

# Internal Labour Estimation (Option B)

System Security Roadmap



Project Details	
<b>Project Number:</b>	P0026308
<b>Project Description:</b>	System Security Roadmap
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## 1. Introduction

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This document shows the bottom-up build approach to estimating costs outside of the System Integrator's (SIs) scope of works within the System Security Roadmap Operational Technology Upgrade Contingent Project Application (CPA). The Internal Cost Estimation has been prepared to estimate all internal resources (labour) associated with the project, along with Transgrid delivered equipment, material and expenses.

The RIT-T process identified Option 2 (Proactive) as the preferred option which is Option B (this document).

## 2. Scope of Work

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The scope of works is for internal Transgrid resources across all initiatives to compliment and enables the scope of works provided by SIs to deliver a single integrated project (see section 5.1). The project is defined within the CPA, being the upgrades and new technologies to deliver the proactive capabilities required for Transgrid's control room and operational planning functions.

The scope of our labour costs includes the following for the project:

- Project management, administration, and risk management
- Testing and validation, including SCADA and test management resources
- Technology architecture and IT support (infrastructure, security, and networks)
- Health, Safety, and Environment (HSE) oversight
- Change management and process transition activities
- Data governance and management roles
- Control centre and SCADA operations support
- Outage management software development
- Facilities oversight for works at Newcastle and Wallgrove
- Project close-out and handover activities.

The scope of our non-labour costs included the following equipment, materials and expenses for the project:

- Upgrades to control room facilities at Newcastle and Wallgrove
- Data centre works at both Newcastle and Wallgrove
- High-spec servers for operational planning systems
- New control room operator consoles for production and training rooms
- PMU data feeds into the new AEMS
- SCADA dual homing RTU upgrades
- Accommodation for additional staff
- Office setup for the project team
- Travel and accommodation expenses for SMEs
- Training costs for courses such as GE GridOS
- Recruitment and visa fees for outsourced consultants
- Costs for setting up tailored contract terms and conditions

### 3. Internal Estimation Inputs

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The following inputs have been taken into account and formed the basis of this Estimation:

- RFI response from SIs (market response).
- A series of facilitated workshops involving SMEs on project delivery, control room operations, SCADA/AEMS engineering, data, testing, architecture, change management and facilities. These workshops drew directly on Transgrid's recent experience in delivering comparable operational technology and facilities projects to determine the resourcing requirements and profile in accordance with the Project schedule.
- Standard Labour Assumptions.
- Supplier estimates (e.g. builders, control room desk suppliers, vendors)
- Independent Cost Review from DGA.

### 4. Assumptions, Exclusions & Constraints

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#### 4.1. Assumptions

The following assumptions are noted in preparation of this Estimation:

- Labour is based on a 140hr working month.
- The estimation has been prepared in alignment with the RFI responses from the vendors.
- To comply with critical infrastructure security access to the SCADA/AEMS is from onsite, except for non-production development environments.
- There is no available capacity to securely host the project team onsite at Wallgrove or Newcastle, hence secure office space needs to be setup at those sites.
- Transgrid to conduct all field works and scope requiring access to communication rooms. System Integrator work will be limited to offices and datacentres.
- Only minor facilities changes required for the control room tools has been factored into the estimates.
- No civil works or excavation required, facilities work remains within the current building envelope.
- Wallgrove data centre floor space is sufficient, however requires backup power capacity uplift to house SSR related equipment
- Newcastle requires additional floor space, power, cooling and fire services uplift. A new datacentre has been estimated to minimise impact to production services.
- Project is exempt from Environmental approval
- There are insufficient local resources and expertise, therefore recruitment and travel (local and overseas) costs are considered
- Transgrid will engage an external legal firm to develop tailored Terms and Conditions specific to the SSR program.
- It is assumed that the procurement process, including approvals and contract award, will take approximately 11 months from CPA funding approval.
- Internal costs are estimated in the base year of 2024/25 to align with system integrator and other vendor estimates.
- The CPA will be prepared based on these estimates, however will also include minor changes to ensure consistency and alignment with estimation approaches for Transgrid's other CPAs (e.g. the assumed hours per FTE for capitalised labour will be increased from 140hrs to 150hrs per month). This equates to an increase of \$2.9m (\$2024/25) above the estimates within this document.

