OPTIONS EVALUATION REPORT (OER)

Various Lines - Conductor Condition

OER- N2595 revision 0.0

Ellipse project no(s):
TRIM file: [TRIM No]

Project reason: Capability - Asset Replacement for end of life condition
Project category: Prescribed - Replacement

Approvals

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Change history

Revision	Date	**Amendment**
00	06/11/2021	Initial Issue

Executive summary

TransGrid's overhead transmission network contains conductor sections that have reached end of life due to various mechanisms including corrosion and annealing. These issues have led to a high and increasing requirement for inspection and maintenance along the transmission lines.

An analysis of conductor deterioration mechanisms including heat exposure, mid-span joint locations and atmospheric corrosion, supported by inspections and testing, have identified approximately 1100 km circuit length of conductor that has condition issues. Remediation is required to address asset health and maintain appropriate risk levels across the network.

The main drivers of the need to remediate these issues are:

> Manage network safety risk levels "As-Low-As Reasonably-Practicable" in accordance with the regulation obligations and TransGrid's business risk appetite. Under the Electricity Supply (Safety and Network Management) Regulation 2014 Section 5 'A network operator must take all reasonable steps to ensure that the design, construction, commissioning, operation and decommissioning of its network (or any part of its network) is safe'; and

> Provide economic benefit to consumers through reduction in reliability, safety and bushfire risks

A total of 40 lines[1] were considered for assessment to address the need/opportunity. The preferred lines for the conductor replacement appear in Table 1. Details of other evaluated lines are in Appendix A.

Table 1 - Preferred options

Lines	Direct Capital Cost ($m)	Network and corporate overheads ($m)	Total capital cost[2] ($m)	Weighted NPV (PV, $m)
Line 21 – Tuggerah 330kV and Sydney North 330kV	6.07	0.56	6.63	74.03
Line 22 – Vales Point PS to Sydney North 330kV	7.25	0.70	7.95	93.63
Line 959 – Sydney North 330kV to Sydney East 330kV	6.47	0.59	7.06	579.17
Line 92Z - Sydney North 330kV to Sydney East 330kV	8.92	0.84	9.76	577.14
Line 65 – Murray 330kV to Tumut 330kV	4.15	0.33	4.48	1.38
Line 2M – Tuggerah 330kV to Munmorah 330kV	9.15	0.88	10.03	170.06

[1] Options to remediate the identified conductor issues within line segments are limited to replacement only. Those considered are based upon network wide assessment of conductor failure hazard and grouped by priority; each line segment has been assessed separately.

[2] Total capital cost is the sum of the direct capital cost and network and corporate overheads. Total capital cost is used in this OER for all analysis.

Lines	Direct Capital Cost ($m)	Network and corporate overheads ($m)	Total capital cost[2] ($m)	Weighted NPV (PV, $m)
Line 17 - Avon 330kV to Macarthur 330kV	8.45	0.79	9.24	376.16
Line 90 – Eraring 330 kV to Newcastle 330kV	1.25	0.11	1.37	35.15
Line 81 – Newcastle 330kV to Liddell 330kV	3.32	0.31	3.62	15.48
Line 93 - Eraring 330 kV to Newcastle 330kV	2.60	0.24	2.84	13.54
Line 26 - Munmorah 330kV to Sydney West 330kV	6.95	0.65	7.60	2.21
Line 25 – Eraring 330kV to Vineyard 330kV	6.92	0.65	7.58	2.23
Line 99Z – ANM 132kV to Albury 132kV	1.07	0.10	1.17	0.28
Line 994 - Wagga 330 kV to Yanco 132kV	29.99	2.97	32.97	4.79
Total	**102.56**	**9.72**	**112.3**	**1945.25**

The lines specified in Table 1 are the preferred lines as they have the positive weighted NPV. These lines have been prioritised based on the NPV per kilometre and also outage constraint. Total project cost is $112.3 million with $31.86 million will be delivered in 2024-2028 Regulatory Period and $80.44 million will be delivered post 2024-2028 Regulatory Period.

1. Need/opportunity

TransGrid's overhead transmission network contains sections of conductor that have reached end of life due to various mechanisms, or combinations thereof. These mechanisms include: annealing due to bushfire exposure; corrosion initiated by bushfire exposure[3], and corrosion at mid-span joint locations[4]. The above issues have led to a high and increasing requirement for inspection and maintenance along these transmission lines.

