

AUSNET

Unit Rates Review

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AMENDMENT HISTORY

Version	Date	Sections	Amendment Details
v1-0 (DRAFT)	18 October 2025	All	First Issue
v2-0 (FINAL)	30 October 2025	All	Final Issue

EXECUTIVE SUMMARY

AusNet has engaged AMCL to provide an independent validation of its unit rates. This report details the findings of the review.

Unit rates are a key input to developing AusNet's investment program. Accurate unit rates are critical for ensuring costs are understood and economic benefits are demonstrable, both for individual projects and the investment program as a whole.

The scope includes an independent validation of AusNet's replacement expenditure (repex) unit rates. A total of ninety line-items were assessed for the following transmission asset categories:

1. Switchyard Bay Equipment	26 line-items (unit rates) validated
2. Civil works	8 line-items (unit rates) validated
3. Secondary Systems	22 line-items (unit rates) validated
4. Communications Systems	10 line-items (unit rates) validated
5. Lines	24 line-items (unit rates) validated

Our review has been undertaken by applying relevant Industry Standards. The approach applied to provide an independent validation of AusNet's unit rates has included the three steps outlined below.

1. Independent unit rates development	We have undertaken an independent bottom-up development of unit rates for each line item. In doing so we have applied globally recognised good practice as defined by relevant industry standards.
2. Comparative review against AusNet's unit rates	We have undertaken a comparative review of our independent unit rates against AusNet's unit rates for each line item. From this exercise we have identified any instances where AusNet's unit rates fall outside an acceptable range as defined by relevant industry standards.
3. Adjustments to AusNet's unit rates	We have recommended adjustments to AusNet's unit rates where appropriate and verified the adoption of those adjustments by AusNet.

We have undertaken a comparative review of our independent unit rates against AusNet's unit rates for each of the ninety line-items. From this exercise we identified twelve instances where AusNet's unit rates fall outside an acceptable range as defined by relevant industry standards.

We have recommended adjustments to AusNet's unit rates where appropriate. The recommended adjustments are based on detailed review of each component to identify values of discrepancy.

We have re-evaluated AusNet's updated unit rates after making the required adjustments based on our recommendations.

We have confirmed that all of AusNet's unit rates are now within an acceptable range (ninety within the scope of this review).

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1. INTRODUCTION

1.1 CONTEXT

AusNet has engaged AMCL to provide an independent validation of its unit rates. This report details the findings of the review.

Unit rates are a key input to developing AusNet's investment program. Accurate unit rates are critical for ensuring costs are understood and economic benefits are demonstrable, both for individual projects and the investment program as a whole.

1. Accurate unit rates ensure costs are understood:	Accurate unit rates ensure that the costs of investment are understood. This allows for: • The projects and program to be effectively forecast, planned, funded and delivered; and • The resultant price-path for consumers to be effectively modelled and managed.
2. Accurate unit rates ensure economic benefits are demonstrable:	Accurate unit rates ensure that the economic benefits of investments are demonstrable through costs versus benefits analysis. This allows for: • Investments to be justified through robust evaluation of options and outcomes; and • The timing and prioritisation of the investment program to be optimised to maximize benefits.

AusNet Services is currently preparing to submit its Regulatory Proposal to the Australian Energy Regulator (AER) on 31 October 2025. The proposal will include AusNet Services' proposed investment program for the 5-year period from April 2027 to March 2032. AusNet Services intends to provide this report accompanying its Regulatory Proposal, as assurance to the AER that its unit rates have been independently validated.

1.2 SCOPE

The scope includes an independent validation of AusNet's replacement expenditure (repex) unit rates. A total of ninety line-items were assessed for the following transmission asset categories:

1. Switchyard Bay Equipment	26 line-items (unit rates) validated
2. Civil works	8 line-items (unit rates) validated
3. Secondary Systems	22 line-items (unit rates) validated
4. Communications Systems	10 line-items (unit rates) validated
5. Lines	24 line-items (unit rates) validated

Scope exclusions:

- The review is being undertaken to support AusNet's Regulatory Proposal for its electricity Transmission Network Service Provider (TNSP) business. AusNet has identified specific assets for which it requires unit rates to be validated. The scope is limited to the assets identified by AusNet.
- The scope applies to unit rates for replacement expenditure (repex) projects. Operational expenditure (opex) and augmentation expenditure (augex) unit rates are out of scope.

The tables below (Table 1, Table 2, Table 3, Table 4 and Table 5) provide a breakdown of the scope of assets included in the review.

Table 1 – Scope of assets included in the review – Switchyard Bay Equipment

Subcategory	Assets In Scope
Other Primary Equipment	500kV • 500kV CT Replacement (3 Phase Set) Complete New Installation • 500kV LTCB Replacement (Complete New Installation) • 500kV ROI Replacement Complete New Installation • Replacement of 500kV SA
	220kV • 220kV CT Replace on Existing Structure (3 phase set) • 220kV Dead Tank Circuit Breaker 3150A 50kA Replacement • 220kV Live Tank Capbank CB Replacement • 220kV ROI Replacement Complete new Installation • 220kV CVT (3 Phase) Replacement • Replacement of 220kV SA
	66kV • 66kV CT (3 Phase) Replacement on Existing Structure • 66kV Dead Tank Circuit Breaker Replacement • 66kV Live Tank Capbank CB Replacement • Replacement of 66kV ROI on existing structure • Replacement of 66kV MVT • 66kV Surge Arrestors Replacement (New) 3 phase
	22kV • 22kV Disconnecter Replacement • 22kV Dead Tank Circuit Breaker Replacement • 22kV Surge Arrestors Replacement (New) 3 phase
Power Transformers	Power Transformer Components • Replace WTI and OTI (New)

	• Replacement of TMS (DRMCC) • Refurbishment of Phase Isolated Bus (3 single phase)
	Bushings Single Phase • Replace 500kV Transformer Bushing • Replace 330/275kV Transformer Bushing • Replace 220kV Transformer Bushing • Replace 66kV Transformer Bushing

Table 2 – Scope of assets included in the review – Civil Works

Subcategory	Assets In Scope
Civil Works	• Replace VESDA and Fire Indication Panel • Replace Fire hydrant system per metro station • Control Building renovation • Replace Aircondition Unit • Replace Cable Trench Cover (per cover) • Re- Dress Yard Surface based on 10,000m2 • Station Sealed Road • Station Service Supplies- AC Auxiliary Supplies with cabling

