ElectraNet

PROJECT ENERGYCONNECT

Cost Estimate Report

30 September 2020

Copyright and Disclaimer

Contents

Figures

Tables

Glossary of Terms

Term	Description
AACE	Association for the Advancement of Cost Engineering
ECI	Early Contractor Involvement
EOI	Expression of Interest
ECS	Engineering Contract Specification
EMS	Engineering Management System
GST	Goods and Services Tax
PACR	Project Assessment Conclusions Report
PADR	Project Assessment Draft Report
PEC	Project Energy Connect
PERT	Program Evaluation and Review Technique (PERT)
PSCR	Project Specification Consultation Report
RFP	Request for Proposal
RIT-T	Regulatory Investment Test for Transmission
Sparq	Standard Processes Assuring Risk and Quality
SPS	Special Protection Scheme
SISC	System Integration Steering Committee
TNSP	Transmission Network Service Provider
WBS	Work Breakdown Structure

1. Introduction

In February 2019, ElectraNet concluded the SA Energy Transformation Regulatory Investment Test for Transmission (RIT-T) with the publication of a Project Assessment Conclusion Report (PACR).

The PACR identified that a new 330kV interconnector between Robertstown in SA and Wagga Wagga in NSW, with a 220 kV spur line to Red Cliffs in Victoria, was the preferred option that satisfies the requirements of the RIT-T, now known as Project EnergyConnect (the Project).

This Cost Estimate Report sets out the detailed basis of the forecast capital and operating expenditure requirements for the delivery of the South Australian component of the Project in support of ElectraNet's Contingent Project Application (CPA) to the AER.

2. Estimating Methodology

The capital expenditure forecasts have been estimated by ElectraNet based on a range of sources, including market information, information from suppliers, consultants' reports, recent projects, and relevant benchmarks. Market based pricing makes up the majority of the estimated capital costs on the Project (over 75%).

ElectraNet manages projects in accordance with its project governance processes and follows a standardised approach to developing, managing and reporting on projects.

In broad terms, the following approach has been adopted for the Project to ensure our capex forecast is prudent and efficient and drives minimum costs for customers:

- A rigorous and robust procurement process, incorporating:
  - A best practice project procurement approach, with a competitive [redacted] early contractor involvement model mitigating schedule uncertainty and supporting both risk and price reduction;
  - Substantial market engagement, both before Expressions of Interest (EOI) and throughout the Request for Proposal (RFP) and evaluation process;
  - Indicative market pricing (derived with a high level of confidence), with a recognition that over 75 per cent of the project estimate is directly informed from the extensive procurement process to date (with the remaining items informed by external valuations, internal estimates and benchmarks).
- Internal delivery costs, developed from a detailed bottom up assessment of resource requirements, based on a project Work Breakdown Structure (WBS).
- A detailed evaluation of project risks and opportunities through a probabilistic assessment process.
- The application of our project governance framework, comprising:
  - Sparq – ElectraNet's project management methodology
  - EMS – Engineering Management System

3. Delivery Model

3.1 Introduction

ElectraNet has devised a commercial strategy and framework for the specific purpose of delivering on this Project and ensuring best for project, best for customer outcomes.

Over the course of the past eighteen months, this strategy has facilitated extensive industry engagement, incorporating both domestic and international contractors considered experienced and capable of performing the scope of works involved.

The result of this strategy and engagement to date has resulted in the following:

1. An optimised concept design and delivery methodology, with market expertise (both domestic and international) providing for an informed market approach;
2. Extensive analysis and market engagement on the transmission line route (in particular), with access and structure location having evolved from the initial concept specification to reflect efficient project delivery;
3. Optimised risk allocation and management, with project risks residing with the party best able to efficiently manage those risks; and
4. An efficient project schedule optimised to ensure best for project outcomes.

3.2 Procurement Objectives

The key objectives informing our procurement process are as follows:

- Ensure a safe, efficient and cost-effective project
- Provide for a collaborative contracting model, encapsulating:
  - Early contractor design involvement
  - Price certainty
  - Aim for zero variations
  - An efficient and fit for purpose project design
  - A cost effective and fixed price (informed by the early identification and quantification of risks, [redacted])
  - Opportunity for innovation in design and delivery models and practices to drive efficiencies in project costs
  - Improved interface between design and construction
  - Schedule certainty
- Consider the security and continuity of contractor resources, noting the extensive energy market activity both planned and currently underway
- Deliver an appropriate, best for customer procurement approach with the engagement model and contractor costs independently verified as required

