Transgrid

People. Power. Possibilities.

A.3 Capex Forecasting Methodology

HumeLink - Stage 1(early works) Contingent Project Application

5 April 2022

Contents

This page is intentionally left blank

1. Purpose, structure and scope of this document

1.1. Purpose and scope of this document

The Australian Energy Market Operator's (AEMO) Draft 2022 Integrated System Plan (ISP) has defined HumeLink as a staged actionable ISP project:

- Stage 1 is to complete the early works by 2024, and
- Stage 2 is implementation of the Project with a target delivery date of 2026-27.

This document is our Stage 1 capital expenditure (capex) forecasting methodology for HumeLink Stage 1 (early works) and forms part of our Contingent Project Application for Stage 1 (Stage 1 CPA or Application).

The purpose of this document is to:

- overview the nature and scope of Stage 1(early works) capex for HumeLink
- explain and justify the methodologies we have used to determine our Stage 1 capex forecast, and
- overview how we verified and validated our actual and forecast capex.

The explanation and justification of the activities covered under our Stage 1 (early works) is in a separate document (A.2 Scope definition) provided as an attachment to this Application.

Unless otherwise stated, all actual and forecast capex values in this document are presented in real 2017-18 dollars and include real input cost escalation.[1]

This document has been developed in accordance with:

- the actionable ISP framework under the National Electricity Rules (NER or Rules), and
- AER's Guidance Note for Regulation of actionable ISP projects.[2]

1.2. Document structure

The remainder of this document is structured as follows:

- section 2 overviews AEMO's definition and approval of Stage 1 (early works) and our Stage1 activities and forecast capex
- section 3 overviews the scope for Stage 1 (early works) and our capex forecasting methodology. It also overviews the outcomes of independent engineering verification and assessment and how we have calculated the changes to our capex allowance
- section 4 explains our direct capex forecast (i.e. procurement and land acquisition)
- section 5 explains our labour and indirect actual and forecast capex[3]

[1] The financial values exclude *both* inflation and any real input cost escalation (e.g. labour) from 30 June 2018 onwards. Although many of the unit rates used applied from 1 July 2019 onwards, these were deflated by a year of actual inflation (from 30 June 2019 to 30 June 2018) and, where appropriate, de-escalated by a year of real labour cost escalation (using the rate allowed by the AER in its determination for the 2018-23 regulatory control period for the year to 30 June 2019).

[2] AER, Guidance Note for Regulation of actionable ISP projects, March 2021.

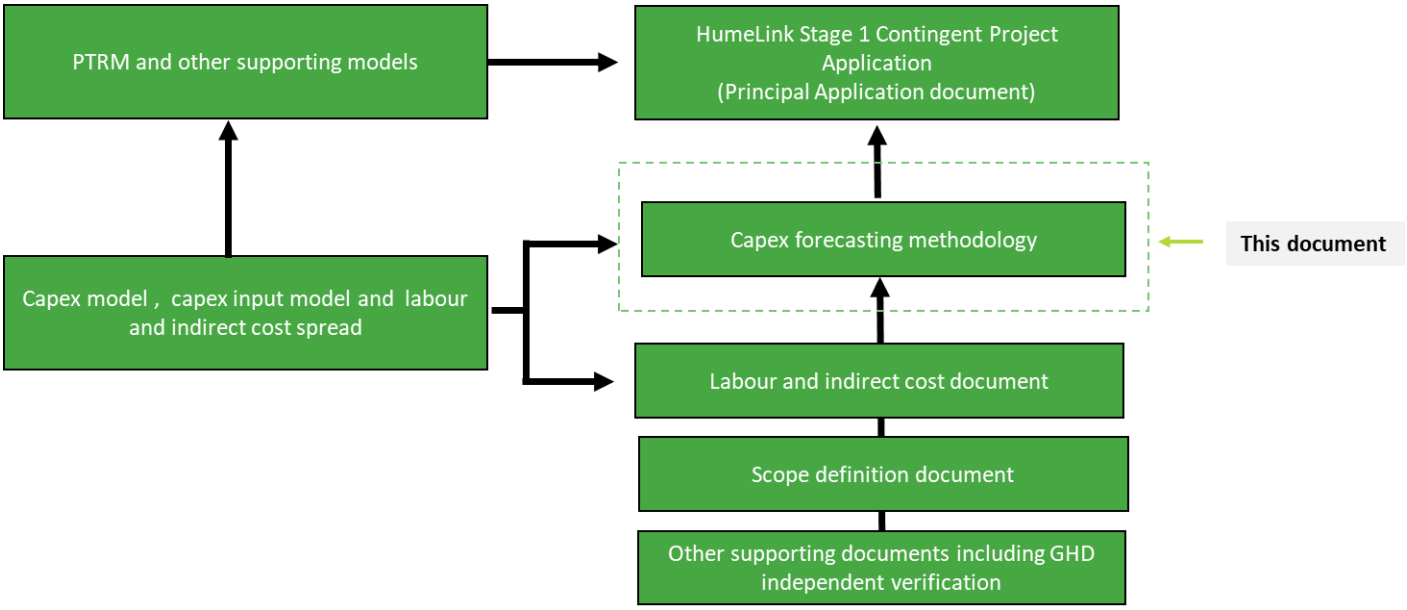
[3] Indirect capex including procurement, project development, community and stakeholder engagement, land and environment, regulatory approvals and other support costs

- section 6 overviews our project expenditure profile, and
- section 7 explains our real input cost escalations.

1.3. Structure of our Stage 1 CPA

There are several other attachments and models that support, and form part of, our Stage 1 Application (as illustrated in Figure 1.1). This Capex Forecasting Methodology document references these attachments, models and other supporting documents and should be read in conjunction with them.

Figure 1.1: Stage 1 CPA document structure for HumeLink



Attachments and supporting models comprising our Stage 1 Application are also detailed in section 1 of our Principal Application document.

2. Overview of Stage 1 (early works) activities and forecast capex

This section:

- overviews AEMO's definition and approval of Stage 1 (early works)
- explains our Stage 1 (early works) activities, and
- overviews our Stage 1 (early works) capex.

2.1. AEMO's definition and approval of Stage 1 (early works)

AEMO defines Stage 1 (early works) as pre-construction activities that can be undertaken now, while keeping open the option to continue, defer or cancel the project as new information becomes available.[4] AEMO identifies the following activities as likely to fall within Stage 1 (early works) for HumeLink:[5]

- detailed engineering design – transmission line, structure and substation design, detailed engineering design and planning
- project initiation – this includes planning and design activities needed to accurately define the project, including pre-contracting activities for engineering, procurement and construction contracts such as obtaining binding bids
- cost estimation – finalisation, including quotes for primary and secondary plant
- land-use planning – to identify and obtain all primary planning and environmental approvals, route identification, field surveys, geotechnical investigations, substation site selection, easement acquisition and preparation of option agreements with landowners, and
- stakeholder engagement – with local communities, landowners and other stakeholders.

AEMO has issued us with a direction in its Draft 2022 ISP to proceed now with Stage 1 (early works) to achieve the following benefits:[6]

- option value – it will allow us to deliver the project as soon as possible or defer it if circumstances change
- insurance value – it will mitigate the risk of schedule slippage and the risk of coal exiting faster than anticipated, and
- continual improvement value[7] – it will refine the project through innovation and cost effective design in order to identify, explore and manage project risks. This will result in more accurate cost estimation and ensure the Project's costs are prudent and efficient.

AEMO has assessed that undertaking early works now will avoid $200 million of 'regret costs' from the project being delivered too late, due to schedule slippage or earlier than expected coal plant closures. AEMO therefore concludes that progressing Stage 1 (early works) is a low regret action for consumers.[8]

4 AEMO, Feedback Loop Notice, 27 January 2022
5 AEMO, Draft 2022 ISP, p. 66
6 AEMO, Draft 2022 ISP, December 2021, p. 80
7 AEMO comments that further work to drive down project costs should be urgently undertaken as part of early works. AEMO, Draft 2022 ISP, December 2021, p. 12.
8 AEMO, Draft 2022 Integrated System Plan (Draft 2022 ISP), December 2021, p.12.

2.2. Our Stage 1 (early works) activities

Our Stage 1 (early works) activities comprise direct capex activities and indirect and labour capex activities.

A key component of our direct capex activities relates to procurement. These activities will be undertaken by successful contractors identified through an Early Contractor Involvement (ECI) process, which will promote competition and innovation. The ECI process will be similar to the approach we undertook for Project EnergyConnect to maximise responsiveness in the supplier market to ensure that the Project's construction cost is prudent and efficient. This process will also ensure we are ready to start construction as soon as possible after the approval of our Stage 2 CPA, in order to meet AEMO's target delivery date of 2026-27. The procurement activities will be undertaken as part of a separable package (SP) of work, known as SP1, and must be completed prior to construction commencing. Construction will be undertaken in SP2 and is subject to the approval of our Stage 2 CPA and our Board making a positive final investment decision (FID).

Stage 1 procurement activities (direct capex) includes:

- steel tower assembly design, erection, and testing of 9 standard towers.
- procuring production slots for equipment with long lead times, in particular substation transformers and reactors
- pre-construction development, including:
  - the design work
  - equipment specifications
  - identifying quantities of plant and materials required, and
  - undertaking project documentation and obtaining work permits.

Our procurement process is discussed in Appendix B.

Other key elements of our stage 1 (early works) activities include:

- acquiring the necessary land and easements, which must be carefully managed to meet our customer and other stakeholders' social licence expectation and is critical for construction to commence as soon as possible following the approval of our Stage 2 CPA and therefore meet the 2026-27 completion date. These activities include:
  - acquiring land for the new Gugaa substation site so designs can be undertaken to match the available site location, size and geotechnical conditions
  - undertaking surveys to identify and protect places of cultural heritage significance along the route
  - determining compensation to be paid to landholders
  - establishing options agreement for acquisition of land in Stage 2, and
  - commencing compulsory land acquisition process in the event that amicable agreements cannot be reached with landholders.
- undertaking project management and development activities in connection with our Stage 1 activities
- developing the Environmental Impact Statement (EIS) and undertaking related activities. These are scheduled to be undertaken between May 2021 to January 2023
- consulting with stakeholders and the community about the Project. This will be guided by our Humelink Engagement Strategy (HES), including indigenous engagement and social impact engagements and

initiatives. Early community engagement is needed to ensure the Project has an appropriate social licence, and

- seeking necessary regulatory approvals from the AER and AEMO for Project implementation.

2.3. Our Stage 1 (early works) capex forecast

Table 2-1 shows that our total Stage 1 capex forecast is $321.87 million, excluding equity raising costs. We will incur most of this capex in the current (2018-23) regulatory period. The remainder will be incurred in 2023-24 (i.e. the first year of the 2023-28 regulatory period).

Our capex is additional to the capex approved by the AER in its 2018-23 Revenue Determination.

Table 2-1: Stage 1 capex ($M, Real 2017-18)

	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Actual	0.38	0.64	8.64	15.59	13.37	-	-	38.61
Forecast	-	-	-	-	31.21	188.85	63.20	283.26
Total capex	0.38	0.64	8.64	15.59	44.58	188.85	63.20	321.87

Notes: Including overheads, excluding equity raising costs

Table 2-2 details our Stage 1 capex in terms of direct and labour and indirect activities.

Our Stage 1 activities relating to direct capex include:

- Undertaking procurement activities, which will be undertaken by the successful contractors, at a cost of $104.59 million (or 32.5 per cent of capex). These activities include:
  - assembling, designing, erecting, and testing of nine standard steel towers
  - procuring production slots for equipment with long lead times, in particular substation transformers and reactors
  - pre-construction development, including for substations and transmission lines, equipment specifications and identifying quantities of plant and materials required.
- acquiring land for a substation at Gugaa and transmission line easements. This includes binding options for transmission line easements and compulsory acquisition, at a cost of $22.12 million (or 6.9 per cent of total capex)

  Our procurement strategy is described in section 4.1.1 and in Appendix B.

Our Stage 1 activities relating to labour and indirect capex (development and approvals (D&A)) include:

- undertaking project management and corporate support (labour costs) for procurement, land and environmental activities, at a cost of $75.45 million (or 23.4 per cent of capex)
- undertaking project development activities, including engineering, legal and economic support, at a cost of $32.86 million (or 10.2 per cent of capex)

- undertaking land and environmental planning and approval activities, including environmental impact studies, surveys, preparing an Environmental Impact Statement (EIS), and specialist land agent support, at a cost of $28.85 million (or 9.0 per cent of capex)
- supporting the procurement process, including bidder payments and data room services at a cost of $27.55 million (or 8.6 per cent of capex).
- consulting with stakeholders and the community (non-labour), including community support, social legacy,[9] design and communication and community improvement, at a cost of $18.56 million (or 5.8 per cent of capex), and
- seeking necessary regulatory approvals – this include actual costs for completing the RIT-T process as well as our actual and forecast capex for preparing our Stage 1 and Stage 2 Applications, at a cost of $11.90 million (or 3.7 per cent of capex).