Table 3 – Scope of assets included in the review – Secondary Systems

Subcategory	Assets In Scope
Protection & Control	• 220kV Line X Protection Scheme Replacement • 220kV Line Y Protection Scheme Replacement • 220kV Single CB Protection Scheme Replacement • 220kV Transformer X Protection Scheme Replacement • 220kV Transformer Y Protection Scheme Replacement • 220kV Capacitor Bank X Protection & Control Scheme • 220kV Capacitor Bank Y Protection & Control Scheme • 220kv Bus X Protection • 220Kv Bus Y Protection
RTU and DC supplies	• RTU-P3 Small • RTU-P3 Medium • RTU-SCD5200

- 48V Battery Bank, Chargers & Dist Board (X) – 850Ah (Replacement) – including fireproofing building
- 48V Battery Bank, Chargers & Dist Board (Y) – 850Ah (Replacement) – including fireproofing building
- 48V Battery Bank, Chargers & Dist Board (X) – 850Ah (Replacement) – excluding fireproofing building
- 48V Battery Bank, Chargers & Dist Board (Y) – 850Ah (Replacement) – excluding fireproofing building
- 250V Battery Bank, Chargers & Dist Board (X) – 1000Ah (Replacement) – including fireproofing building
- 250V Battery Bank, Chargers & Dist Board (Y) – 1000Ah (Replacement) – including fireproofing building
- 250V Battery Bank, Chargers & Dist Board (X) – 1000Ah (Replacement) – excluding fireproofing building
- 250V Battery Bank, Chargers & Dist Board (Y) – 1000Ah (Replacement) – excluding fireproofing building
- Overhead Line Tower Weather Station
- Ground Mounted Weather Station

Table 4 – Scope of assets included in the review – Communications Systems

Subcategory	Assets In Scope
Communication Equipment	• SDH Node Replacement • PDH Node Replacement • DIC Replacement • TPS Node Replacement • CWDM Node Replacement • DWDM Node Replacement • EXCH Node Replacement • PTP Radio Link Replacement • Comms RTU Node Replacement • OFC ADSS (Fibre Optic cable) per km Replacement

Table 5 – Scope of assets included in the review – Lines

Subcategory	Assets In Scope
Outages and Monopoles Method Tower Replacement	• 500kV double circuit suspension transmission tower replacement with new 500kV double circuit suspension tower.-Outages and Monopoles Method

Tower Member Replacement

- Simple -Replacement of non-critical member (no rigging)
- Medium -Replacement of non-critical member require simple rigging
- Complex Crane -Replacement of critical member require complex crane
- Complex Rigging -Replacement of critical member require complex rigging
- Splint -Reinforce of critical member using splint method
- Sherardised Bolt Supply and Replace -Replace single bolt

Tower Resilience

- Steelwork weight (kg) to reinforce existing structure

Insulator Replacement

- 500kV strain insulator replacement with new 500kV composite strain insulator
- 500kV V-string suspension insulator replacement with new 500kV composite suspension insulator
- 500kV I-string suspension insulator replacement with new 500kV composite suspension insulator.
- 220kV strain insulator replacement with new 220kV composite strain insulator.
- 220kV I-string suspension insulator replacement with new 220kV composite suspension insulator

Fall Arrest

- Rack System Fall Arrest
- 500kV Tower Fall Arrest
- 330kV Tower Fall Arrest

Low Spans

- Raising Conductor (Single Circuit, Single Bundle Conductor)
- Raising Conductor (Single Circuit, Double Bundle Conductor)
- Raising Conductor (Double Circuit, Single Bundle Conductor)
- Raising Conductor (Double Circuit, Double Bundle Conductor)

2. METHODOLOGY

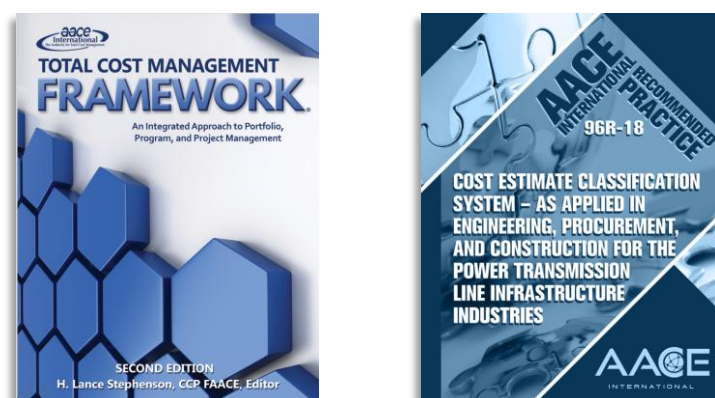
2.1 APPROACH

2.1.1 INDUSTRY STANDARDS

Our review of AusNet's unit rates has been undertaken by applying relevant Industry Standards:

- AACE International – The Authority for Total Cost Management: Total Cost Management Framework – An Integrated Approach to Portfolio, Program, and Project Management, Second Edition 2015 ¹
- AACE International – Recommended Practice 96R-18: Cost Estimate Classification System – As Applied In Engineering, Procurement, And Construction For The Power Transmission Line Infrastructure Industries, Rev. August 7 2020 ²

Figure 1 – Relevant Industry Standards Applied



2.1.2 THREE STEP METHODOLOGY

The approach applied to provide an independent validation of AusNet's unit rates has included the three steps outlined below. The methodology for our independent unit rates development (Step 1 above) is detailed in Section 0 below. The work undertaken and outcomes of Steps 2 and Step 3 above is detailed in Section 3 (Findings).

1. Independent unit rates development

We have undertaken an independent bottom-up development of unit rates for each line item. In doing so we have applied globally recognised good practice as defined by relevant industry standards.

¹ AACE International – The Authority for Total Cost Management: Total Cost Management Framework – An Integrated Approach to Portfolio, Program, and Project Management, Second Edition 2015

² AACE International – Recommended Practice 96R-18: Cost Estimate Classification System – As Applied In Engineering, Procurement, And Construction For The Power Transmission Line Infrastructure Industries, Rev. August 7 2020

2. Comparative review against AusNet's unit rates

We have undertaken a comparative review of our independent unit rates against AusNet's unit rates for each line item. From this exercise we have identified any instances where AusNet's unit rates fall outside an acceptable range as defined by relevant industry standards.