In early 2019, a cross functional Buying Team comprising senior project management, engineering and commercial specialists from across ElectraNet was established for the Project. The Buying Team committed to achieving the following project specific objectives:

- Obtain the lowest delivery cost at an acceptable level of risk;
- Ensure that project outcomes meet the technical and functional requirements;
- Obtain capable and experienced resources for key functions including line design, site management, health, safety and environmental management, and construction;
- Implement a robust and effective risk management strategy that provides for an appropriate allocation of risk;
- Adhere to Cultural Heritage, landowner and native vegetation site access requirements;
- Satisfy the project schedule requirements to ensure:
  - Benefits are delivered to customers as soon as practically possible;
  - Construction outages are minimised;
  - Network failure risk is mitigated by energisation as early as possible;
  - Resources are not constrained due to concurrent impact of other major projects;
  - Minimise project delivery costs by avoiding the potential for stand-down costs;
  - Minimise the need for contingency costs;
- Where possible and appropriate, use local resources to minimise delivery risk and costs.

In order to achieve the above objectives, the Buying Team has developed a commercial framework which will:

- Allow for individual work packages that enable contractor scale and efficiency, ensuring best value for money outcomes;
- Cater for competitive early contractor involvement, with early design facilitating an accurate quantification of risk, and competitive tension to ensure best-for-project pricing;
- Ensure an appropriate allocation of risks, including:

[redacted]

3.3 Procurement Process

The diagram below provides a high-level overview of the procurement process for the Project.

The process commenced in early 2019 with a joint market engagement with TransGrid to identify the potential contractors capable and willing to participate in a procurement process for a project of this nature and scale.

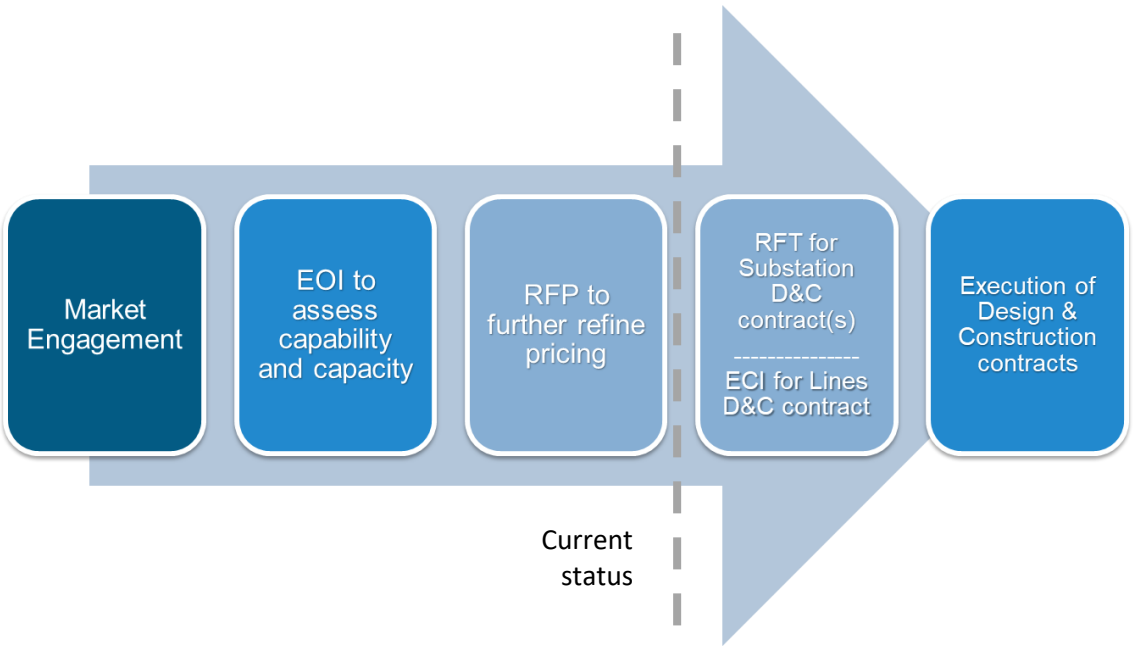

Figure 3-1: ElectraNet Procurement Process

A key output from the procurement process was market confirmation of ElectraNet's commercial framework being best suited to deliver successful and efficient project outcomes, with three key work packages being structured as follows:

