CORONERS COURT
OF NEW SOUTH WALES

General Inquiry:	Into the fire at Reedy Swamp Tarraganda Bega/Tathra
File number:	2018/94889
Hearing dates:	3-7 August 2020, 10-14 August 2020, 17-21 August 2020, 10 and 12 November 2020 (17 days)
Date of findings:	17 December 2021
Place of findings:	Coroners Court, Lidcombe
Findings of:	Deputy State Coroner E Truscott
Catchwords:	Fire General Inquiry-Cause and Origin – Electrical Infrastructure-Vegetation Management – Fuel Load Management – Emergency Response Management Communication and Co-Ordination – Provision of Resources – Rural Fire Service – Fire Rescue NSW – Communications of Warnings to Community –- Declaration under s44 of the Rural Fires Act 1997
Representation:	Counsel Assisting: Mr A Casselden SC and Mr A Mykkeltvedt instructed by Mr J Loosley and Mr G Martin of Crown Solicitor's Office Insurers and Residents (398 property owners): Mr T Smyth instructed by Mr L Parker of Hall & Wilcox Lawyers Essential Energy:

	Mr R Cheney SC and Mr H Pintos-Lopez instructed by Ms C Wilkinson and Ms R Compain-Helsloot of Sparke Helmore NSW Rural Fire Service and Fire and Rescue NSW and Forestry Corporation of NSW: Mr N Newton instructed by Ms J Campbell and Ms C Jamieson of Allens (for NSW Rural Fire Service and Fire and Rescue NSW) and Ms L Baker of Baker Cook Advisory (for Forestry Corporation) Bega Valley Shire Council: Mr D Lloyd and Ms L Johnston instructed by Mr J Riley and Ms C Hawthorne of RGSLAW Asplundh Australia: Mr S Goodman SC and Mr T Hackett instructed by Mr J Siddle and Ms T Smith of Macpherson Kelley Pinnacle Arborpro: Not legally represented. National Parks and Wildlife Service NSW: Mr M Baroni instructed by Mr L Hawkes of McCabe Curwood
Findings:	The fire that impacted on the town of Tathra and its surrounds on 18 March 2018 commenced between approximately 12.15pm and 12.20pm in the electrical easement (**the easement)** that runs in a north easterly direction in the vicinity of 580 Reedy Swamp Road, Reedy Swamp. The fire was caused by the impact between a falling tree (identified in this Inquiry as Tree 4) and an electrical conductor line (identified in this Inquiry as Line 2). As a consequence of that impact, Line 2 fell to the ground between the poles identified in this Inquiry as Poles C and

	D. The contact between the line and the ground resulted in electrical arcing, which ignited vegetation in the easement.
Recommendations:	<u>To Essential Energy</u> i. That Essential Energy review the contemplated process of reconfiguring the fault curve applicable to reclosers under the "group D4 settings" to give consideration to prioritising reclosers in areas of greatest bush-fire risk. ii. That Essential Energy conduct a further review of the settings applicable to sensitive earth faults on Total Fire Ban days with a view to determining whether further changes to the fault settings would be appropriate on such days, having regard to the capabilities of reclosers in the network and the implications of such measures for customer health and key public infrastructure. iii. That Essential give consideration to seeking a revision to the VMCR/VMR such that the nomenclature applied to "grow-in" (Tier 1) hazards and "fall-in" (Tier 2) hazards be changed so as to avoid the implication that fall-in hazards are subsidiary to grow-in hazards. iv. That Essential consider reviewing the guidance provided in the VMCR/VMR to: a. clarify that a given dead, dying or structurally unsound tree that is seen from the perspective of the network assets should be designated a Tier 2 defect even where further investigations are necessary to assess the hazard the tree poses to the network; and b. confirm that a scoper is not themselves required to conduct an assessment of the structural integrity of a tree before reporting it as a Tier 2 defect.

	<u>To Essential Energy , Asplundh and Pinnacle</u> i. That Essential, Asplundh and Pinnacle review the training, guidance material and assessment provided to scopers to: a. ensure that adequate training in tree risk assessment and visual tree assessment is provided to scopers; b. ensure that scopers' capacity to identify dead, dying or structurally unsound trees is adequately assessed; and c. ensure that adequate guidance is provided in relation to when it is necessary to conduct scoping work on foot, rather than in a car or from a stationary position. ii. That Essential, Asplundh and Pinnacle ensure that rangefinder binoculars or devices with similar functionality are provided to all scopers. iii. That Asplundh and Pinnacle review the software used by scopers to ensure that it appropriately prompts scopers to consider Tier 2 defects and enter details regarding them. <u>To the Commissioners of the NSW Rural Fire Service and Fire Rescue NSW</u> i. That the NSW Rural Fire Service conduct a review of the training provided to personnel likely to occupy leadership roles within the Incident Management Team at the Bega Fire Control Centre to ensure that appropriate emphasis is placed on "worst case scenario planning". ii. That the NSW Rural Fire Service review the staffing arrangements applicable to the Bega Fire Control Centre to ensure that: the Incident Management Team includes:

	a. The Incident Management Team includes appropriate dedicated intelligence gathering personnel; b. Planning and intelligence officers be included in the pre-formed Incident Management Team on high bushfire risk days. iii. That the NSW Rural Fire Service review the roll-out of the AVL devices and associated software applications to ensure that fireground commanders are able to effectively discern the location of resources while in the field. This review should include a consideration of the implications of failures in mobile phone networks. iv. That the NSW Rural Fire Service and Fire and Rescue NSW jointly review the arrangements applicable to radio usage in relation to operations involving both NSW Rural Fire Service and Fire and Rescue NSW personnel to ensure that fire ground commanders are able to effectively communicate with, and provide directions to, members of other services. v. That the NSW Rural Fire Service and Fire and Rescue NSW review inter-agency training arrangements, to ensure that appropriate inter-agency practical exercises are conducted on a regular basis. vi. In the early stages of an incident or an IMT being formed, liaison officers from all fire-fighting agencies should be requested, and each agency should make reasonable endeavours, given operational demands and personnel.

IN THE CORONERS COURT
LIDCOMBE
NSW

Section 81 *Coroners Act 2009*

REASONS FOR DECISION

1. These are the Findings of a General Inquiry into a fire that commenced on 18 March 2018 in an area known as “Reedy Swamp”, a rural area to the South East of Bega which impacted on the coastal town of Tathra on the NSW South Coast.

2. By the time fire was fully extinguished on 24 March 2018 it had resulted in the damage of about 1400 hectares of bushland and the loss and damage of many residential houses and dwellings and other property.

Statutory regime

3. Section 32(4) of *Coroners Act 2009* (**Coroners Act**) provides that the State Coroner must direct that a coroner hold a general inquiry concerning a fire or explosion that has destroyed or damaged property within the state if:

    a) an authorised public official has made a request to the State Coroner for a general inquiry to be held, or

    b) the State Coroner is of the opinion that a general inquiry should be held.

4. In the case of bushfires (as defined in the *Rural Fires Act 1997*), an authorised public official is defined as the Commissioner of the NSW Rural Fire Service. On 20 March 2018, Shane Fitzsimmons, then the Commissioner of the NSW Rural Fire Service wrote to the State Coroner to request that a general inquiry into the fire be held pursuant to s. 32(4)(a) of the Coroners Act.

5. In response to Commissioner Fitzsimmons’ request, the State Coroner directed that a general inquiry be held.

6. Pursuant to s. 30(3) of the Coroners Act, the jurisdiction of a coroner to hold a general inquiry concerning a fire or explosion extends to the examination of all of the circumstances concerning the fire or explosion (including, but not limited to, an examination of its cause and origin).

Parties

7. Leave to appear at the Inquiry was granted to number of interested parties:

(a) a group of some 398 persons, who owned property affected by the fire (**Insurers and Residents**);

(b) the NSW Rural Fire Service (**RFS**);

(c) Fire and Rescue NSW (**FRNSW**);

(d) Essential Energy (**Essential Energy**), a state-owned electricity infrastructure company which owns, maintains and operates the electrical distribution network for much of NSW;

(e) Asplundh Australia (**Asplundh**), a tree and arboriculture services company engaged by Essential Energy to manage vegetation in the vicinity of some of its electrical infrastructure assets;

(f) Pinnacle Arborpro (**Pinnacle**), a company that provided vegetation management and scoping services to Asplundh;

(g) the National Parks and Wildlife Service (**NPWS**);

(h) the Bega Valley Shire Council (**Bega Council**); and

(i) the Forestry Corporation of NSW (**Forestry Corporation**).

Outline of Conditions and Events of the day

8. Though it was well after the end of summer, 18 March 2018 was predicted to be a hot and windy day such that there had been declared a Total Fire Ban in anticipation of it. It did turn out to be an extremely hot and dry day. By 10.16am, it was over 30 degrees, and the relative humidity was 37%. As at 12pm, the temperature in Bega was 37.1 degrees and relative humidity had dropped to 18%.

9. It was also very windy. The average wind speed at midday was 35km/h, with gusts up to 50km/h. By 1 pm, the average wind speed had increased to 44km/h, and wind gusts were up to 72km/h in a generally north westerly direction.

10. The temperature peaked at 38.6 degrees at 2.02pm. The temperature remained consistently very high; 38.4 degrees was recorded at 3pm. The average wind speed peaked at 50km/h at 2.40pm and wind gusts of up to 52km/h were still being recorded at 6pm. Relative humidity stayed below 25% until 7pm, at which time it was still 29 degrees. There was a marked shift between 7pm and 7.30pm, with the temperature dropping to 22.2 degrees, humidity increasing to 50% and wind speed decreasing to 8km/h, with gusts of 15km/h in a north easterly direction and at some places in the afternoon the roadway was blocked in a number of places by trees that had fallen in the wind.

11. As said above, a Total Fire Ban was in place for the far south coast of NSW that day. The Forest Fire Danger Index (**FFDI**) as recorded at the Bega Automatic Weather Station peaked at 1pm at 55. At Merimbula, the peak occurred at 1.30pm, where a FFDI of 52 was calculated. This placed the FFDI in the "Severe" range. While there are two higher fire grades, being "extreme" and "catastrophic", it is very unusual for severe fire readings to be recorded that late in the bushfire season and the FFDI readings on the 18 March 2018 were, apparently at that time, the highest on record for March and Autumn. In all, the conditions that day, were "highly conducive to the ignition and spread of wildfire".

12. At about 12.23pm, a member of the public – Mr Robert Russell – who had seen a thin wisp of smoke called his wife and told her of his sighting. Another member of the public, the late Mr Donald Hay, telephoned 000 at 12.26pm to report the fire.

13. At 12.27pm, Mr Wayne Ubrihein, who lives at 558 Reedy Swamp Road, received a call from a friend who told him that there was smoke over behind his house. Mr Ubrihein looked out his window and could see smoke over the ridge line. He soon after drove 1.5 km from his house to the driveway of the house at 580 Reedy Swamp Road which was at the base of a powerline easement which ran electrical overheard lines. He looked up the easement and saw fire in the vicinity of the second and third power poles.

14. At 12.28pm, FRNSW, Fire Communications received notification of a fire. A number of key members of the RFS participated in a conference call in which the preliminary information regarding the fire was relayed.

15. At 12.29pm, various local RFS brigade members began to be notified of the fire by text message and pager. They assembled at their fire stations in Tarraganda, Bega, and Jellat Jellat and began to make their way to the fire. It appears that the first crews arrived between about 12.40pm and 12.50pm.

16. At 1.01pm, a notification was distributed to FRSNSW officers, some of whom were already at the station. Shortly after 1pm, a crew of FRSNSW officers departed the Bega Fire Station to Reedy Swamp Road.

17. The fire quickly became too large for the RFS to establish viable containment lines and the fire progressed with such ferocity as to place fire crews in significant danger. One fire crew was overrun by fire and had to deploy sprinklers on their truck while they travelled through approximately 100 metres of fire.

18. NSW Police Senior Forensic Investigator Detective Senior Sergeant Craig Harris (**D/S/Sgt Harris**) observes, in his statement, that a fire's path and the extent of its spread will be influenced by three main factors:

    a. Weather conditions – especially wind. (D/S/Sgt Harris says fire spreads significantly further and faster with the wind).

    b. Topography – perhaps counter intuitively, fire spreads faster when it is travelling up a hill.

    c. Fuel – the amount, type and arrangement of vegetation impact on the rate and intensity of fire spread. A fire will spread further and faster in fine dry fuels than it will if the potential fuel load is damp, or comprised principally of large trees.

19. Unfortunately, it was extremely windy, there was an abundance of dry fuel and, the fire started part of the way up a slope, so it began by running uphill, building intensity as it went. The fire travelled rapidly towards the Bega River, which is approximately 1 km to the west of Tathra. At the point where the fire met the water, the Bega River is about 100 metres wide.

20. Fire can also spread by way of what is known as an "ember attack". This occurs where pieces of burning vegetation such as leaves or bark are lifted into and carried forward of the main fire via the prevailing winds. Such embers are capable of being carried very long distances, and they cause spot fires many kilometres away from the main fire front. Due to the topography and dry and windy conditions, a phenomena known as "mountain waves and boundary rolls" enabled a great many embers to travel fast and further ahead of the fire front far beyond model predictions. The Reedy Swamp fire "jumped" the Bega river and shortly after it was upon the town of Tathra which came to be, according to one RFS volunteer, "under siege by embers falling from the sky."

21. The main fire front began to impact on streets, including Wildlife Drive, Panorama Drive and Ocean View Terrace, which rapidly were overcome by smoke and flame such that it was too dangerous for firefighting units to work there. There were also spot fires, driven by “extreme spotting” of “unusually large embers” with one witness describing that the embers were not lofting leaves or bark but were “like cricket balls falling vertically”.

22. The fire has been described as a “mass spotting event” which is “where you end up with an enormous amount of embers being produced and being thrown in front of the fire front and those embers successfully igniting the landscape in front of the fire, and so rather than having a progressing fire line, you end up with a landscape on fire and it's, it's one of the eruptive sort of fire behaviour phenomenon that we can see”. Tathra properties became literally under fire in unpredictable and haphazard ways, resulting in significant fire activity towards the coast and away from the main fire front.

23. The varying demands on emergency response teams were such that they were reduced to an approach that was “purely reactive in nature”; resources were simply being sent to new calls as they became available. Every single available brigade was deployed.

24. The RFS on 18 March 2018 deployed numerous units and teams to deal with many other fires in other locations and given their success at resolving those fires, those units were able to be redeployed to Tathra by mid-to-late afternoon. Officers fought the fire long into the night. Some of the first responding officers did not return home until the early hours of the next morning.

25. Fortunately there were no recorded deaths or serious injuries resulting from the fire. Ambulance NSW records suggests that four patients were treated for smoke inhalation. At least one of those patients also suffered some minor burns in the course of trying to save her house.

26. The Building Impact Analysis prepared by the RFS on 21 March 2018 recorded that 65 houses had been destroyed and 48 damaged. About 35 caravans in the Tathra Caravan Park were also recorded as destroyed. Strike Force Butia investigators later calculated the total number of houses destroyed as 56, having regard to information from the Insurance Council of Australia, and the Bega Valley Shire Council Public Works documents, among other materials.

27. The fact that no one lost their life in the fire was remarkable, given the ferocity of the fire, and the speed and indiscriminate nature of its attack on Tathra.

Issues

28. Counsel Assisting's submissions set out the details of the issues that were addressed in the hearing and are addressed in these findings as follows:

Fire cause and origin

1. When and where did the fire start?
2. How did the fire start?
3. Without limiting 2 above:
    a. Did the electrical infrastructure in the easement that runs in a north-easterly direction in the vicinity of 580 Reedy Swamp Road, Reedy Swamp (**Electrical Infrastructure**) play any role in the ignition of the fire? If so, how?
    b. What role, if any, did vegetation play in the ignition of the fire?

Electrical infrastructure

<u>Maintenance and safeguards</u>

4. Did the Electrical Infrastructure include adequate safeguards to address the risk of a fire igniting following damage to the infrastructure or otherwise?

Vegetation Management

5. Did Essential Energy and its subcontractors appropriately manage the vegetation in the vicinity of the Electrical Infrastructure?
6. Without limiting 5 above, did Essential Energy and/or its subcontractors:
    a. adequately clear vegetation in the vicinity of the Electrical Infrastructure; and/or
    b. adequately assess the risk presented by trees in the vicinity of the Electrical Infrastructure, including the four trees that fell across powerlines before, during or after the fire on 18 March 2018?
7. Without limiting 5 above, did Essential Energy and/or its subcontractors take appropriate steps to ensure:
    a. assessments and/or clearances of vegetation in the vicinity of the Electrical Infrastructure took place sufficiently frequently; and

b. the person or persons investigating the risk presented by vegetation in the vicinity of the Electrical Infrastructure were appropriately qualified and trained?

8. If the answer to any of the questions above is no, what measures ought to have been undertaken to appropriately manage the vegetation in the vicinity of the relevant power assets?

Fuel load management

9. Were fuel loads in the vicinity of Bega and Tathra adequately managed as at 18 March 2018?

10. Without limiting [9] above, should additional hazard reduction burns or other measures have been implemented in the vicinity of Bega and Tathra to reduce the risk of bushfire?

Emergency services response

11. Were the NSW Rural Fire Service (RFS) on the NSW Far South Coast adequately prepared to respond to anticipated heightened fire danger on 18 March 2018?

12. Without limiting 11 above:

    a. Did the RFS take adequate steps to plan a response to potential bushfires on 18 March 2018?

    b. Were sufficient firefighting personnel and equipment available to fight fires on the NSW Far South Coast as at 18 March 2018?

13. Did the RFS provide adequate advice to local communities as to the heightened fire danger anticipated on 18 March 2018?

14. Did the RFS respond appropriately to the fire once it had commenced?

15. Without limiting 14 above:

    a. Was information regarding the fire's location, intensity and spread appropriately gathered and disseminated by the Incident Management Team?

    b. Was the nature and extent of the threat presented by the fire adequately assessed?

    c. In particular, was the danger to residents in Tathra and surrounds identified in a timely fashion?

d. Were the available ground-based fire-fighting resources appropriately deployed?

e. Have the relevant recommendations made by Mick Keelty AO APM in the 'Bega Valley Fires Independent Review' dated June 2018 with respect to improving communication and coordination between the RFS and Fire and Rescue NSW been adequately implemented?

f. Were sufficient aviation fire-fighting resources available?

g. Were those aviation fire-fighting resources deployed effectively?

h. Did the RFS take adequate steps to:

(i) Warn the local community after the fire had commenced?

(ii) Recommend what community members should do in response to the fire?

29. Counsel Assisting also identified the question of whether recommendations pursuant to s. 82 of the Coroners Act should be made.

Evidence and Witnesses

30. The Brief of Evidence comprises Exhibit 1 which includes 22 folders labelled Volumes 1-18, 1A, 3A, 3B, and 6A. Select photographs extracted from Exhibit 1 were marked by a number of witnesses and tendered as separate exhibits. Additional photographs, diagrams, maps, videos and witness statements were tendered to comprise an exhibit list, the last being Exhibit 40 a supplementary bundle of statements and reports relating to vegetation management issues.

31. Oral testimony was given by over 40 witnesses in the hearing:

Lay witnesses

- Alison Christison, resident of Bega
- Wayne Ubrihien, owner of property 'Reedy Waters" and Resident of Bega
- Peter Pullin, owner of property "Lilly Pilly"/ Resident of Bega
- Hamish Dean, visitor to the region
- Allan Hull, resident of Tarraganda.
- Nienke Van Doorn, resident and home owner Tathra
- Deborah Nave, resident and home owner Tathra

Investigation Officers

- Detective Sergeant Hassan El-Khansa, Investigator – Strike Force BUTIA – Arson Unit, State Crime Command
- Detective Senior Sergeant Craig Harris, Senior Forensic Investigator and South Eastern Zone Manager – Forensic Examiner
- Angus Barnes, Regional Coordinator and Fire Investigator with the NSW Rural Fire Service

NSW Rural Fire Service

- Katherine Purnell (van der Hout), Former Volunteer NSW Rural Fire Service
- Warren Purnell, Former Volunteer NSW Rural Fire Service
- Christopher Reeve, Volunteer NSW Rural Fire Service
- Ryan Deen, Employee of Tarraganda Rural Fire Service
- Peter van Bracht, Captain of Tarraganda Rural Fire Brigade (RFS)
- Clyde Green, Captain of Bega Headquarter Brigade of the Rural Fire Service
- David Lucas, Volunteer NSW Rural Fire Service Officer
- David Philp, Volunteer firefighter and Nationally Accredited Fire Behaviour Analyst
- Brent Occleshaw, Volunteer Acting Group Officer
- John Cullen, District Manager (Far South Coast Team)
- Jason Heffernan, RFS Deputy Commissioner
- Simon Heemstra, past employee of RFS Operations Directorate- Manager of Planning and Predictive Services

Fire and Rescue NSW

- Cassandra Dickson former member

NSW National Parks and Wildlife Service

- Alan Henderson NPWS, Area Manager

Bega Valley Shire Council

- Derek van Bracht, Environment and Sustainability Coordinator

Essential Energy

- Darrell Worley, Vegetation Officer – Bega Depot
- Robert Saric, Program Compliance Auditor
- Patrick Kelleher, Manager of External Delivery
- Ian Fitzpatrick, Manager of Network Risk Strategies and Policy Formation – Asset Management Team

Asplundh

- Brent Kerrisk, General Manager – Southern New South Wales
- Mark Bennett, Operations Manager – Southern New South Wales

Pinnacle Arborpo

- Travis Wyper, Managing Director
- Michael Jonas, Former Scoper

Experts

- Professor B Don Russell, Professor of Electrical and Computer Engineering – Texas A&M University
- Trevor Blackburn, Adjunct Associate Professor, School of Electrical Engineering and Telecommunications – UNSW
- Geoff Conway, Member – Advisory Committee on Fire-fighter Presumptive Rights
- Paul De Mar, Principal Consultant, Natural Resources and Agriculture Service Group at GHD Pty Ltd
- Marcus Lodge, Consulting Arborist – Arborman Tree Solutions Pty Ltd
- Andrew Norman, Consulting Arborist
- Detective Senior Sergeant Craig Harris, Senior Forensic Investigator and South Eastern Zone Manager – Forensic Examiner

Background

32. The investigation into the fire included police and fire officers attending the easement at 580 Reedy Swamp and conducting a thorough investigation to locate the origin of the fire and, if possible, ascertain what precisely caused it.

33. The easement is a wide cleared cutting between sclerophyll forests running up a fairly steep hill. At the bottom of the easement is the driveway to number 580.

34. Looking from the driveway up the hill there are four wooden power poles positioned at varying distances up the hill. Two transmission lines (also known as conductors) ran from the bottom of the hill to the top through each arm on either side of the poles. The western side is Line 1 (left side looking up the hill) and the eastern side is Line 2.

35. Investigators found both transmission lines at various points on the ground and four burnt trees lying on the ground; two of which, it was suspected, could have been involved in bringing down Line 2.

36. The electrical infrastructure system recorded that at 12.19pm a fault occurred in the transmission line in the easement and six seconds later the power was automatically shut off.

37. Investigators took numerous measurements, records of their observations, photographs and videos and made diagrams and statements. Those assisting me sought reports from expert witnesses in relation to a number of matters including an opinion as to the cause and origin of the fire.

38. On the sixth day of the inquest a FRNSW fire fighter Cassandra Dickson gave evidence further to her statement dated 5 August 2020 which had attached to it a number of photographs taken around 2.30pm on 18 March 2018 near the house at 580 Reedy Swamp. The photographs show in the background one of the power poles which was suspected to have been impacted by one of the trees. The photograph showed that there was no such impact; so that left only one of the four trees as being involved in the electrical infrastructure that day.

39. Accordingly, which tree caused Line 2 to come down is not controversial. Essential Energy says in their submissions:

> "Essential Energy accepts that, on the evidence available to the Inquiry, it is open to the Coroner to find that the Reedy Swamp Bushfire:

a. Commenced in the powerline easement adjacent to 580 Reedy Swamp Road; and

b. Was most likely caused when Tree 4 failed and impacted 11 kV conductors in the easement bring Conductor 2 to ground between Poles C and D, thereby causing arcing and igniting vegetation."

40. Likewise on behalf of the Insurers and Residents Mr Smyth submits that I "ought to find that the fire "was caused by the interaction of electrical infrastructure and and adjacent vegetation in the Easement…that it started in or adjacent to the eastern side of the Easement, between Poles C and D, though closer to Pole C". Mr Newton on behalf of the RFS, FRNSW and Forestry Corporation agrees that the origin was the easement as identified by Counsel Assisting and did not add anything further on the topic of cause and origin.

41. What is somewhat controversial is the timing and mechanism by which the energy of the transmission line transferred to the dry vegetation causing it to ignite. Specifically, there is a question as to whether to downing of the transmission line would have resulted in arcing and, in turn, the emission of extreme heat and sparks sufficient to cause ignition of the fire immediately (i.e. within "tens or hundreds of a millisecond") or after a short delay (i.e. after the first second).

42. This issue assumed some importance as it relates to the settings which Essential Energy impose on its recloser mechanisms to deal with electrical faults so that power is automatically shut down. Whether it should be set at less than the prevailing six seconds was subject to some discussion by the experts.

43. Those assisting me obtained an expert report from Associate Professor Trevor Blackburn, and Essential Energy retained an expert report from Professor Russell. Those two experts gave their evidence in conclave.

44. The transfer of electrical transfer from conductors to combustibles apparently has no established linear relationship between time and probability of ignition. Whilst basic logic might suggest that the less time a live wire is exposed to combustible fuel the less the risk of an ignition Professor Russell's evidence suggested that electrical faults behave in such unique and varied ways to make the task of calculating the impact of a change in timing on the probability of ignition impossible.

45. I have determined that Counsel Assisting's submissions in regard to the factual matrix, content and structure in relation to the issue of cause and origin of the fire

and the related electrical infrastructure provide an appropriate summary of the evidence and issues, so I have reproduced their submissions in their entirety. Indeed, I determined that it is appropriate to use Counsel Assisting's submissions to provide the content and structure of much of these findings. I have adopted this approach as the Local Court Coronial resources are not such that an alternative approach can be taken in dealing with the amount and complexity of evidence and submissions of the numerous parties to this Inquiry. In that regard, by doing so I do not wish to convey to parties that I have placed any greater or lesser weight on those submissions nor do I wish to convey by not incorporating, in the same manner, other parties' submissions that I have afforded to them any lesser value or weight.

46. For the sake of completeness I have included the commencement of the section though it contains matters to which I have already referred. I have amended parts to identify where counsel assisting addresses the coroner directly and I have of course included submissions where appropriate from the parties. I emphasise that I have carefully reviewed the submissions of all parties, and have – throughout these findings – sought to identify the decisions I have made in relation to the various issues where a controversy arises.

47. The reading of [paras.8-27] above should also be considered as matters relevant in the consideration of cause and origin. I included them in the introduction of these findings as I was compelled by Mr Newton's submissions (on behalf of the RFS, FRNSW and the Forestry Corporation) that the day's environmental and weather conditions provide an overall context in which unfolding events must be seen and appraised.

48. In its submissions Essential Energy asks that the coroner have regard to the context within which Essential Energy operates its electricity network, including the nature of the network and the regulatory framework. I set that out as provided by Essential Energy:

> "Essential Energy is an energy distributor operating under the *Energy Services Corporation Act 1995* (NSW) (the **ESC Act**). Essential Energy is required by section 8 of the ESC Act to have regard to the following objectives:
>
> a. to be a successful business and, to this end:
>
> i. to operate at least as efficiently as any comparable businesses,

ii. to maximise the net worth of the State's investment in Essential Energy, and

iii. to exhibit a sense of social responsibility by having regard to the interests of the community in which Essential Energy operates;

b. to protect the environment by conducting its operations in compliance with the principles of ecologically sustainable development contained in section 6(2) of the *Protection of the Environment Administration Act 1991* (NSW);

c. to exhibit a sense of responsibility towards regional development and decentralisation in the way in which Essential Energy operates;

d. to operate efficient, safe and reliable facilities for the distribution of electricity and other forms of energy;

e. to be an efficient and responsible supplier of electricity and other forms of energy and of services relating to the use and conservation of electricity and other forms of energy; and

f. to be a successful participant in the wholesale and retail markets for electricity and other forms of energy and for services relating to the use and conservation of electricity and other forms of energy.

Those are Essential Energy's principal objectives and are of equal importance.

Essential Energy is also required to comply with licence conditions set out in the licence granted by the NSW Minister for Energy pursuant to the *Electricity Supply Act 1995* (NSW).

As at March 2018, the relevant ministerial licence conditions were set out in the *Reliability and Performance Licence Conditions for Electricity Distributors* commencing 1 July 2014 (**Reliability and Performance Conditions**) and *Schedule Listing Ministerially Imposed Licence Conditions for Distribution Network Service Providers* (collectively referred to as the **Licence Conditions**). The purpose of the Reliability and Performance Conditions is "to facilitate the delivery of a reliable and cost-effective supply of electricity". Relevantly, if supply interruptions

experienced by customers exceed a specified threshold in terms of duration and frequency, Essential Energy may be required to make payments to such customers.

In FY2017-18, Essential Energy operated a network which spanned 737,000 square kilometres of regional, rural and remote areas, covering over 95 per cent of New South Wales and parts of southern Queensland. Essential Energy's infrastructure in FY2017-18 included approximately 183,612 kilometres of overhead powerlines (which is enough to travel around Australia thirteen times) and over 1.3 million power poles. Of the 183,612 kilometres of overhead powerlines, 163,417 kilometres of powerlines was located in designated bushfire prone areas, so that approximately 90% of Essential Energy's network was located within bushfire prone areas. The average age of Essential Energy's network assets is 36 years.

In FY2017-18, Essential Energy had approximately 840,000 customers, comprising homes, businesses and public facilities, including hospitals and schools. Essential Energy has one of Australia's lowest average customer densities per kilometre of powerline. In FY2017-18 the average customer density was approximately 4.6 customers per kilometre of powerline, which equates to an average of 1.6 power poles for every customer.

Essential Energy takes its responsibilities in relation to bushfire risk mitigation and public safety seriously and implements comprehensive policies and programs to meet those responsibilities.

When making decisions in relation to network configurations during 'high bush fire risk days' (also referred to as 'TOBAN' days), Essential Energy is guided by the Industry Safety Steering Committee guideline entitled *ISSC-33 – Guideline for Network Configuration During High Bush Fire Risk Days* (**ISSC 33**). ISSC 33 is the relevant industry standard for NSW network operators in relation to network settings on high bushfire risk days".

49. Finally, by way of contextual matters, it is appropriate to make note of the following observations advanced on behalf of the Insurers and Residents by Mr Smyth:

> "To be clear, this fire cannot be characterised as an inevitable consequence of climate change or drought. The fire ought not be seen

> as a consequence (only) of the weather on the day, or any natural organic process of the bushland in which it ignited. It could not have ignited as it did if Essential had managed the Easement more carefully and its protection systems more thoughtfully".

50. In relation to Essential Energy's submission about the context in which the Coroner should understand its operations and remit, Mr Smyth remarks that it does Essential Energy no service if it is suggesting that its network is too large and/or complex to adequately discharge its remit.

51. Essential Energy did not lead any evidence that suggests that it has unsuccessfully sought additional funding to carry out certain works relevant to the matters raised in this Inquiry.

52. Much of the submissions made by Mr Symth on behalf of the Insurers and Residents, in relation to Essential Energy and the submissions made by Mr Cheney on behalf of Essential Energy mainly but not exclusively, in response to Mr Smyth's submissions took on the mantle of a civil suit.

53. The coronial jurisdiction is not a preliminary jurisdiction to found civil action nor is it one which determines to place blame or determine legal concepts such as negligence.

54. Mr Smyth's submissions referred to the Victorian bushfires of 2009 which resulted in the deaths of very many people and the loss and destruction of much property and the environment but which this Inquiry did not examine. In that regard I have determined not to refer to those matters about which the Inquiry did not receive and examine evidence.

55. Mr Smyth says that, other than the fact 18 May 2018 was in autumn rather than summer, the conditions were not otherwise exceptional. Though this submission goes against the weight of the evidence, I understand Mr Smyth to be saying that very hot windy days are par for the course in the Australian bushfire season. That season "officially" runs from 1 September to 31 March.

First reports of fire

56. The first witness to the fire may have been Mr Robert Russell. Mr Russell states that he saw the fire at about 12.15pm from his farm on Jellat Jellat Flats. He states that he "looked in a north east direction towards midway of Tathra and Tanja when in the bushland I saw a small whisp of white smoke and after a minute or so changed into a darker colour smoke."

57. In his statement, Mr Russell indicates that “a few minutes later” after the fire “grew in size” he telephoned his wife Phillipa, using his mobile phone, asking her to get in touch with the RFS. He stated that he did this at “about 12.20pm”.

58. A subsequent review of Mr Russell’s mobile phone bill revealed that this telephone call in fact took place at 12.23pm. This suggests that Mr Russell’s initial sighting of the “small whisp of white smoke” likely took place a few minutes later than his estimate of “about 12.15pm”.

59. Consistent with this timeline, the first report of the fire to 000 occurred at 12.26pm, when Mr Donald Hay telephoned 000.

60. Mr Hay took photographs of the plume of smoke associated with the fire at 12.29pm and 12.38pm. There was already a large amount of smoke by the time of the first photo at 12.29pm. Those photographs demonstrate a significant increase in the amount of smoke in the nine-minute interval between them.

61. Dr Heemstra was shown a copy of the photograph taken by Mr Hay at 12.29pm. He observed that the photograph appeared to have been taken in the early stages of the fire; the smoke was white, which according to Dr Heemstra suggests that the fire was, at that time, building in heat. Additionally, the fact that the smoke column was laying quite low relative to the landscape suggested that there were strong winds in the area at the time.

62. At 12.27pm, Mr Wayne Ubrihien, who lived in the property at 558 Reedy Swamp Road, Reedy Swamp, received a telephone call from his friend Terry Gray. Mr Gray told Mr Ubrihien: “There’s a heap of smoke over behind your house somewhere”.

General area of origin

63. The overwhelming weight of the evidence as to the fire’s origin suggests that it began in or around the powerline easement running up hill in a north easterly direction in the vicinity of 580 Reedy Swamp Road, Reedy Swamp (**the easement**).

Witness accounts

64. Ms Alison Christison arrived home at her house at 44 Grandview Road, Blackrange at about 12.30pm on 18 March 2018. Her property overlooks the Bega Valley and offers a clear view up the powerline easement, albeit from several kilometres away. On arriving home, Ms Christison noticed that there was fire coming from the area of the easement. At 12.33pm, she took a photograph of the fire, looking roughly north-east from her premises. That photograph shows no evidence of fire or smoke to the

west of the powerline easement. A magnified version of the image produced by investigators shows that the smoke appeared to originate from a point within the easement.

65. Ms Christison took further photographs at 12.42pm, 12.56pm, and 1.21pm. Those photographs show a very substantial increase in the amount of smoke to the east of the easement. They also show an increase in smoke activity in the easement itself. Magnified versions of those photographs are wholly consistent with a conclusion that the fire originated in the easement; the 12.42pm and 12.56pm photographs show an increase in smoke in the easement. That increased smoke is contained within the easement and to the east of it; no smoke appears to the west of the easement until 1.21pm, when a small amount of smoke becomes visible beyond the western edge of the easement.

66. At 12.30pm, the wind was recorded at the Bega Automatic weather station to be blowing from a north westerly direction. Consistent with this Ms Christison observed that during the time she was watching it, the fire was “rapidly moving” towards the east.

67. Police conducted a walkthrough interview with Mr Ubrihien two days after the fire on 20 March 2018. During that interview, Mr Ubrihien stated that after receiving the aforementioned call from Mr Gray he looked out his window and could see smoke over the ridge line near his premises. The ridge line corresponded with the general location of the powerline easement. Mr Ubrihien concluded that the smoke was probably somewhere in the vicinity of the driveway that travelled from his house to Reedy Swamp Road.

68. Mr Ubrihien called 000 – at 12.31pm – and after spending a minute or two undertaking some preparations to fight a fire at his house if necessary, got into his car and drove along his driveway to the gate to his neighbours house at 580 Reedy Swamp Road (i.e. the base of the powerline easement).

69. At that time, Mr Ubrihien observed that the fire was approximately 150 to 200 metres up the hill away from the gate to 580 Reedy Swamp Road. In Mr Ubrihien’s estimation, the fire appeared to have started under the electrical powerlines in the easement between the poles identified in this Inquiry as Poles B and C. At the time Mr Ubrihein arrived at the gateway to 580 Reedy Swamp Road, the fire was burning well into the bush to the east of the easement. Mr Ubrihien described it as “raging up the hill”. The fire front in the bush appeared to Mr Ubrihien to be in the order of 100 metres.

70. Mr Ubrihien was asked if he observed any smoke on the left-hand side of the easement (that being the western side). He indicated that he did not; there was "only a trickle of fire in the grass under the easement" – the fire had gone about 10 metres or so from the power poles.

71. Mr Allan Hull, who lives at 457 Reedy Swamp Road, also gave evidence at the Inquiry. At about 12.30pm, Mr Hull saw smoke coming from the direction of a property at the end of Emma Road. He then moved to a location that was directly in line with the easement.

72. Mr Hull described what he saw from that location as follows:

> "I observed flames, a lot of black, it was quite black around of the easement lines, I saw a, I saw a tree that was on fire and was laying within the easement, I was directly underneath the conductors I though, I couldn't see whether the conductors were down or not, because of the black, because of the black ground but there was flames burning with the swamp(?) directly underneath the conductors."

73. Mr Hull "distinctly" remembered seeing a log burning in the easement, though acknowledged that it was difficult to position the burning tree relative to the electricity poles in the easement.

74. There is a range of further evidence showing that the fire was burning on the eastern side of the easement, rather than the western side. By way of example, Mr Clyde Green, a Captain of the Bega Headquarter Brigade, who was one of the first RFS officers on scene, noted that the first time he sighted fire was in the vicinity of 580 Reedy Swamp Road. The truck Mr Green was travelling in stopped at the top of the easement on Reedy Swamp Road. Mr Green looked down the easement and noted fire down under the powerlines about 100 metres away. The fire was moving in a generally easterly direction. Group Officer David Lucas of the RFS similarly noted that "The fire was burning under the easement and to the east of the easement".

75. The evidence given by witnesses who saw the fire in its early stages leaves little doubt that it originated in the area of the easement.

Investigations after the fire

76. The investigations conducted after the fire confirmed that position.

77. Having regard to information received during a briefing on 19 March 2018 (which

included details of some early witness accounts and photographs) it became apparent to Detective Senior Sergeant Craig Harris (D/S/Sgt Harris that the easement may become an area of interest to investigators. In the statement he provided to the Inquiry, D/S/Sgt Harris concluded that based on the shape of the fire shown on a fire progression map, the prevailing wind conditions during the fire, and the relatively uniform nature of the forest in the area of the fire, the most likely area of the fire's origin was in the Reedy Swamp area.

78. Together with Inspector Angus Barnes, the lead fire investigator for the RFS, D/S/Sgt Harris attended the easement on the afternoon of 19 March 2018.

79. The following morning, the two conducted an aerial examination of the fireground. In the course of that aerial examination, they tracked various runs of fire from Tathra north-west to the general vicinity of the easement. The fire damage stopped about 200 metres north west of the easement.

80. D/S/Sgt Harris identified an intense run of fire that had destroyed the canopy of the trees and left no residual undergrowth to the east of the top of the powerline easement. D/S/Sgt Harris and Inspector Barnes selected that area as an appropriate one to commence a ground examination.

81. At about 12.15pm on 20 March 2018, D/S/Sgt Harris and Inspector Barnes began their ground examination of the fireground, beginning at the point identified during the aerial observations, that is, a location off Reedy Swamp Road, to the east of the top of the easement.

82. D/S/Sgt Harris and Inspector Barnes began to track the run of the fire by reference to fire burn indicators (physical objects that display changes as a result of exposure to heat, flame and by-products of combustion) and fire patterns (physical changes formed by fire effect, including an overall pattern of fire spread determined by reference to the entirety of fire indicators over a larger area).

83. In the course of that investigation, D/S/Sgt Harris and Inspector Barnes observed fire pattern indicators at a number of locations. Those indicators suggested that the fire had moved in a generally south-easterly direction. Shortly after 5pm that day, D/S/Sgt Harris and Inspector Barnes suspended their investigation of the fire ground.

84. D/S/Sgt Harris and Inspector Barnes recommenced their examination the following day. It had rained overnight, which may have disturbed or eliminated some of the fire indicators. The macro and micro indicators identified by D/S/Sgt Harris and

Inspector Barnes generally showed the fire moving in a south easterly direction from the easement in the vicinity of pole B.

Conclusion regarding the general origin of the fire

85. Having regard to the photographic evidence, linescan imagery, mapping of fire damage, and witness accounts, the evidence of the fire investigators and that of Mr De Mar (who agreed with the conclusion of D/S/Sgt Harris and Inspector Barnes that the fire started in the easement) there can be little doubt that the fire commenced in the vicinity of the easement.

86. While the general area of origin was quite apparent from the outset of the Inquiry, there remained a real issue as to the specific area of origin and, in turn, the cause of the fire.

How the fire started

87. On arrival at the easement, investigators noted that Lines 1 and 2 were down in various places within the clearing. Four trees had fallen into the easement.

88. Having regard to those matters, and in the absence of any real evidence of other potential causes, investigators quite properly focused on the electrical infrastructure within the easement as the likely cause of the fire.

The electrical infrastructure

89. There were four timber power poles located in the easement between the driveway to 580 Reedy Swamp Road and the top of the easement. There were also two other power poles located below those four poles (to the south-west).

90. During the Inquiry, the pole closest to the driveway of 580 Reedy Swamp Road was labelled “A”, with poles “B”, “C” and “D” being the three poles north east, or uphill of Pole A. The two poles located southwest of the driveway to number 580 were labelled “E” and “F”.

91. Those poles had been ascribed numbers by Essential Energy. They corresponded as follows:

Investigator’s Pole Label	Essential Energy Pole Number
A	63638
B	63639
C	63640

D	63641
E	63637
F	63636

92. The power poles carried two copper 11kV power transmission lines. The line on the northwest side of the poles (that is, the side closest to the property at 580 Reedy Swamp Road) has been referred to during the Inquiry as Line 1. The other line, on the south-east side of the poles was referred to as Line 2.