## 4.2. Exclusions

The following exclusions are noted:

- Upgrades to Transgrid's outage management system (TheOS).

## 5. Project Details

The table below specifies key project milestones.

Task Name	Task Start Date	Task Finish Date
CPA Funding Decision (Expected)	01/07/2026	01/07/2026
PAD Approved (DG2)	01/07/2026	31/08/2026
Possession of Site (PoS) - Contract Award	01/07/2026	31/05/2027
Detailed Design (IFC)	01/06/2027	30/10/2027
Practical Completion (PC)		1/04/2031
Asset in Service (AIS)*		1/04/2031
Commissioning*		1/04/2031
Close Out/Handover Completed (CO)		31/07/2031
Major Release 1 (MR1)		31/05/2029
Major Release 2 (MR2)		30/04/2031

\* Note: Dates shown are for the final asset commissioning and in service, however assets will primarily be commissioned in stages during major release 1 and 2.

### 5.1. Project Schedule

Initiative	Start Date	Finish Date	Duration (months)	Major Release 1 / Major Release 2
Data management and network modelling	01/06/2027	31/05/2029	24	MR1
SCADA/AEMS System	01/06/2027	30/04/2031	47	MR1 & MR2
Outage management	01/06/2027	31/05/2028	12	N/A
Fault level and system parameter monitoring	01/06/2029	31/05/2030	12	MR2
Alarm management enhancements	01/06/2027	30/06/2030	37	MR1 & MR2
Visualisation and situational awareness	01/12/2028	30/11/2030	24	MR2
Training technologies	01/03/2028	31/01/2029	11	MR1

Operational documentation management system	01/06/2027	30/04/2028	11	N/A
Operational planning system	01/12/2026	31/10/2027	11	N/A
Operational forecasts and look-ahead contingency assessment	01/09/2029	31/10/2030	14	MR2
Wide area monitoring	01/09/2029	31/10/2030	14	MR2
Smart transmission device management	01/09/2029	31/10/2030	14	MR2
Facilities	01/10/2026	30/09/2027	12	N/A

## 6. Labour Details

### 6.1. Labour Assumptions

The labour assumption is structured around a clear and deliberate separation of responsibilities between the System Integrator (SI) and Transgrid. The SI is assumed to be responsible for the delivery of the technology solution, including detailed design, configuration, system integration, testing, defect remediation, and technical commissioning activities.

Transgrid resourcing provides project governance, technical oversight, data management, stakeholder coordination, and formal review and acceptance of SI deliverables. In addition, Transgrid is responsible for all facilities-related activities, including control room upgrade, communications room (e.g. RTU updates) and data centre construction works, along with outage management configuration system changes..

Transgrid effort does not overlap with or duplicate SI delivery activities. The resourcing model reflects a clear labour boundary, avoids double counting, and is aligned with established commercial and delivery models for complex technology implementations, where technology delivery is performed by the SI..

Resource Type	Basis of Estimation
<b>Project Management</b>	
Project Director	- Full-time from Pre-PAD to Close Out (1x FTE)
Level 4 Manager	- Pre-PAD: 0.75 days per month - PAD to PC: 1.8 days per month - PC to Close Out: 0.5 days per month
Project Manager (Transgrid projects)	- One full-time (1xFTE) PM from PAD for 36 months - Projects being SCADA Dual homing, PMU Data feeds, Data Centre expansion, Outage Management initiative.
Program and Risk Planner	- Pre-PAD: 1.5 days per month - PAD to PC: 2.5 days per month - PC to Close Out: 0.5 day per month
PMO Analyst – Project Admin	- Full-time for the entire program (1x FTE) from Pre-PAD to Close Out

