engagement

The contractor services costs related to stakeholder and community engagement activities is provided in the table below.

Table 18 Verification and assessment of contractor services for stakeholder and community engagement cost forecast ($ Nominal)

Cost element	GHD consideration	$M
EnergyCo budget allocation	Based upon interview results with Ausgrid it was communicated that following the RFP submission to EnergyCo, they requested that a social licence program should be proposed. Following advice and benchmarking a $5M provision was proposed. Ausgrid is currently developing the programs strategy and governance structures. The details of the social licence program and support for the $5M forecast is detailed in the Social Licence Proposal.	5.0

<table>
<tr><th>Cost element</th><th>GHD consideration</th><th>$M</th></tr>
<tr><td>Social engagement costs</td><td>Additional costs associated with engagement activities. Considered prudent to support social licence.
<table>
<tr><th>Items</th><th>Particulars</th><th>Amount</th></tr>
<tr><td>Access and approvals</td><td>Community investment/benefit workshops x 5</td><td rowspan="14">[redacted]</td></tr>
<tr><td></td><td>Travel, accommodation and living expenses</td></tr>
<tr><td></td><td>Videos/animations</td></tr>
<tr><td></td><td>Site photography - footage for website</td></tr>
<tr><td></td><td>Advertising - radio, print, social media</td></tr>
<tr><td></td><td>Meetings with Traditional Owners</td></tr>
<tr><td></td><td>Communication Collateral, graphic design, printing and distribution costs</td></tr>
<tr><td></td><td>Letterbox distribution</td></tr>
<tr><td>Construction</td><td>Travel, accommodation and living expenses</td></tr>
<tr><td></td><td>Videos/animations</td></tr>
<tr><td></td><td>Advertising - radio, print, social media</td></tr>
<tr><td></td><td>Communication collateral including printing</td></tr>
<tr><td></td><td>Letterbox distribution</td></tr>
<tr><td>Other</td><td>Project information centre x 1</td></tr>
<tr><td>Costs below 25K</td><td></td></tr>
<tr><td colspan="2">Total</td><td>900K</td></tr>
</table></td><td>1.0</td></tr>
<tr><td>Total</td><td></td><td>6.0</td></tr>
</table>

6.6.2 Stakeholder and community engagement conclusion

The engagement forecast includes $16.8M of Ausgrid labour costs and a social licence program of $5.0M negotiated with EnergyCo that is currently in strategy development.

The forecast labour costs as developed by T&T using first principles cost estimating and Ausgrid internal labour rates. The cost is based on Ausgrid's Community & Stakeholder Engagement Plan included within the Commitment Deed. The forecast community & social team consists of an average of 12 monthly FTEs and comprises a team structure consistent with typical engagement project team structures, phased in align with the projects schedule.

These costs include $6.5M of labour costs associated with land acquisition making the cost element appear higher.

6.7 Land and easements

The proposed infrastructure runs through the NSW Local Government Areas of Muswellbrook, Cessnock and Singleton. The REZ itself also falls into the Local Government Areas of Upper Hunter, Newcastle, Central Coast and Lake Macquarie.

Jones Lang Lasalle was engaged by Ausgrid to support the land and easement capex estimating process.

The table below summarises the land and easement forecast.

Table 19 Land and easement acquisition cost forecast summary ($ Nominal)

Cost element	Section reference	$M
Contractor services	Section 6.7.1	[redacted]
Land acquisition costs	Section 6.7.2	
Subtotal		*23.9*
Escalation		0.4
Total		**24.3**

6.7.1 Contractor services – Land and easements

The contractor services costs related to land and easements are provided in the table below.

Jones Lang Lasalle report states that no allowances for professional fees have been made in the estimate of total compensation.

Table 20 Verification and assessment of land and easement acquisition services forecast ($ Nominal)

Cost element	GHD consideration	$M
Valuation fees	Valuation fees payable by Ausgrid and estimate for reasonable valuation costs incurred by landowners [redacted] unique landowners assumed [redacted] Further [redacted] allowance for valuer input into negotiated outcomes.	[redacted]
Legal services		
Disturbance costs		
Fees	Based on advice from JLL on ancillary land acquisition costs (legal, valuation, disturbance costs) provided by JLL	
Total		

6.7.2 Land acquisition costs

Based upon the proposed alignment, the estimated land acquisition and compensation costs are summarised in the table below.

Table 21 Land acquisition and compensation cost estimate summary ($ Nominal)

Item	Section reference	$M
Compensation and acquisition costs	Section 6.7.2.1	[redacted]
[redacted]	Section 6.7.2.2	
Updated JLL valuation, agreed to JLL update advice		
Purchase of a rail easement lot	Not material	
Total		

6.7.2.1 Easement compensation and acquisition costs

An initial desktop estimate on Easement Compensation costs for properties expected to be impacted along the proposed alignment was prepared by JLL in 2024. This estimated that 129 affected lot parcels (total of [redacted] hectares) would need to be compensated to accommodate the proposed alignment. This iteration of land acquisition costs also advised that two land holdings require acquisition to accommodate the alignment. The estimated compensation and acquisition costs are outlined in Table 22[7].

Table 22 Desktop estimate of compensation and acquisition (source: JLL 2024)

Easement segment	Number of affected parcels	Easement area (ha)	Estimated compensation / market value $M
Kurri Kurri to Branxton	[redacted]		
Branxton to Singleton Maison Dieu Site			
Singleton Maison Dieu Site to Liddell Hub Site			
Liddell Hub Site to Muswellbrook 132kV			
Muswellbrook 132kV to Transgrid 330kV			
Potential Optic Fibre Route Liddell Hub to Transgrid			
Rights of Carriageway Affecting Adjoining Lands			
Lots for acquisition			
Subtotal			

[redacted]

Table 23 [redacted]

[redacted]

[redacted]

6.7.3 Easement width

The proposed design is intended to utilise existing easements, reducing easement compensation costs and reducing biodiversity offset liabilities. This is illustrated in the following figure.

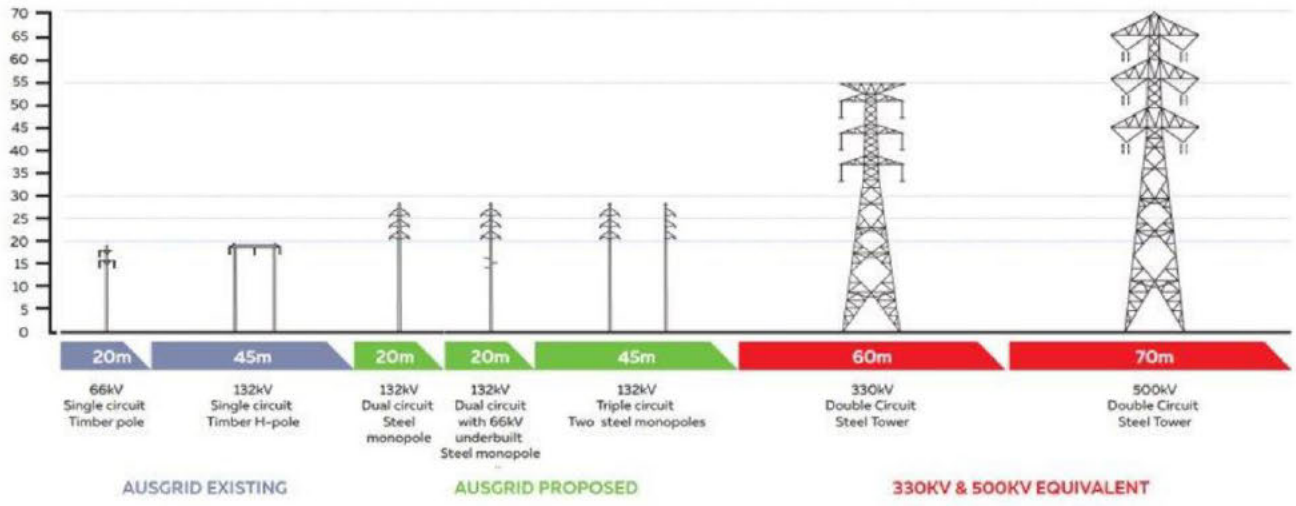

Figure 2 Ausgrid existing and proposed tower design

GHD has verified easement width requirements against AS/NZS 7000:2016. New construction of steel monopole from section A-A to E-E can fit in 20m wide easement. New construction of two steel monopoles side by side can fit in 45m wide easement.

