



UFU RESPONSE TO DRAFT RISK ASSESSMENT METHODOLOGY DISCUSSION PAPER

19 November 2021

Part 1: Introduction

1. The United Firefighters Union of Australia is a registered federal union of career firefighters and fire service employees employed by fire services in Australia. The Victorian Branch of the United Firefighters Union of Australia (**UFU**) represents professional firefighters, emergency call centre employees and fire agency corporate, administration, hospitality, technical and mechanical employees employed across a range of agencies.
2. On 20 June 2019, the *Firefighters Presumptive Rights and Fire Services Reform Bill 2019* passed the Victorian Legislative Council. In addition to providing access to presumptive rights legislation to all Victorian firefighters, abolishing the Metropolitan Fire & Emergency Services Board (**MFESB**), and creating Fire Rescue Victoria (**FRV**), the Bill also provided for the establishment of an independent panel, the Fire District Review Panel (**FDRP**).
3. The role of the FDRP is to provide advice to the Minister for Emergency Services with respect to the FRV Fire District, specifically whether it should or needs to be changed. The FDRP must undertake 4-yearly reviews of the FRV Fire District, or upon the request of the Minister.
4. The object of the FDRP review is to conduct a “risk-based assessment of responsibility” having regard to any change in fire risk within the FRV Fire District and country Victoria. Following a process, the FDRP must ultimately report its findings to the Minister and can also recommend changes to the FRV Fire District.
5. The FDRP was established at a critical time for Victoria. For almost 40 years, there was no independent oversight or critical analysis or review of Victorian fire boundaries. The previous Country Fire Authority (**CFA**) and MFESB boundaries were enshrined in statute and were static.
6. The FDRP provides an opportunity for the FRV Fire District to grow to adequately respond to the growth in Victorian population, infrastructure, major hazards, etc. and to meet the expectations of the Victorian community.
7. On 20 September 2021, the newly established FDRP provided its draft Risk Assessment Methodology Paper (**the draft Paper**) to the UFU and invited comment.
8. On 15 October 2021, members of the FDRP and representatives of the UFU met to discuss the draft Paper and the work of the FDRP more broadly. ██████████ delivered a presentation in relation to fire risk methodology. As a result of this presentation, the

UFU identified a key area of inclusion in the draft Paper and advised that it would focus its response to the draft Paper on **standards of fire cover**.

Part 2: The use of sound data sets to inform the FDRP

9. The draft Paper and subsequent presentation indicated that several, statistically-sound data sets would be relied upon by the FDRP in conducting its analytical work. For example:
 - Population density;
 - Socio-economic;
 - Land-use;
 - Preparedness.¹
10. The FDRP, during its presentation to the UFU, also indicated that the following data would be drawn upon:
 - Fire incident data;
 - Capacity and capability data;
 - Road network data;
 - Australian Bureau of Statistics;
 - Planning Victoria; and more.
11. The UFU welcomes the use of statistical data to inform the work of the FDRP. The UFU has long supported full transparency of fire service data, inclusive of response time data.
12. However, the UFU respectfully cautions the FDRP against the use of fire service data without scrutiny and without context. Examples of possible scenarios where further scrutiny (ie a complete and holistic view) would be required of fire service data:
 - Where FRV responds outside of the FRV Fire District, arrives first on scene and commences (and sees through) operations. Whilst community service delivery is met, and this would likely be represented in response time data, the particular brigade/station or fire agency's *own* service delivery is skewed.
 - Where a Hazard Class 3 brigade is meeting its service delivery targets. Some brigades are incorrectly classified. For example, some brigades are classified as CFA Hazard Class 3 (low urban), however the area's demographics are better reflected by Hazard Class 2 (medium urban).
 - Where there is a discrepancy between the response reported by the responding appliance and the actual response. For example, where a volunteer responds to a fire incident (via a portable radio in their private vehicle), but the brigade

¹ FDRP Risk Paper, page 12, <https://www.vic.gov.au/fire-rescue-victoria-fire-district-review-proposed-risk-assessment-methodology-discussion-paper>, accessed 19 November 2021.

truck has not responded ie. has not actually left the brigade. This creates a discrepancy between that reported and the reality.