Resource Type	Basis of Estimation
PMO Analyst – Project Controller	<ul style="list-style-type: none"> <li>- Pre-PAD to PC: 12 hours per month</li> <li>- PC to Close Out: N/A</li> </ul>
Contract Manager	<ul style="list-style-type: none"> <li>- 1x Full-time from PoS to PC as this role would also include managing multiple vendor contracts.</li> </ul>
Procurement Specialist	<ul style="list-style-type: none"> <li>- 3 days a week from PAD to PoS</li> </ul>
<b>Testing</b>	
Test Manager	<ul style="list-style-type: none"> <li>- 2 days a week from PoS to PC</li> </ul>
Tester – SCADA/AEMS SME	<ul style="list-style-type: none"> <li>- 3x SCADA engineers for 9 months fulltime prior to MR1</li> <li>- 3x SCADA engineers for 9 months fulltime prior to MR2</li> </ul>
Tester – Control Room SME	<ul style="list-style-type: none"> <li>- 1x Control room operator 9 months full time prior to MR1</li> <li>- 1x Control room operator 9 months full time prior to MR2</li> </ul>
Test Developer	<ul style="list-style-type: none"> <li>- 1 x FTE from design completion to PC</li> </ul>
Security Tester – Enhanced AEMS SCADA	<ul style="list-style-type: none"> <li>- 1x FTE 6 months prior to MR1</li> <li>- 1x FTE 1 month prior to MR2</li> </ul>
Infrastructure Tester – AEMS SCADA	<ul style="list-style-type: none"> <li>- 1x FTE 6 months prior to MR1</li> <li>- 1x FTE 1 month prior to MR2</li> </ul>
Technology Change Manager – Release and cutover manager	<ul style="list-style-type: none"> <li>- 3 days a week starting 18months after PoS to PC) (e.g. vendor manages change of systems until the first project goes live and then Transgrid manages change)</li> </ul>
Security Penetration Testing (Contractor)	<ul style="list-style-type: none"> <li>- 1 design review, 1 cutover (MR1) and 1 cutover (MR2), then 1 post MR2 (project close). Done by external provider. @\$50,000 per test</li> </ul>
<b>Architecture Governance</b>	
Lead Architect	<ul style="list-style-type: none"> <li>- One full-time from PAD to design completion then 1 day per week until PC</li> </ul>
Security Architect	<ul style="list-style-type: none"> <li>- One 8 days a month from PoS to design completion then 1 day a month until PC</li> </ul>
Infrastructure Architect	<ul style="list-style-type: none"> <li>- One 8 days a month from PoS to design completion then 1 day a month for 12 months</li> </ul>
Network Architect	<ul style="list-style-type: none"> <li>- One 8 days a month from PoS to design completion then 1 day a month for 12 months</li> </ul>
<b>HSE</b>	
Safety Officer	<ul style="list-style-type: none"> <li>- 0.5 day per month for the entire program from PAD to PC as there is minimal site work</li> </ul>
Environmental Officer	<ul style="list-style-type: none"> <li>- 7 days for the entire program</li> <li>- Assumed the program will be exempted of environmental approval and required on ad-hoc basis</li> </ul>
<b>Change Governance</b>	

Resource Type	Basis of Estimation
Project Engineer	- AMC resources – 1 Senior Engineer for 2 days a week for 3 months prior to PC
Change Manager	- 2 days per week from PoS to PC
Process Analyst	- 3 days per week from PoS to Design Completion
<b>Data Governance and Management</b>	
OT Data Steward	- OT Data Steward - Full Time from PoS to completion of Data management & Network Modelling initiative
Data Architect	- One full-time from PoS to design completion then 4 days a month until completion of Data management & Network Modelling initiative
Data SME	- Two full-time for the full duration of Data management & Network Modelling initiative
<b>Control Centre SMEs</b>	
Product Manager	- One Product Manager full-time across all initiatives from PAD to Close Out. Represents business as key decision maker and coordination point for Transgrid's technical resources.
Control Room SME	- One full time from Pre-PAD to Close - Plus One 2 days a week from PoS to PC
Network Control Manager SME	- Full time from PoS to PC
Operational Planning SME	- 1x full time for whole project duration of Operational Planning Systems initiative
Asset Monitoring SME	- 1x full-time for the whole project duration of Network Model Management initiative
Senior SCADA Engineer	- Full-time from PAD to PC months (1x FTE) - 50% Allocation from PC to Close Out
AEMS Engineer	- Full-time from PoS to PC (1x FTE)
Junior SCADA Engineer	- Full-time from PoS to PC
Engineer	- Full time resource for the duration of Operational Documentation Management System
Document Writer (contractor)	- Full time resource for the duration of Operational Documentation Management System
<b>Outage Management Solution</b>	
Application Developer – Senior Software Developer	- 1 FTE for Outage Management initiative
Application Developer – Software Developer	- 1 FTE for Outage Management initiative

