

South East SA Renewable Energy Zone

Preparatory Activities – Draft Report

30 JUNE 2023

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1. Introduction, context and background

AEMO's 2022 Integrated System Plan (ISP) identified that the South East SA Renewable Energy Zone (REZ) has high quality wind resources.

The South East SA REZ lies on the major 275 kV route of the South Australia – Victoria Heywood interconnector. The REZ has moderate to good quality wind resources as evidenced by the high proportion of wind generation (over 300 MW) near the South East border with Victoria.

AEMO's 2022 ISP identified that expansion of the South East SA REZ may be required in the mid to late 2020s in the *Hydrogen Superpower* scenario and the *Step Change* scenario to facilitate the connection of generation within this REZ. Consequently, the 2022 ISP required ElectraNet to undertake Preparatory Activities, which will inform development of AEMO's 2024 ISP.

This final report provides AEMO with the outcome of the Preparatory Activities that ElectraNet has undertaken for this potential ISP project.

1.1. The South East region

The South Australian transmission network is one of the most extensive regional transmission systems in Australia, extending across some 200,000 square kilometres of the State. This network consists of transmission lines operating at 132,000 Volts (132 kV) and 275,000 Volts (275 kV), which are supported by both lattice towers and large stobie poles. It connects the major South Australian load centres with various sources of generation.

The South East region (Figure 1) contains a mixture of electrical loads including agricultural; light and heavy industrial; rural; urban; and commercial. The South East 132 kV transmission system supplies ten major load centres and it derives its supply from the Main Grid via 275/132 kV substations located at Tailem Bend and South East.

The 275 kV network was extended to Tailem Bend in 1976 and a 275/132 kV substation was established there to feed into the South East. The South East network was further augmented in 1989 when the 275/132 kV South East substation was established just north of Mount Gambier. At that time the South East substation was also connected to the Victorian transmission system at Heywood 500/275 kV substation.

In 2016, series compensation was installed at Black Range (near the midpoint of the Tailem Bend to South East 275 kV lines) to enable higher transfers into and out of South Australia across the Heywood interconnector.

Current solar, wind, and battery energy storage system (BESS) preliminary enquiries, connection enquiries and applications indicate strong interest in new connections in the South East.