Our labour and indirect capex includes our actual costs to 31 December 2021 and our forecast for the additional resources and associated costs to 30 June 2024.

Table 2-2: Stage 1 CPA capex by category ($M, Real 2017-18, including overheads)

Category capex	Description	Forecast capex	% of total capex
Direct Capex			
Procurement	Steel tower assembly design and prototype testing	[redacted]	[redacted]
	Long-lead time equipment – Substation transformers and reactors	[redacted]	[redacted]
	Pre-construction development[10] – substation and transmission lines	[redacted]	[redacted]
Land acquisitions	Valuation and acquisition costs including options for acquiring transmission line easements and compulsory acquisition	22.12	6.9%
Total direct capex		126.71	39.4%
Labour and indirect capex (Development and Approvals)			
Labour and related costs		75.45	23.4%
Project team resources	Labour and corporate support for project management, procurement, land and environmental activities	75.45	23.4%
Indirect Costs		119.71	37.2%

[9] Social legacy seeks to leverage off the project building a more sustainable energy system – and through its strategic partnership approach, enabling more sustainable, resilient and future focused community programs. This includes community grants, youth traineeships, long-term jobs for indigenous communities, provision of 5G and digital communication.

[10] Includes detailed design for substations and transmission lines and other pre-construction works and costs

Category capex	Description	Forecast capex	% of total capex
Project development	Development, engineering, legal and economic support	32.86	10.2%
Land and environment	Fees, labour and indirect costs	28.85	9.0%
Procurement	Bidder payments	22.22	6.9%
	Data room services and market road show	0.56	0.2%
	Transaction procurement support	4.78	1.5%
Community & stakeholder engagement	Community support, social legacy, design and communication and community improvement	18.56	5.8%
Regulatory approvals and other support costs	RIT-T analysis and documentation and Stage 1 and 2 CPA documentation, modelling and reports	11.90	3.7%
Total labour & indirect capex		195.16	60.6%
Total (excluding equity raising costs)		321.87	100.0%
Equity raising costs	Equity raising costs	2.99	
Total including equity raising costs		324.86	

Our Principal Application document and Scope definition document discusses the activities that comprise our Stage 1 (early works) and how our capex will deliver the following outcomes:

- determine the prudent and efficient construction cost for Stage 2 (project implementation) by refining the Project scope through innovation and cost effective design
- identify, explore and manage our project risks. This will allow us to mitigate and/or diversify the Project's risks so that residual risk costs included in our Stage 2 Application are as low as possible, and
- achieve AEMO's target delivery date of 2026-27 by ensuring that construction can commence as soon as possible following the approval of our Stage 2 CPA.[11]

[11] AEMO, Draft 2022 ISP, p. 13 (see Table 1).

3. Our Stage 1 (early works) forecasting method

This section overviews:

- why our scope for Stage 1 (early works) is appropriate
- our capex forecasting methodology for our Stage 1 (early works) activities
- the independent engineering assessment and verification to support our Stage 1 (early works) capex, and
- how we have calculated the proposed change to our regulatory allowance.

3.1. Our proposed scope for Stage 1 is effective and efficient

The scope of our Stage 1 (early works) activities is set out in our Scope definition, provided as an attachment to this Application. This explains why the scope is appropriate to meet Stage 1 of the Project. Our forecast capex will deliver value for money for consumers because:

- the works are no more than is required to meet the need, and
- that the project costs are efficient.

3.2. Our Stage 1 forecasting methodology

We are committed to delivering the Project at the lowest sustainable cost to maximise benefits to customers. Our early works capex forecasts reflect detailed scopes of work and:

- rigorous and transparent capex forecasting methodologies as set out in this document, and
- our governance framework and processes, which have been detailed to the AER in previous CPA submissions.

As discussed in Chapters 4 and 5, we have used the following forecasting techniques to derive our Stage 1 capex forecast:

- external market-based quotations and valuations – generally, we have used the lowest cost quotations where we have received multiple quotations
- outcomes from the RIT-T, which have been subject to public scrutiny, stakeholder consultation and AER review
- benchmarks of similar projects, such as Project EnergyConnect[12]
- bottom-up estimates based on recent actual costs, and
- other industry market data and specialist advice.

The forecasting process involved the following three steps.

Step 1 – Define the initial scope and identify the indicative costs

In this step we defined the initial scope for each Stage 1 activity, including by:

- establishing the project team and governance requirements

[12] To establish a reasonable mid-point estimate and cost range

- identifying the corporate support required for the development and approval activities, and
- identifying required external specialist resources and services.

We obtained prices for these resources and services based on our procurement policies and procedures to establish our initial cost estimate.

Our Scope definition document', provided as an Attachment to this Application, sets out the scope of our Stage 1 activities and explains why the scope is efficient.

Step 2 – Refine the initial scope and costs

In this step, we refined our initial scope and cost estimate by obtaining:

- non-binding offers from suppliers
- actual costs from recent projects for long lead time equipment (LLE)
- recent land acquisition experience
- current design specifications and quantities for plant and materials, and
- additional quotations, where necessary, from specialist service providers.

We also re-engaged with service providers to further refine the Project scope and adjust our internal resources, including stakeholder engagement and social legacy programs.

Step 3 – Finalise the early works capex forecast

In this step, we finalised our capex forecast by:

- updating our labour and support activities for our actual costs to 31 December 2021 from Ellipse, our enterprise resource planning (ERP) system
- refining the scope and costs in step 2 to improve the accuracy of our capex forecast, and
- comparing our labour and indirect costs with Project EnergyConnect, which is a comparable project, and AEMO's Transmission Cost Database (TCD).[13] AEMO explains that the costs in its TCD are based on Class 5 estimates, which are not as accurate as cost estimates developed at the CPA stage, which take into account that specific details of the project. This analysis showed the following for our Stage 1 (early works):
  - total indirect and labour costs are 4 per cent higher than the equivalent costs for Project EnergyConnect and are 19 per cent higher than AEMO's TCD
  - project management and development costs are 4 per cent higher than the equivalent costs for Project EnergyConnect and are 19 per cent higher than AEMO's TCD
  - land and environment costs are within 2 per cent of the equivalent costs for Project EnergyConnect and are 20 per cent higher than AEMO's TCD
  - stakeholder engagement costs are 2 per cent lower than the equivalent costs for Project EnergyConnect and are 20 per cent lower than AEMO's TCD, and
  - procurement transaction costs are 17 per cent higher than the equivalent costs for Project EnergyConnect and AEMO's TCD. This is due to relatively higher bidder payments for HumeLink.

[13] Comparative Project Capex worksheet – A.6 Capex Forecast Model

3.3. Independent engineering verification of our Stage 1 Capex (early works)

We engaged GHD to undertake an independent engineering verification and assessment of our Stage 1 capex forecast and the scope of our Stage 1 activities. GHD used various methods to assess our scope and capex forecast including:

- benchmarking based on AEMO's Transmission Cost Data Base (TCD)
- reviewing of our tender processes and documents
- reviewing our actual costs from comparable Transmission projects such as Project EnergyConnect, and
- assessing reasonableness of our Project team structures, scheduled hours and labour rates.

GHD's assessment:

- verified that our Stage 1 (early works) activities are aligned with the definition of early works, representing the works necessary to develop a robust cost estimate for Stage 2, progress the regulatory, planning or environmental approvals before construction works are able to take place and to avoid delay to the project completion date
- found that our overall Project timeline is reasonable to deliver the Project by 2026-27
- confirmed that our procurement costs are reasonable and are based on specialist advice
- found that our indirect and external labour costs are reasonable and are supported by tender outcomes, quotations and benchmarking, and
- found that our actual and forecast internal labour costs are reasonable, noting that our actual labour costs are from Ellipse and our forecast labour costs benchmark in line with other ISP projects.

Overall, GHD concluded that our Stage 1 (early works) costs are within a reasonable margin of its comparative estimates. GHD's independent review therefore supports the consistency of our forecast capex with that which would be incurred by a prudent and efficient business. GHD's report is provided as an attachment to our Application.

3.4. Calculating the required change in our regulatory allowance

Finally, we calculate our proposed adjustment to our revenue allowance for the current regulatory period (2018-23) using the three step process shown in Figure 3.1:

- build the capex forecast
- develop the capex forecasting model, and
- populate the Post Tax Revenue Model (PTRM).

Figure 3.1: HumeLink Stage 1 capex forecasting process

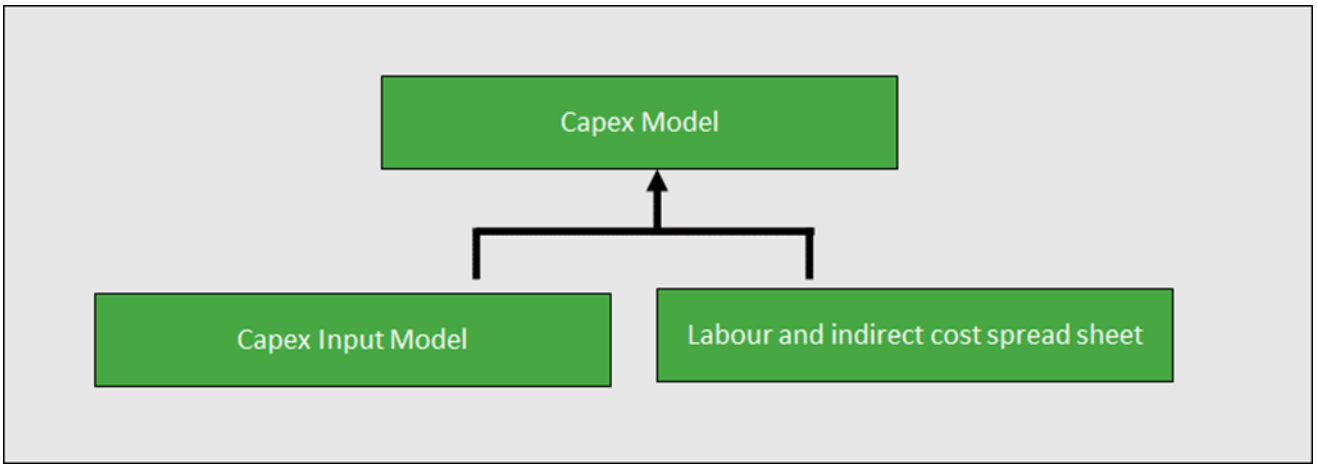
Step one – Build the capex forecast

The purpose of this step is to allocate our capex forecast across regulatory asset classes and years. Our capex model structure is shown in Figure 3.2 and comprises:

- Capex input model – this model builds up the procurement and land acquisition costs based on artefact data, and
- Labour and indirect cost spreadsheet – this builds up the labour and indirect costs (including procurement, project development, community and stakeholder engagement, land and environment, regulatory approvals and other support costs). The Labour and Indirect Cost spreadsheet applies inflation where appropriate.

Step one involves the development of Capex Input Model and Labour and Indirect Cost spreadsheet . These models are input into the capex model, which is developed in Step two.

Figure 3.2: Capex model structure



Step two – Develop capex model

The Capex model allocates the capex forecasts (step one) across years and regulatory asset classes and applies labour costs escalation, and inflation as appropriate to the Direct Non-Labour Costs. The model adheres to the same principles as the Capital Accumulation Modes used for business-as-usual capital projects. Our early works capex forecast is split by:

- financial year (project cash flows)
- regulatory asset category, and
- commodity type (real input cost escalators was applied to labour only).

The Capex model groups forecast expenditure into the regulatory asset classes approved in the AER's 2018-23 Revenue Determination for Transgrid. The asset classes relevant to the CPA for Stage 1 are shown in Table 3-1.

Our approach to the allocation is to apportion the relevant early work direct costs to the relevant asset classes and then to apportion the labour and indirect costs according to the asset classes based on the relative expenditure over the whole Project. The rationale for this approach is that the development work is towards the whole Project and that the same allocation method will apply in the Stage 2 CPA. This is consistent with the approach that we applied in our Application for Project EnergyConnect.

Table 3-1: Asset classes relevant to the CPA for Stage 1

Asset class	Impacted by Humelink early works capex
Transmission Lines (2018-23)	Yes
Underground Cables (2018-23)	No
Substations (2018-23)	Yes
Secondary Systems (2018-23)	No
Communications (short life) (2018-23)	No
Business IT (2018-23)	No
Minor Plant, Motor Vehicles & Mobile Plant (2018-23)	No
Transmission Line Life Extension (2018-23)	No
Land and Easements	Yes

The AER approved real materials and labour cost escalators as part of the current 2018-23 Revenue Determination. For labour, this is the simple average of forecasts provided by Deloitte Access Economics and BIS Oxford Economics. The AER approved real material cost escalation rates of zero. Accordingly, materials are only escalated by inflation. The Application applies real input cost escalation as discussed in section 7.

Step three – Populate the PTRM

The outputs from the Capex Forecast Model are in a format suitable for input to the PTRM and is used to populate the PTRM rather than from the Capital Accumulation Model.