Resource Type	Basis of Estimation
<b>Control Room Facilities Change to Support New Operator Visualisation Initiative</b>	
IT/Systems/Network Support/Management – Senior – Newcastle Control Room Facilities	- 35hrs/ month for 12 months (Oversight of facilities site works – Newcastle)
IT/Systems/Network Support/Management – Senior – Wallgrove Control Room Facilities	- 35hrs / month for 12 months (Oversight of facilities site works – Wallgrove)
<b>SCADA/AEMS Customisations</b>	
Custom code (Engineer, developer, tester)	<ul style="list-style-type: none"> <li>- Operator Visualisation: Assumed 4 medium (500 technical hours per customisation) customisations for visualisation @ \$250,000 each = total \$1,000,000</li> <li>- Alarm Management: Assumed 3 medium (500 technical hours per customisation) customisations for visualisation @ \$250,000 each = total \$750,000</li> <li>- Operational forecasts and look-ahead contingency assessment: Assumed 3 medium (500 technical hours per customisation) customisations for visualisation @ \$250,000 each = total \$750,000</li> </ul> <p style="text-align: right;"><b>= \$2,500,000</b></p> <p>Refer to <a href="#">Appendix- Item 1</a></p>
<b>SCADA Dual Homing</b>	
Apportion to SCADA/AEMS initiative	
Note: 30 sites with single SCADA channel with dual RTU and 7 sites with single RTU	
Backup comms channel design	- Comms Design engineer 1,140 hrs (38 hours per site for 30 sites)
New DCONs	- Comms Design engineer 3,486 hrs (498 hours per site for 7 sites)
Modify DCONs to use ethernet and test	- Communications Technician 720 hrs (24 hours per site for 30 sites)
RNF	- Comms Design engineer 112 hrs (16 hours per site for 7 sites)
RTI & verification	- Comms Design engineer 1,406 hrs (24 hours per site for 30 sites and 98 hours per site for 7 sites)
Modify schematics, panels, cable schedule	- Communications Technician 2,752 hrs (32 hours per site for 30 sites and 256 hours per site for 7 sites)
Commissioning	- Site visits for Communications Technicians 740 hrs (20 hours per site for all 37 sites)

Resource Type	Basis of Estimation
	- SCADA Engineers 160 hrs (80 hours per datacentre across two sites)
<b>PDC and PMU data feeds</b> Apportion to WAMS initiative	
Design	- SCADA Officer for 140 hours (20 days for one FTE)
Procurement	- Procurement of equipment (5 days for one FTE)
Test	- SCADA Officer for 140 hours (20 days for one FTE) - SCADA Senior Officer for 35 hours (5 days for one FTE)
Installation	- Comms Tech for 70 hours (10 days for one FTE) - SCADA Officer for 280 hours (20 days for two FTE) - Network Engineer 140 hours (20 days for one FTE)
Commissioning	- SCADA Officer for 70 hours (10 days for one FTE)

<sup>1</sup> Based on the program schedule submitted by the System Integrator.