Table 24 Existing and new easement widths

Line section	Easement width (m)	Existing construction	New construction	Typical pole height (m)	Typical pole span (m)
A-A	20	66kV single pole	132kV single steel monopole	28	200
B-B	20	66kV single pole	132kV underbuilt single steel monopole	28	200
B-B (Dochra special) At the time of report drafting the preferred option for the rebuild of the KU12 West time was still under consideration. Solutions may include use of the existing 11kV line easement. It is expected that the final solution will be reflected into Ausgrid's Revenue Proposal.	TBC	66kV single pole	TBC at time of report drafting	TBC at time of report drafting	TBC at time of report drafting
C-C	20	N/A	132kV underbuilt single steel monopole	28	200

Line section	Easement width (m)	Existing construction	New construction	Typical pole height (m)	Typical pole span (m)
D-D	20	66kV single pole	132kV underbuilt single steel monopole	28	200
E-E	20	66kV single pole	132kV underbuilt single steel monopole	28	200
F-F	45	132kV H-Pole	132kV two steel monopoles	28	200
G-G	45	132kV H-Pole	132kV two steel monopoles	28	200
H-H	45	132kV H-Pole	132kV two steel monopoles	28	200

6.7.4 Biodiversity offset costs

No biodiversity offset costs are anticipated given that the existing easement corridor is the same under the proposed design and the proposed new switchyard at Sandy Creek will be constructed on Ausgrid's existing site. Also, the [redacted] hectare of land/easement acquisition will not attract any biodiversity offset costs.

6.7.5 Land and easement conclusion

Ausgrid's proposed concept design utilises existing transmission line easements with pole design falling within the width of these easements. There is one exception to this observation relating to the easement required around the Dochra Airstrip, which based upon interviews with Ausgrid is approximately 2km.

At the time of report drafting the preferred option for the rebuild of the KU12 West time was still under consideration. Solutions may include use of the existing 11kV line easement. It is expected that the final salutation will be reflected into Ausgrid's Revenue Proposal.

No biodiversity offset costs are anticipated given that the existing easement corridor is the same under the proposed design and the proposed new switchyard at Sandy Creek will be constructed on Ausgrid's existing site.

6.8 Enabling and ancillary works

The table below details the total costs for enabling and ancillary works including both Ausgrid labour and external contractor services.

Table 25 Enabling and ancillary works forecast summary ($ Nominal)

Cost element	Section reference	$M
Contractor services – enabling works	Section 6.8.1	[redacted]
Ausgrid labour – enabling works	Section 7.5.1	
Contractor services – ancillary works	Not material	
Ausgrid labour – ancillary works	Not material	
Subtotal		*12.1*
Escalation		0.6
Total		**12.7**

6.8.1 Contractor services – enabling works

The estimated cost of contractor services for enabling works was produced by T&T.

Table 26 Verification and assessment of enabling works contracted services forecast ($ Nominal)

Category	Description	Unit	Est Qty	Rate ($)	$
Trench	476m trench EQ30164 tEQ30438 1608m underground EQ30437 tEQ20243	m	[redacted]		
Trench, conduit	1200m trench	m			
Trench	425m HV trench 425m common LV and HV trench 200m (4x 50m) LV branches	m			
Trench	960m	m			
Trench, conduit	550m trench	m			
Trench, conduit	500m trench	m			
Cable procurement	2700m 11kv cable	m			
Operating and Permits		Nos			
Trench	340m trench EQ20067 tEQ20409	m			
Trenching	280m Jerrys Plains Rd	m			
Cable procurement	New 11kV 1220m 11kv cable	m			
Cable procurement (400 aluminium 3 core cable)	1000m	m			
Total number of poles for 1a and 1c	Total number of poles	No.			
11kV poles	20x	No.			
Subtotal					
Items less than $100K					
Total					

GHD interviewed T&T via Teams, with T&T walking through the process used to develop this estimate. In summary the estimate was based upon geo spatial drawings to develop length parameters which were costed based upon past project performance and rates provided by Ausgrid. GHD is satisfied that the analysis underpinning the estimate is robust.

6.8.2 Enabling and ancillary works conclusion

Enabling and ancillary works are based upon robust estimation of quantities priced based upon previous project experience and Ausgrid rates.

Ancillary works are based upon Ausgrid's estimate of minor works to be undertaken by Transgrid to facilitate connection to the NSW transmission network.

6.9 Design forecast

Ausgrid has retained responsibility for design.

The table below details the forecast to deliver these activities.

Table 27 Design cost forecast ($ Nominal)

Cost element	Section reference	$M
Contractor services	Section 6.9.16.9.1	[redacted]
Ausgrid labour	Section 77	
Subtotal		*9.2*
Escalation		0.5
Rounding		0.1
Total		**9.8**

6.9.1 Contractor services – design

Design services for the Antiene Sub-Transmission Switching Station (EHSTSS) and the Sandy Creek Sub-Transmission Switching Station (MSTSS). The services are to be provided in four stages:

- Stage 1 Concept (10% design definition)
- Stage 2 Pricing (40%)
- Stage 3 Developed (90%)
- Stage 4 Issued for construction (100%).

The total of [redacted] was agreed to a supporting fee proposal by AECOM for Stage 3 & 4 for [redacted]. The stage 1 & 2 costs were agreed to SAP transactions of [redacted] as these have been completed.

6.9.2 Design forecast conclusion

Ausgrid has retained design responsibilities delivering these services through a blend of contracted services and internal labour. Contract costs are supported by estimates from contractors and labour costs are based upon required resources, phased by the projects schedule.

6.10 Harmonic filters

Based upon interview results with Ausgrid it was determined that both Ausgrid and EnergyCo decided that harmonic filters would be required at the network level. These are required as some of the generators within the REZ zone may rely upon inverters to convert direct current into alternating current introducing unintentional harmonics into the network.

During the bid phase, EnergyCo encouraged Ausgrid to make provision within its solution for the centralised management of harmonics, in recognition that centralised management would result in a lower overall cost to the consumer than harmonics being managed at each individual connection.

The exact scope of harmonic filters on the HCC RNI is presently unknown due to uncertainty of what generators will connect to the REZ, and the specific inverter technology that each generator will use.

Ausgrid proposed a solution, which was accepted by EnergyCo and is reflected in the Commitment Deed, whereby Ausgrid would provide [redacted] harmonic filters as part of its solution, with the exact size and location to be developed during delivery of the project as generator connections became known.

Ausgrid's scope has allowed for:

- Costs for the design, supply, installation and commissioning of [redacted] harmonic filters
- Costs for the design, supply, installation and commissioning of [redacted] associated switchbays for these harmonic filters.
- Suitable space within three of its substations for these harmonic filters.

Table 28 Harmonic filter forecast ($ Nominal)

Cost element	Section reference	$M
Other	Refer below	8.0
Escalation		1.0
Total		**9.0**

Interview with Ausgrid indicates that the rates are based upon previous projects with discount due to no incremental project management / overheads due to ongoing other projects related to capacitator banks

Table 29 Harmonic filter costs ($ Nominal)

Particulars	Quantity	Unit Price ($M)	$M
HV harmonic filter	[redacted]	[redacted]	[redacted]
Feeder Bay (Based on Ausgrid unit rates)			
Discount for project management and overheads			
Total			**8.0**

6.10.1 Harmonic filters conclusion

Based upon engagement with EnergyCo a decision was taken that harmonic filters would be provided as part of Ausgrid's solution.

The exact scope of harmonic filtering on the HCC RNI cannot yet be known due to uncertainty of what generators will connect to the REZ, and the specific inverter technology that each generator will use. As a result, the cost of [redacted] harmonic filters and associated switchbays have been included based upon existing Ausgrid unit rates and non-binding market engagement

6.11 Underground fibre

As part of the HCC RNI scope the following underground fibre optic circuits are required:

- Installation of 13 km of underground fibre optic circuits between the proposed Antiene switching station (STSS) and Muswellbrook bulk supply point (BSP), establishment of a new Fibre Marshalling Kiosk at Muswellbrook BSP

The table below summarises this forecast.

Table 30 Underground fibre forecast ($ Nominal)

Cost element	Section reference	$M
Contractor services	Refer below	[redacted]
Escalation		
Total		

Contractor services agreed to executed Contract Number AOP000599 awarded to Service Stream Mobile Communications for [redacted]

6.11.1 Underground fibre conclusion

The forecast for underground fibre is supported by a contract with Service Stream Mobile Communications.

6.12 Secondary systems

The estimate for secondary systems is summarised in the table below.

Table 31 Secondary system forecast summary ($ Nominal)

Cost element	Section reference	$M
Telecommunications	Section 6.12.1	[redacted]
Equipment	Section 6.12.2	
Ausgrid labour	Section 7	1.8
Subtotal		*4.3*
Escalation		0.4
Total		**4.7**

6.12.1 Telecommunications

The telecommunications [redacted] cost estimate is developed by T&T using first principles cost estimating method and Ausgrid internal labour rate.

6.12.2 Equipment – secondary systems

Table 32 Verification and assessment of free issue secondary system equipment forecast ($ Nominal)

Cost element	GHD consideration	$M
Free issue equipment	Not material	[redacted]
Free issue secondary systems	Not considered material, but includes the following estimate build up.	