93. D/S/Sgt Harris measured the distances between each of the poles as follows:

Span	Distance
Pole F to E	272.9m
Pole E to A	71.0m
Pole A to B	139.7m
Pole B to C	113.8m
Pole C to D	59.1m

94. Essential Energy's infrastructure included protection for faults via an 11kV circuit recloser (identified via the number 15-R11972) located on the feeder line that supplied power to the easement.

95. A recloser is an electric switch, in this case contained in a metal box mounted to a power pole. It includes fault detection and measurement capabilities and a circuit breaker that allows electrical power to be shut off when a fault occurs. The relevant recloser was programmed to operate remotely and its settings could be adjusted from Essential Energy's system control rooms in Port Macquarie and Canberra.

Sensitive earth fault

96. Earth faults occur where there is a fault between one phase and the earth. Typically, such faults occur either where:

97. a tree falls on a line but remains connected to the stump in the ground; or

98. a powerline breaks for some reason (for example, where a tree falls on it) and the live conductor falls to the ground.

99. In this case, a sensitive earth fault with a current above 6 amps was detected at recloser 15-R11972 at 12.19pm and 38.249 seconds. 6.049 seconds later, at 12.19pm and 44.298 seconds, the recloser operated to shut off the power to the lines.

100. During the 6.049 seconds, power continued to run.

Cause of the sensitive earth fault

101. In view of the downed lines and the location of the four dead trees, there is little doubt that the sensitive earth fault was caused by some form of interaction between vegetation and the powerlines.

102. There was, however, a real issue as to which of the four trees caused the fire.

Lay evidence regarding the precise location of the fire

103. The lay and expert evidence before the Inquiry (some of which is considered above) makes it clear that the fire commenced in the easement. However, the evidence from those witnesses alone would not, without more, allow me to discern the cause of the fire with any precision.

104. As noted above, Mr Ubrihien observed fire between Poles B and C at the time of his arrival. He did not observe any trees down in the easement at the time of his arrival, nor did he see any trees leaning against the powerlines. He did not notice any powerlines down; he stated that they were definitely still up between Poles A and B and that he was “pretty sure” they were still up between Poles B and C.

105. At about 1pm, Mr Peter Pullin stopped his car on Reedy Swamp Road. He looked down the easement from his car and saw a fire that he described as a “swirling mass of flame” under the powerlines coming up the hill towards his car. He indicated that the fire was between about 70 to 100 metres down the easement, coming back up the hill.

106. Mr Hamish Dean also observed the fire from the top end of the easement in its relatively early stages. He stated that when he saw flames, they were almost at the tree-tops on the left of the easement looking down (that is, to the east). He indicated that the right-hand side was slower to burn.

107. As noted above, Mr Allan Hull observed a burning log across the easement, though was not able to be sure as to where it was relative to the power poles. Given he was located several hundred metres from Pole A at the time of his observations, I do not,

in any event, have confidence in Mr Hull's capacity to identify where that log was with any precision.

108. That being so, none of the lay witnesses who observed the fire in its early stages allow for a conclusion to be drawn as to when each of the four trees fell, and the impact they had on the electrical infrastructure when they did so.

Arborist evidence

109. The Inquiry has received evidence from two arborists, Mr Andrew Norman and Mr Marcus Lodge. Relevantly in the present context, Messrs Norman and Lodge were asked questions regarding the timing of the deaths of the four trees in the easement.

110. For his part, Mr Lodge:

a) was not able to assess when Tree 1 died;

b) as concerns Trees 2 and 3, considered that the level of desiccation, loss of bark on branches and lack of smaller branches was such that those trees had been dead for more than two years and possibly somewhere between five and ten years; and

c) in relation to Tree 4, noted that it had no bark on its trunk and its timber was desiccated and dry such that it is likely to have died at least five years prior to the fire.

111. Mr Lodge also expressed a view as to the apparent cause of failure of each of the trees. In his report, he observed:

d) Tree 1 appears to have failed at the base as a result of fire damage to a pre-existing area of decay.

e) Tree 2 similarly failed at the base. In Mr Lodge's view, it is likely that the tree was damaged at the base by termite activity which "allowed the fire to burn both the internal wood and the bark resulting in the tree's failure".

f) Tree 3 also failed at the base. Again, there was evidence of termite activity. It appeared to Mr Lodge that hollowing at the base of the trunk allowed the internal timber to be burnt which, in turn, led to the tree's failure.

g) According to Mr Lodge, Tree 4 also failed at the base. The bottom portion of the trunk had been completely burnt away. Mr Lodge suggested that the extent to which the trunk had burnt away may indicate that the level of decay in the trunk was greater than that in the other trees.

112. To summarise, in the case of each of Trees 1- 3, Mr Lodge's opinion was that the tree likely failed at the base as a result of fire damage in the context of pre-existing decay. Mr Lodge's opinion regarding Tree 4 indicated only that the tree had failed at the base; he did not state that the cause of failure was the impact of fire on the trunk. Mr Lodge's conclusion that the level of decay may have been greater in Tree 4 than in Trees 1 – 3 might be taken to suggest that it is more likely that Tree 4 (relative to the other trees) failed in the absence of fire impact. Without more, however, such a conclusion would not clearly establish any one of the trees as the cause of the fire.

113. Mr Norman conducted a visual assessment of the trees in situ in the easement on 21 March 2018. His report similarly contained some observations as to the likely time of each of the trees' death, and the factors likely to have contributed to their failure. The observations in his report regarding each of the four trees might be summarised as follows:

    a) Tree 1 "released from the base at ground level". It likely died between 2 and 5 years before the fire.

    b) Tree 2 also likely died between 2 and 5 years prior to the fire. The tree failed from the base and termite damage was likely a causal factor in the trees' failure and the collapse of the trunk.

    c) Tree 3 likely died between 2 and 4 years before the fire. The cause of Tree 3's failure was "root plate release" that occurred after the fire had damaged the tree. Mr Norman reached this conclusion because there are unburnt roots present at the base of the tree.

    d) Tree 4 appears to have been dead for at least 4 years. It had wounding on the remaining base of the tree that was consistent with some decay and deterioration in wood tissue. It also had what Mr Norman described as a "bow", which suggested a "weight bias in the direction of fall".

114. While Mr Lodge's opinion might be taken to suggest that Tree 4 was the more likely culprit, the two arborists' evidence could not be said to close off the possibility that another of the trees – in particular Tree 2 – had fallen onto the powerlines lines prior to the fire.

The initial electrical engineering evidence

115. Associate Professor Trevor Blackburn, electrical engineer, conducted an examination of the electrical infrastructure after it had been removed from the

easement. He also considered a range of materials in the brief, including material relating to the four trees, and Essential Energy's records regarding the operation of the recloser.

116. Associate Professor Blackburn provided a number of reports prior to giving evidence. The view expressed by Associate Professor Blackburn in those reports was that the fire was likely caused by the impact of Tree 2 on the electrical infrastructure at Pole B. Associate Professor Blackburn's opinion was based on a number of factors:

    a) The broken fragments of insulator found under Pole B were consistent with the application of blunt force.

    b) The height of Tree 2 (19.1 metres) compared to its distance from Pole B (9.2 metres) and the apparent impact between it and the insulator, was consistent with a series of events wherein the branches of the crossarms of Pole B (which had a higher and a lower set of cross-arms), caused the tree to be held up against the pole for a period of time after it fell.

    c) Such an event may have resulted in Tree 2 remaining in contact with the lines at Pole B for "some tens of seconds at least" resulting in "leakage current" going to earth which, in turn, would have generated burning embers that fell and ignited grass on the ground under Pole B while the tree was still held up.

    d) The branches of Tree 4 that were able to be readily reconstructed were estimated to be 21.5 metres in height, but the stump of that tree was 21.2 metres from Pole C. Assuming a pole height of 8 metres, Associate Professor Blackburn's calculations suggest the distance between the stump of Tree 4 and the line was approximately 21.7 metres, meaning, in Associate Professor Blackburn's view, that there may not have been significant contact between Tree 4 and the line.

    e) There was no evidence of significant arcing of the conductors, which would, in his view, rule out a phase to phase fault involving a clash between the conductors as the cause of the fire.

    f) Finally, Associate Professor Blackburn observed that the technical electrical information drawn from the recloser pointed to Tree 2 as the source of ignition. While fallen conductors are a well-known cause of fire ignition, it is difficult for electrical protection systems to detect such faults because they are typically associated with a "very low fault current level". He noted that while it is

possible that Tree 4 may have caused conductors to fall, and that this may have caused ignition before the Pole B event, such an event would not likely have been sufficient to operate the recloser protection, given the low fault current typically associated with such events.

117. After the Inquiry had commenced, Essential Energy provided those assisting the Inquiry with a report of Professor Don Russell, another electrical engineer who is based in the United States.

118. Professor Russell disputed Associate Professor Blackburn's conclusion that the fire likely eventuated as a result of contact between Tree 2 and the electrical infrastructure at Pole B.

119. In that respect, he noted that Tree 2 was a dead tree, and made reference to his experience that dry, dead trees "do not conduct electricity at significant ignition levels and do not represent an ignition mechanism from charring." In Professor Russell's view, even a dead tree in contact with a live conductor for a "period of tens of seconds" or more "would not cause burning embers to be created and fall to start a fire." Professor Russell also noted that Tree 2 exhibited no burning at the top of the tree and that there was no physical evidence of burning at the top of Pole B.

120. There was nevertheless some residual ambiguity in Professor Russell's report as to how and when the fire had started. He observed:

> "When Tree 4 fell on line 2 and dropped the line to the ground, arcing of the line to the ground at very low current levels would likely immediately cause the fire, but would not immediately be sufficient to cause operation of the recloser. The recloser, without regard to its setting and without regard to any time delay, would take longer to operate than the very short time required for an arc to ignite the fire. Since multiple trees fell and there was damage to the various spans in the general area of origin, it is simply not possible to assign a relative timing of the ignition of the fire to a specific event that ultimately did cause the recloser to operate."

121. He went on to note:

> "It is also important to note that with many meters of line on the ground, there can be scores of locations where arcing occurs randomly, often simultaneously, while often drawing very little current. Each arc individually represents a competent ignition mechanism. In the subject incident, with many meters of line on the ground, there likely were scores of low current arcing

events any one of which could have caused ignition of the fire without initially drawing sufficient current to operate protection."

122. Essential Energy submits that the cited paragraph does not represent any 'residual ambiguity' as Professor Russell was clearly not saying that Tree 4 caused the fire but that the interaction between the tree and the line was capable of causing the fire and the fire might have started before the commencement of the operation of the protection system. Professor Russell provided further clarification of his views in evidence. However, before either Associate Professor Blackburn or Professor Russell gave evidence, very significant further information was obtained from two FRNSW officers who were present in the easement after the commencement of the fire.

FRNSW witnesses in the easement

123. Most notably, the Inquiry heard evidence from Ms Cassandra Dickson, who in March 2018 was a retained firefighter with FRNSW. Ms Dickson attended the easement on the afternoon of the fire to protect the house at 580 Reedy Swamp Road from the fire.

124. She stated that she arrived at the top of the easement at sometime between 1.30pm and 2pm. At that time the fire was on the eastern side of the easement, with flames of 6 to 8 metres in height. She was shown a photograph taken by Mr Daniel Sommerville which she said fairly depicted the state of the fire when she was at the top of the easement.

125. Ms Dickson then travelled with her crew members from the top of the easement down to the residence at 580 Reedy Swamp Road. Ms Dickson states that she arrived there between about 2pm and 2.30pm. Once there, FRNSW officers set up a perimeter at the house.

126. At about 2.40pm Ms Dickson took a number of photographs from a point in the vicinity of Pole B. At that time, the fire was slowly moving down the slope of the easement towards the house.

127. Ms Dickson spent approximately an hour and a half at that location. She did not observe any tree suspended or hanging from powerlines in that area, nor did she observe any tree fallen across the easement in that area. There were no powerlines down between Poles B and C while Ms Dickson was conducting property protection works.

128. Ms Dickson was not able to see further up towards Reedy Swamp Road while she was in the easement and could not see any fallen trees further up the easement.

129. Ms Dickson's observations of Pole B and the surrounds find clear support in photographs 1 and 5 annexed to her statement. Those photographs clearly show Pole B (readily identifiable by the white tubing and transformer/switch box present on the lower portion of the pole; none of the other poles in the easement had those features). The images demonstrate that at the time Ms Dickson and the other FRNSW officers were in the easement, there was no tree in contact with the lines at Pole B, nor was there a tree on the ground in the vicinity of Pole B.

130. Those matters are of very great significance to my assessment of any contest between Tree 2 and Tree 4 as the cause of the sensitive earth fault at 12.19pm and, in turn, the fire.

131. Ms Dickson's evidence is supported by the contents of a statement of Mr Trent Galli, another member of her FRNSW crew. Mr Galli noted that in the approximately two hours he was conducting property protection work in the vicinity of 580 Reedy Swamp Road, he did not see any trees fall, nor did he see any on the ground that may have fallen prior to his arrival. He marked a photograph to indicate that he was in the vicinity of Pole B when conducting his firefighting works. Similarly, he did not see any of the powerlines down. It was, however, very smoky, and visibility looking up the easement was "low".

The effect of the FRNSW evidence

132. Subsequent to the preparation of his expert reports, Associate Professor Blackburn was provided with the statements of Ms Dickson and Mr Galli. In evidence, he was asked about the impact that material had on the views he had previously expressed to the effect that Tree 2 was the likely cause of the fire.

133. Associate Professor Blackburn candidly observed that in circumstances where the photographs annexed to Ms Dickson's statement were taken some two hours and twenty minutes after the recloser had operated, and there had been no power to Pole B for that period of time, there was no possibility that the interaction between Tree 2 and the electrical infrastructure at Pole B had caused the fire.

134. Associate Professor Blackburn nevertheless expressed some surprise at the strength of the fault current recorded:

> "I said in my reports that I didn't deny that there were other possible causes of fires along the easement with the interaction, particularly of tree 4 with the line,

and I didn't deny that that happened, so in that case that must have been the cause of the fire. What I am not - what I don't understand and find a bit puzzling is the magnitude of the fault current that tripped the recloser, is 15 or 16 amps and it's certainly, in my experience of these types of faults, not usually normal. It's completely abnormal to get that magnitude of fault current in the sort of situation where you had a tree falling on the line."

135. Nevertheless, he agreed that in all probability the fire was caused by Tree 4 falling onto the conductor line 2 between Poles C and D in the powerline easement.

136. In evidence, Professor Russell confirmed that, in his opinion, the interaction between Tree 4 and Line 2 between Poles C and D was the likely cause of the fire.

137. Professor Russell did not share Associate Professor Blackburn's surprise as to the current associated with the sensitive earth fault; he did not doubt that the contact between Line 2 and the ground could have generated the fault current:

> "Well, the first thing is to ask ourselves the question, did the recloser trip. If the answer is yes, then we have kind of a foregone conclusion that we had sufficient current for that to take place. Now, precisely what the behaviour of that fault was at any given time cannot be known. My research with down conductors shows that you can have a conductor fall, arc once, sit and have no current at all, come back and have 20 or 30 or 40 amperes, stop, do it again and you can have that happen in a few hundreds of milliseconds or you can have it happen in tens of minutes. These are chaotic behaviours, it's an uncontrolled situation, it's on ground that we will never be able to fully model or characterise because we can't...(not transcribable).. it exactly existed. We had about 40 metres of line on the ground, which is a lot. ."

138. The views of Professor Russell and Associate Professor Blackburn, as expressed following the receipt of Ms Dickson's evidence and that of Mr Galli, strongly support a conclusion that the fire commenced as a result of Tree 4 falling and making contact with Line 2 in the vicinity of Pole C. That series of events resulted in Line 2 falling to the ground between Poles C and D at – or potentially shortly prior to – 12.19pm on 18 March 2018.

Fire investigators

139. Prior to the information received from Ms Dickson and Mr Galli, D/S/Sgt Harris expressed a view that the fire likely originated in the easement somewhere between Pole B and Pole D. He explained the possible inconsistency between his conclusion

as to the cause of the fire (being the interplay between Tree 4 and the electrical infrastructure) by reference to a possible secondary run of fire at some later stage in the day, which might have resulted in indicators of "advancing fire" from the vicinity of Pole B.

140. Subsequent to the receipt of evidence from Ms Dickson and Mr Galli, D/S/Sgt Harris was asked if he wished to revisit his earlier conclusion that the fire had commenced somewhere between Pole B and Pole D in the easement. In response, D/S/Sgt Harris refined his view and indicated that, in his opinion, Tree 4 had caused the fire by bringing down the line between Poles C and D.

141. As to why he and Inspector Barnes had followed macro and micro indicators to the vicinity of Pole B, D/S/Sgt Harris acknowledged that his previous theory of a secondary run of fire starting lower in the easement and moving up the easement did not accord with the evidence of Ms Dickson and Mr Galli. He speculated that there may have been some factor relating to the movement of wind that resulted in unusual fire behaviour.

142. Setting aside the variation in his view as to the area of origin of the fire, D/S/Sgt Harris remained steadfast in his view that the fire likely resulted from Tree 4 falling onto powerlines. Of particular significance to this conclusion was first, the fact that a section of Line 2 featuring a severe kink in the wire consistent with impact damage was located in the vicinity of Tree 4; and second, the fact that there were areas of unburnt or protected vegetation at points where the trunk of Tree 4 was in contact with the ground. Those "areas of protection" suggested that Tree 4 had fallen to the ground prior to the commencement of the fire. Importantly, no such areas of protection were found underneath the other three trees that had fallen into the easement.

143. Inspector Barnes, for his part, did not engage in a detailed consideration of the specific mechanism underpinning the fire; he considered that the investigation as to the specific cause of the fire did not fall within the purview of his responsibilities.

Evidence of Mr De Mar

144. Mr Paul de Mar was also asked to give evidence about the mechanism by which the fire commenced.

145. Mr de Mar agreed with D/S/Sgt Harris that the patches of unburnt groundcover vegetation corresponding to the location of uncharred patches on Tree 4 suggested that the tree was already on the ground when it came to be impacted by fire.

146. Ultimately, Mr de Mar concluded that the most likely cause of the fire was a phase to earth fault resulting from Tree 4 falling on and breaking Line 2 between Pole C and Pole D in the easement. After falling to the ground, Mr de Mar considers that Line 2 would likely have discharged electrical energy into the ground, where there were likely small pieces of dead vegetation, which, given the very hot and dry conditions, would have been highly susceptible to ignition.

147. Mr de Mar's evidence also shed some light on why D/S/Sgt Harris and Inspector Barnes may have been mistaken in their initial conclusions as to the fire's area of origin. In observing the photographs of the area around Pole B furnished by Ms Dickson, Mr de Mar noted that the burning trees shown in the photograph were stringybarks. The bark of such trees is very fibrous and, as such, highly flammable. Mr de Mar noted that on the downwind side of the trees (the leeside) the fire was running up the tree. In his view, that could have been the source of confusion for fire investigators; the burn pattern observed on such trees might lead an investigator to erroneously deduce that the features observed were indicative of advancing fire.

Exclusion of other causes

148. Both D/S/Sgt Harris and Inspector Barnes undertook a consideration of whether the fire might have been caused by something other than the electrical infrastructure. Neither investigator found any evidence of possible ignition sources, other than the downed powerlines:

    a) There was no evidence of human activity in the area of the easement immediately prior to the fire. There was not, for example, any evidence of cigarettes, campfire or similar.

    b) No fragments of copper or molten copper were found on the ground in the easement. This suggests that the fire had not been caused by the lines striking each other and arcing.

    c) A review of available lightning strike data for the Bega area between midnight on 15 March 2018 and 11.59pm on 18 March 2018, shows that there were no strikes that could have caused the fire. D/S/Sgt Harris reported that he observed no physical evidence of lightning strikes in the area of origin of the fire.

149. In line with these conclusions, Ms Dickson gave evidence that neither she nor any other member of her crew undertook back burning in the vicinity of the easement.

Conclusion as to the cause of the fire

150. Lay evidence on the whole demonstrates clearly that the great preponderance of the fire was to the east of the easement.

151. When the lay evidence and that of fire investigators is considered in conjunction with the evidence of Professor Russell and the revised opinion of Associate Professor Blackburn, the only plausible conclusion is that the fire was caused by Tree 4 falling on Line 2 between Poles C and D. That brought the line to the ground between Poles C and D and, in turn, caused arcing or sparking, which ignited the fire.

152. Essential Energy submits that Professor Russell made it clear that downed, arcing conductors represent a competent ignition mechanism. Essential Energy emphasised that in his evidence Associate Professor Blackburn referred to arcing and sparking together, but that in his report he suggested that such was unlikely to have caused the fire, whereas Professor Russell gave evidence that an arc is capable of generating temperatures in order of 5000 to 10000 degrees. Essential Energy seeks to draw some distinction that Professor Russell made no reference to 'sparking' and a limited reference to 'sparks' as a potential ignition mechanism.

153. Professor Russell said "So the mechanism is not just about the heat of the arc next to fuel, it is also about the incandescent particles in matter that is thrown out away from the site of the arc by the dynamics of what's going on". Mr Cheney on behalf of Essential Energy submits an accurate finding would not refer to sparks but rather "that the physical processes of ignition are capable of being caused by arcing in contact with a dry fuel bed".

154. Mr Smyth submitted that I ought to find, on D/S/Sgt Harris' evidence, that the downed section of Line 2 arced and emitted heat or sparks into the vegetation around it and those sparks ignited the fire. At another time in his submissions Mr Smyth referred to Associate Professor Blackburn's use of the term 'pyrolytic' process of heat radiation and convection until sufficient heat was transferred to the surrounding flammable vegetation".

155. For the reasons expressed above I am satisfied that the words proposed by counsel assisting "The contact between the line and the ground resulted in electrical arcing, which ignited vegetation in the easement" do not require amendment.

156. This evidence accords with the observations of the arborists, Mr de Mar and the opinion of D/S/Sgt Harris. In particular, the key aspects of those observations were:

a) tree 4 was dead prior to the fire, and the extent to which it had burnt at its base may have been suggestive of a significant degree of decay;

b) when its branches were reconstructed, Tree 4 was tall enough to have contacted the powerlines;

c) there were areas of protection under Tree 4, suggesting that it had fallen before the fire had started;

d) there were no areas of protection under Tree 2, and the trunk of the tree was largely unburnt; and

e) there were no areas of protection under the pieces of ceramic insulator that had broken and fallen to the ground upon contact with Tree 2.

Confusion as to the timing of the fire's commencement

157. Before leaving the subject of the fire's cause and origin, one aspect of the evidence concerning the timing of the fire's commencement ought be addressed briefly.

158. That is, Mr Michael Jay, an RFS Volunteer who serves as the Captain of the Brogo fire shed, has provided a statement, in which he indicates:

> "About 11 .50am on Sunday 18 March 2018, myself and several other persons attached to the Brogo RFS had just completed some internal training when one of my deputies Bradley SMITH noticed some smoke coming from the Reedy Swamp locality."

159. Mr Jay's statement gives rise to the possibility that the fire may have started earlier than is suggested in the remainder of the material; notably, if his account is correct, the fire commenced before the recloser was activated.

160. The very great weight of the evidence, however, suggests that Mr Jay was likely mistaken in his suggestion that that the fire commenced well prior to midday. In that respect, it is relevant to note that Mr Jay's statement was made on 30 April 2020, more than two years after the fire. I am content, as Essential Energy suggest to not make a positive finding that Mr Jay was mistaken as he was not called and given an opportunity to confirm (or refute that) he was mistaken or review the time at which he suggested this sighting occurred. However, it does not take away from counsel's submission that the nominated time does not fit in with the other evidence in the inquiry.

161. It should be noted that observations of the fire prior to midday – while inconsistent with other evidence – would not necessarily be inconsistent with the fire being

caused by Tree 4 falling on Line 2; Professor Russell's evidence suggests that the timing of fault events and/or arcing after such instances can be unpredictable. Nevertheless, I agree with counsel assisting' observation that "such a turn of events seems extremely unlikely; it would have required the line to fall to the ground and arc in a way that caused the fire without registering a fault for some tens of minutes".

162. Consequently, it is submitted by Counsel Assisting that I "would prefer the evidence suggesting that the fire commenced sometime around the recording of the sensitive earth fault at 12.19pm".

163. Mr Smyth on behalf of the Insurers and Residents submit that I ought to make a finding that the fire started at 12:19 pm or alternatively between 12:15 and 12:20 pm.

164. Given the evidence referred to in relation to the unpredictable fashion and time at which a fire can start as a result of arcing, the latter time period, as is expressed in Counsel Assisting's proposed findings and suggested in the alternative by Mr Smyth, is appropriate.

Appropriate finding as to cause and origin

165. With regard to above the cause and origin of the fire, my finding is as follows:

> The fire that impacted on the town of Tathra and its surrounds on 18 March 2018 commenced between approximately 12.15pm and 12.20pm in the electrical easement that runs in a north easterly direction in the vicinity of 580 Reedy Swamp Road, Reedy Swamp.
>
> The fire was caused by the impact between a falling tree (identified in this Inquiry as Tree 4) and an electrical conductor line (identified in this Inquiry as Line 2). As a consequence of that impact, Line 2 fell to the ground between the poles identified in this Inquiry as Poles C and D. The contact between the line and the ground resulted in electrical arcing, which ignited vegetation in the easement.

Electrical infrastructure – maintenance and safeguards

166. As noted above, the electrical infrastructure in the spur line that ran up the easement included six power poles. The poles supported two conductor lines with a voltage of 11kV between the two bare conductors. The conductors were uninsulated and were electrically live at a nominal phase voltage of 6.35kV relative to earth.

Each conductor comprised seven strands of 0.064 inch diameter hard-drawn copper wire. The line was likely 40 – 50 years old or more.

167. The conductors were supported at each pole by wooden cross-arms with ceramic post-type insulators bolted to the cross arms.

168. Pole B differed from the other poles in that it supported a pole-mounted substation comprising a transformer and other items including high voltage fuses and surge arresters.

169. The feeder line that supplied power to the easement included recloser 15-R11972. The recloser was a NOJA power type RCO1 recloser. A recloser is programmed to identify "faults", that is, high or low levels of current, outside the programmed bands. Having identified a fault, a recloser is programmed to send a "trip signal" to a circuit breaker. Reclosers may be programmed to send this trip signal immediately, or after the lapse of a pre-set time.

170. "Reclosers" are labelled as such because the majority of faults are transient and, accordingly, the system is designed to "reclose" itself and restore power after a fault. If, after a specified number of attempts (normally three or four) to reclose the circuit, the relevant fault remains, the system will regard the fault as a permanent one, such that the circuit breaker will activate to open the circuit and prevent the delivery of power beyond the point of the recloser.

171. If that occurs, it will be necessary (at least according to Essential Energy's policy) for a physical observation of the power infrastructure to occur before power is restored.

172. There are two main categories of fault the recloser's protection system is designed to detect:

    a) First, overcurrent faults – which arise where the fault current is higher than the normal operating current in the system. This is usually caused by what is known by a "phase to phase fault", which may occur when two lines come into contact with each other, either directly or via some kind of conducting object such as a green tree branch.

    b) Secondly, earth faults, where there is a fault between one phase and the earth. Here, the fault involves a current lower than the normal rated load for the line. Such faults can occur in two main ways:

        (i) Where a tree falls on a line, but remains connected to the base stump in the ground. If there is some moisture in the wood, this will allow a low level of electrical current to pass through the tree. In that event, the

points of contact between the tree and the live conductor is likely to produce considerable sparking or electrical arcing. That sparking in turn, would be expected to heat the relevant tree branches, creating flaming embers that will fall to the ground and may ignite fire in vegetation there.

(ii) Where the powerline breaks for some reason (for example, contact with a tree) and the live conductor falls to the ground. This will cause a low current to pass into the ground. Depending on the nature of the surface and vegetation, resulting electrical arcing may lead to the ignition of a fire.

173. The recloser includes two fault modes regarding earth faults: an earth fault mode, and a sensitive earth fault mode. Both detect earth faults, but sensitive earth fault protection is designed to be triggered by lower fault currents. The relevant fault type in this case, was a sensitive earth fault.

174. Here, the sensitive earth fault mode was designed to operate where a sensitive earth fault current above 6 amps was recorded. The sensitive earth fault mode did not have an auto reclose function associated with it (as distinct from earth faults and over current faults). Essential Energy notes that the reason for this is that reclosers on its network are set by default to disable auto reclose in respect of sensitive earth faults. Instead, in order to reduce the occurrence of spurious tripping, the sensitive earth fault mode was associated with a six second delay between the pick-up of the fault and the sending of the trip signal. That is to say, that the recloser system was designed to allow power to run for six seconds before triggering the circuit breaker. The settings applicable to the sensitive earth fault mode are considered below.

175. There was also a high voltage fuse (15-F13943) located between the recloser and the location of the fault, however, high voltage fuses of that type do not afford any protection for sensitive earth faults of the kind observed.

Maintenance of electrical infrastructure

176. Associate Professor Blackburn conducted an inspection of the electrical infrastructure, which had been removed from the easement by investigators.

177. He noted that the lines in the easement between Poles F and D had broken in a number of places. There were a number of “crimp” connections in the two lines between Poles F and D, suggesting that there had been previous ruptures of the conductors in the easement.

178. There was not, however, any evidence of inadequacies in the process of crimping the conductors.

179. Additionally, while there was some dispute as to the appropriateness of the settings in place (see further below), the recloser system operated as was intended; at 12.19.38.249pm a sensitive earth fault system was identified. The recloser then waited the programmed 5.999 seconds before sending the trip signal, which resulted in the activation of the circuit breaker 6.049 seconds after the sensitive earth fault. During the fault, an abnormally high neutral current of 15 amps was recorded (as distinct from the normal condition of 0).

180. Essential Energy agree with counsel assisting's submission that in the circumstances, there is no evidence that any deficiency in the maintenance of the electrical infrastructure in the easement contributed to the fire. The Insurers and Residents do not take issue with this submission. In those circumstances, having regard to the evidence, I accept that the fire was not caused or contributed by any deficiency in the maintenance of the electrical infrastructure in the easement.

Recloser settings in place

181. Essential Energy's policy is to disable the automatic reclose function on Total Fire Ban Days in rural areas. Consistent with this, the automatic reclose function on the recloser 15-11972 was disabled remotely on 17 March 2018. Essential Energy's submissions reiterate that as referred to by Counsel Assisting above at [para123] it is the reclose settings for earth and overcurrent faults which is disabled by Essential Energy whereas in respect of sensitive earth faults, on Essential Energy's network, these are set by default to disable auto reclose.

182. As noted above, the recloser operated as intended; having detected a fault current, the recloser was programmed to wait for six seconds before sending a signal to trip the circuit breaker. This six second delay is intended to decrease the rate of false positives; most issues will clear in a matter of a few seconds. In such cases, the recloser would not trigger the circuit breaker, and the supply of power would not be unnecessarily interrupted.

Impact of the settings

183. Associate Professor Blackburn expressed concern about the appropriateness of such a setting on high fire danger days. He stated that in circumstances where the minimum operation time from pickup to tripping of the circuit breaker could have been as low as 0.05 seconds, "the extra 6 seconds of arcing may mean the

difference between ignition and non-ignition of flammable material by the arc". Consequently, Associate Professor Blackburn describes the six second delay for low current faults as "potentially counter-productive in terms of fire risk".

184. In preparing his report, Professor Russell was asked whether, on the balance of probabilities, a shift in the sensitive earth fault settings on the recloser so that it would trip at one second at 6 amps would have prevented the fire occurring. Professor Russell reiterated that a line falling to the ground with many metres contacting earth will immediately exhibit arcing in multiple locations. He noted that each arc would have an extremely high temperature, typically greater than 5,000 degrees Fahrenheit. In those circumstances, Professor Russell observed:

> "Under the conditions that existed at the time of the subject fire it is probable that the downed line ignited the fire within hundreds of milliseconds and most certainly long before one second. Therefore, a change of sensitive earth protection to 1 second would likely have no practical effect."

185. In evidence, Professor Russell noted that the six second delay before the recloser operated was not only sufficient but "grossly sufficient" for fire to commence. He noted, in that respect, that "the first arc that occurred several thousands of degrees in the first competent field bed, will potentially ignite."

186. Accordingly, Professor Russell opined that it would not have made any difference whether the recloser was set to trip one second after a sensitive earth fault, nor would it matter whether the sensitive earth fault settings were set to trigger at a level lower than 6 amps. When there is a significant quantity of dry fuel, and a substantial portion of line on the ground, fire will, on Professor Russell's account, likely start in the first tens or hundreds of milliseconds.

187. In that respect, Professor Russell noted that there is not a linear relationship between the time power flows after a fault and the probability of ignition. The difference between a setting of five seconds and ten seconds will often be purely academic as the fire would have long before started.

188. Associate Professor Blackburn disagreed with the suggestion that the fire likely ignited within tens or hundreds of milliseconds of the line being downed; he observed that while in some cases ignition can occur in hundreds of milliseconds, in other cases it can take much longer ("many seconds") for the heat from the arcing to transfer to the flammable material.

189. Having heard that evidence, Professor Russell acknowledged that “every fault is different” and that he did not fundamentally disagree with Associate Professor Blackburn’s opinion that some fires might not commence quickly.

190. Ultimately, Associate Professor Blackburn observed that in his view, the ignition event likely occurred after the first second. As concerns the impact of having some 40 metres of line on the ground, Associate Professor Blackburn noted that a longer length of line on the ground, and a greater number of arcs, might reduce the energy associated with each of the individual arcs. As a consequence, it may take longer for sufficient heat to be transferred to the relevant flammable material to cause ignition

191. In response, Professor Russell indicated that it is not correct to say that the current would be divided among the arcs occurring along the line because the arcs would not necessarily be simultaneous.

192. Counsel Assisting submitted “that it is not possible, on the available evidence, to sensibly reach a conclusion as to precisely when the fire commenced relative to the identification of the sensitive earth fault by the recloser. It seems likely that the sensitive earth fault was registered very shortly after Tree 4 brought the conductor to ground, however, even that was the subject of some conflicting evidence; it remains possible (though perhaps unlikely) that the fire started before the sensitive earth fault was even registered. Counsel assisting submits that there is certainly no material before me that enables a conclusion properly to be reached as to whether the fire began in the first second after the sensitive earth fault, or in the few seconds between the pick-up of the sensitive earth fault and the operation of the circuit breaker”.

193. Essential Energy submits that I would prefer the evidence of Professor Russell that the fire likely ignited before the identification of the sensitive earth fault as he wrote in his report “under the conditions that existed at the time of the subject fire it is probable that the downed line ignited the fire within hundreds of milliseconds and most certainly long before one second. Therefore, a change of sensitive earth protection to 1 second would likely have [had] no practical effect”. Mr Cheney criticises Associate Professor Blackburn’s evidence that it was likely longer as “speculative”.

194. With respect, the identification of precisely when the ignition occurred from both witnesses is speculative. Essential Energies point is that even if the recloser had been set to 1 second the fire might have, or probably did start earlier than then.

Given the number of points where Line 2 could have been arcing there could have been a number of places ignited.

195. It is not possible to ascertain the ignition to such a level of specificity. Indeed, even a comparatively long period of energy transference may not result in an ignition as it depends on the object to which it transfers. Whether it proceeds to a flame and then a fire depends on matters additional to the arc of the 11 kV line.

196. I do not think that Associate Professor Blackburn when assessing the likely time in which the effective ignition occurred was unreasonable nor is it inconsistent with Professor Russell's evidence. There is no need to prefer one witness over the other. I was impressed with both witness's expertise, engagement and contribution to the inquiry.

Appropriateness of the delay between recloser pick up and trip

197. Counsel Assisting submitted that it is not possible to discern whether a change to the recloser settings would, or would not, have prevented the fire from occurring. However, Mr Cheney on behalf of Essential Energy and Mr Smyth on behalf of the Insurers and Residents take issue with Counsel Assisting's position and they make submissions further to their respective interests.

198. Essential Energy seeks a finding that a change to the recloser settings would not have prevented the fire.

199. Mr Smyth seeks a finding that a change to the setting for 'a one second pick up to manual lockout' would have avoided or materially reduced the risk of the fire igniting as it did and should have been adopted as a prudent protection setting in the conditions forecast for the day. He submits that I would find that Essential Energy should have used a "a fast-trip single-shot mode (being a one second pickup to manual lockout". He says that it is "safer" than Essential Energy's use of "reclose operation" which he claims favours network reliability.

200. Mr Cheney says that Professor Russell is clear that a shorter time setting would most likely not have prevented the fire. Mr Smyth says that though there is no real way of ascertaining the exact timing of the ignition, limiting the exposure of a powered line to a dry environment limits the risk of that fire starting and on that basis seeks the finding he puts forward.

201. The level of the settings applicable to sensitive earth faults on high fire risk days was considered by the experts.

202. As concerns the six second delay, Associate Professor Blackburn's report concluded:

> "I do not believe that it was consistent with good practice in terms of fire ignition risk. A hazard assessment of the protection operation scheme should have considered the risk incorporated in imposing such a delay….the retention of the 6 second delay with SEF is a potentially greater hazard that [sic] leaving the auto-reclose feature activated when in the EF mode of operation.
>
> I believe that some attention to SEF settings should be considered for high fire risk days. It is current practice to disable the auto-reclose facility in high fire risk conditions. It is my opinion that attention should be given to reducing the 6 second delay when in the SEF protection mode. Even at the low currents that are picked up by SEF sensors, 6 seconds of arcing can cause ignition of flammable material. Modern electronic recloser settings can be easily adjusted remotely by the system operator to achieve low risk operation. On hot windy days such as on 18 March 2018 the most common faults are either grounded lines or vegetation interaction. Both of these are likely to cause low current faults that will be picked up by the SEF mode of protection. Having the 6 second delay will not give optimal protection against fire ignition."

203. As noted above, Professor Russell's evidence suggests that the fire may well have commenced even if the recloser was set to operate after a period of one second rather than six.

204. Nevertheless, as noted by Counsel Assisting, there is some intuitive appeal to Associate Professor Blackburn's contention that a reduction of the delay to one second may prevent fires that would otherwise have occurred from taking place.

205. The identification of both the appropriate delay period and the appropriate sensitive earth fault reading requires a weighing of competing imperatives.

206. On the one hand, Professor Russell observed that a delay of six seconds is appropriate, having been shown to provide a reasonable balance between "protection matters" and the "need to have system reliability" (that is, the need to avoid "false positives", or the operation of the recloser system to cut off power in circumstances that do not warrant it).

207. On the other hand, Associate Professor Blackburn's view was that in "catastrophic bush fire conditions" – i.e. Total Fire Ban days – the issue of customer reliability ought be a secondary consideration to safety issues.

208. As concerns the appropriate fault level, Associate Professor Blackburn expressed the view that the 6 amp setting was too high. In that respect, he observed that a level between 4 amps and 10 amps is appropriate for normal operating conditions, but on catastrophic or Total Fire Ban days, there should be provision made for the operator to shift the tripping level downwards; as low as 1 amp or less.

209. Professor Russell responded to the suggestion of a sensitive earth fault pick-up below 4 amps on Total Fire Ban days by noting first that there is "no right answer" and that it is "always a balancing act". Indeed, Professor Russell noted that in parts of California the current approach involves a complete shut-off of power on high fire risk days.

210. Having reiterated his opinion that changes to the settings as concerns the subject fire would not likely have made a difference to the outcome in this case, Professor Russell noted that there may still be "some marginal value" emerging from changes made on high risk days. Professor Russell stated he had "no objection to anything anyone wants to do to narrow it [the window of opportunity for fire to commence] but don't have the expectation that the very first arcs that occur when the line goes down haven't already started the fire".

211. Associate Professor Blackburn conceded that he did not know of any electricity service provider either here in Australia or internationally that would set their levels below 4 amps and time delay below five seconds. In doing so, he noted that the only step taken by most Australian utilities is the disablement of the auto reclose function when operated in the earth fault mode.

212. In view of that concession, and the residual doubt as to whether different settings would have led to a different outcome, Counsel Assisting submitted that it would not be possible for me to conclude that the settings in place on the day of the fire were inappropriate.

213. For the reasons already discussed above, I agree with Counsel Assisting's position; but further, I am of the view that the evidence does not enable me to make a positive finding that the settings were either appropriate or inappropriate.

214. That does not, however, necessitate a conclusion that the settings in place were optimal.

215. Ultimately, the act of balancing the risk of needless power outages against the risk of fire calls for a difficult policy judgment as to the weight to be afforded each of the competing imperatives. Counsel Assisting submitted that the evaluation of these

competing imperatives warrants significant further consideration. Even if the ultimate benefit is only "marginal" in terms of the number of fires a change to recloser setting would prevent, the devastation wrought by the fire the subject of this Inquiry makes it clear that a single fire can have a calamitous impact. That being so, a change that results in only a slight reduction in the number of bushfires may well be warranted, provided the other implications of those changes are not unduly burdensome on the health and wellbeing of community members.

216. Mr Smyth refers to Counsel Assisting's comment :

> "The scope of the Inquiry did not, for example, extend to include a consideration of the likely impact of different recloser settings on the healthcare of persons or on particular economic undertakings or on public utilities such as water services. Such questions are best answered via a consideration of all such imperatives (potentially informed by one of the recent broad-ranging inquiries into the implications of bushfires)."

217. Mr Smyth remarks that given the existence of CEOP8002.02, a discussion about which follows, at least as it applies to Total Fire Ban days indicates that the standard has now been determined so there is no need for further consideration. His submissions go to the issue that Essential Energy should have come to such a standard earlier by reference to the 2009 Victorian bushfires.

218. Given the insufficiency of evidence in relation to the time and funding resources and issues and consultations involved in Essential Energy's development of CEOP8002 as well as the absences of specific evidence in this Inquiry about the electrical system details involved in the Victorian Bushfire, I decline to engage in any consideration as to whether Essential Energy should have created the standard before March 2020 other than saying that if, as Mr Fitzpatrick says, Essential Energy's review was in response to the 2019/2020 bushfires, then Essential Energy completed it very expeditiously. Essential Energy should continue to review the issue and the progress of the implementation of the policy contained CEOP8002.

Changes to the settings

219. In March 2020, Essential Energy completed a review of its network protection settings following the 2019 / 2020 bush fire season.

220. As a result of that review, Essential Energy's branch procedure distribution protection guidelines were updated to require that reclosers in designated areas be

automatically switched to what are known as Group 4D Settings (Group 4D settings is the name given to Total Fire Ban Day settings).