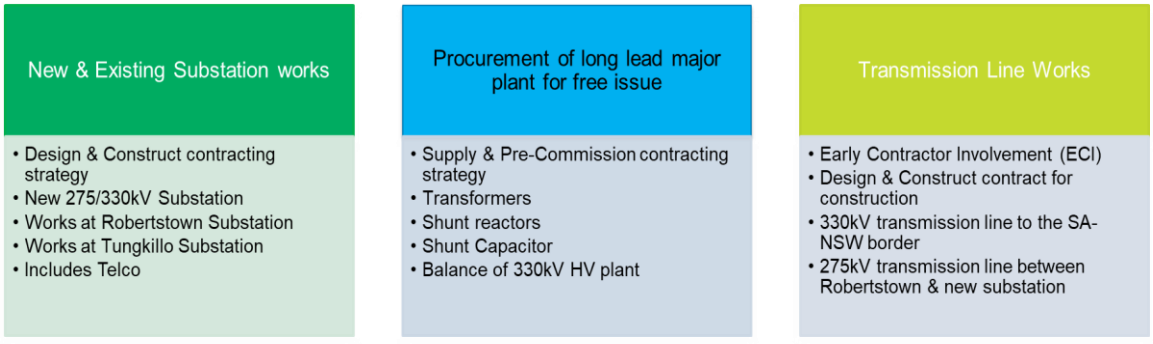

Figure 3-2: Commercial Framework

3.4 Market Approach

In April 2019, ElectraNet issued an Expression of Interest (EOI) to a select group of both domestic and international contractors specialising in the design and construction of transmission lines and/or substations, specifically:

1. Consolidated Power Projects
2. Enerven Energy Infrastructure
3. Quanta Services Australia
4. Zinfra
5. Elecnor
6. Downer Group
7. UGL Limited
8. VINCI Energies
9. Acciona
10. John Holland Group

The EOI was intended to identify potential contractors best able to successfully deliver against ElectraNet's critical success factors. To identify a short list of contactors, ElectraNet sought detailed information (reflecting agreed pre-determined evaluation criteria) on:

- Workplace health, safety and environmental Native Title, Cultural Heritage and quality systems;
- Capabilities and experience in working at culturally and environmentally sensitive heritage sites;
- Delivery capabilities and experience;
- Key personnel;
- Proposed suppliers;
- Subcontractors and consultants;
- Corporate structure;
- Financial capacity;
- Employee arrangements (enterprise agreements); and
- Insurances.

In May 2019, on receipt of the EOI responses and following a capability assessment process, [redacted] were invited to participate in the next phase of the procurement process, a Request for Proposal (RFP). The RFP sought specific, detailed information (reflecting agreed pre-determined evaluation criteria) regarding:

- Proposed delivery methodology
- Opportunities to depart or value-add to the proposed concept specification
- Contractor fees and pricing on a non-binding basis
- Project schedule
- Technical qualifications
- Commercial qualifications

The invited parties are shown below.

Table 3-1: Invited Market Participants

[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

The next six weeks saw extensive contractor engagement, incorporating ElectraNet presentations, briefing sessions and a number of RFP addendums issued. These activities progressed with a view to ensuring informed and appropriate market pricing.

3.5 RFP Evaluation

In July 2019, following the submission of RFP responses, ElectraNet undertook an extensive assessment and evaluation process. The assessment included:

- Presentations by contractors addressing project resources, safety performance, historical projects, workforce planning and indicative delivery plans;
- Site visits to review and inspect site management procedures, work practices, workmanship and site management capability;
- Detailed reviews of pricing and cost structures in building up packaged costs;
- Risk analysis, including the interface of risks between contractors;
- A consideration of alternative delivery strategies and their cost impacts; and
- Scenario analysis and sensitivity testing.

3.6 RFP Price Refresh

In March 2020, ElectraNet undertook a refresh of the market pricing previously submitted.

The contractors were asked to review and update their previously provided RFP pricing and schedules to capture the impact of any market changes since the RFP process in July 2019.

Of particular relevance was the impact of COVID-19 on China and associated markets, with a significant proportion of plant, equipment and construction materials being sourced from Asia and India.

3.7 RFP Shortlisting & Site Clarification Activities

In July 2020, following an extensive clarification and evaluation process, [redacted].

Further site-based activities were then undertaken with [redacted]. The site clarification works centred around civil works, access tracks, environmental and cultural heritage impacts. The activities allowed engagement with the contractors to better understand the logistics of how to build the transmission line.