Relay Type	Quantity	Unit Price ($)	$
Siemens 7SL86 Product code Short: P1C894234	[redacted]		
L90-UE3-HKH-F8L-H6A-LXX-N6U-S67-UXX-W7K			

Cost element	GHD consideration					$M
	POWER QUALITY SENSOR					
	Items less than $50K					
	Total					
Protection and control systems	Not considered material, but includes the following estimate build up					
	Description	**Units Per Assembly**	**Quantity**	**Unit Price ($)**	**$**	
	Panel Assembly 66kV Differential Protection					
	Less than $77K					
	Total					
Total						

6.12.3 Secondary systems conclusion

The estimate has been based on a detailed build-up of a large number of components using first principles cost estimating methods and Ausgrid internal labour rate.

6.13 Environment & planning

The forecast for obtaining regulatory approvals is summarised in Table 33.

Table 33 Environment and planning forecast summary ($ Nominal)

Cost element	Reference	$M
Contractor services	Refer table below	2.4
Escalation		0.1
Total		**2.5**

Table 34 breaks down the cost of contracted services, which Ausgrid has based upon previous project experience.

Table 34 Environment and planning forecast breakdown ($ Nominal)

Cost element	$M
Preliminaries	
Preliminary environmental assessment	
Proposal	
Planning Approvals	
Environmental Impact Statement (EIS)/ Review of Environmental Factors (REF)	
Supplementary Environmental Report (SER) - early works rearrangements	
SER - early works access tracks	
SER - Berowra to Somersby OPGW and ADSS	
Ausgrid Direct Costs	

Cost element	$M
Environmental Site management/inspection/monitoring	1 FTE
Other costs	<0.1
Environmental Consultant Cost	
Aboriginal Heritage Assessment (ACHAR)	[redacted]
RAPS	
Aboriginal Excavation Investigation/cultural salvage	
Background Noise Assessment (Antiene)	
Construction Noise Assessment	
Operational noise assessment	
Ecology habitat corridor investigation	
Ecological Impact Assessment	
EMF Assessment	
Visual Impact Assessment (if required)	
Cultural Heritage	
Cultural Heritage Management Plan	[redacted]
Sub Total	
Archaeology treatments (known artefacts)	
Offset Planting	
Total	**2.4**

6.13.1 Environment & planning conclusion

The costs of environment and planning approvals has been prepared by Ausgrid based off experience from past projects.

6.14 Other costs

Table 35 Other cost forecast summary ($ Nominal)

Cost element	Section reference	$M
Regulatory approvals	Section 6.14.1	1.2
Legal	Section 6.14.2	[redacted]
Insurance	Section 6.14.3	
Subtotal		[redacted]
Escalation		0.8
Rounding		0.2
Total		[redacted]

6.14.1 Regulatory approvals

These represent the costs associated with developing and supporting the Revenue Proposal

Table 36 Regulatory approvals forecast summary ($ Nominal)

Cost element	Section reference	$M
Ausgrid labour	Refer below	0.8

Cost element	Section reference	$M
Consulting costs	Refer below	0.4
Total		**1.2**

Consulting costs are consistent with other regulatory applications requiring drafting support and assurance services.

6.14.2 Legal

The legal support cost estimate is presented in Table 37. The cost estimate for legal services includes external costs only. Ausgrid's internal legal costs are recovered via corporate overheads.

The below legal cost estimate represents an internal estimate by Ausgrid. This was substantiated by an external estimate by Gilbert & Tobin.

Table 37 Legal costs forecast summary ($ Nominal)

Cost element	GHD consideration	$M
Development	Gilbert & Tobin legal support costs related to project RFP / Early Works phase and Commitment Deed from November 2023 to December 2024. Represents actual costs based on invoices.	
Project Deed	Estimate of legal support costs from January 2025 to December 2025 based on outstanding Project Deed items and informed by Development costs.	
FY26	Estimate for ongoing legal support from January 2026 to June 2026.	
FY27	Estimate for ongoing legal support from July 2026 to June 2027.	
FY28	Estimate for ongoing legal support from July 2027 to June 2028.	
Total		

6.14.3 Insurance

Ausgrid have allowed for [redacted] for insurance costs as advised by Ausgrid's engaged insurance broker Marsh Pty Ltd. This was supported by an estimate developed by Marsh based on understanding of prevailing market conditions and expected future market conditions. The summary of forecast insurance costs from this analysis is reproduced in the table below.

Table 38 Summary of insurance premiums forecast

Cost element	Low estimate ($M)	High estimate ($M)
Contract works		
Public & Products Liability inc. Completed Operations		
Professional Indemnity		
Marine Transit		
Environmental Impairment		
Broker Service Fee		
Rounding		
Total		

6.14.4 Other costs conclusion

Other costs relate to progressing regulatory approvals, legal and insurance costs.

Legal and insurance estimates are supported by external estimates and advice.

6.15 Ausgrid direct and indirect capex forecast conclusion

The base forecast for direct and indirect costs are based upon:

- The outcomes of competitive tendering processes that Ausgrid have undertaken for delivery packages related to transmission lines and substations, with tenders based upon a detailed scope definition
- The cost of free issue equipment related to these delivery packages based upon existing, or refreshed panel agreements
- Estimated cost for compensation for affected lots and land acquisition costs is supported by an estimate by JLL
- Labour costs related to Ausgrid retained areas of responsibility based upon phased team labour rates including appropriate oncosts. Refer section 7

The base estimate elements are supported by tender outcomes or reasonable estimates that draw upon the scope definition and supported price estimates. The estimate reflects the scope at its current level of definition and are required to deliver the project scope or to reduce risk.

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7. Direct and indirect labour

Table 39 details the actual labour costs to June 2024 and the forecast labour costs to March 2029 for both direct and indirect costs.

Labour forecasts where prepared by T&T by applying labour rates supplied by Ausgrid to team roles phased in line with the projects schedule. Ausgrid has used role-based labour rates with corporate overhead allocation assumptions applied.

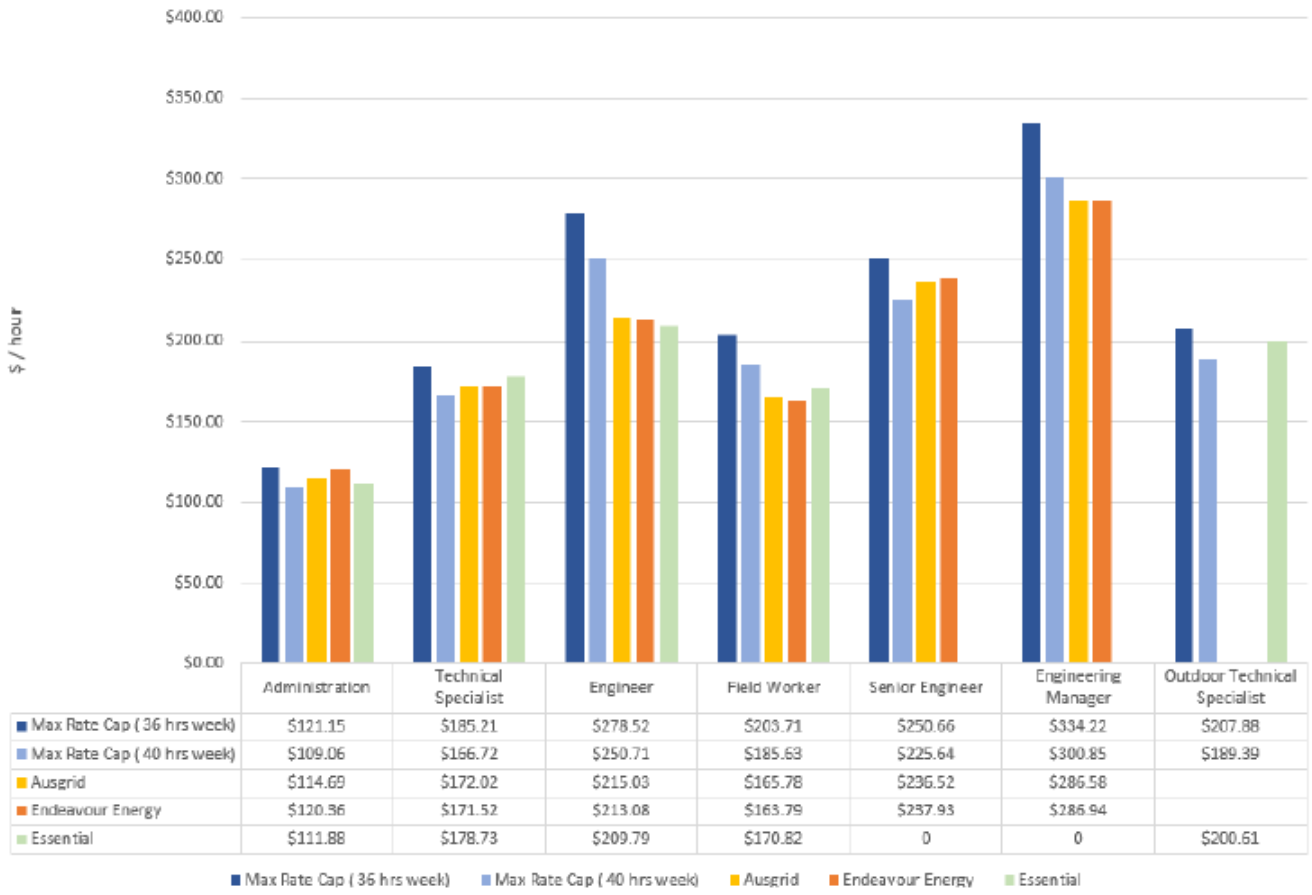
Ausgrid's labour rates were supplied by their finance function based upon average cost per role category. To test the accuracy of this process Ausgrid performed a variance analysis against the Ancillary Network Services (ANS) Rate Card.