An analysis of bushfire impact history and mid-span joint locations, mapped against corrosion zones, identified the locations that were likely exposed to the above described degradation mechanisms. Various inspections, including Smart Aerial Image Processing (SAIP), and ground and aerial based inspections, identified visual indicators of degradation such as: broken strands; bulging, visible white product; discolouration; out of lay strands and discolouration.

Material testing of conductor samples from the locations identified above confirmed the following:

> Aluminium and zinc oxides were contained within the white surface product, partial loss of the galvanising layer on the steel strands and reduction in cross section of the inner aluminium strands was observed when the samples were dismantled;

> Loss of tensile strength at the locations where strands were out of lay; and

> Migration of the conductor grease away from the inner at locations where surface deposits and discolouration was observed.

There is a need to remediate these issues to:

> Manage network safety risk levels "As-Low-As Reasonably-Practicable" in accordance with the regulation obligations and TransGrid's business risk appetite. Under the Electricity Supply (Safety and Network Management) Regulation 2014 Section 5 'A network operator must take all reasonable steps to ensure that the design, construction, commissioning, operation and decommissioning of its network (or any part of its network) is safe'; and

> Provide economic benefit to consumers through reduction in safety and bushfire risks.

If the condition issues on the line are not addressed in sufficient time, then the asset will operate with increasing risk of failure as it continues to deteriorate. The level of reactive corrective maintenance needed to keep the line operating within required standards may also increase, particularly when asset failures ultimately occur.

Consequently, the proposed project has an economic benefits need, and addressed this need will provide avoided cost savings from reduced in bushfire and safety risk, and maintenance costs that would otherwise occur without refurbishment.

Appendix B provides a summary of line segments with condition issues.

2. Related needs/opportunities

> Need 1351 – TL18 Refurbishment

> Need 1600 – Line 11 Suspension Structure Renewal – Conductor replacement for Line 11 is included in Need 1600.

[3] The conductor grease forms a barrier layer between the aluminium outer strands and protective galvanizing layer of the inner steel strands. Exposure to bushfire can cause the conductor grease to migrate from the inner strands to the surface, the zinc then becomes a sacrificial anode in the galvanic cell formed between it and the aluminium leading to a loss of galvanizing and initiation of corrosion.

[4] Mid-span joints are collection points for contaminants deposited on conductors, these contaminants accelerate the corrosion process.

- Need 1408 – Line 23 – Vales Pt – Munmorah – Refurbishment – Conductor replacement for Line 23 is included in Need 1408.
- N2396 – TL 11 Conductor Condition
- Need 1590 – Silmalec Cond Midspan and Deadend – Stg 2
- Need 1290 – 330kV Silmalec Conductor Deadends and Mid-span Joints Phase 1
- N2522 – TL1 Refurbishment
- N2521 – TL2 Refurbishment
- N2523 – TL3 Refurbishment
- N2609 – Main Grid Low Spans

There is also an outstanding Need to address fatigue related issues with dead-ends and mid-span joints on lines that have Silmalec conductor (Need 1590).

3. Options

The base case for this assessment is a 'do nothing' scenario, where the assets are left in service until they fail and require replacement. In addition to the base case, a single remediation option has been considered which is discussed in Section 3.2.

3.1 Base case

It is noted that a 'run to fail' scenario, where the issues are addressed through increased asset monitoring and preventative maintenance tasks, is not a valid base case for this Need. The condition issues on the asset have already been identified through maintenance inspections, and increasing the frequency of inspections to monitor the condition issues will not necessarily address them.

The base case will instead be defined as a 'do nothing' scenario, where the assets are left in service until they fail and require replacement. The replacement cost has been captured in the NPV assessment under financial risk cost.

3.2 Options evaluated

Option A, B, C – Replacement of existing Conductor as specified in Appendix B.[NOSA-N2595, OFS-N2595A, OFS-N2595B, OFS-N2595C]

Due to the scope of conductor assessed and the limited options available to remediate conductor condition issues, the options costed were based upon the grouping of line segments using a combination of conductor type and degradation mechanism. Each line segment has been assessed individually and inclusion within the recommended scope based upon the NPV of the remediation works, outage constraints, ALARP threshold and optimal timing.