The key objectives of the RFP site clarification activities were to:

- Confirm RFP pricing (particularly access and site conditions)
- Provide an additional level of confidence in the estimate prior to CPA lodgement (allowing for reduced contingency)
- Reduce risk
- Support contractor engagement & consultation
- Maintain contractor critical resources in SA

The biggest portion of the project is the transmission line and the biggest challenge is understanding the logistics of mobilising people and resources in and out along the easements and the impacts on the environment.

This updated information led to a number of relatively minor adjustments to the capital cost estimate and provided added confidence in the accuracy of the forecast.

3.8 Negotiation and Award

The three primary work packages will be procured and delivered as follows:

Design and Construction of Substations

ElectraNet will leverage the outcomes of the EOI to issue a tender to a select group of contractors specialising in the design and construction of substations.

The tender will be informed by an ElectraNet specification and evaluated in accordance with pre-agreed evaluation criteria. [redacted].

[redacted].

Supply of Primary Plant

ElectraNet will issue a competitive RFT for the free issued plant [redacted].

The tender will be informed by an ElectraNet specification and evaluated in accordance with pre-agreed evaluation criteria. [redacted]

[redacted]

Design and Construction of Transmission Line

ElectraNet will undertake a dual, competitive Early Contractor Involvement (ECI) process. The dual ECI will provide for:

- Significant competitive tension, resulting in best for project, best for customer outcomes;
- Early contractor involvement facilitating interface linkages between design and construction, reducing delivery costs and risks;
- Significant value engineering, ensuring an appropriate and efficient project;
- Fewer variations, noting that the contractor will have been involved early in the design and will enter into the project with a greater knowledge and awareness of project risks;
- Early risk identification, with risks mitigated and properly allocated to the party most efficiently able to manage and address, reducing delivery costs; and
- The demonstration of early collaborative behaviours, leading to a more efficient and successful project (reducing costs).

The ECI deliverables include, but are not limited to the following:

- Tower selection
- Constructability
- Design
- Access logistics
- Laydown areas

- Access paths
- Camps
- Footing design & selection
- Geotech
- Fixed & firm contract price

It is recognised that the [redacted] - the ECI will identify, quantify and allocate this risk to the party best able to manage the risk in a competitive environment, ensuring best for customer outcomes.

[redacted].

4. Basis of Estimate

4.1 Estimate breakdown

As discussed above, our capital expenditure forecast has been estimated based on information obtained from prospective vendors, current delivered costs and prevailing market rates. This information is drawn from a range of sources, including competitive tender responses, market information, current and historical projects.

Our capital expenditure forecasts have also addressed a range of other factors through the course of detailed project planning, including detailed assessment of project risks, additional access track requirements, environmental approval requirements, and the impacts of COVID-19.

4.2 Weighted average analysis and costs

[redacted]

[redacted]

Our risk assessment contains detailed evaluation and probabilistic assessment of known risks which provides a way to capture the uncertainty of the items listed above and other key risks and opportunities, both until contract award and during the design and construction phase of the project.

In balancing all of these considerations, the capital expenditure forecast represents the most prudent and efficient estimate of the project costs based on all the information available at this point in time. Our risk mitigation activities, weighted average pricing methodology, the procurement process to date and the next steps of competitive tendering together with our detailed risk assessment combine to provide a high level of confidence in this forecast.

A breakdown of the capital expenditure forecast is provided in Table 4-1 below and is detailed in the following sections.

Table 4-1: Breakdown of capital expenditure forecast ($m 2019-20)

Component	$m	Basis
Transmission Lines	268.2	Indicative market pricing which was normalised and a weighted average estimate determined for: • Transmission line between Robertstown and the border [redacted]
Substations	112.3	Indicative market pricing which was normalised and a weighted average estimate determined for: • Bundey substation • Robertstown substation • Tungkillo substation [redacted]
Project Delivery (including costs incurred to date)	33.4*	The project delivery forecast is based on a detailed bottom up resource assessment. The resource plan was developed based on roles required as per the work breakdown structure that was used to develop the project schedule. The estimate also includes the costs incurred to date.
Special Protection Scheme	19.6	Based on independent estimate of the expected scope and cost of the scheme
Land & Easement	11.5	Independent valuations prepared by an external consultant
Internetwork testing	13.9	Estimate of testing costs and requirements developed with AEMO and TransGrid
Environment, Stakeholder & Cultural Heritage	10.6	Estimate based on known scope of works based on external consultant estimates and revealed costs
Risk Allowance	16.9	Detailed probabilistic risk assessment reflecting a P50 (50% probability of exceedance) estimate
Total	**486.3**	**Market pricing accounts for over 75% of total costs**

** Excludes prior period expenditure of $3.4m ($2019-20)*

4.3 Transmission Line

The cost estimates for the transmission line works have been derived from competitive market pricing. The indicative market pricing was normalised for known risk factors and an efficient cost estimate derived through the weighted average analysis process.