4. Forecast direct capex

Our early works direct capex comprises:

- procurement costs to cover steel tower design and prototype testing, placement of orders for long lead time equipment, and pre-construction and detailed design work, and
- land acquisition costs associated with key substations and options for transmission line easements.

4.1. Forecast capex for early works procurement activities

This section explains and justifies the methodology we have used to derive our forecast capex for the following early procurement activities:

- steel tower assembly design, erection, and testing of 9 standard towers.
- procuring long-lead time equipment
- pre-construction development, which includes:
  - finalising the design work
  - finalising the equipment specifications
  - identifying quantities of plant and materials required, and
  - completing project documentation and obtaining work permits

Our forecast capex for early works procurement activities is $104.59 million and comprises 32.5 per cent of our total early works capex forecast. Table 4-1 summarises our forecast capex for early procurement activities.

Our Stage 1 (early work) capex forecast for procurement is based on multiple sources of comparative cost estimates including pricing from suppliers, independent advice from specialists, and actual costs for Project EnergyConnect and QNI. These costs have been verified by GHD as being reasonable.

Our capex forecast is efficient and prudent because it reflects actual costs and the best available information.

Table 4-1: Early works forecast capex for procurement ($M, Real 2017-18)

Early procurement activities		Capex forecast $M	Worksheet Reference[1]	Basis
Steel tower prototype testing	Tower assembly design, erection and testing of prototype towers	[redacted]	Steel tower assembly	We received quotations from two suppliers for the supply of steel which included the assembly design, erection and testing of standard tower designs. Forecast capex is based on further detailed pricing from the lowest cost steel supplier for prototype tower testing.
Long-lead time	Substation transformers	[redacted]	Long lead	20% booking fee multiplied by the total estimate for equipment

Early procurement activities		Capex forecast $M	Worksheet Reference[1]	Basis
equipment – Substations	Reactors	[redacted]		(substations and reactors) at a cost of [redacted] million, where: • the booking fee is based on quotes from two suppliers, and • total estimated equipment cost is based on actual costs for equivalent plant for Project EnergyConnect and QNI.
Pre-construction development	Transmission lines – 500 kV (365km) and 330kV (15km)	[redacted]	Lines	Expected pre-construction costs of 4.43 per cent of the total construction cost from PACR based on independent advice from AECOM. The construction costs for HumeLink are expected to be around: • [redacted] million for transmission lines, and • [redacted] million for substations.
	Two 500kV greenfield substations and modifications to two existing (one 500 kV and one 300 kV) substations	[redacted]	Substation	
Total		**104.59**		

Note: 1. See Direct Non-labour cost model.

4.1.1. A competitive process is currently occurring for early works procurement activities

In order to promote competition, efficiency and innovation we are undertaking an Early Contractor Involvement (ECI) procurement process to maximise responsiveness in the supplier market, commensurate to the scale and complexity of the Project. The ECI process is designed to:

- attract high calibre contractors to participate in the process through bidder payments
- allow tenderers to refine their proposals based on site and design information. Increased investigation and understanding of Project's requirements, opportunities, and challenges will enable tenderers to identify cost savings, efficiencies, improvements, and or innovations as well as identify risks, and
- enable the assessment of non-price factors such as 'values alignment' and 'working together' through the selection process.

The ECI process will comprise five phases, which will be completed in Stage 1 (i.e. before 30 June 2024).

- Phase 1 – Formal market sounding
- Phase 2 – Expressions of interest
- Phase 3 – ECI Tender
- Phase 4 – ECI Delivery
- Phase 5 – RFT and award of early works contracts

Figure 1 shows the expected timing of each phase. Appendix C provides further details on the ECI procurement process and timeframes.

Figure 1: ECI and procurement timeline

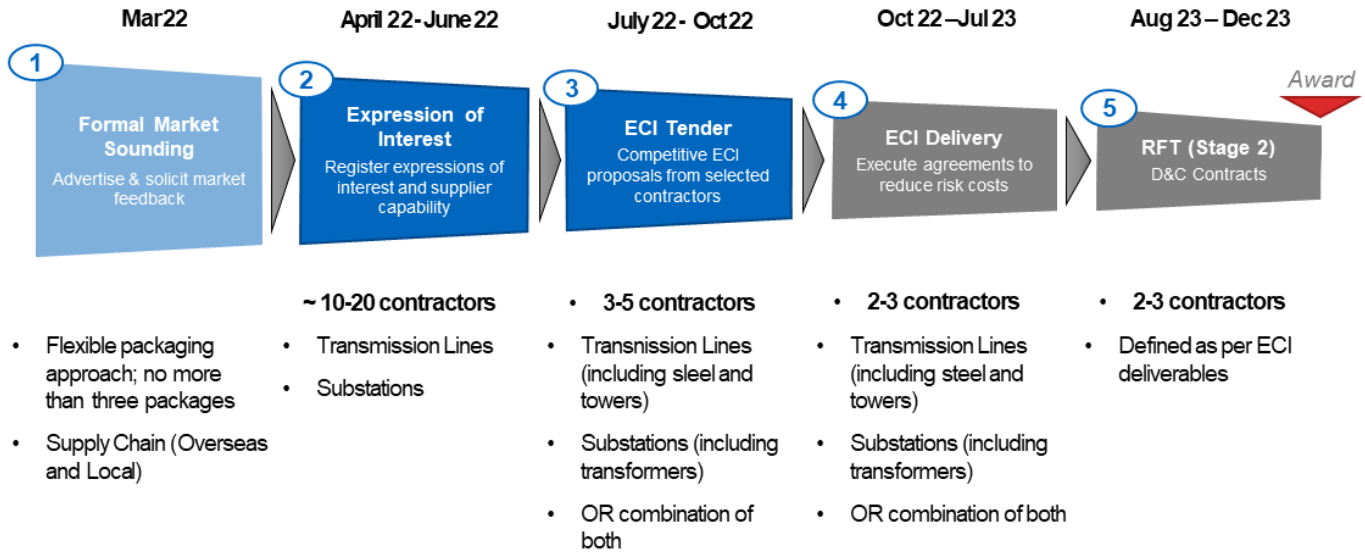


Figure 1 shows that by December 2023, contracts will be awarded to the successful tenderers who will undertake all of the procurement activities identified under our Stage 1 direct capex forecast, including:

- steel tower assembly design, erection, and testing of 9 standard towers.
- procuring long-lead time equipment
- pre-construction development including:
  - finalising the design work
  - finalising the equipment specifications
  - identifying quantities of plant and materials required, and
  - completing project documentation and obtaining work permits

These activities will be undertaken as part of a separable package (SP) of work, known as SP1, and must be completed prior to construction works commencing. Construction will be undertaken in SP2 under the construction contracts and is subject to the approval of our Stage 2 CPA and our Board making a positive FID.

Successful tenderers would be awarded one package each which could be:

- transmission lines and substations, or
- transmission lines only, or
- substations only.

4.1.2. Steel tower assembly design and prototype testing

We have defined nine standard designs for the Project. Prior to ordering around 39,000 tonnes of steel required to deliver the Project, we will prototype test each standard tower design which is required for prudent risk management when designing tower structures to revised standards or new loading

conditions. It is critical that these tests are completed together with detailed designs as part of our early works, to enable steel orders to be placed as soon possible after our Stage 2 CPA has been approved.

Our forecast capex for steel tower assembly design and prototype testing is [redacted] million[14] based on quotations from two suppliers and the total metric tonnes of steel for the nine towers. The forecast capex is based on further detailed pricing from the lowest cost steel supplier for prototype tower testing[15]:

- tower design and detailed drawings [[redacted] + [redacted]] x # Towers [9] = [redacted] million
- prototype erection of towers [[redacted] per metric tonne (MT)] x 481 MT = [redacted] million
- tower load testing [[redacted] per MT] x 481 MT = [redacted] million
- allocation of supplier management costs = [redacted] million

The total forecast capex in is [redacted] million.

4.1.3. Long lead time equipment

Long-lead time equipment (LEE) has a 12-18 month delivery time following placement of orders. Stage 1 (early woks) involves paying deposits for LLE to secure supplier production slots. The timing of this step is critically linked to the awarding of work packages in the procurement process and subsequently the confirmation of specifications and designs as part of the pre-construction works. Production and delivery of these long lead time purchases is required for construction to begin sufficiently early to meet the 2026-27 delivery date.

The equipment and quantities which are specified in the PACR remain unchanged except for a rating increase for the reactors (which has changed following further power system studies) as follows:

- 7 x 500kV 181 (previously 150) MVAr shunt reactors (which includes 1 spare)
- 5 x 3 phase 1500MVA 500/330/34.5 kV power transformers (plus 1 single phase spare – 16 single phase units in total)

Our capex forecast for reactors is [redacted] million and transformers is [redacted] million. Our capex forecast is based on our MTWO cost estimating data base, which reflects actual outturn costs for reactors installed as part of QNI and transformers currently being installed as part of Project EnergyConnect. We have allowed for a 20 per cent booking fee based on independent information from suppliers [refer to worksheet 'Long Lead' items 1: Email exchange with GE Renewable Energy and 2: Email exchange with Hyosung].

The forecast costs for booking the supply for transformers and reactors is calculated as follows:

- Transformers [[redacted] m] x [20%] + Reactors [[redacted] m] x [20%] = [redacted] million ($ Real 2021-22)

We note that this payment represents a pre-payment of the total capex costs for the transformers and reactors.

Our total forecast capex for LLE is [redacted] million.

[14] Subtotals are rounded and as a result do not to the total as per the Capex Forecast Model
[15] See: A.6 – Direct Non-Labour Model, 'Tower Tests' sheet, *Item 1: Advice from Mitas Industry*.

4.1.4. Pre-construction development

To meet the 2026-27 Project completion date, construction needs to commence as soon as possible following approval for our Stage 2 (implementation) Application. This in turn requires that the following are finalised as part of pre-construction early works activities:

- detailed substation and transmission line designs
- equipment specifications
- quantities of plant and materials, and
- resource plans.

Construction permits will also need to be secured as part of pre-construction development.

The pre-construction activities to achieve the above include:

- project management and related costs
- management plans and documentation
- resources and scheduling
- procurement
- detailed design (inclusive of Site Surveys, etc.)
- permits and stakeholders

The detailed substation design work will involve the design of two greenfield substations (500kV/330kV at Gugaa and 500kV/330kV at Maragle[16]) and design modifications to two brownfield substations at Banaby 500kV and Wagga Wagga 300kV. The detailed design work for transmission lines is for 365km of 500kV line and 15km for the 330kV line.

AECOM has provided cost estimates for the pre-construction project development activities listed above. This has been provided as a percentage of the expected total cost of a transmission project, subject to an engineering, procurement and construction (EPC) contract, assuming that 'the contractors are experienced in the industry and based in Australia'. This represents only the pre-construction work and costs necessary to be included in Stage 1.

AECOM has estimated 4.43% for the required pre-construction costs (for transmission lines and substations in total for HumeLink[17]). We have also reviewed our actual costs for PEC, and this scope represents around 85% of the total pre-construction scope including detailed design works required in Stage 1. Our estimate of required pre-construction costs for Stage 1 is 4.57 %. This is only slightly higher than the AECOM's estimated percentage of 4.43%. We have used 4.43% for the calculation of the required pre-construction works to be consistent with advice from AECOM.

The expected EPC contract price for transmission lines and substations is based on the Option 3C PACR estimates. The estimated EPC contractor costs are lower than the respective substation and transmission line costs shown in the PACR NPV model[18] because the PACR values include property costs and our

[16] The Maragle 330 kV switching station is being constructed as part of the Snowy 2.0 Generator Connection project on the same site and will precede HumeLink works

[17] See: A.6 – Direct Non-Labour Model, 'Substation' sheet, *Item 1: AECOM advice*.

[18] HumeLink, PACR addendum NPV model, 17 December 2021. See worksheet 'CBA inputs'. We have updated the costs in the PACR to remove the following costs: non-labour and indirect costs, biodiversity costs and property costs.

apportioned labour and indirect costs. The PACR costs are based on our MTWO cost estimating data base, which reflects transmission line and substation costs for Project EnergyConnect, QNI and VNI[19].

The EPC contract costs for HumeLink are expected to be around:

- [redacted] million for transmission lines, and
- [redacted] million for substations.

We then calculate the pre-construction development costs as follows:

- (Transmission Line costs [redacted] + Substation costs [redacted]) x 4.43% = [redacted] million

For the purposes of allocating capex to the respective transmission line and substation asset classes, we have used the 4.43% percentage as follows:

- (Transmission Line costs [redacted]) x 4.43% = [redacted] million
- (Substation costs [redacted]) x 4.43% = [redacted] million

Our total forecast pre-construction development capex is [redacted] million comprising [redacted] million for transmission lines and [redacted] million for substations.

Our pre-construction development capex forecast is based on:

- the estimated EPC contract price for transmission lines and substations. The EPC cost is based on the costs in the PACR for substations and transmission lines, adjusted to remove non-EPC related costs[20]
- independent advice from AECOM on the expected pre-construction costs (for both transmission lines and substations) as a percentage of the total EPC contract price, and
- actual costs for the required scope of work for Project EnergyConnect.