The remediation includes replacement of all conductor compression fittings, suspension clamps/AGSU, jumper connections, spacers and vibration dampers on relevant section of lines.

The estimated cost (in $2020-21) of each transmission line is outlined in Appendix A,

The estimated cost of line conductor replacements in regulatory period 2024-2028 and post regulatory period 2024-2028 are as follows:

Table 2 estimated cost

Selected lines	Length (km)	Total Cost 2024-2028 Regulatory Period	Total Cost Post 2024-2028 Regulatory Period
Line 65 – Murray 330kV to Tumut 330kV	6.8	-	4.48

Selected lines	Length (km)	Total Cost 2024-2028 Regulatory Period	Total Cost Post 2024-2028 Regulatory Period
Line 11 – Dapto 330kV to Sydney South 330kV	Assessed and included under Need-1600		
Line 21 – Tuggerah 330kV and Sydney North 330kV	15.8	6.63	-
Line 2M – Tuggerah 330kV to Munmorah 330kV	26.2	-	10.03
Line 22 – Vales Point PS to Sydney North 330kV	21.4	7.95	-
Line 23 - Munmorah 330kV to Vales Point 330kV	Assessed and included under Need-1408		
Line 959 – Sydney North 330kV to Sydney East 330kV	14.1	7.06	-
Line 92Z - Sydney North 330kV to Sydney East 330kV	23.7	9.76	-
Line 17 - Avon 330kV to Macarthur 330kV	26.7	0.16 (Development cost)	9.08
Line 90 – Eraring 330 kV to Newcastle 330kV	1.0	-	1.37
Line 81 – Newcastle 330kV to Liddell 330kV	6.2	-	3.62
Line 93 - Eraring 330 kV to Newcastle 330kV	1.0	-	2.84
Line 26 - Munmorah 330kV to Sydney West 330kV	17.1	0.15 (Development cost)	7.45
Line 25 – Eraring 330kV to Vineyard 330kV	17.1	0.15 (Development cost)	7.43
Line 99Z – ANM 132kV to Albury 132kV	0.33	-	1.17
Line 994 - Wagga 330 kV to Yanco 132kV	123	-	32.97
Total		**31.86**	**80.44**

The Lines in Table 2 are mostly located in coastal regions and are subject to harsher operating conditions and therefore higher rates of corrosion than conductors situated away from the coastline. In additions, the majority of lines are located in the high bushfire consequence area. The replacement of the conductor and associated fittings will mitigate the bushfire and safety risks on the lines that may arise due to conductor drop.

The lines in Table 2 have been prioritised based on the highest weighted NPV per kilometre and outage constraint. It is estimated that the total project cost is $112.3 million (in $2020-21) with $31.86 million will be delivered in 2024-2028 Regulatory Period and $80.44 million will be delivered post 2024-2028 Regulatory Period.

3.3 Options considered and not progressed

The following options were considered but not progressed:

Table 3 Options considered but not progressed

Option	Reason for not progressing
Increased inspections	The condition issues have already been identified and cannot be rectified through increased inspections.
Elimination of all associated risk	This can only be achieved through retirement and decommissioning of the associated assets which is not feasible.
New transmission line	Due to significant costs of this option, a new transmission line is not considered commercially feasible.
Non-network solutions	TransGrid will invite proposals for potential non-network solutions as part of the RIT-T process.

4. Evaluation

4.1 Commercial evaluation methodology

The economic assessment undertaken for this project includes three scenarios that reflect a central set assumptions based on current information that is most likely to eventuate (central scenario), a set of assumptions that give rise to a lower bound for net benefits (lower bound scenario), and a set of assumptions that give rise to an upper bound on benefits (higher bound scenario).

Assumptions for each scenario are set out in the table below.

Table 4 Scenario Inputs

Parameter	Central scenario	Lower bound scenario	Higher bound scenario
Discount rate	4.8%	7.37%	2.23%
Capital cost	100%	125%	75%
Risk costs	100%	75%	125%
Scenario weighting	**50%**	**25%**	**25%**

Parameters used in this commercial evaluation:

Table 5 Parameters used in the NPV evaluation

Parameter	Parameter Description	Value used for this evaluation
Discount year	Year that dollar values are discounted to	2020/2021
Base year	The year that dollar value outputs are expressed in real terms	2020/2021 dollars
Period of analysis	Number of years included in economic analysis with remaining capital value included as terminal value at the end of the analysis period.	25 years
Expected asset life	Period of depreciation of the asset	35 years
ALARP disproportionality	Multiplier of the environmental and safety related risk cost included in NPV analysis to demonstrate implementation of obligation to reduce to ALARP.	Refer to section 4.3 for details.