Table 39 Direct and indirect labour costs ($ Nominal)

Cost element	Section reference	$M
Transmission lines	Section 7.1	2.3
Substations (greenfield & brownfield)	Section 7.2	2.4
Owners costs	Section 7.3	51.4
Community & social	Section 7.4	16.8
Enabling and ancillary works	Section 7.5	3.7
Design	Section 7.6	[redacted]
Secondary systems	Section 7.7	1.1
Other costs	Section 7.8	1.5
Total		**84.8**

In July 2022, CutlerMerz performed a benchmarking exercise of NSW Distribution Network Service Providers (DNSP) ANS labour rates. Whilst these services include public lighting services, metering services and ANS, there are some common roles such as engineering that provide a useful benchmark of labour costs.

Figure 3 provides an all-inclusive labour rate comparison showing that Ausgrid's rates align with other NSW DNSP's.



	Administration	Technical Specialist	Engineer	Field Worker	Senior Engineer	Engineering Manager	Outdoor Technical Specialist
Max Rate Cap (36 hrs week)	$121.15	$185.21	$278.52	$203.71	$250.66	$334.22	$207.88
Max Rate Cap (40 hrs week)	$109.06	$166.72	$250.71	$185.63	$225.64	$300.85	$189.39
Ausgrid	$114.69	$172.02	$215.03	$165.78	$236.52	$286.58	
Endeavour Energy	$120.36	$171.52	$213.08	$163.79	$237.93	$286.94	
Essential	$111.88	$178.73	$209.79	$170.82	0	0	$200.61

Figure 3 $2022/23 All-inclusive labour rates cap comparison

Source - July 2022, CutlerMerz benchmarking exercise of NSW DNSP ANS labour rates

A comparison of these rates updated by WPI 3.2% to end of December 2024 compared to the rates used in the forecast indicates the following.

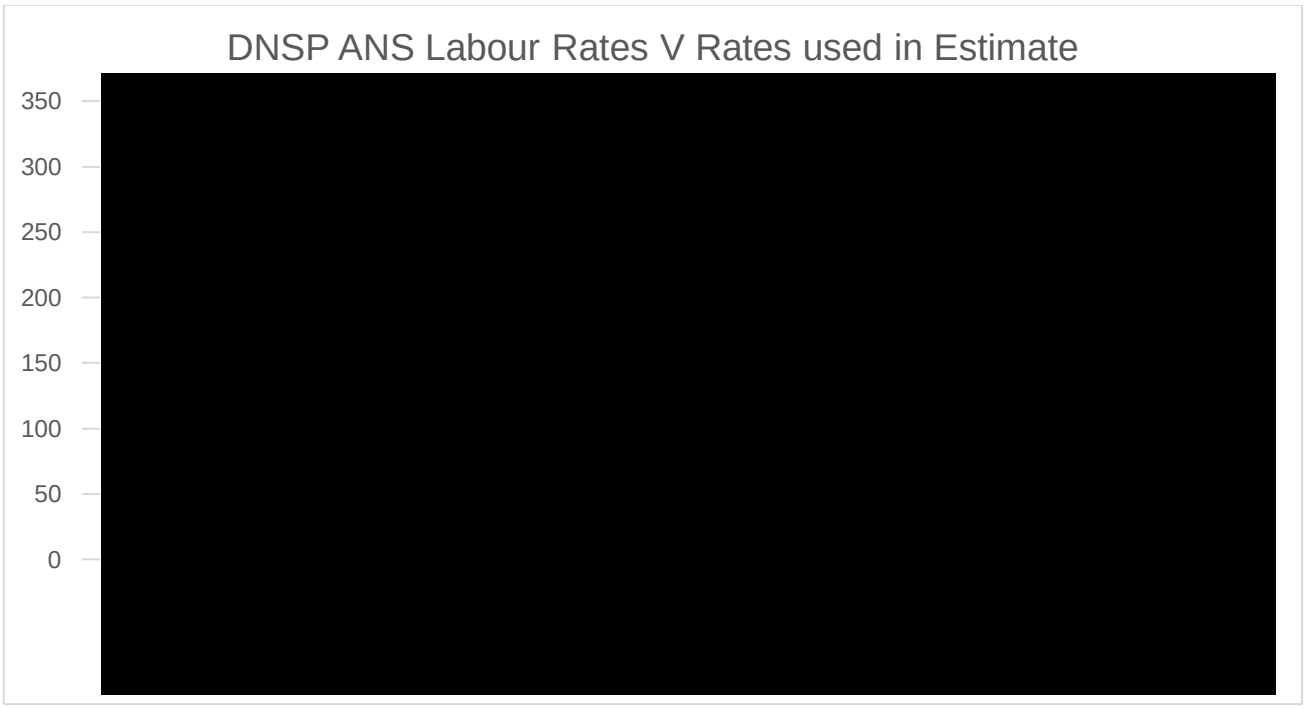


Figure 4 Comparison of CutlerMerz NSW DNSP ANS rates to labour rates used by Ausgrid in labour cost estimates

7.1 Transmission lines

Table 40 details the labour costs of $2.3M related to the transmission line scope. This scope includes the activities associated with the demolition of existing 132kV and 66kV transmission lines and the procurement and construction of replacement higher capacity 132kV and 66kV lines.

Table 40 Transmission line labour costs ($ Nominal)

Cost element	$M
Network outages for staging and construction	1.3
Network outages for safety clearance (line crossing)	0.8
Testing	0.1
Rounding	2.2
Total	**2.3**

The forecast labour costs for the network outages for staging and construction and for safety clearance have been estimated based on the assumptions in Table 41.

Table 41 Transmission line network outages labour costs ($ Real, 2025)

Cost element	Qty (outages)	Rate ($/outage)	$M
Network outages for staging and construction			
Operational personnel [redacted] outages Two operational personnel per outage Two 8-hour days per operator per outage Ausgrid labour rate of [redacted] per hour per operator (Rate aligns with above averages)	[redacted]	[redacted]	1.3
Network outages for safety clearance (line crossing)			
Operational personnel [redacted] Line crossings (physical count along route) Two outages per line crossing Two operational personnel per outage Two 4-hour days per operator per outage Ausgrid labour rate of [redacted] per hour per operator Rate aligns with above averages)	[redacted]	[redacted]	0.3
Project officer One project officer per outage Two 4-hour days per office per outage Ausgrid labour rate of [redacted] per hour	[redacted]	[redacted]	0.1
Earthworks Earthworks required for safety clearance Genus BoQ rate	[redacted]	[redacted]	0.3
Other not material	-	-	0.1
Rounding			0.1
Total			**2.2**

7.2 Substations (greenfield & brownfield)

Table 42 details the labour costs of $2.4M related to the greenfield & brownfield substation works. These works include procurement and construction of two greenfield substations at Sandy Creek and Antiene and the augmentation works to Kurri Kurri and Rothbury.

Table 42 Substation (greenfield & brownfield) labour costs ($ Nominal)

Cost element	$M
Internal works (Kurri Kurri)	1.6
Internal works (Rothbury)	0.4
HV Cable labour	0.3
Free issued secondary	< 0.1
Rounding	< 0.1
Total	**2.4**

The forecast labour costs for the internal works at Kurri Kurri were based on an assessment of the activities required, measured in hours, multiplied by an average rate of [redacted] The analysis, prepared by T&T covers 67 activities.

The forecast labour costs for the internal works at Rothbury is based upon the same methodology over 26 activities at an average rate of [redacted]

7.3 Owners costs

Table 43 details the labour costs related to owners engineer activities, including Ausgrid staff labour, disbursement costs and project development costs. The project development costs reflect the project actual owners engineers costs to June 2024.