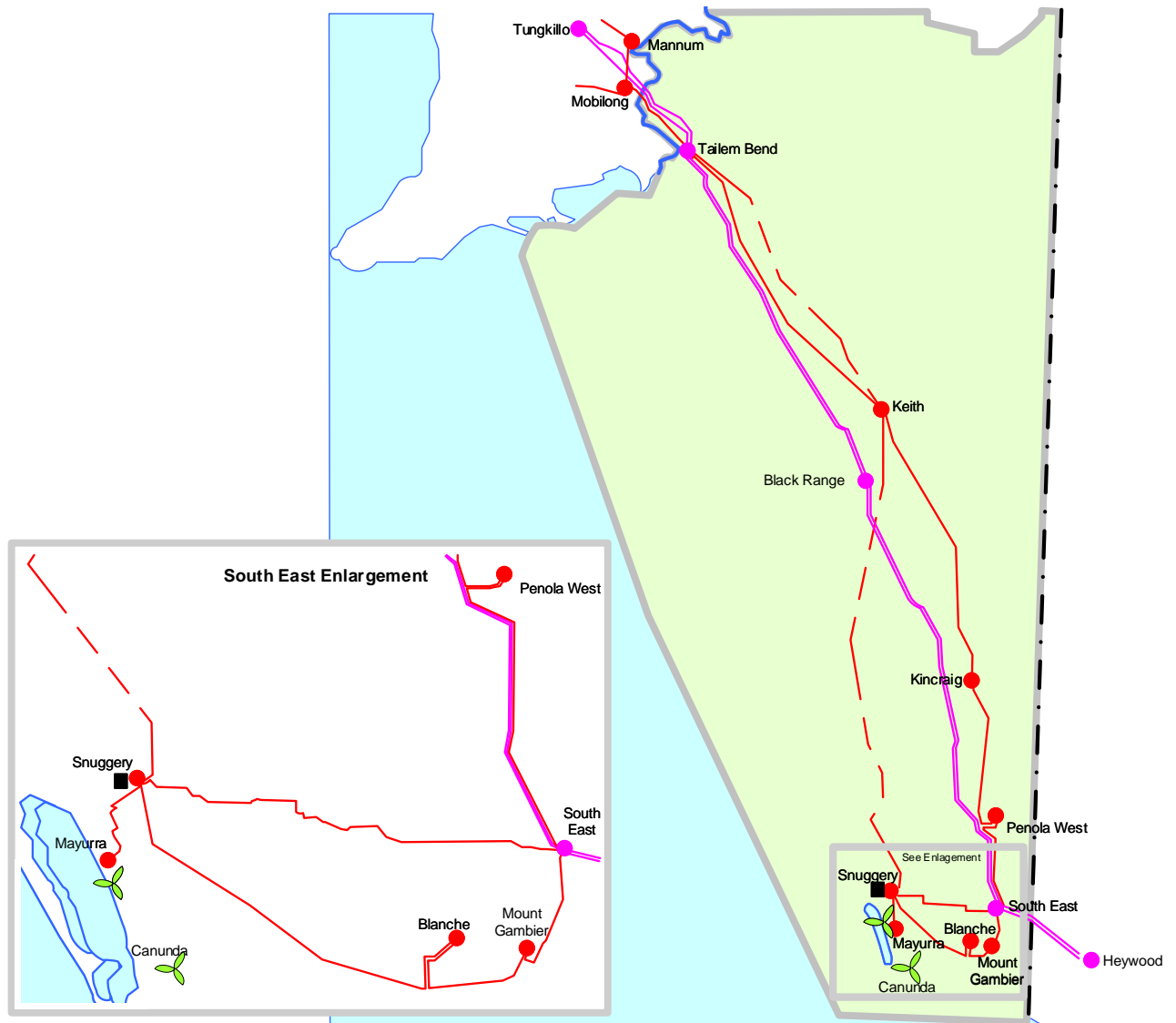


Figure 1 The South East region

2. Preliminary engineering design

2.1. Single line diagrams