The capex figures in this OER do not include any real cost escalation.

4.2 Commercial evaluation results

The commercial evaluation of the preferred technically feasible options is set out in Table 6. Details of the commercial evaluation for lines not selected to proceed appear in Appendix A.

Table 6 - Commercial evaluation (PV, $ million)

Line	Capital Cost PV	Central PV	Low PV	High PV	Weighted NPV (PV, $m)
Line 65	3.72	0.89	-1.83	5.59	1.38
Line 11	Will be completed under Need-1600				
Line 21	5.50	65.42	28.52	136.78	74.03
Line 2M	10.03	151.83	70.43	306.17	170.06
Line 22	6.58	83.73	38.12	168.95	93.63
Line 23	Will be completed under Need-1408				
Line 959	5.84	519.51	254.96	1022.71	579.17
Line 92Z	8.09	517.45	252.53	1021.12	577.14
Line 17	7,65	332.56	154.89	684.64	376.16
Line 90	1.13	31.11	14.34	64.03	35.15
Line 81	3.01	13.48	4.70	30.27	15.48
Line 93	2.36	11.86	4.37	26.08	13.54

Line	Capital Cost PV	Central PV	Low PV	High PV	Weighted NPV (PV, $m)
Line 26	6.31	1.35	-3.21	9.33	2.21
Line 25	6.29	1.37	-3.19	9.34	2.23
Line 99Z	0.97	0.17	-0.49	1.28	0.28
Line 994	25.61	1.41	-14.60	30.93	4.79

4.3 ALARP evaluation

TransGrid manages and mitigates bushfire and safety risk to ensure they are below risk tolerance levels or 'As Low As Reasonably Practicable' ('ALARP'), in accordance with the regulation obligations and TransGrid's business risk appetite. Under the Electricity Supply (Safety and Network Management) Regulation 2014 Section 5 'A network operator must take all reasonable steps to ensure that the design, construction, commissioning, operation and decommissioning of its network (or any part of its network) is safe.' TransGrid maintains an Electricity Network Safety Management System (ENSMS) to meet this obligation.[5]

In its Network Risk Assessment Methodology, under the ALARP test with the application of a gross disproportionate factor[6] the weighted benefits are expected to exceed the cost. TransGrid's analysis concludes that the costs are less than the weighted benefits from mitigating bushfire and safety risks. The proposed investment will enable TransGrid to continue to manage and operate this part of the network to a safety and risk mitigation level of ALARP.

Evaluation of the above lines has been completed in accordance with As Low As Reasonably Practicable (ALARP) obligations. The Network Safety Risk Reduction is calculated as 6 x Bushfire Risk Reduction + 6 x Safety Risk Reduction + 0.1 x Reliability Risk Reduction.

Results of the ALARP evaluation for the preferred lines are set out in Table 7. Others can be found in Appendix A.

Table 7 - Reasonably practicable test ($ million)

Line	Network Safety Risk Reduction	Annualised Capex	Reasonably Practicable?[7]
Line 65	0.05	0.27	N
Line 11	Assessed and included under Need-1600		
Line 21	2.39	0.39	Y
Line 2M	9.13	0.60	Y
Line 22	4.10	0.47	Y
Line 23	Assessed and included under Need-1408		

[5] TransGrid's ENSMS follows the International Organization for Standardization's ISO31000 risk management framework which requires following hierarchy of hazard mitigation approach

[6] In accordance with the framework for applying the ALARP principle, a disproportionality factor of 6 has been applied to risk cost figures. The values of the disproportionality factors were determined through a review of practises and legal interpretations across multiple industries, with particular reference to the works of the UK Health and Safety Executive. The methodology used to determine the disproportionality factors in this document is in line with the principles and examples presented in the AER Replacement Planning Guidelines and is consistent with TransGrid's Revised Revenue Proposal 2023/24- 2027/28.