Table 43 Owners labour costs ($ Nominal)

Cost element	Section reference	$M
Ausgrid labour costs	Section 7.3.1	42.4
Support services	Section 7.3.2	2.7
Disbursement costs	Section 7.3.3	4.3
Project development costs	Section 7.3.4	1.9
Other costs	N/A	0.1
Total		**51.4**

7.3.1 Ausgrid owner labour costs

The forecast labour costs to March 2029 of $42.4M was developed by T&T using first principles cost estimating and Ausgrid internal labour rates. The forecast owners engineers team consists of an average of 18 monthly FTEs and comprises:

- Head of Major Projects
- Commercial Director
- Project Director

- PMO
- Design engineers
- Safety advisors & manager.

The forecast owners engineers labour costs were agreed to the supporting spreadsheet. The project FTEs are phased based upon the projects schedule.

Figure 5 details the phasing of roles required for owners engineering requirements.

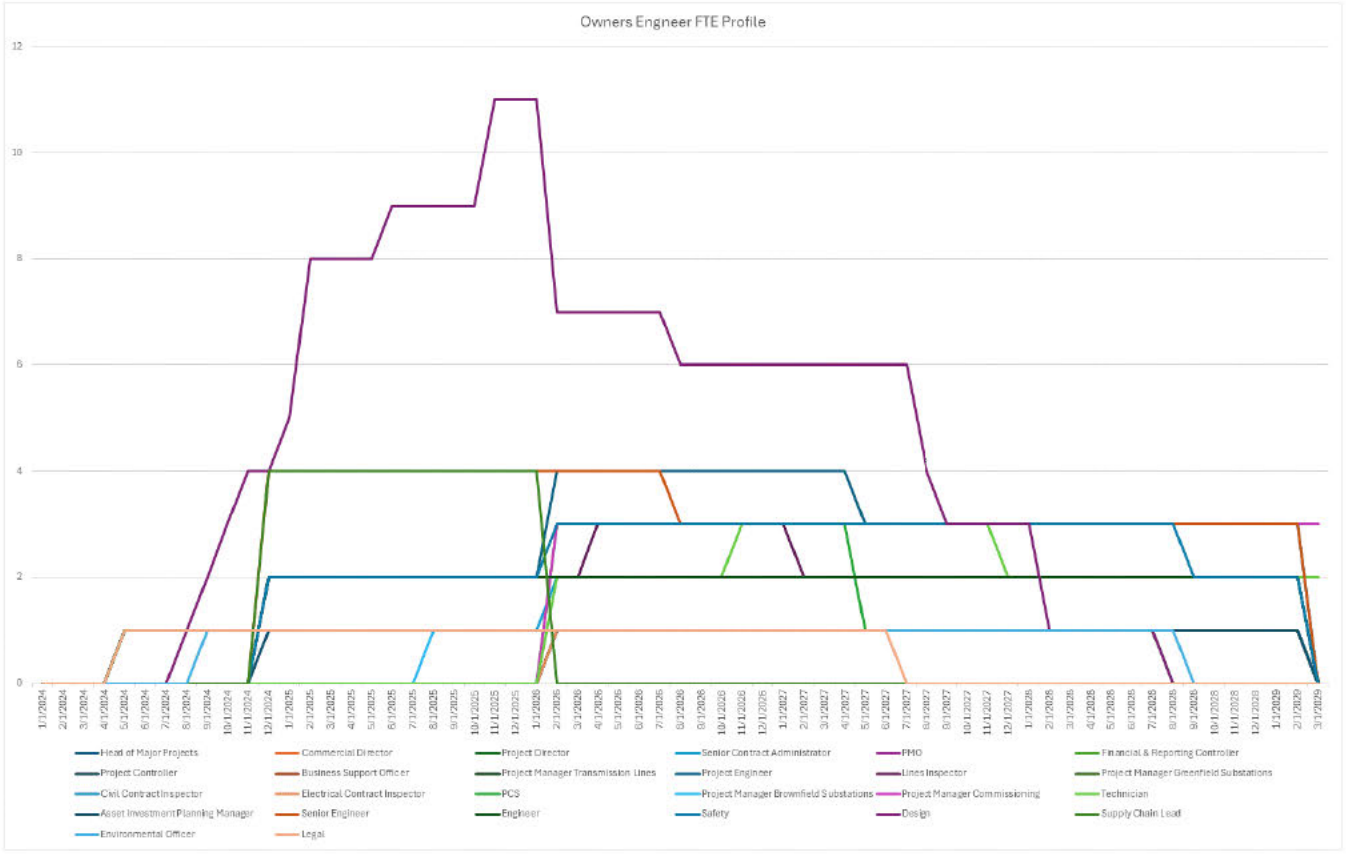


Figure 5 Owner engineer FTE profile

7.3.2 Support services

Table 44 details the forecast costs of $2.7M for support services related to owners engineers activities. This includes the use of various consultants and external services (e.g. power system analysis consultants, quantity surveying, etc.) outside of Ausgrid labour.

The costs were agreed to supporting invoices/quotes.

Table 44 Support services labour costs ($ Nominal)

Details	$M
Additional Cost/Risk/Schedule Support to secure Commitment Deed	
Cost/Risk/Schedule Support to establish PMO	
Establishment of Final IAPP	
Quantity Surveying	
Power Systems Analysis Consultants	

Details	$M
Procurement Management	[redacted]
Development of Generator Connection Plan and batching regime.	
Development of project reporting systems to meet Project Deed Obligations.	
Additional staff training budget	
Total	**2.7**

7.3.3 Disbursement costs

Table 45 details the forecast disbursement costs related to the owners costs.

The sustenance costs of $1.8M relate to the meal allowance provide to Ausgrid staff who are required to travel to and attend the project site for one or more nights. The forecast has been estimated based on:

- Estimated nights required to spend on site
- Ausgrid daily allowance rate.

The travel costs of $2.0M relate to the travel time required for Ausgrid staff to travel to/from the project site. The forecast has been estimated based on:

- Estimated trips to site per week
- Hours per trip
- Ausgrid labour rates.

The vehicle costs have been estimated based on the purchase of four (4) vehicles at a cost of $27,200.00 each. The cost of each vehicle has been based on previous Ausgrid vehicle purchases.

All disbursement costs were agreed to supporting spreadsheets.

Table 45 Owners disbursement costs ($ Nominal)

Cost element	$M
Sustenance costs	1.8
Travel costs	2.0
Vehicle costs	0.1
Rounding	0.4
Total	**4.3**

7.3.4 Project development costs

The project development costs of $8.4M less IP fee early works funded by Energy Co include actual costs incurred to June 2024 (including early works) related to owners engineers activities. The costs include Ausgrid labour and contracted services from external consultants. The costs were based on transactions recorded in Ausgrid's internal record keeping system.

7.4 Community & social engagement

The forecast labour costs to September 2028 of $16.8M was developed by Turner & Townsend using first principles cost estimating and Ausgrid internal labour rates. The cost is based on Ausgrid's Community & Stakeholder Engagement Plan included within the Commitment Deed. The forecast community & social team consists of an average of 12 monthly FTEs and comprises:

– Stakeholder Engagement Manager
– Communications Manager
– Community Engagement Lead
– Community Engagement Coordinator
– First Nations Manager
– First Nations Officer
– Land and Property Access Manager
– Acquisition Manager x 2
– Property Coordinator x 2
– Social License Lead.

The forecast community & social labour costs were agreed to the supporting spreadsheet. The team structure for community and social engagement is considered appropriate for the project streams objectives, noting the presence of acquisition staff inflating the FTE numbers.

Figure 6 presents the phased team profile.