13. The UFU submits that corroboration of fire incident data could occur by accessing datasets held by Emergency Services Telecommunications Authority (**ESTA**). ESTA datasets, in particular the CAD Detail that could be extracted, provide a line-by-line radio transcript between ESTA (including the on-duty Fire Services Communication Controller) and the volunteer or Officer on the fireground. Access to ESTA data, more broadly, could also assist the FDRP in understanding issues on the fireground relating to crew size and crew efficiency.

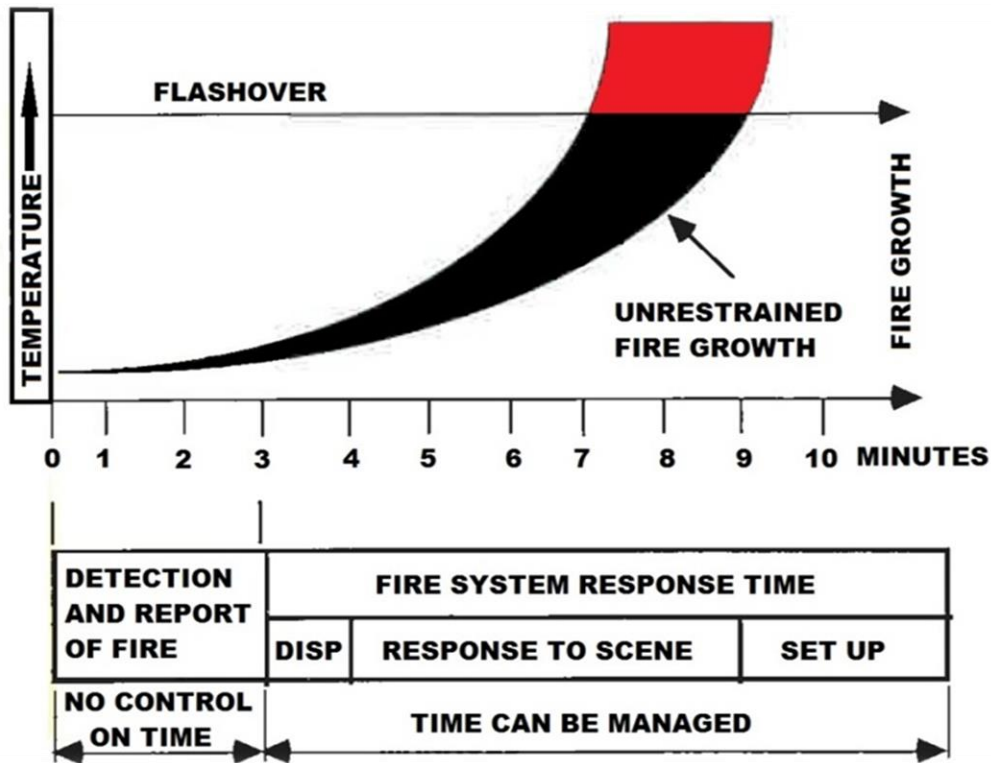
Part 3: Standards of fire cover

14. The UFU respectfully submits that the draft Paper be amended to include a key fire service factor: **standards of fire cover**.
15. It is respectfully recommended that the draft Paper be amended to include a history and explanation of the current standards of fire cover adopted by FRV and CFA, as this will increase transparency about agency expectations and agency response, and will inform the Victorian community about the standard of fire cover under which they are covered.

What is a standard of fire cover?

16. A standard of fire cover is a term to describe “the level of service provided for the control and suppression of fire”.² Standards of fire cover are informed by and should reflect accepted fire science.
17. To maximise the prevention of loss of life and minimise damage to property, fire services mandate a quick response by applying standards for the firefighters to respond to emergencies. Response standards are the difference between life and death. The time in which the fire service responds, and the number of qualified and trained firefighters at the incident within the required time determines whether a rescue can be performed, whether a home or business can be saved and directly impacts on the safety of firefighter.
18. Fire service response time standards are underpinned by scientific research.
19. For structure fires, there is a correlation between the point of fire in the room (ignition), rapidly increasing temperatures towards the ceiling of the room, and point of unrestrained fire growth. These physical characteristics of fire cause a dynamic simultaneous ignition of most combustible materials and gases, which is known as **flashover**.
20. Flashover can be demonstrated diagrammatically as follows:

² 33rd Report to the Parliament, Report of the Public Bodies Review Committee into the Metropolitan Fire Brigades Board (Inquiry into the Metropolitan Fire Brigades Board), 1994, page 16, para 2.1.4.