[7] Reasonably practicable is defined as whether the annualised CAPEX is less than the Network Safety Risk Reduction.

Line	Network Safety Risk Reduction	Annualised Capex	Reasonably Practicable?[7]
Line 959	17.62	0.42	Y
Line 92Z	17.62	0.58	Y
Line 17	15.93	0.55	Y
Line 90	1.75	0.08	Y
Line 81	0.91	0.22	Y
Line 93	0.84	0.17	Y
Line 26	0.49	0.45	Y
Line 25	0.49	0.45	Y
Line 99Z	0.07	0.07	Y
Line 994	1.91	1.96	N

The result of the ALARP evaluation is that all lines meet the ALARP threshold with the exception of Line 994 and Line 65.

4.4 Preferred option

16 lines have positive weighted NPV of al the technically feasible options considered as part of this need. 4 out of 16 lines (Line 21, 22, 959, 92Z) have been prioritised to be delivered in 2024-2028 Regulatory Period based on the NPV/km and also outage constraint. Other line segments were not selected as they had lower NPV per kilometre or were not optimally timed.

Capital and Operating Expenditure

The total required capex expenditure for the preferred options is $112.3 million with $31.86 million will be delivered in 2024-2028 Regulatory Period and $80.44 million will be delivered post 2024-2028 Regulatory Period.

Regulatory Investment Test

A regulatory investment test for transmission (RIT-T) is required for all the preferred options as the estimated capital cost for the preferred lines is above the threshold of $6 million.

5. Optimal Timing

The test for optimal timing of the preferred lines has been undertaken. The approach taken is to identify the optimal commissioning year for the preferred option where net benefits (including avoided risk costs and safety disproportionality tests) of the preferred option exceeds the annualised costs of the option. The optimal timing assessment considers the delivery requirements of the project and the estimated delivery timeline as per the OFS.

The commencement year is determined based on the required project disbursement to meet the commissioning year based on the OFS.

The results of optimal timing analysis can be found in Appendix A.

6. Recommendation

16 lines have positive weighted NPV of al the technically feasible options considered as part of this need. 4 out of 16 lines (Line 21,22, 959, 92Z) have been prioritised to be delivered in 2024-2028 Regulatory Period based on the NPV/km and also outage constraint.

It is therefore recommended that these lines be scoped in detail, so that it can be progressed from DG1 to DG2. Total project cost is $112.3 million with $31.86 million will be delivered in 2024-2028 Regulatory Period and $80.44 million will be delivered post 2024-2028 Regulatory Period.

Appendix A Conductor Summaries

Line and Option	Total capital cost[8] ($m)	Weighted NPV (PV, $m)	Network Safety Reduction ($m)	Annual Capex ($M)	ALARP	Optimal Timing	Total Benefit including Risk	Inclusion in regulatory period 2024-2028	Inclusion in Regulatory Period 2029-2033
N2595A-U3	5.05	-0.03	0.05	0.30	N	2035	3.42	N	N
N2595A-2	12.29	-1.08	0.11	0.73	N	2038	7.34	N	N
N2595A-U5	10.49	-6.18	0.00	0.62	N	-	1.55	N	N
N2595A-U7	8.65	-4.89	0.00	0.52	N	-	1.46	N	N
N2595A-3	0.99	-0.55	0.00	0.06	N	-	0.18	N	N
N2595A-65	4.48	1.38	0.05	0.27	N	2028	4.31	N	Y
N2595A-L5	1.45	-1.09	0.00	0.09	N	-	0.01	N	N
N2595A-64	3.63	-0.82	0.02	0.22	N	2039	1.69	N	N
N2595A-M11	1.47	-1.01	0.00	0.09	N	-	0.09	N	N

[8] Total capital cost is the sum of the direct capital cost and network and corporate overheads. Total capital cost is used in this OER for all analysis.