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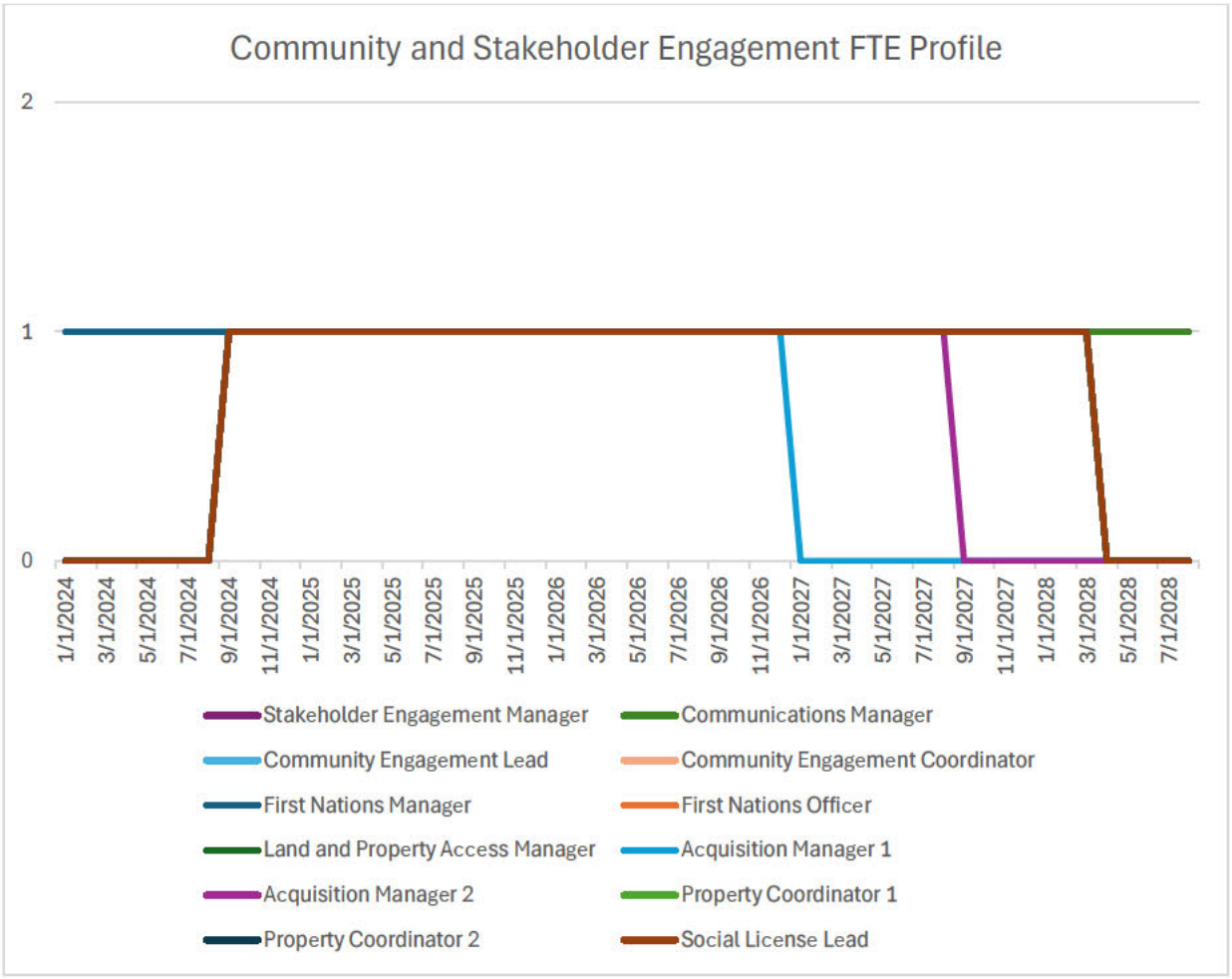

Figure 6 *Engagement FTE profile*

7.5 Enabling and ancillary works

The enabling and ancillary works labour costs of [redacted] includes the relocation of existing Ausgrid distribution assets to enable the rebuild of the required transmission lines (enabling works) and works that will be performed by Transgrid but funded by Ausgrid under a Services Agreement with Transgrid (ancillary works).

The forecast estimate for the enabling works was developed by T&T using first principles cost estimating and Ausgrid internal labour rates. The forecast estimate for ancillary works was based on an equivalent scope of works previously performed by Ausgrid with a [redacted] contingency included to account for Transgrid.

Ausgrid's capex estimation for enabling works labour costs of [redacted] and ancillary works of [redacted] were agreed to supporting spreadsheets and Ausgrid labour rates.

Table 46 *Enabling and ancillary works labour costs ($ Nominal)*

Cost element	$M
Enabling works	[redacted]
Ancillary works	
Total	

The cost estimate for enabling works has been reproduced in Table 47.

Table 47 Enabling works forecast breakdown ($ Nominal)

Cost element	$M
Package 1	
Sub-package A (McLeod Road, Loxford)	
Sub-package B (Scales Ave, Loxford)	
Sub-package C (Lovedale Road, Allandale)	
Sub-package D (Majors Lane, Keinbah)	
Sub-package E (Tuckers Lane, Greta)	
Sub-package F (Golden Highway, Mt Thorley)	
Sub-package G (Antiene TBS and AUX supply)	
Package 2	
Jerry Plains Road, Mt. Thorley/Gouldsville	
Package 3	
Sub-package A (Staden Drive, Lower Belford)	
Sub-package B (Pothana Lane, Belford)	
Sub-package C (Bell Road/New England Highway, Belford)	
Sub-package D (Mitchell Lie Service Road, Whittingham)	
Sub-package E (Golden Highway, Whittingham)	
Sub-package F (Golden Highway, Whittingham (Dochra Airfield)	
Sub-package G (East of Range Road, Whittingham)	
Sub-package H (New England Highway, Whittingham)	
Other costs	
Field engineering	
As Built Designs	
Rounding	
Total	

7.6 Design

The design labour costs of [redacted] includes the design of the brownfield substation, control and protection, distribution mains and transmission mains. Greenfield substation design has been excluded from internal costs as this will be undertaken by AECOM as an external consultant, however a budget for the internal team to review this design has been costed for. This estimation was developed by T&T using first principles cost estimating and Ausgrid internal labour rates.

Table 48 Design labour costs ($ Nominal)

Cost element	$M
Brownfield Substation Design	
Control & Protection Design	
Distribution Mains Design	
Greenfield Substation Design Review	
Transmission Mains Design	
Total	

7.7 Secondary systems

The cost of $1.1M includes Ausgrid's internal labour costs for remote end secondary system upgrades, as well as the provision of power quality metering at remote substations covered under the scope included in the Commitment Deed. This estimation was developed by T&T using first principles cost estimating and Ausgrid internal labour rates.

Table 49 Secondary systems labour costs ($ Nominal)

Cost element	$M
132kV Voltage Transformer, Single Phase – Supply & Install	0.1
132kV Feeder A/B Protection & Control	0.7
SCADA	0.2
Protection LAN	0.2
Rounding	0.1
Total	**1.1**

7.8 Other costs

The remaining labour costs of $1.5M are associated with regulatory requirements and internal telecommunications staff. The estimation for both costs elements was developed by T&T using first principles cost estimating and Ausgrid internal labour rates.

Table 50 Other labour costs ($ Nominal)

Cost element	$M
Telecommunication costs	0.7
Regulatory costs	0.8
Total	**1.5**

7.9 Direct and indirect labour conclusion

Labour costs have been estimated from the bottom up, phasing project team roles by the schedule, applying labour rates that align with industry benchmarks.

8. Risk provisions

Different categories of project risks are present during project phases and the ability to manage the outcomes diminishes over time. Under a lump sum EPC contract, the contractor is responsible for risk management, and they will include risk provisions within their tendered prices. Reliance is placed upon competitive tendering process to help ensure that this provisioning is reasonable.

The HCC RNI capital forecast includes a risk provision of $48.0M which represents 9.5% of the total capital forecast excluding the IP fee (EnergyCo component).

Based upon the Ausgrid Risk Contingency Summary 20 March 2025 provided to GHD risk provision was based upon a two-step process:

- Ausgrid conducted risk workshops to develop a qualitative risk register using actual costs provided by Ausgrid SMEs which represent the extent of likely financial outcome of each risk after the identified controls and treatment actions have been undertaken
- The completion of a quantitative analysis utilising Monte Carlo simulation based upon schedule range analysis. This produces a probability range of estimates with Ausgrid presenting P50 values in the projects risk register. In scope range analysis a predetermined percentage of the project Base Schedule (e.g. 10%) will be added to the project base schedule across the board to scenario model the impact.

Based upon analysis of the build-up of the capital forecast detailed above, it does not include general risk provisioning. Risk provisioning is considered prudent based upon the retained responsibilities detailed in section 4.1 and the large number of interfaces that needs to be managed detailed in their Interface and Third-Party Agreements response.

From a high-level perspective risks present would include:

- Price changes driven by market movements
- Program risks such as weather
- Regulatory risks
- Community risks
- Interface risks
- Productivity assumptions risk
- Latent conditions
- Design changes
- Access
- Construction / stringing methodology.

These risks are considered appropriate and are reflected in the projects risk register with a summary of high rated risks presented below.