## 6.2. Labour Hours Estimate

Labour	Hours
<b>Project Management</b>	
Level 4 ID Manager (Projects)	708.8
Project Manager (Projects) – Project Director	8,120.0
Program and Risk Planner (Portfolio Controls)	994.0
Project Controls – Senior (Portfolio Controls)	696.0
Contract Administrator (Commercial)	6,580.0
Project Manager – Technical (Projects)	5,040.0
Admin Support Officer (Projects)	8,120.0
Procurement Officer	672.0
<b>Testing</b>	
Project Manager – Test Manager (Projects)	2,632.0
SCADA Officer – Tester (Network Operations Tech)	7,560.0
SCADA Officer – Security Tester (Network Operations Tech)	980.0
SCADA Officer – Infrastructure Tester (Network Operations Tech)	980.0
Network Operations – Control Room Operator	2,520.0
SCADA Officer – Test Developer	5,880.0
Project Admin – Technology Change Manager	2,268.0

<b>Technology Architecture</b>	
IT Support Analyst – Lead Architect Senior (IT Service Management)	2,996.0
IT Support Analyst – Infrastructure Architect Senior (IT Service Management)	371.0
IT Support Analyst - Security Architect Senior (IT Service Management)	574.0
IT Support Analyst – Network Architect Senior (IT Service Management)	420.0
<b>HSE</b>	
Safety Officer (Safety and Environmental Delivery)	192.5
Environment Officer (Safety and Environmental Delivery)	49.0
<b>Change Management</b>	
Project Engineer - Senior (Projects)	168.0
Project Manager – Change Manager (Projects)	2,632.0
Project Officer – Process Analyst (Project Governance and Assurance)	420.0
<b>Data Management</b>	
IT Support Analyst – Senior Data Architect (IT Service Management)	1,344.0
Asset Manager – Data SME (Asset Analytics & Insights)	6,720.0
IT – OT Data Steward	3,360.0
<b>Control Centre SMEs</b>	
Network Operations Officer – Control Room SME (Control Centre)	10,752.0
Network Operations Officer – Senior SCADA Engineer (Control Centre)	7,700.0
SCADA Officer – AEMS Engineer (Network Operations Tech)	6,580.0
SCADA Officer – Junior (Network Operations Tech)	6,580.0
Network Control Manager SME	6,580.0
Network Operations Officer – Operational Planning SME (Control Centre)	1,540.0
Network Operations Officer – Asset Monitoring SME (Control Centre)	3,360.0
SCADA Officer - Engineer	1,540.0
SCADA Officer – Document Writer	1,540.0
SCADA Officer – Product Manager	7,700.0
<b>Outage Management</b>	
Network Operations Officer – Application Developer Senior Software Developer (Control Centre)	1,680.0
SCADA Officer – Application Developer – Software Developer (Network Operations Tech)	1,680.0
<b>Newcastle and Wallgrove facilities internal costs</b>	
IT – Oversight of Facilities Site Works - Wallgrove	420.0
IT – Oversight of Facilities Site Works - Newcastle	420.0

<b>Close Out</b>	
Level 4 ID Manager – Close out (Projects)	10.5
Project Manager – Product Manager - Close out (Projects)	350.0
Program and Risk Planner – Close out (Portfolio Controls)	10.5
Network Operations – Senior SCADA Engineer Close Out	210.0
Admin Support Officer – Close out (Projects)	700.0
Project Manager – Project Director Close out (Projects)	420.0
Network Operations Officer – Close out (Control Centre SME)	420.0

### 6.3. Labour Hours Estimate: SCADA Dual Homing

<b>Labour</b>	<b>Hours</b>
Designer - Telecommunications Backup comms channel design	1140.0
Designer - Telecommunications New DCONs	3486.0
Telecommunication Technician Modify DCONs to use ethernet and test	720.0
Designer - Telecommunications RNF	112.0
Designer - Telecommunications RTI & verification	1406.0
Telecommunication Technician Modify schematics, panels, cable schedule	2752.0
Telecommunication Technician Site Visits	740.0
IT/Systems/Network Support/Management - Senior Site Visits (SCADA Engineers)	160.0