Line and Option	Total capital cost[8] ($m)	Weighted NPV (PV, $m)	Network Safety Reduction ($m)	Annual Capex ($M)	ALARP	Optimal Timing	Total Benefit including Risk	Inclusion in regulatory period 2024-2028	Inclusion in Regulatory Period 2029-2033
N2595A-M13	1.19	-0.89	0.00	0.07	N	-	0.01	N	N
N2595A-L1	1.37	-1.03	0.00	0.08	N	-	0.01	N	N
N2595A-L3	0.89	-0.47	0.00	0.05	N	-	0.18	N	N
N2595A-11	20.98	2511.54	115.52	1.25	Y	2026	2278.66	Y (Need 1600)	N
N2595A-97G/1	10.47	-7.27	0.00	0.62	N	-	0.35	N	N
N2595A-18	7.40	-0.66	0.40	0.44	N	2039	4.40	N	Y
N2595B-21	6.63	74.03	5.69	0.39	Y	2025	70.48	Y	N
N2595B-2M	10.03	170.06	9.13	0.60	Y	2026	159.50	N	N
N2595B-10	5.32	-0.95	0.30	0.32	N	2042	2.73	N	N
N2595B-22	7.95	93.63	6.20	0.47	Y	2026	89.81	Y	N
N2595B-23	4.04	96.64	5.97	0.24	Y	2025	91.14	Y (Need 1408)	N

Line and Option	Total capital cost[8] ($m)	Weighted NPV (PV, $m)	Network Safety Reduction ($m)	Annual Capex ($M)	ALARP	Optimal Timing	Total Benefit including Risk	Inclusion in regulatory period 2024-2028	Inclusion in Regulatory Period 2029-2033
N2595B-959	7.06	579.17	33.64	0.42	Y	2026	524.92	Y	N
N2595B-92Z	9.76	577.14	33.64	0.58	Y	2026	524.92	Y	N
N2595B-17	9.24	376.16	15.93	0.55	Y	2026	339.63	N	Y
N2595B-90	1.37	35.15	1.75	0.08	Y	2025	32.16	N	Y
N2595B-81	3.62	15.48	0.91	0.22	Y	2025	16.25	N	Y
N2595B-93	2.84	13.54	0.84	0.17	Y	2025	14.03	N	Y
N2595B-26	7.60	2.21	0.49	0.45	Y	2029	7.16	Y	Y
N2595B-25	7.58	2.23	0.49	0.45	Y	2029	7.16	Y	Y
N2595C-97G/3	8.56	-6.11	0.00	0.51	N	-	0.32	N	N
N2595C-97K	32.53	-16.75	0.00	1.94	N	-	4.07	N	N
N2595C-97L	13.34	-9.12	0.00	0.79	N	-	0.42	N	N

Line and Option	Total capital cost[8] ($m)	Weighted NPV (PV, $m)	Network Safety Reduction ($m)	Annual Capex ($M)	ALARP	Optimal Timing	Total Benefit including Risk	Inclusion in regulatory period 2024-2028	Inclusion in Regulatory Period 2029-2033
N2595C-9GM	9.48	-6.12	0.00	0.56	N	-	0.92	N	N
N2595C-966	34.32	-5.22	1.86	2.04	N	2054	16.41	N	N
N2595C-99Z	1.17	0.28	0.07	0.07	Y	2025	1.06	N	Y
N2595C-M3	1.15	-0.78	0.00	0.07	N	-	0.08	N	N
N2595C-994	32.97	4.79	1.91	1.96	N	2032	25.04	N	Y
N2595C-996	27.37	-3.14	1.48	1.63	N	2046	14.90	N	N
N2595C-999	20.97	-12.49	0.00	1.25	N	-	2.31	N	N

Appendix B Line Segments Details

Priority 1 - Transmission Line Conductor Replacement

TL	Start Structure	End Structure	Existing Conductor	Proposed Conductor	Total Length (km)
U1[9]	Gantry	16	91/.161in - Silmalec	2 x Olive	5.19
1	Gantry	70	91/.161in - Silmalec	2 x Mango	19.85
U3[10]	Gantry	15	91/.161in - Silmalec	2 x Olive	4.96
2[11]	Gantry	150	91/.161in - Silmalec	2 x Mango	19.73
U5[12]	Gantry	10	91/.161in - Silmalec	2 x Olive	3.75
U7	Gantry	9	91/.161in - Silmalec	2 x Olive	3.88
3[13]	1R	303	91/.161in - Silmalec	2 x Mango	0.32
65[14]	Gantry	111	91/.161in - Silmalec	2 x Mango	7.76
L5	Gantry	2	91/.161in - Silmalec	2 x Olive	0.55
64	Gantry	17	91/.161in - Silmalec	2 x Mango	5.70
M11	6	11	91/.161in - Silmalec	2 x Mango	0.32
M13	5	6	91/.161in - Silmalec	2 x Mango	0.40
L1	Gantry	2	91/.161in - Silmalec	2 x Olive	0.58
L3	Gantry	2	91/.161in - Silmalec	2 x Olive	0.57
11	Gantry	154	54/6/.139in+1/.146in - Moose	2 x Olive	68.02
97G/1	115	195	30/6/.118in+1/.124in - Panther	Lemon	17.52
18	Gantry	41	54/6/.118in+1/.124in - Bison	2 x Mango	16.34