[redacted]

Table 4-2: Summary of transmission line pricing ($m 2019-20)

Transmission Line items	$m
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
Total Lines	**268.2**

4.4 Substation

The cost estimates for the substation works have been derived from competitive market pricing. The indicative market pricing was normalised for known risk factors where relevant (including inclement weather and latent conditions) and an efficient cost estimate derived through the weighted average analysis process as follows:

[redacted]

[redacted]

Table 4-3: Summary of substation cost ($m 2019-20)

Substation Items	$m
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
Total Substations	**112.3**

4.4.1 Primary Plant

The cost estimates for primary plant, [redacted], have been informed by a competitive market approach. The indicative market pricing was normalised and put through the weighted average analysis process.

4.5 ElectraNet Project Delivery Costs

Project delivery costs have been forecast based on current costs, consistent with benchmarks accepted by the AER in previous revenue determination processes and application of ElectraNet's approved Cost Allocation Methodology. ElectraNet delivery costs have been developed from bottom-up principles based on resource assessments based on individual functions or roles with effort estimated based on the project schedule.

Project delivery costs represent approximately 7.2% of total project cost. This compares favourably with the project delivery costs of 8.9% recently approved by the AER for Eyre Peninsula Reinforcement, a greenfield line project of similar scale and complexity.

The project scope of work was broken down and a Work Breakdown Structure (WBS) created to estimate the duration and cost for each of the WBS components. The cost components include:

- Direct hours for ElectraNet project personnel
- Hours for resource contractors employed or to be employed by ElectraNet
- Contract Works Insurance
- Consultant's costs for external legal support and
- Costs for regional, interstate and international travel and accommodation.

The actual costs incurred to date include a range of early works undertaken until January 2020 centred around:

- route selection,
- environmental approvals,
- preliminary line design,
- stakeholder and community consultation
- land and easement acquisition

Table 4-4: Summary of Project Delivery Costs ($m 2019-20)

Category	$m
Actuals to date	5.7*
Forecast internal delivery costs	23.8
Contract Works Insurance	1.9
External Legal Services	0.8
Travel & Accommodation	1.3
Total	**33.4**

**Excludes prior period expenditure of $3.4m ($2019-20)*

Table 4-5: Breakdown of Forecast Internal Delivery Costs ($m 2019-20)

Component	$m
Project Management	8.6
Contract & Procurement	0.6
Safety & Sustainability	0.8
Land, Easements & Planning Approvals	0.6
Engineering	7.4
Regulatory, Legal & Finance	0.3
Network Planning	5.5
Total	**23.8**

The internal delivery costs were developed based on detailed resource assessments through a bottom up approach based on the WBS from the project schedule. The functions and roles have been developed from the project management and engineering management methodologies.

The delivery functions have been broken down as follows:

Category	Delivery functions
Project Management	All roles related to the project management of the project. The functions needed to manage; • Time, cost, quality, resourcing, stakeholders, procurement, risk, communication, change control, reporting and governance • Monitor and report construction progress • Document management • Project Administration – Management of correspondence – Formatting of letters and documents – Minutes and agendas for meetings – General support for the team
Contract & Procurement	All the roles and functions to develop, negotiate, maintain and close all the contracts to deliver the project.
Safety & Sustainability	All the roles and functions to oversee the principal contractor's delivery of the project to the legislative, regulatory, industry and business requirements. • Execute ElectraNet's duty of care under the WHS Act; • Hold account the principal contractor for the safe and appropriate management of day to day site safety; • Audit, inspection and monitor contractor's safety and environmental practices and performance; • Report to regulatory bodies on performance and deviation from requirements; • Hold account the contractor to meet all environmental laws and best practice; • Investigate and hold account the principal contractor for all safety and environmental incidents and negative events • Provide safety and sustainability leadership and strategy to ensure positive and mutually beneficial outcomes to all parties
Land, Easements & Planning approvals	All the roles and functions to obtain all the required land, easements and statutory approvals in accordance with the applicable rules, regulations and standards. • Development approval and management • Environmental approval and management • Cultural Heritage approval and management • Preparation of cultural heritage agreements • GIS System support • Land Access Permits management • Community liaison