3. Adjustments to AusNet's unit rates

We have recommended adjustments to AusNet's unit rates where appropriate and verified the adoption of those adjustments by AusNet.

2.2 STEP 1 – INDEPENDENT UNIT RATE DEVELOPMENT

The methodology applied for the independent unit rate development is detailed below.

2.2.1 CLASS 4 ESTIMATE APPLIED

The independent development of unit rates for each scope item has been developed using first principles cost estimating, in accordance with AACE International – Recommended Practice 96R-18.

The independent unit rates that we have developed are "Class 4 Estimate". This is aligned with the project stage and will provide support for decision-making processes.

Figure 2 – Extract from AACE International – Recommended Practice 96R-18 – Class 4 Estimate Applied ³

ESTIMATE CLASS	Primary Characteristic	Secondary Characteristic		
	MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES Expressed as % of complete definition	END USAGE Typical purpose of estimate	METHODOLOGY Typical estimating method	EXPECTED ACCURACY RANGE Typical variation in low and high ranges at an 80% confidence interval
Class 5	0% to 2%	Concept screening	Cost/length factors, parametric models, judgement, or analogy	L: -20% to -50% H: +30% to +100%
Class 4	1% to 15%	Study or feasibility	Cost/length, factored or parametric models	L: -15% to -30% H: +20% to +50%
Class 3	10% to 40%	Budget authorization or control	Semi-detailed unit costs with assembly level line items	L: -10% to -20% H: +10% to +30%
Class 2	30% to 75%	Control or bid/tender	Detailed unit cost with forced detailed take-off	L: -5% to -15% H: +5% to +20%
Class 1	65% to 100%	Check estimate or bid/tender	Detailed unit cost with detailed take-off	L: -3% to -10% H: +3% to +15%

Table 1 – Cost Estimate Classification Matrix for the Power Transmission Line Infrastructure Industries

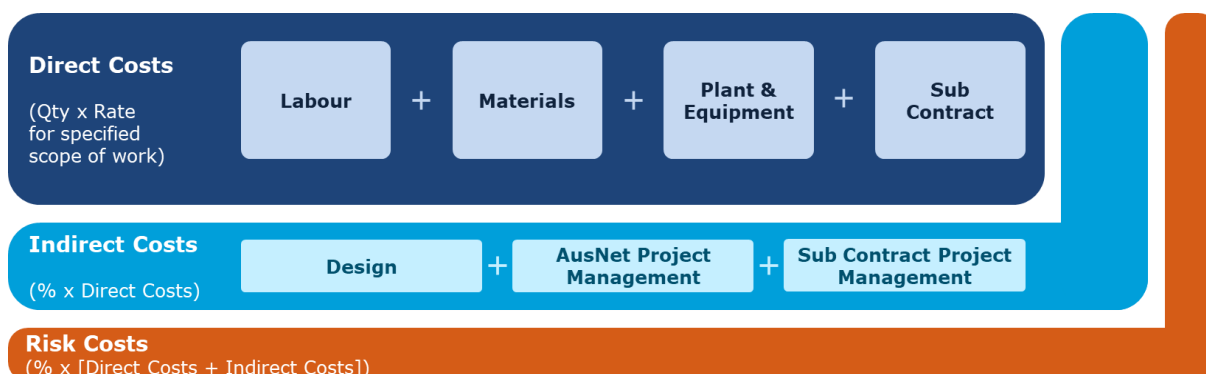
2.2.2 BUILDING BLOCKS APPROACH

We have applied a "building blocks" approach to develop independent unit rates for each scope item.

$$\text{Unit Rate} = \text{Direct Costs} + \text{Indirect Costs} + \text{Risk Costs}$$

³ AACE International – Recommended Practice 96R-18: Cost Estimate Classification System – As Applied In Engineering, Procurement, And Construction For The Power Transmission Line Infrastructure Industries, Rev. August 7 2020, Section 3. Cost Estimate Classification Matrix for the Power Transmission Line Infrastructure Industries, Page 4

Figure 3 – Building Blocks Approach



2.2.3 ASSUMPTIONS

We have applied the below overarching assumptions to develop our independent unit rates for all line items:

- All costs use a 2024 base year.
- All costs are based on current market rates excluding escalations or exchange rate fluctuations.
- All costs exclude project contingencies.
- All costs exclude overheads and finance charges e.g. Rates exclude management reserve, overhead & Finance charges, Written down Values, removal of contaminated soils & asbestos, Outage rebates such as MIPS.

Specific assumptions by Building Block are provided in Table 4 below.

Table 6 – Specific assumptions by Building Block

Building Block	Assumptions
Direct Costs	• The Scope of Works has been determined for each scope item based on AusNet's standard drawings and construction methodology. The Scope of Works for each line item is provided in Appendix A • Material rates include AusNet period order prices and the other recent quotes as obtained from a single source of suppliers. • We have undertaken a benchmarking of market supply rates and equipment supply rates provided by AusNet, and formed a view on the most appropriate values to use for each scope item. • Direct construction costs have been developed using several methods including composite unit rates, benchmark rates and lump sum allowances (excluding contingency). • Subcontract costs include temporary works and staging where defined.

Indirect Costs	- Indirect costs apply a variable percentage for each subcategory based on benchmarked industry rates. The Indirect Cost Allowances for each subcategory is provided in Section 2.2.4. - Indirect costs include temporary construction facilities such as construction sites, office buildings and lay down areas, supervision staff, and indirect plant & equipment and associated works are included separately.
Risk Costs	P50 rate of 7.5% has been applied for all line items. The 7.5% value is based on current market benchmarks, consistent with good industry practice, and consistent with our experience working on in similar projects with peer organisations.

2.2.4 INDIRECT COST ALLOWANCES

Table 5 below provides a breakdown of the indirect cost allowances applied to develop the independent unit rates. The indirect cost allowance values are based on current market benchmarks, consistent with good industry practice, and consistent with our experience working on in similar projects with peer organisations..