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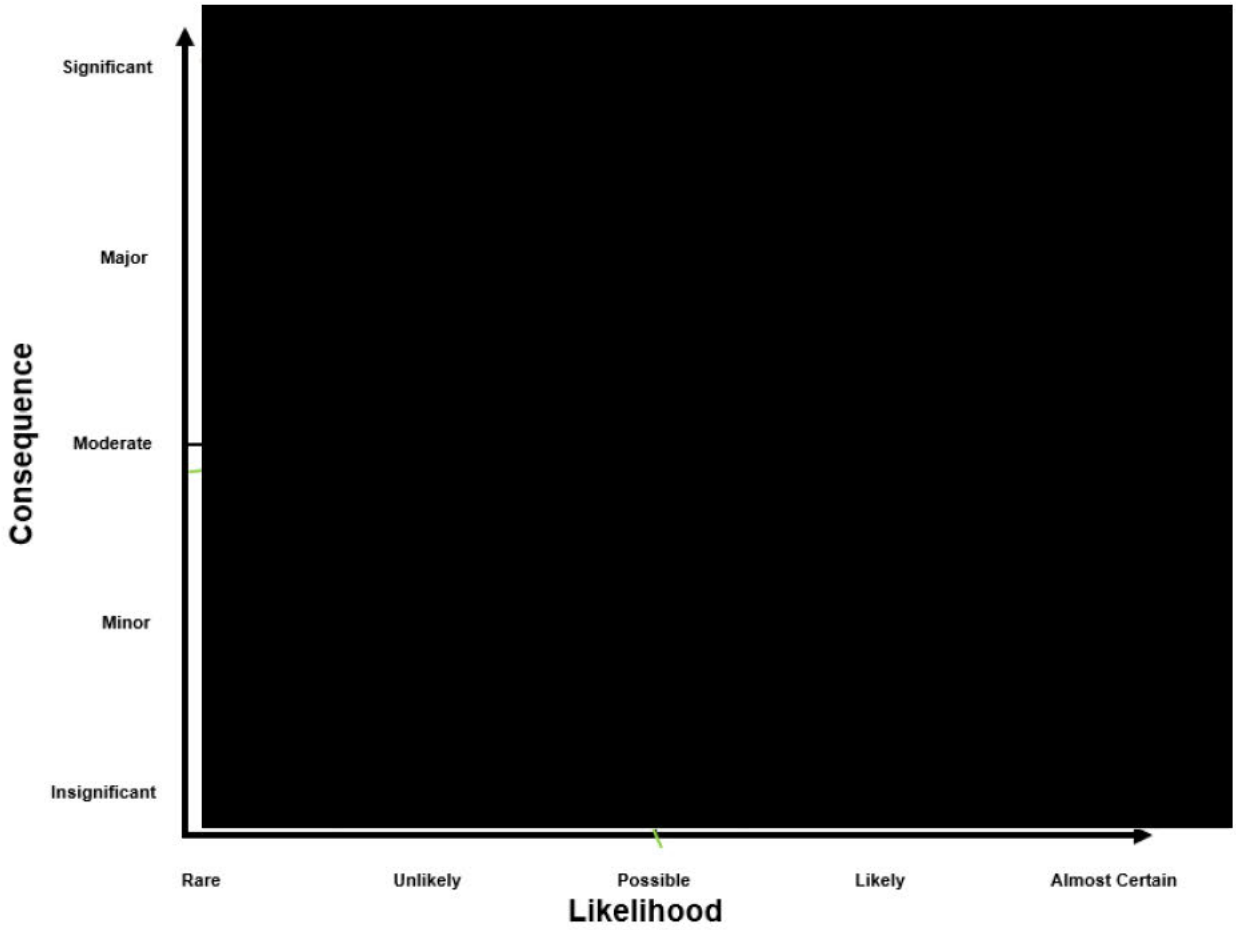

Figure 7 Ausgrid project risks (High only)

The level of risk provisioning required, and the class of estimate are interrelated as is illustrated by Figure 8 presented below, with the base forecast representing a blend between class 2 and 3 estimates. In this case risk provisioning is considered prudent to improve the confidence interval of the estimate.

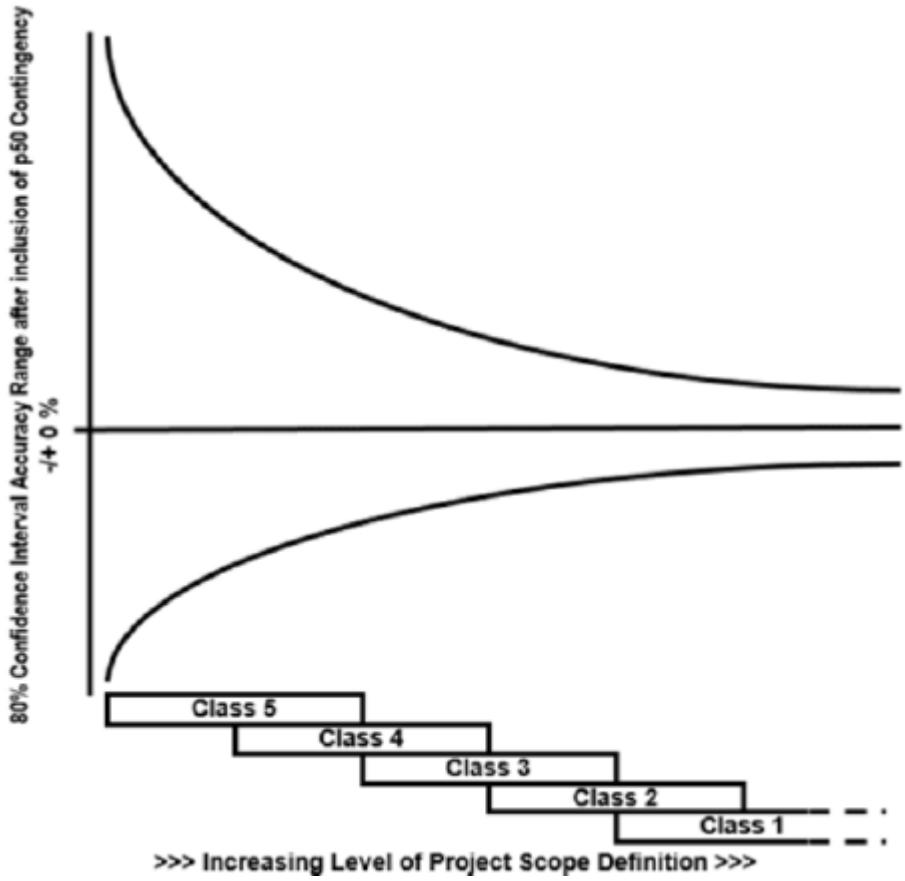

Figure 8 ***Concept of improving accuracy with increased scope definition (source: Contingency Guidelines Engineers Australia 2nd Edition)***

"Contingency allowances are often included in a cost estimate to allow a RIT-T proponent to take into account uncertainty in the costs of a credible option. If a contingency allowance is included in a cost estimate for a credible option, the RIT-T proponent must explain:

- The reasons and basis for the contingency allowance, including the particular costs that the contingency allowance may relate to, and
- How the level or quantum of the contingency allowance was determined"[8].

[8] AER Application Guidelines RIT-T October 2023 P 58

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8.1 Top 10 risks

Table 51 summarises the top 10 risks by value.

Table 51 Top 10 risks by value ($ Nominal)

Risk ID	Description	Basis	GHD consideration
65	Delays to Greenfield Switching Station Subcontractor Scope	JHG daily rate for preliminaries is [redacted] P10 is [redacted] P50 is P90 is	Subcontract conditions allow for John Holland to claim delay costs for a number of delay events. The schedule attached to the contract indicates approximately [redacted]. The P50 estimate would be an approximate delay of [redacted] Schedule X7.4 of the NEC4 contract with John Holland indicates that the aggregate delay damages payable by the Contractor shall not exceed an amount equal to [redacted] of the Price, which is [redacted] Day rates are approximately [redacted] per day per contract schedules. The difference is not considered material and provisioning considered prudent.
64	Ausgrid delay costs	SRA shows: P10 is [redacted] nth. P50 - [redacted] month P90 - [redacted] Probability is [redacted] because the ability to mitigate [redacted] of time delay by reallocation of people to other projects, however on the whole the same resources will be completing the same work, over a longer duration due to delays. Probability is already weighted and there is a [redacted] chance of time delay costs being incurred.	Ausgrid engaged TBH to develop its construction schedule and undertake an SRA using the Monte Carlo simulation methodology. The resulting P50 date of [redacted] was considered reasonable given the overall schedule of the project of 1,378 days. The cost impact of [redacted] represents [redacted] of the average monthly Ausgrid internal labour costs for Owner Engineers activities across the period January 2025 – September 2028 and was agreed to supporting spreadsheet. Provision is considered prudent.
80	Delays to Kurri Kurri STSS Augmentation Subcontractor Scope	Gongues daily rate for preliminaries is [redacted] P10 is [redacted] P50 is [redacted] P90 is [redacted]	Subcontract conditions allow for subcontractors to claim delay costs for a number of delay events. The Gongues rate has been determined on the basis of the preliminaries in their offer ([redacted] and increased by [redacted]. The increase is because Gongues price is not locked in