Category	Delivery functions
Engineering & Technical Management	All the roles related to the technical management of the project. The functions needed to develop, maintain: • Engineering Scopes • Safety in Design • Engineering Contract Specifications • Concept and preliminary designs • Factory audits • Outage planning • Asset and Network requirements • Engineering consultancies • Design reviews • ITP review including sign off • Review of standards • Clarification of technical issues • Manage as built information, • Manage close out • Monitor testing process • Facilitate and assist with asset handover • Maintain the Asset Management system • Development of asset maintenance plans • Asset handover acceptance • Outage bookings • Switching sheets • Operational Protocols
Regulatory, Legal & Finance	All the roles and functions related to; • regulatory approvals, • legal development, negotiation and review of contracts, agreements and resolution of legal disputes, • financial and economic modelling
Network Planning	All the roles and functions related to; • System studies and analysis, network configuration studies and Impacts, fault levels and earthing studies • Connection Configuration • Design Studies – Insulation Co-ordination – Switching and TRV Studies – Secondary Arc and NGR sizing – Single Pole Auto reclose Studies – Dynamic Reactive Control Scheme • SPS detailed assessment, development and coordination with other parties • Review Emergency Control Schemes • Constraint Equations and inter regional co-ordination • Inter network testing • Development of test plans – Participation on the System Integration Steering Committee (SISC) – Configuration and testing of the capacity transfer

Category	Delivery functions
Contract Works Insurance	Insurance premiums to cover the risks associated with construction activities additional to existing insurance cover.
External Legal	All the external services related to legal development, negotiation and review of contracts, agreements and resolution of legal disputes
Travel & Facilities	All the services related to: • Travel and accommodation • Vehicle management • Facility management • IT management

Contractor Roles & Responsibilities

The D&C contractors will be responsible for completion of the following key activities, inclusive of respective project management and overhead cost.

Category	Contractor Responsibilities
	
	

Category	Contractor Responsibilities
[redacted]	[redacted]

4.6 Special Protection Scheme

A concept level report for the SPS has been prepared.

Independent experts BECA were engaged to review the original report, prepare a high-level functional design and develop a detailed cost estimate.

4.7 Land & Easement costs

The cost estimates for land and easements were based on independent valuations and advice from external consultants, overseen by internal subject matter experts. There are [redacted] parcels of land over which easements are required for the delivery of the line works on the project.

The cost estimates have been prepared on a desktop basis with reference to data provided by ElectraNet subject matter experts. [redacted]

[redacted]

Table 4-6: Summary of Land and Easement costs ($m 2019-20)

[redacted]	[redacted]	[redacted]	Total ($m)
[redacted]	[redacted]	[redacted]	11.5

4.8 Inter-network testing

The inter-network testing cost estimate was developed in conjunction with the System Integration Steering Committee (SISC) which brings together the accountable managers from AEMO, ElectraNet and TransGrid to oversee and coordinate the internetwork testing arrangements.

Internal costs are borne by ElectraNet and TransGrid while the testing costs are shared on a 50:50 basis as follows.

Table 4-7: Summary of inter-network testing costs ($m 2019-20)

[redacted]	[redacted]	[redacted]	Total
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	**13.9**

Given the level of uncertainty over the extent and level of re-testing required, the shared costs associated with re-testing have been captured in the risk allowance.

4.9 Environment, Stakeholder & Cultural Heritage

The costs associated with environment, stakeholder and Cultural Heritage approvals have been estimated based on the advice of external experts in conjunction with internal subject matter experts and in consultation with contractors for constructability methodology. The cost estimates have been developed through a combination of desktop studies and on-site studies.

The services cover the following areas.

- Corridor Selection
  - Route selection
  - Landowner discussions
  - Land access agreements
- Environmental
  - Development Approvals
  - Environmental Impact Assessment and Approvals
  - EPBC Referral
  - Federal and State Government Assessment and Approval Fees
  - SEB Offset costs
  - Commonwealth Offset cost
- Stakeholder Engagement & Communication
  - Key stakeholder engagement
  - Regional Engagement Campaigns
  - Development of Feedback capture and stakeholder analysis tools
  - Website development and launch
- Cultural Heritage
  - Cultural heritage discussions
  - Aboriginal Heritage Agreements
  - Cultural heritage survey and co-ordination

The corridor selection, environmental and stakeholder engagement and communication cost estimates have been provided by independent expert consultants, JBS&G.