Table 7 – Indirect Cost Allowances

Subcategory	Design	AusNet PM	Sub Contract PM
Power Transformers	12%	13%	15%
Other Primary Substation Equipment	15%	12%	15%
Substation Civil Works	10%	15%	20%
Protection, Control, and Comms	35%	15%	20%
DC Supplies	12%	15%	10%
Transmission Lines	4%	6%	9%

3. EVALUATION

3.1 STEP 2 – COMPARATIVE REVIEW AGAINST AUSNET'S UNIT RATES

We have undertaken a comparative review of our independent unit rates against AusNet's unit rates for each of the ninety line-items. From this exercise we have identified twelve instances where AusNet's unit rates fall outside an acceptable range as defined by relevant industry standards i.e. Class 4 Estimate – Expected Accuracy Range (refer to Section 2.2.1).

A summary view of the evaluation is provided in Table 6 below. Screenshots of the spreadsheet calculations or provided in Appendix B with commercially sensitive values redacted.

Table 8 – Comparative evaluation of AusNet's unit rates

Item	Evaluation
Substation Primary Equipment	
Other Primary Equipment	
500kV	
500kV CT Replacement (3 Phase Set) Complete New Installation	Within acceptable range
500kV LTCB Replacement (Complete New Installation)	Outside acceptable range
500kV ROI Replacement Complete New Installation	Within acceptable range
Replacement of 500kV SA	Outside acceptable range
220kV	
220kV CT Replace on Existing Structure (3 phase set)	Within acceptable range
220kV Dead Tank Circuit Breaker 3150A 50kA Replacement	Within acceptable range
220kV Live Tank Capbank CB Replacement	Outside acceptable range
220kV ROI Replacement Complete new Installation	Within acceptable range
220kV CVT (3 Phase) Replacement	Within acceptable range
Replacement of 220kV SA	Outside acceptable range
66kV	
66kV CT (3 Phase) Replacement on Existing Structure	Within acceptable range
66kV Dead Tank Circuit Breaker Replacement	Within acceptable range
66kV Live Tank Capbank CB Replacement	Outside acceptable range
Replacement of 66kV ROI on existing structure	Within acceptable range
Replacement of 66kV MVT 3 phase	Within acceptable range
66kV Surge Arrestors Replacement (New) 3 phase	Outside acceptable range
22kV	
22kV Disconnecter Replacement	Within acceptable range
22kV Dead Tank Circuit Breaker Replacement	Within acceptable range
22kV Surge Arrestors Replacement (New) 3 phase	Within acceptable range
Power Transformers	
Power Transformer Components	
Replace WTI and OTI (New)	Within acceptable range
Replacement of TMS (DRMCC)	Within acceptable range
Refurbishment of Phase Isolated Bus (3 single phase)	Within acceptable range
Bushings Single Phase	
Replace 500kV Transformer Bushing	Within acceptable range
Replace 330/275kV Transformer Bushing	Within acceptable range
Replace 220kV Transformer Bushing	Within acceptable range

Replace 66kV Transformer Bushing	Within acceptable range
Civil Works	
Replace VESDA and Fire Indication Panel	Within acceptable range
Replace Fire hydrant system per metro station	Within acceptable range
Control Building renovation	Within acceptable range
Replace Aircondition Unit	Outside acceptable range
Replace Cable Trench Cover (per cover)	Within acceptable range
Re- Dress Yard Surface based on 10,000m2	Within acceptable range
Station Sealed Road	Within acceptable range
Station Service Supplies- AC Auxiliary Supplies with cabling	Within acceptable range
Secondary Systems	
Protection & Control	
220kV Line X Protection Scheme Replacement	Within acceptable range
220kV Line Y Protection Scheme Replacement	Within acceptable range
220kV Single CB Protection Scheme Replacement	Within acceptable range
220kV Transformer X Protection Scheme Replacement	Within acceptable range
220kV Transformer Y Protection Scheme Replacement	Within acceptable range
220kV Capacitor Bank X Protection & Control Scheme	Within acceptable range
220kV Capacitor Bank Y Protection & Control Scheme	Within acceptable range
220Kv Bus X Protection	Within acceptable range
220Kv Bus Y Protection	Within acceptable range
RTU and DC supplies	
RTU-P3 Small	Within acceptable range
RTU-P3 Medium	Within acceptable range
RTU-SCD5200	Within acceptable range
48V Battery Bank, Chargers & Dist Board (X) – 850Ah (Replacement) – including fireproofing building	Within acceptable range
48V Battery Bank, Chargers & Dist Board (Y) – 850Ah (Replacement) – including fireproofing building	Within acceptable range
48V Battery Bank, Chargers & Dist Board (X) – 850Ah (Replacement) – excluding fireproofing building	Within acceptable range
48V Battery Bank, Chargers & Dist Board (Y) – 850Ah (Replacement) – excluding fireproofing building	Within acceptable range
250V Battery Bank, Chargers & Dist Board (X) – 1000Ah (Replacement) – including fireproofing building	Within acceptable range
250V Battery Bank, Chargers & Dist Board (Y) – 1000Ah (Replacement) – including fireproofing building	Within acceptable range
250V Battery Bank, Chargers & Dist Board (X) – 1000Ah (Replacement) – excluding fireproofing building	Within acceptable range
250V Battery Bank, Chargers & Dist Board (Y) – 1000Ah (Replacement) – excluding fireproofing building	Within acceptable range
Overhead Line Tower Weather Station	Within acceptable range
Ground Mounted Weather Station	Within acceptable range
COMMUNICATION EQUIPMENT	
SDH Node Replacement	Within acceptable range
PDH Node Replacement	Within acceptable range
DIC Replacement	Within acceptable range
TPS Node Replacement	Within acceptable range
CWDM Node Replacement	Within acceptable range
DWDM Node Replacement	Within acceptable range
EXCH Node Replacement	Within acceptable range
PTP Radio Link Replacement	Within acceptable range
Comms RTU Node Replacement	Within acceptable range
OFC ADSS (Fibre Optic cable) per km Replacement	Within acceptable range