4.2. Forecast capex for land acquisitions

The Project requires the acquisition of easements over a substantial amount of land that impacts many landholders' properties. Securing access to land is a critical Stage 1 (earl works) activity, so that construction can start as soon as possible following the approval of Stage 2. Our forecast land access and acquisitions capex is $22.12 million (real 2017-18). This comprises 6.9 per cent of the total direct capex forecast.

It covers the following activities:

- undertaking surveys to identify and protect places of cultural heritage significance along the route
- providing landholders with an allowance to obtain professional advice, as required under the Just Terms Compensation Act 1991 (NSW) (JTC Act) and our internal guidelines
- determining the compensation to be paid to each landholder
- establishing option agreements for the later acquisition of easements in Stage 2
- commencing any compulsory acquisition process in the event amicable agreements cannot be reached with landholders, and
- securing a site for Gugaa substation so that designs can be undertaken to match the available site location, size and geotechnical conditions.

[19] See: A.6 – Direct Non-Labour Model, 'Substation' sheet, *Item 1: AECOM advice*.
[20] HumeLink, PACR addendum NPV model, 17 December 2021. See worksheet 'CBA inputs'.

The forecast capex and basis of estimates for land acquisitions are summarised in Table 4-2.

Table 4-2: Forecast capex for early works land acquisitions ($M, Real 2017-18)

Category	Capex forecast $M	Worksheet Reference[1]	Basis of Estimate
Cultural heritage	0.52	Heritage	Based on our recent project experience with Project EnergyConnect – a bottom-up calculation for each component: • chainage walkover of alignment, • transmission line and substation geotechnical surveys, and • support for survey teams.
Landholder legal valuation	6.70	Landholder Costs	Based on 362 landholders in total along the route, each valued using section 4 of Transgrid's Property Acquisition Compensation Principles for NSW Major Projects. An allowance of $18,514 is based on the amount used on recent past projects and in line with our internal guideline.
Land valuation	2.15[2]	Land Valuation	Based on fee estimate provided by a valuation consultant.
Option Fees	[redacted]	Option Fees	Based on 287 private landholders within the HumeLink corridor and consistent with section 7.3 of Transgrid's Property Acquisition Compensation Principles for NSW Major Projects and recent experience with PEC.
Valuer General Fees	0.88	Valuer General	Based on the number of properties estimated to require compulsory acquisition, valuation fees and Valuer General management cost per property
Land acquisition Gugaa Substation	[redacted]	Gugaa Substation	Based on forecasts by a valuation specialist and Transgrid's Property Acquisition Compensation Principles for NSW Major Projects considering the potential market value and disturbance, diminution, and potential severance compensation costs. In addition, option fees on two other site locations.
Total	**22.12**		

Notes: 1. See Direct Non-labour cost model. 2. Land Valuation includes 0.31 million actual costs.

Further information below is provided to support the forecast costs for each of the above categories.

Cultural heritage

Cultural heritage surveys are required to identify and protect places of cultural heritage significance along the proposed transmission line route, proposed access tracks, substation sites and potential construction laydown areas. It is a well-established technique for systematically investigating heritage resources within a defined geographic area.

The surveys will also use actual documentary research, field work and community engagement to explore the range and diversity of actual themes associated with the survey area and to identify places and areas of heritage significance.

Our forecast capex relates to two survey teams over 70 days, inclusive of support costs (overheads) and expenses. It is based on actual costs, unit rates and duration incurred for cultural heritage surveys for Project EnergyConnect, adjusted for respective route distances[21].

Our forecast cultural heritage capex is $0.52 million.

Landholder legal valuation

We are required by the Just Terms Compensation Act 1991 (NSW) (JTC Act) to compensate landholders for their legal costs to review contracts and address matters that may arise.

Based on the number of landholders, we have allowed for 362 landholders requiring legal valuations and contract reviews although this is subject to change as the route is further refined. An allowance of $18,514 per landholder is based on the amount used on recent past projects and in line with our internal guideline.[22]

Our forecast capex is calculated as:

- (# landholders [362]) x (cost allowance [$18,514]) = $6.70 million

Our forecast landholder legal valuation capex is $6.70 million.

Land Valuation

We use our panel contractors to undertake detailed land valuations to inform our estimates of compensation to landholders for acquiring easements. The contractor will be appointed following a competitive procurement process.

Our forecast land valuation costs is based on unit rates from one of our panel suppliers which is consistent with our recent experience for property valuation costs[23]. We have also included an estimate for desktop valuations that will occur prior to detailed valuations being undertaken.

Our forecast land valuation capex is calculated as:

- (# landholders [362]) x (valuation cost [$5,554]) + (Desktop valuations [$138,858]) = $2.15 million

Our forecast land valuation capex is $2.15 million.

Establish options fees for private landholders

As discussed above, the Project requires the acquisition of easements over a substantial amount of land that impacts many landholders. To ensure site access as soon as possible, we need to establish early option agreements to secure future acquisitions, and to commence any compulsory acquisition process prior to our Board making a FID.

The current route has 362 landholders in total. Of these, 287 are private landholders and 75 are public landholders (Crown, Local Councils and Statutory Authorities).

We have established a standard allowance for option fees for private land holders. This is based on section 7.3 of our Property Acquisition Compensation Principles for NSW Major Projects [refer worksheet 'Option Fees' Item 1: Transgrid's Property Acquisition Compensation Principles and Item 2: Internal

[21] See: A.6 – Direct Non-Labour Model, 'Heritage' sheet, *Item 1: Ngumbaay invoice*.
[22] See: A.6 – Direct Non-Labour Model, 'Landholder costs' sheet, *Item 2: Internal memo*.
[23] See: A.6 – Direct Non-Labour Model, 'Land Valuation' sheet, *Item 1: Knight Frank advice* and *Item 2: Internal memo*.

memo amended to reflect [redacted] for the Project EnergyConnect. We have used the allowance of [redacted] which has previously been approved by the AER.

The total forecast capex is then estimated as follows:

- (# landholders [287]) x (Option Fees [redacted]) = [redacted] million

The forecast option fee capex is [redacted] million.

Valuer General fees

Valuer General fees are necessary for a determination on the compensation to be paid to each landholder for establishing easements resumed under compulsory acquisition.

A forecast of these costs requires consideration of the following three factors:

- the number of properties estimated to require compulsory acquisition
- the Valuer General Fee per property
- the number of properties expected to be assessed over the forecast period of CPA for Stage 1 (i.e. to June 2024)

As noted above, the total number of landholders is 362. Of this, 287 are private landholders and 75 are public landholders (Crown, Local Councils and Statutory Authorities). In relation to the 75 public land holders 50 are Crown land holdings comprising 35 road reserves and 15 statutory authorities.

Easements over Crown land (other than road reserves) will require valuation and acquisition under the compulsory land acquisition process. Accordingly, 15 Crown land holdings will require compulsory land acquisitions.

The expected number of private properties requiring compulsory acquisition is 115 and is based on our experience with Project EnergyConnect[24].

The total expected properties requiring compulsory acquisition is therefore 130 (15 Crown land holdings plus 115 private landholdings).

The Valuer General Fees is determined by the total of three costs, estimated as follows:

- administration costs based on 3 hours per property at $324.00 per hour[25] ($972.01)
- costs for the management of each determination based on 20 hours at $324.00 per hour ($6,480.05)
- an external valuation report per property based on the costs for PEC ($4,165.75)

Based on the above, the estimated Valuer General Fee per property is $11,617.80 [(20 hours x $324.00 per hour) +$4,165.75].

Forecast capex for Valuer General fees is calculated as:

- (# properties compulsory acquired [130] x (average Valuation Fee [$11,617.80] = $1,510,314.01

We expect that compulsory acquisition assessments will only be completed for some of the 130 landholders in Stage 1. The number of properties expected to be assessed during Stage 1 is based on the expected

[24] See: A.6 – Direct Non-Labour Model, 'Valuer General' sheet, *Item 1: Knight Frank advice* and *Item 2: NSW Government invoice*.

[25] See A.6 – Direct Non-Labour Model 'Valuer General', Item 2 indicates $300/hr, however recent advice from Valuer General indicates that this has increased to $350/hr ($2022).

progress to 30 June 2024. The estimated number of properties to be assessed in Stage 1 is 58 out of the total of 130.

Our forecast capex for Valuer General fees is $0.88 million.

Property acquisition costs for the Gugaa substation

Securing the new Gugaa 500/330kV substation site as part of the early works is a critical element to ensuring HumeLink can progress as planned and designs can be undertaken to match the available site location, size and geotechnical conditions. We need to freehold purchase an approximate 90 hectare site for the substation.

The capex forecast is based on a valuation by Knight Frank for the preferred site location [refer worksheet 'Gugaa Substation' Item 2: NSW legislation (extract)]. Knight Franks' valuation approach incorporates the individual components of compensation (disturbance, potential for diminution of balance parcel and potential severance) in total under Section 55(f) Injurious Affection of the Land Acquisition (Just Terms Compensation) Act 1991 [refer worksheet 'Gugaa Substation' Item 1:Transgrid's Property Acquisition Compensation Principles (Appendix A)].

Our compensation principles [refer worksheet 'Gugaa Substation' Item 1: Transgrid's Property Acquisition Compensation Principles (s 7.2)] make an allowance for two times the sum of the costs below to achieve a final negotiated price for the acquisition of freehold land.

Forecast capex for property acquisition for the substation is calculated as:

- Section 55(1) Market Value - [redacted]
- Section 55(f) Injurious Affectation - [redacted]
- Total assessed compensation: [redacted] x [redacted] (allowance for negotiated settlement) - [redacted]

We also need to ensure that a suitable site is established for the Gugaa Substation should negotiations to acquire the preferred site does not proceed. The Option Fees for two other potential sites is estimated to cost [redacted].

The total forecast capex is calculated as:

- [redacted] million + [redacted] million = [redacted] million.

5. Our labour and indirect capex

5.1. Labour and Indirect capex cost categories

This section explains our capex forecast for labour and indirect costs for HumeLink's early works.

We will incur labour and indirect costs during the early works phase of the Project. There are six categories of labour and indirect costs:

- **project team resources** – this capex relates to labour costs for managing development activities and preparing for the delivery of the Project. This includes project management, corporate and other support for procurement, community and stakeholder engagement, land access and environmental approvals.
- **procurement** – this capex relates to indirect costs for contractor bidder payments and data room fees
- **project development** - this capex relates to the indirect costs including non-labour costs for geotechnical and survey studies, concept designs, legal fees and other consultant and professional fees
- **land and environment** – this capex relates to costs required for environmental impact studies, surveys, developing the EIS, and specialist land agent support
- **community and stakeholder engagement** – this capex relates to stakeholder and community engagement during the early works phase for the Project. The stakeholder and community engagement costs relate to non-labour costs of community support, social legacy, design and communication and community improvement
- **regulatory approvals and other support** – this capex relates to completing the RIT-T process with the resolution of the statutory PACR dispute period, working with AEMO for confirmation that the Project remains on the Optimal Development Path, and the preparation of the Stage 1 and Stage 2 CPA submissions and validation of the respective scope and costs.

We have already incurred labour and indirect capex to progress HumeLink, including preparing the RIT-T and our Stage 1 Application. We discuss our labour and indirect capex forecasts for:

- actual costs incurred to December 2021, and
- forecast costs from December 2021 onwards for the current (2018-23) and next (2023-28) regulatory periods

We have submitted a separate document with our Application (A.4 Labour and indirect costs) that provides further detail about the nature of capex for labour and indirect costs, which is consistent with the methods we applied in our CPA's for Project EnergyConnect and VNI.

The associated A.7-Labour and Indirect Cost Model is supported with additional spreadsheets which provide source evidence for our indirect forecast costs. This is provided for all cost subcategories except for forecast categories that total less than $0.75 million each (around 1.5% of the Stage 1 CPA costs in aggregate).

5.2. Actual labour and indirect capex

Our actual capex reflects transactions recorded in Ellipse, our enterprise resource planning (ERP) system. We have allocated and attributed our actual costs to HumeLink in accordance with our cost allocation methodology (CAM). We have also treated actual capex in accordance with our capitalisation policy.

We have allocated our actual labour and indirect capex that we incurred on the HumeLink Project from 1 July 2017 to 31 December 2021 to the indirect capex categories outlined above, which include:

- labour and labour-related capex including travel, expenses (including accommodation, meal allowances and other expenses) and support costs.
- non-labour capex including consulting and legal fees, and outsourced labour and work related to the categories outlined in Table 5-1.

Our actual labour and indirect costs are $38.61 million and represent 19.8 per cent of the total labour and indirect capex forecast. These costs were incurred between 1 July 2017 and 31 December 2021.

Table 5-1 sets out our actual labour and indirect costs by category and year[26].