221. The guideline states that for Group 4D the last recloser on each line section is to be set at one second, with each upstream recloser set at 0.5 seconds higher progressing back along the feeder towards the zone substation. Mr Ian Fitzpatrick, a Network Risk Manager employed by Essential Energy, stated that it may take years to individually reconfigure each recloser device requiring manual configuration.

222. As to whether this approach is an appropriate course, Professor Russell observed that "it could be" though noted that there was an aspect of arbitrariness to the precise settings to be applied and he had not undertaken the necessary work to provide a conclusive view on that subject.

223. For his part, Associate Professor Blackburn observed that the proposed amendments to the settings are "certainly going in the right direction".

224. In submissions Essential Energy points out that Mr Fitzpatrick explained in his evidence that it can take years to individually reconfigure each recloser setting requiring manual configuration, and that it is generally not prudent to undertake large-scale changes to network protection settings because this creates an 'untested scenario. Though there are reclosers that can be adjusted remotely the practice for large scale changes is to test such changes at the recloser device which involves Essential Energy field technicians running circuit tests to check that the device opens and closes as expected before allowing the device to be reconnected to the network.

225. Mr Smyth says in his submissions "It is apparent that Essential effectively concedes the necessity to program a fast fault-curve on TOBAN days. It revised its operating protocols to that effect in March 2020". Mr Cheney is critical of this observation and says that there is no basis for assuming that "the change to protection settings following the fire involves an acceptance that the settings on the day of the Fire were inadequate, inappropriate or inconsistent with industry practice". I accept that position.

226. The fact that Essential Energy's review of its network protection settings resulted in changes being recommended does not necessarily establish that the previous settings were inappropriate, having regard to prudent industry practice. It does, however, underscore the need for the question of protection settings to be subject to further and continuing review and consideration.

Emergency services response

227. At 12.28pm, FRNSW received notification of a fire.

228. At 12.29pm, various RFS brigade members began to be notified of the fire. Those notifications were delivered by text messages and pages.

Personnel resourcing of the Fire Control Centre

229. Mr Brent Occleshaw, an RFS Group Officer, gave evidence that when he arrived at the Bega Fire Control Centre (**FCC**) at approximately 1pm, it was fully staffed with approximately 12 to 15 people present including radio operators, planning officers, the incident controller and an operations officer. The resourcing of the Incident Management Team (**IMT**) at the FCC is more clearly detailed in the statement of Deputy Commissioner Jason Heffernan of the RFS.

230. Notably, there was no FRNSW Liaison Officer at the FCC at the time the fire commenced. On Superintendent Cullen's recollection, no such liaison was present until approximately 5pm on the day of the fire.

231. In his first report, Mr Conway observed that the incident management arrangements at the FCC were appropriate for the forecast conditions. In his supplementary report, Mr Conway noted that the absence of an FRNSW liaison from the FCC "was a gap in IMT capability critical to effective information sharing between agencies".

232. In examining Deputy Commissioner Heffernan's third and fourth statements, Mr Conway formed the view that it was unclear when Mr David "Marty" Webster, the Planning Officer, actually joined the IMT. The need for the Planning Officer to be in attendance at an early stage was therefore a qualification to his observation that there was an appropriate level of preparedness at the IMT; Mr Conway stated that it would have been appropriate for the planning officer to be in attendance prior to the fire commencing.

233. The assumption was put to Mr Conway that Mr Webster arrived at the FCC at about 1pm. In response to that assumption, Mr Conway observed that while that was somewhat reassuring, he continued to believe that, having regard to the forecast for 18 March 2018, and having regard to the volume of information that emerged in the early stages of the fire it would have been appropriate for the Planning Officer to be placed in the IMT prior to the start of the fire.

234. Mr Newton submits that though the FRNSW liaison officer did not arrive at the FCC until 5 pm, there was good liaison between FRNSW and the RFS throughout the afternoon. He makes the following points:

a) ”There was coordination between the FRNSW and RFS upon the 000 call being made, with the initial response to the Reedy Swamp fire consisting of both RFS crews and FRNSW crews, namely the Bega pumper, the Narooma pumper and the Merimbula pumper (Superintendent Tye, 1st statement at [16]; Ex 1, tab 30).

b) Superintendent Tye tasked Inspector Gerrard as a FRNSW liaison officer, however, because of unfolding events, Inspector Gerrard was redirected to Tathra to act as a strike team leader (Superintendent Tye, 2nd statement at [11]; Ex 1, tab 246).

c) Members of the IMT were talking with representatives of FRNSW throughout the afternoon (T732.35). During this period Mr Cooper in the IMT was in “*direct contact with a liaison from FRNSW, who was mobile on the road, responding to the Bega Fire Control Centre in relation to the availability of FRNSW resources*” (Cooper statement at [23]; Ex 1, tab 25).

d) During the first few hours of the fire, Superintendent Tye was involved in deploying FRNSW resources to the fires and offering and helping the RFS in their response to the fires. He communicated regularly with FRNSW Strategic Operations Centre concerning the resources being deployed to the fires and he was aware they were in turn communicating with RFS State Operations Centre. Among other matters, from about 1519 hours, Superintendent Tye was aware that a s 44 declaration was likely to be made; FRNSW Fire Com were directing FRNSW resources to be moved to maintain coverage in the townships of Bega, Narooma, Merimbula and Eden; FRNSW moved additional FRNSW appliances towards Bega in anticipation of urgent requests from the RFS for assistance (Superintendent Tye 1st statement at [22]; Ex 1, tab 30); and at a time before 1557 hours, FRNSW were responding with all available FRNSW resources to an RFS request for all available FRNSW assistance within a 30 minute radius, with all appliances to go to Wildlife Drive, Tathra (Superintendent Tye, 1st statement at [19]-[24]; Ex 1, tab 30).”

235. In relation to the planning officer not initially being in the FCC, Superintendent Cullen’s evidence was that Mr Webster and Mr Cooper were within 10 minutes of the FCC if needed (T730.24) and that the planning function was undertaken by Mr

Webster and Mr Cooper (T731.49). In relation to each of Mr Cooper and Mr Webster, their statements confirm that both were part of the pre-arranged IMT, they were both aware of the fire when it started, and they both arrived at Bega FCC shortly after the fire was reported. Mr Conway's evidence was there was an appropriate level of preparedness, although it would have been preferable for Mr Webster to have been there before the fire commenced (T918.28). When Mr Conway became aware of Mr Webster's arrival time, he was somewhat reassured (T951.2) and he accepted that one aspect to be considered in terms of pre-positioning was that if the fire had started to the north of the zone, Mr Webster and other personnel may have been required at the Moruya FCC (T951.32). Mr Webster's evidence was that he was on standby to travel to either Bega or Moruya (at [7]).

236. Both Counsel Assisting and Mr Newton submit that the lack of a FRNSW Liaison Officer and the delayed arrival of the planning officer aside, the resourcing arrangements in the FCC were appropriate. I agree and I accept that the matters put forward by Mr Newton substantially address Mr Conway's limited concerns.

237. Various RFS personnel were available to be paged 24 hours a day, 7 days a week in their capacity as an RFS volunteers.

238. Mr Conway expressed a view that the initial response to the fire, whereby the first 000 call was received at 12.26pm and the first responding officers were on scene at approximately 12.45pm, was appropriately prompt.

239. Counsel Assisting submitted that, in assessing the speed of the initial response and the extent of resources initially deployed, it is appropriate to have regard to the nature of the RFS as a volunteer service. As noted by Mr Conway, before volunteer officers can respond, they must first congregate at the relevant station to form teams and procure protective gear, fire-fighting equipment and vehicles. I agree with this submission.

Development of an initial strategy

240. Group Officer Lucas states that he drove down to Lilli Pilli Road and assessed that it was a possible containment line. It was, on his account, the first access point that provided a potential point of attack. Group Officer Lucas's overarching strategy was to keep the fire to the west of Lilli Pilli Road and to the South of Reedy Swamp Road. Officers were deployed to each of those locations.

241. As to whether it was appropriate to attempt to establish a containment line at Lilli Pilli Road, Mr Conway observed that he was not able to comment definitively given

that he was not familiar with the topography, but noted that it is not uncommon for fire ground commanders to look for opportunity to contain a fire using roadways.

242. Notwithstanding Mr Conway's inability to be more definitive, I agree with Counsel Assisting's submission that the initial strategy contemplated by Group Officer Lucas was an appropriate one.

243. The fire in this case had very quickly progressed to a height of five or six metres. Indeed, in some cases, the fire had reached the top of the tree canopies. Mr Hamish Dean, for example, noted that he saw fire services personnel soon after he arrived at Mr Somerville's residence at 730 Reedy Swamp Road. By that time, Mr Dean observed that the fire was "coming across the road like the size of a bus".

244. The capacity of fire services to engage in a direct attack on the fire was significantly hampered by the fact that there was no way of readily accessing the main fire front, which was deep in the bush by the time officers arrived, and by the intensity of the fire.

245. In the circumstances, it is submitted that the fire could not reasonably have been susceptible to a direct attack at the time of the arrival of the responding officers; first, the officers could not readily access the head of the fire; and second, the intensity of the fire was such that direct attack on the fire would, in Mr Conway's words, have been "challenging at best and probably ineffective".

246. Accordingly, the only real possibility for containment of the fire in its early stages was at Lilli Pilli Road, and it was appropriate for RFS officers to attempt to do so.

247. That said, it appears that there may have been some difficulties in relation to the communication of this strategy.

248. Group Officer Lucas gave evidence that he communicated his plan in relation to the containment of the fire to the crews via radio and face to face communications. He said that he briefed crews and developed the plan within the first half hour after his arrival on scene at 1pm.

249. However, Ms Kathryn Purnell (née van der Hout) gave evidence that she was not aware of this strategy. Captain Van Bracht stated that he received a general instruction from Group Officer Lucas to protect property and life in the best way possible. On his account, no specific instructions were provided as to how to do that. The fact that Captain Van Bracht did not arrive until sometime after the first arriving officers may explain why he did not hear the explanation of the strategy to be adopted.

250. In the result, firefighters were positioned on Reedy Swamp Road and in the area of Lilli Pilli Road, consistent with the strategy contemplated by Group Officer Lucas. Unfortunately, however, by the time the fire reached Lilli Pilli Road, the flames were "a lot higher than the trucks" according to RFS Captain Clyde Green, such that it was not safe for fire officers to be in the area. Group Officer Lucas also concluded it would not be possible to hold the fire at that location. By the time it approached Lilli Pilli Road, the fire was already spotting past the containment line that had been established..

251. While there may have been some issues in relation to the communication of the proposed early response strategy among the original responding crews, there was no real prospect of arresting the fire by way of a direct attack at the time of the fire services initial response.

252. The development of a strategy involving an attempted containment at Lilli Pilli Road and Reedy Swamp Road was therefore appropriate.

"Backburning" during the fire-fight

253. Information received via a Statement of Ms Katherine Purnell, a member of the Tarraganda RFS brigade, dated 31 July 2020 raised the possibility that there may have been some inappropriate protective burning activities conducted by some of the first responding RFS officers.

254. She responded to the fire as part of a team in Tarraganda 7, which was a Category 7 tanker. The initial crew also included Senior Deputy Captain Baden Edwards, Deputy Captain Warren Purnell (who was the crew leader), Ryan Dean and Ms Purnell.

255. Ms Purnell indicated that after locating the fire and looking for somewhere to establish a control line, the crew (which by that time had been joined by Brigade Captain, Peter Van Bracht, who had arrived in his personal vehicle) attended Lilli Pilli Road in Tarraganda 7.

256. There were two dwellings at the end of that road. Ms Purnell was stung in the face by a hornet. She stated that while she went to get a drink of water, she noticed Mr Van Bracht walking away from the truck with a drip torch. Ms Purnell indicated that it was about 2pm at this time, though she did not check the time. Ms Purnell's evidence was that Mr Van Bracht was accompanied by Baden Edwards and Ryan Deen. Ms Purnell stated that she asked Mr Van Bracht what he was going to do and

if he had permission to conduct a burn. She asserts that he did not answer her question.

257. Ms Purnell stated that she then telephoned Warren Purnell (with whom she was in a relationship). She said she asked Mr Purnell if he knew what Mr Van Bracht was doing. On Ms Purnell's account, Mr Van Bracht had not radioed his intention to conduct a backburning operation to Fire Control.

258. Mr Purnell recalled being asked by Ms Purnell whether any back burns had been authorised. Mr Purnell gave evidence that he told Ms Purnell that he wasn't aware of any authorised backburns and relayed what Ms Purnell had told him to Group Captain Lucas.

259. After her conversation with Mr Purnell, Ms Purnell walked over to where Mr Van Bracht, Mr Edwards and Mr Dean were located. She observed Mr Van Bracht lighting the undergrowth with a drip torch. He was doing so on a downward facing slope. She stated that Mr Van Bracht told her that he was protecting property, however, the only property that she could see in the vicinity of the burns was an "old lean too with a boat and a couple of abandoned cars". Ms Purnell identified the area of this backburning as to the eastern side of Lilli Pilli Road, to the South East of the easement.

260. Ms Purnell's evidence was that subsequent to this, the main fire met up with the back burn. She asserted that this increased the size of the main fire.

261. Mr Van Bracht accepted that he conducted a burn as part of his attempt to arrest the fire's progress, but denied that it occurred in the way suggested by Ms Purnell.

262. It was submitted by Counsel Assisting that, for the reasons that follow, the Court could not conclude that the backburn occurred in the way suggested by Ms Purnell.

263. The backburn marked by Ms Purnell was in a significantly different location to that identified by Mr Van Bracht. The area marked by Mr Van Bracht as the location of the boat and vehicles is more consistent with the remainder of the accounts regarding the backburn.

264. A few months after the fire, Mr and Mrs Purnell attended the initial fire ground. They travelled to Lilli Pilli Road and viewed the remains of the lean-to and the vehicles near where the back burn had been lit. In a supplementary statement provided on 5 August 2020, Mr Purnell marked the area Ms Purnell showed to him during the "debrief" a few months subsequent to the fire. The area marked on that map differs

very significantly from the area identified by Ms Purnell. Indeed, the area marked by Mr Purnell accords much more closely with the area identified by Mr Van Bracht.

265. Ms Purnell was not interviewed at the time of the fire. Her evidence on the matter was not recorded until her statement of 31 July 2020, after she contacted the NSW Police to raise the matters contained in her statement.

266. Perhaps because of this, it became apparent in her evidence, that Ms Purnell was mistaken in some very key respects:

    a) Ms Purnell accepted that she made an error when she marked the location of a green water tank on the map; she had marked that as very close to where the backburn was said to have been conducted, though later accepted that the water tank was on the western side of Lilli Pilli Road, in part of the road that was travelling in a southerly direction towards the houses.

    b) She went on to accept that the backburn had been conducted in the vicinity of the green water tank, and that if she had positioned the water tank in the wrong location on the map, she had also positioned the back burn in the wrong location. Ms Purnell was taken to Mr Christopher Reeve's statement, showing the location of that water tank. She accepted that the position marked by Mr Reeve was accurate.

267. In view of those matters, Ms Purnell accepted that the backburn was undertaken in the area near where Lilli Pilli road turns to the east and that it was burning downhill. This location is more consistent with the evidence that the Tarraganda crew travelled to the vicinity of the houses on Lilli Pilli Road prior to the backburning.

268. The area originally marked by Ms Purnell as the location of the burn was more than 1km away from the houses; if the truck was indeed parked near the houses, it would have made little sense for Mr Van Bracht to walk that distance before conducting a burn (and, indeed, Ms Purnell would not have been able to see him).

269. Other members of the Tarraganda crew gave evidence that their earliest interventions involved the use of a rake hoe. Mr Van Bracht said that the first rake hoe line they put in was closer to Reedy Swamp Rd. The area he identified as the location of the rake hoe line corresponded roughly to the line marked by Ms Purnell as the location of the first back burn (which, as noted above, she subsequently resiled from). After that line was put in, Mr Van Bracht states that a second line was also put in. Again, this line was close to the area originally identified by Ms Purnell

as the area where the first backburn took place. It is possible that this distinction is the cause of Ms Purnell's confusion as to the location of the first back burn.

270. Even if the Court accepted Ms Purnell's account in relation to the location and timing of Mr Van Bracht's backburning activities, it could not conclude that the backburn meaningfully contributed to the size or intensity of the fire; on Ms Purnell's account, the fire was already spotting across Lilli Pilli Road at the time of the backburn, and having regard to the conditions on the day, and the fact that the fire was already burning at an extremely high level of intensity, there is no reason to consider that, in overrunning the backburn, it materially increased in size or intensity.

271. Consistent with this, Mr Reeve's statement notes that in the areas where there were controlled burns, the height of scorch marks was about knee to hip height, whereas the areas of the main fire showed scorching into the trees. According to Mr Reeve, the main fire front had already passed by the time the backburn met the main fire.

272. While the backburns conducted by Mr Van Bracht were closer to property than suggested by Ms Purnell and likely did not materially impact on the size or intensity of the fire, it remains true that Mr Van Bracht did not seek approval in relation to the backburning activities from any superior officer in the RFS. It is, however, not clear that this was a deviation from appropriate procedure.

273. Mr Van Bracht told the Court that he considered he was the crew leader in the area and there was no one else there to report to.

274. The evidence before the Inquiry suggests that there is a distinction between a strategic backburn implemented on a large scale and a tactical backburn, conducted on a small scale close to the main fire.

275. Group Officer Lucas did not recall receiving any information regarding backburning or Mr Van Bracht's intention to conduct backburning. Group Officer Lucas was not aware of any backburning being conducted on the day of the fire.

276. In the wake of the fire, Mr Van Bracht had a conversation with Mr Lucas who expressed a view that the backburns around the area of Lilli Pilli Road should not have been conducted without permission. In response, Mr Van Bracht indicated that they were tactical backburns performed in an attempt to save property in the area.

277. In evidence, Group Officer Lucas noted that a tactical backburn would not always require permission. He described such backburns as small burns done directly in the path of the fire to protect assets or life. Mr Lucas observed that he would regard a burn done as part of the attempt to hold the fire as it approached Lilli Pilli Rd to be a

tactical burn. He stated that normally a fire officer would convey what they were doing to the FCC but it is not necessary to seek approval.

278. Mr Conway was asked about the "tactical" backburning conducted by Mr Van Bracht. He made the general observation that:

> "Any tactical approach by fire ground managers to introduce additional fire into the landscape in conditions that were experienced on 18 March 2018, would be one taken with a great deal of care and some reflection before it was done. The use of fire to reduce fuel and assets in the path of a fire, again, is entirely dependent on the context if we're talking about grass fuels around a domestic dwelling and we may be talking about a small area, maybe a quarter of an acre or something like that, and there are resources available to do that work, then it may be a very appropriate tactical response. If we're looking to undertake fuel reduction work in heavier fuels, say woodlands or heavy forests, around an assets in the path of an oncoming fire, that's far more problematic because the capacity to control the burn that you're starting becomes more difficult, the challenge for the resources or undertaking that burn is also more challenging, so it's very contextual and any decision taken by a fire ground commander to do that would have to reflect those sorts of considerations."

279. Having noted the need for care to be employed in conducting such burns, Mr Conway noted that tactical decisions, such as whether to conduct these types of burns "are very much a decision for the fire ground managers, the people who are looking at the fire". By "fire ground managers", Mr Conway was referring to the Group Officers or Captains on the fireground.

280. Mr Conway indicated that he would expect the crew leaders (i.e. people in positions such as Captain Van Bracht) to keep the fire ground manager informed of tactical burning activities. However, Mr Conway also noted that if Tarraganda 7 was the only crew present at the time of the fire, then Mr Van Bracht would have been in command of that part of the fire ground and it would have been appropriate for him to make a determination as to whether or not to conduct the burn without approval from a Group Officer.

281. In summary, Counsel Assisting submits that if the "tactical" burn conducted by Mr Van Bracht had occurred at the location suggested by Ms Purnell, there would have been real questions as to the appropriateness of his actions. However, for the

reasons expressed above – not least of which is the fact that she accepted that her account was inaccurate, I do not accept the version provided by Ms Purnell in her statement of 31 July 2020.

282. I accept Mr Newton's submissions that Mr Van Bracht's decision to light a backburn was a "tactical one", which was within his authority as the most senior officer at that location on the fireground; and that the location of the tactical backburn was to the north of Lilly Pillly Road.

283. Mr Newton submits that I would find that at the time it was conducted was well after the firehead of the fire had passed, however, I do not agree with that appraisal as Mr Reeve said that "the fire had already passed by the time that the back burn met the actual fire". He had gone on to say that "unless there was a change in wind direction... it didn't have a negative effect" at which time Mr Newton cut him off and led from him "it did not in effect add to the fire front… because as you said a moment ago the fire had already passed through" to which the witness agreed. The back burn was lit before, not well after, the firehead had passed, otherwise Mr Reeve would not have used the term "back burn met the actual fire" and sought to go on about change of wind.

284. However, I agree with Counsel Assisting's; remark that while it would have been preferable, if possible, for Mr Van Bracht to communicate with his Group Leader in relation to the fact of the burn, it is accepted the tactical burning he engaged in was appropriate.

285. Accordingly, there is no basis to conclude that the tactical burn carried out by Mr Van Bracht had any impact on the size or intensity of the fire as it travelled towards Tathra.

Fire spread prediction

286. Mr David Philp, a retired engineer and long-time RFS volunteer, conducted a fire prediction in the early stages of the fire and produced a rapid assessment fire spread prediction map.

287. Mr Philp was accredited as a fire behaviour analyst. He had been placed on standby as part of a proposed IMT for the Bega area and arrived at the FCC at about 8.30am on the morning of 18 March 2018.

288. Mr Philp became aware of the fire at 12.28pm, upon the FCC's receipt of a 000-call relating to it.

289. He began to prepare a fire spread prediction at 12.40pm using information from the first trucks arriving regarding the location of the fire, weather forecasts, and information from the RFS geographical information system regarding the fuel types that existed in the area, together with topographic information regarding the contours of the relevant terrain. He did not have linescan imagery available at that time.

290. Additionally, Mr Philp did not have access to the actual weather information. Accordingly, his prediction proceeded on the basis of average wind speeds of approximately 30 to 35km/h, when in fact the average wind speeds at about 1pm were approximately 44km/h (and gusts were significantly higher).

291. Mr Philp proceeded to prepare a fire behaviour prediction using the RFS Manual Fire Behaviour Calculator, a spreadsheet developed by Professor Tolhurst of Melbourne University, which provides a method for calculating rates of fire spread and intensity using the Macarthur Mark 5 prediction model.

292. The fire spread prediction prepared by Mr Philp was designed to predict the course of the fire until 5pm. At 1.26 pm, Mr Philp completed a rapid-fire spread prediction map, which showed the fire progressing about 2km to an approximate area of Vimmy Ridge Road by 3 pm, progressing a further 1km by 4 pm and reaching "*Andersons Saddle*" to the west of the Bega River and approximately 3km north-west of Tathra by 1700 hours.

293. The version of that prediction map provided to the Inquiry did not include any predicted "spot fires". According to the prediction map provided to the Inquiry the fire was not predicted to cross the Bega River. However, Mr Philp gave evidence that the version of the map that he in fact provided to Superintendent Cullen, the Incident Controller at the FCC, did show that the fire had the potential to spot to a location (across the river) towards the (very) northern end of Thompson Drive at about 3pm. Consistent with that, Superintendent Cullen recalled that the fire prediction he received included a marking to suggest possible spotting in the northern area of Thompson Drive.

294. Although a copy of a marked fire prediction report was provided to the Inquiry, in view of Superintendent Cullen's and Mr Philp's evidence, it would appear that Mr Philp's initial prediction did, in fact, contemplate the possibility of a spot fire over the Bega River.

295. The projected spot fire was further north than the area in which the fire ultimately impacted upon Tathra, which is likely explained by the fact that the wind was

blowing from the north west towards the south east whereas the forecast had predicted a westerly wind.

296. Mr Newton fairly points out in his submissions that Mr Philp's prediction "was not an indication of a prediction that the spot fire would result in another fire run and he was not predicting that there would be property damage in the area. Rather, given "*calculations of a spot fire are highly uncertain*" and the prediction was for winds to begin back to the west, his expectation at the time was that the winds would push the fire to the north of Tathra. .

297. Mr Philp's conversation with Superintendent Cullen in relation to the fire spread prediction was remarkably brief. When asked to detail the contents of that conversation, Mr Philp observed:

> "Basically, I had probably less than 15 seconds to actually brief Superintendent Cullen at the time. Things were very hectic in the - in the incident control room at - in that particular period. He was actually coming out of the incident controller's office at the time. I handed him the map and said, "Oops, I've forgotten that I need to indicate to you that there's a potential for a spot fire at that - across the other side of the river". I really didn't have time to confirm that he understood clearly what I had said, because I know that there was a growing feeling in the - in the Incident Management Team that the fire was unlikely to cross the Bega River, and I think that's reflected in the situation report that you just recently took me to."

298. Mr Philp's evidence was that he did not have any further conversations with either Superintendent Cullen or senior officers in the FCC as to his concerns that the fire might cross the river and impact on properties in the Tathra area.He did however give copies of his map to the IMT Operations Officer lain Stroud and he also briefed Mr Webster which must have been some time after 5 pm, though he could not recall the contents of the discussions.

299. Mr Conway was asked about the level of importance he would expect an Incident Controller to ascribe to an early prediction of the fire's possible behaviour. He stated: "At that stage in the firefight you would certainly give it reflection and consideration. It would be one of a number of pieces of intelligence that the Incident Controller would be using to help understand the context of decision making and what was going on or likely to go on the fireground."

300. Counsel Assisting submit that the evidence suggests that senior RFS personnel in the IMT did not fully appreciate the extent of the risk that the fire would spot across the river, and the implications of such spotting. Mr Philp indicated that he considered that it was more likely than not that the fire would spot across the river. When asked whether he communicated his view that it was more likely than not that the fire would spot across the river to Superintendent Cullen, Mr Philp said:

> "I did but I doubt – it would appear that I wasn't successful in doing that."

301. After he had prepared the fire spread prediction, but before the fire had begun to impact Tathra, Mr Philp was re-tasked. Mr Newton's submissions draw attention to the evidence Mr Philps' gave in relation to his task at that time:

> "[W]hen I handed over that prediction there had been a series of fires that were now starting to kick off in the Bega area, there was a fire that had begun in View Close off Kerrisons Lane in South Bega. There was a fire that had, was a re-ignition of a hazard reduction or prescribed burn that had been carried out in Love grass about three or four days before. That reignited at Toothdale and Wolumla, there was another fire that had kicked off at a power pole in Frogs Hollow with the, again a potential to spread into the Black Range and on towards the coast. And a vast amount of my attention was directed towards that and during that process there were another two fires kicked off at Coopers Gully. Again, which I needed to have a look at to see what the potential risks were associated with those fires".

302. At 2.10 pm Mr Philps read an ICON intel message that a number of people were trapped in their properties and at 2.30 Mr Philp was re-tasked to identify property owners in the Reedy Swamp area and assist the public liaison officer in making contact with those residents to ensure that they understood the risks that they were facing.

303. The properties contacted as part of that process were located in and around Reedy Swamp some considerable way west of the Bega River. Though Counsel Assisting remark that the time Mr Philp was asked to undertake that work, many of the relevant properties had almost certainly been passed by the main fire front.

304. Mr Philp was not tasked to produce an updated fire prediction. No further predictions were prepared until Dr Stuart Matthews, a fire behaviour analyst at the RFS State Operations Centre, completed a prediction at 4.45pm. Dr Matthews was not tasked

to begin this analysis until sometime after 3.15pm (that is, after the fire had begun to impact on the Thompsons Drive area).

305. In the result, the initial fire spread prediction at 1.26pm very greatly underestimated the spread of the fire. The fire was predicted to travel only approximately 2km by 3pm, and approximately 3km by 4pm – in both cases, a long way short of the Bega River. However, by 3pm, the fire had crossed the river, and by 4pm, a significant number of properties in Tathra proper were already on fire.

306. Dr Simon Heemstra, who was the manager of the RFS's Planning and Predictive Services section, gave evidence that when a particular fire involves a "mass spotting event" (i.e. where a large amount of embers are produced and thrown in front of the fire, igniting the landscape ahead of the original fire front), the McArthur Mark 5 model has a tendency to underpredict the spread of fire. Nevertheless, Dr Heemstra was of the view that it was not inappropriate for Mr Philp to employ the McArthur Mark 5 model, and noted that the "Vesta model" (an alternative fire prediction tool) also has significant limitations.

307. Dr Heemstra also referred in evidence to recent research by meteorologists in relation to the interplay between fine scale weather phenomenon that contributed to the mass spotting event. He drew the Court's attention to a weather phenomenon called "mountain waves". As to the impact of that phenomenon, he observed

> "…what a mountain wave can do is with the prevailing winds coming over the dividing range, it sets up a - the mass of air comes over the range and then drops down and so it accesses the - a lot more of the weather aloft and particularly where you're looking at dry air, a loft and also very windy, that, those mountains waves can help draw that dry, windy air down and that's particularly where we're observing that strong gustiness, that would explain a lot of that strong gustiness that we saw with this fire."

308. High gustiness is said to be a feature of increased turbulence and, in turn, increases the prospect of embers being entrained into higher layers in the air and transported further than they otherwise would be. Weather events such as "mountain waves" are beyond the scope of the currently available prediction models and may go some way to explaining the extent of the underprediction of the fire's likely behaviour in this case.

309. Mr Conway was asked about the fire prediction process. He suggested that any Incident Controller ought reflect on what the worst possible scenario might be in the

context of the relevant event, and include responses to such a scenario in their planning. It would, according to Mr Conway, have been appropriate for Superintendent Cullen to "reflect very conservatively on the circumstances they were faced with and the intelligence they were gathering and assume the worst".

310. Counsel Assisting submit "It appears that did not occur to the extent that it should have. Instead, planning at the IMT was coloured by a perception that the fire would not cross the Bega River. That "overly optimistic" perception persisted far longer than it should have".

311. Whilst not taking issue with Counsel Assisting's submission that senior RFS personnel in the IMT did not fully appreciate the extent of the risk that the fire would spot across the river, and the implications of such spotting, Mr Newton submits that Mr Conway at no stage suggested that the mass spotting event that unfolded was predictable or predicted such that it should have provoked an earlier reaction. Mr Newton submits that the period of time that Mr Conway describes that the IMT was "overly optimistic" was limited to an hour of the afternoon, namely about 2 pm to 3 pm.

312. Mr Newton submits Mr Lucas did not report his concerns until 3.04 pm. That submission is correct. I think it is fair to say that from the time the fire was reported at about 12.30 pm, given its location and the information about the prevailing wind prediction the IMT likely had some reason to be optimistic that the fire would not cross the river but by about 1.30 given Mr Philps' prediction map the IMT should not have thought that the river would act like a natural containment line.

313. It is unclear what if any, information about the fire's behaviour in terms of the amount and movements of embers attack and wind and topography effect was conveyed to the IMT from the fireground. Though Mr Lucas did not mention the river or any towns in his 2 pm radio call, that call should have been sufficient to extinguish any optimism about the fire's behaviour and control.

314. However, it was not until the helicopter report at 2.57 pm, when the IMT was informed the fire had crossed the river, that the IMT began to give the threat arising from the fire crossing the river any attention. There is no record of any communication between Mr Lucas and FCC after his 2.05 pm radio call and the next call at 4.45 pm. However, it is clear that there were many other radio communications beyond those contained in the log.

315. According to Mr Conway, the limited duration of the conversation between Superintendent Cullen and Mr Philp at 1.30 pm (in relation to his prediction that the

fire would spot across the river) was a potential cause of concern, though the extent of that concern might have been reduced if, for example, Mr Philp was discussing his prediction with someone undertaking the planning function in the IMT.

316. In that respect, Mr Philp said he was engaged with other tasks relating to other fires and that though he gave a copy of his prediction map to Mr Stroud and later spoke with Marty Webster he was unsure as to the content of those discussions. It would seem that Mr Philp did not confidently assert his prediction with senior personnel in the IMT.

317. As to what might have been done had the possibility of the fire spotting over the river and into Tathra been regarded as a more serious threat, Mr Conway indicated that it would have been appropriate for the Incident Controller to consider applying resources to deal with the possibility of spot fires in Tathra. There was, of course, due to the other fires burning at the time, a need to factor in the distribution of resources. Mr Conway observed that as part of that process of reflection, it would have been appropriate for discussions to occur with officers at the Major Incident Control (**MIC**) desk in an attempt to secure additional resources. There is no evidence in the telephone transcripts of those call that would suggest there was such a discussion which evidences an insufficient regard to the issue.

Situational awareness and reports

318. In trying to understand the basis upon which the IMT was operating in relation to the Reedy Swamp fire, Mr Newton submits that the most reliable source of identifying the time at which information was received and the content of what that information was, is that which was being written in real time in the Operations Log and the transcripts of telephone conversations between IMT and MIC rather than the Situation Reports. While the Operations Log may not have captured all relevant communications given the volume of radio traffic and telephone calls on the day, I consider that the Operations Log provides a more reliable insight into what was known and discussed at the IMT and the MIC than the Situation Reports. Unfortunately – as will be considered further below – the Situation Reports did not accurately summarise the state of the fire or the necessary response to it for much of the afternoon.

1.27pm situation report

319. Counsel Assisting note "that the view that the fire was not likely to cross the Bega River pervaded the various situation reports prepared by RFS officers during the

course of the afternoon of 18 March 2018". I do not think such a conclusion can be positively drawn from the Situation Reports given their overall inadequacy and the paucity of detail conveyed in them; the Situation Reports were sufficiently poor, that I cannot confidently conclude that what was conveyed in them actually reflected what was known or believed at the IMT at any given time.. In any event, the first Situation Report referred to by Counselling Assisting in submissions is at 1.27 pm. Mr Newton points out that the first Situation Report in relation to the Reedy Swamp fire was issued at 12.30 pm by FRNSW because it was thought that the fire was within FRNSW boundary. There was no warning or details contained in the report.

320. The second report was issued at 12.41pm and was authorised by Superintendent Cullen and though the Deputy Incident Controller was still listed as the FRNSW person it in fact was Mr Lucas. The location of the fire was incorrectly recorded as "Tarraganda Lane, Bega" and the warning level was "A3". The narrative describes that at that time fire units (15 RFS personnel and 4 FRNSW personnel) were en route to the fire and the property was described as "unknown". The third situation report was created by personnel at IMT after a telephone call between IMT and MIC.

321. At 12.55pm Superintendent Cullen spoke with Chief Superintendent Ken Hall and John Clark at the MIC desk. During the course of that call, Superintendent Cullen indicated that in view of the weather conditions and the nature of the bush in the area, he intended to place the fire at a Watch and Act 3 warning level. Counsel Assisting say: "In response to that, Chief Superintendent Hall instructed Superintendent Cullen to place the fire at an "Advice Level".

322. Counsel Assisting further say "Consistent with this, the situation report issued at 1.27 pm, placed the fire at an Advice Level 3. That the situation report was approved by Mr Peter McKechnie, who was the Chief Superintendent within the RFS holding the position of State Operations Officer in Sydney, Superintendent Cullen agreed that it seemed "unusual" for Chief Superintendent McKechnie to have been undertaking that task". This criticism was again taken up in Counsel Assistings' submissions when they referred to Mr Conway's evidence:

> "Mr Conway made the following comments regarding the communication between Chief Superintendent Hall and Superintendent Cullen:
>
> > "I think it is of concern but it would be useful to understand the broader contexts in which Mr Hall came to that conclusion. In my experience the determination of warnings should be left with the incident controller and if Superintendent Cullen was looking for a

watch and act it would be appropriate that that level of warning should go out.""

323. Counsel Assisting say at the time he made the comment, the Chief Superintendent also observed that "You're the only gig", which Counsel Assisting suggests appeared to be a remark premised on contextual factors such as (the lack of) other fires. It may have been but that doesn't mean to say that the IMT was not busy, as for example Mr Philp's fire prediction map took at least 45 minutes to prepare.

324. Mr Newton submissions correctly explain that the third situation report was in identical in terms to the 12.41 pm Incident Report but for a notation which identified that the re-issue was due to a change in the lead agency – that is, not FRNSW but RFS. Deputy Commissioner Hefferman said in evidence that it was not unusual that such an administrative rather than substantive change would occur by someone in MIC rather than the local IMT.

325. Mr Newton also makes a submission, which I accept, that Mr Hall did not in fact instruct Mr Cullen in relation to the warning he wished to issue. Mr Newton submits that the transcript of the telephone call at 12.55 pm indicates that, in response to Mr Cullen when talking about the Reedy Swamp fire, said:

> "that he wasn't sure "what we've got ahead of us there" Mr Hall was suggesting that he should "find out what you've got first", to "get your head around it first" and again "find out what you've got first" before placing a "Watch and Act 3" warning."

326. I think that is a fair reading of the transcript which means that Mr Cullen, once he had "got his head around what he was dealing with" could provide an accurate warning level which is as Mr Newton says, is what Mr Cullen in fact did.

2pm situation report and related actions

327. A further situation report was issued at 2pm. That situation report elevated the warning level to Watch and Act 4. It included, for the first time, an indication that properties might be affected. Those properties were described as follows:

> "< 2 hours Properties along Bega River in vacinity [sic] of Reedy Swamp Road Lilly Pilly Road [sic] & Vimmy Ridge Road [sic]
>
> Potential 2 – 6 hrs Properties along Bega River in vacinity [sic] of Reedy Swamp Road Lilly Pilly Road [sic] & Vimmy Ridge Road [sic]"

328. Counsel Assisting correctly submit “No properties across the Bega River were identified as at risk. No properties at all were identified as being subject to threat in the “6 – 24 hour” or “24 hour +” windows.” The writer of the reports was not called in the Inquiry so there is no evidence as to why properties across the Bega River were not at that stage identified as being at risk in the Situation Report. It is fair to infer that “Properties along Bega River in the vicinity of Reedy Swamp Road Lilly Pilly Road” includes only those properties on the northern side of the river. Accordingly, the lack of any reference to other properties, particularly those south of the river is consistent with, at least the writer of the reports, if not the IMT, understanding that the risk posed by the fire was to the north of the river only.

329. Counsel Assisting rely on Group Officer Lucas’s evidence that when he was in the area of Vimy Ridge Road he formed the view that it was not safe for his crews to be in that area. At that time, the flames were about two to three metres in height and burning to the east, with strong westerly winds and warm temperatures. He experienced embers and spotting fires.

330. Mr Lucas was asked what the time was at that point and he said “Look, I’d only be estimating, maybe 2 o’clock”. As concerns the potential risk to neighbouring communities, Mr Lucas formed the view that “they were all under threat, the residents of Kalaru, Thompsons and Tathra”. He said he formed that view “due to the spotting nature of the fire and conference with the chopper; that he believed the fire had just spotted over the river”.

331. The Operation Log identifies that the helicopter reported over the radio at 2.57 pm that the fire had crossed the river. It was at 3.04 pm when Mr Lucas called over the radio to Fire Control “Messages needed to Mogareeka Thompsons area - On Quarry Road”.

332. The narrative in the Log records “FC getting crews to spots on other side of river fire nearly on Quarry Rd”. The writer of that entry in the Log was not called in the Inquiry but it is understood, at least by Mr Newton in his submissions, that what is written is an indication that FC were responding immediately by sending crews to the firespot reported by the helicopter.

333. It is unclear whether that is in fact correct. However, as regards Mr Lucas’s suggestion relating to “messages needed” there was a telephone call between IMT and MIC in relation to, amongst other things, elevating the Warning level.

334. Group Officer Lucas stated that he communicated his concerns to the FCC in a conversation with Ian Stroud and John Cullen. As to what he told them, Group Officer Lucas stated:

> "I think I told them to put a notice out or warn the residents of that area and just start sending resources to that direction".

335. In Mr Conway's view, situation reports of this nature should have elicited a prompt response. It would have been appropriate for that response to include the diversion of RFS resources to Tathra and Thompson Drive. What resources were available at that time is discussed below.

336. Mr Newton says that the IMT did respond promptly upon hearing a report from the helicopter at 2.57 pm. He points to a telephone call at 3.10 pm between IMT and MIC when Mr Webster informed him that "we're just sending crews to that side and to Tathra- Thompsons drive area". There is, however, no evidence as to who the personnel involved in this were. This is further discussed below.

337. Counsel Assisting pointed out the issue as to the timing of Group Officer Lucas's warnings in this respect of messages or warnings to residents:

338. "The FCC's Operational Log (**Operational Log**) does not include any clear reference to any potential threat to Tathra until a call at 3.04 pm from Reedy Swamp Control saying:

> "messages needed to Mogareeka Thompson's area". That call was preceded by the aforementioned call from a helicopter asset at 2.57pm to say that the fire had spotted over to the other side of the river."

339. Mr Newton submits, that this marks the time referred to by Mr Lucas as to when he conveyed to Mr Cullen and Mr Stroud that messages should be sent out to residents. I accept that was the case and I also accept Mr Newton's submission that Mr Lucas' call records with FCC indicate that between 2 pm and 2.50 pm he was very much engaged and occupied with the scenario on Reedy Swamp Road and the Vimy Ridge Rd and reported at 2.50 pm "heli nearby – spotting on both sides of fire [at Vimy Ridge] getting out now.

340. Counsel Assisting submit that, on considering the incoming information, "there are clear indications that it was sometime before 2 pm that those at the fire front communicated that the fire could not be contained:

a) The Fire Control Centre Operational Log includes a call from "Reedy Swamp Control" at 1.38pm headed "Emergency" that is recorded as noting "All units pull out from Reedy Swamp Rd."

b) At 1.40pm, a call is recorded as follows: "Fire over Reedy Rd – new containment lines needed further to north – Quarry Rd – Dr George Rd N" which was a location several kilometres north.

c) At 2.07pm the Reedy Swamp call sign is recorded as saying something that appears to read "Do you need at Tathra?", though it is difficult to discern the precise words or the intention behind them."

341. My interpretation of the 2.07 pm log entry is that it likely related to whether the helicopter was needed at Tathra or the firefront but in any event the entry is not one, even with the other two, from which I could draw any conclusion as to whether the fire was communicated as being out of control.

342. Counsel Assisting submits that:

> "while the Court could not conclude that Mr Lucas provided the specific warning regarding Thompson Drive, Tathra and Kalaru at or prior to 2pm, his communications made it clear that there was no prospect that the fire would be contained. …[H]aving regard to the extreme conditions on the day, the information should have led the IMT to conclude that there was a very real prospect that the fire would jump the river and, in turn, impact upon the Thompson Drive, Kalaru and Tathra areas."