### 6.4. Labour Hours Estimate: PMU Data Feed

<b>Labour Resource</b>	<b>Hours</b>
SCADA Officer (Network Operations Tech)	140.0
Supply Specialist (Procurement)	35.0
SCADA Officer – Test	140.0
Asset Manager (Asset Analytics & Insights)	35.0
Network Operations Officer (Control Centre)	140.0
Telecommunications Technician (Construction)	70.0
SCADA Officer - Installation	280.0
SCADA Officer – Commissioning	70.0

## 7. Equipment, Materials, and Expenses

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### 7.1. Summary of Equipment

Equipment	Unit	Cost
High spec servers for operational planning systems such as PSSE Apportion to Operational Planning initiative	6	\$900,000 (or \$150,000 each, hardware and licensing)
<b>TOTAL</b>		<b>\$900,000</b>

### 7.2. Summary of Materials

Material	Unit	Total Cost
Newcastle Data Centre build to host 12 server racks (12 months)	1	\$750,000
<b>Newcastle – Control Room facilities change to support new operator visualisation initiative (12 months)</b>		
Modification of Newcastle control room to support training and operator visualisation initiative	1	\$630,000

		\$480,000
		\$160,000
Accommodation for increased BAU team - 50% of the 18 additional staff to be accommodated at Newcastle. Refurbish within existing structures to provision power/AC/comms/computers/desks and chairs to accommodate 9 workstations. 10m2 per person @\$3,000 p/m2 rate (90*3,000 = \$270,000)	9	\$270,000
<b>Wallgrove – Control Room facilities change to support new operator visualisation initiative (12 months)</b>		
Modification of Wallgrove control room to support training and operator visualisation initiative	1	\$1,260,000
		\$480,000
		\$160,000
Accommodation for increased BAU team - 50% of the 18 additional staff to be accommodated at Wallgrove. Refurbish within existing structures to provision power/AC/comms/computers/desks and chairs to accommodate 9 workstations. 10m2 per person @\$3,000 p/m2 rate (90*3,000 = \$270,000)	9	\$270,000

Wallgrove Data Centre upgrade		
Wallgrove Data Centre Power Upgrade [REDACTED]		\$660,000
[REDACTED]		
<b>SCADA Dual Homing (PAD plus 6 months)</b>		
[REDACTED]	74	\$550,000
[REDACTED]	37	\$277,500
[REDACTED]	30	\$150,000
[REDACTED]	7	\$700,000
[REDACTED]	7	\$315,000
[REDACTED]	46	\$460,000
[REDACTED]	14	\$140,000
[REDACTED]	7	\$35,000
[REDACTED]	12	\$60,000
[REDACTED]	2	\$200,000
<b>PMU/PDU data feeds (Wide Area Monitoring project start date)</b>		
[REDACTED]	4	\$400,000
[REDACTED]	2.5	\$500,000
[REDACTED]	4	\$80,000
[REDACTED]	1	\$20,000
[REDACTED]	1	\$10,000
[REDACTED]	1	\$15,000
Test Automation		
Internal Test Automation PoS+ 4 Months	[REDACTED]	\$600,000

### 7.3. Summary of Expenses

Expenses	Unit	Total Cost (\$)	Duration
Office Set-up for Project Team	[REDACTED]	[REDACTED]	PAD Commencement Date + 2 Months

			Spread it over 3 months
SCADA terminals			PAD Commencement Date + 2 Months
Travel (Within Australia to AEMO and TNSPs)			Every 3 months from PAD Commencement date until 10 trips completed
Travel (Overseas for SCADA vendor and customers) –			1 trip per year commencing from PoS End date
Training (GE GridOS course fees)			Assumption: System Capabilities needs to be understood prior to finalising architecture 3 months from SCADA/AEMS Initiative commencement date
Outsource Consultant (Recruitment and Visa fees)			PAD commencement date + 2 Months
SME travel and accommodation to Wallgrove project office for various SMEs			Stagger expenses in equally by 4 years starting from PoS
Set up contract terms and conditions			PAD then spread for next 5 months
<b>TOTAL</b>		<b>\$965,000</b>	