TRANSMISSION LINES	
Outage and Monopoles Method Tower Replacement	
500kV double circuit suspension transmission tower replacement	Within acceptable range
Tower Member Replacement	
Simple -Replacement of non-critical member (no rigging)	Within acceptable range
Medium -Replacement of non-critical member (simple rigging)	Within acceptable range
Complex Crane -Replacement of critical member	Within acceptable range
Complex Rigging -Replacement of critical member	Within acceptable range
Splint -Reinforce of critical member using splint method	Within acceptable range
Bolt Replacement -Replace single bolt	Within acceptable range
Tower Resilience	
Steelwork weight (kg) to reinforce existing structure	Within acceptable range
Insulator Replacement	
500kV strain insulator replacement with composite strain insulator	Outside acceptable range
500kV V-string suspension insulator replacement with composite	Within acceptable range
500kV I-string suspension insulator replacement with composite	Within acceptable range
220kV strain insulator replacement with composite	Within acceptable range
220kV I-string suspension insulator replacement with composite	Outside acceptable range
Ground Wire Replacement	
Direct retrofit of existing ground-wire with like for like - metro	Outside acceptable range
Direct replacement of existing ground-wire with OPGW – metro	Outside acceptable range
Critical crossing single span ground-wire replacement like for like	Outside acceptable range
Fall Arrest	
Rack System Fall Arrest	Within acceptable range
500kV Tower Fall Arrest	Within acceptable range
330kV Tower Fall Arrest	Within acceptable range
Low Spans	
Raising Conductor (Single Circuit, Single Bundle Conductor)	Within acceptable range
Raising Conductor (Single Circuit, Double Bundle Conductor)	Within acceptable range
Raising Conductor (Double Circuit, Single Bundle Conductor)	Within acceptable range
Raising Conductor (Double Circuit, Double Bundle Conductor)	Within acceptable range

3.2 STEP 3 – ADJUSTMENTS TO AUSNET’S UNIT RATES

We have recommended adjustments to AusNet’s unit rates where appropriate and verified the adoption of those adjustments by AusNet.

Table 7 details the recommended adjustments to AusNet’s unit rates, which are based on detailed review of each component within each Building Block to identify values of discrepancy.

We have re-evaluated AusNet’s updated unit rates after making the required adjustments based on our recommendations.

We have confirmed that all of AusNet’s unit rates are now within an acceptable range (ninety within the scope of this review).

Screenshots of the spreadsheet calculations or provided in Appendix B with commercially sensitive values redacted.

Table 9 – Recommended adjustments to AusNet’s unit rates

Item	Recommendations
500kV LTCB Replacement (Complete New Installation)	Discrepancy identified with AusNet’s Plant & Equipment rate for 500kV Live Tank Circuit Breakers (LTCB). Use AMCL benchmark rate instead.
Replacement of 500kV SA	Discrepancy identified with AusNet’s Design allowance. Use benchmark rate instead.
220kV Live Tank Capbank CB Replacement	
Replacement of 220kV SA	Discrepancy identified with AusNet’s Sub Contract Project Management allowance. Use AMCL benchmark rate instead.
66kV Live Tank Capbank CB Replacement	
66kV Surge Arrestors Replacement (New) 3 phase	- Discrepancy identified with AusNet’s Design allowance. Use benchmark rate instead. - Discrepancy identified with AusNet’s internal Project Management allowance. Use AMCL benchmark rate instead.
Replace Aircondition Unit	
500kV strain insulator replacement with composite strain insulator	- Discrepancy identified with AusNet’s internal Project Management allowance. Use AMCL benchmark rate instead. - Discrepancy identified with AusNet’s Sub Contract Project Management allowance. Use AMCL benchmark rate instead.
220kV I-string suspension insulator replacement with composite	
Direct retrofit of existing ground-wire with like for like - metro	
Direct replacement of existing ground-wire with OPGW – metro	
Critical crossing single span ground-wire replacement like for like	

APPENDICES

Appendix A SCOPE OF WORKS

A.1 500KV PRIMARY SUBSTATION EQUIPMENT

Item	Scope of Work
Replacement of 500kV 3 phase CTs	• Supply of 500kV 3 phase CTs • Marshalling Box • Foundation • Structure • Earthing • HV Connection to adjacent Equipment • Secondary Cables • Installation • Testing • Removal of existing CT included demolition of foundation • Disposal • Secondary Upgrade/modification • Reinstate the yard • Outage- 02 no
Replacement of 500kV LTCB	• Supply of 500kV LTCB • Supply of POW relay • Online Condition monitoring • Foundation • Structure • CB Access Landing platform • Earthing • HV Connection to adjacent Equipment • Secondary Cables • Installation • Testing • Removal of existing CB including demolition of foundation • Disposal • Secondary Upgrade/mods

	• Reinstate the yard • Outage- 02 no
Replacement of 500kV ROI	• Supply of 500kV ROI • Supply of 500kV 2xESW • Foundation • Structure • Earthing • HV Connection to adjacent Equipment • Secondary Cables • Installation Labour • Testing Labour • Removal of existing ROI included demolition of foundation • Disposal • Secondary Upgrade • Reinstate the yard • Outage- 02 no
Replacement of 500kV SA	• Supply of 500kV SA three phase • Foundation • Structure • Earthing • HV Connection to adjacent Equipment • Installation Labour • Installation Plant • Removal of existing SA included demolition of foundation • Disposal • Reinstate the yard • Outage- 02 no

A.2 220KV PRIMARY SUBSTATION EQUIPMENT

Item	Scope of Work
Replacement of 220kV 3 phase CTs on existing structure	• Supply of 220kV 3 phase CTs • Marshalling Box

	• Foundation • Structure • Earthing • HV Connection to adjacent Equipment • Secondary Cable Installation Labour • Installation • Testing • Removal of existing CT included demolition of foundation • Disposal • Secondary Upgrade • Reinstate the yard • Outage- 02 no
Replacement of 220kV DTCB	• Supply of 220kV DTCB • Online Condition Monitoring relay • Foundation • Structure • CB Access Landing platform • Earthing • HV Connection to adjacent Equipment • Secondary Cables • Installation • Testing • Removal of existing CB including demolition of foundation • Disposal • Secondary Upgrade/Mods • Reinstate the yard • Outage-2 nos
Replace of 220kV Live Tank Capbank CB	• Supply of 220kV LTCB with POW relay • Online Condition Monitoring relay • Foundation • Structure • CB Access Landing platform • Earthing