343. I do not think that inference is available from that evidence. Indeed there is little evidence about what the IMT was informed over the radio communications relating to the fire behaviour other than it was travelling very fast and that Mr Lucas considered that containment lines north of it were necessary.

344. There was no communication between IMT and Mr Van Bracht who was on the fireground close to property on the northern side of the river. Mr Cullen said in his evidence that from about 1.30 pm he was aware that there was a possibility that the fire would spot across Bega River. That he was aware that it was a possibility was not because he thought it likely but rather it was because Mr Philp had told him.

345. In response to that information Mr Philp gave evidence that Mr Cullen expressed his view that the fire was not going to cross the river and Mr Philps suggested that the IMT shared Mr Cullen's view which was reflected in the situation report of 2 pm. Further it would appear that, though Mr Cullen thought it was possible but unlikely

that the fire would cross the river, he did not discuss it with MIC nor did he implement any strategy to address the possibility other than elevate the warning at 2 pm. In his evidence he suggested that a group officer and the crews from Dr George and Reedy Swamp were deployed to address the possibility of fire spot on the south side of the river.

346. Mr Conway noted that there was no information to suggest that the fire would be contained and that any conclusion reached to that effect would be of concern to him. There is no evidence that the IMT ever thought that the fire was contained.

347. Superintendent Cullen acknowledged the lack of reference to potential impacts south of the river in the 2 pm Situation Report was an "error". Counsel Assisting submit it appears reflective of Superintendent Cullen's view as expressed to Mr Philp approximately 30 minutes earlier that the fire was not going to cross the river. That may well be correct. Mr Cullen's evidence that as a result of his concerns at 1.30 pm he sent out a group officer to investigate "smoke sighting somewhere near Blackfellows Lake" and had crews come down from Dr George and Reedy Swamp is mistaken.

348. These actions did not occur until after 3 pm. The crews from Dr George and Reedy Swamp were those of Mr Lucas and Mr Green and they did not leave the fire ground until after 3 pm and as they had to go the long way around and cut up and remove three trees fallen across their paths it had taken them half an hour to arrive in Tathra. Mr Occleshaw said that he arrived at the FCC shortly after 1 pm. His attention was focussed on a number of other fires which the FCC was also dealing with. He then left the FCC "shortly after 1 pm" and travelled to the lagoon, stopping in at least three places and walking to a vantage point. He had three radios with him and his call sign was "Bega South 2". His first call is logged at 3.20 pm in which he said that there was no fire to the south of the river but it can be seen to the east. In examination by Mr Newton he said it may have taken up to 1 – ½ hours to get to the vantage point at which he made the call as stopped the car at three places and walked to a track. I note it took him just 9 minutes to go from that call location to Thompsons Road when he made his next call at 3.29 pm.

349. Despite Mr Occleshaw's agreement with Mr Newton that he may have taken up to 1 ½ hours to arrive at his vantage point I think that is extremely unlikely and I don't accept his evidence in that regard. Mr Newton submits the following in relation to the unreliability of Mr Occleshaw's evidence about times:

> "In Mr Occleshaw's oral evidence he made clear that his evidence concerning timing were estimates and it appears he estimated the events occurred approximately half an hour earlier than they actually occurred. This is unsurprising given he frankly acknowledged that the matters he was describing could have taken longer than he estimated and he may have arrived in Tathra later than he estimated".

350. Given the overall inadequacies of the situation reports generally, though they are consistent with evidence that the IMT were of the view that the fire would not cross the river, I am unable to determine such based on the Situation Report. The evidence shows that the IMT were busy with other fires and it was not until after 3 pm that the availability for extra resources for the Reedy Swamp fire was considered.

The period around 3pm

351. Another Situation Report was created at 3.03pm. The warning level remained at Watch and Act 4, and again, there was no reference to any potential impact across the Bega River. Counsel Assisting say "This was so despite the fact that by this time the FCC had received information from both a helicopter and Mr Occleshaw that the fire had crossed the river". This is partly correct - in relation to information from the helicopter - but probably not so in relation to Mr Occleshaw's information, reasons for which are set out above.

352. Counsel Assisting submit that "this situation report was not only inconsistent with what might reasonably have been expected to occur in the coming hours, it was inconsistent with what was actually happening at the time". I agree with that appraisal. Mr Newton does not cavil with that description but submits that the Incident Report is not an accurate reflection of what was known or what action was being taken by the IMT at that time. I think that is correct. Mr Cooper didn't file one draft report (the 5th) possibly, as Mr Newton posits, due to perhaps attending to matters more important than paperwork.

353. However, Mr Conway indicated that the apparent deficiencies in the Situation Reports could have real impacts:

> "I think there are very practical implications for the people who used these Situation Reports and these warnings on which to base their decision making. Any member of the public who was referring to RFS material at this stage and looking for an understanding of what the

> potential impact would be on Tathra and the surrounding areas, doesn't get information from this Situation Report that reflects the real circumstances that were confronting them, and as a consequence their capacity to make an informed decision is limited".

354. In line with such concerns about the transmission of key information within the IMT, Superintendent Cullen did not recall receiving information regarding the fact that Mr Occleshaw had observed the fire across the river. Counsel Assisting suggest that information may have been conveyed to the FCC as early as 2.45pm but that is inconsistent with the operations log. I prefer to rely on the times in Operating Log in that regard.

355. Mr Newton relies on evidence that Mr Philp learned at 2 pm that the weather update had the predicted southerly change occurring not at 10 pm but at 5 pm. Mr Newton refers to Mr Cooper (one of the situation report writers) and others at the IMT expecting that the change meant that the wind could push the fire back north into the reserve. However, this evidence does not account for what was expected or planned in the three hours before the change arrived.

356. Superintendent Cullen agreed that the situation report at 3.03pm was "hopelessly wrong". As to why, he observed:

> "There's only one explanation, is that they weren't checked carefully enough and signed off with the correct information in them."

357. Superintendent Cullen stated that at that time the warning level should have been set at "at least" Emergency Warning Level 5 (**EW5**). That there was some consideration in the IMT of the possibility of elevating the warning level as a result of the 2.57 pm information is evident in the transcript of a call at 3.06-3.09 pm from MIC to IMT between Mr Hall and Mr Webster.

358. Mr Hall asked "…you want to tell people to be ready…or are you doing something else?" and Mr Webster replied "no, so that that was the intention…there's potential" and Mr Hall responded "It's a potential".

359. Mr Hall asked him whether it is doing any more that what is has been doing for the last hour or so and Mr Webster said "No there hasn't been a sudden increase" and Mr Hall replied "No, no there's yeah alright. So you are just giving a heads up, if in case of this thing starting to taking a big run, it might go in the Blackfellows Lake Road and and potentially into Tathra" to which Mr Webster replied "Yeah that right Yep".

360. Mr Hall then told Mr Webster to watch his language "up here because you've escalated pretty well…so just calm down" and Mr Webster said that he had picked the right sort of …Mr Hall said "It's alright…when you start saying how far you are going to go…".Then Mr Hall asked how far the southerly was away and Mr Webster said an hour and they discussed the effect that the southerly would be so as to push the fire away from everyone. They spoke about the fire going downhill and into gullies.

361. Mr Hall then said "Yeah and its not, its not jumping across, like there no embers hitting the cross black, in the Blackfellows Lake?" Mr Webster replied that "there was a little bit of chatter before about embers being blown across..um we haven't had reports of anything actually starting on the the other side but a bit of material being material blown across". To which Mr Hall replied "Yep, no that's cool". Mr Hall said "alright thanks mate, can you just um yeah just keep an eye on it for us though. If you could just give us a heads up in you are going to, if you need to escalate it. Mr Webster agreed and told him that the other fires were "basically calming down now."

The elevation to Emergency Warning 5

362. The warning level was ultimately elevated to EW5 at the time of the situation report issued at 3.37pm. This occurred immediately following a telephone call at 3.31-3.35 pm between Mr Cullen, Mr Webster and Mr Hall. Mr Newton's submissions refer to the transcript of the call thus:

    a) Superintendent Cullen told Chief Superintendent Hall "*the fire is on both sides of Thompsons*" but that "*Tathra need to be included as well*"".

    b) Mr Webster said "*the advice that was given to Police is to make sure that the residents along Thompsons Drive are aware of the situation… if they're prepared to stay and defend that's that their call*".

    c) They then spoke about a map Mr Webster had uploaded to ICON showing the areas to be warned and which ended with a decision that a Red Phone conversation with State Operations was to be organised, which occurs when a fire is elevated to Emergency Warning status."

363. Superintendent Cullen asserted that the possibility of elevating the warning level to an EW5 was discussed with the MIC desk at the State Operations Centre between 1.30pm and 2pm. Mr Cullen stated that he considered that the warning level should have been lifted to EW5 at that time and that he had advocated for such a shift to the MIC.

364. Deputy Commissioner Heffernan gave evidence that he was not privy to any recommendation by Superintendent Cullen that the warning be upgraded to an EW 5 as at 2pm.

365. As noted above, transcripts of telephone conversations between Superintendent Cullen and the MIC desk suggest that there was some discussion about the appropriate warning level with Mr Cullen at 12.55pm regarding the mooted transition to a warning level rather than an advice level. The transcripts provided to the Inquiry do not include any calls between Superintendent Cullen and the MIC desk at around 2pm of the type contemplated by Superintendent Cullen's evidence.

366. Counsel Assisting submit that irrespective of whether Superintendent Cullen was actively advocating for a shift to EW5 at 2pm, having regard to the conditions applicable on the day, and Group Officer Lucas's communications regarding the inability to contain the fire, it would have been appropriate for the warning level to be elevated to that status at approximately 2pm.

367. Mr Newton says that though in hindsight that would be correct, the Operation Log at 1403 indicates that a call with IMT and Mr Lucas discussed a watch and act alert not an escalation to "emergency warning (EW5) – which I note incidentally, may be the telephone call Mr Cullen was referring to in his evidence as a telephone call about the topic and had mistakenly recalled that it was with MIC rather than Mr Lucas. In any event, Mr Newton can fairly rely on support from Mr Conway's evidence that the Major Fire Update at 2.40 pm reflected Mr Lucas' observations and on that basis it was appropriate that the IMT relied on that information.

368. The nature of the warning is as good as the information received and collated by the IMT and I am satisfied that though the information collection resources were limited, such as there was not available to the IMT linescan services, an actual weather report at the time Mr Philps prepared his prediction of fire map and the helicopter was yet to arrive.

369. Importantly the potential for a mass spotting event to occur was not apparently identified and accordingly not conveyed from the fire ground to the IMT.

370. On the basis of the information known by the IMT at the time, which primarily came from Mr Lucas on the fireground and Mr Philps prediction map, and the earlier weather report, the 2 pm warning level of "Watch and Act" was appropriate. However, it was to be another 40 minutes from the time of the helicopter report to the issuing of the Emergency Warning.

Record of available resources

371. The situation reports also do not appear to have accurately reflected the resources deployed to fight the fire. The situation reports between 12.41pm and 5.15pm, for example, all record that there were five RFS appliances and 15 field personnel deployed to the fire. This would, if accurate, be highly alarming given the extent of the impact the fire had by the later time.

372. The evidence suggests, however, that this was more likely a product of inadequate record keeping than it was a true reflection of the resources actually deployed. As a further illustration, contrary to the clear evidence available to this Inquiry, no aircraft were recorded as deployed.

373. Mr Conway noted that in his experience, situation reports rarely keep an accurate indication of the resources deployed at the fire ground. His greater concern was the failure of the situation reports to make any reference to the possibility of impact beyond the Bega River.

374. The failure to accurately record the number of RFS resources deployed may be less consequential than the failure to record the likely progress of the fire, but such information may nevertheless be of importance, for example, in allowing an Incident Controller to rapidly assess the extent of the resources deployed. Such information may also assist in determining whether additional resources might, if sought, be able to be made available; if a very large proportion of the available appliances were recorded as deployed, then that would afford an incident controller with a rough and ready indication that the fire was being addressed as forcefully as possible.

Situational awareness among commanders generally

375. Counsel Assisting submit that while some allowance necessarily ought be made for the fast moving nature of the fire, there were “significant deficiencies in the situational awareness of key personnel in the FCC and, in turn, the MIC”.

376. Mr Conway observed that the IMT were “at least essentially half an hour behind the fire in terms of their understanding of what was going on”. He said:

> “The conclusion I've drawn from material made available to me in the brief of evidence is that the Incident Management Team weren't entirely aware. There may have been individuals within the IMT who had a solid grasp of where the fire was, but collectively, as represented in the witness statements and the other material in the brief of evidence, the

sense I get is that the Incident Management Team weren't keeping up with the fire…"

377. Counsel Assisting submit that, though the precise impact of these deficiencies is difficult to characterise, a consideration of matters referred to below would inform a conclusion that it is likely that, had the threat to Tathra been appreciated in a more timely way, additional resources may have been able to be made available for the defence of properties in the town.

378. Mr Newton suggests that a basis for Mr Conway's nomination that the IMT were half an hour behind the fire may be due to the incorrect time Counsel Assisting ascribed to information from Mr Occleshaw and Mr Lucas. It would appear, however that Mr Conway was referring to more information than that. In any event, that Mr Occleshaw reported at Thompsons Drive just 9 minutes after reporting from his vantage point by the river suggests that it is unlikely to have taken him 1 ½ hours to get to the lagoon in the first instance.

379. That the helicopter reported the fire spot at 2.57 pm yet when Mr Occleshaw was in Thompson Drive at 3.29 there were 3 m flames and no fire units is consistent with a half hour lag. Mr Newton submits that there aren't any significant deficiencies that Counsel Assisting point to.

380. Mr Conway affirmed in his answer to Mr Newton that Mr Webster's apparent response that units were being sent to Thompsons drive as soon as the helicopter information came into the IMT was an example of a planning officer understanding where the fire is and what going on and what is needed. Mr Newton identifies it was the "mass spotting event" which occurred shortly after 3 pm that as Mr Conway said in his evidence had "massive implications" and Mr Conway said "that planning the response to a fire that is escalating at speed is very challenging".

381. Mr Newton' submissions can be summarised thus: Mr Conway stated that inevitably, the focus of an IMT became very reactive. They were reliant on their fireground managers such as Mr Lucas and Mr Occleshaw and the resources immediately available because "*two to three hours…that's the sort of time frame it takes with resources*".

382. Mr Conway agreed that in those circumstances the options available to Superintendent Cullen and his IMT were very limited; they were pretty much stuck with the resources they had on the fireground to be deployed as best they were able . Mr Conway explained that, given his understanding of time and space in terms of the Far South Coast, any additional resources would be at least an hour and

potentially longer away, which meant that: the capacity to develop any detailed strategy for response was very limited; the IMT was limited to doing everything it could to support the fireground managers in terms of the resources they had and the support and the extra intelligence that could be given to them; and the IMT had to trust that they deployed the resources as effectively as possible to protect people and assets that may be in the path of the fire .

383. Mr Conway stated that such a response is very reactive and somewhat ad hoc, which he explained by saying *"[t]he nature of fire, particularly in these mass spotting events, is that your ability to predict with confidence where the fire is going to end up and when is very problematic*."

384. If the IMT was half an hour behind the fire sometimes the evidence at the Inquiry seemed to have them half an hour ahead of it. The timings at which events occurred as set out in the Operations Log that if it wasn't for the helicopter the IMT would have had no idea about the progress of the fire on the river front as they were only receiving intelligence from Mr Lucas who was on the northward face of the firefront trying to put in containment lines until that was abandoned at about 3 pm.

385. The IMT had no radio communication with Mr Van Bract's fire crew on the northern side of the river opposite Thompson's Rd and indeed they were marooned without any contact until sometime after 11 pm. However, Mr Van Bracht said that he had mobile phone communication. It is unclear as to how long that communication was sustained.

386. It would appear that mobile telephone communications do not form a part of the Operations Log so perhaps though it is the most reliable document of events before the Inquiry, it too has limitations in providing a full picture of unfolding events and knowledge at the IMT.

387. However, in reviewing those events it must be kept in mind that the time in which events escalating was extremely quick and full of activity and communications as can be seen by reading the Operations Log between the time the helicopter reported seeing the fire spot across on the south side of Bega River at 2.57 pm to 4.03 pm when in addition to other resources there were nine fire appliances being directed to attend Ocean View Road in Tathra to fight the fire.

388. Inclusion of this part of the Operations Log hopefully provides a picture against which the diametrically opposed submissions of Counsel Assisting and Mr Newton for the State Agencies is set (*call signs are used in the Log):

“14.57 helicopter*	fire has spotted across river south side direction of Kalaru
15.10 Tanja station	No 7 to go to Tathra station
15.17 helicopter	says that there needs to be an evacuation order crossed river further to river not spotting yet
15.17 Lucas *	on Dr George going to Mogareeka
15.18 helicopter	urgent evacuation Tathra heads spotted 100 m long way south of river
15.20 helicopter	south of Tathra- Thompsons - Tathra Township Rd has across bend few hundred house fires west in trees units required
15.20 Occleshaw *	no fire south of river but can be seen to east at which FC says "need you at Tathra"
15.20 helicopter	Panorama Drive is where fire is impacting
15.21 angelde 7 & ?7	proceed to Tathra ASAP
15.22 helicopter	western end of Thompson Dr western side of Tathra
1523 Occleshaw	Thompson Drive to eyeball - on way
15:23 Wynd TB	Fire on edge of road Thomspn Rd both side moved down embankment
15:26 [Tanja 7]	hasn’t hit Thompsons - SE Thompsons Rd -heading to Tathra access is closed
FC to Tanja7	Move to property protection Tathra
15:27 helicopter	Front on Discovery Drive multiple spot fires will impact on Tahtra
	Keep patrolling for spot fires along wildlife drive
	ops ok
	heading for fuel at ZMerimbula
15:27 Tanja	Flame about to cross Thompsons Dr
Tathra 1	at Tathra
FC directs	set up around Wildlife Drive – triage
15:29 Occleshaw	Thompson Rd – both sides Flames 21/2-3 meteres cant go further
15:30 Merimbula	almost at Jellat Flat
FC directs	then down Thompsons Rd
Kerrison	spot fires 30 m from house Wildlife Drive
FC	3 units on standby - Pambula Statiton, Wyndm 9B, Angeldale 9 (at Coopers Gully)
1534 Tathra1	Sanctuary Place Active Fire
FC directs	Angeldale 9 to attend from Coopers Gully
1537 Occleshaw	Thompsons both sides R
	Panorama, Wildlife, Sanctuary Drives, Haven Place Impacted in next 10 minutes No reports available about further north
1537 Merimbula	get Pam (Perimbula) 1/7 on road ASAP
	Proceed up Thompsons Drive to attack there
1539 Pambula	Crew 7 copy with 3 people
FC	Head to Tathra…hold at station
Nethercote7	Weather has just eased a bit dropped 10 degree
1540 Tathra	active fire all along Panorama Drive and Sanctuary Dr
15:41 FC	strategic options?
	Property protection in 10 min
15:42 Lucas	Can’t do anything
	1 pumper, tanker and striker to Tahra
	On flat turn right up to Tahra 1
15:40 F	Rescources 3 unit
	Mer pumper 1 tanker
15:42 Occleshaw	Killarney road fire will impact in next 5 minutes Resources needed
15:45	Fire & Rescue sending strike team with pumpers –tasking soon
15:46 Tathra station	Red Message
15;47 heli (2)	fire spotting between houses
15:50 Tathra control	Bayview, Wildlife, Panorama, Sanctuary } Amber(sic) attack

…..

15:55	Mer 1	Police needed – evacuation underway – on the flat engage in property protection in wildlife drive All units to wildlife and Sanctuary Drive - property protection
……		
1603		9 appliances on scene Ocean view Tce to be impacted Vehicles to go to house go for it"

Deployment of resources to Tathra

389. Counsel Assisting submit that the deficiency in the situational awareness in the command centre impacted on the effectiveness of the response to the fire as it reached Thompson Drive and Tathra proper. In some locations there was no sign of a fire service response until after homes had been lost.

390. Mr Newton submits that this is not a fair assessment of the IMT response when regard is had to the information that they had and the other priorities that they had been addressing up to that stage. Mr Newtwon submits that "the real reason that the IMT had to urgently move available resources to Tathra after that first spot was reported was that, following the first spot, the "*mass spotting event*" appears to have erupted shortly before 1500 hours". Given that the first spot identified was at 2.57 it is not clear that can be categorised as the beginning of the mass spotting event. That it was not at that time understood by IMT to be such is clear. It was at 3.17 pm that the helicopter advised an evacuation was required.

<u>Lay evidence</u>

391. The Inquiry has received statements from a large number of residents in Tathra detailing the extent of their property destruction. The Inquiry also benefited from oral evidence of two residents, whose experience appeared to typify that of a number of residents in Tathra.

392. Ms Nienke Van Doorn, who lived at 143 Thompson Drive, learnt of the fire at approximately 3.10pm, when she saw flames consuming her car port. She was, at the time, sitting on her couch. She immediately ran to her car but, as she started to leave, realised it was surrounded by flames, so she ran to her husband's car in the driveway. She and her husband had to drive through flames for approximately 300 metres to escape. When they reached the top of the driveway, she looked backwards and saw that her house was already on fire.

393. From there, Ms Van Doorn drove to the Tathra RFS station, arriving there at some time prior to 3.25pm. A woman named Prue came out of the station and asked if she could assist. Ms Van Doorn indicated that her house had just burnt down and told Prue that the fire had jumped Thompson Drive and was heading towards Tathra. Ms

Van Doorn recalled that in response to that, Prue swore and said "Oh my God, it's jumped the river" before running towards the fire station.

394. Ms Van Doorn had not received an emergency warning of any kind, or other communications from fire services before the fire started.

395. The Inquiry also heard oral evidence from Ms Deborah Nave, who lived at 17 Bayview Drive in Tathra. She first became aware of the fire when she saw smoke while driving towards Tathra and then when she saw the fire across the river from Thompson Drive.

396. By the time Ms Nave returned home, there was no power and she had very poor mobile phone reception. Shortly thereafter, she became aware that the fire had reached Tathra when she saw it in bushland three rows of houses away from her own premises.

397. According to Ms Nave, there were no RFS or FRNSW vehicles in the vicinity at that time, nor did she see any such vehicles after leaving her house.

398. Ms Nave had not received any warning messages at the time of her family's evacuation. Later in the afternoon, Ms Nave did receive a message on her phone from the RFS saying that she should leave.

Preparations for the fire's arrival

399. Counsel Assisting submit "that there is no evidence of a "ramping up" in relation to the available resources until after the fire had crossed the river and begun to impact upon Thompson Drive. There were no pre-positioned resources at locations where the bushland met the town of Tathra, such as Panorama Drive and Wildlife Drive. In fact, it appears that there were no RFS resources in Tathra at all at the time the fire struck Thompson Drive". Mr Conway said it can take up to two to three hours to get resources from other locations, Shoalhaven resources were two hours away.

400. Counsel Assisting refer to the telephone call from IMT to MIC when Marty (David) Webster and Chief Superintendent Ken Hall had this exchange at 3.10 pm:

> Webster: Just so you know, a guy's just came in and told me we have got fire on the south side of the river now.
>
> Hall: Yeah, right…Whereabouts?
> Webster: I haven't got an exact location, but the chopper's just called that in.
>
> Hall: The chopper has, has he?
> Webster: Yeah.

Hall: Alright. So that'd be a ... just a … have you got crews over that side mate?
Webster: We're just sending crews that side as well, and we're just starting…Stroudy just came in and said he's just starting to send some resources into Tathra – Thompsons Drive area.

Hall: Alright.
Webster: Just because we've left them a little bit vulnerable – sending everyone out to the main fire."

401. Counsel Assisting point out that the 5.15 pm situation report records the same number of RFS resources as the 12.41pm situation report. They submit that given the deficiencies in the situation reports, and without vehicle tracking information, it is not possible to ascertain when exactly resources began to flood into Tathra, but it is almost certain that the relevant situation report does not accurately portray the extent of firefighting efforts at 5.15pm. The updated situation report at 6.04pm records that there were 60 RFS field personnel deployed to fight the fire (with 20 appliances), as well as FRNSW personnel and personnel from both NPWS and the Forestry Corporation. It is likely that some of those 60 personnel may well have been in Tathra prior to 6.04pm.

402. The Situation Report of 7.13pm indicates that some 150 RFS personnel and 37 appliances were allocated to the fire.

403. As noted above, the fire appears to have impacted on the Thompson Drive area very soon after 3pm and to have begun impacting Tathra proper sometime prior to the linescan imagery at 3.42pm. Mr Newton refers to the evidence where Dr Heemstra explained the 1542 hours linescan as showing that "*almost simultaneously that whole landscape is alight*" and he agreed that 80% of the fire towards the coast "*is all glowing and alight, and so it's almost simultaneous that this part of the landscape is all burning.*"

404. The fire was burning in locations several streets beyond the interface between Tathra and the bush by at least 4.11pm. By the time of the linescan image taken at 5.42pm, the fire had reached its full extent, having burnt all the way to the coast in various parts of Tathra. Shortly prior to that linescan, at 5.28pm, a helicopter advised the FCC that approximately 50 houses had already been lost.

405. Mr Newton says that the time at which the fire commenced impacting on Thompsons Road was at 3.26 pm. Though that is consistent with the Operations Log it is not consistent with Ms Van Doorn's evidence who was very clear that after she fled her burning house she arrived at the Fire Station before 3.25 she thought it was 3.15-3.18 pm. She was unchallenged about this evidence and I accept it.

Whoever she spoke to at the station was apparently unaware that the fire had even crossed the river 20 or so minutes before.

406. Counsel Assisting fairly submit that having regard to the extreme fire behaviour, and the unpredictable nature of the ember attack associated with it, there was no prospect that the fire's progress into Tathra could have been averted. They suggest however, that an earlier deployment of resources to the town of Tathra, may well have resulted in a decrease in the number of properties ultimately lost.

407. Counsel Assisting sought to assess whether resources could feasibly have been deployed by considering the other demands facing the RFS on 18 March 2018. Mr Newton submits that the assessment is factually inaccurate. Counsel Assisting suggest that "at 2.23pm, the Kerrisons Lane fire was recorded in the Operational Log as having been in a mop up phase, with nil properties under threat. Frogs Hollow Control made a call indicating that the fire was being contained as at 1.58pm. A further call regarding Frogs Hollow at 2.35pm noted that the head of the fire was not spreading any further. "

408. The status of those fires would, in Mr Conway's view, have allowed for the consideration of redeployment of resources by the IMT. Counsel Assisting ultimately submitted that "as noted by Mr Conway, the available material does not allow for the Court to engage in a precise reconstruction of which resources were located at which fires, and how they could optimally have been deployed. Counsel Assisting submit that "such an undertaking would, in any event, involve a process of granular hindsight reasoning that ought not be undertaken by the Court in a general Inquiry such as the present".

409. Counsel Assisting provide that "allowance must also be made for considerations of time and space; RFS resources, for example, are quite properly spread out across a wide area in rural regions" but say "Nevertheless, the fact that the RFS resources in Tathra did not peak until approximately 1h 45 minutes after a time at which 50 houses had already been lost is cause for some concern". However, as Mr Newton submits, there is no basis to find that there were otherwise resources available that were not sent or which could have been made available.

410. Counsel Assisting's final point is that "on an overall level, Mr Conway observed that if he had been in the shoes of the Incident Controller, he would have recommended that additional resources be obtained and positioned in locations such as Thompson Drive and Tathra in response to the information regarding the fire crossing the river.

411. Counsel Assisting submit “to some extent that is what happened. Mr Occleshaw, for instance, travelled to Thompson Drive (the FCC Operational Log records him indicating that he was on his way to “eyeball” that area at 3.23pm)”.

412. Counsel Assisting then set out an analysis of the Operational Log records about the times at which fire appliances were apparently available but not redeployed. Mr Newton takes issue with that analysis. Counsel Assisting submit “that vehicles were being released from other jobs without being redirected to Tathra. A note at 3.15pm relating to Tathra 1 states “released from Kerrisons heading back to station”. Another note at 3.16pm (the call-sign relating to which cannot clearly be read) states “Most of trucks can stand down now”. Counsel Assisting submit that “These notes certainly do not suggest that there was any comprehensive redirection of resources to Tathra underway or even being considered at that time”. Mr Newton submits that Counsel Assisting has not appreciated what the notes indicate and he also reminds the court that Superintendent Cullen gave evidence that “*when we got the call that the fire had crossed the river, we were working with the Kerrisons Lane, the Frogs Hollow incident controllers, group officers at that level, looking at what resources they could possibly give us safely to head straight to Tathra, and other resources that were coming back online from the Coopers Gully fire, from Bemboka, the fires there from Wyndham Lane were directed straight to Tathra*”.

413. Telephone communications are not contained in the Operation Log. Mr Newton fairly submits “Contrary to CA's submissions there is clear evidence of crews active in and around Tathra shortly before and at the time the fire struck, those crews having been released from other fires:

    a. At 1508 hours, “*Wyd 9B*” was heading to “*Jellet flats*” (which is near where the fire had been thought to have spotted) “*to investigate*” .
    b. At 1507 hours, the Tanja brigade was told to “*Take 7 to Tathra station*”
    c. At 1515 hours, Tathra 1 had been “*released from Kerrisons heading back to station*”
    d. At 1526 hours, “*Wynd 7B*” reported “*Fire on edge of road Thompson[s] Rd*”, but that it “*hasn't hit thompsons*” . Tanja 7 was instructed to “*Move to property protection Tathra*”.
    e. At 1527 hours, Tanja brigade reported “*Flames about to cross Thompson Dr*” and Tathra 1 reported it was “*at Tathra*” and it would “*set up around Wildlife Dr – triage*.”

f. At 1530 hours, Merimbula 1 was "*almost at Jellat flat*" and was directed "*down Thompson's road*" and Wyndham 9B reported spot fires 30 metres from Wildlife Drive.

g. At 1537 hours, Group Officer Occleshaw reported from "*Panorama, Wildlife and Sanctuary Drive"*, which he expected to be "*[i]mpacted in next 10 minutes*".

414. Mr Newton fairly submits that "though Counsel Assisting suggest in their submissions that resources may have been moved from the Kerrisons Lane fire and the Frogs Hollow fire earlier because they were "*being contained*" or "*not spreading any further*" , the evidence does not suggest that more resources could have been safely released without risking those fires getting away, particularly having regard to the weather conditions that afternoon and the other call on resources. That is particularly the case given that other fires continued to start, such as the Coopers Gully fire, which led to a request by the IMT to Kerrisons Control at 1433 hours, "*can you release units*", leading to Merimbula 1 and Angledale 7 being released at 1438 hours.

415. Further, upon the fire spotting over the river, the Operations Log provides further evidence that the principal source of crews able to be sent to Tathra was from the existing fires as and when it was safe for them to be released from those other fires, including:

a. At 1516 hours, Angledale 9 (at the Coopers Gully fire) stated that most trucks could be released, which immediately led to a request by the IMT for Merimbula 1 and a couple of others to be released

b. At 1517 hours, Mr Lucas and the crews under his command were "*Now going to Dr George along Quarry Rd – staging area to protect Mogareeka*"

c. By 1518 hours, Merimbula 1 had been released from the Coopers Gully fire and by 1530 hours was almost at Tathra

d. At 15.21 hours, Angledale 7 and Buckajo 7 were released from the Coopers Gully fire and told to "*Proceed to Tathra ASAP Proceed to Tathra (cross NH Bega Bridge)"*

e. At 1602 hours, Kerrisons Control reported "*Tathra 9 released for Tathra*", however other crews were required to remain

f. At 1615 hours, Candelo 7 was released from Frogs Hollow and at 1636 hours it was told to "*engage anywhere there's fire*"

416. Mr Newton reasonably submits that "As is clear from Superintendent Cullen's evidence and the Operations Log, as soon as the IMT became aware that the fire had crossed the river, all available resource were diverted to Tathra".

417. Counsel Assisting referred to evidence given by Mr Occleshaw about his opinion regarding the impact that an earlier notification might have had:

> "You know, if we'd had half an hour more warning the fire was going to be in Tathra, it would have been a different outcome. If we'd had five minutes' more warning it would have been a different outcome."

418. Counsel Assisting remark that Mr Occelshaw's observations "underscore the significance of the lag which existed between the fire's actual progression, and the awareness of the fire that existed in the FCC."

419. I doubt very much that five minutes would have made any difference at all and what the different outcome would have looked with an extra half hour is impossible to assess and Mr Occleshaw did not attempt to do so.

420. Mr Newton set out the FRNSW, Forestry Corporation and NPWS resources which were part of a broader FRNSW regional response additional to those of the RFS which should, for the sake of completeness be included in these findings:

a) Bega Pumper 219, which was part of the initial response to the Reedy Swamp fire before redeploying to Tathra, where they together with other crews fought fires during the afternoon and into the night

b) At 1411 hours, Narooma Tanker 398 (approximately an hour to the north of Bega) responded to a "*bush fire Near Hospital at Tarranganda Lane Bega*" with Narooma Pumper 398, before being were redirected to Tathra, where they conducted property protection until returning to Narooma Fire Station later that night

c) At 1416 hours, FRNSW pumper Merimbula 395 was en route to the Reedy Swamp fire

d) At 1546 hours, FRNSW were sending a strike team to Tathra

e) At 1612 hours, there were no additional available FRNSW resources within a 30 minute radius of Tathra, but additional resources from outside that radius, namely 217 Tanker from Batemans Bay; 236 Tanker from Braidwood; 477 Tanker from Ulladulla; and 405 tanker from Nowra were en-route

Command and control in Tathra

421. Counsel Assisting submit “that there is some evidence to suggest that the resources that were available in Tathra may not have been distributed as efficiently as they could have been.

422. Mr Occleshaw assumed control of the fire ground at Tathra in the period around 3.40pm. Upon encountering the fire along Wildlife Drive, Panorama Drive, and Ocean View Terrace, Mr Occleshaw made a request for “40 units”. In making that request, he was essentially seeking every available resource.

423. There is some evidence that the fact that Mr Occleshaw had assumed control was not effectively communicated to other units in Tathra. RFS Captain Clyde Green, for example, gave evidence that when he arrived in Tathra, he was not aware of anyone other than Mr Lucas that he should have been reporting to. He states that he became aware that Mr Occleshaw had assumed the mantle of Tathra command, but it wasn’t until 7 or 8 pm that he was told this. Mr Occleshaw and Mr Lucas were effectively jointly co-ordinating the fireground and it was entirely appropriate and without any negative consequence that Mr Green continued to report to Mr Lucas.

424. Mr Green described radio communication difficulties as follows:

> “There was - it was mayhem, people were talking over the top of other people, you had a job to hear what was going on, every now and again you'd get like a PMR radio to confile(?) or to the leaders and that, it was just all not, in event, you couldn't really hear anything from that, we were also using UHF radios and that and there was a lot of traffic(?) to go over that as well, but we were able to get some information through on them, but.”

425. Communications were further hampered by the fact that there was no mobile phone reception by the time RFS personnel entered Tathra.

426. Counsel Assisting say there did not appear to have been a formal announcement from the Fire Control Centre that Mr Occleshaw had assumed control – rather, it was assumed that personnel would deduce that from the fact that he was using the Tathra 1 call signal. Similarly, it does not appear that there was a formal direction for personnel to check in with Mr Occleshaw to seek direction as to where they should direct their efforts upon entering the Tathra fireground.

427. Counsel Assisting remark that Mr Conway was of the view that it would have been appropriate for a “general message” to be issued from Tathra Control to all units to

indicate that Tathra Control had been established and confirming the appropriate radio channel on which Tathra Control could be contacted. If available, it would have been appropriate for a similar message to have been passed on via other means, such as mobile data terminals or a digital paging network.

428. Mr Newton points out that Mr Occleshaw's evidence was that once he assumed Tathra Control, RFS standard operating procedures were that crews would defer to him without there being a need for a formal announcement. Further, throughout the afternoon he heard broadcasts from the IMT directing crews to check in with him and providing them with the fireground radio channel.

429. Mr Occleshaw's evidence is corroborated by the Operations Log (Ex 33), which clearly shows that Mr Occleshaw was regularly broadcasting using the call sign "*Tathra Command*", that he was using UHF19, and that crews were directed to use UHF19 for tasking.

430. Counsel Assisting is somewhat critical that at times guidance was limited to an instruction along the lines of "if you see fire, put it out" citing Mr Green's description of what happened in Tathra as "all mayhem….we were all trying to do the best we could".

431. Mr Newtown responds to this by referring to Mr Conway's evidence that he considered that the approach adopted by Mr Occleshaw and Mr Lucas of allowing crews to act autonomously, while being mobile on the fireground and making assessments as to areas of need, and directing crews to tasks where they considered it appropriate, was practically all that could be done given the challenges they faced that afternoon.

432. Group Officer Lucas believes that it was not possible to develop any overarching strategy:

> "There was no overlying defence of Tathra it was just crews working wherever they could to put out houses, there was no actual firefront in Tathra it just had spotting fire all over Tathra houses in different locations, different streets, catching fire, so it was pretty much try and put a truck in each street the best we could."

433. Consistent with this, Group Officer Lucas observed that it was not possible for the fire ground commanders to keep track of where exactly fires were burning within Tathra; he described the approach adopted as "just seat of the pants sending crews to where I could meet them".

434. Mr Occleshaw sought to paint a slightly more positive picture of the extent to which fire ground command had an understanding of the distribution of fires and resources within the town; he noted that from about 4pm, after joining up with Mr Lucas, who had a scribe with him, Mr Occleshaw was able to develop a more complete picture of the response.

435. Notwithstanding the progressive development of a clearer operating picture by the fire ground commanders, there were instances where units were not directing their energies in the most efficient or effective way. Mr Occleshaw stated:

> "Yes, not all units, all services from time to time were sometimes working on, for instance, putting out a fence when in the next street they could be putting out a house, and that's the beauty of having somebody mobile and triaging because of necessity that unit doesn't have a bigger picture."

436. On a related note, Mr Occleshaw's statement indicated that there were a number of instances where FRNSW officers did not report to him or make any attempts to synchronise their efforts with those of the RFS. In evidence, Mr Occleshaw gave an example of the implications of such failures in coordination in the context of the defence of Tathra's school:

> "…because that actually talks just to the gist of what my concern is and that is that I directed three heavy units, so that's a category 1 or category 2 tanker, I directed three units to protect the school, and they were there for some 20, perhaps 25 minutes before I returned to that location. This is very early on in the fire, it would have been immediately after 3 o'clock, and when I got back to the school, the RFS units were on one side of the school and the Fire and Rescue units were on the other side of the school and that meant that I had tied up three units that could have been defending houses had they alerted me that their units were there and covering that asset."

437. This event took place at an early stage in the fire response, at a time when the involved resources comprised a significant proportion of the total resources available. Mr Newton says that though that incident occurred the evidence indicated that the double of resources at the one location may not have been for a period of a minute or so. In any event, it was quickly resolved by Mr Occleshaw which was indicative of appropriate co-ordination.

438. The fact that various units do not appear to have entered the formal chain of command and sought guidance from Tathra Control was not unusual in Mr Conway's experience, but was nevertheless of concern:

> "the circumstance where we have a number of units operating independently of the incident management structure is of significant concern. Where there's the potential for tactical response by individual crews or groups of crews that is inconsistent with what the fire ground manager is intending to pursue, can create extra vulnerabilities for the crews who aren't linked in to fire ground management structure, for those crews who are and may be impacted by tactical actions of other crews, and also the general effectiveness of the response to the incident can potentially be compromised."
>
> …
>
> Any crew on the fire ground is constrained by what they can see in front of them and what they understand immediately around them. They don't get the broader understanding of what's happening on the fire ground more generally and as a consequence they become vulnerable to development of the fire, they can become vulnerable to tactical decisions made by other crews in the absence of an understanding of what's being pursued, and those people that all these crews are endeavouring to protect are left compromised to a degree because the response of the agencies is less effective than it would otherwise be.

439. Counsel Assisting summarise that "given the unpredictable nature of the mass-spotting event which struck Tathra, resulting in a haphazard distribution of fire throughout the town, it would have been nigh on impossible to ensure an optimal distribution of resources throughout the town; to some extent, an ad hoc approach to the fire fight was inevitable. That said, improvements in coordination and communication may have resulted in a more efficient approach to the fire and made at least some impact on the level of property damage that resulted". Mr Newton says that this comment invites speculation.

440. In my view there is insufficient evidence to find that any property would have been saved if something in particular should have been done which wasn't done or something that shouldn't have been done was done. A mass spotting event is inherently likely to create mayhem and to have disastrous results, which makes it impossible to respond in any way other than a reactive fashion.

Monitoring of vehicle locations

441. The main fire overran Lilli Pilli Road, such that Tarraganda 7 was prevented from returning to Reedy Swamp Road. They remained in that area until about 11pm.

442. After Incident Controller David Lucas first left the location of the Tarraganda 7 Crew, Mr Van Bracht did not hear from more senior personnel for the rest of the day. Mr Van Bracht stated:

> "It was - awkward and uncomfortable being in there on our own thinking that we had been forgotten about, but I understood the fact that he was more importantly needed at Tathra."

443. The Operational Log suggests that Tarraganda 7 appears to have been "lost" to the Fire Control Centre until late in the evening. Mr Van Bracht states that the Tarraganda 7 crew made attempts to contact fire control, however, those attempts were not successful. Mr Van Bracht expressed concerns that: "…it's almost like we were forgotten in there; and with the fire the way it was, it wasn't exactly a comfortable position to be in."

444. Group Officer Lucas said that he attempted to contact Tarraganda 7 by radio from Tathra, but stated that there was no response. He also said that he attempted to contact Tarraganda 7 before leaving the Reedy Swamp area. He was unable to recall whether or not he was able to get through to them at that stage.

445. In the months prior to the commencement of the hearing the RFS completed a program of installing Automatic Vehicle Locator devices across its fire appliances. The presence of such a device may not have solved the issue of an inability to communicate with Tarraganda 7, but it may have allowed the FCC to at least ascertain the location of the vehicle and, for example, attempt to send someone to check on their wellbeing if possible.