Risk ID	Description	Basis	GHD consideration
			Provision is considered prudent.
75	Stringing Methodology Changes	Genus provided a price which [redacted] helicopter stringing, Ausgrid included an allowance in base capex for [redacted] helicopter stringing. P10 - [redacted] P50 - P90 - Probability - [redacted] Across the whole route. [redacted] of [redacted]	Section 6.3.1 already includes a [redacted] provision related to stringing. However, this relates to scope areas identified post tender that will not allow for helicopter stringing. This provision relates to the remaining scope areas providing for a [redacted] that helicopter stringing will be changed given the risk exposures. Provision is considered prudent.
76	Additional crane / piling rig pads required	1 x pad costs [redacted] There are [redacted] new poles, each potentially requiring a pad. There are [redacted] existing concrete poles requiring removal, which potentially require a pad. Total of [redacted] potential pads. We have an allowance in base cost for [redacted] approx. [redacted] of the total potentially required. Pads will be installed based on a DCP testing at the required site – this determines ground bearing pressure. Should the bearing pressure be insufficient, a pad is required. Noting that only done [redacted] Geotech bore holes across the route, and with no detailed design, don't know where the new poles are going until next year. P90 - [redacted] P50 - [redacted] p10 - [redacted]	Section 6.3.1 includes an allowable for the removal of pads for [redacted]. This provision provides for a [redacted] probability that [redacted] more pads might be required based upon the [redacted] Geotech bore holes across the route. Geotechnical testing required to determine if ground bearing pressure is sufficient, and pad is not required. Base cost of [redacted] pads represents [redacted] of potential total required. Geotechnical testing will not be undertaken until detailed design phase where specific locations are identified. Therefore, contingency is considered prudent. Cost of [redacted] per pad was agreed to Genus BOM Considered prudent to provision.
47.03	Aviation - Clearing and Access Works	Clearing and access works for [redacted] wide x [redacted] m long = [redacted] m2 Clearing cost is average rate of [redacted] per m2 from Genus submission P10 - [redacted] P50 - P90 -	As indicated in section 6.7.3 at the time of report drafting the preferred option for the rebuild of the KU12 West time was still under consideration. Solutions may include use of the existing 11kV line easement. It is expected that the final salutation will be reflected into Ausgrid's Revenue Proposal. Considered prudent to provision

Risk ID	Description	Basis	GHD consideration
78	Increased Material Costs	Equipmen Secondary Overhead TOTAL - $[redacted] Value of all equipment (less poles, conductor, insulators) P10 - [redacted] P50 - [redacted] P90 - [redacted]	As detailed in section 6.2, Ausgrid in their base cost estimate has included a [redacted]% escalation factor for potential cost increases. The P50 provision assumes a [redacted] probability for price increases of [redacted]% or more. GHD notes that the geopolitical environment is still uncertain with strong demand in the infrastructure sector.
22	Health & Safety Event	A major WHS would bring substantial disruption, delay, and additional cost to the Total combined delay costs for [redacted] and Ausgrid is [redacted] reflecting productivity loss to address issue, training etc. P10 - [redacted] P50 - [redacted] P90 - [redacted]	This reflects a prudent allowance for safety risks
79	Delays to Transmission Line Rebuild subcontractor scope	Genus daily rate for preliminaries is [redacted]/day P10 is [redacted] P50 is [redacted] P90 is [redacted]	Subcontract conditions allow for subcontractors to claim delay costs for a number of delay events. The Gongues rate has been determined on the basis of the preliminaries in their offer [redacted]) and increased by [redacted]. The increase is because Gongues price is not locked in Provision is considered prudent
12.02	Design Development - Transmission Lines	Changes to design through design development results in growth of scope for transmission lines. The quoted Genus price is based on concept designs formulated from sites that could be accessed and limited geotechnical information available during the tender period. Detailed design may result in design changes requiring increased equipment/material costs. Cost impact based on increase to Genus quoted cost plus materials less preliminary costs of [redacted] P10: [redacted] P50: [redacted] P90: [redacted]	Provision is considered prudent given tender price is based on concept design only.

8.2 Risk provisioning assessment

The AER's guidance note on the regulation of actionable ISP projects states that it can accept a project risk allowance for a contingent project where[9]:

- Residual risks have been identified
- The associated cost estimates of the residual risk are efficient i.e., the consequential cost adjusted to reflect the likelihood of occurrence.

To inform its assessment, the AER requires a comprehensive and transparent explanation of how the risks have been identified and costed, including[10]:

- Risk identification, i.e., clearly identifying the risk events
- Risk cost assessment, i.e., estimating the potential cost impacts, the likelihood of occurrence, the consequential costs, and any mitigation/management strategies.

8.3 Risk provisioning conclusion

Ausgrid has been transparent in the development of risk provisions and has applied an appropriate combination of deterministic and quantitative analysis utilising Monte Carlo simulation to create a risk provision based upon P50 estimates.

Given that the base estimate is free of generalised risk provisioning, provision for identified risk is considered prudent.

Minor possible adjustments were noted during GHD's assessment. However, these are not considered to be material.

9. IP fee (EnergyCo component)

EnergyCo's IP fee.

Table 52 IP fee (EnergyCo component) breakdown

IP breakdown	$M
IP fee (EnergyCo component)	92.9

[9] AER, **Guidance Note, Regulation of actionable ISP project**, March 2021
[10] AER, *Regulation of actionable ISP projects,* Guidance note, March 2021, p 17

10. Benchmarking

GHD attempted to benchmark the Ausgrid's HCC RNI capital estimate against the AEMO's updated TCD Tool for a top-down assessment. The TCD Tool generates an early-stage high-level project cost estimates in a deterministic fashion, compiling capex estimates of various elements of network infrastructure. The TCD Tool is used to ensure the NEM ISP is supported by high-quality cost estimates for electrical transmission networks. The TCD Tool does this by assembling varieties of required network elements from a database of network infrastructure asset building blocks described at Class 5 level to match the given scope of work and adjusts the compiled capital estimate to reflect project specific attributes and risk exposures based on user inputs. The TCD Tool Class 5b and 5a estimates provide a ±50% and ±30% range of accuracy respectively.

The TCD Tool is not a distribution network infrastructure capex estimating tool and its database does not contain standardised asset building blocks that are granular and bespoke to match specific description of predominantly distribution network solutions proposed for HCC RNI. Therefore, GHD did not use the TCD Tool for benchmarking the overhead lines and the fibre optic communication lines included in the HCC RNI because of considerable difference between the proposed scope of work and the description in the available standardised asset building block in the TCD Tool.

Further, while TCD Tool was used to benchmark the capex estimates of the station and underground power cable network elements of the HCC RNI, it should be viewed cautiously as a number of adjustments and assumptions were employed to translate the specification of these network elements as inputs of the TCD Tool. For example, the TCD Tool does not have cost information for establishing distribution size station or bench sites in its database, and hence the smallest available sizes were reduced to match the HCC RNI scope. Single line diagram of the stations along with brief description of the station site characteristics and underground power cable route characteristics were referred to compile the capex estimate in the TCD Tool.

Finally, the following estimating parameters were considered to benchmark these HCC RNI network elements:

- TCD Tool estimates were compiled at Class 5b level, i.e., front-end estimate using the high-level conceptual project information as it would be available at the beginning stage of the project or network solution development
- The indirect costs component of the capex estimate generated by the TCD Tool was ignored because this component is designed to be calculated for the entire HCC RNI in the TCD Tool
- Only the relevant and equivalent cost items included in the Ausgrid capex estimate were used for this benchmarking (i.e., free issue plant and material costs, greenfield subcontract value, brownfield subcontract value, design contract value, testing and commissioning cost etc. for the relevant sites).

The resulting benchmark difference between the Ausgrid proposed capex estimate and the TCD Tool output, from top-down assessment, is shown in the following table.

Table 53 TCD Benchmarking Summary

Cost elements	Ausgrid	TCD Tool direct costs only	% total difference
Two greenfield station sites (Antiene and Sandy Creek)	$84.2M	Antiene (Eastern Hub): $37.0M Sandy Creek STSS: $42.5M Total: $79.5M	5.6
Four brownfield station sites (Kurri Kurri, Rothbury, Singleton and Mitchel Line)	$13.0M	Kurri Kurri: $11.1M Rothbury: $9.3M (includes 1CB bay of 132kV which is tentative in Ausgrid's single line diagram to be reviewed for reactor switching suitability) Total: $20.4M	56.9
Double circuit underground power cable direct buried in conduit (Sandy Creek STSS)	$5.3M	500m of underground cable: $6.1M	15.1
Total	**$102.5M**	**$106.0M**	**3.4%**

10.1 Benchmarking conclusion

The benchmarking performed covered substations indicates alignment within the range of estimation accuracy within the TCD, apart from a marginally higher result from the TCD model which is outside the accuracy range

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