Table 5-1: Actual Labour and indirect capex by category to 31 December 2021 ($M, Real 2017-18)

Capex category	2017-18	2018-19	2019-20	2020-21	2021-22	Total capex
Labour and Labour-related	-	0.35	5.75	9.18	5.44	20.72
Project management and development	-	0.24	2.71	3.46	2.61	9.01
Procurement	-	-	-	0.42	0.21	0.63
Community and stakeholder engagement	-	0.00	0.32	1.05	0.59	1.96
Land and environment	-	0.07	1.23	2.13	1.16	4.59
Core business engineering and other support	-	0.04	1.50	2.12	0.86	4.52
Non-Labour	0.38	0.28	2.89	6.41	7.93	17.89
Transaction procurement support	-	-	0.05	1.65	1.40	3.10
Project development	-	-	-	-	0.23	0.23
Land and environment	-	-	0.16	1.36	1.58	3.10
Community and Stakeholder Engagement	-	0.12	1.48	2.42	3.42	7.45
Regulatory approvals and other support costs	0.38	0.16	1.20	0.98	1.30	4.02

[26] Table 2.1 p7 in A.4 Labour and Indirect Costs

Total	0.38	0.64	8.64	15.59	13.37	38.61

5.3. Project team resources (labour and labour-related costs)

The capex forecast for the total project team resources is $75.45 million which comprises 38.7 per cent of the total labour and indirect capex forecast within the CPA for Stage 1.

Table 5-2 shows the project team resources total capex forecast for the CPA for Stage 1. This is based on the forecast capex to FID plus the actual costs for each corresponding subcategory. The following section outlines the forecast to FID capex for each category and the basis of the estimates.

Table 5-2: Summary of forecast capex for project team resources ($M, Real 2017-18)

Subcategory	Actual capex	Forecast capex	Total capex
Project management and development team	9.01	30.66	**39.67**
Procurement team	0.63	6.56	**7.19**
Community and stakeholder engagement	1.96	2.72	**4.68**
Land & Environment	4.59	10.06	**14.66**
Core business engineering and other support	4.52	4.73	**9.25**
Total	**20.72**	**54.73**	**75.45**

There are 136 roles in total required for the HumeLink project team. The basis of estimates for these project team resources and salary costs is summarised in section 7 of 'A.4 Labour and indirect costs', provided as an attachment to this Application. The project team resources include subcategories of labour required for project management and development, procurement, community and stakeholder engagement, and land access and environmental approval. The following provides a summary of the scope definition and forecast costs for each subcategory.

Estimates of labour and labour-related costs are described in detail in section 5.2 and section 7 of supporting document of 'A.4 Labour and indirect costs'. Table 5-3 below provides an overview of the assumptions we have used to calculate our forecast capex for project team resources.

Table 5-3: Overview of assumptions used to calculate forecast capex for project team resources ($M, Real 2017-18)

Subcategory	Overview and summary of approach used
Project management and development team	A project centric team organisation structure, reporting to the Project Director, has been developed to ensure sufficient resources are available to effectively manage the Project. The total forecast capex for the core internal project management and development team is based on: • Actual costs of $9.01 million to 31 December 2021. • Forecast costs to 30 June 2024 of $30.66 million for Internal Labour, reflecting an average of around 32.76 FTEs across the forecast period.
Procurement team	Stage 1 requires resources for the procurement of contractors to deliver the HumeLink Project in Stage 2, and for early works consisting of transmission tower steel prototype testing, securing slots for LLE, and the completion of

Subcategory	Overview and summary of approach used
	detailed design work ready for construction. The internal procurement team consist of 12 roles involved in the Project over the period to 30 June 2024. The total forecast capex is based on: • Actual costs of $0.63 million to 31 December 2021. • Forecast costs to 30 June 2024 of $6.56 million for Internal Labour, reflecting an average of around 6.62 FTEs across the forecast period and other tendering resources and expenses to support the tender process.
Community and stakeholder engagement	The community and stakeholder engagement team undertake activities to help obtain stakeholder acceptance for the delivery of HumeLink. The internal community and stakeholder engagement team consist of 12 roles involved in the Project over the period to 30 June 2024. The total forecast capex is based on: • Actual costs of $1.96 million to 31 December 2021. • Internal labour costs to 30 June 2024 of $2.72 million for Internal Labour, reflecting an average of around 2.61 FTEs across the forecast period.
Land & Environment	HumeLink is a greenfield project and due to the size of this project and the geographical expanse it will cover, significant resources will be required to manage the land acquisition process and environmental implications of the project. The total forecast capex for the land and environmental team is based on: • Actual costs of $4.59 million to 31 December 2021. • Internal labour costs to 31 June 2024 of $10.06 million for Internal Labour, reflecting an average of around 12.18 FTEs across the forecast period.
Core business engineering and other support	Internal Labour resources provide support across the D&A phase of work and for the direct early works on the HumeLink Project. Support is required from our internal engineering and design, network planning and development teams, and from corporate support for health and safety, legal, risk and audit, and regulatory activities. The internal corporate and other project support consist of 51 roles working part time on the Project over the period to 30 June 2024. The total forecast capex is based on: • Actual costs of $4.52 million to 31 December 2021. • Internal labour costs to 30 June 2024 of $4.73 million for Internal Labour, reflecting an average of 5.86 FTEs over the forecast period.

5.4. Procurement (indirect costs)

The capex forecast for indirect procurement costs is $27.55 million which comprises 14.1 per cent of the total labour and indirect capex forecast within the CPA for Stage 1 ($195.16 million)

Forecast indirect capex for procurement relates to non-labour costs comprising bidder payments and tender data room costs and support from external procurement transaction resources. A mix of internal and outsourced labour will support the procurement transaction process.

The procurement process in Appendix B describes how we will engage the construction market early through the ECI process which is aimed at:

- ensuring greater cost certainty to support the Stage 2 CPA, and
- improving project definition and site information, discuss innovations, design completeness, develop program assumptions, progress EIS and identify risks and opportunities.

The tender payment and facilities costs over the forecast period is provided in Table 5-4. We describe our capex forecast approach in further detail below.

Table 5-4: Procurement indirect costs and basis of estimates ($M Real $2017-18)

Subcategory	Actual capex	Forecast capex	Total capex
Bidder payments	-	22.22	**22.22**
Data room services	-	0.56	**0.56**
Transaction management expenses	0.23	4.55	**4.78**
Total	**0.23**	**27.33**	**27.55**

Bidder payments

We have forecast capex of $22.22 million for bidder payments. This is based on[27]:

- [redacted]
- [redacted]
- [redacted]
- The total payment is higher for HumeLink due to partly the larger EPC costs for HumeLink compared to Project EnergyConnect and the need to ensure bidders are committed to the project by aligning bid recovery costs closer to current market pressures.

This selected payment has considered specialist advice on higher level of payments for recent NSW infrastructure projects against the backdrop of actual amounts paid for Project EnergyConnect and the NSW Government Policy.

Our forecast capex is based on achieving an accurate estimate through the procurement strategy and the current market conditions to attract competent bidders to participate in the ECI process. The outcome is aimed at achieving collaboration in a competitive tender process to lower costs and risks for the construction works in Stage 2.

Data room services

The $0.56 million is based on a quotation from Ansarada for 250GB of capacity over a 36 month period. [28]

[27] See: A.7a – Indirect Costs Artefacts 1, 'Bidder Costs' sheet, *Item 1: Advice from pro*[2]
[28] See: A.7a – Indirect Costs Artefacts 1, 'Data Room' sheet, *Item 1: Prices from Ansarada.*

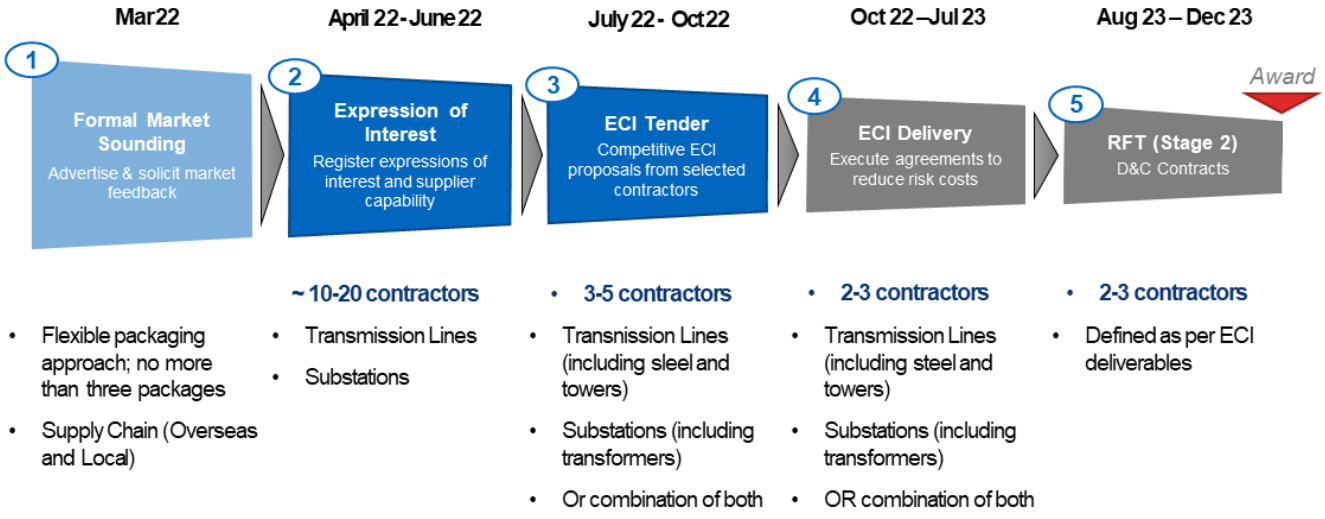
Transaction management expenses

A procurement team has been deployed to develop and implement the procurement strategy. The internal project team will be supported with external contracted services. The transaction management expenses are to cover the costs of our procurement team and associated external services required.

The ECI and procurement phase timeline is shown in Figure 3. The procurement process commenced in 2021 with formal market sounding (phase 1) which will be followed by requests for market capability proposals (phase 2). Transactions will then proceed to an ECI Tender (phase 3) to shortlist contractors for ECI Delivery (phase 4), then through a tender process (stage 5), and then to negotiation and award of contracts (phase 5).

We describe in further detail the actual costs we have incurred to date and our forecast capex we expect to incur by the different phases below.

Figure 3: ECI and procurement phase timeline



Prior to the transaction phases with potential contractors, we undertook market research to refresh our understanding of the potential pool of suitable national and international contractors and to consider suitable contract models for HumeLink based on the various contract models used on similar projects. The research also looked at the five year forecast period (from 2022 to 2027) of the infrastructure market in NSW and Australia with a particular focus on NSW and the Eastern Seaboard. The cost of this external contracted work to 31 December 2021 is $0.23 million and has already been incurred.

The forecast costs are based on achieving an accurate estimate through competitive quotations from specialist service providers and then three progressive revisions of the required resources needed to meet refinements to the scope of work.

Forecast capex for external resources required during the ECI phase 1 and phase 2 is $0.43 million. This covers the following:

- strategy support and costs reviews for the current and remaining transaction phases, and
- transaction management support for further market sounding, requests for capability submissions and evaluation.

Forecast capex for ECI Tender phase 3 is $1.81 million. This involves the critical pre-tender engagement with shortlisted companies to prepare tenders and select bidders for the ECI delivery stage.

Forecast capex for ECI phase 4 and 5 (ECI Delivery and RFT) is $1.62 million. This involves the ECI delivery phase which aims to improve project definition, scope, cost and risk optimisation with Contractors,

and the preparation of documentation for the final competitive tender, issuing of tenders and managing the tender process to when final tenders are submitted, and the contracts are awarded.

Other external expenses will be incurred throughout the contract program including costs for staff travel and accommodation, room hire and catering, probity training and support, and commercial advisory services. The total forecast capex for these external expenses is $0.69 million.

The total forecast transaction management capex is calculated based on[29]:

- Actual costs of $0.23 million to 31 December 2021.
- Forecast costs to 30 June 2024 of $4.55 million for external labour resources and other indirect costs

The total forecast transaction management capex is $4.78 million.

5.5. Project management and development (indirect costs)

Our forecast capex for project management and development is $32.86 million. This comprises 16.8 per cent of the total labour and indirect capex.

Table 5-5 shows the nine subcategories of project management and development capex. Our forecast capex of $32.86 million is derived by adding the forecast capex to 30 June 2024 to our actual costs for each subcategory of capex.

Table 5-5: Summary of forecast capex for project development resources ($M, Real 2017-18)

Capex Forecast Model - subcategory	Actual capex	Forecast capex	Totalcapex
1. External legal expenses	0.54	16.09	**16.63**
2. Project management/Concept Engineering	1.91	2.95	**4.86**
3. Geotech and Surveys	0.05	5.48	**5.53**
4. Owners engineer	0.02	2.60	**2.63**
5. Specialist studies	0.24	0.12	**0.35**
6. Travel, accommodation and minor expenses	0.09	1.03	**1.12**
7. Other (PACR and Project Implementation Plan)	0.23	0.02	**0.25**
8. Probity Advisor	0.01	-	**0.01**
9. Risk analysis, reporting and cost control support	0.02	1.46	**1.48**
Total	**3.10**	**29.75**	**32.86**

[29] See: A.7a – Indirect Costs Artefacts 1, 'Transaction support' sheet, *Item 1: Advice from OCM*, *Item 2: Requisition for support from Pro Squared Consultations*, *Item 3: Connell griffin cost review*, *Item 4: Transaction management support*, *Item 5: Market research*, and *Item 6: Staff Travel & AECOM Expenses*.