446. Mr Newton adds that:

> " the RFS has completed a program of installing Automatic Vehicle Location (***AVL***) devices across its appliances, to the extent possible having regard to the current status of the NSW Government Radio Network (***GRN***) In addition to the GRN, the RFS is also trialling other options for AVL connectivity. This includes a pre-pilot of 20 connectivity devices and a pilot of mobile data terminals (***MDTs***) in fire fighting appliances within three areas across NSW by June 2021, with a subsequent roll out plan for MDTs to the rest of the fleet. Members will

be able to jump in a vehicle and use a mounted MDT device to display the job they are attending, and they will have access to road and routing information. Information from the member availability and response system will show members allocated to attend, and job information in the system will automatically populate for completion of brigade incident reporting. This trial will test alternate technology on 3G/4G and satellite networks to deliver AVL and other operational information direct to the fire appliances and field commanders where the GRN is not available. The NSW Far South Coast (including Tathra) is one of the selected trial areas."

Air support

Aerial fire-fighting and intelligence

447. Group Officer Lucas's evidence was that at approximately 1.30pm he asked whether there was any air support available. He was told that there was an helicopter inbound. He stated that it arrived about 20 minutes after the call. The helicopter began "water bucketing" the fire and provided advice as to the direction it was taking.

448. Mr Occleshaw gave evidence that he was in contact with aviation resources and requested such support when he first arrived in Tathra, and was satisfied with the speed at which those resources arrived.

449. Mr Conway reviewed the available information regarding aviation resources. He concluded that the first water bombing aircraft were dispatched within a reasonable timeframe.

450. Mr Occleshaw described aerial information as "very high-quality information" that is "cherished" by fire officers. He stated that he received "very good intelligence" from aircraft during the response.

Linescans

451. The first linescan image wasn't available until 3.42pm. It would likely have been of great assistance to have such imagery available earlier, given the fire was progressing faster than appears to have been expected by those in the IMT.

452. However, the linescanning aircraft covers a large area from the Hunter Valley down to the South Coast and out to the central ranges of NSW. There were a number of

fires that day covering a large area. As it became apparent that the Tathra fire was escalating the linescanning aircraft was tasked to attend the fire.

453. Having regard to the fact that there is only one such aircraft available in the relevant region, and the distance it had to travel, I agree with Counsel Assisting's submission that the line-scanning aircraft facility was deployed appropriately.

Warnings to community and evacuation

Communication with community prior to 18 March 2018

454. As noted above, 18 March 2018 was a Total Fire Ban day.

455. The RFS had published advice to all communities in NSW at the commencement of the 2017 / 2018 fire season to indicate that there would be a high level of bushfire risk across the state.

456. The RFS Twitter account published entries on 13, 16, 17 and 18 March 2018 relating to the high fire danger. Tweets sent on 17 and 18 March 2018 referred to the Total Fire Ban for 18 March 2018.

457. Superintendent Cullen also gave radio interviews in the days prior to the fire to alert communities to the high fire danger likely to ensue on 18 March 2018.

458. I accept Counsel Assisting's submission that efforts in the lead up to 18 March 2018 to warn the community of the fire danger likely to arise on that day were appropriate. Mr Newtown says in addition to those warnings, the RFS provided information through a variety of sources including traditional media such as the ABC, its website and Fires Near Me application, Major Fire Updates and emergency services personnel on the ground.

Timing of warnings on 18 March 2018

459. On the day, there was The Major Fire Update for the Reedy Swamp fire issued at 2.20 pm, and as noted above, the Operational Log recorded Reedy Swamp command indicating at 3.04pm that messages were needed to the Thompson Drive area.At 3.17pm, the Operational Log recorded, a communication from the helicopter, "Thompson Drive – evacuation order".

460. At 3.20-3.26 pm there was a call between IMT and MIC in which Mr Cooper advised Mr Hall "…We just got a spot fire that's about to impact right on Tathra now. So there's major fire spotting…We've got no idea where it started and we've got an idea now we've got spot fires that have gone south of the river and now we've got

another bigger fire which near Tathra Headland…I think it's a spot according to the helicopter…it could be impacting on quire (sic) a number of homes very soon".

461. Mr Hall discussed a map and asked "need to probably go to emergency alert" and Mr Cooper and Mr Cullen agreed that they needed to and when they discussed what it was that the emergency warning should say Mr Cullen and Mr Hall agreed that "If not prepared leave now". They discussed that people would be told to go south and they discussed certain areas and maps. At 3.31 – 3.34 another telephone conversation where IMT was told to make the red phone call. At 3.36 pm a call was made from IMT to Sate Operations to upgrade to EW5 and at 3.38 the red phone call was made."

462. There was no reason why a "redphone call" to elevate the warning level and initiate a warning message was not made after the 3.20-3.26 pm conversation. That said, there is no evidence as to whether that 10 minutes would have made any difference.

463. Counsel Assisting identify that "first warning messages, were sent at 3.48pm". At that time, a voice message to landline telephones relayed the following:

> "New South Wales Rural Fire Service emergency bush fire warning. Bush Fire burning towards Thompson Drive Tathra area, you are in danger. Act immediately. Seek shelter now to protect you from the heat of the fire. Stay up to date. Check the RFS website at www.rfs.nsw.gov.au or contact the bush fire information line on 1800 679 737.

464. An SMS message sent at the same time stated:

> "NSW RFS EMERGENCY BUSH FIRE WARNING – Thompson Drive Tathra – Immediate danger. Seek shelter now. www.rfs.nsw.gov.au or 1800679737.

465. At about the same time, a Major Fire Update was posted on the RFS website warning people who were "in the area of Thompson Drive at Tathra" to seek shelter if fire impacted on their property.

466. Counsel Assisting note that by the time of these warnings were sent, "the fire had long passed Thompson Drive and was already impacting Tathra proper". The linescan imagery taken at 3.42pm makes this plain. As do the observations recorded in the Operational Log at 3.40pm.

467. At 3.58pm, a further emergency warning was issued.

468. At the same time, A further Major Fire Update was published, again on the RFS website, stating:

> "If you are in **Tathra** seek shelter if the fire impacts. It is too late to leave. Protect yourself from the heat of the fire."

469. Further emergency warnings were issued at 5.34pm and 5.46pm.

470. Counsel Assisting say that "many people in Tathra only became aware of the fire when they saw smoke or, in more extreme cases, the fire itself bearing down upon them". Counsel Assisting submit that "in those circumstances, it cannot sensibly be determined that the emergency warning system functioned as intended". Though there is no evidence as to the numbers of people who had not "become aware of the fire" and at what point, I accept the picture Counsel Assisting seeks to present in terms of people in Tathra being taken by surprise. That included the people in the IMT, who were perhaps not surprised that the fire had crossed the river but certainly had not anticipated the speed and ferocity of its advancement (if the term "advancement" is an appropriate term for a mass spotting event as opposed to an advancing fire front).

471. Counsel Assisting suggest this explanation: "the first reason for that is apparent from the above consideration of fire services' situational awareness; at the outset, personnel in the FCC were overly optimistic that the fire would not cross the Bega River. As the afternoon progressed, and the fact of the crossing of the river became apparent, fire services remained at least 30 minutes behind the fire". I do not think the evidence supports a finding that it was a lack of situational awareness behind the timing of the emergency warning. The telephone records between IMT – MIC indicate that at 3.06 the embers had crossed and again that was discussed in an IMT-MIC telephone call at 3.10 pm. Mr Newtown notes that in the telephone call between IMT and MIC at 1520-1527 Mr Cullen said that the police had been asked to door knock and make people aware of what's going on around them and at 3.28 pm a message was posted on the Tathra Brigade's Facebook page:

> 'URGENT NOTICE - Spot fires are occurring at Mogareeka and Thompsons Drive at Tathra. At Thompsons fire has crossed the road and is heading towards Tathra. Spot fires are developing behind Wildlife Drive. Trucks will preparing [sic] to engage property protection in Tathra.'

472. The second reason for a late warning "is a technical one; on account of mobile phone reception issues (arising at least in part from the destruction of a mobile phone tower by the fire) and power-outages many people simply never received the

messages". The main reason for the late warning, which I note is consistent with Mr Newton's submission, was because the mass spotting event took the IMT by surprise – its speed and scale and its unpredictability. It is evident that the fire spots being discussed in the phone calls between MIC and IMT were about the "everyday" ember that might not lead to a firetrail or establish into a fire. The embers hitting Tathra on this day were something else altogether.

Evacuations

473. Primary responsibility for the conduct of evacuations falls to NSW Police. There was never a determination that Tathra proper should be evacuated in its entirety. According to Mr Conway, "blanket evacuations in the heat of battle" have the potential to be "problematic". Mr Conway did not consider that there was sufficient time for a general evacuation of Tathra to have been safely undertaken; doing so would have put more people at risk.

474. In those circumstances, it was submitted by Counsel Assisting that no criticism should attach to the fact that a blanket evacuation of Tathra was not undertaken.

475. Similarly, the fact that there were no deaths or even serious injuries in a fire of this scale and intensity is remarkable and suggests that the necessary evacuations occurred effectively.

476. That is not to say that there could not have been improvements in the process. There is some evidence, for example, of near misses. Ms Muriel Appleby, for example, was an 83- year-old woman who was only evacuated after being told to leave her home by two neighbours; her house on Bay View Drive, Tathra was destroyed. Ms Appleby passed away prior to the Inquiry and did not give evidence.

477. Furthermore, the evidence suggests that there could have been some improvements in the instructions provided to RFS officers regarding the process of evacuation for residents who sought guidance from them.

478. RFS Captain Clyde Green, for example, gave evidence that he was not provided any guidance as to what directions or instructions he should be providing to evacuating residents. Rather, he was simply providing instructions to residents who requested information on the basis of what he had observed himself.

479. Similarly, Group Officer Lucas stated that he did not receive instructions from the FCC as to how to approach evacuations. He described that as a "police matter". Group Officer Lucas was not aware of any evacuation plan as to either evacuation route or destination.

480. Mr Occleshaw was not provided information by the FCC regarding the establishment of a particular evacuation point. Nor was he informed as to whether a particular evacuation route had been assessed as safer than other routes. Mr Conway observed that while it not uncommon for a fire ground manager not to be given information in relation to what should happen in relation to the evacuation of individuals, it was "of concern" and is one area that the IMT should be reflecting on and providing guidance on. Mr Conway clarified that that there is absolute merit in trusting group officers and crew leaders to make judgements concerning evacuations, "*because they are the ones who can see the context and make judgment about safely of moving people or not as the case may be*", also, "*you've got to trust the people who are looking at what's going on in front of them to make a judgment*".

Timing of the s. 44 declaration

481. Pursuant to s. 44 of the *Rural Fires Act 1997*, the Commissioner of the RFS is to take charge of bush fire-fighting operations and fire prevention measures. The Commissioner is to take such measures as he or she considers necessary to control or suppress any bush fire if, in the opinion of the Commissioner:

a) the fire has, or is likely to, assume such proportions as to be incapable of control or suppression by the local fire-fighting authority or authorities; or

b) the prevailing conditions are conducive to the outbreak of a bush fire likely to assume such proportions, or

c) a bush fire is not being effectively controlled by the local fire-fighting authority; or

d) a bush fire is burning in a place that is not the responsibility of any fire-fighting authority.

482. Under s. 44(2), the Commissioner may delegate his or her functions to a member of the RFS, a person employed in FRNSW, a person employed in the Department of Industry, Skills and Regional Development, the Office of Environment or Heritage or any other person.

483. A declaration was made under s. 44 of the *Rural Fires Act 1997* at 5.20pm. The declaration delegated the Commissioner's functions to Mark Williams, a Superintendent of the RFS, and appointed him Incident Controller. Superintendent

Cullen of the RFS, Alan Henderson of NPWS, and Superintendent Gary Tye of FRNSW were all appointed Deputy Incident Controllers.

484. Counsel Assisting submit that a s. 44 declaration should have been made as soon as practicable after it became apparent that the fire crossed the Bega River and certainly no later than 4pm. By 4pm, a variety of reliable information (including linescan imagery and reports from Mr Occleshaw) as to the nature and extent of the fire's impact on Tathra had been available for approximately 20 minutes. However the timing of the s. 44 was not an issue in the inquest and in any event had no impact on the provision of resources to fighting the fire. On the other, Deputy Commissioner Heffernan observed that most of the local resources were already out on tasks and allocated, so in his view an earlier s. 44 declaration would not have made any difference.

485. Mr Newton's summary is set out to provide sufficient understanding:

> The effect of a s. 44 declaration is to establish a statutory coordinated command and control arrangement under the RFS Commissioner's direction. It is directed to facilitating coordinated command and control and does not, in of itself, give rise to access to additional resources. While practically a s 44 declaration is often accompanied by further resources from other agencies and other rural fire districts, including in the early stages of a fire if resources are not already deployed, the two are independent and extra resources (including from out of area and other agencies) can be, and often are obtained and deployed, without a s 44 declaration. In this case, the available resources were already deployed and further resources were being obtained before the s 44 declaration was made. Accordingly, the only effect of the s 44 declaration was in respect of who controlled the resources that were already deployed. The Declaration Letter describes the support which will be provided by MIC and SOC following the declaration.

<u>Adequacy of response to the Keelty Report</u>

486. Mr Conway expressed some concerns about the sharing of information between RFS and FRNSW officers during the course of the fire fight in Tathra, as well as concerns about the coordination of the two agency's resources.

487. The communication and coordination issues between the RFS and FRNSW were the subject of consideration by Mick Keelty, AO APM, in the Independent Review of

the Bega Valley Fires he conducted in 2018 for the Office of Emergency Management within the Department of Justice.

488. In light of that review, the Inquiry did not include a comprehensive review of the communication and coordination between the two fire-fighting bodies. Instead, it considered the measures implemented by the RFS and FRNSW in response to Mr Keelty's recommendations.

489. In that respect, the Inquiry received a detailed joint statement from Assistant Commissioners of the RFS and FRNSW addressing the agencies' responses to the recommendations.

490. The Joint Statement observed that in the wake of the fire, the RFS and FRNSW took a number of immediate steps to address issues regarding dispatch of resources to respond to fires and coordination and communication between units on the fireground. Those measures included the creation of a Joint Operations Taskforce and the issue of a joint statement regarding the need to ensure that the fastest and most appropriate resources are responded to calls.

491. Subsequent to the recommendations made by the Keelty Report, the two services have undertaken a number of further steps.

492. Those steps have included:

a) a joint mobilisation trial to examine the use of RFS and FRNSW resources based on the shortest mobilisation time for initial response to incidents;

b) the use of Automatic Vehicle Location Platforms;

c) the issue of an instruction, pending the roll-out of AVL platforms that no offers of assistance by one agency to the other is to be rejected if what was being offered is appropriate;

d) a number of measures directed at developing a fully integrated civilian-operated call and dispatch centre and, in the meantime, the positioning of a NSWRFS officer at the FRNSW ComCEN during business hours and at other times of elevated fire danger;

e) the issue of a revised plan to make provision for public information and warning messages to be issued through the ABC Manager Emergency Broadcast and Community Development ABC Radio; and

f) the establishment of a place for the ABC at the State Operations Centre during bush fire incidents.

493. The Inquiry also received evidence from particular officers in relation to improvements that had occurred in the wake of the fire. Mr Occleshaw, for example, gave evidence of the improvements in the interaction between FRNSW and the RFS as follows:

> "The Tathra bushfire was pivotal, a lot of good things came out of it for us. When we do our AAR, after action review, this ability to work well with Fire and Rescue and the other agencies was highlighted and a lot of good work has happened locally to get people to walk in each other's shoes, train together, and learn each other's systems, and so there have been substantial gains. However, on fires around Batemans Bay and on the far south coast I continually encounter the problem with a lack of radio comms between the two services."

494. As concerns the automatic vehicle locator system referred to above, Deputy Commissioner Heffernan informed the Inquiry that in the months prior to the commencement of the hearing the RFS completed a program of installing the devices across its fire appliances.

495. That system will allow for an up to date location of appliances that will in turn enable incident mangers to observe in real time the location of RFS resources. This system is said to be accessible from any mobile device (including, notably, mobile telephones).

496. There is also a pilot program of mobile data terminals that will assist commanders in the field to identify vehicle locations and other data.

497. On the whole, it is submitted by Counsel Assisting that appropriate steps have been, or are being, undertaken to address the recommendations made in the Keelty Report. I deal with Mr Newton's submissions in relation to the State Agencies' Response to the Keelty Report below relating to Counsel Assisting's proposed recommendations. I accept that the State Agencies response have been appropriate.

Fuel load management

498. I now turn to the issue of fuel load management. Both Counsel assiting and Mr Newton referred to the framework but I have determined to include only Mr Newton's comprehensive outline.

General overview

499. The *Rural Fires Act 1997* provides the statutory framework for among other matters, the *coordination* of hazard reduction. This is conducted through two levels of multi-party committees, namely:

a) the Bush Fire Co-ordinating Committee (***BFCC***), which is a statutory corporation constituted under s 46 of the *Rural Fires Act,* comprised of representatives of RFS, FRNSW, NPWS, Department of Planning Industry and Environment, NSW Police, Forestry Corporation, Local Government NSW, Minister for the Environment, Nature Conservation Council of NSW, NSW Farmers Association and the Rural Fire Service Association; and

b) Local Bush Fire Management Committees (***BFMCs***), which, by s 50 of the *Rural Fires Act,* the BFCC is required to form for each area of the State subject to the risk of bushfire. In March 2018, there were 57 BFMCs across the State, which included the Bega Valley BFMC. The Bega Valley BFMC comprised of locals from various agencies, including RFS, FRNSW, NPWS, NSW Police, Forestry Corporation, Bega Council and NSW Farmers Association.

c) Pursuant to s 52 of the *Rural Fires Act*, part of the responsibilities of the Bega Valley BFMC was to prepare a draft bush fire risk management plan (***BFRMP***) for approval by the BFCC, which is a central *planning* platform for hazard reduction planning and treatment.

Part 4 of the *Rural Fires Act* imposes the responsibility for *implementing* hazard reduction work on public and private land managers. In particular, s 63 of the *Rural Fires Act* provides that public land managers, owners and occupiers have a duty to take practical steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of bush fires on or from, their land. This includes by managing fuel loads on their land through hazard reduction activities.

Practically, while the legal obligation to carry out hazard reduction works rests with the land owner or manager, the RFS, through its participation on the Bega Valley BFMC, plays a role (together with land owners and managers) in the coordination, risk assessment, prioritisation and planning of hazard reduction activities. It also assists land managers and owners in undertaking hazard reduction works.

Bush Fire Management Zones

500. The Bega Valley Bush Fire Risk Management Plan (BVBFRMP) in place at the time of the fire was approved by the NSW Bush Fire Coordinating Committee on 9 June 2010. It made provision for certain Bush Fire Management Zones, being Asset Protection Zones (**APZs**) and Strategic Fire Advantage Zones (**SFAZs**). Mr Lloyd highlights on behalf of the BVSC that the BVBFRMP does not impose any s. 63 obligations upon the Council for which it held just 3.5% of the subject area in the Bega Valley.

501. Counsel Assisting set out that "an APZ is said to be designed to protect human life and property and to enable the safe use of direct attack suppression strategies." SFAZs, on the other hand, are designed to "provide strategic areas of fire protection advantage which will reduce the speed and intensity of bush fires and reduce the potential for spot fire development".

502. As concerns SFAZs, the BFRMP provides for risk treatment as follows:

> "Mosaic patten of treatment Assess Overall Fuel Hazard (OFH) once vegetation communities reach minimum fire thresholds within this plan. Management practices should aim to achieve mosaic fuel reduction patterns so that the majority of the SFAZ has an OFH of less than high".

503. The primary means of managing SFAZs is via prescribed hazard reduction burning.

504. Such burns present a number of challenges. The process of conducting a hazard reduction burn requires resources to be available, which may include Rural Fire Service personnel and aircraft support. It is also necessary for the conditions to be favourable. A burn cannot be conducted if it is too hot and dry or too windy. Similarly, a burn cannot be conducted if it is too wet.

505. Accordingly, hazard reduction burns are usually only able to be conducted from Autumn through to winter or early spring, that is, approximately April through to September. Later in spring, burns may not be safe as the conditions tend to be windier and drier, such that the fires will not extinguish as readily.

506. Once the plan for a hazard reduction burn is developed, it will be approved with a hazard reduction certificate before being submitted into the RFS Bushfire Risk Information Management system.

507. Two SFAZs were considered during the inquiry:

    a) the SFAZ within the Tanja Flora Reserves; and

b) the West Tathra SFAZ.

508. Paul De Mar specialises in bush fires and vegetation management and gave evidence in the Inquiry about a number of matters, fuel load management was one of them.

Fire intervals

509. The BVBFRMP contains within it minimum fire thresholds. A minimum fire threshold is the period in which there should be no fire in the relevant parts of a SZAZ. Relevantly the fire thresholds are:

a) For rainforest, there should never be any fire introduced.
b) For wet sclerophyll forest (shrubby sub formation) the minimum period for no fire was 25 years.
c) For wet sclerophyll forest (grassy sub formation) the minimum period for no fire was 10 years.
d) For dry sclerophyll forest (shrub/grass sub formation) the minimum period for no fire was 7 years, but occasional intervals greater than 25 years may be desirable.
e) For dry sclerophyll forest (shrubby sub formation) the minimum period for no fire was 5 years, but occasional intervals of greater than 25 years may be desirable.

510. Counsel Assisting say that there was some inconsistency in the evidence as concerns the period of time different forest types would take to attain an overall fuel hazard of “high” or greater following a burn.

511. Mr Newton submits that Counsel Assisting has given insufficient attention to the relevant minimum thresholds and that their submissions relating to this issue fail to grapple with the real implication of those fire intervals in the management of SFAZs.

512. Counsel Assisting say that “Mr de Mar indicated that following a burn, it would typically take eight to ten years before the fuels return to high levels. According to Mr de Mar, this period of time is largely independent of whether the climate has been wet or dry in the relevant period. That is because in dry years, there will be a greater shedding of leaves, which adds to the fuel and offsets the fact that in wet years additional growth of grass and low shrubs in the understory is to be expected”.

513. Additionally, Counsel Assisting say “Mr de Mar was of the view that the longer fire intervals applicable to wet sclerophyll forests were attributable to ecological

considerations, rather than a reflection of the period of time the relevant forest type would actually take to attain an overall fuel hazard level of high or greater. "

514. Counsel Assisting continues, "in that respect, Mr de Mar noted that while wet sclerophyll forests contain greater moisture and therefore burn more slowly, this is offset by the higher equilibrium level of fuels in such forests. Accordingly, it would, in Mr de Mar's view, be erroneous to assume that a portion of wet sclerophyll forest would automatically have a lower fuel load than dry sclerophyll forest that had not been burnt in the same time".

515. Mr Newton's submissions in relation to Mr de Mar's evidence are these: As Mr de Mar acknowledged, it is only once a vegetation community in a SFAZ reaches that minimum fire threshold, that one comes to consider the overall fuel hazard (***OFH***) in a particular area. Also, in conducting hazard reduction burning, the Bush Fire Environmental Assessment Code requires land managers to take into account threatened species among other things, which may lead to the minimum fire threshold being greater than otherwise applicable to a particular type of forest. This aspect is particularly relevant to the SFAZ in the Tanja Nature Reserve given the presence of koalas in that reserve". While in Mr de Mar's view that creates a conflict for land managers, the Bush Fire Environmental Assessment Code required that the conflict be resolved in favour of the bush fire management intervals, not the OFH. Irrespective of what Mr de Mar considers to be appropriate, land managers were bound to comply with those intervals when burning within SFAZs.

516. Mr de Mar conceded that his recommended approach to hazard reduction in a SFAZ would mean a land manager would be in breach of the fire thresholds. His approach would require a modification of the approach then in place, to favour suppression objectives over ecological objectives One consequence of that would be that the structure of the forest would change over time, favouring different types of forest species and animals.

517. Mr de Mar acknowledged that the presence of threatened species makes planning and undertaking a hazard reduction burn more difficult, because it can be difficult to prevent the fire going into areas where threatened species reside. Mr de Mar conceded that his view of how hazard reduction should be implemented in NSW was not universally held by people with an interest in the area. He was aware that one of the issues before the NSW Independent Bushfire Inquiry (***NSW Inquiry***) then being held was hazard reduction and he expected the competing views on hazard reduction to be aired at that inquiry. Further, land management and hazard

reduction were topics addressed recently by the Royal Commission into National Natural Disaster Arrangements (***Royal Commission***) at chapter 17 of its report dated 28 October 2020.

518. Mr Newton submits that the consequence of Mr de Mar's evidence is that his criticisms of the level of hazard reduction that took place within the SFAZs considered by the Inquiry was not by reference to what was lawfully achievable having regard to the constraints posed by fire thresholds, but what he considered appropriate ignoring those thresholds.

519. Consequently, according to Mr Newton, Mr de Mar's criticism of the level of hazard reduction undertaken in the SFAZs (and Counsel Assisting's embrace of that criticism) proceeds on an incorrect premise, namely that the BFRMP requires mosaic burning within an SFAZ so as to achieve an OFH of less than high throughout the whole SFAZ. Mr Newton says that such an approach ignores the precondition of minimum fire thresholds and also that the OFH goal only applies to the majority of the SFAZ.

520. Mr Newton goes on to say:

> "The interaction of the minimum fire thresholds, OFH assessment and mosaic burning in SFAZs is addressed in Deputy Commissioner Heffernan's third statement at [26]. As the Deputy Commissioner makes clear:
>
> a) The mosaic pattern treatment does not involve burning all sections of the SFAZ, rather only parts are burnt, which still provides significant protection but lessens the impact on flora and fauna species.
> b) The reference to achieving mosaic fuel reduction patterns so that the majority of an SFAZ has an OFH of less than high is an objective which represents the ideal situation, however generally it is not practical (or indeed possible) to manage the vast majority of SFAZs across the State to that standard That is because of the various constraints identified by Deputy Commissioner Heffernan in his third statement including weather conditions, smoke impacts and resourcing constraints.
> c) As the BFRMP recognises, an OFH of less than high is not an absolute objective, but rather one to be considered in the context of the minimum fire thresholds for vegetation communities covered by the plan.

521. Mr Newton submits that "the effect of starting with Mr De Mar's incorrect premise means that Counsel Assisting's conclusions related to this matter are misconceived,

given they take the OFH objective as an absolute one and ignore the context of the minimum fire thresholds.

522. In particular, given the West Tathra SFAZ included areas of rainforest and wet sclerophyll forest in addition to dry sclerophyll forest ,and Dr Heemstra's vegetation mapping showed the area from the heel of the fire through to the Bega River (which included part of the Tanja SFAZ) was a majority of wet sclerophyll forest intermixed with dry the evidence before the Inquiry does not allow a conclusion that further hazard reductions could have been done in those areas having regard to the 25 year minimum fire threshold for wet sclerophyll forest.

523. Alan Henderson gave evidence on behalf of NPWS as to the fuel load management in relevant Tanja Reserve SFAZ. Counsel Assisting submit that Mr Henderson's evidence as to the time the relevant forest types would take to regenerate to an overall fuel hazard of high aligned with the minimum fire intervals. According to Counsel Assisting, it appears, however, that Mr Henderson's view was driven by an assumption that the fire intervals were created by reference to regeneration times. In those circumstances, they submit it seems likely that Mr de Mar's characterisation of the minimum fire intervals as being driven largely by ecological considerations rather than the likely fuel levels is more likely to be accurate; otherwise, it is somewhat difficult to understand the 15 year gap between the two different types of wet sclerophyll forest. Mr Baroni submits that there is no conflict between Mr de Mars evidence and that of Mr Henderson in this regard. Mr Baroni submits that Mr Henderson's understanding was driven by the fuel accumulation together with ecological issues, such as altering the composition of species in the area. Mr Baroni points to section 5.5 of the Bush Fire Environmental Assessment Code which relates to the protection of biodiversity and imposes burn limits. Mr Baroni points out that the Code states that for areas with little or no burn history, the burn history is to be determined by a site inspection. Mr Baroni submits such a site inspection is required to consider fuel loads. Considered in that regard, the evidence is reconciled.

Tanja Flora Reserves SFAZ

524. In 2016, the Bermagui Flora Reserve, the Mumbulla Flora Reserve, the Murrah Flora Reserve and the Tanja Flora Reserve were amalgamated as the Murrah Flora Reserves and managed by NPWS in accordance with the *Forestry Act 2012*. The purpose of this agreement was to preserve the koala population of the four forests.

525. From that point on, NPWS took over the management of the flora reserve from the Forestry Corporation. As at the time of the handover it does not appear that any burn plans had been prepared by Forestry Corporation.

526. These arrangements were of relevance to the Inquiry because the fire's path took it, in part, through the Tanja Flora Reserve. The power line easement was approximately 1km from the nearest part of the flora reserve and the fire burnt approximately 250 hectares of the flora reserve. The last hazard reduction burn in the Tanja forest was conducted in 2010. The last burn conducted in the SFAZ within the Tanja forest was in the 2008/2009 financial year.

527. Mr Henderson, the Eurobodalla Area Manager for the NPWS, gave evidence before the inquiry. Mr Henderson indicated that in the eastern half of the Flora Reserve the majority of the vegetation would be dry sclerophyll forest. He said that ordinarily, dry sclerophyll forest would take approximately 7 to 10 years to accumulate to an overall fuel hazard of high.

528. In relation to those areas of the forest that were treated in 2010, Mr Henderson conceded that by the time of the fire they would likely have been approaching an overall fuel hazard of high. As concerns those areas that were last treated in 2008, they would, in Mr Henderson's view, "definitely" have been approaching the high mark.

529. On the basis of taking the "de Mar" approach Counsel Assisting identifies that those areas that had not been treated at all would likely have had anoverall fuel hazard greater than "high".

530. In Annexure D of Mr Henderson's second statement there is a Map entitled Murrah Flora Reserve. The map was developed in 2017 and sets out proposed three year prescribed burning targets, which identify the hazard reduction burning activities that were proposed for the three years between 2017/18 and 2019/20. That map indicates that there was a hazard reduction burn proposed for the Tanja Flora reserve in 2018/2019.

531. A hazard reduction burn plan would ordinarily be prepared and submitted to the RFS BRIMS database. Burn plans, once approved, can be put into place at any point in a 12 month period. Mr Henderson observed that burn plans are "definitely" developed and approved prior to the start of April in the relevant year.

532. Mr Henderson said in his evidence that at the time of the Reedy Swamp fire a NPWS 2018 burn plan for the Tanja Flora Reserve had not been completed. He

was not aware why it I had not been completed. Had the plan been developed for approval to carry out the planned burn for the 2018/2019 season (which ideally would run from 1 April to 31 August in 2018), he would have expected that the plan would be submitted by February, March at the latest of 2018. Mr Henderson suggested that it may have been that the burn was not going to be conducted until Autumn 2019. If that was the case then the NPWS application for a certificate to conduct the burn would not have been needed until February 2019.

533. Mr Henderson said that there were no burn plans created after the fire because the Reedy Swamp fire had taken place. If it was anticipated that according to the 2017 three year plan that a burn plan was to be on foot for the 12 months 2018/2019 then there was a failure to submit a plan in 2018.

534. Mr Baroni submits that it is open for the court to conclude that but for the fire, the three year burn plan relevant to the Tanja Flora Reserve would have occurred either later 2018 or in mid-2019. Though there is no evidence that there was any such plan contemplated for later in 2018, I do accept, that had the Reedy Swamp fire not occurred that it is likely that such a plan would have been submitted to carry out a burn in the period 1 April-31 August 2019. If that was the case, however, the fuel load would have been such as to be above the targeted fuel load for a dry sclerophyll forest given that the last burn was in 2010. Even in 2018 the fuel load would likely have been around high.

535. A key consideration in the conduct of burns within the Tanja Flora Reserve was the koala population. The evidence before the inquiry indicates that hazard reduction burns can be structured in a way that minimises the risk to such populations. Indeed, hazard reduction burns might have a protective effect in that they reduce the intensity of future bushfires. Accordingly, the presence of the Koala population would not be a basis for not conducting burns in the relevant SFAZ.

536. Additionally, there is no evidence of objections from the Yuin people that might have precluded a burn from being conducted.

537. Mr de Mar concluded that the works conducted within the SFAZ within the Tanja forest would not have been sufficient to maintain the majority of the SFAZ with an overall fuel hazard of less than high. In the untreated areas, the fuel load would likely have been, according to Mr de Mar, very high or greater. In the areas that had been treated in the 2008 / 2009 period, they would likely have “just re-entered the bottom end of the high range”.

538. It is submitted by Counsel Assisting that on the basis that the overall fuel hazard in the majority of the relevant area was not kept at a level below high, the Court could not be satisfied that the SFAZ in the Tanja Flora Reserve was managed in line with the BFMP. However, I accept Mr Newton's submissions that Mr De Mars evidence proceeds on a basis otherwise than that which could permissibly have been applied having regard to the stipulated fire intervals. That is, Mr De Mars adopted an "absolute objective approach without taking into account the context of minimum fire thresholds". Accordingly, I make no findings in relation to whether the management of the SFAZ in the Tanja Flora Reserve was consistent with the BFMP. Mr Baroni, on behalf of the NPNSW has not directed his submissions to in this regard.

West Tathra Strategic Fire Advantage Zone

539. The West Bega SFAZ comprised approximately 250 hectares. It was again subject to a requirement, pursuant to the BFRMP, that the majority of the area be kept below an overall fuel hazard loading of high.

540. Approximately 30 hectares of the West Tathra SFAZ is managed by the Bega Council. The Inquiry received evidence from Mr Derek Van Bracht, the environment and sustainability coordinator for the Bega Council.

541. Mr Lloyd in his submissions highlights that the Council was responsible for only a relatively small proportion of the West Tathra SFAZ and there was poor delineation of those parts of the SFAZ managed by Council and those parts managed or owned by other people or entities, in relation to hazard reduction burning which had occurred prior to the Reedy Swamp Fire.

542. The area of council-controlled lands burned on 6 March 2014 amounted to approximately 6.41 hectares. A further 1.16 hectares was burned on 21 June 2017.

543. As concerns those portions of the West Tathra SFAZ subject to Bega Council management, approximately 7.5 of the 30 hectares was subject to a hazard reduction burn in the period between 2010 and 2018. Mr Van Bracht gave evidence the majority of the forested area in the areas subject to burns in the West Tathra SFAZ in 2009, 2014 and 2017, were dry sclerophyll.

544. As for the West Tathra SFAZ more generally (i.e. including those parts not managed by Bega Council), some larger hazard reduction burns were conducted on 18 June 2009. When those burns are combined with the Bega Council burns, and a further smaller burn on 19 May 2014 adjacent to one of the council burns in the vicinity of Wildlife Drive, the total area of the West Tathra SFAZ subject to hazard reduction

burns between 18 June 2009 and the time of the Bushfire amounted to approximately 70 hectares.

545. Mr Van Bracht observed that the 2009 hazard reduction burn had a significant impact on the structure of the forest in that area, resulting in a more open forest. He stated that the fuel loading in that area would best be characterised as variable. In part, he based this statement on his own observations of the area. He characterised those observations as "casual" in nature, as distinct from a formal assessment of fuel loads in the area.

546. The areas that were last burnt in 2009 would, in Mr de Mar's view, on the basis already articulated above, have reached the low end of the high range. On that basis those areas that had not been burnt, would have been at high or greater. I note that Mr Van Bracht's description of the level of the vegetation as "variable". I did not take Mr Van Bracht as suggesting that the area did not have "low end of the high range" loading on the basis that was put to him by Counsel Assisting. I accept that Mr Van Bracht was casually but sufficiently familiar with the area to which he was referring.

547. Counsel Assisting submit that whether Mr de Mar's view or Mr Van Bracht's view of the areas subject to hazard reduction burning in 2009 is correct, in circumstances where less than a third of the SFAZ had been burned in the approximately 9 years prior to the fire, and the remainder not subject to a recorded burn, it is highly likely applying Mr De Mars approach that the management of the SFAZ would not have met the requirement that the majority of the area have a fuel hazard level of less than high. However, given that Mr De Mars approach is the "absolute objective approach without taking into account the context of minimum fire thresholds" the subject area may well not fall foul of the OFH.

548. In any event, I accept Mr Newton's submission that given the West Tathra SFAZ included areas of rainforest and wet sclerophyll forest in addition to dry sclerophyll forest and Dr Heemstra's vegetation mapping showed the area from the heel of the fire through to the Bega River (which included part of the Tanja SFAZ) was a majority of wet sclerophyll forest intermixed with dry the evidence before the Inquiry does not allow a conclusion that further hazard reductions could have been done in those areas having regard to the 25 year minimum fire threshold for wet sclerophyll forest.

549. Mr de Mar indicated his expectation would be not only that an assessment of the fuel loads in the relevant areas be conducted, but that the relevant area would be

divided into a series of blocks, the fuel levels in those blocks assessed, and a treatment schedule arranged so as to allow for hazard reduction to be conducted in accordance with the requirements surrounding SFAZs. A mosaic approach to treatment should be adopted, in Mr de Mar's view, such that not all areas of the SFAZ are treated at the same time.

550. Counsel Assisting suggest that there were some deficiencies in relation to the way hazard reduction activities were planned and tracked by the Council, however as Mr Lloyd submits such a criticism should not be directed at the Council, having regard to the limited obligations imposed upon it pursuant to the extant statutory framework.

551. An audit was conducted by the RFS in relation to the implementation of a number of BFRMPs in 2013 and 2014. One of the plans subject to audit was the Bega Valley BFRMP.

552. The audit found that the Bega BFRMP had not prepared an endorsed and compliant annual program of works. In response to that finding the Bega Council began appending action tables to the reports the Council made to the BMC. Those action tables included a list of proposed hazard reduction works, together with a priority rating, a scheduled action date, and a space for comments to be made. I agree with Counsel Assisting's remarks that the documents before me could not said to set out an overarching strategy for the management of the fuel loads in a particular SFAZ at or below a given overall fuel hazard rating.

553. A review of the Bega Council's reports to the BFMC provides some further indications that the progress of intended hazard reduction works may not have been adequately tracked and/or prioritised. A series of those reports, dating between 2012 and 2017 were annexed to the statement of Mr Van Bracht. Those reports make it clear that there were significant delays in conducting some proposed burns. In April 2014, Berrambool Drive, Merimbula, was identified as a location requiring a hazard reduction burn as at April 2014, and Bermagui cemetery was similarly identified as a location for hazard reduction burns in October 2014. Neither of those locations were subject to a burn in the subsequent 3 years covered by the reports.

554. Counsel Assisting acknowledge that a relevant consideration in relation to the assessment of whether SFAZs have been appropriately managed is the availability of resources.

555. Mr Newton correctly points out that the appropriate approach to managing SFAZs generally it is outside the scope of this Inquiry. He points out that the *NSW Bushfire Inquiry* did consider the appropriate regimes for fuel management and was a topic

which was subject to extensive evidence, submissions and recommendations. The approach to hazard reduction is undergoing a period of change and review both in the ordinary course and in response to the recommendations made by the NSW Inquiry. Those changes include a Revised Bush Fire Environmental Assessment Code, a new Bushfire Risk Management Process, pilot programs involving the University of Melbourne and the replacement of BRIMS with the new Guardian Program.

Impact of deficiency in burns

556. Counsel Assisting submit that "there is little doubt that the relevant SFAZs were not managed as well as they should have been". I would not be making findings in that regard given the issues raised by Mr Newton. Counsel Assisting say that the question of whether the fuel management made a difference in the present case is less straightforward.

557. In general terms, Mr Conway expressed a view that fuel loads are relevant to the capacity of responding officers to manage a fire. He stated:

> "Fuel loads are a critical contribution to fire intensity which is the element which determines the effectiveness of any tactical approach to fire fighting. [The higher the] fuel load the more intense the fire is likely to be and the less likelihood of its successful tactical.. approach to any firefighting…...Obviously it's going to be more difficult to effectively contain and suppress a fire with a higher fuel load, but I would stress that we need to consider the other factors that impact fire behaviour at the same time, it may well be that you have a very high fuel load on the south facing slope and a fire backing down that slope. In that circumstance you even with a high fuel load, you still may have a lower fire intensity and again weather conditions are critically important in that circumstance. The hotter and drier the atmosphere ...(not transcribable)… with the winds, the higher the fire intensity is going to be, so, in the circumstances on 18 March 2018, with very hot weather, very dry air and strong winds, that high fuel load combined with those other factors were going to make any impact ...(not transcribable)… applied by the fire ground managers a challenge at best."

558. When asked whether, having regard to the conditions, a lower fuel load would have made a difference, Mr Conway observed:

> "Not necessarily, no. We've experienced in recent times in Australia incredibly intense fires even with very low fuel loads and research that's been released

in more recent times is generating an understanding that soil moisture and consequently fuel moisture are other key determinants in the intensity of any particular fire, so it may well be that the fuel hazard was relatively low, but, it in extreme weather conditions were the fire fuels are extremely dry, you are still going to get very intense fire behaviour which makes the tactics applied by any fire fighters again challenging and given the wind speeds and temperature on this particular day, problematic."

559. Mr de Mar said that, even if the burns had been undertaken, the fire would have been uncontrollable. However, in his view, there might have been an impact on the nature and intensity of the spotting experienced at the edge of Tathra.

> "What I would say is that if the strategic fire advantage zone, west of Tathra had it been maintained at a fuel load of less than high, the fire moving through that zone I would expect would still have been uncontrollable, it's not that the fire fighters could have gone in there and put that fire out. The conditions were simply against them. But, what that, as I tried to show through the modelling that I put in my first report, what would have occurred was that that fire would have been a lot less intense than it was. One of the objectives, well there are two key objectives in a strategic fire advantage zone. One is to minimise the extent of crown fire and the other is to reduce the incidents of spotting. So, they're two stated objectives in that bush fire risk management plan. If that, if the fuel loads in there had have been at a moderate or low level, I consider that there wouldn't have been crown fire approaching the edge of Tathra within that SFAZ, there still would have been some spotting, because there are a lot of stringybark tress in that area and the low intensity fuel reduction burning will char some of the bark on the lower trunks of the trees, but because of the more intense fire coming under those severe conditions there still would have been some spotting but it would have been less than what did occur on the day."

560. Dr Heemstra was also asked about the impact of fuel loads on the ultimate outcome of the fire. His answer, in essence, was "it depends":

> "That - it would depend on where and when that fuel modification had occurred and so if it was somewhere near the origin, it could take fires, particularly lower fuel loads during the build-up phase, it can take fires longer to initiate. Once that fire had built up ahead of steam(?) and started producing that spotting, the effect of the fuel, any fuel

> modification would be a lot less and I mean particularly in this last fire season, we had areas that had burnt and then a couple of months later fires came through and burnt the same area again and so if you get, once a fire is up and running, particularly under more extreme weather conditions there is a much lower effect. At night, yes, in the initiation stages, yes, but, yeah, it wouldn't be as noticeable and particularly because you were getting this mass spotting, you would have to have the entire landscape reduced to have an actual effect rather than and it would have to be very recent as well.