21. To maximise the prevention of loss of life and minimise damage to property, former MFESB Firefighters were required to turn out of the station within 90 seconds and the first appliance was required to arrive with crews commencing fire operations within 7.7 minutes for structure fires. This standard was implemented to respond to fire science at the time. This remains the standard for FRV. The CFA does not employ this standard.

Standards of fire cover in Victoria

22. The Victorian fire services have historically had two different standards of fire cover.
23. As explained above, for the former MFESB, Firefighters were required to turn out of the station within 90 seconds and the first appliance was required to arrive with crews commencing fire operations within 7.7 minutes for structure fires. Again, this remains the standard for FRV.
24. The CFA standard of response varied due to the ‘hazard classification’ of the brigade. The hazard classification (medium urban, low urban or rural) determines a response time of 8, 10 or 20 minutes.³

³ CFA Emergency Response Times, <https://www.cfa.vic.gov.au/about-us/publications/emergency-response-times>, accessed 14 November 2021.

25. Prior to the Victorian Government’s Fire Services Reform, CFA comprised of both professional career firefighters and volunteers. As such, the CFA employed two standards of fire cover:
- Career firefighter standard – Required to turn out of the station within 90 seconds and arrive on scene within 7.7-8 minutes for structure fires (note: Former CFA career firefighters are now employed by FRV);
 - Volunteer firefighter standard – Generally required to turn out of the station within 4 minutes and be on the scene from 8 to 20 minutes depending on the hazard classification. This remains the CFA standard.

Weight of attack

26. In addition to the above response time standard, the MFESB would also dispatch two appliances to each standard structure fire. This ensured at least seven firefighters on the fireground for effective and safe fireground operations.
27. The requirement for at least seven firefighters on the fireground also has its scientific origins.
28. The “seven on the fireground” standard originates from a 1998 United Kingdom Home Office Report that reviewed fire services’ standards of fire cover and systems of work.⁴ In the 1998 Report, a minimum of seven firefighters on the fireground is required to satisfy safe systems of work. This number increases to a minimum of nine firefighters in the event of ‘persons reported’ in a structure fire (ie. persons trapped). This number ensures effective fireground operations and, most importantly, ensures firefighter safety.
29. The seven on the fireground standard ensures firefighters can attack structural (building) fires safely, specifically:
- Two firefighters in BA to enter the structure to perform any necessary internal attack and/or rescue (firefighters should not enter a structure fire alone and should work in pairs in order to meet OH&S best practice - this is to ensure a firefighter is available to render assistance if the other firefighter requires it).

⁴ Out of the Line of Fire, Modernising the Standards of Fire Cover: Report of the Joint Committee on the Audit Commission Report to the Central Fire Brigades Advisory Council, Fire and Emergency Planning Directorate, Home Office, July 1998.

- Two firefighters outside the structure in BA to comply with the “two in two out” principle which requires that for every firefighter in BA, there needs to a replacement firefighter in BA ready to relieve or assist.
 - One firefighter to operate the pump. Pumps can be operated automatically but this is not a safe system of work as a pump operator is responsible for monitoring the operation of the pump which of course is the key equipment to provide water.
 - A BA safety officer who monitors the entry and exit of fire-fighters in BA and the time/air available of those in BA. This is a key role on at a structure fire where BA is always required.
 - An OIC to undertake the initial assessment of the incident and direct the crew on scene to undertake the necessary duties as well as communicate via radio with the communications centre relaying information and any requests for escalation or further assistance.
30. The “two-in, two-out” approach for structural firefighting has been accepted as a fundamental safety principle.⁵
 31. The above safe fireground operations are facilitated by the pre-determined alarm level dispatch system utilised by the MFESB, and now FRV, known as the Greater Alarm Response System (**GARS**). GARS ensures that adequate resources (both in terms of number and type of appliances and numbers of trained personnel) are rapidly responded to the emergency incident.
 32. As such, the standard of fire cover employed by the MFESB, and now FRV, appropriately classifies the risk, ensures rapid response to fire/emergency from a strategically-located fire station and by its 7.7 minute Key Performance Indicator (for structure fires), and also ensures the most appropriate weight of attack (in personnel and type of appliance) via GARS.
 33. Since the commencement of FRV, 13 of the 38 FRV (former CFA) fire stations have been gradually included in the GARS response.
 34. CFA does not have an equivalent or similar dispatch system.