4.9.1 Route Selection & Land Access

The cost estimate includes all corridor and route selection works along with internal land, engineering and environmental resources. The studies involve a range of engineering, environmental, social and land access investigations to assess the constraints and opportunities to inform the corridor selection.

The cost estimate also includes the services to obtain land cadastre, obtain contact details of landholders, initial contact with landowners, the tender to manage land access specialists to undertake to thorough valuation of easement costs, negotiation of the easement costs with landowner and to provide web portal detailing land access progress.

4.9.2 Environmental

The cost estimate includes preparation of DA, preparation of Environmental Impact Statement, preparation of EPBC, specialist studies to produce ecology reports and Significant Impact Statements as well as noise, air quality, traffic and economic reports, provide web portal detailing environmental constraints and Federal and State Government Assessment and Approval Fees. The fees have been generated from "SA Government Assessment and Approval Fees" guidance. EPBC fees have been estimated using the "EPBC Act Cost Recovery - Fee Schedule".

Native Vegetation SEB Offset payments have been estimated using the [redacted] easement corridor and based upon indicative structure and access clearances provided by the contractors, and Commonwealth offset payments have been estimated based upon [redacted].

4.9.3 Stakeholder Engagement & Communication

The cost estimate includes website development, key stakeholder engagement and messaging, development of feedback capture and stakeholder analysis tools, develop stakeholder engagement plans and regional engagement campaign and ongoing coordination with TransGrid.

4.9.4 Cultural Heritage Fees

The Cultural Heritage cost estimates were provided by our independent expert consultant, Indigenous Engagement Australia. The Cultural Heritage cost estimates also reflect Traditional Owner agreements in place with existing Traditional Owner groups.

The cost estimates have been developed in conjunction with external Cultural Heritage advisors, and after initial meetings with the Traditional Owners and costs are based on the rates and manpower quantities detailed in our current agreements.

[redacted]

Table 4-8: Breakdown of Environment, Stakeholder & Cultural Heritage Costs ($m 2019-20)

Category	$m
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
Total	**10.6**

4.10 Project Risk Assessment

An appropriate project risk allowance has been calculated based on the established project risk management methodology previously accepted by the AER.[1] This methodology involves a detailed evaluation and probabilistic assessment of known risks and opportunities that reflect the stage of the project in the delivery cycle and complexity of the works involved.

The steps taken in performing these risk assessments are outlined below:

- Project risks are identified through a process of expert internal review and assessment across the relevant project disciplines. A description of each risk is captured and documented within a risk register.
- A risk assessment is undertaken to identify appropriate mitigation measures and quantify the cost impact of the residual risk. The detailed inputs to this risk assessment are determined with the relevant subject matter experts.
- Monte Carlo Analysis is performed to simulate project risk cost outcomes on a probabilistic basis, based on the likelihood of occurrence and range of potential cost impacts across each of the identified risks on a 50% probability of exceedance ('P50') basis.
- The outcomes of this risk assessment are used to establish the risk allowance component of the capital cost estimate.

Further risk reviews were undertaken to consider lessons learned on recent contingent projects and the Capex Risk Allowance Workshop held by the AER with ElectraNet and TransGrid in September 2019. A joint risk workshop was also held between ElectraNet and TransGrid to ensure good practice, alignment and coordination.

[1] Consistent with AER's Expenditure Forecast Assessment Guideline (2013) and the risk allowance methodology used in ElectraNet's recently approved Main Grid System Strength contingent project application: https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/contingent-projects/electranet-main-grid-system-strength-contingent-project.

The risk allowance includes:

- Risks that relate to a realistic latent condition with the site(s) [redacted]
- Risks associated with the actions or requirements of a third party that are not under contractual arrangement with the NSP and hence the risk is not able to be addressed through enforcement of the contract terms [redacted]
- Opportunities that have been identified to realise potential savings and efficiencies in the delivery of the project.

The risk allowance does not include:

- Risks that are reasonably under, or should reasonably be under the control of ElectraNet [redacted]
- Risks that would normally be managed by ElectraNet as part of business as usual practices within its overall portfolio of projects [redacted]
- Risks that are, or should, reasonably be covered by contract terms [redacted] or
- Risks that are, or should be, reasonably covered by insurance [redacted] or otherwise recoverable from third parties.

The risk allowance was developed using the Risk Engineering Society Contingency Guidelines, drawing on information from current projects, lessons learned as well as historical information.