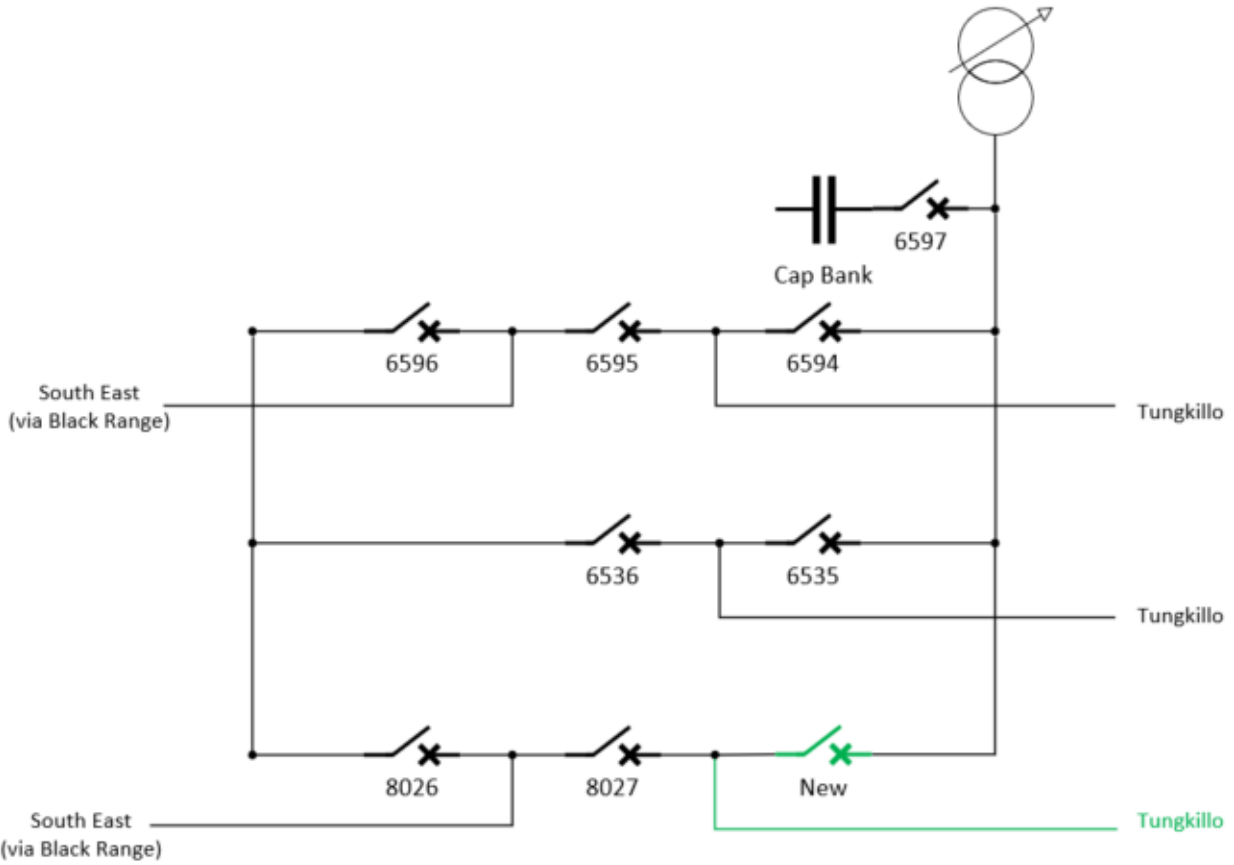


Figure 2 Works required at Taillem Bend substation (new works shown in green)