The internal project development teams are being supported with external engineering resources providing concept design and engineering, owner's engineering services, risk assessment specialists, geotechnical and Light Detecting and Ranging (LiDAR) surveys and specialist studies.

The development work also requires substantial legal support services which cover the requirements for land acquisitions and transactions, environmental approvals, and predominately in support of the contract program.

The basis of estimates for project development resources applying to each subcategory are summarised below with details provided in section 6.2 of the supplementary document A.4 - Labour and Indirect Costs.

Table 5-6: Overview of assumptions used to calculate forecast capex for project development resources ($M, Real 2017-18)

Subcategory	Overview and summary of approach used
External legal expenses	The external legal support services captured under project development expenses relate to work programs including development advice, land acquisitions and transactions, environmental and heritage issues, support to the contract program and Corporate legal matters. The forecast costs are based on competitive submissions from legal service providers. Their submissions were prepared based on a detailed scope of work for each work program. We also drew on the experience on Project EnergyConnect and other major projects. [refer to A.7a sheet 'Legal' and Item 1]
Project management/Concept Engineering	External design specialists from Aurecon were engaged to provide detailed concept designs required for LLE equipment and materials. The external services also include project managers (up to five in total) to manage the engineering work for the project, environmental approvals, and community and stakeholder engagement during the D&A phase. The forecast costs are based on achieving an accurate estimate through a bottom up estimate of required technical and management resources [refer to worksheet 'Engineering' and Item 1 to 3] and from the three progressive revisions of hours needed to meet the scope of work. The expected costs are also supported by the experience on Project EnergyConnect.
Geotech and Surveys	Geotechnical reports are required to inform contractor's prices. In particular, they inform the costs of foundations and risk costs associated with geotechnical conditions. It is more efficient for us to carry out the geotechnical and surveys once and make the reports available to Contractors in the tendering stage. The forecast costs are based on achieving an accurate estimate through a combination of a bottom-up estimate of the borehole testing required, Project EnergyConnect unit cost rates, and quotations from contractors and consultants for the other range of tests, surveys and studies. [refer to worksheet[30] 'Geotechnical' and Items 1 to 5]

[30] Labour and Indirect Cost Model

Subcategory	Overview and summary of approach used
Owners engineer	The Owners engineer role is separate from the design and construction contractor role, which is to directly deliver detailed design and construction works for the Project. The Owner's engineer is involved in overseeing the technical due diligence aspects of the works. The Owner's engineer operates as a third party overseeing the executing parties' activities throughout a project. The contractor was selected through a competitive process based on a schedule of agreed hours and rates for the expected work activities over the Stage 1 period. Our forecast capex reflects the outcomes of this competitive process. [refer to A.7a sheet[26] 'Owners engineer' and Item 1]
Specialist studies	The specialist studies include: • tower investigations • planning studies • an insulation study • a lightning study • a flood study, and • a transport study. The tower investigation has been completed and the remaining studies will be completed in Stage 1. In general the capex forecast is based on the lowest quotation provided by the respective consultants via a competitive process.
Travel, accommodation and minor expenses	The travel and accommodation expenses for the project management and development teams have been estimated by a build-up of the number of site visits and the corresponding unit costs to meet the requirements of the work scope during the D&A phase.
Other (PACR and Project Implementation Plan)	These are expenses for actual estimates to date for PACR validation and the development of Project Implementation Plan (PIP). An allowance for revisions to the PIP is included in the forecast costs to 24 June 2024. This work was tendered through a competitive process. Our capex forecast reflects the outcome of this competitive tender process.
Probity Advisor	This item covers costs for a Probity Advisor to support the initial project and procurement strategy development. The actual capex to 31 December 2021 was $0.01 million and there is no additional forecast capex.
Risk analysis, reporting and cost control support	The scale, complexity and total expected costs to deliver the HumeLink places significant importance on the development phase for the project to build a robust forecast and to equally apply sophisticated quantitative risk analysis over the whole project. We have engaged an international specialist services company to provide project scheduling, cost control and risk assessment services. This company previously provided advice and support on Project EnergyConnect.

Subcategory	Overview and summary of approach used
	Our forecast costs are based on quotations we received from the selected specialist service provider to undertake project scheduling, cost control and risk assessments services. [refer to A.7a sheet 'Risk analysis' and item 1].

5.6. Land and environment (indirect costs)

The capex forecast for indirect costs for land and environment indirect costs is $28.85 million which comprises 14.8 per cent of the total labour and indirect capex forecast within Stage 1 (early works).

Table 5-7 shows our forecast land and environment (indirect costs) capex, which is based on:

- actual costs of $7.45 million to 31 December 2021.
- forecast costs to 30 June 2024 of $21.40 million.

The total land and environment capex is $28.85 million.

In total, we have identified five sub-categories of capex for land and environment costs. Forecast capex of $18.79 million for EIS development is the largest category, comprising 65.1 per cent of the total costs.

Table 5-7: Summary of forecast capex for land and environment ($M, Real 2017-18)

Capex Forecast Model - subcategory	Actual capex	Forecast capex	Total capex
EIS Application Fee	-	2.58	**2.58**
EIS development	6.96	11.83	**18.79**
Land Agents	-	6.64	**6.64**
Specialist services and expenses	0.04	0.05	**0.10**
Travel, accomodation, and minor expenses	0.44	0.30	**0.75**
Total	**7.45**	**21.40**	**28.85**

Our capex forecast is based on a build of unit costs and quantities at a work scope level and as scheduled over the forecast period. The number of outsourced resources and services are based on quotations from specialist service providers to initial scopes of work. During the estimate review stages the scope of work has been refined and costs reviewed based on quoted unit cost rates.

Comparison with the equivalent activities for other transmission projects confirmed close alignment after adjusting for project capex. GHD Advisory also benchmarked the land and environment internal team costs with other ISP projects and found close alignment of costs.

The basis of estimates for land and environment indirect costs for each subcategory is summarised in Table 5-8 below. Further details are provided in section 6.3 of the supplementary document A.4 - Labour and indirect costs.

Table 5-8: Overview of assumptions used to calculate forecast land and environment indirect costs ($M, Real 2017-18)

Subcategory	Overview and summary of approach used
EIS Application Fee	The EIS Application Fee is based on a calculation of the fee using a template model [refer to A.7b sheet 'EIS Fee' and Items 1] first developed and first used for the Snowy Transmission Connection Project EIS[31]. The template first determines the Capital Investment Value (CIV) which as outlined in Division 1AA of the EP&A Regulation 2000 and the NSW Planning Circular of 2010. We have applied the latest available forecast capex of $2,820 million[32] for the HumeLink Project to meet the definition of the CIV and for the calculation of the fees according to formulas in the regulations. The total calculated fee of $2.58 million comprises the following component fees: • a base fee of $1.27 million (reference 256F33) • a planning reform fee of $1.27 million (reference 256L) • Critical State Significant Infrastructure (CSSI) and Environmental Impact Statement (EIS) exhibition fees totalling $0.05 million (reference 256K and 256L).
EIS development	The resource requirements for developing the EIS consist of: • Work already undertaken commensurate with actual costs (31 December 2021). This includes work undertaken by Aurecon for planning and undertaking seasonal route ecology surveys, the environmental scoping report under the Environmental Protection and Assessment (EP&A) Act and a referral under the Environment Protection and Biodiversity Conservation (EPBC) Act. • Remaining work commensurate with the forecast additional capex will predominately be undertaken by Aurecon and includes: - undertaking targeted threatened species surveys and heritage surveys - providing technical assessments for the EIS and input to route option assessments - completion of EIS documentation The forecast costs are based on achieving an accurate estimate through competitive quotations from specialist service providers and then three progressive revisions of the required resources needed to meet refinements to the scope of work [refer to A.7b sheet 'EIS development' and Items 1 to 9].
Land Agents	This cost covers the costs of four Land Agents, two Property Administrators, and a Property Projects Officer which will be provided over the period of January 2022 to June 2024 to lead the engagement with landholders for the

[31] See: A.7b – Indirect Costs Artefacts 2, 'EIS fee' sheet, *Item 1: CSSI Application Fee Estimate*.
[32] $ 2020-2021
[33] Division 1AA of the EP&A Regulation 2000 and the NSW Planning Circular of 2010

Subcategory	Overview and summary of approach used
	negotiations to establish options to acquire easements, the Gugaa substation site acquisition, and land subject to compulsory acquisition of easements. The costs are based on average monthly rates ($29,623) for the above personnel with two agents scheduled initially until February 2022 and all scheduled from April 2022 to June 2024. Land Agent fees for Project EnergyConnect are comparable to the scheduled costs for HumeLink with a relative increase due to the number of landholders and the number of transactions expected [refer to A7.a sheet 'Land agents' and Items 1].
Specialist services and expenses	These following specialist services have been required and have incurred costs to 30 December 2021: • Aurecon GIS support. The services were required to update and record data in our GIS system related to land information. • Additional Indigenous heritage surveys to inspect proposed substation sites for artefacts that could be disturbed during the construction and operation of the proposed new Gugaa substation. • Surveys of utility services which relates to identifying and recording utility services along the route into our GIS. • Incidental other land management services. The total actual costs to 31 December June 2021 for the specialist services are $0.04 million and the total forecast capex is $0.10 million
Travel, accomodation, and minor expenses	The travel and accommodation expenses for the land and environment work has been estimated by a build-up of the number of site visits and the corresponding unit costs to meet the requirements of the work scope during the D&A phase. The total forecast costs to 30 June 2024 are: • the travel/accommodation expenses (actual and forecast) total $0.52 million • early development work for the connection of Snowy 2 at a cost of $0.23 million which are all historical

5.7. Community and stakeholder engagement (indirect costs)

The capex forecast for community and stakeholder engagement is $18.56 million. This comprises 9.5% per cent of the total labour and indirect capex forecast.

Table 5-9 below shows:

- There are six non-labour subcategories of costs for community and stakeholder engagement, and
- We have adding the forecast capex to 30 June 2024 to the actual costs for each corresponding subcategory to derive the total capex forecast.

Table 5-9: Summary of forecast capex for community and stakeholder engagement ($M, Real 2017-18)

Capex Forecast Model - subcategory	Actual capex	Forecast capex	Total capex
1. Community engagement services	2.44	6.13	**8.57**
2. Media and events	0.01	0.56	**0.56**
3. Community strategy development	0.13	0.45	**0.58**
4. Travel, accommodation, and minor expenses	0.20	0.31	**0.52**
5. Social legacy initiatives	0.32	0.44	**0.76**
6. Community grants	-	7.58	**7.58**
Total	**3.10**	**15.46**	**18.56**

The basis of estimates for each category of community and stakeholder engagement is summarised in Table 5-10 below. Further details are provided in section 6.4 of the supplementary document A.4 - Labour and indirect costs.

Table 5-10: Overview of assumptions used to calculate forecast capex for community and stakeholder engagement ($M, Real 2017-18)

Subcategory	Overview and summary of approach used
Community engagement services	We have engaged an experienced contractor to provide the bulk of the resources to deliver community and stakeholder services. The successful contractor will work in an integrated team with our internal project team, which is focussed on developing and implementing our HES, which includes: • specific actions plans for landholder • the associated indigenous engagement plan, and • social impact engagements and initiatives. [refer to A.7b sheet 'CSE engagement' and item 1, 2, 3, and 4]. The forecast capex is based on achieving an accurate estimate through competitive quotations from specialist service providers and then three progressive revisions of the required resources needed to meet the required improvements to the HES and refinements of the scope of work over the course of the stage 1 and stage 2 engagements.
Media and events	This includes communication media such as newsletters, printing, photography and videos. It includes, for example, film crews for video footage of transmission lines and substations to demonstrate the visual aspects in different terrains. The costs have been based on standard rates for these costs. The total forecast capex is based on: • Actual costs of $0.13 million to 31 December 2021.