For each risk, three-point estimates for cost and time were estimated and then subjected to a Monte Carlo simulation from which an overall P50 estimate was derived as the basis of the overall risk allowance. The primary risks and opportunities are summarised below.

Table 4-9: Top risks by value ($m 2019-20)

Risk Description	Risk Level	Weighted Avg P50 ($m)
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
Total Risk Allowance	**$16.9**	

Further details are provided in the risk register that accompanies the Contingent Project Application, including detailed explanation and assessment of the individual risks.

5. Incremental Operating Expenditure Requirements

5.1 Background

While the majority of the future maintenance and operating costs associated with the Project can be expected to commence in the next regulatory control period after the completion of the Project, some minor incremental operating expenditure will be incurred in the balance of the current regulatory period to allow for the efficient delivery of the Project. The basis of these forecast requirements is outlined as follows.

5.2 Resource Requirement

Maintaining power system security relies on dependable and reliable Special Protection Schemes (SPSs) to prevent or mitigate against wide area impacts following significant contingency events. The growing complexity of the power system is resulting in more complex special protection schemes to ensure the resilience of the power system.

The introduction of the new interconnector will result in a fundamental change to the SA transmission system. Whereas currently SA is at the extreme end of a mostly linear NEM transmission system, the Project will have the effect of 'meshing' SA with the NEM with two AC connections – one via the existing Heywood interconnector to Victoria and the other via the new interconnector to NSW.

Consequently, the Project will significantly increase the number and complexity of special protection schemes required for maintaining system security. Regular functional review of all SPSs is required, and this effort will have to be stepped up significantly with the introduction of the Project. As a minimum, the following schemes will have to be redesigned since Project EnergyConnect has a fundamental impact on their operation:

- Under Frequency Load Shedding
- Over Frequency Generation Shedding
- System Integrity Protection Scheme
- Other schemes that may be impacted, e.g. generator runback schemes

As a result, the following additional specialist engineering role will be required on an ongoing basis:

Table 5-1: Resource Requirements

Role	Function	Level	No. FTEs	% of time allocated to opex	Required Starting Date
SPS Functional Lead	Regular Functional review and oversight of all SPSs	Principal Engineer	1.0	60%	Jan 2021

To forecast the additional cost, ElectraNet has applied the relevant labour unit cost for the required role calculated in accordance with the approved Cost Allocation Methodology.

The fully burdened hourly rate was then multiplied by the average productive work hours for the role category as reported in ElectraNet's 2019 Category Analysis RIN and the proportion of employee costs related to operating expenditure to determine the incremental resource costs applicable to operating expenditure during the balance of the current regulatory period.

5.3 Land Tax

Ongoing land tax will apply to the new Bundy Substation land parcel once obtained. ElectraNet has estimated this cost at $3,000 ($ 2019-20) per annum based on existing valuations, assumed to apply from 2021-22 onwards.

All remaining expenses associated with land, approvals, Cultural Heritage costs, community consultation and easements have been captured in the capital costs for the Project.

5.4 Incremental operating expenditure forecast

The incremental operating expenditure requirements associated with the Project are summarised as follows.

Table 5-2: Summary of additional opex requirement in ($m Nominal)

Requirement ($m Nominal)	2019	2020	2021	2022	2023	TOTAL
SPS Functional Lead	0.000	0.000	0.000	0.123	0.255	**0.377**
Land Tax	0.000	0.000	0.000	0.003	0.003	**0.006**
TOTAL	**0.000**	**0.000**	**0.000**	**0.126**	**0.258**	**0.384**

6. General Pricing Assumptions

We have made the following assumptions when compiling our cost estimates:

- All costs are based on indicative market prices for labour, materials and equipment hire;
- The following approvals and/or agreements are envisaged to be in place at project commencement:
  - necessary State and Commonwealth environmental approvals for the project;
  - necessary land access or easement agreements are in place with landholders; or other third parties
  - necessary heritage agreements with Traditional Owners for access are in place; and
  - No Native Title issues are encountered
- Reasonable market conditions; and
- Contractor/ resource availability

Internal labour costs has been escalated based on the approved labour cost escalation rates in the current regulatory period.

7. Exclusions

The following are excluded from the cost estimates:

- GST;
- Cost of decommissioning and site rehabilitation at end of asset life;
- Staging costs (assuming each project work package is carried out in one continuous effort);
- Generation support (assumed not required); and
- Force majeure and abnormal climatic conditions.

ElectraNet