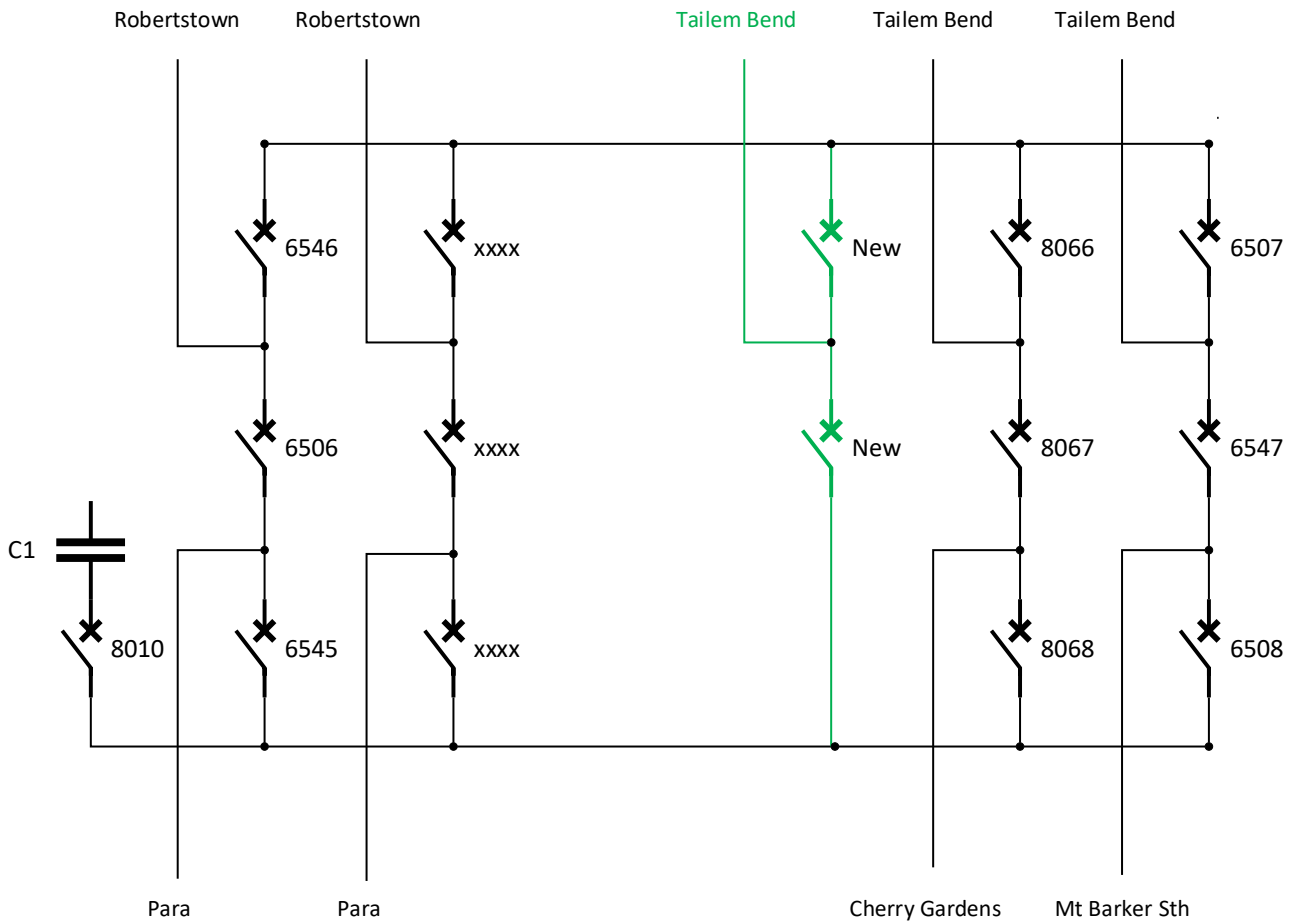


Figure 3 Works required at Tungkillo substation (new works shown in green)

2.2. Site layouts

Ultimate layout drawings (Appendix A) for Taillem Bend and Tungkillo show that each site can accommodate the proposed expansions indicated in section 2.1.

2.3. Asset list

At Taillem Bend:

- One new 275 kV circuit breaker in an existing diameter, with associated required plant (e.g. CTs, disconnectors, earth switches, secondary systems)
- One new 275 kV line exit, with associated gantries and conductors.

At Tungkillo:

- Two new 275 kV circuit breakers in a new diameter, with associated required plant (e.g. CTs, disconnectors, earth switches, secondary systems)
- One new 275 kV line exit, with associated gantries and conductors.

Line works:

- Conductor and line hardware to string the existing vacant circuit on one of the Taillem Bend to Tungkillo 275 kV lines (about 66 kV route length).

2.4. Easement assessment and route selection

Connectivity of the South-East REZ to the Adelaide Metropolitan load centre will require the stringing of conductor on the vacant circuit between Tailem Bend and Tungkillo. The towers that currently support Feeder F1944 have a spare circuit with crossarms already in place. The scope of works would require the hanging of insulators and stringing the approximately 66 km long line.

The existing line traverses a variety of different land uses including grazing, cropping, intensive animal keeping, centre-pivot irrigation. From a terrain perspective, heading north from Tailem Bend, the land is flat / gently undulating to the River Murray valley. North of the River Murray to Tungkillo, the land becomes hilly and rocky with a large number of watercourse and road crossings. Biosecurity management, including weed and pest/disease control, will be important for this project.

Conventional ground-based stringing would be required as aerial stringing (e.g. helicopter) would not be suitable due to existing OPGW/Earthwires on F1944.

Stringing will also require the use of a boat to take draw wire across the River Murray and closure of the river for boating and other vessels during the stringing of that section of line.

No new easement needs to be acquired; however, access and works licences will be required for construction activities, including establishment of access tracks and brake/winch sites for stringing. Landholder compensation may be required for damage/disturbance of farming operations and crop loss.

2.5. Network parameters

Electrical network parameters have been determined to enable the project to be modelled for loadflow, fault level and dynamic analysis (Table 1). These parameters are consistent with one circuit of a 66 km Olive 275 kV double circuit line.

Table 1 Loadflow and fault level electrical parameters (per unit, 100 MVA base)

Circuit	R1	X1	B1	R0	X0	B0
Tailem Bend - Tungkillo 275 kV No. 3	0.005	0.036	0.14	0.019	0.10	0.08

The new line is expected to have a summer thermal rating of about 597 MVA.

2.6. Existing transfer limits

Without the proposed upgrade, flows from the South East to the rest of South Australia (i.e. from Tailem Bend to Tungkillo) are constrained to 750 MW. This limit is set by the thermal rating of the Tailem Bend to Mobilong 132 kV line in combination with one of the existing Tailem Bend to Tungkillo 275 kV lines for the contingent loss of the other existing Tailem Bend to Tungkillo 275 kV line.