561. As submitted by Counsel Assisting and accepted by Mr Lloyd on behalf of the BVSC it is not possible to reach any conclusion as to the nature and extent of the impact, if any that further hazard reduction activities might have had. It is relevant, in this respect, to note that the SFAZs comprised a relatively small portion of the land through which the fire burnt. Furthermore, a not insignificant portion of the part of the West Tathra SFAZ most affected by fire had in fact been subject to hazard reduction activities in 2014.

Recommendations

562. A number of recommendations were put forward by Counsel Assisting in relation to the electrical infrastructure, fuel load management and emergency services response aspects of the inquiry. I will address these recommendations and the parties' responses to them in turn:

> <u>Electrical infrastructure settings</u>
>
> (i) That Essential Energy review the contemplated process of reconfiguring the fault curve applicable to reclosers under the "group D4 settings" to give consideration to prioritising reclosers in areas of greatest bush-fire risk.
>
> (ii) That Essential Energy conduct a further review of the settings applicable to sensitive earth faults on Total Fire Ban days with a view to determining whether further changes to the fault settings would be appropriate on such days, having regard to the capabilities of reclosers in the network and the implications of such measures for customer health and key public infrastructure.

Essential Energy are supportive of the recommendation but Mr Smyth is not. He is critical of the proposed recommendations on the basis that they do not include a time constraint and he on behalf of Insurers and Residents seeks that Essential Energy be required to take immediate action.

The action which he seeks is that "Essential roll out and operationalise the change to ACR settings described on internal p 14 of the March 2020 edition of CEOP8002.02, such that in the designated area the last ACR on each line section be set to an SEF time grading of 1 second with every upstream reclosed set at 0.5 seconds higher progressing back along the feeder towards the zone substation; and that this be done as a matter of urgent priority".

Mr Smyth had said that there was no reason why such could not be done by the end of 2020 which was about six weeks from the date of his submissions. Mr Smyth has underestimated the process involved, though some of the reclosers can be remotely reconfiguration, the change requires field technician attendance to check its application. The recommendation does not need to refer to EE's own standard in any event so the detail as expressed in his proposed recommendation is unnecessary. I decline to place a time constraint as "areas of greatest bush-fire risks" may of course change over time. I have received insufficient evidence to understand what EE's process of implementation is but the evidence I have received makes clear that the process requires actioning, which Essential Energy already knows as it enacted the policy. I make the recommendations as proposed by counsel assisting.

Emergency response

563. There are five recommendations advanced by Counsel Assisting. The State Agencies are responsive to each one and in addition advance a sixth recommendation.

564. I set out Ms Newton's general response and then separately deal with each recommendation..

"Since the Reedy Swamp fire there has been significant work undertaken to introduce measures which will improve the way in which the Stage Agencies (together with other agencies and the community) are equipped to prepare for and respond to similar fires in the years to come. Some of those measures have been introduced in the course of 'business as usual' improvements by the relevant

agencies. Others have been in response to the Keelty Review, the NSW Inquiry and/or the Royal Commission.

In the context of the recommendations proposed by Counsel Assisting, the NSW Inquiry is particularly apposite. Against the background of the devastating 2019-20 bush fire season, the Inquiry made 76 recommendations for future improvements to how NSW plans and prepares for, and responds to, bush fires. Those recommendations traverse most aspects of bush fire planning and response, and the underlying operational systems, research and strategic policy frameworks. The NSW Government has accepted each of the recommendations in principle (with further work to be done on specific timelines) and to date has committed funding of $192.2 million to support their implementation. The State Agencies are currently engaged (with others) in implementing those recommendations or, where appropriate, undertaking the necessary preliminary work to prepare for their implementation.

Some of the implemented or planned improvements that are of particular relevance to the matters considered by this Inquiry include the following (by way of example only):

a) The various steps taken by the RFS and FRNSW to implement the recommendations of the Keelty Review, as described in the joint statement of Deputy Commissioner Hamilton and Deputy Commissioner Heffernan (Ex 1, tab 234) including in respect of the cooperation, liaison and communication between the RFS and FRNSW.

b) The RFS has completed a program of installing AVL devices across its appliances which is operational when those appliances are in an area covered by the GRN. Consistent with NSW Inquiry Recommendation 37(b), it has also committed to accelerate its rollout of MDTs to all fire fighting vehicles to provide that connectivity in other areas.

c) RFS continues to move towards the implementation of an integrated dispatch system (see paragraph 27 of the joint statement) and has received increased funding to further advance that project.

d) RFS is committed to (and has received funding for) an increased focus on training and development in Area Planning and fire behaviour analysis, including in respect of extreme fire behaviour. Consistent with NSW Inquiry Recommendation 6 this will include targeted training in local weather effects for fire behaviour analysts in IMTs, the training of

more meteorologists in fire behaviour and the training of more fire behaviour analysts.

e) RFS has committed to ongoing development and investment to provide increased functionality and accessibility to the Fires Near Me application, including in respect of community advice warnings. The possibility of displaying fire prediction maps is also under consideration.

f) The State Agencies are continuing to work with the National Warnings Group to finalise and implement the National Warning System framework, with the bush fire component on track to be implemented in December 2020.

g) In relation to fuel load management:

   i. In response to Recommendation 19 from the NSW Inquiry, legislation is to be implemented to expand the RFS's powers to audit the implementation of BFRMPs.

   ii. Increased funding has been committed for the delivery by the RFS of new hazard reduction audit and compliance functions, and to implement a new risk-based approach to hazard reduction planning.

   iii. The methodology for a new approach to the bush fire risk management plan (as noted in paragraph 68 of the 3rd Heffernan statement, Ex 1, tab 236A) is being finalised by the University of Melbourne and is due to be completed this year.

   iv. Funding has been confirmed for additional mitigation crews to undertake additional hazard reduction activities and enhance rapid wildfire response capacity. A dedicated grants process will also be established to support local government and land managers with implementation of APZ and SFAZ works (including increased access to RFS mitigation resources).

565. Against this background, while the relevant State Agencies accept the recommendations proposed by Counsel Assisting, they note that the underlying objective of most of the proposed recommendations is already earmarked to be addressed as part of the broader reform and improvement process already underway. Accordingly, on the basis that the recommendations are desirable, I make the following recommendations (notwithstanding the fact that some steps are already on foot to address some of these matters):

Recommendation (i).

> That the RFS conduct a review of the training provided to personnel likely to occupy leadership roles within the IMT at the Bega Fire Control Centre to ensure that appropriate emphasis is placed on "worst case scenario planning".

566. Mr Newton responds to this recommendation:

a) The RFS accepts that this proposed recommendation is appropriate.

b) It also notes that it falls within the broader scope of Recommendation 6 made by the NSW Inquiry that the "*Government support training initiatives to increase the capacity of fire authorities to fight the kind of megafires seen in the 2019-20 season*". It does, however, note (and accepts) the specific focus of the proposed recommendation on the IMT at the Bega Fire Control Centre.

Recommendation (ii):

> That the RFS review the staffing arrangements applicable to the Bega Fire Control Centre to ensure that: the IMT includes appropriate dedicated intelligence gathering personnel; planning and intelligence officers be included in the pre-formed IMT on high bushfire risk days.
>
> h) The IMT includes appropriate dedicated intelligence gathering personnel;
>
> i) Planning and intelligence officers be included in the pre-formed IMT on high bushfire risk days.

567. Mr Newton responds to this recommendation:

a) The RFS accepts that this proposed recommendation is appropriate.

b) While noting (and accepting) the specific focus of the recommendation on the IMT at the Bega Fire Control Centre, the RFS further notes that it falls within the broader scope of:

(i) Recommendation 44 from the NSW Inquiry, namely *"[t]hat, in order to ensure suitably skilled and experienced personnel operate as Divisional Commanders during major fire incidents,*

Bush Fire Management Committees identify appropriate personnel as part of their plan of operations."

(ii) Recommendation 6 from the NSW Inquiry which also specifies targeted training in local weather effects for fire behaviour analysts who are embedded in IMT as one of the recommended training initiatives.

Recommendation (iii):

> That the RFS review the roll-out of the AVL devices and associated software applications to ensure that fireground commanders are able to effectively discern the location of resources while in the field. This review should include a consideration of the implications of failures in mobile phone networks.

568. Mr Newton responds to this recommendation:

a) The RFS accepts that this proposed recommendation is appropriate.

b) Further, the RFS notes that the roll out of the AVL is complete in areas covered by the GRN and it is actively working on ways to improve the AVL rollout using other technologies as stated above. As noted above the RFS has committed to accelerate its rollout of MDTs to all fire fighting vehicles to provide connectivity in areas not covered by the GRN.

Recommendation (iv):

> That the RFS and FRNSW jointly review the arrangements applicable to radio usage in relation to operations involving both RFS and FRNSW personnel to ensure that fire ground commanders are able to effectively communicate with, and provide directions to, members of other services.

569. Mr Newton responds to this recommendation:

a) The RFS and FRNSW accept this proposed recommendation is appropriate.

b) They further note its overlap with Recommendation 55(a) from the NSW Inquiry, namely that, in order to improve fireground communications the Government ensure all NSW fire authority personnel and vehicles can

access and utilise the Public Safety Network (***PSN***). This should include access to RFS Private Mobile Radio (***PMR***) networks where PSN coverage is not yet available – in this respect, RFS has agreed to provide approval for NSW firefighting agencies to program their radios with RFS PMR channels in accordance with standard protocols.

Recommendation (v):

> That the RFS and FRNSW review inter-agency training arrangements, to ensure that appropriate inter-agency practical exercises are conducted on a regular basis.

570. Mr Newton responds to this recommendation:

a) The RFS and FRNSW accept this proposed recommendation is appropriate.

b) They further note that implementation of the recommendation is already occurring through, for example, joint exercises that are part of the work being undertaken by the Joint Operations Taskforce in compliance with Recommendation 11 of the Keelty Review (Ex 1, tab 234; joint statement of Deputy Commissioner Hamilton and Deputy Commissioner Heffernan at [27(e)(ii)]).

571. I also make a sixth recommendation at the request of the State Agencies as they ask the Coroner to consider an additional recommendation (to the RFS and FRNSW) in the following terms intended to further enhance liaison, coordination and communication between firefighting agencies in the early stages of an incident:

Recommendation (vi)

> In the early stages of an incident or an IMT being formed, liaison officers from all fire-fighting agencies should be requested, and each agency should make reasonable endeavours, given operational demands and personnel

572. I am of the view that is an appropriate and desirable recommendation and accordingly make it,

Fuel load management

573. There are two recommendations that Counsel Assisting propose. The first is :

> That members of Bega Valley Shire Bushfire Management Committee develop a process to more systematically monitor

the maintenance of overall fuel hazards of SFAZs at or below the desired level. The following should be considered in the development of that process:

a) The use of a standardised document for each SFAZ that identifies sub-zones within each SFAZ and includes details of:

   i. the forest types applicable within each sub-zone;

   ii. the history of hazard reduction treatments applied within each sub-zone;

   iii. any unplanned burns that have occurred in each sub-zone;

   iv. when the minimum fire interval applicable to the sub-zone will expire;

   v. the hazard reduction works proposed to be conducted within each sub-zone in the three years subsequent to the next planned BMC meeting.

b) A requirement that each member of the BMC conduct an annual assessment of its Bushfire Management Zones and report the results of that assessment to the BVSMC.

574. Mr Newtown responds to these proposed recommendations thus: while the State Agencies acknowledge the importance of developing a process to more systematically monitor the maintenance of overall fuel hazards of SFAZs, they oppose the making of the proposed recommendation for the following reasons:

a) The future approaches to fuel load management were outside the scope of the statement of issues and were therefore not addressed in any detail by the evidence presented to the Inquiry.

b) The proposed recommendation is for the process to be developed by the Bega Valley BFMC. This is inconsistent with the governance arrangements for local BFMCs which operate under state-wide guidelines overseen by the BFCC.

c) The state-wide approach to fuel load management (including the planning, implementing and monitoring of hazard reduction activities) is

being reviewed and overhauled, including after input into and recommendations from the NSW Inquiry.

d) In particular, Recommendation 19 from the NSW Inquiry is for a "*re-commit[ment] to the current, regionally based approach to planning and coordinating hazard reduction activities across all tenures through Bush Fire Management Committees but ensure that it is actually being implemented at a high-level of quality across NSW".* The Recommendation notes that getting it to a *"high-level of quality requires*" (among other things):

   i. Implementing the Inquiry's recommendation about performance auditing of BFRMPs (see paragraphs g) above and 13.b) below); and

   ii. Prioritising implementation of revised processes for bush fire risk management planning that incorporate new modelling and methods for quantifying risk and the residual risk profile as a result of proposed hazard reduction works.

e) The revised processes for bush fire risk management planning referred to in Recommendation 19 include those referred to in paragraph 68 of the third Heffernan statement (Ex 1, tab 236A), in particular:

f) Improvements are being made to facilitate better recording of the implementation of hazard reduction burns in NSW, with the replacement of BRIMS with the '*Guardian*' program.

g) Guardian will provide a unified and spatially enabled system to assess risk, assign treatments and inform the community about hazard reduction activities and prevention measures across the State. Aspects of the Guardian system which have been implemented to date have allowed for spatial representations of planned hazard reduction activities across all land tenures to now be publicly available on the RFS website.

h) Guardian will be able to produce both automatic and bespoke reporting of mitigation activity, enabling RFS and partner agencies to efficiently and accurately respond to reporting requirements. Importantly, all activities can be linked to BFRMPs, ensuring real time tracking of progress against Annual Works Programs.

i) In addition, in relation to planning strategy, the RFS is developing risk planning products and tools to support a revised BFCC policy. The new model will incorporate the latest research and improved data to quantify risk and provide decision support to BFMCs when developing and designing treatment strategies. This was delayed by the 2019/20 bushfire season and other factors although the project schedule is being revised.

j) This work is currently being undertaken at a State level and will be applied to the Bega Valley BFMC. Development of a bespoke approach by the Bega Valley BFMC (as envisaged by the proposed recommendation) would put it out of step with the rest of the State.

575. Mr Lloyd likewise also makes compelling and persuasive submissions as to why I would not make either of the recommendations suggested by Counsel Assisting. The least of which is that the BVSBFMC has not been joined as a party to these proceedings. And that significantly the NSW Bushfire Inquiry has attended to these matters in a far more detailed and studied manner than this Inquiry. For those reasons I decline to make the recommendation sought.

576. The second recommendation is:

> That the RFS review its processes relating to the audit of hazard reduction activities of BMCs to assess whether its audits adequately assess whether the SFAZs falling within the relevant Bushfire Management Zone are successfully being managed in accordance with the requirements for SFAZs applicable under the relevant BFRMP.

577. Mr Newton's response is :

a) The RFS is content with the substance of the proposed recommendation.

b) It is, however, submitted that it is unnecessary having regard to the major overhaul to the monitoring and auditing of fuel load management processes currently underway in response to NSW Inquiry Recommendation 19 New legislation (*Bushfires Legislation Amendment Bill 2020*) is in the process of being implemented in response to that recommendation to expand the RFS's powers to audit the implementation of BFRMPs, and increased funding has

been committed to support the new powers. RFS will also establish a performance, audit and implementation unit to undertake ongoing review of BFCC and BFMC functions, plans and outcomes. Among other things, these processes will be significantly enhanced and supported by the ongoing implementation of Guardian.

578. Accepting Mr Newton's submission I accept that it is neither desirable nor necessary to make the recommendation and it is declined.

Vegetation Management of the Easement

579. As noted above, the fire that impacted the town of Tathra and its surrounds on 18 March 2018 commenced in the electrical easement (**the easement)** caused by the impact between a falling tree and an electrical conductor line. This raises issues in relation to the management of the vegetation in and adjacent to the easement as follows:

- Did Essential Energy and its subcontractors appropriately manage the vegetation in the vicinity of the Electrical Infrastructure?
- Without limiting the issue above, did Essential Energy and/or its subcontractors:
    a. adequately clear vegetation in the vicinity of the Electrical Infrastructure; and/or
    b. adequately assess the risk presented by trees in the vicinity of the Electrical Infrastructure, including the four trees that fell across powerlines before, during or after the fire on 18 March 2018?
- Again without limiting the issues above, did Essential Energy and/or its subcontractors take appropriate steps to ensure:
    a. assessments and/or clearances of vegetation in the vicinity of the Electrical Infrastructure took place sufficiently frequently; and
    b. the person or persons investigating the risk presented by vegetation in the vicinity of the Electrical Infrastructure were appropriately qualified and trained?

- If the answer to any of the questions above is no, what measures ought to have been undertaken to appropriately manage the vegetation in the vicinity of the relevant power assets?

580. As part of the police investigation into the fire, the police engaged Andrew Norman, an arborist, to attend the easement and assess the trees found in the easement and the surrounding vegetation. Mr Norman attended the easement on two occasions, once on 21 March 2018r Norman had worked as a scoper for Asplundh between 2000 and 2005 and Mr Lodge had worked as a scoper from 2001 to 2008. Short evidence in conclave was taken on 20 August 2018 and for procedural reasons the continuing of their evidence was stood over until a later date. When the Inquiry resumed to hear evidence further to the matters addressed by Mr Norman and Mr Lodge, Mr Norman was unable to attend due to illness. He had prepared a report as requested during the adjourned period which by agreement of parties was tendered. Numerous other reports were tendered as was a report from another arborist, Cameron Ryder.

581. On 10 November 2020 evidence was taken from witnesses who worked as scopers or vegetation managers for Pinnacle, Mr Donlon and Ms Smithers and Mr Uebe who was a former General Manager for Pinnacle. They gave evidence relevant to the training that Pinnacle provided to Pinnacle's scopers as well as to matters relating to scoping work. On 11 November 2020, Mr de Mar, Mr Lodge and Mr Ryder gave evidence in conclave.

Overview of vegetation management arrangements

582. The Inquiry focused on the role of Essential Energy, Asplundh and Pinnacle in the management of vegetation in the vicinity of the easement. As noted above, the role of each can be summarised as follows

a. Essential Energy , a state-owned electricity infrastructure company which owns, maintains and operates the electrical distribution network for much of NSW;

b. Asplundh, a tree and arboriculture services company engaged by Essential to manage vegetation in the vicinity of some of its electrical infrastructure assets; and

c. Pinnacle, a company that provided scoping services to Asplundh to assist with the performance of Asplundh's obligations under its contract with Essential.

583. Essential Energy's network is divided into a number of vegetation maintenance areas (**VMAs**). The easement was located within a VMA known as V-Bega 1533,

which falls within the area managed by Essential's Bega depot. There are approximately 100 VMAs in that area.

584. Essential Energy classifies its network according to bushfire risk priority classifications; each area is given a designation between P1 and P4, with P1 designation reserved for high risk areas. As at the time of the fire, the V-Bega 1533 VMA was classified *P2 – Moderate risk severity*. The classification of the V-Bega 1533 VMA was downgraded from the P1 high risk category after 2016. The classifications are based on fire risk modelling undertaken in collaboration with the Rural Fire Service (**RFS**) and the University of Melbourne. The consequence of this change is that the V-Bega 1533 VMA was not, from 2016 onwards, subject to Essential's Pre-Summer Bushfire Inspection Program.

Vegetation inspection process

585. There are three forms of vegetation inspection activities conducted by Essential Energy and its subcontractors:

    a. ground-based assessments conducted by scopers walking or driving along electrical infrastructure;

    b. light detection and ranging (**LiDAR**) inspection modelling the network and capturing vegetation clearances; and

    c. aerial examinations (involving photography from fixed wing aircraft and helicopters).

586. Ground-based assessments conducted by scopers are the backbone of Essential Energy's vegetation management program. The program is conducted on a cyclical basis. The relevant cycle is 12-18 months in urban areas and between two and five years in rural areas. The V-Bega 1533 VMA was subject to a two-year maintenance cycle.

Vegetation management framework

587. Electricity distribution network service providers are required to implement network-wide programs to manage the risk to electricity infrastructure presented by vegetation. The applicable vegetation management standards were developed by network service providers in concert with the relevant regulator, that being the Independent Pricing and Regulatory Tribunal of NSW (**IPART)**. They are designed to assist electricity network service providers to satisfy the safety requirements specified in the *Electricity Supply (Safety and Network Management) Regulation*

2014 and *Australian Standard 5577 – Electricity Network Safety Management Systems – 2013*. They are recorded in the *ISSC 3 Guide for the Management of Vegetation in the Vicinity of Electricity Assets* (**ISSC 3 Guide**).

588. The ISSC 3 Guide formed the basis for the Vegetation Management Common Requirement (**VMCR**) developed in 2014 by Essential Energy, together with the two other electricity network operators in NSW, Ausgrid and Endeavour Energy. The VMCR has since been revised and renamed the Vegetation Management Requirements (**VMR**).

589. The VMCR prescribed the minimum vegetation clearance specifications applied by Essential Energy and, in turn, Asplundh and Pinnacle in the period leading up to the fire. It also set out requirements in relation to potentially hazardous trees beyond the minimum clearance zones. These requirements will be considered further below.

590. The *Vegetation Management Services Contract* between Essential and Asplundh made provision for the conduct of both an "Initial Cut" and ongoing maintenance of vegetation in the area of the relevant electrical infrastructure in accordance with the VMCR.

Vegetation hazard categories

591. There are two key categories of issues that those responsible for vegetation management in the context of powerlines are required to address under the VMCR:

    a. The first is the maintenance of adequate clearance in accordance with minimum vegetation clearance requirements. An encroachment beyond the minimum prescribed distance is said, in the VMCR, to be a *Tier 1 defect*.

    b. The second is the identification, "as far as reasonably practicable", of "dead, dying or structurally unsound vegetation" that would constitute a hazard to electrical infrastructure were it to fall in the direction of the infrastructure. Such hazards are referred to as *Tier 2 defects*.

592. In essence, there is a distinction between "grow-in" vegetation hazards (Tier 1) and "fall-in" vegetation hazards (Tier 2). There is a third type of hazard, described as a "blow-in" hazard (i.e. where a piece of vegetation is blown onto a power line), however, the standards applicable to vegetation management do not require inspections to assess for such hazards.

593. Each of the four trees that fell into the easement were located further from the Electrical Infrastructure than is required by the minimum clearance distances provided for in the VMCR.

594. In those circumstances, the primary focus during the Inquiry was on the identification of Tier 2 defects and the performance of ground-based scoping works.

Requirements for Tier 1 / grow-in hazards

595. The ISSC 3 Guide and, in turn, the VMCR prescribe the minimum clearances to be maintained between vegetation and overhead powerlines. An additional 0.5 metres of clearance is to be added to all bare conductor clearances in bush fire prone areas. The minimum vegetation clearance tables in the VMCR and ISSC 3 Guide also make clear that the minimum distances depend on the length of the span, the conductor voltage, the relevant portion of the span and whether the line is covered or insulated.

596. For bare 11kV (11,000 voltage) copper conductors – as were found in the easement – the clearance distances, (as measured in all directions from conductor) were specified as follows:

Portion of span	**Span length: 50 – 100m**	**Span length: 100 – 200m**
First and last 1/6th	1.5 metres	2.0 metres
Middle 2/3rd	2.5 metres	3.5 metres

597. By reference to the VMCR and ISSC 3 Guide requirements, and the status of the V-Bega 1533 VMA as a bushfire-prone area, the minimum distances in relation to the spans between Poles A and B and Poles B and C were 2.5 metres for the first and last sixth of the span, and 4 metres for the middle 2/3rd of the span.

598. The appropriate rectification times for Tier 1 defects is provided for by the VMCR in *Table 4* – Maximum *Tier 1 Defect Rectification Time*. That table provides (original emphasis):

> "In bushfire prone areas Tier 1 defects are to be prioritised based on Table 4 and targeted for rectification within the maximum periods in the Table 4 or the start of the bushfire season, <u>whichever comes first</u>."

599. The rectification times are prescribed by reference to the extent to which the vegetation encroaches into the minimum vegetation clearance, as expressed in percentage terms. The relevant periods of time are defined as:

    a. six months for an encroachment of less than 25%;

    b. three months for an encroachment between 25% and 50%;

    c. one month for an encroachment between 50% and 75%; and

    d. one month for an encroachment of more than 75% but which does not touch the line.

2. Circumstances where the vegetation touches the line are described as an "Emergency".

Requirements for Tier 2 / fall-in hazards

Definition of Tier 2 defects

600. The ISSC 3 Guide of November 2016 defines a fall-in vegetation hazard as follows:

> "Visually defective vegetation (which is vegetation that is dead, dying and appears structurally unsound as identified from the perspective of the Network Asset as far as it is reasonably practicable to do so), that is outside the minimum Clearing Requirement distances from Electricity Assets and which may require pruning, cutting or removal to obviate the risk of it falling, dropping and contacting the assets."

601. A fall-in hazard is defined in slightly different terms in the VMCR. In that document, a fall-in hazard is referred to as a Tier 2 Defect and is defined as:

> "Dead, dying or structurally unsound vegetation that has been visually identified so far as reasonably practicable, which in the opinion of the authorised officer constitutes a hazard to bare, covered or insulated aerial conductors or other network infrastructure in the event that it were to fall in the direction of the network asset".

602. There is a key inconsistency between these two definitions in that the ISSC 3 Guide refers to vegetation that is dead, dying *and* appears structurally unsound whereas the VMCR refers to vegetation that is dead, dying *or* structurally unsound. The evidence suggested that those involved in vegetation inspection understood the identification of Tier 2 defects to involve an assessment in terms of the VMCR formulation; that is, a tree that is capable of impacting the network assets were it to fall will be a Tier 2 defect tree if it is dead, dying *or* structurally unsound.

603. It is submitted by Counsel Assisting that there should be no requirement for a tree that is dead or dying to also be considered structurally unsound before it qualifies as a Tier 2 defect, such that further investigations of the tree are conducted. Scopers may not have sufficient training or experience to allow them to identify whether a tree that is dead or dying is also structurally unsound. Similarly, they may not have the necessary equipment, nor the time, to conduct that examination. Essential Energy's response in relation to this submission is that "Counsel Assisting submit that there should be no requirement for a Tier 2 tree to be structurally unsound before being regarded as a Tier 2 defect". What is said is more nuanced. Counsel Assisting's submission merely supports the use of the alternative "or" which the VCMR uses rather than the conjunctive "and" of the ISSC 3 Guide. That usage, as noted above, is consistent with what at least some workers involved in the scoping process understood to be required. It is not said that all dead or dying trees should be removed. It is also consistent with the expert evidence put before me.

604. In support of their submission Counsel Assisting refer to Mr de Mar's observations:

> "In my opinion, because of the **limited viewing perspective** which scopers have when conducting vegetation clearance inspections, and the often long ranges from which they view vegetation, and the compressed timeframes they have for undertaking their inspection, I consider they do not have a proper opportunity to assess whether a dead or dying tree is structurally unsound, and most do not have appropriate qualifications to do so in any case. Accordingly, consistent with the Tier 2 defect definition in the VMCR, I consider that scopers should be required to report all trees which are dead or dying, which if they fell toward the network asset could strike the asset, and live trees in which they can see major structural defects which, to the extent they can determine on the basis of their training and knowledge, cause the tree or limb to be structurally unsound and capable of striking the asset if the tree or limb fails." (emphasis added)

605. Mr De Mar's opinion has been adopted as a recommendation advanced by Counsel Assisting. Essential Energy respond that on Mr de Mar's estimate there are millions of trees within fall-in range of Essential Energy's electrical infrastructure and adopts Counsel Assisting's submission that there must be many thousands of potential Tier 2 defects in proximity to the network.

606. Essential Energy says that electricity distributors cannot make safe all dangerous trees proximate to the network nor does it have the have the resources to attempt to do so. The cost of managing the vegetation as suggested by Mr de Mar would be financially prohibitive. In any event the ISSC 3 Code and the VMCR is directed at risk reduction not elimination and as such hazard management involves the exercise of discretion. Essential set out the relevant VCMR and emphasise upon what they rely to found their submission:

> "Dead, dying or structurally unsound vegetation that has been **visually identified** as far as reasonably practicable, **which in the opinion of the authorised officer constitutes a hazard to** bare, covered or insulated aerial conductors or other network infrastructure in the event that it were to fall in the direction of the network asset.

607. That emphasis means therefore that though the scoper might be able to see a dead tree in the fall zone unless the scoper then assesses the tree as one which is likely to fail within the prescribed period then the scoper need not record or report the tree for any further action. Essential Energy submit that is would be a wrong interpretation to say that all dead dying or structurally unsound trees that are within falling distance of a powerline are hazards

608. It is on that basis Essential Energy says that it is not a case of a scoper's task being just assessing that a height of a dead or dying tree is such that if it fell it would come into contact with electrical infrastructure but rather whether it is likely to fail (on the basis it would fall in). Further Essential Energy submit the VCMR requirements only apply if the tree is visually identified as far as reasonably practicable. As such there is no requirement upon a scoper to touch or tap the tree or further examine it though they can do so if they chose as part of their risk assessment. The opportunity for "visual identification" is defined by the term "from the perspective of the infrastructure". That means it is when the scoper is in the easement that their visual functions are employed.

609. As the evidence in this Inquiry reveals, that perspective can be a particularly limited one depending on a range of factors including: the position in the easement from which the scoper is located, the angle at which they are looking, and how far into the forest they can see, and any undergrowth obstructing a sufficient sightline to a tree.

Conduct of inspections

610. Section 3.4 of Schedule 1 of the ISSC 3 Guide provides that "Fall-in Vegetation Hazards shall be identified as part of the vegetation management process and the general asset management and inspection" (emphasis added). This suggests that Tier 2 defects are required to be identified during vegetation clearance (i.e. Tier 1) defect inspections, trimming works and the process of auditing works. There does not appear to be a requirement to schedule inspections for the purpose of independently inspecting for fall-in defects.

611. The VMCR includes similar terms:

"8.1.5Tier 2 Defects

Vegetation surrounding network infrastructure shall be visually inspected for Tier 2 Vegetation Defects while on site as part of the vegetation management process.

This inspection shall be conducted during the undertaking of normal vegetation clearing / inspection. The area inspected shall not be limited to the Minimum Vegetation Clearances and/or easement width (or equivalent) but shall assess all areas readily visible from the vicinity of the network assets.

In assessing Tier 2 defects consideration is to be given to the length of the vegetation beyond the potential breaking point compared to the distance from the network asset.

Tier 2 defects shall be cleared when identified by the Authorised Officer and verified by the contract manager. In cases of emergency, the clearing of Tier 2 defects may be carried out based on verbal verification, subject to appropriate electrical, outage and other safety related requirements being met."

612. The allowable time for rectification of Tier 2 defects is set out in *Table 3 – Defect Categories* within the VMCR. That provides that in relation to overhead lines, a Tier 2 defect is to be rectified within "One month unless subject to risk assessment up to a maximum of six months".

613. This table goes on to include a note in the following terms:

"Any Tier 2 vegetation defects in bushfire prone areas identified during the bushfire season are to be rectified as soon as reasonably practicable

unless a risk assessment by a horticultural advisor determines otherwise. The risk assessment is to nominate the rectification time, up to a maximum of six months."

The need for clarification

614. In view of his observations regarding the problems associated with a requirement that a given tree be dead, dying, *and* structurally unsound before it qualifies as a Tier 2 defect, Mr de Mar observed that consideration should be given to clarifying guidance material such that:

    a. Any dead or dying tree of sufficient height that could potentially fall onto a powerline is required to be reported as a fall-in vegetation hazard.

    b. The relevant guidance material should explicitly state that scopers undertaking vegetation clearance inspections are not required to conduct risk assessments about the structural condition of an observed dead or dying tree; rather, their report of a potential fall in vegetation hazard will trigger an inspection by a suitably qualified arborist or other trained person or, alternatively, the tree will simply be removed.

615. In addition to this concern, it is submitted by Counsel Assisting that there are two further aspects of the above provisions of the VMCR and ISSC 3 Guide that warrant further clarification:

    a. First, the extent of the requirement to conduct an investigation "from the perspective of the network assets" should be clarified. As discussed further below, there is some potential for confusion to arise where, for instance, a tree is visible as dead or dying from the perspective of the network asset, but it is necessary to approach the tree to assess whether it might pose a risk to the network asset (for example by assessing its height, the direction it is leaning, or its structural integrity). As is apparent from Mr Ryder's evidence considered below, this ambiguity may result in some scopers determining the tree is not a Tier 2 defect without engaging in the closer inspection of the tree that is plainly called for.

616. Second, while it is understandable, for efficiency's sake, that Tier 2 defects should be investigated during the course of other scoping or cutting duties, the provision for

such defects to be dealt with in the course of inspecting vegetation clearances generally, together with the "Tier 2" nomenclature, may create an impression that such defects are, in fact, of subordinate concern such that they do not require the same level of attention as Tier 1 defects. Given the potential risks to the network associated with such defects, the terminology and definitions employed should be reviewed to ensure that Tier 2 defects are not viewed as a secondary concern.

The importance of Tier 2 defects

617. While, as noted above, the Tier 2 label might be taken to suggest a subordinate status, it is plainly the case that Tier 2 defects can have critical importance for an electricity network. When asked about the importance of Tier 2 as against Tier 1 defect trees, Marcus Lodge observed:

> "From a risk perspective, I would think that tier 2 defects have the potential to have a greater consequence, in that they are from an uncontrolled part of the site, i.e. they haven't been pruned, or generally haven't been pruned. And are likely to impact with some force to the infrastructure. Whereas a tier 1 defect is not talking about failure, it's talking about encroachment within a limit. And that, if it's within half of the limit, well then, that's not going to have such a consequence as something actually hitting the power."

618. Essential Energy submit that Mr Lodge's comment as to a tier 2 defect having the potential to be a greater risk than a tier 1 defect should be disregarded as although an expert in trees he is not an expert in electrical infrastructure and he has no relevant expertise about trees' behaviour when in contact with conductors. Mr Lodge's opinion is just common sense and though a lay person could formulate it, Essential Energy takes much umbrage preferring Mr Norman's evidence that depending on the circumstances the risk of causing fire a grown in can cause fire just as a fall in.

619. However, It would appear from Essential's submissions that there is agreement with the proposition that Tier 1 defects are as equally important as Tier 2 defects in terms of vegetation management carried out for Electrical Network Service Providers. Tier 1 defects are easier to see and assess than Tier 2 because grow-ins by their very nature do not occur suddenly or unpredictably so encroachment limits and inspection cycles can be set to manage encroachments.

620. The Tier 2 defect by its very nature of sudden and unexpected fall involves a far more complex vegetation management approach.

621. The concern raised by Counsel Assisting in the language of the VCMR and the need to clarify it is so that the inspections for Tier 2 defects is not "incidental" to the task of the scoper when carrying out inspections for the ever slowly growing encroachments is a valid one. In any event, Essential Energy support the recommendation to clarify that Tier 2 is not subsidiary to Tier 1. Essential Energy oppose the suggestion that there is any basis to clarify any further matters as raised by Counsel Assisting. The primary position adopted by Essential Energy is that terms and definitions contained in the VCMR do not need clarification. It is the effect that such clarification as advanced by Counsel Assisting would have on Essential Energy's vegetation management practices that is the basis of Essential Energy's opposition. Essential mischaracterises Counsel Assisting's submissions as if they are advocating that all dead, dying trees be removed. That is incorrect. Counsel Assisting are advocating that if the subject tree which has been visually identified from the perspective of the easement is dead or dying and is tall enough to fall into the infrastructure then the scoper should note it, report it and the tree should be then assessed by a person who has the skills and the time to carry out such a task and determined whether the subject tree should be removed.

<u>State of vegetation in the easement</u>

622. There is some limited evidence that the vegetation in the easement may have been overgrown in the period prior to the fire.

623. Mr Hamish Dean, for example, gave evidence that he recalled the vegetation in the easement being "overgrown quite a bit". He stated:

> "Well, there wasn't much of an easement, there was - it was pretty much just a bush like bit of a gully running through there with some power poles and some lines."

624. However, Mr Dean indicated that the state of vegetation in the easement was not something he "paid much attention to".

625. Mr Stuart Donlan, a scoper for Pinnacle, stated that when Pinnacle took over the scoping work, the vegetation around electrical infrastructure was "in a pretty bad state" and that there were "a hell of a lot of tier 2 defects". This observation was not made by reference to the easement, but Mr Donlan said it accurately reflected the situation in a wide variety of areas. A photograph taken on 12 December 2016

showing some canopy "grow-in" near the overhead lines and a photograph taken on 31 January 2017 taken from about pole A looking up the easement provide some evidence of how the easement looked at least at those times prior to the fire. There are also aerial photographs (Lidar scan 13 December 2017) which show the height and density of the canopy on either side of the easement.

626. I accept Counsel Assisting's submission that the limited evidence available would not allow the Court to form a concluded view about the state of the vegetation in the easement prior to the fire or make a positive finding in line with Mr Dean's observation that the vegetation was "overgrown". There is, however, a history of Tier 1 defects in the easement, which provides some indication as to vegetation management required in the easement.

Vegetation management activities in the easement

627. A range of vegetation inspection and treatment activities were conducted in the easement in the period leading up to the fire. The following table sets out a summary of the evidence as to when scoping and cutting activities were conducted in the easement between 2015 and 2018.

Date	Event
27 August 2015	A pre-summer bushfire aerial inspection was completed by Oberon Air.
7 October 2015	A pole inspection was completed by Essential Energy (between spansCE63638 and CE636410).
16 March 2016	A pre-summer bushfire inspection aerial patrol was completed by Oberon Air.
Approx. 19 May 2016	It is unclear whether there a ground inspection further to the aerial patrol was " conducted by Daryl Worley.
17 August 2016	Scoping may have been conducted in the easement by Pinnacle.
8 September 2016	Two staff members of Line Sight Scoping – Indigo Stienki and Adam Jessup – carry out three vegetation trimming tasks (between spans CE63638 and CE63639)
6 October 2016	Two staff members of Line Sight Scoping – Gary Moore and Matt Hammond – finished cutting outlined above.
12 December 2016	Michael Jonas conducts scoping in the easement.

Date	Event
19 January 2017	Garth Prince of Line Sight Scoping conducts audit works in relation to September / October 2016 cutting.
31 January 2017 and 2 February 2017	A Skytrim crew from Asplundh (Leeroy Davis and Chris Harris) conduct work in the spans as part of the initial cut in response to Jonas' scoping. Mark Bennett conducts Job Behaviour Observation on 31.1.17 – asserts that his practice would have extended to include keeping an eye out for Tier 2 defects.
20 and 21 April 2017	Pinnacle Arborpro (Stuart Donlan) conducts a rescoping audit of a number of VMAs including V-Bega 1533. Note: Does not appear to have included the easement.
24 October 2017	Following switching request, last works of the initial cut completed by Scott Robinson and Paul Burns of Gibbon Tree services.
26 November 2017	A LiDAR scan was conducted by Network Mapping between CE63640 and CE63642.
13 December 2017	A LiDAR scan was conducted by Network Mapping between CE63635 and CE63640.

628. As concerns the tasks undertaken by Asplundh and its subcontractors, those works were performed either in accordance with the "initial cut" required to be performed under the contract, or pursuant to the cyclical cutting obligations under the contract.

629. Some inconsistencies in the evidence in relation to which tasks were conducted are discussed further below.

Presence of Tier 1 defects in the easement

630. Each of the four trees that fell into the easement was located further from the Electrical Infrastructure than is required by the minimum clearance distances provided for in the VMCR and ISSC 3 Guide.

631. The vegetation inspection closest in time to the fire was a LiDAR inspection conducted by Network Mapping on 13 December 2017. LiDAR inspections (and

aerial observations generally) are principally directed at assessing for Tier 1 defects; they are unlikely to afford an opportunity to assess for Tier 2 defects.

632. There were delays in processing the results of that inspection and providing them to Essential Energy. As a consequence, the inspection results were not available until after the fire. In fact, the inspection results were only provided to Essential Energy in response to a specific request that the delivery of those results be expedited. That request was only made after the fire. In the result, the inspection results were provided on 27 March 2018, that is, right at the end of the annual bush fire period.

633. The LiDAR inspection revealed only one area of encroachment into the minimum clearance space. That encroachment involved vegetation located approximately 3.52m from the conductor line between Pole F and Pole E (as against the prescribed minimum clearance of 4.5 metres at that location).

634. In Mr de Mar's opinion, it is unlikely that lateral growth of more than 1.3 meters would have occurred in the period preceding the fire. Accordingly, this encroachment was most likely also present throughout the 2017/2018 bushfire period. That there had been the last of the "initial cut" completed less than eight weeks before makes it likely that it would have been an encroachment at that time though whether it was in January 2017 when works were being carried out or in December 2016 when the easement was last scoped there is no evidence. I note Mr Kerrisk suggested that growth of eucalypts in that area would be about half to a maximum of one metre a year.

635. Earlier inspections had also revealed Tier 1 defects in the easement. Oberon Air's pre-summer bushfire inspection on 16 March 2016, for instance, identified Tier 1 defects: one classified as "touching HV [high voltage] mains", and "various" other trees encroaching within 1.5 metres of high voltage lines.

636. Despite being identified and detailed in such a way in Oberon Air's 16 March 2016 inspection, the defects were not rectified until 8 September and 6 October 2016.

637. The inspection conducted by Michael Jonas on 12 December 2016 (that is, within three months of the works arising from the March 2016 inspection being completed) identified four spans in the easement with vegetation encroachments.

638. The defects identified during that inspection process were subject to treatment in two stages: first, on 31 January and 2 February 2017; and second, on 24 October 2017. The delay in the latter of these stages was apparently attributable to the need for a power outage to facilitate safe access to the vegetation.

639. Counsel Assisting identify that the rectification of defects identified by Oberon Air in March 2016 and by Mr Jonas in December 2016 did not occur within the prescribed maximum rectification times; as noted above, the maximum Tier 1 defect rectification times provided for in the VMCR range from "emergency" or "as soon as reasonably practicable" out to a maximum of 6 months in the case of A4 encroachments that extend less than 25% into the minimum vegetation clearance. In the case of both inspections, works were not completed until well after the prescribed period.