	• HV Connection to adjacent Equipment • Secondary Cables • Installation • Testing • Removal of existing CB including demolition of foundation • Disposal • Secondary Upgrade/Mods • Reinstate the yard • Outage-2 nos
Replacement of 220kV ROI	• Supply of 220kV ROI • Supply of 220kV 2ESW • Foundation • Structure • Earthing • HV Connection to adjacent Equipment • Secondary Cables • Installation • Testing • Removal of existing ROI included demolition of foundation • Disposal • Secondary Upgrade • Reinstate the yard • Outage-2nos
Replacement of 220kV CVT	• Supply of 220kV CVT-3 ph • Marshalling Box • Foundation • Structure • Earthing • HV Connection to adjacent Equipment • Secondary Cables • Installation • Testing

	• Removal of existing CVT included demolition of foundation • Disposal • Secondary Upgrade • Reinstate the yard • Outage
Replacement of 220kV SA	• Supply of 220kV SA three phase • Foundation • Structure • Earthing • HV Connection to adjacent Equipment • Installation • Removal of existing SA included demolition of foundation • Disposal • Reinstate the yard • Outage

A.3 66KV PRIMARY SUBSTATION EQUIPMENT

Item	Scope of Work
Replacement of 66kV 3 phase CTs on existing structure	• Supply of 220kV 3 phase CTs including marshalling box • Marshalling Box • Foundation • Structure • Earthing • Earthing Labour • HV Connection to adjacent Equipment • HV Connection Installation Labour • Secondary Cables • Secondary Cable Installation Labour • Installation Labour • Installation Plant • Testing Labour

	• Testing Plant • Removal of existing CT included demolition of foundation • Disposal • Secondary Upgrade • Reinstate the yard • Outage
Replacement of 66kV DTCB	• Supply of 66kV DTCB including Support Structure • Foundation • Structure-included • Earthing • Earthing Labour • HV Connection to adjacent Equipment • HV Connection Installation Labour • Secondary Cables • Secondary Cable Installation Labour • Installation Labour • Installation Plant • Testing Labour • Testing Plant • Removal of existing CB included demolition of foundation • Disposal • Secondary Upgrade • Reinstate the yard • Outage
Replacement of 66kV Live Tank Cap Bank CB	• Supply of 66kV LTCB including POW relay • Foundation • Structure-included • Earthing • Earthing Labour • HV Connection to adjacent Equipment • HV Connection Installation Labour • Secondary Cables

	• Secondary Cable Installation Labour • Installation Labour • Installation Plant • Testing Labour • Testing Plant • Removal of existing CB included demolition of foundation • Disposal • Secondary Upgrade • Reinstate the yard • Outage
Replacement of 66kV ROI on existing structure	• Supply of 66kV ROI • Foundation • Structure-existing structure • Earthing • Earthing Labour • HV Connection to adjacent Equipment • HV Connection Installation Labour • Secondary Cables • Secondary Cable Installation Labour • Installation Labour • Installation Plant • Testing Labour • Removal of existing ROI • Disposal • Secondary Upgrade • Reinstate the yard • Outage
Replacement of 66kV MVT	• Supply of 66kV MVT-single phase • Marshalling Box • Foundation • Structure • Earthing • Earthing Labour

	• HV Connection to adjacent Equipment • HV Connection Installation Labour • Secondary Cables • Secondary Cable Installation Labour • Installation Labour • Installation Plant • Testing Labour • Removal of existing CVT included demolition of foundation • Disposal • Secondary Upgrade • Reinstate the yard • Outage
Replacement of 66kV SA	• Supply of 66kV SA three phase • Foundation • Structure • Earthing • Earthing Labour • HV Connection to adjacent Equipment • HV Connection Installation Labour • Installation Labour • Installation Plant • Removal of existing SA included demolition of foundation • Disposal • Reinstate the yard • Outage

A.4 POWER TRANSFORMERS

Item	Scope of Work
Replacement of WTI/OTI	• Supply, Delivery and Install OTI and WTI • Testing and Commissioning • Dismantle Old OTI/ WTI • Secondary Upgrade/modify

	• Outage-1nos
Replacement of TMS (DRMCC)	
Refurbishment of Phase Isolated Bus (3 single phase)	
Replacement of 500kV Transformer Bushing Single Phase	• Supply, Delivery of single phase 500kV Bushing • Install single phase bushing • Testing and Commissioning • Dismantle Old 500kV Transformer bushing • Outage-1nos
Replacement of 220kV Transformer Bushing Single Phase	• Supply, Delivery of single phase 220kV Bushing • Install single phase bushing • Testing and Commissioning • Dismantle Old 220kV Transformer bushing • Outage-1nos
Replacement of 66kV Transformer Bushing Single Phase	• Supply, Delivery of single phase 66kV Bushing • Install single phase bushing • Testing and Commissioning • Dismantle Old 66kV Transformer bushing • Outage-1nos

A.5 SUBSTATION CIVIL WORKS

Item	Scope of Work
Replace VESDA and Fire Indication Panel	
Replace Fire Hydrant system per Metro Station	• Install Water Storage Tank • Pump System • Fire Pipe • Fire hydrants • Removal of existing fire system

	• Mob/Demob
Control Building renovation	
Replace Aircondition Unit	
Replace Cable Trench Cover (per cover)	
Re Dress Yard Surface based on 10,000 m2	• Remove Existing Yard Surface • Install Yard Surface • Disposal and cleanup • Topup earthgrid (10% of total area) • Mob/Demob
Station Sealed Road	
Station Service Supplies- AC Auxiliary Supplies with cabling	

A.6 220KV SECONDARY SYSTEMS

Item	Scope of Work
220kV Line X Protection and Control Replacement	• Panels including relays, wiring , assembly, FAT testing and deliver to site • Cabinet Install at site • Control Cables • Testing and Commissioning • Remove Existing Panel • Modify other panels • Outage- 01 no
220kV Line Y Protection and Control Replacement	• Panels including relays, wiring , assembly, FAT testing and deliver to site • Cabinet Install at site • Control Cables • Testing and Commissioning • Remove Existing Panel • Modify other panels • Outage- 01 no