Subcategory	Overview and summary of approach used
	• Forecasted costs to 30 June 2024 of $0.45 million for external contract services
Community strategy development	Community strategy work to comply with the recommendations made in the Stowe report. The total forecast capex is based on: • Actual costs of $0.20 million to 31 December 2021. • Forecasted costs to 30 June 2024 of $0.31 million for external contract services
Travel, accomodation, and minor expenses	The travel and accommodation expenses for the community and stakeholder engagement teams have been estimated by a build-up of the number of site visits and the corresponding unit costs to meet the requirements of the work scope during the D&A phase. The forecast capex for travel and accommodation is based on a team of seven and their expected days travelling per month and establishing a monthly average cost. An allocation of earlier work associated with the connection of the then proposed Snowy 2.0 project is included in actual costs ($0.15 million).
Social legacy initiatives	NSW and Federal Government policies currently target a minimum 3 per cent project spend on indigenous employment and businesses and achieving social legacy outcomes. For Project EnergyConnect we are targeting 5 per cent and HumeLink will likely aim to achieve a similar or higher investment over the course of the development and delivery phases of the Project. We have identified and developed opportunities for Social License and Local Community Partnership Initiatives as part of our Social Impact Management Plan. We have established a total of nine separate initiatives that will be funded and the initiatives ranging in costs between $370,000 to $1,350,000 each and averaging around $840,000 per initiative. [refer to A.7b sheet 'Social Initiatives' and item 1].
Community grants	Community grants are part of achieving our social legacy outcomes. Community giving using grants is one initiative towards meeting this objective. The total forecast capex is based on: • Actual costs of $0.01 million to 31 December 2021. • Forecasted costs to 30 June 2024 of $0.56 million for external contract services

5.8. Regulatory approvals and other support costs (indirect costs)

The capex forecast for regulatory approval and other support costs is $11.90 million which comprises 6.1 per cent of the total labour and indirect capex forecast within the CPA for Stage 1.

Table 5-11 shows forecast capex for each of the seven subcategories. We have added the forecast capex to 30 June 2024 to the actual costs for each corresponding subcategory to derive the total capex forecast.

Table 5-11 shows that the largest sub-categories are:

- the preparation of the Stage 2 CPA documents. This comprises 29.4 per cent of total capex, and
- the RIT-T documentation preparation. This comprises around 18.1 per cent of the total capex.

Table 5-11: Summary of forecast capex for regulatory approvals and other support ($M, Real 2017-18)

Capex Forecast Model - subcategory	Actual capex	Forecast capex	Total capex
Stage 2 CPA submission	0.00	3.50	**3.50**
Stage 1 CPA submission	0.09	0.25	**0.34**
Independent external validation PACR	0.64	-	**0.64**
RIT-T documentation	2.07	0.08	**2.15**
Market benefits modelling - Stage 2 CPA	-	1.11	**1.11**
Related expenditure - Snowy II and HumeLink Board Meetings	0.81	0.02	**0.84**
Corporate support and systems	0.40	2.92	**3.33**
Total	**4.02**	**7.88**	**11.90**

Table 5-12 overviews the basis of estimates for each sub-category of regulatory approvals and other support costs. Further details are provided in section 6.5 of the supplementary document A.4 - Labour and indirect costs.

Table 5-12: Overview of assumptions used to calculate forecast capex for community and stakeholder engagement ($M, Real 2017-18)

Subcategory	Overview and summary of approach used
Stage 2 CPA submission	The preparation of the Stage 2 CPA documentation will require drafting and collation of information for regulatory submissions. This includes the preparation of the Stage 2 Principal Application as well as supporting document and models such as: • Scope definitions documents • capex forecasting methodology • Labour and indirect cost document • Capex models for direct and indirect costs • Regulatory models including the PTRM • independent economic and engineering verifications. The forecast capex for preparing our Stage 2 CPA is based on the actual costs incurred in preparing the CPA for Project EnergyConnect. Two specific costs, early works insurance costs and management expenses have been included in this subcategory in the A.4 Labour and indirect cost

Subcategory	Overview and summary of approach used
	model and relate to the delivery of the Stage 1 early works. The cost split is as follows: • Stage 2 CPA documentation $2.11 million • Early Works indirect delivery related costs $1.39 million The contract work insurance cost is based on the insurance costs for Project EnergyConnect and adjusted for the capital value of the direct costs for Stage 1. [refer to A.7b sheet 'Stage 2 CPA' and item 1].
Stage 1 CPA submission	The preparation of documentation the Stage 1 CPA documentation is similar to Stage 2 CPA documentation, albeit that the complexity of scope will be significantly more in Stage 2. We have engaged external technical and regulatory specialists to assist us prepare our Stage 1 submission. These costs are based on fee proposals from suppliers on agreed rates under master service agreements.
Independent external validation PACR	These costs were incurred in the development of the PACR and validation of the costs and benefits for options considered in the RIT-T process.
RIT-T documentation	Specialist consultants have supported the preparation and supporting modelling work during the RIT-process producing the PSCR, PADR and PACR (reports).
Market benefits modelling - Stage 2 CPA	This scope of work will be necessary to confirm the market benefits for the preferred option (HumeLink Option 3C) by accessing competition benefits as defined in the RIT-T for Option 3C under the four scenarios adopted in the draft AEMO 2022 Integrated System Plan. Changes that may occur in the market after the publication of the final AEMO 2022 ISP can also be included. The work would be conducted in 2023 prior to submission of the Stage 2 CPA. The total forecast capex is based on indicative pricing submitted for this work and our consideration for the potential of revisions due to changes to modelling assumptions after the initial modelling work has been undertaken. [refer to A.7b sheet 'Market modelling' and Item 1]
Related expenditure - Board Meetings	Early development costs were captured during the initial studies associated with investigating customer connection options. These actual costs (approximately $0.81 million) have been allocated to a number of work programs under related expenses or travel/accommodation and minor expenses.
Corporate support and systems	We are currently reviewing and will be rolling out improved systems for project governance and assurance This will provide efficiencies in project governance and assurance and is driven by the current growth in major projects that we are undertaking. It will involve new systems and systems integration for cost control, scheduling, contract management, document control, reporting and assurance. [refer to A.7b sheet 'Support' Item 1 and 2]

Subcategory	Overview and summary of approach used
	The actual costs to date and the forecasted costs are based on an allocation of the estimated total implementation costs across HumeLink, other four current major projects. The total forecast capex for this allocation of costs is based on[34]: • Actual costs of $0.40 million to 31 December 2021. • Forecasted costs to 30 June 2024 of $2.92 million. Other costs in this total relate to external expenses for corporate meetings and activities related to the Project as follows: • Actual costs of $0.08 million to 31 December 2021. • Forecasted costs to 30 June 2024 of $0.28 million. The forecast is based on actuals to date and is projected over the remaining time to 30 June 2024.

.

[34] See: A.7b – Indirect Costs Artefacts 2, 'Support' sheet, *Item 1: Allocation of project governance system costs*.

6. Project expenditure profile

The expenditure profile for the CPA for Stage 1 is shown below in Table 6-1.[35] The respective expenditure in the financial years for each category aligns with the high-level delivery timetable and milestones shown in Figure 6.1.

Direct labour and external resources will be engaged to meet the deliverables which are detailed in our Scope definition supporting document, provide with our Application.

Deliverability has been ensured through the development of our Project Implementation Plan for the early works and with the project scheduling and resourcing set up in via our P6 project planning and scheduling software platform. The scope, forecast expenditure and project schedule have been reviewed through our internal and external risk and assurance processes.

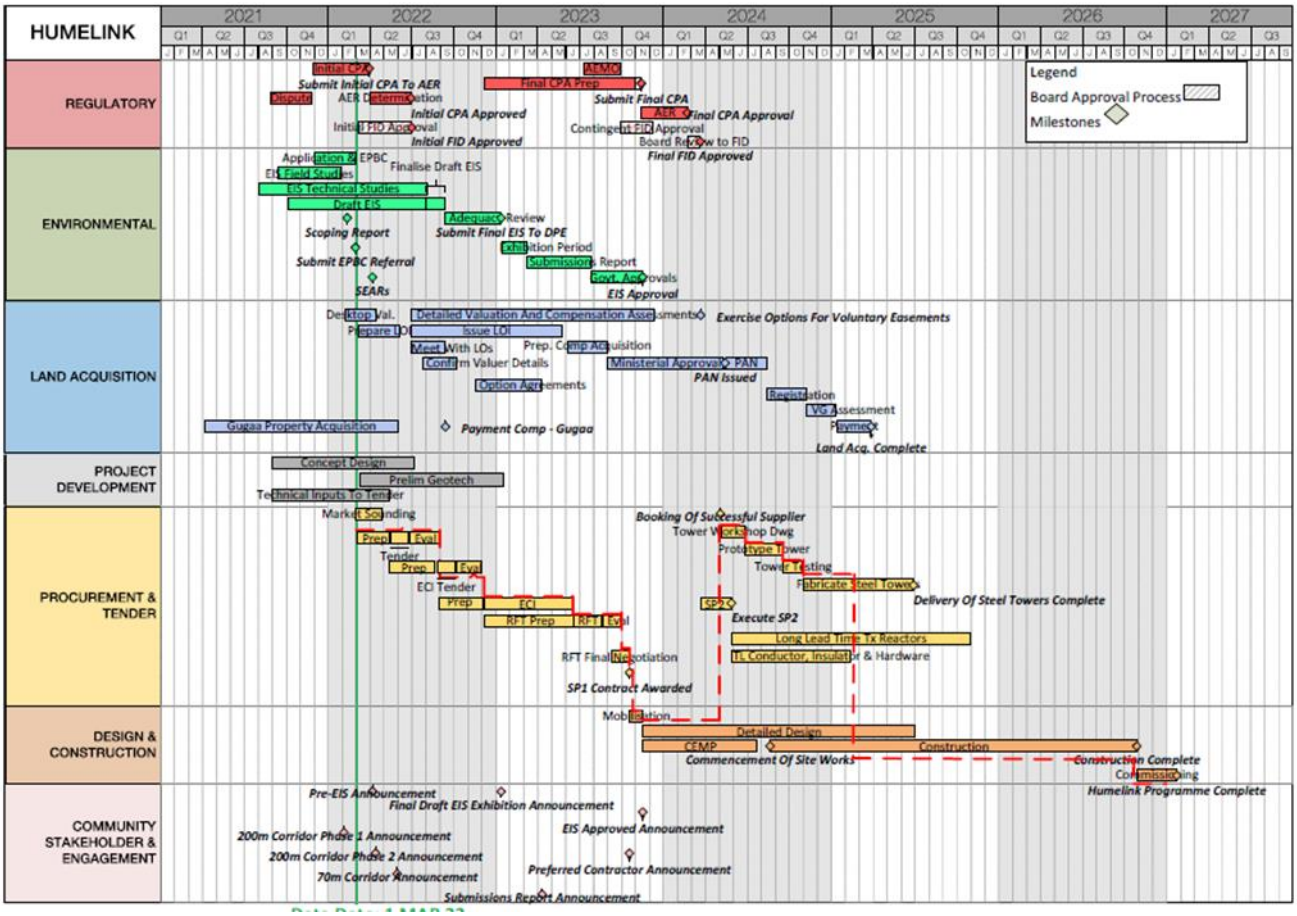
Table 6-1: HumeLink Stage 1 CPA expenditure profile ($M, Real 2017-18)

Category capex	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Direct capex	**-**	**-**	**-**	**-**	**1.70**	**109.51**	**15.51**	**126.71**
Procurement	-	-	-	-	-	89.97	14.63	104.59
Land acquisitions	-	-	-	-	1.70	19.54	0.88	22.12
Labour and indirect capex	0.38	0.64	8.64	15.59	42.89	79.34	47.70	195.16
Labour and related costs	-	0.35	5.75	9.18	15.54	23.59	21.03	75.45
Project team resources	-	0.35	5.75	9.18	15.54	23.59	21.03	75.45
Indirect Costs	0.38	0.28	2.89	6.41	27.34	55.75	26.67	119.71
Procurement	-	-	-	-	1.64	24.79	1.12	27.55
Project development	-	-	0.05	1.65	7.06	14.90	9.20	32.86
Land and environment	-	0.12	1.48	2.42	11.25	10.21	3.35	28.85
Community & stakeholder engagement	-	-	0.16	1.36	4.31	4.01	8.73	18.56
Regulatory approvals and	0.38	0.16	1.20	0.98	3.08	1.84	4.26	11.90

[35] The table excludes equity raising costs.

Category capex	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
other support costs								
Total Capex	**0.38**	**0.64**	**8.64**	**15.59**	**44.58**	**188.85**	**63.20**	**321.87**

Figure 6.1 HumeLink Stage 1 CPA high level delivery schedule



7. Our real input cost escalations

Labour costs make up a large component of our forecast capital expenditure for the Stage 1 CPA – and those costs have increases over the 2018-23 regulatory period by more than inflation. To recognise that, we have included the forecast impact of these costs, which are commonly referred to as real input cost escalation.

Forecast real input cost escalation is calculated by multiplying the labour cost components of the tendered expenditure, property costs, and indirect expenditure by the forecast real labour cost escalators allowed by the AER in its 2018-23 Revenue Determination.[36] Consistent with that determination, no real input cost escalation was included for non-labour components of the expenditure.

The real labour input cost escalators for 2018-19 to 2022-24 are set out in Table 7-1. These are converted into a cumulative index from the 2017-18 year.

Table 7-1: Real labour input cost escalator and cumulative index

	2018	2019	2020	2021	2022	2023	2024
Real labour input cost escalator	N/A	0.81%	0.95%	1.21%	1.46%	1.49%	0.46%
Cumulative index	1.000	1.008	1.018	1.030	1.045	1.061	1.066

Note: Values are rounded for presentational purposes. Unrounded figures were used in the calculations.