640. In relation to the Operon Air detections, Asplundh's submissions point to evidence which might explain why this was so. Asplundh did not download the 16 March 2016 aerial patrol data from Essential Energy's Vegetation Information Management System (VIMS system) until 14 June 2016, at which time, it is said, there were no Tier 1 defects recorded as *"touching HV [high voltage] mains"*. Asplundh suggest the reason for that was because Mr Worley had attended the easement "possibly on 19 May 2016 and carried out a task known as "ground-truthing" which in his evidence Mr Kerrick explained was:

> "to validate that the defect is actually a defect and then again we, you know, based on, I suppose, the original data being captured from an aeroplane. I can't tell us what crews to send in to be able to, sort of, do that work. So, we need to know if we can send, you know, for instance an EWP crew or a climate crew or a ground crew to clear that defect."

641. It is unclear whether Mr Worley did in fact attend the easement. He did not give evidence that he did and Asplundh did not suggest to him that he did in fact attend.

642. Asplundh submit that

> "The aerial patrol task was undertaken as part of Essential Energy's pre-bushfire mitigation program. Whilst the defects identified in the aerial patrol task were not rectified strictly in accordance with maximum rectification periods contained within the VMCR, the fact that the defects were rectified either before, or in the case of work requiring switching, within the first week of, the start of the bushfire season, indicates that the purpose of the aerial patrol task was largely achieved".

643. In relation to the work that required switching being achieved within the first week of the start of the bushfire season, that work which needed to be performed had been identified in December 2016 not by an aerial patrol but by a inspection by a

vegetation manager or scoper Mr Jonas. Asplundh's submission overlooks that the defect prevailed throughout a whole bushfire season. There is no evidence provided evidence as to why the switching (off of electricity) could not have occurred earlier than it did.

644. In relation to Mr Jonas's detections Asplundh correctly submits that the first section of work was performed within the three months required but work that required the power to be switched off or "switching" could not proceed. Asplundh submitted a "switching request" to Essential on 7 February 2017 but it was not until 16 October 2017 that Asplundh was notified by Essential that the switching would occur on 24 October 2017.

Presence of Tier 2 defects in the easement

645. The evidence received by the Inquiry makes clear that there were several dead or dying trees present in the easement prior to the fire.

646. Each of Trees 1 to 4 are considered further below. There is little doubt that each of those trees was dead at the time of the fire. With the exception of Tree 1, in respect of which there is perhaps some uncertainty, it is very likely that each of those trees was dead well before Mr Jonas's inspection in December 2016.

647. The evidence received by the Inquiry discloses that, in addition to Trees 1-4, there were a number of other dead trees, in the easement at the time of the fire.

648. When he inspected the easement in the days after the fire, Andrew Norman observed several dead or dying trees on or near the edge of forest, some of which he qualified as Tier 2 defects. Some of those trees had, in his view, been dead for a number of years.

649. Mr Robert Saric, a former Vegetation Officer for Essential Energy, confirmed that there were several trees marked for removal following the fire, some of which died before the fire.

650. Though Asplundh submits that the court would be cautious in accepting Mr Norman's report of having observed a number of dead trees when he attended the site, Mr de Mar having reviewed the drone footage taken by the RFS and concluded that there were at least six other dead trees adjacent to the easement, which were "potentially classifiable as Tier 2 defects". As concerns two of these trees, Mr de Mar noted that their dead crowns were "sufficiently conspicuous" and they would have been "readily visible" even to a scoper positioned at a stationary location in the

centre of the span. He did not address whether the other dead trees shown in the video would have been visible to a scoper walking along the easement.

Training and qualifications of vegetation inspectors

651. Essential Energy requires personnel engaged by its contractors to hold specified qualifications and be authorised before performing work under the relevant contract. The required training and qualifications for personnel (including scopers) are set out in the training matrix annexed to the contract between Asplundh and Essential.

652. Mr Roger Uebe, Pinnacle's General Manager between 2016 and 2020, gave evidence that Pinnacle could not start an employee without Asplundh signing off. He also stated that Asplundh conducted an audit of the training records that Pinnacle provided.

653. As at March 2018, scopers were required to have completed *Module UETTDRVC24A – Assess vegetation and recommend control measures in an ESI environment*. It appears that this module is intended to include some consideration of the assessment of trees for defects. A summary of the module's intended content – albeit one produced in 2019 – was in evidence. That document suggests that the module included, as performance criteria:

> "2.3 Operational knowledge for the assessment of vegetation and recommendation of control measures for working near live electrical apparatus so the work is confirmed to ensure completion in an agreed timeframe and to quality standards with a minimum of waste according to requirements and established procedures
>
> 2.4 Assessment of vegetation, and in particular trees, for defects is undertaken in accordance with established procedures".

654. Both of these criteria are couched in terms of "operational knowledge" and "procedures." Overall, the focus of the criteria appears to fall very heavily on procedural and safety matters; none of the criteria specifically requires that a person be capable of accurately assessing the risk posed by particular trees or defects in them. Counsel Assisting submit that the evidence, as set out below, suggests that, in practice, this module included very little consideration of such assessments. I note that Asplundh submit that though the headings of the module did not contain reference to it, Power Safety Training (PST) had confirmed to Essential Energy by email of 10 July 2019 that from at least November 2017 their program included the topics: "Hazard Trees on the Network; Tree Growth and Visible defects; Organisms

that Attack Wood; and Practical Assessment on the latter". This supports Counsel Assisting's suggestion as to the content of the training at least in 2016.

Training provided to scopers generally

655. The Inquiry received evidence from a number of current and former Pinnacle employees regarding the training provided to scopers generally.

656. Mr Stuart Donlan, another Pinnacle scoper, gave evidence that he did not have any formal qualifications in visual tree assessment or tree risk assessment prior to commencing at Pinnacle. Mr Uebe confirmed that there was no requirement that the scopers have such qualifications.

657. Mr Donlan indicated that after his commencement with Pinnacle, he did a three day training program in Ulladulla and then spent up to three days "out on the line". The focus of that training was the electrical infrastructure and occupational health and safety issues; the training did not involve tree risk assessment or visual tree assessment components though tree identification was "touched on" and, in one instance, a dead tree was identified.

658. After he had been on the job for a period, Mr Donlan undertook a further period of training or supervision with Roger Uebe, Pinnacle's General Manager. That training consisted of two days in which Mr Uebe supervised Mr Donlan in the performance of his duties. Mr Donlan indicated that Mr Uebe was "a lot more in-depth" in ironing out "kinks" in Mr Donlan's practices: "[h]e was adamant about making sure that I did what I was supposed to do and was entered properly".

659. It appears that, consistent with his earlier training, the focus of Mr Donlan's time with Mr Uebe was on procedural matters, rather than the identification of Tier 2 defects, though Mr Donlan did observe that:

> "….we did have a look at a few hazard trees, yeah. They were, I think, Sheoaks at the time, like they were a fast-growing quick-dying tree and that's about as far as my memory goes."

660. Ms Colleen Smithers, another Pinnacle scoper, who was ordinarily responsible for the Bega area, also spoke of receiving classroom training in the order of three days. She also received on-the-job training with Mr Travis Joiner (another Pinnacle employee) for a number of days.

661. Essential Energy and Asplundh held an induction program for all new employees in April or May 2016. In his statement Mr Uebe said:

> "I recall attending an Essential Energy induction with Mick Jonas and other Pinnacle Scopers at the Moruya Essential Energy depot. Exact times and what was covered in those meetings I do not have a full recollection of. What I can recall is that we were stepped through the VMCR (Vegetation Management Common Requirement) which was explained in detail and what was expected with vegetation management around energy assets".

662. New Pinnacle employees were also subject to audits of the work that they had conducted; Mr Uebe stated that the work of new employees would be subject to a 100% audit which would gradually reduce as they developed further experience.

Training and authorisation of Mr Jonas

663. Mr Jonas was employed by Pinnacle ArborPro from 27 April 2016 to 25 April 2017. The evidence obtained in the Inquiry includes a certificate issued by Interlink Training stating that Mr Jonas had fulfilled the requirements of *UET201312 Certificate II in ESI – Powerline Vegetation Control* dated 28 June 2016. Mr Wyper said in his evidence that though he didn't recall the detail of subject matter of the units of competency he was aware (or rather had the feel) that they do not provide an appreciation to the candidate of visual tree assessment or the identification of tier 2 defects, rather he said "it's primarily based around safety and working close to the electrical network".

664. The statement of results corresponding to that certificate referred to the "elective unit" *UETTDRVC24A - Assess vegetation and recommend control measures in an ESI environment*. Interlink Training recorded Mr Jonas' results in that unit as "CT", which stood for "credit transfer".

665. Given the "CT" marking, it is not clear exactly what this training corresponded to; Mr Jonas himself had limited recall of the training that he had received. A "Training Passport" included in evidence made reference to the completion of the *UETTDRVC24A - Assess vegetation and recommend control measures in an ESI environment* module. That document was signed on 5 May 2016 by Mr Travis Joiner who, as noted above, was involved in the training of new Pinnacle recruits.

666. Having regard to the date of enrolment on the Interlink Training record (being 28 April 2016) and the completion date (30 April 2016), together with the details on the training passport, it is possible that the credit transfer provided by Interlink corresponded to the three days of training delivered by Pinnacle in Ulladulla referred

to by Mr Donlan. Though Asplundh submit the evidence is insufficient to draw such an inference, and point the VCMR's definition of an "authorised officer" (a scoper) as "A person with technical knowledge **or** sufficient experience [Asplundh's emphasis] who has been approved, or who has delegated authority to act on behalf of the organisation to perform the duty concerned in accordance with any applicable company policies or proceedings", there is no evidence that Mr Jonas fell within the category of having an approval on the basis of having sufficient experience. I am content to draw the inference as suggested by counsel assisting.

667. Counsel Assisting submits on the basis that Mr Jonas received his credit transfer due to attending the Ulladulla training there is a real question as to whether Mr Jonas received any meaningful training in the assessment of vegetation and, in particular, the assessment of Tier 2 defects. As submitted by Counsel Assisting, the evidence of Mr Donlan [discussed further below] regarding the three-day training program suggests that it included, at best, a very cursory exploration of tree risk assessment.

668. In line with the process referred to by Mr Uebe, Mr Mark Bennett of Asplundh certified Mr Jonas as competent. He did not engage in any independent assessment of Mr Jonas's competence nor did he undertake any inquiries with Interlink in relation to the training provided to Mr Jonas. Mr Bennett could not recall whether he spoke to Mr Jonas before certifying him as competent.

669. After the Ulladulla training course, Mr Uebe travelled with Mr Jonas in his car for a period of time while he conducted scoping work. Mr Uebe states that as part of this process, he explained to Mr Jonas how to identify Tier 2 defect trees. He did not show Mr Jonas photographs of possible Tier 2 defects; no such photographs were held by Pinnacle. Counsel Assisting asked Mr Uebe whether he took Mr Jonas to Tier 2 defect trees as part of his in-field training on how to identify a Tier 2 defect tree and he replied:

> "I took him to trees that were potentially tier 2 defects, or even if they weren't tier 2 defects, I explain to him what - what you should be looking out for. So, you know, you could walk up to any tree and sort of explain - well, if this was wrong, or - or trees outside the easement that could potentially – would potentially be a tier 2 defect if they were next to the line sort of thing, yeah.

670. Mr Uebe also conducted a number of audits of Mr Jonas's work.

Appropriate training standards

671. In Mr Lodge's view, persons conducting scoping works should have undertaken specific training in visual tree assessment and tree risk assessment.

672. Mr Norman observed that, at a minimum, persons undertaking scoping works should come from an arboriculture industry background with *AHC30816 Certificate 3* qualifications. Mr Norman observed:

> "I mean, traditionally, the scopers I've trained and have been involved with have been, you know, taken from other outdoor industries, and generally the amount of training that they can get, just specific for tree risk assessment, is limited. They should have a good basic understanding of, of risk assessment and the identification of, of tree hazards, and the characteristics that have a high failure, potentially."

673. Counsel Assisting submit "that on the available evidence, it seems that the training provided to scopers did not include sufficient focus on visual tree assessment or tree risk assessment. This is likely reflective of the overall emphasis on Tier 1 defects in priority to Tier 2 defects that existed at the relevant time".

674. In reviewing the then available material regarding the training afforded to scopers, Mr Lodge observed that the training program appears to have been targeted at persons undertaking the work of clearance around powerlines as opposed to that of conducting the assessment of vegetation in an electrical easement.

675. While these observations were made prior to the availability of Mr Donlan's and Ms Smithers' evidence, they appear to align with the evidence of those witnesses.

676. Ms Smithers' experience in early 2018 is instructive in this regard. While unable to remember exact dates, Ms Smithers recalls that in early 2018 there was a change in the approach taken to the identification of hazard trees. These changes will be considered further below.

677. Ms Smithers expressed some consternation about the new process on the basis that she did not feel equipped to undertake an assessment of trees in the way required by the new process. In response to concerns that Ms Smithers expressed, Travis Wyper provided her with additional training via a PowerPoint presentation that included a number of different hazard trees and an assessment of what makes each tree a hazard.

678. The changes to the process regarding hazard trees resulted in a significant increase in the time it took to perform the scoping task. Ms Smithers agreed that she began

looking for hazard trees more closely following the changes in the process and her meeting with Mr Wyper. Ms Smithers confirmed that the information she was provided in her meeting with Mr Wyper regarding tree assessment (including matters to look out for in the identification of hazard trees) was new information to her.

679. It is submitted by Counsel Assisting that taken together, the material suggests that there may not have been adequate attention to the assessment of Tier 2 defect trees in the course of the training provided to scopers prior to the fire. That may have been the case for some scopers but it was not Mr Donlon's experience of the overall training, particularly that provided to him "in the field". I do note however that in regards to Mr Donlon, he was a scoper who presented with perfectionist qualities and had an extraordinarily high application to his task which would be considered outside and above the norm of most employed as a scoper. Having said that, this extract of his evidence indicates his experience of the process and standard of his training provided by Pinnacle:

> Q. And how was that training delivered?
>
> A. I think we did it through - I'm not 100% as I said but I think we did a three day training in Ulladulla and then one day out on the line.
>
> Q. And what was the focus of that training?
>
> A. Just to learn what we were dealing with, learn the different electrical apparatus and how to just identify what's what and how to identify what we're looking for when it comes to knowing the different issues associated with my job, and also the OH&S side of things as well.
>
> Q. So is it fair to say that the focus of that training was on firstly understanding how the electrical infrastructure and secondly on understanding how to work safely in close proximity to that infrastructure?
>
> A. That's correct, yeah.
>
> Q. And that course again didn't involve any tree risk assessment or visual tree assessment components?
>
> A. No, no, not as far as I know.
>
> Q. Having completed that course did you undertaken any on-the-job training?

A. Yeah, that one day following that course we went out and we had a look at identifying the different hazards that might be associated with the role.

Q. And what hazards are you referring to?

A. Just if there's any decline in the trees or just to how firstly identify them and then also put that information in our required fields in our notes and collector, in the different workbooks, stuff like that, like the process if you know what I mean.

Q. So you were shown how to use the collector application on your iPad?

A. That's correct, yep.

Q. Were you shown, for example, dead or dying trees?

A. In the vicinity of where we were working I'm not 100% sure - no, they took us out to different sites with different - it was two years ago, sorry my memory's not as great as it could be but they took us to different sites where a few different problems were identified. I remember that.

Q. Do you remember what problems those were?

A. One of them was identifying a dead tree, yeah, near the high voltage power line and different forms of decay and also different tree species were identified and also different voltages.

Q. In relation to that dead tree were you given any information as to how you should record that tree in the system or if you should record it?

A. We weren't given a great deal of information on the day is what I'd say. We had a bit of onsite training, the actual scoping, and that's when we did a little bit of that identification. I did that with Travis Joiner, I think it was two weeks, maybe a week after I did that training.

Q. As part of that training did you come to understand the difference between a tier 1 or grow-in defect and a tier 2 or fall-in defect?

A. The difference I understood at the time between tier 1 and tier 2 is that tier 1 is anything that has like in that clearance zone that we need to identify and tier 2 was what was outside of that clearance zone. What we have to look at outside of the clearance zone was a tier 2.

Q. And beyond being outside the clearance zone what did you understand about tier 2 defects? What made a defect a tier 2 defect?

A. Whether it was showing any forms of decline. Often trees die from the top down and the way I often identified them was from the top down as my first stage of identification.

Q. When you say the top down are you referring to the crown of the tree?

A. The crown of the tree, yeah.

Q. And what kind of signs would you look for?

A. Dieback, any sort of dead limbs but I sort of had a bit of this training before I went into it but we did touch on that yeah.

Q. And having conducted that initial day of on-the-job training you began work, is that right?

A. I did about three days with Travis Joiner, it wasn't one day, I'll just correct that. It was about three days I think with Travis Joiner, it was near Bemboka and we were just running what's known as a feeder and just identifying everything we come across in the feeder and the different process. The main thing I needed to learn was how to input that information into the system as well, like, we really sort of focus pretty hard on that. But when it come to the tree identification we touched on it when we came to it but there was a few that we identified yeah.

Q. When you say a few what do you mean?

A. There was a dead tree considered a hazard tree and I ran through the process with Travis. It was a good opportunity to run through the process but that was part of the onsite training that I did with Travis over those three days.

Q. And subsequent to that training you commenced work?

A. That's correct, yeah

……

"Because it was a whole new job for me. I had to learn everything from the ground up so apart from – I knew trees but that's it but even identifying hazard trees and stuff like that a lot of things came up in that that were really important information so you have to listen and take it on board. But it was good training, it wasn't bad training, but it was bloody good training…There's a lot, there was a lot of training. It was really, really, really good training…"

680. For Asplundh's part, Mr Uebe said that Pinnacle received guidance by way of discussions and that it was a process of continuous improvement and they had meetings to discuss the training when it needed to be upgraded. As referred to in Mr Smyth's submissions, though not with the same force, I note that such discussions as between Asplundh and Pinnacle may indicate that "the content [of training] was not the result of any set of formal requirements or any formal training rubric though he notes that Mr Kerrisk conducted a training program at Bateman's Bay on 19 September 2016 in which included a segment on Tier 2 defect trees." Mr Jonas attended the training and though he had poor recollection of the day other than where it was held he was able to recall that the training covered "dead, dying or structurally unsound trees".

681. Asplundh submissions sought to downplay Ms Smither's evidence about Mr Wyper's Power Point training.Ms Smithers referred to more recent information which has included how to record and report Tier 2 defects and required additional attention to be paid to hazard trees, including by taking photographs for each individual hazard tree whereas earlier the assessment of hazard trees was "more included with the whole scope.

682. Of the three scoper witnesses from whom the Inquiry heard evidence in regards to their training, Ms Smithers would fairly be seen as in the middle and Mr Donlan at the perfection end and Mr Jonas somewhere near the other. One of Asplundh's criticism of Counsel Assisting's submission as to the adequacy of the training relating to Tier 2 defect assessments regards their not addressing the cost involved for scopers and others to attain the education that is set out by Mr Lodge in his report. With respect that does not go to the submission.

683. Mr Smyth submits that any failings of Mr Jonas' performance was due to the poor training he received. Mr Smyth's submissions are marked with highly sweeping statements abundant with conjecture with the result that the court is effectively not invited to look at the relevant detail.

684. It is clear that in 2016 the "classroom training" was not focussed on Tier 2 defects and if the in-field training was adequate, appears to be in part dependent on the interest of the trainee and partly dependent on how the training is given. Mr Uebe's description of demonstrating to Mr Jonas how to identify a tier 2 defect did not, with all due respect to Mr Uebe, seem to me to be particularly helpful to Mr Jonas. Mr Donlon's application to the task and his ability and enthusiasm to alleviate the risk of

Tier 2 trees is more likely a testament to his application rather than solely to his training.

685. Essential Energy submit that the identification of Tier 2 defects was not subordinate to Tier 1 detection and clearance. Essential's submissions explain that the VMCR provision relating to the inspection for Tier 2 defects to occur at the time of "normal vegetation clearing and/or inspection" is premised on the size of the network and that undertaking separate inspections for Tier 2 defect would "dramatically increase costs". Essential points to the rectification periods ascribed to Tier 2 to illustrate the importance given to this category – Tier 2 defects must ordinarily be rectified within one month (unless subject to a risk assessment) and such defects in bushfire prone areas are to be rectified as soon as practicably as possible.

686. Overall, I accept Counsel Assisting's position that in at least 2016 to around the date of the fire, the training provided to scopers was likely inadequate in relation to identifying tier 2 defect trees and determining whether they should be removed due the risk they posed to electrical infrastructure. That by mid-2016 attention was being focussed in addressing this inadequacy is apparent by Mr Kerrisk's September 2016 workshop and Mr Wyper's Power Point training.

Appropriate scoping methodology

687. The inquiry received a range of evidence regarding the appropriate methodology for the conduct of the scoping exercise.

Scoping from a vehicle

688. In view of the GPS information contained within the evidence provided by Mr Wyper, there arose a question as to the extent to which Mr Jonas had conducted the scoping exercise from within his vehicle.

689. Mr Jonas did not have any recollection of his inspection of the easement, though indicated that his practice was to get out of the car "at various times" and, "a lot of the time" to walk the easement which, in his view, allowed for a better view of the vegetation. GPS evidence is consistent with Mr Jonas driving to points through the easement, stopping the vehicle for a time before moving to the next position. The stop times were equally consistent with Mr Jonas remaining in the vehicle or leaving the vehicle to walk parts of the easement.

690. Mr Norman notes that a position inside a motor vehicle will leave a scoper subject to field of view restrictions. In particular, a location within a vehicle will impede a scoper's ability to recognise dead tree crowns or vegetation overhanging conductors.

691. Mr de Mar echoed this, noting that a scoper sitting in the driver's seat inside the vehicle cabin has "substantially restricted lines of sight" which are especially relevant to the scoper's capacity to see into the mid to upper stratum of the forest.

692. In evidence Mr de Mar, Mr Lodge and Cameron Ryder all agreed with Mr Norman's observation that it is not possible to conduct a detailed assessment of Tier 2 defects while driving and seated in a moving vehicle. Mr de Mar, for instance, observed:

> "When you're sitting within a car and you're undertaking scoping duties your field of view is greatly diminished, so if you can imagine yourself in the driver's seat, you're the only person in the car, when you look out the side your view upwards is very constrained. You can really only see the bottom portion of any tree as you're driving past and that particular tree".

693. It was submitted by Counsel Assisting that it would not be possible for a scoper to adequately investigate the presence of Tier 1 and Tier 2 defects in an area such as the easement from a position within a motor vehicle. This is obviously correct.

Scoping from the perspective of the network asset

694. That does not, however, resolve the question of whether it would have been necessary for a scoper to walk the length of the powerlines in the easement.

695. The language in the ISSC 3 Guide makes reference to the identification of Tier 2 defects *from the perspective of the network asset*. That raises an issue as to whether it is appropriate for a scoper to simply select a position in line with particular powerline infrastructure and conduct their inspections from that location.

696. Mr de Mar observed that a stationary mid-span position could provide an adequate vantage point for the inspection of Tier 1 defects. This observation was predicated on the capacity of scopers with several months or years' experience to become "quite proficient at estimating vegetation clearance distances".

697. However, in Mr de Mar's view, the assessment of Tier 2 vegetation defects is a more complicated process. He attributes this to the fact that potential Tier 2 defects may be further away from powerlines, including past the edge of a given tree line and, as such, obscured by other trees or shrubs.

698. Mr de Mar ultimately concluded that it is "not satisfactory for a scoper to limit themselves to inspecting for Tier 2 defects from a mid-span position only (particularly in potentially high fall-in tree hazard easements)". In his view, there is not a single practice that can be prescribed to allow for adequate conduct of visual inspection for all Tier 2 vegetation defects; in deciding how to assess Tier 2 defects

within a given span, the scoper needs to conduct an assessment of the key risk factors applicable to the span, including the length of the span, the height and condition of vegetation and how easy it is to see into the vegetation. It is also incumbent upon a scoper to take account of indicators of the likelihood of Tier 2 defects, for example, an abundance of logs or large branches lying on the ground and the number of termite mounds present.

699. Mr Lodge observed that, in view of the absence of rangefinder equipment, it would not be possible for a scoper to assess for either Tier 1 or Tier 2 defects from the mid-point in a span:

> "Given the length of the spans, the lack of a range finder or similar measuring device and the width of the easement it is not possible to conceive of a method that would allow a scoper to adequately conducted a visual assessment for Tier 1 and Tier 2 defects in the easement from a stationary position at or near to the mid-point of each of the spans."

700. Asplundh advances a submission incorrectly that Mr Lodge's evidence only related to Tier 1 defect. A rangefinder is useful for both. Mr de Mar observed that had a scoper conducted an appropriate appraisal of what he describes as the "Tier 2 defect risk factors":

> "They would have observed the general abundance of deadwood in the crowns of trees near Pole A and should also have seen that there were two dead trees about 10 metres from Pole A. Looking up at tree crowns along the edge of the easement in the span between poles A and B they would have seen that there were dead branches extending out into the easement. They would have estimated the average height of trees to be in the 20 to 25 metre range with some trees up to about 30 metres, with a 10 metre wide easement and thus making the appraisal that trees 10 to 15 metres or more in past the edge of the easement could be potential Tier 2 defect trees. They would have seen a densely stocked forest with many suppressed trees, and an abundance of fallen logs/trees on the ground, both within the forest edge and extending out into the easement. They would also have noticed relatively abundant termite mounds and they may also have noticed some trees with significant basal damage from termite attack."

701. These observations, in Mr de Mar's view, would have taken a scoper no more than one to two minutes to conduct and would have put them on notice that there was "a

very high likelihood of Tier 2 defects within the easement". Such an assessment would have made it prudent to conduct a walk through inspection of the easement to allow "sufficiently close proximity and viewing perspectives to adequately assess for Tier 2 defects". Such an approach would have allowed a scoper to focus on one side of the easement on one way up, and on the other side of the easement on the way back. Asplundh is highly critical of Mr de Mars evidence which they incorrectly describe as "how a scoper would have inspected the easement". The evidence in the above paragraph was consistent with what could be observed in photographs of the burnt area as well as the unburnt forest. The criticism advanced in their submissions was unreasonable.

702. Overall, the evidence of both the experts and persons with experience in scoping clearly established that in order to conduct an adequate assessment for vegetation defects – in particular Tier 2 defects – it would have been necessary for a scoper to exit their vehicle and walk along the easement. It would not have been sufficient to drive the line, nor would it have been enough to drive to a central point in the span, leave the car, and make observations from that point.

703. The next question that arises is which route a prudent scoper should have adopted when walking along the easement.

704. In that respect, Mr Norman noted that different locations within the span would have different benefits as concerns the type of defects that might be observed. He stated that walking the easement under the conductors "provides the best perspective to assess Tier 1 defects and 'clear to sky' when appropriate." On the other hand, he observed that walking the line of the vegetation would give "the best possible perspective to recognise lower trunk condition in trees that may be potential Tier 2 defects". However, such an approach may impede the inspection of upper crowns of trees on account of the overhanging canopy.

705. In line with Mr Norman's observations, Mr Lodge noted that "when walking along the vegetation edge branches and foliage of adjacent life trees can obscure the visibility of the crown."

706. The presence of a relatively clear access track was another relevant consideration in this respect. Mr de Mar opined that it is more likely that a scoper would have conducted any walk-though inspection using the access track, which did not have the shrubby vegetation and tripping hazards that would have interfered with the scoper's progress had they chosen to walk another line. Mr Ryder took a similar view to Mr de Mar in this respect.

707. I consider that , having regard to these work health and safety considerations and the adequate viewpoint afforded by the access track, it would have been appropriate for a scoper to employ the access track as the path along which they walked.

The need to enter the forest

708. The fact that a scoper could appropriately have performed the bulk of his or her task by walking along the access track should not be taken to suggest that it would not have been necessary or appropriate for a scoper to stop at particular points, and to leave the access track if they saw anything that appeared to be a potential Tier 2 defect.

709. The evidence made clear that should a scoper make observations that put them on notice that a Tier 2 defect may be present beyond the forest line at an easement, it would be necessary to conduct a closer inspection of the relevant tree, including if that meant walking past the edge of the forest and into the stand of trees.

710. However, the question of whether a scoper should traverse past the line of trees at the edge of the forest as a matter of course was the subject of differing views.

711. Mr Norman, for example, stated that:

> "Conducting a thorough assessment of vegetation such as that found bordering the Reedy Swamp easement would require walking along the edge of the tree line and through the individual trees to a distance from the infrastructure equal to the height of the trees."

712. Mr Worley and Mr Donlan also observed that their practice would involve moving beyond the line of the trees at the edge of the easement to inspect for Tier 2 defects.

713. These practices, however, appear to extend beyond what is required in the applicable guidance material.

714. The ISSC 3 Guide referred to defects visible "from the perspective of the network assets" it clearly does not contemplate a scoper walking into the forest as a matter of course. Similarly, as concerns Tier 2 defects, the VMCR observed that (emphasis added):

> "This inspection shall be conducted during the undertaking of normal vegetation clearing / inspection. The area inspected shall not be limited to the Minimum Vegetation Clearances and/or easement width (or equivalent) but shall assess <u>all areas readily visible from the vicinity of the network assets</u>."

715. The reference to the “perspective of the network assets” and “areas readily visible from the vicinity of the network assets” makes it plain that there is no requirement for Tier 2 defect inspections to be conducted from beyond the edge of the forest.

716. A range of evidence from other scopers and those supervising them supported this interpretation.

717. Ms Smithers, for instance, indicated that she would not walk past the tree line into the forest unless she “saw something, like a dead tree”.

718. Consistent with this, Mr Uebe confirmed that while, in forested spans, scopers would be required to walk at least part of the line and he would expect a scoper to “really closely look” beyond the edge of the forest, he would not expect them to walk beyond the edge of the trees.

719. Mr Bennett observed that while his expectation would be that a scoper would undertake an assessment of the vegetation they could see; he did not believe that scopers “should be walking off the edge of the easement, ten to 15 metres off the edge of the easement, looking for defects”. However, if a potential Tier 2 defect was observed when they were patrolling the line, Mr Bennett noted that he would expect the scoper to “go and have a look at that tree”.

720. In practical terms, it is likely that the methodology proposed by Mr Donlan – that is, regularly walking into the forest to observe whether there might be obscured defects – would substantially increase the time taken to perform scoping works.

721. As Mr Donlan accepted, his approach to scoping was reflective of a “counsel of perfection”. Mr Donlan had been “constantly” subject to concerns expressed by management that he ‘over-does’ his job, together with suggestions that he not be as “hard” on vegetation.

722. It is not submitted by Counsel Assisting that the latter criticism should be endorsed; and I agree with Counsel Assisting’s remark that the events leading to this Inquiry make it clear that it may well be prudent for scopers to be “hard” on vegetation. However, considering the very significant extent of the network Essential manages, it is necessary for a balance to be struck between appropriately attending to Tier 2 defects in an efficient manner, and attempting to exhaustively identify each and every potential defect. As noted by Mr Lodge, a scoper should not be criticised for going into the forest in the course of their duties, but routinely doing so is not something that would be “anticipated”.

723. Mr de Mar expressed the view that it "would be highly unlikely" that a scoper would perform their task by walking along the vegetation border, or going into the stand of trees and noted, in support of that proposition, the "time pressure" applying to a scoper's work.

724. It is submitted by Counsel Assisting that it would not be expected, as a matter of course, that a scoper would walk out of a cleared easement and into the forest in search of Tier 2 defects that they did not observe (and/or could not observe) from the perspective of the relevant powerlines. This position is adopted by Asplundh.

Recording data regarding hazard trees

725. As at the time of the inspection of the easement by Mr Jonas, the *Collector* software/load-sheet employed by Pinnacle did not include a specific prompt for scopers to identify whether or not a Tier 2 defect was present in a given span. Similarly, the data output from a scoper's *Collector* entries (as recorded in an Excel spreadsheet) did not include a separate column relating to the possible presence of Tier 2 defects.

726. Rather, a scoper identifying a Tier 2 defect for either removal or trimming would select an entry relating to hazard trees from a list of 30 possible "Work Type" options.

727. Mr Donlan observed that the fact that a particular entry was a Tier 2 defect would become apparent to the reader of the relevant data by virtue of the fact that it was necessary for a scoper to enter the clearances for the defects identified; if a given defect was noted despite the fact it was beyond the minimum clearance distance, it would become apparent to the person reviewing the data that a Tier 2 defect had been identified.

728. It is submitted by Counsel Assisting that this system could be improved by including a specific 'prompt' or 'category' for the identification of Tier 2 defects. Doing so would assist by encouraging the scoper to consider the existence of Tier 2 defects and make it easier for the person reviewing the data to determine if such defects had been located.

729. Mr Donlan observed that as at 2016 the process of reporting "hazard trees" involved the use of what was known as a "discretionary form". As part of that process, it was necessary to take photographs of the relevant tree and upload all the information to Google Drive. Mr Donlan described the process surrounding the reporting of hazard trees as "tedious".

730. Asplundh point out that a number of witnesses gave evidence that there was an increased focus on hazard trees since early 2018 consistent with the introduction of a new system or process which is described by Mr Kerrisk as follows:

> "*the system separated the reporting and processing of tier 2 defects/hazard trees from the reporting and processing of other vegetation management works and ensured there was a separate register for tier 2 defect trees*."

731. Asplundh relies on Mr Donlon's evidence that "we're nearly on top of all the hazard trees near the network" " to found their submission that scopers are considering the existence of Tier 2 defects such that there is no specific need for them to be "encouraged" to do so. It is not ideal that Asplundh seem reluctant to improve their data system to provide ease of use for their workers

Equipment available to scopers

732. To ascertain whether a tree is a Tier 2 defect tree, it is necessary for a scoper to know not only the distance between the tree and the relevant powerline, but also the height of the relevant tree.

733. The scopers engaged by Pinnacle did not have any devices available to them to assist in that endeavour.

734. Mr Donlan agreed that notwithstanding the fact that his personal experience as a surveyor left him well-placed to assess the height of a tree by sight, not everyone has those skills and the provision of a rangefinder would be "more useful".

735. Ms Smithers recalled asking Pinnacle for a rangefinder. She did so via email but had no response to that request.

736. Mr Uebe agreed that a rangefinder would make the scoper's task easier. Mr Uebe recalled that it was not only Ms Smithers that had raised the potential for rangefinders to be provided to scopers. Mr Uebe recalled that he did speak to Mr Wyper about the possibility of using rangefinders, though no such devices were purchased.

737. In evidence, Mr Lodge observed that he finds it "difficult to understand how they can accurately measure between the powerline on the opposite side of the track and the trees to determine whether or not they have an encroachment" without a rangefinder. He went on to say that he was "surprised" that rangefinders were not

available to the scopers, noting that: “I didn't realise that people were still scoping without using rangefinders.”

Should the defect trees in the easement have been identified?

738. For the reasons set out above, the appropriate methodology, in an area such as the electrical easement, would have been for the scopers to walk the span.

739. The question as to whether Trees 1-4 should have been identified as a Tier 2 defect during the course of scoping conducted prior to the fire, and in particular in December 2016, is considered on the basis of a scoper having walked within the easement.

740. Clearly had the scoping been performed while driving a vehicle, or from a stationary position at the centre of each span, that necessarily would have diminished the prospects of each of the trees (or any of them) being identified as a Tier 2 defect. Indeed, the weight of the evidence suggests that the four trees may not have been ‘readily visible’ as a potential Tier 2 defect tree adopting such methodology.

State of vegetation in the easement

741. An important consideration in assessing the extent to which the Tier 2 defect trees (and, in particular, Tree 4) should have been identified arises from the state of the vegetation in the easement at the time of the fire. That is, it is likely that the vegetation in the easement was in a significantly different state prior to the fire (and at the time of the various works conducted in the easement) relative to the condition it was in at the time investigations conducted for the purposes of this inquiry.

742. The photographs taken by Cassandra Dickson, for example, show various grasses, shrubs and saplings in the easement. While the evidence suggests that such vegetation was likely sparser in the area around Pole C (i.e. where Trees 3 and 4 were located) it is very likely that it was at least somewhat more difficult to see into the forest at that location before the fire than it was after the fire.

743. Additionally, works conducted in the easement prior to the fire likely had an impact on the density of vegetation. A comparison between LiDAR imagery taken in 2014 and 2017 suggests that the vegetation was less expansive in 2017 than it was in 2014.

744. However, it is not possible to make any concrete assessment of the impact of the decrease in vegetation as at the time of Mr Jonas’s scoping works in December 2016. This is particularly true in circumstances where cutting works applying to

"various trees" were undertaken both before Mr Jonas's inspection (i.e. at least in September and October 2016) and between Mr Jonas's inspection and the 2017 LiDAR inspection, which post-dated cutting works conducted in January, February and October 2017. Asplundh point out the evidence from Mr Bennett that when he attended the easement on 31 January 2017 it was "heavily vegetated" on both sides.

745. The defects cleared as a result of Oberon's aerial inspection prior to Mr Jonas's inspection were identified as between 0 to 1.5 metres from the line, whereas the defects identified by Mr Jonas were only A3 and A4 defects, that is, 2.5 metres to 3 metres, or 3.5 metres to 4.5 metres from the line. On one view, that may suggest that the bulk of the difference between the 2014 and 2017 LiDAR scans was attributable to the 2016 cutting, but such a conclusion cannot be drawn with any real confidence.

746. It is also relevant to note that the fire likely had a meaningful impact on the state of the vegetation and the level of visibility into the forest. Having said that, it must be said that the fire did not appear to reach peak intensity until after it had travelled some way into the forest (see, for example, Ms Dickson's photographs of the fire in the vicinity of Tree 2, which show that the fire appears to have been burning at relatively low intensity). Additionally, the video footage available suggests that the vegetation canopy in the area was relatively unchanged by the fire.

747. In that respect, it is relevant to note Mr de Mar's observation that "scorched" leaves tend to be retained in a tree for some weeks following a fire and that there was little evidence of "leaf fall" in the available photographs.

Tree 1

748. Tree 1 was located at, or very near to the edge of, the forest and was approximately 9.8 metres away from the pole alignment. There were no trees between Tree 1 and the pole alignment. The tree was close to the edge of the access track. A scoper walking or driving along the access track would have passed very near to it.

749. Tree 1 had bark attached to the trunk. Mr Norman notes that the persistent attachment of bark to dead trees is not uncommon with Eucalypts such as the stringy bark species.

750. Messrs Norman, Lodge and de Mar all agreed that had a scoper walked along the easement approximately in line with the easement (or, as preferred by Mr de Mar,

the access track), Tree 1 would have been readily visible and able to be identified as a potential Tier 2 defect tree, such as to warrant further investigation.

751. While the trunk of the tree retained fibrous outer bark of a colour similar to that observable on a live tree, the crown of the tree was, at the time of the fire, visible as grey dead wood without bark, outer branch tips, leaves or epicormic shoots.

752. As noted above Tree 1 is the only one of the four trees that could potentially have been alive as at December 2016. Mr Ryder disagreed with the conclusion of Mr Norman that Tree 1 had been dead between two and five years, opining that it was likely dead for one to three years. Mr de Mar noted that "if it was alive at that time its crown would have been in an advanced state of decline with a high proportion of dead branches, thus exhibiting signs that it was dying."

753. Mr Lodge also drew attention to an apparent wound near the base of the trunk of Tree 1 and the fact that the bark was desiccated as well as the death of branches emerging from the trunk as factors making Tree 1 identifiable as a Tier 2 defect tree. Mr Lodge also noted that Tree 1 (along with Trees 2 and 3) would likely have presented similarly to the dead trees observable in video footage taken from a drone played during the hearing.

754. For his part, Mr Ryder stated that while Tree 1 would have been visible from the track, "[a]s to whether the tree would have been easily identified as dead is another question"; the bark held tightly to the tree, there was little branching and upper sections were likely mixed with surrounding alive trees.

755. Mr de Mar observed that the relevant question was something of a hypothetical given the presence of the access track, which likely would have been used by the scoper to gain access to the line given its status as a safer and easier access route. Given the state of the trunk of Tree 1, Mr de Mar agreed that the identification of the tree as a Tier 2 defect tree would depend on whether the scoper saw the crown. He observed that a scoper walking along the centre line or the track would have had an opportunity to see those dead upper branches if they were looking up for Tier 2 defects.

756. Similarly, Mr Lodge considered the upper crown of Tree 1 would likely have been visible to a scoper.

757. In conducting his assessment, Mr Ryder also observed that he does not consider that Tree 1 "would have necessarily been assessed as high risk of falling" though

noted that it is reasonable to assume if it did fall that it would have impacted on the conductors.

758. That, however, is not the test for whether a tree constitutes a Tier 2 defect expressed in the VMCR; the test is simply whether a tree (that would, if it fell, have the potential to impact on electrical infrastructure) is dead, dying or structurally unsound. Having been assessed as such, a further assessment may be conducted (by an appropriately qualified person) as to the risk the relevant tree might pose of falling. There is nothing to indicate that a "high-risk" designation of the type contemplated by Mr Ryder is built into the consideration, at first instance, of whether a tree ought be flagged as a Tier 2 defect.

Tree 2

759. There were no mature trees between Tree 2 and the electrical infrastructure. The type of vegetation in the easement near Tree 2 is visible in the photographs taken by Ms Dickson.

760. There was also a large termite mound in very close proximity to Tree 2.

761. There was a range of evidence in the Inquiry that the presence of a termite mound is a matter that ought put a scoper on notice as to the prospect of Tier 2 defects. In evidence, Mr Donlan indicated that the presence of termite mounds around a tree would be sufficient for him to identify the relevant tree as a hazard tree. (He clarified later that the second element that the tree would be identified as a hazard tree was on the basis that it also posed a risk to the network). Whether or not Mr Donlan's approach in this respect is overly cautious, there can be no doubt that the presence of termite mounds is something that scopers should be attentive to. Specifically in the context of Tree 2, Mr Norman noted:

> "It is reasonable to expect an adequately trained scoper to be aware of potential damage to the tree and an elevated risk of failure. Termite mounds at the base of a tree or termite galleries on the outside of a tree trunk are an indication that there may be internal damage to the tree. Closer inspection would be required to determine the extent of damage, if any, and is usually done with the aid of a sounding hammer or small diameter drill bit. Sounding hammers return a tone when struck against the tree and can indicate soft or damaged wood. A drill bit is used to determine the resistance to pressure applied to cut a hole in wood. Damaged wood requires little pressure."