220kV Single CB Management Replacement	• Panels including relays, wiring , assembly, FAT testing and deliver to site • Cabinet Install at site • Control Cables • Testing and Commissioning • Remove Existing Panel • Modify other panels • Outage- 01 no
220kV Bus X Protection Replacement	• Panels including relays, wiring , assembly, FAT testing and deliver to site • Cabinet Install at site • Control Cables • Testing and Commissioning • Remove Existing Panel • Modify other panels • Outage- 01 no
220kV Bus Y Protection Replacement	• Panels including relays, wiring , assembly, FAT testing and deliver to site • Cabinet Install at site • Control Cables • Testing and Commissioning • Remove Existing Panel • Modify other panels • Outage- 01 no
220kV Transformer X Protection Replacement	• Panels including relays, wiring , assembly, FAT testing and deliver to site • Cabinet Install at site • Control Cables • Testing and Commissioning • Remove Existing Panel • Modify other panels • Outage- 01 no
220kV Transformer Y Protection Replacement	• Panels including relays, wiring , assembly, FAT testing and deliver to site • Cabinet Install at site

	• Control Cables • Testing and Commissioning • Remove Existing Panel • Modify other panels • Outage- 01 no
220kV Capbank X Protection Replacement	• Panels including relays, wiring , assembly, FAT testing and deliver to site • Cabinet Install at site • Control Cables • Testing and Commissioning • Remove Existing Panel • Modify other panels • Outage- 01 no
220kV Capbank Y Protection Replacement	• Panels including relays, wiring , assembly, FAT testing and deliver to site • Cabinet Install at site • Control Cables • Testing and Commissioning • Remove Existing Panel • Modify other panels • Outage- 01 no

A.7 RTU AND DC SUPPLY

Item	Scope of Work
RTU-P3 Small	
RTU-P3 Medium	
RTU-SCD5200	
250V Battery Bank, Chargers and Distribution Board(X&Y) 1000Ah Replacement	• S&I 250V DC 100Ah Battery Bank (X&Y) • S&I 48V DC Battery Chargers 850Ah (A&B) • Decommission and dispose existing 250DC, 1000Ah X&Y Prot and Control battery banks • S&I cables for X&Y connection from New battery bank to isolation cubicle

	• VA Permit • SFTs permit • Outage- 01 no
Replace 48V Battery-850AH with external enclosure	• S&I 48V 850Ah Battery Bank (A&B) • External Enclosure (Includes charger ,BMS and dist board) • 48V DC board (S&I) • 48V DC battery Isolation Cubicle (S&I) • 48V DC battery chargers (S&I) • External Footing • Decommission and dispose existing 250DC, 1000Ah X&Y Prot and Control battery banks • S&I cables for X&Y connection from New battery bank to isolation cubicle • VA Permit • SFTs permit • Outage- 01 no
Replace 48V Battery-850AH in existing building require fire proofing	• S&I 48V 850Ah Battery Bank (A&B) • S&I 48V DC Battery Chargers 850Ah (A&B) • 48V DC board (S&I) • 48V DC battery Isolation Cubicle (S&I) • Decommission and dispose existing 250DC, 1000Ah X&Y Prot and Control battery banks • S&I cables for X&Y connection from New battery bank to isolation cubicle • Establishment of a new charger room separated by 2hr fire rated wall • VA Permit • SFTs permit • Outage- 01 no
Replace 250V Battery-1000AH in existing building require fire proofing	• S&I 250V DC 1000Ah Battery Bank (X&Y) • 250V DC dist board (S&I) • 250V DC battery Isolation Cubicle (S&I) • 250V DC battery chargers (S&I) • Decommission and dispose existing 250DC, 1000Ah X&Y Prot and Control battery banks

- S&I cables for X&Y connection from New battery bank to isolation cubicle
- Establishment of a new charger room separated by 2hr fire rated wall
- VA Permit
- SFTs permit
- Outage- 01 no

Weather Monitoring

A.8 COMMUNICATION EQUIPMENT

Item	Scope of Work
Communication Equipment	• SDH Node Replacement • PDH Node Replacement • DIC Replacement • TPS Node Replacement • CWDM Node Replacement • DWDM Node Replacement • EXCH Node Replacement • PTP Radio Link Replacement • Comms RTU Node Replacement • OFC ADSS (Fibre Optic cable) per km Replacement

A.9 TRANSMISSION LINES

Item	Scope of Work
Outages and Monopoles method Tower Replacement	• 500kV double circuit suspension transmission tower replacement with new 500kV double circuit suspension tower
Tower Member Replacement	• Simple -Replacement of non-critical member (no rigging) • Medium -Replacement of non-critical member require simple rigging • Complex Crane -Replacement of critical member require complex crane

	• Complex Rigging -Replacement of critical member require complex rigging • Splint -Reinforce of critical member using splint method • Bolt Replacement -Replace single bolt
Tower Resilience	• Steelwork weight (kg) to reinforce existing structure
500kV Strain Insulator Replacement with new composite Strain Insulator	• Composite Insulator and Hardware supply 3 phase • Removal and replacing the old Insulator with new (8menx 2.5 days towers per day) • Crane and EWP • Mob/ Demob • Disposal • Outage- 2 nos
500kV V-string suspension Insulator Replacement with new composite Suspension Insulator	• Composite Insulator and Hardware supply 3 phase • Removal and replacing the old Insulator with new (8menx 1.5 towers per day) • Crane and EWP • Mob/ Demob • Disposal • Outage- 2 nos
500kV I-string suspension Insulator Replacement with new composite Suspension Insulator (500 towers using live line techniques)	• Composite Insulator and Hardware supply 3 phase (1 Tower) • Removal and replacing the old Insulator with new (8menx 1 towers per day) • Crane and EWP • Mob/ Demob • Disposal • Outage- 1 nos
220kV Strain Insulator Replacement with new composite Strain Insulator	• Composite Insulator and Hardware supply per 3 phase (10 Towers) • Removal and replacement strain with new twin strain insulator(8 man crewx 1.5 days per towers) • Crane and EWP