2.7. Transfer limits after completion

Under conditions with flows from the South East to the rest of South Australia (i.e. from Tailem Bend to Tungkillo), flows of up to 870 MW can be accommodated between Tailem Bend and Tungkillo. This constraint is again set by the thermal rating of the Tailem Bend to Mobilong 132 kV line in combination with two of the Tailem Bend to Tungkillo 275 kV lines for the contingent loss of the third Tailem Bend to Tungkillo 275 kV line.

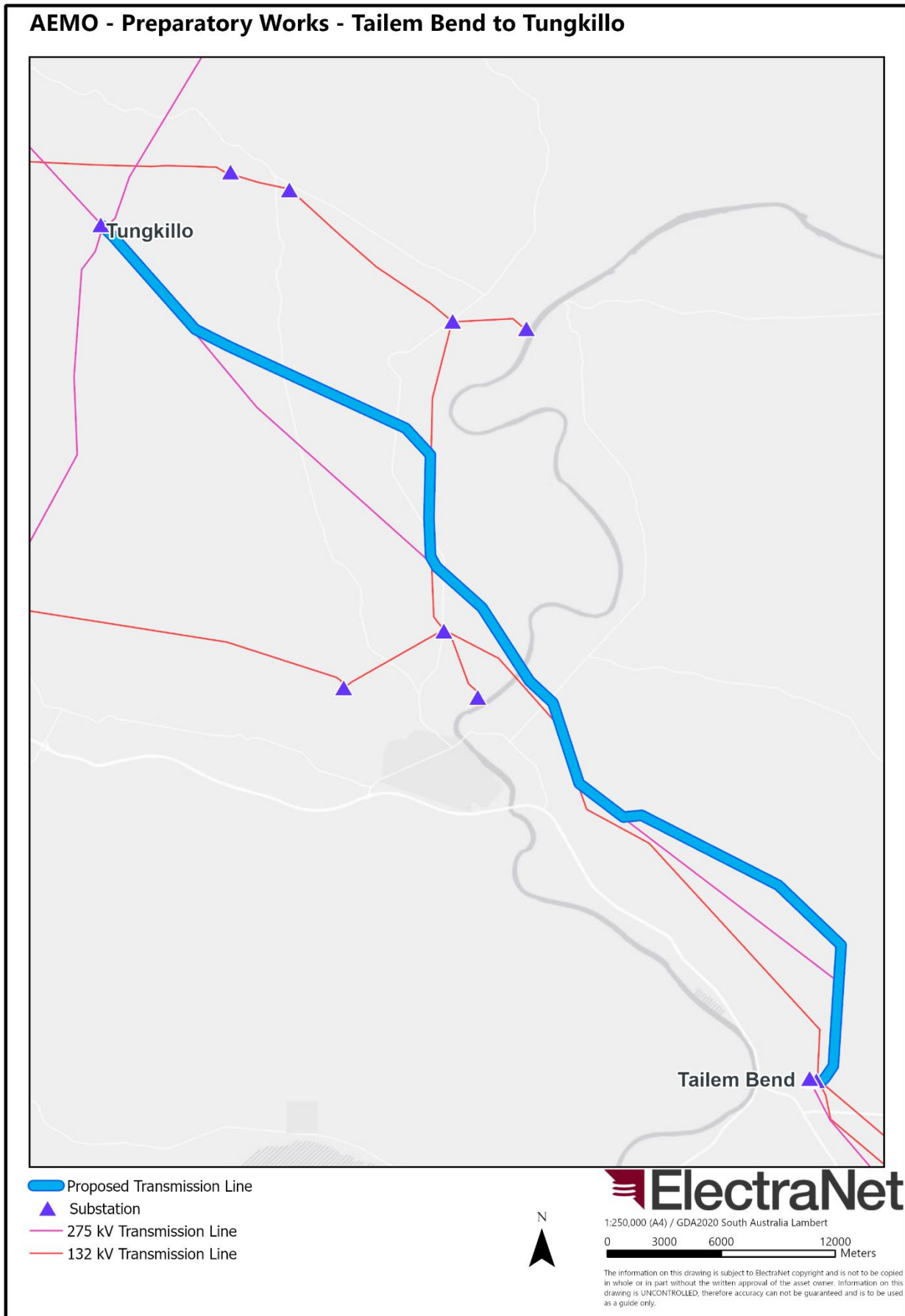


Figure 4 Proposed line route

3. Project schedule and cost estimates

3.1. Schedule

We have developed a high-level project schedule based on the project being identified as actionable in a future ISP (Table 2).