Priority 2 - Transmission Line Conductor Replacement

TL	Start Structure	End Structure	Existing Conductor	Proposed Conductor	Total Length (km)

[9] 2019/20 bushfire damage within this segment, rectification works given in works scheduled planned for spans STR 009 – 014, all phases impacted.

[10] 2019/20 bushfire damage within this segment, rectification works carried out in spans STR 009 – 013, all phases. Works planned for spans STR 005 – 009, one phase only.

[11] 2019/20 bushfire damage within this segment, rectification works planned for spans: STR 006 – 009, one phase only; STR 006 – 015, two phases; STR 038 – 044, two phases; STR 068 – 072, two phases; and STR 079 – 108 one phase only

[12] 2019/20 bushfire damage within this segment, rectification works planned for spans STR 005 – 010, all phases.

[13] 2019/20 bushfire damage within this segment, rectification works planned for spans: STR 007 – 023, two phases; STR 035 – 041, two phases; and STR 044 – 060, all phases.

[14] 2019/20 bushfire damage within this segment, rectification works planned for spans: STR 001 – 006, all phases; and STR 007 – 011 one phase only

TL	Start Structure	End Structure	Existing Conductor	Proposed Conductor	Total Length (km)
21	118	122	54/6/.139in+1/.146in - Moose	2 x Olive	1.75
2M	45	62	54/6/.139in+1/.146in - Moose	2 x Olive	10.20
10	Gantry	28	54/6/.139in+1/.146in - Moose	2 x Olive	10.96
22	1	53	54/6/.139in+1/.146in - Moose	2 x Olive	21.36
23	Gantry	25	54/6/.139in+1/.146in - Moose	2 x Olive	6.75
959	19	50	54/6/.139in+1/.146in - Moose	Olive	14.06
92Z	19	50	54/6/.139in+1/.146in - Moose	Olive	14.10
17	Gantry	60	54/6/.139in+1/.146in - Moose	2 x Olive	25.24
21	64A	67	54/6/.139in+1/.146in - Moose	2 x Olive	14.04
90	98	123	54/6/.139in+1/.146in - Moose	2 x Olive	0.74
81	444	457	54/6/.139in+1/.146in - Moose	2 x Olive	5.58
2M	1	45	54/6/.139in+1/.146in - Moose	2 x Olive	15.96
92Z	1A	19	54/6/.139in+1/.146in - Moose	Olive	9.60
93	6	21	54/6/.139in+1/.146in - Moose	2 x Olive	5.67
26	47C	58	54/6/.139in+1/.146in - Moose	2 x Olive	16.90
25	11	58	54/6/.139in+1/.146in - Moose	2 x Olive	16.90

Priority 3 - Transmission Line Conductor Replacement

TL	Start Structure	End Structure	Existing Conductor	Proposed Conductor	Total Length (km)
97G/3	Gantry	113	30/6/.118in+1/.124in - Panther	Lemon	15.32
97K	1	36	30/6/.118in+1/.124in - Panther	Lemon	11.25
97L	Gantry	77	30/6/.118in+1/.124in - Panther	Lemon	20.33
97K	37	299	30/6/.118in+1/.124in - Panther	Lemon	64.89
966	1A	578A	30/6/.118in+1/.124in - Panther	Lemon	176.68
99Z	452	453	30/6/.118in+1/.124in - Panther	Lemon	0.33
M3	11	Gantry	91/.161in - Silmalec	2 x Mango	0.51
994	2.14A	459	30/6/.118in+1/.124in - Panther	2 x Lemon	123.35
996	37	423	30/6/.118in+1/.124in - Panther	2 x Lemon	99.34
999	2	258	30/6/.118in+1/.124in - Panther	2 x Lemon	114.31