	• Disposal • Outage- 2 nos • Mob demob ISP
220kV I-string suspension Insulator Replacement with new composite Suspension Insulator (using live line method)	• I string Insulator and Hardware supply per three phase • Removal and replacement strain with new twin strain insulator (8 man crew x 1 days per towers) • Crane and EWP • Disposal • Outage- 2 nos • Mob demob ISP
Rack System fall arrest	• Supply new fall arrest per terminal station site • Fall arrest Install - 6men x 8days • Outage- 2 nos • Mob demob ISP
500kV Tower System fall arrest	• Supply new fall arrest per terminal station site • Fall arrest Install - 6men x 1days • Mob demob ISP
330kV Tower System fall arrest	• Supply new fall arrest per terminal station site • Fall arrest Install - 6men x 1days • Mob demob ISP
Low Spans	• Raising Conductor (Single Circuit, Single Bundle Conductor) • Raising Conductor (Single Circuit, Double Bundle Conductor) • Raising Conductor (Double Circuit, Single Bundle Conductor) • Raising Conductor (Double Circuit, Double Bundle Conductor)

Appendix B COMPARATIVE EVALUATION

										AMCL+ LEADING ASSET MANAGEMENT		Turner & Townsend						
AusNet Unit Rates Review																		
S/No.	Item	Unit Rates		Delta	Comments	General Comment	AACE 96R-18		Evaluation									
		AusNet (P50)	AMCL (P50)				Low -20%	High +20%										
Substation Primary Equipment																		
Other Primary Equipment																		
500kV																		
1	500kV CT Replacement (3 Phase Set) Complete New Installation	REDACTED	REDACTED	5%	Minor difference	REDACTED	REDACTED	REDACTED	Within allowable range									
2	500kV LTCB Replacement (Complete New Installation)			3%	Minor difference on LLE material cost, civil works, and number outages				Within allowable range after Ausnet rate adjusted									
3	500kV ROI Replacement Complete New Installation			2%	Minor difference				Within allowable range									
4	500kV CVT (3 Phase) Replacement Complete New Installation			5%	Minor Difference				Within allowable range									
5	Replacement of 500kV SA			10%	Minor Difference				Within allowable range after ausnet provided their rate									
220kV																		
1	220kV CT Replace on Existing Structure (3 phase set)			-2%	Minor Difference				Within allowable range									
2	220kV Dead Tank Circuit Breaker 3150A 50kA Replacement			-4%	Minor Difference				Within allowable range									
3	220kV Live Tank Capbank CB Replacement			-1%	Minor Difference				Within allowable range after Ausnet Provided the rate									
4	220kV ROI Replacement Complete new Installation			4%	Minor Difference				Within allowable range									
5	220kV CVT (3 Phase) Replacement			4%	Minor Difference				Within allowable range									
6	Replacement of 220kV SA			-6%	Minor Difference				Within allowable range after Ausnet Provided the rate									
66kV																		
1	66kV CT (3 Phase) Replacement on Existing Structure	3%	Minor Difference	Within allowable range														
2	66kV Dead Tank Circuit Breaker Replacement	-3%	Minor Difference	Within allowable range														
3	66kV Live Tank Capbank CB Replacement	-18%	Minor Difference	Within allowable range after Ausnet Provided the rate														
4	Replacement of 66kV ROI on existing structure	0%	Minor Difference	Within allowable range														
5	Replacement of 66kV CVT	4%	Minor Difference	Within allowable range														
6	66kV Surge Arrestors Replacement (New) 3 phase	0%	Minor Difference	Within allowable range after Ausnet Provided the rate														
22kV																		
1	22kV Disconnecter Replacement			Ausnet rate looks fair and reasonable														
2	22kV Dead Tank Circuit Breaker Replacement			Ausnet rate looks fair and reasonable														
3	22kV Surge Arrestors Replacement (New) 3 phase			Ausnet rate looks fair and reasonable														

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AMCL

LEADING ASSET MANAGEMENT



AusNet Unit Rates Review

S/No.	Item	Unit Rates		Delta	Comments	General Comment	AACE 96R-18		Evaluation
		AusNet (P50)	AMCL (P50)				Low -20%	High +20%	
RTU and DC supplies									
1	RTU-P3 Small	REDACTED	REDACTED			REDACTED	REDACTED	REDACTED	Ausnet rate looks fair and reasonable
2	RTU-P3 Medium								Ausnet rate looks fair and reasonable
3	RTU-SCDS200								Ausnet rate looks fair and reasonable
4	48V Battery Bank, Chargers & Dist Board (X) – 850Ah (Replacement) – including fireproofing			5%	Minor Difference				Within allowable range
5	48V Battery Bank, Chargers & Dist Board (Y) – 850Ah (Replacement) – including fireproofing			5%	Minor Difference				Within allowable range
6	48V Battery Bank, Chargers & Dist Board (X) – 850Ah (Replacement) – excluding fireproofing			-6%	Minor Difference				Within allowable range
7	48V Battery Bank, Chargers & Dist Board (Y) – 850Ah (Replacement) – excluding fireproofing			-6%	Minor Difference				Within allowable range
8	250V Battery Bank, Chargers & Dist Board (X) – 1000Ah (Replacement) – including fireproofing			6%	Minor Difference				Within allowable range
9	250V Battery Bank, Chargers & Dist Board (Y) – 1000Ah (Replacement) – including fireproofing			6%	Minor Difference				Within allowable range
10	250V Battery Bank, Chargers & Dist Board (X) – 1000Ah (Replacement) – excluding fireproofing			-6%	Minor Difference				Within allowable range
11	250V Battery Bank, Chargers & Dist Board (Y) – 1000Ah (Replacement) – excluding fireproofing			-6%	Minor Difference				Within allowable range
12	Overhead Line Tower Weather Station								Ausnet rate looks fair and reasonable
13	Ground Mounted Weather Station								Ausnet rate looks fair and reasonable
COMMUNICATION EQUIPMENT									
1	SDH Node Replacement	REDACTED	REDACTED			REDACTED	REDACTED	REDACTED	Ausnet rate looks fair and reasonable
2	PDH Node Replacement								Ausnet rate looks fair and reasonable
3	DIC Replacement								Ausnet rate looks fair and reasonable
4	TPS Node Replacement								Ausnet rate looks fair and reasonable
5	CWDM Node Replacement								Ausnet rate looks fair and reasonable
6	DWDM Node Replacement								Ausnet rate looks fair and reasonable
7	EXCH Node Replacement								Ausnet rate looks fair and reasonable
8	PTP Radio Link Replacement								Ausnet rate looks fair and reasonable
9	Comms RTU Node Replacement								Ausnet rate looks fair and reasonable
10	OFC ADSS (Fibre Optic cable) per km Replacement								Ausnet rate looks fair and reasonable

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