Table 2 High-level project schedule

Activity	Duration of activity	Cumulative duration
Declared as actionable project in ISP	Start of project	Start of project timeline
RIT-T (PADR and PACR) Development applications and approvals Stakeholder engagement	12-18 months	12-18 months
Contingent project application and approval Stakeholder engagement	3-9 months	15-27 months
Project construction Stakeholder engagement	15-21 months	30-48 months

3.2. Cost estimates

Our total class 5b cost estimate for this project is \$34 million (Table 3).

Table 3 Class 5b cost estimate

Item	Estimated cost
New 275 kV line exit at Taillem Bend in existing Diameter, including 1x 275 kV circuit breaker bay and 1x 275 kV line exit bay, excluding bench or gantry or overhead strung bus	\$6 million
New 275 kV line exit at Tungkillo, including 2x 275 kV circuit breaker bays and 1x 275 kV line exit bay, excluding bench or gantry or overhead strung bus	\$8 million
275 kV single circuit transmission line to vacant circuit on the existing Taillem Bend to Tungkillo line	\$20 million
Total	\$34 million

4. Approvals and stakeholders

4.1. Consumer Advisory Panel

ElectraNet's Consumer Advisory Panel (CAP) was established in 2015.

The CAP is part of ElectraNet's commitment to consumer engagement and the vehicle through which ElectraNet engages and collaborates with consumer representatives on the safety, affordability, and reliability of electricity transmission services in South Australia and the sustainability of ElectraNet's operations.

The overarching purpose of this engagement is to provide meaningful opportunities for input to improve the value of electricity transmission services in South Australia.

More specifically the role of the CAP is to:

- Provide considered advice, feedback and solutions to ElectraNet on significant current or future operational, industry and strategic issues that are of relevance to electricity consumers
- Provide considered advice, feedback, and solutions to ElectraNet on electricity consumer needs, concerns, issues, and services across areas including the energy transformation, network planning and operations, regulated revenue proposals, and transition to future energy markets
- Promote the delivery of lowest long-run cost services to consumers and their communities
- Provide two-way engagement between ElectraNet and consumers
- Assist in the development of a strengthened relationship between consumers and ElectraNet, through fostering open and honest dialogue.

ElectraNet will be engaging with the CAP throughout the planning, delivery and life cycle of all network investments including ISP projects.

The CAP Terms of Reference is attached to this report.

4.2. Estimate of planning approval complexity

There will not be a requirement for development approval for stringing the vacant circuit on the existing towers. If during detailed design it is determined that there is a need for additional new structure or gantries outside of a substation, there may be a need to lodge a development application for these minor works. A planning approval for such works would not be complicated or time-consuming.

4.2.1. Environmental approvals

Conventional ground-based stringing will require native vegetation clearance and ground disturbance however ultimately this option will have less impact than building a new line and therefore environmental impact will be dependent upon the proposed work method.

It will be important during the early design phase to undertake environmental surveys to determine likely environmental impacts of the project including potential impacts to Matters of National Environmental Significance under the *Environment Protection and Biodiversity Conservation Act 1999*. Where possible potential impacts will be avoided or mitigated as far as reasonably practicable, however, depending upon the level of potential residual impacts, a referral and subsequent approval pursuant to the EPBC Act may be required.

One Commonwealth land property is traversed by the existing line, being the Department of Defence Murray Bridge Range. The line and easement is located on the very western tip of the property however it is possible that the proposed works will not impact on the Defence land.

Given the need for ground disturbance for stringing clearance / Brake & Winch sites, cultural heritage assessment/surveys and management plans will be required to ensure compliance with the *Aboriginal Heritage Act 1988*.

A Native Vegetation Clearance application in accordance with the South Australian *Native Vegetation Act 1991* will be required to be submitted for necessary construction works, unless addressed by a Development Application.