The approach is applied in our Stage 1 CPA Capex Model, which is included as an attachment to this Application.

Applying this approach gives forecast real input cost escalation of $2.39 million over the 2018-23 regulatory period, as set out in Table 7-2.

Table 7-2: Forecast real input cost escalation ($M, 2017-18)

	2018	2019	2020	2021	2022	2023	2024
Real input cost escalation	-	0.00	0.10	0.27	0.67	1.35	1.29

[36] See, Australian Energy Regulator, May 2018, *AER - Final decision TransGrid transmission determination - Capex model - May 2018*. The labour escalators adopted by the AER are at cells H23:H27 of the 'Input_Fixed' sheet.

Appendix A Stage 1 CPA Documents

Table A1 is a list of the principal documents for the HumeLink Project Stage 1 CPA. This document is A.3, capex forecast methodology.

Table A1: Documents and models comprising this Application (excluding our other supporting documents)

Document /model number	Name	Content/purpose
A.1	HumeLink - Stage 1 (early works) Contingent Project Application - Principal Application document	Seeks the AER's approval to amend the forecast capex allowance in the 2018-23 Revenue Determination and the revenue requirements and MAR for the 2023–28 regulatory period based on Stage 1 (early works) costs.
A.1A	HumeLink Stage 1 2018–23 Post Tax revenue Model (PTRM)	Demonstrates the calculations of our incremental revenue requirements and MAR for the 2018–23 regulatory period, based on Stage 1 (early works) costs
A.1B	HumeLink Stage 1 2023–28 Post Tax revenue Model (PTRM)	Demonstrates the calculations of our incremental revenue requirements and MAR for the 2023–28 regulatory period, based on Stage 1 (early works) costs
A.1C	HumeLink Stage 1 2018–23 Roll-forward Model (RFM)	Rolls forward the Regulatory Asset Base (RAB) and Tax Asset Base (TAB) across the 2018–23 regulatory period, inclusive of Stage 1 (early works) costs
A.1D	HumeLink Stage 1 2018–23 Depreciation Model	Calculates forecast depreciation based on as commissioned capex over the 2018–23 capex, inclusive of Stage 1 (early works) costs
A.2	Scope definition document	Overviews the scope of our Stage 1 (early works) activities. It also presents the basis on which the works have been efficiently scheduled to: • determine the prudent and efficient construction cost for Stage 2 • identify, explore and manage our project risks, and • meet the 2026-27 target date in the ISP.
A.3	Capex forecasting methodology	Explains and justifies our Stage 1 (early works) capex including: summarising the nature and scope of Stage 1 activities the methodologies we have used to determined our forecast capex, and how we have verified and validated our capex forecast
A.4	Labour and indirect costs	Explains the bottom-up forecast of labour and indirect support costs required for the development and approvals

Document /model number	Name	Content/purpose
		work, management of the early works program, and overall project management.
A.5	Capex forecast model	This model forecasts capex by regulatory asset class and year to 2023-24, sourcing inputs from the Direct Non-Labour Cost Model and the Labour and Indirect Cost Model and applying labour cost escalation and inflation where appropriate
A.6	Direct non-labour model	This model builds up the procurement and land acquisition costs that input to the Capex Forecast Model
A.7	Labour and indirect cost model	This model builds up the labour and indirect costs (including procurement, project development, community and stakeholder engagement, land and environment, regulatory approvals and other support costs) that inputs to the Capex Forecast Model
A.7a	Indirect Costs Artefacts 1	This spreadsheet contains the artefacts that support the cost build up for procurement, project development and land acquisition indirect costs
A.7b	Indirect Costs Artefacts 2	This spreadsheet contains the artefacts that support the cost build up for environmental impact, community stakeholder engagement and regulatory approval indirect costs
A.8	GHD Advisory Independent capex Review	An independent assessment of the scope, procurement process and forecast capex for Stage 1 (early works).

Appendix B : Procurement Strategy

Central to the delivery strategy for the HumeLink Project is an Early Contractor Involvement (ECI) approach to engage design and construct Contractors early in project development to reduce contractor's risk premiums at time of tender. A collaborative early engagement facilitates market feedback on risk allocation and an in-depth understanding of the project prior to tendering.

We will engage the construction market early through the ECI process to:

- ensure greater cost certainty to support the Stage 2 CPA, and
- improve project definition and site information, discuss innovations, design completeness, develop program assumptions, progress EIS and identify risks and opportunities.

The design and construction works will be competitively tendered. We will undertake a tender process that will be interactive with contractors and informed by progressive provision of data, managed through an online data room, and engagement on key elements of project evolution including engineering design, long lead equipment specification and route finalisation.

The procurement strategy anticipates the award of two separate packages for design and construction contracts. While multiple contracts increase our responsibility to manage interfaces between contracts, it also mitigates the risk concentration associated with a single Contractor's performance for a project of this scale.

Bidder payments will be made to unsuccessful tenderers so as to encourage the competitive participation of multiple bidders and support the considerable investment required of the bidders. These payments are in line with common industry practice and NSW government policy[37].

Multiple contractors will be invited to bid on all sections of line and substations. Successful tenderers would be awarded one of the packages each which could be:

- transmission lines and substations, or
- transmission lines only, or
- substations only.

The separate packages of work for transmission lines and substations will also be awarded in two separable portions, the delivery of Stage 1 scope (SP1), and then the delivery of the remaining Stage 2 scope (SP2), the latter conditional on the separate Stage 2 CPA approval by the AER and our FID for Stage 2.

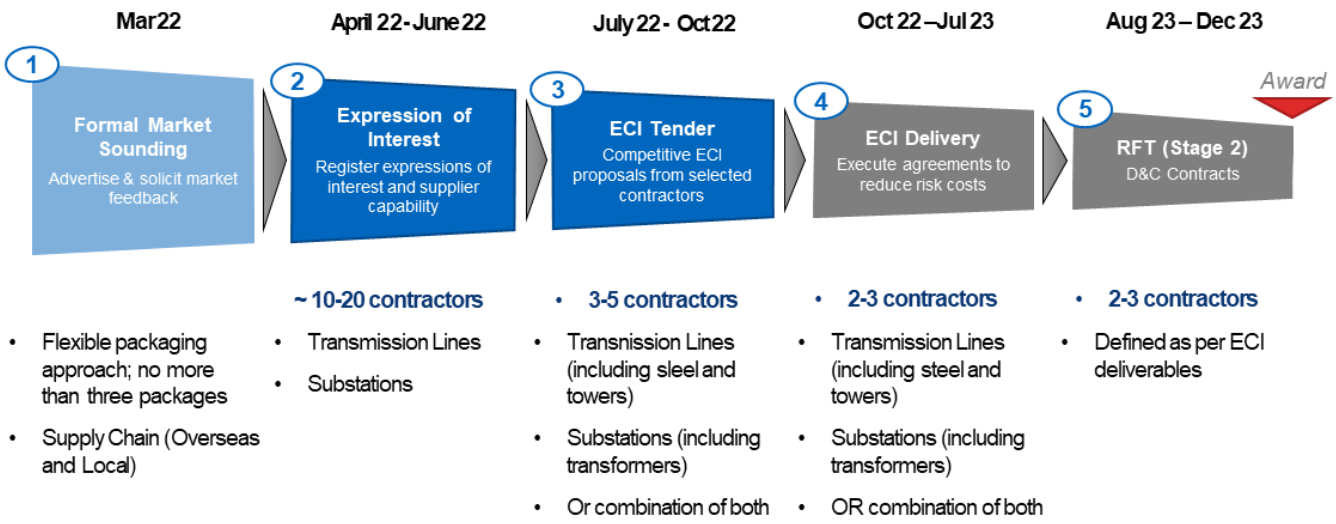
We will need to award contacts as early as possible to enable them to procure long-lead equipment and undertake detailed design and other pre-construction works. We will be able to directly place orders for LLE and novate the supply contracts to successful Contractors should a delay occur in the awarding of Stage 1 separable portion contracts (SP1).

Construction is targeted to commence in Q3 2024, subject to regulatory, planning and funding approval. The current estimate for the duration of construction and commissioning phases is approximately 2.5 years, with completion and handover of works targeted for Q4 2026.

The procurement process has commenced with market sounding in March 2022 and will end at Contract award as shown in Figure C1 as follows, which summarises the timeline from market sounding to Early Contractor Involvement, then through a tender process to Contract award.

[37] Bid Cost Contributions Policy, NSW Treasury, May 2018.

Figure C1 Procurement process timeline, key activities, and output



Implementation of the procurement strategy will proceed through five phases all to occur within Stage 1 to enable the award of the direct project scope included in Stage 1.

Stage 1: Formal Market sounding

Early engagement with the construction market (i.e., prior to the tender process) allows us to build awareness of the Project and assess the level of interest to participate in a tender process.

We have significant in-depth knowledge of the transmission line and substation supply and construction market through its range of projects. Contractors who have been identified as key business partners or having specific relevant experience and express an interest to participate in the HumeLink Project will be invited to the briefings. A market scanning exercise will be used to complement the known list of Contractor's that are able to undertake the proposed works in a 'Head Contractor' capacity with a report prepared from the findings.

Stage 2: Expression of Interest

Capable Contractors will be invited to participate in a detailed market capability exercise, whereby briefings and workshops will be used to both supply and gather the necessary project information and market intelligence. Contractors will be required to prepare a proposal for evaluation, prior to proceeding to the next stage.

Stage 3: Early Contractor Involvement (ECI Tender)

The ECI tender is a critical activity that aims to improve project definition and the tender process. The advantage to ECI is an acceleration of market involvement prior to a tender to introduce potential Contractors to the project details at an early stage.

The ECI will be a paid engagement (payments to unsuccessful bidders) to ensure we secure the attention and the Contractor's resources necessary to meet the objectives.

The ECI will engage the construction market early for:

- cost certainty to support the Stage 2 CPA

- improving project definition of necessary site investigations, resolution of design completeness, interrogate program assumptions (e.g. steel orders, completion date), major risks and opportunities for innovation, and
- the most efficient and effective tender process where tender documents, contract strategy, works packaging, risk allocations are reviewed, and cost premiums are avoided.

Stage 4: Early Contractor Involvement (ECI Delivery)

Collaboration during the ECI delivery will follow a structured Procurement Plan. Prior to commencement the Contractor's will be engaged under an ECI Contract that will include a scope, methodology, schedule and fee. The scope of the ECI will cover topics including:

- the proposed procurement strategy
- site information such as aerial maps, topology, bore logs
- refinement of centreline
- review of proposed concept designs for towers and substations
- design management plan and costs
- tower testing and design innovation strategy
- pre-construction and construction program
- approach to steel procurement innovation and other long lead items
- construction methodology, and
- areas for innovation.

During this stage we will prepare documentation for a competitive tender. The tender will be issued at the conclusion of the ECI delivery phase. Preparation of tender documentation includes the resolution of scope, schedule, cost scheduling and risk allocations incorporated into the legal framework. The information transactions and the following tender process will be managed through a secure data room.

Stage 5: RFT tender process and award of contracts

The tender phase is an interactive period between release of the tender and award of contracts. Communication with tenderers is strictly controlled in formal meetings and all tenderers are treated with equality. The competitive construction tender will be managed by the project team and viewed by the probity advisor to mitigate perception bias by participants.

Participants will be required to tender their design and construction price, program, team and methodology for the entirety of the project scope to avoid 'cherry-picking' the preferred packages. The final awarded contract scope for each Contractor will be determined through the tender phase. Emphasis will be made on maximising certainty of price, while considering the risk allocation framework developed during the ECI delivery phase.

The risk framework determined prior to tender, will consider key common issues in a construction contract, including:

- site management, partial site access impacts to program, construction method, resource strategy
- biodiversity offset impacts on design

- tower design and testing process
- supply delays for steel and transformers
- liability for existing asset integrity that will be reused by the Contractor
- consequential upgrades to substations from system design
- civil works from geotechnical conditions
- latent conditions of contamination or heritage artefacts
- stormwater design related to transformer tank oil containment
- new technologies
- planned network outages
- interfacing with other projects and HumeLink Contractors, and
- develop required “bill of quantities” to identify other Long Lead-time Equipment (LLE) or materials that may require specific/immediate attention.

After contractor’s submit their tendered bids, the evaluation team will commence a process of seeking clarifications and evaluation. Prior to completion of this stage the certainty of the planning approval is likely to occur (if it has not occurred already) and we may have to incorporate impacts from the approval into the tender process. There is a high likelihood that revised proposals will be required prior to the finalisation of the tender evaluation.

At time of award, the funding approval from the Stage 1 CPA is anticipated to permit commitment to the early works scope, including:

- design development
- tower testing
- evolution of EIS conditional planning requirements, and
- premobilisation.

We will award and instruct the preferred Contractors on the above scope, as distinct from the overall scope using separable portions within the contract conditions.

A future instruction to proceed with the construction separable portion will occur when the Stage 2 CPA/FID is approved. This approach will limit our exposure to non-recourse funding commitments of the main construction contract if the Stage 2 CPA/FID is not approved.