762. Setting aside the question of the termite mound, Messrs de Mar, Lodge and Norman all took the view that Tree 2 ought to have been identified as a possible Tier 2 defect by an adequately trained scoper.

763. In evidence, Mr Ryder expressed some doubt as to whether the dead crown of Tree 2 would have been sufficiently visible to put a scoper on notice that it was a dead tree. Counsel assisting suggest that his evidence was somewhat difficult to reconcile with Mr Ryder's observation in his report:

> "The scoper would be located approximately 4-5 metres from the track to the tree. In this location it is likely that the tree would have been seen and recognised as dead.
>
> ...
>
> With the tree being dead, termites at the base and the upper branches significantly bleached, it is likely that this tree should have been recognised as at a high risk of failing.
>
> Given the likelihood for a tree to fall downhill and the proximity of the asset being 9.1m offset, a trained scoper is likely to have assessed this as having potential to impact the asset."

764. Mr de Mar, on the other hand, observed that a scoper walking up the track would have had a "good opportunity" to observe that "those major structural branches were dead". Mr Lodge similarly considered that the crown would have been sufficiently visible to warrant an assessment of the tree.

765. Mr Norman observed that the visual indicators of crown death in Tree 2 would have been "easily recognised and not obscured by surrounding live vegetation".

766. Having regard to the observations of Messrs Norman, Lodge and de Mar – and noting the apparent inconsistency in Mr Ryder's observations as between his report and evidence – I am satisfied that Tree 2 would have been readily visible to an adequately trained scoper as a potential Tier 2 defect.

Tree 3

767. Tree 3 was positioned near to the edge of the forest abutting the powerline easement. It too was very likely dead in December 2016, though had persistent bark attached to its trunk.

768. Near where Tree 3 was located, the easement track crossed under the powerline and continued onwards on the north-western side (i.e. the opposite side of the powerlines to Trees 3 and 4).

769. The photographs tendered in the Inquiry suggest there were no trees in the easement between the access track and the stump of Tree 3 that would have obscured a scoper's view of Tree 3 from within the easement.

770. Tree 3 had a small internal cavity within the base of the tree, however, visible external evidence of that hollow was small.

771. Mr Ryder indicated in his report that the "upper canopy is likely to have shown as a dead tree" to a scoper walking the centre line. Mr Ryder's report separately observed that from the perspective of the access track, it is likely that Tree 3 "would have been seen and recognised as dead, mostly from the upper branches."

772. In evidence, Mr Ryder observed that the upper sections of the tree would likely have been "completely blocked" by the surrounding canopies and stated that it is not necessarily the case that a prudent scoper would have been on notice that Tree 3 constituted a Tier 2 defect. Again, the inconsistency between Mr Ryder's report and his response in evidence is somewhat difficult to understand.

773. Mr de Mar and Mr Lodge both disagreed with Mr Ryder's assertion that the canopy of Tree 3 would likely have been completely obscured. Both witnesses considered that Tree 3 should have been visible as a potential Tier 2 defect.

774. Mr Norman also considered the crown of Tree 3 would have been readily visible.

775. Mr Ryder observed that the observation of dead wood some 15 or 16 metres away from the line, as he perceived may have been visible in the context of the upper branches of Tree 3 amidst the canopy of other trees, would not in itself have warranted a closer look. Mr Lodge observed, in response to this:

> "My thought in relation to that is that if you see dead wood, that is a trigger to identify a tier 2 defect and as such you should undertake enough assessment to determine whether that is dead wood on a tree, as in a dead branch, or whether that's in fact a dead tree. From there you can make a decision about how you deal with it."

776. This approach ought to be preferred; if, as is suggested by Mr Ryder, it may have been difficult to see the canopy of Tree 3, then it would have been prudent for a scoper, noting the presence of dead wood amidst the live canopy, to further investigate with a view to discerning how appropriately to deal with the relevant tree.

Tree 4

777. The trunk of Tree 4 was measured as 21.2 metres from the pole alignment. It appears that it was approximately 7.7 metres in from the edge of the forest. It was dead in December 2016.

778. In Mr Norman's view, if the scoping task was performed from a location level with the pole alignment, it would have been possible for a scoper to recognise the lower portion of the trunk as a dead tree; he stated that the visual identification of the tree would have been "relatively easy for Tree 4 as the trunk colour would be grey and the trunk texture not consistent with surrounding vegetation." Mr Norman noted that the crown of Tree 4 may have been more difficult to see than trees 1, 2, or 3 because of potential obstruction by other live crowns.

779. Mr Norman states that "There existed a notable gap in the stem spacing between [Tree 4] and the pole alignment". He drew this conclusion by reference to the drone footage depicted in the *Easement Run 4* film and certain photographs taken by the RFS. In Mr Norman's opinion, the gap would have been sufficient to allow the trunk to be seen and would have alerted an inspector "that the tree was problematic".

780. The "notable gap" referred to in the statement of Norman is visible in a number of photographs tendered in evidence before the Inquiry. However, it would have required the scoper to look in a direction that was relatively perpendicular to the powerlines as there were trees sitting roughly on the diagonal between Pole C and Tree 4.

781. Consistent with this, Mr Lodge observed that Tree 4 "is unlikely to have been readily visible unless the assessor was standing directly opposite it and had reasonably clear vision of the trunk and crown".

782. Mr Lodge observed that had Tree 4 been observed, it showed signs that would have indicated to an adequately trained scoper that it was dead, dying or structurally unsound, including:

    a. it had no bark, such that dead timber was exposed for the entire length of the tree;

    b. its crown was devoid of foliage and lacked small branchlets; and

    c. it likely had a history of branch failure.

783. However, in Mr Lodge's view, the likely obstruction of the trunk and crown of Tree 4 meant that it may not have been possible to identify Tree 4 as a potential Tier 2 defect.

784. Consistent with Mr Lodge's observations, Mr de Mar noted:

> "From the section of track within the span just past Pole C to about 15 metres from Pole C, it is possible that a scoper looking in the direction of Tree 4 at that time could observe its dead stem which I consider would have been exhibiting a characteristic light grey deadwood appearance, having already lost its bark."

785. In that respect, Mr de Mar noted that Tree 4 had been dead for a "considerably longer time" than the other trees, and likely lost its outer bark long before 18 March 2018. He stated:

> "Having shed its bark, the wood of the stem would be exposed, and subject to degradation by light and weathering attaining a characteristically grey colour which would differentiate it from nearby live trees."

786. This was the subject of some disagreement in evidence, with Mr Ryder expressing a degree of uncertainty as to whether the bottom portion of Tree 4 would have been missing bark in the same way the unburnt section of the tree was.

787. In response, Mr de Mar observed that the likelihood of Tree 4 still having any bark was "very low", noting: "that section of trunk was completely burnt away, it's gone. That indicates that it was so dry that it was able to completely smoulder away to ash. That doesn't happen if the trunk is live, so it was certainly dead and desiccated."

788. Mr Lodge's evidence in this respect was consistent with that of Mr de Mar. He noted that, having regard to the deterioration of the crown and the condition of the remainder of the trunk, the burnt section of the trunk "in all likelihood did not have bark on it". In any event, Mr Lodge observed that the part of the tree that may have been visible from the track was likely to have been the section from about "two and a half metres to maybe ten or more metres". That is to say, that the potentially visible portion of the tree included parts that had not been burnt and which clearly had no bark.

789. In Mr Ryder's view, had the scoper been walking the line "it is possible but unlikely that a scoper would have been able to see Tree 4". In that respect he indicates that the tree is likely to have been set back 20-25 metres and vegetation in the area is likely to have precluded vision of large parts of the lower truck – it is possible that some sections of the trunk could have been visible, though Mr Ryder states this

could not be determined with any level of confidence. Lower foliage on other trees would, in Mr Ryder's view, have precluded a view of the canopy of the tree. In that respect, Mr Ryder noted that the "edge effect" of the forest tends to cause more foliage retention lower on the trunks of living trees, further obstructing vision.

790. Mr Ryder's observations in this respect are compelling and sit well alongside those of Messrs Lodge and de Mar.

791. Counsel Assisting addressed some matters in Mr Ryder's report in relation to the considerations of the scoper when identifying a Tier 2 defect tree.

792. The question Mr Ryder responded to in his report is whether each of the relevant trees "was dead (or dying) and structurally unsound such that it would be considered to pose a high risk of failing and contacting network assets?" (emphasis added).

793. Mr Ryder's response notes:

> "In answering this question, the focus is not on the tree being dead, rather it is whether or not there was a high risk of failing. Dead trees can stand for many years and in many cases the mode of failure will be small twigs first, smaller branches, larger branches and possibly the trunk. If dead trunks are vertical and they are not subject to significant forces, then they may stand for many years."

794. As indicated above, the VMCR does not restrict the definition of a Tier 2 defect tree to a tree that poses a "high risk of falling and contacting network assets". Rather, that assessment comes into play when, after the identification of a tree as a Tier 2 defect, a determination is made as to whether the tree ought be removed. Nor, as considered above, does a tree need to be dead (or dying) *and* structurally unsound in order to qualify as a Tier 2 defect.

795. Additionally, Mr Ryder's observations appear to proceed on the basis that for a tree to qualify as a Tier 2 defect, the relevant assessment needs to be able to be made without approaching the tree to conduct a closer inspection. This emerges in two noteworthy ways in Mr Ryder's reasoning.

796. First, Mr Ryder observes:

> "Assuming it had been recognised as dead, a scoper would have estimated the offset of the tree to the conductors and realised that only a basal (or close to it) failure would result in the tree impacting the lines. Given existing vegetation, the tree base is unlikely to have been readily assessable from this location."

797. Plainly, as is apparent from the other experts' evidence in the context of the crown of Tree 3 considered above, recognition of a tree as dead or potentially dead warrants closer exploration; it is not sufficient for a scoper to determine that a dead tree is not a Tier 2 defect on the basis that a conclusion regarding the likelihood of it failing at its base cannot be reached without closer inspection.

798. I agree with Counsel Assisting's appraisal that this observation should not be perceived as a criticism of Mr Ryder. Rather, the reasoning employed by Mr Ryder appears to be a reflection of the ambiguity inherent in the definition of a Tier 2 defect in the ISSC 3 Guide. Specifically, the requirement that the relevant tree "appears structurally unsound as identified from the perspective of the Network Asset" contained in the definition of a Tier 2 defect may create confusion. Given the likely impossibility of assessing the structural integrity of many dead trees from a distance, this cannot be what was intended by the framers of the document. Such an approach would be absurd.

799. Essential Energy's submissions disagree with Counsel Assisting's approach and submit:

> "None of these attacks is warranted. The words mean what they say, and their effect, plainly intended, is that scopers are not required or expected to closely assess trees in search of latent defects or to exclude the possibility of risk. On the contrary, they are expected to identify defective trees on the basis of a visual assessment from a distance, for example by having regard to obvious defects….ISSC 3 and the VMCR focus upon what can be seen from the vicinity of the network asset as a way of placing manageable limits around an otherwise unmanageable task. Moreover, the reference to "readily visible" necessarily suggests that the focus is upon features that can be easily seen from the position of the asset without requiring close inspection of the vegetation. Although scopers are not expected to keep their distance from trees, nor are they expected to closely inspect trees in order to form a view as to whether they pose a risk."

800. With respect to counsel for Essential Energy, that position is the absurdity about which Counsel Assisting are concerned. Essential Energy refer to Mr Kelleher's evidence:

> "Essential Energy does not expect its contractors will identify every dead or dying tree in proximity to the network. Rather, Essential Energy

> expects that contractors will identify trees that are considered to pose an immediate or short term risk to the network. If contractors were to report every dead or dying tree as requiring further assessment, this would have a significant effect on Essential Energy's vegetation management resources and budget. Without knowing the incidence of dead or dying trees in proximity to the network it would also be difficult to budget for such work."

801. Though the assessment of the tree should ideally be carried out at the time of the scope, given that the expectation is a "visual assessment" without necessarily approaching the tree, and not all scopers are confident or qualified to carry out the assessment, the proposal put forward by Counsel Assisting that Essential Energy should clarify exactly what is required is necessary.

802. In a similar vein, Mr Ryder notes that having regard to the height of Tree 4, it is possible that a scoper could have assessed the tree as not reasonably capable of impacting the conductors. He states that: "From the vantage point of the scoper on the track and the offset of the tree into the forest, it is highly unlikely that the scoper could accurately estimate the tree height and subsequently its ability to impact the asset."

803. Again, it could not sensibly be regarded as prudent practice for a scoper to identify a tree as dead, only to determine that it is not a Tier 2 defect tree on the basis of some uncertainty – arising from an assessment made at a distance without specialist equipment – as to whether it would, if it fell, impact on the lines.

804. Returning to the central question, in evidence, Messrs Lodge, Ryder and de Mar were asked to respond to Mr Norman's conclusions regarding the visibility of Tree 4.

805. Mr de Mar sought to emphasise that Tree 4 was in a different category to Trees 1-3 in that it was set back significantly further into the forest, which would have made it much more difficult to see any parts of the crown of the tree, because those branches would have been obscured by the branches of other (live) trees in between Tree 4 and the easement.

806. Mr de Mar noted:

> "…detecting that tree would, in my view, really rely on being able to see the trunk because that's the clearer part for a line of sight towards the tree, and in walking past you just have to be looking in that particular direction as you're going - you've got a reasonably limited time frame to

be able to spot that trunk as you walk past. In my view it would have been - it was obviously dead and it would have been characteristically grey in colour but to detect that tree 4 was dead while walking along you would have had to have been looking virtually in the direction of that tree and spot that lower section of the trunk. Unlike those other trees where you would have been really relying on seeing the crown of those other three trees, in the case of tree 4 you would have to spot that the trunk is characteristic of a dead tree."

807. Mr de Mar's report was prepared on the basis of an assumption that the tree was approximately 11 metres into the forest. As alluded to above, it appears more likely that the tree was about 7.7 metres into the forest. Mr de Mar clarified that this difference is unlikely to significantly alter his view:

> "…the point is that it's set back into the forest and so you've got trees that are closer, particularly as - until you're almost perpendicular to where that tree is you're view towards the trunk of that tree is going to be obscured, at least at times, by the trunks of trees that are closer to the easement edge."

808. Mr Lodge agreed with Mr de Mar that Tree 4 would have "been a difficult one for someone to pick [as a Tier 2 defect]".

809. Mr de Mar observed that "if they saw the dead grey trunk that we've talked about then, yes, they would have that detection opportunity. But if they were looking elsewhere as that window passed then they could easily miss it." Mr Lodge agreed with this observation.

810. Mr Ryder also sought to add as a potential factor the effect of dappled lighting conditions and also the contrast between the bright areas outside the forest and the dark areas within the forest. This is something that scopers need to be aware of and make attempts to manage, for example, by regularly moving their position so that they are not always looking into the sun.

811. In making the above observations regarding the different views of the experts, it must be said that Mr Norman is the only one of the experts who visited the site following the fire. That may warrant ascribing some additional weight to his evidence. However, his visit occurred only after the fire, and approximately 18 months after the scoping exercise conducted by Mr Jonas. His assessment was therefore afflicted by much of the same speculation that impacts upon the other experts' assessments. I am of the view that though visiting the site gave Mr Norman

the benefit of perspective and space such an advantage is not sufficient to persuade me to accept his opinion above those of the Messrs Lodge, Ryder and de Mar. Mr Smyth sought to distinguish Mr Norman's attendance at the site as being such that when he provided his opinion he was not doing so on the basis of speculation.

812. I am of the view that the experts were all giving their opinions in that manner and the fact that three of them had not been on site does not cause me to place such little weight on their evidence as sought by Mr Smyth. I am not content to prefer Mr Norman's evidence for that reason and I note that his evidence was untested as through no fault of his own he was unable to continue giving evidence in the proceedings.

813. I do wish to make clear that Mr Norman's absence is not the deciding factor, and though Mr Smyth is critical, describing it as a "nose-count" that Counsel Assisting posit a conclusion based on the evidence of the other three experts. Mr Smyth's submission disregards the value of their evidence which is unreasonable. I do not accept Mr Smyth's submissions as regard to the vegetation in the forest at the time of Mr Jonas's inspection. Mr Smyth did not think the court should have regard to the pre-fire photographs to assess the forest. Those photographs do not support his submissions that Tree 4 would have been visible from the easement (or as expressed by him that it would not be not visible. Those photographs show the area in which Tree 4 inhabited prior to the fire as a dense tree forest with high vegetation. That can be seen from the aerial photographs and the photograph taken on 31 January 2017. The vegetation was likely dense and difficult to see into, though Mr Smyth advanced many submissions why this was not so.

Conclusion regarding Tree 4

814. I accept Counsel Assisting's submissions that the Court could conclude that an appropriately trained scoper would, if they had observed the Tree 4 trunk, have been put on notice that it was a dead, dying or structurally unsound tree that warranted further investigation.

815. I also accept Counsel Assisting's submissions that the Court could not find, on the balance of probabilities, that an adequately trained scoper, assessing the potential presence of both Tier 1 and Tier 2 defects in the easement, would have seen Tree.

816. The reasons for this conclusion are as summarised by Counsel Assisting but except for c where Counsel Assisting used the term "may have" whereas I have found determined that it is "likely":

c. the scoper is likely to have been walking on the vehicular access track, which was positioned more than 20 metres away from the stump of Tree 4;

d. the likely obstruction of the dead crown of Tree 4 by the canopies of surrounding trees;

e. there were likely additional shrubs or vegetation present in the easement that obscured the scoper's view of Tree 4 from particular angles;

f. the change in elevation between the access track (or the pole alignment) and Tree 4 may have impacted upon the available view of Tree 4;

g. any view the scoper had of the tree is likely to have existed for only a brief period of time when the scoper was walking along the easement given the presence of other trees closer to the edge of the forest on either side of it; and

h. the areas within the forest would have been darker than the area in the easement, with the lighting conditions potentially making it more difficult to identify the different colouring of Tree 4 and its absence of bark.

Adequacy of the scoping

817. Vegetation inspection programs need to account for the fact that vegetation is dynamic in nature; trees near powerlines will continue to grow, be damaged by factors such as storm, drought and fires, and be subject to fungal infections, or termite infestation.

818. It is also necessary to account for the very large numbers of trees in the network that could potentially affect power lines. In short there are likely millions of trees within "fall-in range" of Essential Energy's electrical infrastructure. Many thousands of those trees are no doubt potential Tier 2 defects.

819. Having regard to those practicalities, the evidence before the Inquiry disclosed that the approach to ground-based scoping by vegetation managers involves a "limited visual assessment" approach in line with the VMCR (now VMR), with any Tier 2 defect trees identified to be reported for further or action. The relevant further action can take the form either of the immediate removal of the tree or a referral of the tree for further assessment by an arborist.

820. Even bearing in mind the practical restrictions on the capacity of Essential Energy and its subcontractors to comprehensively examine the easement for possible vegetation defects, it could not be said that the scoping and clearance works in the easement were adequate.

Adequacy of inspection for Tier 1 defects

821. Only one Tier 1 defect was reported in the easement as a result of the 13 December 2017 LiDAR scan. That encroachment remained 3.52 metres from the conduct and, as such, was unlikely to present a critical risk to the infrastructure at the time of the fire.

822. Nevertheless, the assessment and treatment of Tier 1 defects in the vicinity of the easement were not entirely adequately conducted in the period leading up to the fire.

823. First, as noted above, the Tier 1 defects that were identified in the two years prior to the fire were not remedied in accordance with the timeframes set out in the defect rectification schedule contained in the VMCR.

824. Second, the recurrent identification of Tier 1 defects as a result of inspections conducted within a reasonably short period of time suggests either that Tier 1 defects were not being adequately identified, or that cutting works in response to them were not conducted properly.

825. The electrical infrastructure in the easement was subject to one or more Tier 1 defects in the Bush fire danger periods in 2015/2016, 2016/2017, and 2017/2018. In those circumstances, Mr de Mar concluded:

> "On the face of it, the vegetation clearance inspection program implemented by Essential Energy during the 2015 to 2018 period appears inconsistent, untimely and inefficient, with Tier 1 defects being found in spans cut only 3 months earlier."

826. In addition to these issues in relation to Tier 1 defects, Mr de Mar observed that the clearance of vegetation in the easement proper did not appear to be compliant with the specifications provided for in the contract between Essential and Asplundh. However, Mr de Mar was mistaken as that compliance was only required in relation to spans of a certain length which those in the easement were not. In any event reviewing the photographs of the easement, Mr de Mar noted that regeneration of established trees was visible within 10 meters of the centre line of the electrical infrastructure. He observes that while the presence of this vegetation did not conflict

with minimum vegetation clearance specifications, its presence likely had two key effects: First, young trees not removed from the easement would require recurrent trimming as they grew taller. Second, the impact of such trees on the visibility into the forest edge along the easement boundary could have reduced the capacity of vegetation inspectors to locate Tier 2 defect trees.

827. Finally as concerns Tier 1 defects, Mr de Mar was concerned by the timing of the inspection cycle implemented by Essential Energy and its subcontractors. Mr de Mar summarised his concerns as follows:

> "In my opinion the vegetation inspection practices implemented between 2015 and 2018 suffered from timeliness issues, with inspections being carried out in summer, at least two months after commencement of the bushfire danger period, with vegetation defects not rectified until late in the bushfire danger period".

828. The 2017 LiDAR inspection provides an example of this. Mr De Mar expressed consternation in relation to this inspection on two bases: first, the timing of the inspection itself was problematic in that the inspection was conducted well into the bush fire risk period (i.e. after Summer had started); and second, the results of that inspection were not provided until the end of the relevant bush fire period (and only then after a specific request was made for the relevant results to be expedited in the wake of the fire). It is, in this respect, to be recalled that the VMCR provided for any Tier 1 defects identified during the bushfire season "to be rectified on a prioritised basis and be completed as soon as reasonably practicable."

829. Essential Energy address this issue in their submissions and point out that Mr de Mar at the time he proffered that opinion did not have access to Essential Energy's further evidence particularly that contained in Mr Kelleher's supplementary statement which should be set out: "The vegetation management programs were subject to change between 2016 and 2019, which likely contributed to Mr de Mar forming his views in relation to the consistency and timeliness of those programs." As to this, the further material produced by Essential Energy, which is not addressed [in Counsel Assisting Submissions] shows that:

    a) "V-Bega 1533 was subject to a PSBI inspection in March 2016. However, after 2016 the fire risk classification of V-Bega 1533 changed from "high risk" (under Essential Energy's previous classification system) to "P2", meaning it was no longer subject to a PSBI inspection (which only applies to "P1" areas);

b) in respect of the LiDAR program, there were changes in program strategy that resulted in the V-Bega 1533 area being inspected twice in three years:

   i. the LiDAR program commenced in 2013-14;

   ii. initially, the LiDAR vegetation component inspected about 20% of the rural network per year;

   iii. from about 2017, the LiDAR strategy changed to capture a larger proportion of the network. At the relevant time in March 2018, Essential Energy's LiDAR program covered approximately 60 of 107 designated rural depot areas. This component was designed to inspect the proportion of the network with the highest vegetation density, growth and expenditure for the purposes of improved network risk management and driving greater efficiency from vegetation programs;

c) Essential Energy expects that rural areas, such as V-Bega 1533, will be subject to a two-year maintenance cycle under the Cyclic Program, however the actual frequency of treatment may vary depending on the approved program schedule developed by Essential Energy's contractor for the purposes of the relevant contract.

Fifth, as to the carrying out of inspections in summer, it must be recalled that the bulk of Essential Energy's network is in bushfire prone areas. Given this, Essential Energy does not have the practical ability to confine its Cyclic or LiDAR programs to the period between March and October each year.

Further, it is a misconception to label as 'problematic' the timing of the LiDAR survey in December 2017. There is no practical benefit in timing the Cyclic and LiDAR programs to be completed before the bushfire season. The only program that is timed to occur before the bushfire season is the PSBI inspection program.

Essential Energy typically commences PSBI inspections in about February of each year in order for such inspections to be completed well ahead of 1 October of the same year. This allows Essential Energy sufficient time to remedy defects identified in the course of the PSBI

> inspections ahead of the bushfire season. The PSBI inspection program is only undertaken in areas designated 'P1'."

Adequacy of inspection for Tier 2 defects

830. Four different dead trees at four different points in the easement fell into the easement in the period surrounding the fire. Only one of those trees fell prior to the fire, but the other trees each had vulnerabilities that might, in the absence of the fire, have caused them to fall at some other time. In the case of three of those trees, the fact of their death clearly should have been identified, and the potential for them to fall on the powerlines further assessed.

831. Moreover, the four trees that fell into the easement were not the only potential Tier 2 defect trees that were not identified; there were at least a handful of dead or dying trees on, or very near to, the edge of the forest. None of those trees were flagged for assessment or removal.

832. Mr Lodge and Mr de Mar both concurred in this respect.

833. By way of potential explanation for this failure, Mr Lodge stated that from the evidence he had reviewed as at the time of his first report, it did not appear that the assessments undertaken focused on the potential for Tier 2 defects.

834. Mr de Mar sought to explain the failure in the following terms:

> "To miss all four dead trees would, in my opinion indicate that the scoper was not being particularly observant for dead trees. If however, he was operating on the understanding that his requirement was only to report dead trees that were structurally unsound according to his judgement from where he saw them, then it is possible that none were reported because he did not consider them to be structurally unsound based on what he could see."

835. The fact that no Tier 2 defects were identified by anyone conducting vegetation management activities in the easement suggests that the failure to identify any Tier 2 defects in the easement was not merely a product of some deficiency in Mr Jonas's practice, but rather an issue regarding the training and guidance provided to personnel involved in scoping activities, in particular as concerns the emphasis placed on Tier 2 defect trees.

836. Mr Uebe agreed that prior to the fire, the focus was on Tier 1 rather than Tier 2 defects:

"Yeah, the focus was on the tier 1 defects, yes. Heavily - more - I wouldn't say that there was no focus on tier 2 defects. We definitely were focused on tier 2 defects but tier 1 defects were the main - was the higher level of focus, yes."

837. Mr Wyper's evidence was consistent with Mr Uebe's in respect of the focus on Tier 1 trees as opposed to Tier 2 trees in the context of training and induction. He stated that as at December 2016:

"I would say that there was more of a focus on tier 1, yes as directed by Asplundh and inadvertently [sic] Essential Energy."

838. The following exchange then took place:

" Q. Why do you say that, that there was a direction from Asplundh and indirectly Essential Energy to focus more on tier 1 defects at that time?

A. Because primarily that was what was required at the time, there was more focus on the tier 1. Not to say that we shouldn't be assessing tier 2."

839. The conclusion that Tier 2 defects were a secondary consideration in the period prior to the fire draws further support from the increased emphasis placed on such defects from early 2018 onwards.

840. That increased emphasis is perhaps most clearly illustrated by the terms of a briefing paper distributed by Mark Bennett to Asplundh, Pinnacle and Line Sight Scoping personnel in February 2018. It included the following terms:

"Hazard trees, have been identified as one of the number one risks to Essential Energy's business, with incidents of "Hazard Trees" being identified as a network risk not having the correct follow up procedures in place resulting in network incidents.

As a result of the IPART investigation, Essential Energy have undertaken internal audits on Hazard Tree identification, with results showing a large number of Hazard Trees being unidentified in Pre List Inspections, Hazard Trees that had been identified, still showing an incomplete status of over 180 days (6 months) and tasks being identified as a Hazard Tree where upon investigation, trees identified posed no risk to Essential Energy's network.

> Essential Energy have instructed Asplundh review current scoping procedures when identifying Hazard Trees and Defect rectification timeframes".

841. The increase in focus on Tier 2 trees also manifested in a change to Essential Energy's practices. From January 2018, Essential instituted a *Hazard Tree Program* which resulted in Essential conducting its own scoping work to assess possible Tier 2 defect trees.

842. After the bushfire, all Pinnacle scopers were stood down until they undertook hazard tree training. Additionally, Mr Donlan recalls that scopers "all got sent out to do massive hazard tree audits". In respect of additional measures introduced by Asplundh and Pinnacle after February 2018, Asplundh's submissions seek to limit the changes that were made to relate only to "process of recording and communicating Tier 2 defects". I do not accept that was the case at all.

843. In the period since the fire, Essential Energy has taken steps to review the training in hazard tree identification and to require all new contractor personnel to complete training in topics including hazard trees in the network, tree growth and visible defects, as well as in relation to organisms that attack wood. Additionally, contractor personnel are now required to undertake a practical assessment as part of the process of delivery of Module *UETTDRVC24A – Assess vegetation and recommend control measures in an ESI environment*. Despite the weight of the evidence against them, which has been examined in detail, Asplundh maintains a position in their submissions that the training was sufficient and that Tier 2 defect trees in the easement were not identified because they could not be seen at the various times the inspections were conducted.

Termination of Mr Jonas's employment

844. Ultimately, Mr Jonas's employment with Pinnacle was terminated on 25 April 2017. Mr Jonas recalled that Mr Uebe had told him, in providing reasons for the termination, that he had "missed a couple of trees".

845. Mr Uebe provided Mr Jonas with a letter that identified several issues with Mr Jonas's work. The Inquiry was provided an undated, unsigned version of that letter. The issues regarding Mr Jonas's performance were specified in the letter as follows:

- Missing spans altogether in a work pack;
- Failing to identify poles that require clearing;

- Failing to identify services that require clearing;
- Failing to request a removal when a removal was clearly required; and
- Failing to identify trees that require trimming on a sub transmission line.

846. Mr Uebe could not recall how long before Mr Jonas' employment was terminated that he was provided with this letter; he indicated that it would "have only been a few months".

847. There was some question in the Inquiry as to whether Mr Jonas had ever identified a Tier 2 defect. Mr Jonas gave evidence that he did not recall ever identifying a tree as a fall-in tree because it was dead, dying or structurally unsound. Additionally, Mr Worley's evidence was that he did not recall receiving any notification of tier 2 defects between his commencement at Bega in November 2016 and the time of the fire.

848. Contrary to this, the supplementary statement of Mr Brent Kerrisk dated 19 August 2020 states that Mr Jonas identified two Tier 2 defects in the V-Bega 1533 area on 8 December 2016: first, dead wood in some conductors overhanging some conductor lines; and second, a dead tree. The first of these defects, however, is said in the relevant "load sheet" to fall in the "Overhang" category and the "notes" section suggests that the "dead wood" was associated with the removal of some regrowth. There is no express indication that the entry related to a Tier 2 defect. The second of these defects is recorded as an A3 Tier 1 defect, with the "notes" section recording "CLEAR SPAN AT THE MEDOWS REEDY SWAMP ROAD AND DEAD TREE". The work type is recorded as "Standard Trim".

849. While this evidence suggests that Mr Jonas did, on at least some occasions, identify Tier 2 defect trees, it underscores the need for a greater emphasis on them in the reporting system.

850. In any event, the concerns with Mr Jonas' performance were such that around the time of his termination, audits were conducted of scoping work he had performed. There was some inconsistency in the evidence as to how these audits came about, and exactly what they sought to address.

851. Mr Uebe gave evidence that the auditing of works performed by Mr Jonas occurred at the initiative of Pinnacle rather than by way of a formal request from Asplundh. As part of that process, Mr Uebe discussed the conduct of a 100% re-audit of Mr Jonas' recent works with Mr Bennett and Mr Kerrisk. The audit was focused particularly on spans that Asplundh had not yet cut.

852. Mr Uebe and Mr Donlan's recollection of the audit was at odds with Asplundh personnel's recollection; Mr Bennett, for example, stated that he was under the impression that Mr Donlan undertook a 100% audit of the V Bega 1533 VMA. That said, Mr Bennett was not aware of any document recording a request for such a re-scoping to be completed.

853. Mr Wyper denied receiving a request from Asplundh to undertake a 100% rescope of Mr Jonas' scoping work in the V Bega 1533 area.

854. Mr Uebe considered that the scoping work performed by Mr Jonas in the V Bega 1533 area on 12 December 2016 were not within the scope of "recent works" to be subject to a 100% audit.

855. Mr Donlan gave evidence that he was asked to check some of Mr Jonas' work for the "first couple of hours" of a training day. As part of that process, Mr Donlan travelled to the V Bega 1533 area. He states that he was not told to conduct an audit of the entire area. His audit did not take in the easement. In fact, he only examined the V Bega 1533 because it was closest to Bega, where the training he was undertaking that day was taking place.

856. The records of Mr Donlan's audit reveal four defects identified in the V-Bega 1533 area, including one A1 defect within 50 cm of the line. Consistent with Mr Donlan's evidence, none of the recorded defects were in the area of the easement. Mr Donlan's audit of the area did not identify any Tier 2 defects.

857. In light of Mr Donlan's and Mr Uebe's evidence, it would seem that Asplundh did not make a formal request of Pinnacle to conduct a 100% rescope of the V-Bega 1533 area.

Concluding matters relating to submissions

858. Though the inquiry is an examination of the matters raised in the issues list, Mr Smyth takes a different approach and seeks findings in a manner as explained by him:

"The specific findings the Victims seek, and the way we slot them into the structure of the Issues list, are that the vegetation in the vicinity of the Electrical Infrastructure (as defined) was not appropriately managed, in that:

i. vegetation, including Tree 4, was not 'adequately' assessed or cleared in the sense that it was not assessed or remediated in accordance with the requirements of the VMCR (Issue 6); and

j. Essential's systems for selecting, training and auditing those tasked with undertaking scoping was not adequate or appropriate (Issue 7(b)).

As to the findings and recommendations sought under Issues 8 and 16(a),(sic) the Victims contend for findings as to remediative measures that ought to have been taken / recommendations for the future.

Accordingly, we seek the following general finding but – to be clear – we seek it as a 'blanket' finding covering the more specific findings and recommendations we have just mentioned:

that Essential and its subcontractors did not appropriately manage the vegetation in the vicinity of the Electrical Infrastructure (as defined in the Issues List).

6(a) did not remediate Tree 4 in accordance with the terms of the VMCR; and therefore within the two years from September 2015 mandated by the Contract, or at all prior to the fire. Tree 4 met the VMCR description of a Tier 2 defect tree by no later than December 2016 (and likely significantly earlier);

Tree 4 would have been detectable as such by an adequately trained scoper undertaking her or his duties in accordance with the VMCR in December 2016 and ought accordingly to have been detected as such at that date, and remediated shortly thereafter but in any event before March 2018; and

in view of findings (a) and (b), Essential failed adequately to assess the risk Tree 4 posed to the Electrical Infrastructure."

859. For the reasons already expressed in these findings, I have determined that a scoper from the position of the easement on a visual assessment would likely not have seen Tree 4. Accordingly, I would not be making any of the findings that are

put forward by Mr Smith. The issues relating to the vegetation management have been examined in detail and are set out in these findings.

860. Mr Smyth supports the recommendation proposed at (d) of Counsel Assisting's submissions but submits that the recommendation not contain the word "consider". He sought a firmer recommendation that scopers be provided with rangefinders. There is much force to his submissions in this respect. In particular, he refers to Mr Lodge's evidence who expressed his concern that scopers would not be able to accurately measure between the powerline on the opposite side of the track and the trees to determine whether or not they have an encroachment.

861. Mr Smyth also points out though there was no evidence that they are moderately priced. I note that Essential Energy, Asplundh and Pinnacle accept the recommendation already advanced by Counsel Assisting. Despite Asplundh not opposing the recommendation in their reply submissions they objected to Mr Smyth's submissions on the misconception that he was advocating that a rangefinder would be used to identify Tier 2 characteristics.

862. Mr Smyth appearing for insurers and owners of properties chose the word "victims" to refer to those he represents. That has been rightly criticised by Essential Energy for being an attempt to evoke an emotional bias. I have no doubt that the persons who have lost their homes and treasures and in some cases their livelihoods and some relationships due to the Reedy Swamp Bushfire feel completely wronged. That the fire should not have happened and that they should not have suffered is apposite. There should be scrutiny and accountability about such events which has occurred in this Inquiry. That accountability does not extend to blame and recompense in this jurisdiction. I have not referred to all of Mr Smyth's submissions in these findings as some, like other submissions received by other parties, did not take matters any further than Counsel Assisting. I have read each parties submissions and those in reply more often than was probably necessary and though it has not been practicable to produce findings that comprehensively refer, in terms to each specific point made, I have taken them into account but for the portions where matters not in evidence were referred to.

863. Mr Smyth has an excellent understanding of bushfires and the impact of electrical infrastructure with vegetation and he is right to advance a position that if electricity lines are run through bushland that the vegetation needs to be maintained so that it does not come into contact with the infrastructure. He is right to expect response and change arising from the 2009 Victorian Bushfires and this 2018 Reedy Swamp

Bushfire and the IMPART audit. Whilst the risk is impossible to eliminate the risk needs to be minimised as best it can be. If that measure is solely cost determined then it is not going to be borne by the customer or the shareholder so the only ones left are to use Mr Smyth's term the "victims". There does need to be a better way to deal with this problem which has vast issues and complexities far beyond the purposes of this inquiry.

864. As I have identified above, formal findings are entered as follows:

> The fire that impacted on the town of Tathra and its surrounds on 18 March 2018 commenced between approximately 12.15pm and 12.20pm in the electrical easement (**the easement)** that runs in a north easterly direction in the vicinity of 580 Reedy Swamp Road, Reedy Swamp. The fire was caused by the impact between a falling tree (identified in this Inquiry as Tree 4) and an electrical conductor line (identified in this Inquiry as Line 2). As a consequence of that impact, Line 2 fell to the ground between the poles identified in this Inquiry as Poles C and D. The contact between the line and the ground resulted in electrical arcing, which ignited vegetation in the easement.

865. The following Recommendations are proposed by Counsel Assisting in relation to the Vegetation Management portion of the Inquiry.

a. <u>That Essential</u> give consideration to seeking a revision to the VMCR/VMR such that the nomenclature applied to "grow-in" (Tier 1) hazards and "fall-in" (Tier 2) hazards be changed so as to avoid the implication that fall-in hazards are subsidiary to grow-in hazards.

b. <u>That Essential</u> consider reviewing the guidance provided in the VMCR/VMR to:

   i. clarify that a given dead, dying or structurally unsound tree that is seen from the perspective of the network assets should be designated a Tier 2 defect even where further investigations are necessary to assess the hazard the tree poses to the network; and

ii. confirm that a scoper is not themselves required to conduct an assessment of the structural integrity of a tree before reporting it as a Tier 2 defect.

c. That Essential, Asplundh and Pinnacle review the training, guidance material and assessment provided to scopers to:

i. ensure that adequate training in tree risk assessment and visual tree assessment is provided to scopers;

ii. ensure that scopers' capacity to identify dead, dying or structurally unsound trees is adequately assessed; and

iii. ensure that adequate guidance is provided in relation to when it is necessary to conduct scoping work on foot, rather than in a car or from a stationary position.

d. That Essential, Asplundh and Pinnacle consider providing rangefinder binoculars or devices with similar functionality to all scopers.

e. That Asplundh and Pinnacle review the software used by scopers to ensure that it appropriately prompts scopers to consider Tier 2 defects and enter details regarding them.

Essential Energy's Response

866. Essential Energy supports the making of recommendations (a), (c)(i)-(ii), and (d)-(e)

867. Essential Energy supports the recommendation in paragraph (c)(iii) provided it is understood that any such guidance should not seek to interfere with the ability of scopers to make reasonable risk-based assessments, having regard to all of the relevant circumstances.

868. Essential Energy does not support the recommendations at paragraphs (b)(i)-(ii) for reasons already discussed and including:

a. these recommendations are inconsistent with the intention of ISSC 3 and the VMCR (now the VMR);

b. clarifying or amending the VMR (which only applies to Essential Energy) would potentially place Essential Energy at a disadvantage compared to other NSW distributors, which are operating in accordance with ISSC 3; and

c. insufficient evidence has been received about, and consideration given to, the likely cost consequences.

869. In this respect, Essential Energy notes a potential inconsistency between emphasising the need for further training to improve the capability of scopers to identify Tier 2 defects while requiring them to identify such trees for further assessment by other persons (see paragraphs 250(b)(ii) and 250(c)(i) of the CA VM Submissions).

870. The submission in relation to cost and the intention of the ISSC 3 Guide go hand in hand. If the clarification between the VCMR/VMR and the ISCC 3 Guide as advanced by Counsel Assisting prevailed Essential would need to adopt a Vegetation Management programme that would, it is submitted, significantly increase operating costs which could only be recovered through the Australian Energy Regulator (**AER**).

871. Essential Energy say such a program would put them at significant commercial disadvantage as all others comply with the ISCC 3 guide and according to Ms Lindsay's evidence it would be extremely unlikely that the costs could be recovered from the AER and she points to an 2014-2019 application by another electricity provider seeking funding to comply with minimum risk standards regarding clearance distance between mains and vegetation. Apparently the application was rejected because the AER considered that the company could carry out the works within the operating budget of a prudent and efficient service provider to achieve its objectives.

872. The implications of undertaking a clarification as proposed by Counsel Assisting are not matters which this Inquiry is concerned. Essential's resistance to them may be reasonable from their perspective but it may not be so from many other perspectives. If the consequences of the lack of clarification as identified in these findings is such that a "hands-off" approach continues then it is likely that the problems identified will never be addressed.

873. That an electrical distributor conducts their vegetation management with such limitations may not be managing the risk to an appropriate standard. The recommendation that consideration be given to clarifying that position is desirable so that bushfires caused by vegetation coming into contact with electrical infrastructure are prevented when and as often is possible in the circumstances. I make the recommendation,

874. Asplundh is response to the recommendation (c) do not indicate any objection or support but comment that there is uncertainty about what adequate means and how much it would the recommendation would cost to implement. In relation to (e) Asplundh opposes the recommendation on the basis that it is unnecessary and in any event they don't know what the word "appropriate" refers to. It is plain that the word "appropriate" is intended to ensure that the system emphasises Tier 2 defects in a way that is likely to result in scopers paying sufficient attention to them. I make the recommendations and suggest that Asplundh consult with Essential in connection with each of the recommendations).

875. There is force in Mr Smyth's submission that the evidence demonstrates that a scoper should be provided with a rangefinder. Accordingly, I amend proposed recommendation (d) and recommend that is amended from "considering providing" to: "ensure that rangefinder binoculars or devices with similar functionality are provided to all scopers".

    d. <u>That Essential, Asplundh and Pinnacle</u> ensure that rangefinder binoculars or devices with similar functionality are provided to all scopers.

This Inquiry is now closed

Magistrate E Truscott

Deputy State Coroner

17 December 2021