4.2.2. Planning approvals

As previously mentioned, it is possible that no development approvals are required for the South East REZ. If during the design phase works are identified that require development approval, there are three possible approval pathways for the Mid North REZ project under the *Planning, Development and Infrastructure Act 2016* in South Australia:

1. Approval by councils through the standard development assessment provisions
2. Essential Infrastructure pathway
3. Crown Development pathway (depending if proposed Regulation changes currently being considered don't allow transmission lines >5km to be assessed under Essential Infrastructure pathway)

The standard development assessment pathway (pathway 1) may be possible if the extent of works is contained to within one council area. If the works requiring approval are located within multiple council areas, the standard development assessment pathway is not recommended as each area would require a separate approval.

The pathway for Crown or Essential Infrastructure assessment is outlined in Table 4.

4.2.3. Other Approvals

Aquatic Activity Licence – Harbors and Navigation Act 1993

An aquatic activity licence is needed when an event needs exclusive use of a designated area of a waterway for an aquatic sport or activity (such as closing or restricting river use for stringing).

ElectraNet will need to obtain a Licence and arrange duty boats to manage / supervise marine vessels using the Murray River. ElectraNet will need to liaise with Marine Safety SA and may need to engage the SA State Emergency Service (SES) or SA Police (Water Operation) to provide services and authority to stop vessels during stringing across the River.

Table 4 Crown Development or Essential Infrastructure Assessment Process

Stage	Crown Development (pathway 3) or Essential Infrastructure (pathway 2) process
Declaration	The proposal meets the requirements for this section to apply. No declaration is required. Where a private sector developer is sponsored by a State Agency for the purposes of essential infrastructure, the application must be prepared and lodged by the state agency in accordance with the requirements of the PDI Act.
Guidelines and level of assessment	There are no specified levels of assessment and guidelines are not prepared.
Public exhibition	The assessment is included in a development application which is exhibited for at least 15 business days.
Response to submissions	There is no legislated requirement for the proponent to respond to issues raised in submissions but it is standard practice for the proponent to directly respond to each submitter. This does not form part of the documentation assessed by DPTI.
Public hearings	A submitter has the opportunity to appear before State Commission Assessment Panel (SCAP).
Assessment report	SCAP prepares an assessment report.
Decision	Decision by Minister (or Delegate).
Appeal	No appeal rights.

4.3. Stakeholder assessment

There is a diverse range of anticipated stakeholders along the proposed route (Table 5).

Table 5 Anticipated stakeholders

Group	Key Stakeholders
Landholders	Approximately 90 landholdings, layers of land users e.g. lessees/tenure
Traditional Owner Groups	Ngarrindjeri and Others Native Title Claim SCD2017/002 First Peoples of the River Murray and Mallee Region #2 SC2019/001 Peramangk Heritage Association Kaurna Nation Cultural Heritage Association Inc Ramindjeri Heritage Association Inc
Local Government areas	Mid Murray Council The Rural City of Murray Bridge Coorong District Council
Federal Electorates	Barker (Tony Pasin MP, Liberal)
State Electorates	Hammond (Adrian Pederick MP, Liberal) MacKillop (Nick McBride MP, Liberal)
National Parks and Wildlife Regions	Riverland and Murraylands
Energy Sector	Energy generators and relevant industry associations
Local and Regional Community	Communities and local suppliers
Federal and State Government Agencies	This includes regulatory agencies and broader agencies, e.g. Department of Climate Change, Energy, the Environment and Water (Cth), Department of Trade and Investment (DTI) and Department of Premier and Cabinet (DPC), Department for Environment and Water (DEW), Department of Primary Industries and Regions (PIRSA), Infrastructure SA etc. Department of Defence (DoD)
Energy Regulator	Australian Energy Market Operator (AEMO), Australian Energy Regulator (AER)
Industry Representative Bodies	National Farmers Federation, Primary Producers SA, tourism bodies, winery and growers' associations
Environment	Conservation Council, Birdlife Australia, local environment groups

4.4. Stakeholder engagement plan

We have developed a high-level plan that defines the indicative points of stakeholder and reputation engagements that should occur with each stakeholder group at each stage of the Project lifecycle (Table 6). This plan would be further developed with a range of Stakeholder and Reputation Management activities, together with an assessment of stakeholder priority levels.

Table 6 Stakeholder engagement plan

Stakeholder Group	PADR	Prior to DA Submission	Statutory Notification Period	Assessment Process	Project Approved	Construction	Operations
Commonwealth and State Government							
Local Government							
State / Federal Political Reps							
Consumer Advisory Panel							
Landholders, major land users, Traditional Owners							
Local community and suppliers							
Industry Associations							
Advocacy Groups							
Regional Service Providers							
Media							



Appendices

Appendix A Ultimate site layouts

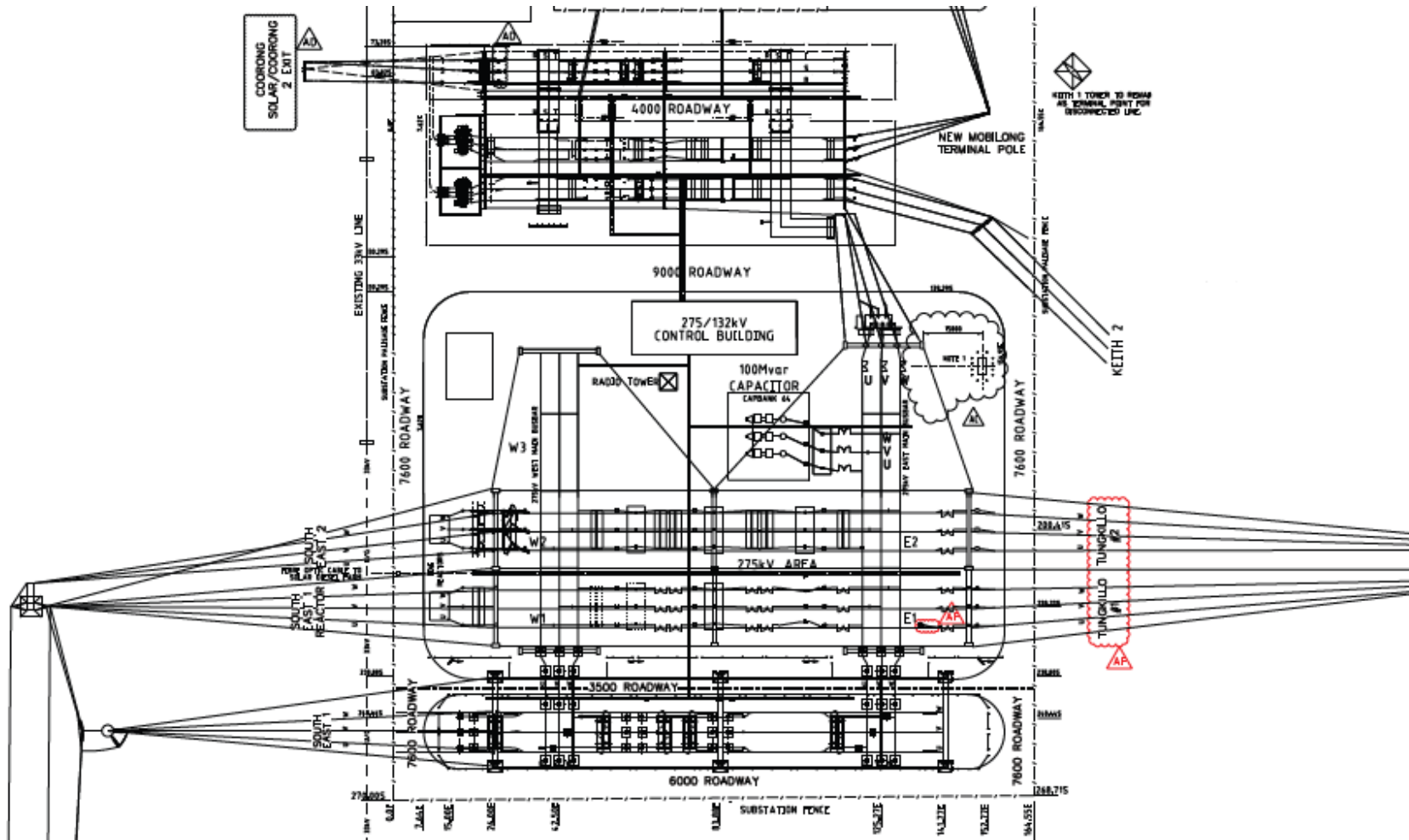


Figure 5 Tailem Bend ultimate layout