⁵ United Firefighters Union of Australia v Transfield Services Australia Pty Ltd [2007] AIRC 781.

Field Experiments

35. Further to the 1995 and 1998 Home Office Reports (UK), crew sizes and implications for specific fireground tasks and outcomes were later examined in the 2010 National Institute of Standards and Technology (NIST) Report on Residential Fire Ground Field Experiments and the 2013 NIST Report on High-Rise Fire Ground Field Experiments.

Residential experiments⁶

- Different standards of fires – slow, medium and fast-growth rate fires, were tested and proved that fires grow exponentially with time.
- There was a significant difference between the toxicity for occupants of the residence depending on the time of the arrival of the fire crew. Occupants rescued by an early crew suffered less exposure to combustible products than those rescued by a later crew.
- “The fire modelling showed clearly that a 2-person crew cannot complete essential fireground tasks without subjecting them to an increasingly toxic atmosphere”. This exposure would be a significant risk, particularly to children and the elderly. The experiments showed 50% of the general population would be incapacitated if only a two-person crew responded to a fast growth-rate residential fire requiring rescue.
- The Residential study found that 4-person crews operating on a residential structure completed all tasks on the fireground seven minutes (30%) faster than a 2-person crews.
- The 4-person and 5-person crews started and completed a primary search 6% faster than a 3-person crew and 30% faster than a two-person crew.
- An effective response force was assembled by a 5-person crew three minutes than a 4-person crew.

High-rise experiments

- The High-Rise study showed that the number of fire service crew members responding to a fire had a dramatic effect on the crew’s ability to protect lives and property. The research showed that 3-person crew ascending to a medium growth rate fire on the 10th floor “confronted an environment where the fire had released 60%

⁶ NIST Report on Residential Fire Ground Field Experiments: Executive summary.

more heat energy than the fire encountered the 6-person crews doing the same work⁷ – exposing the smaller crew to greater risks and more challenges.

- On average 3-person crews took nearly an hour to complete their fire response, while crews of 6 required a mean time of just under 40 minutes.⁸
- Putting water on the fire is one of the most important tasks. In the high-risk experiments, a 3-person crew took 8.5% longer than a 4-person crew to roll a hose line from the water source to the fire, and 2 minutes 4.7 seconds longer (13.9%) than a 5-person crew, and 4 minutes 28 seconds longer (22.3%) than a 6-person crew.⁹
- The size of crew had a dramatic impact on search and rescue. Four-person crews successfully removed the person from the building 25.1% faster or 13 minutes and 11 seconds faster than the 3-person crew. Six-person crews started the search 22% faster and completed the search 47% faster than a 3-person crew. The 6-person crew successfully performed the rescue 38.1% faster than 4-person crews and 12% faster than 5-person crews.¹⁰ The differences in the time taken to perform a second rescue by the different-sized crews increased even more.

Modern fire science

36. Fire science now demonstrates that the time taken to reach the point of flashover is now notably quicker due to a change in key variables, being the construction of the building and furnishing materials.
37. The change in construction materials, most notably the increase in use of synthetic products, has rapidly increased the time it takes for fire to spread and reach the point of flashover.
38. The Firefighter Safety Research Institute (**FSRI**) last year published a side-by-side video comparison of flashover that demonstrates the time it takes to reach the point of **flashover** in a modern living room with modern furnishings compared with an older living room with older furnishings.¹¹ This recent research confirms that the point of flashover for a modern home is **4.50 minutes**.
39. This is a subject of interest of fire services and key organisations abroad, including the Metropolitan Fire Chiefs Association (**MFCA**). The MFCA, in its recent position statement “Effect of Crew Size on Firefighter Health and Safety”, states:

⁷ NIST Report on High-Rise Fireground Field Experiments, Executive Summary, page 1.

⁸ NIST Report on High-Rise Fireground Field Experiments, Executive Summary, page 5

⁹ NIST Report on High-Rise Fireground Field Experiments, Executive Summary, page 5

¹⁰ NIST Report on High-Rise Fireground Field Experiments, Executive Summary, page 6

¹¹ <https://fsri.org/research/new-comparison-natural-and-synthetic-home-furnishings>

“Firefighters are facing an unprecedented level of risk in today’s fires because of widespread use of synthetic building materials and furnishings, lightweight construction, larger buildings, and more open floor plans.”¹²

40. Indeed, the international -recognised standard of fire cover, as dictated by the NFPA 1700, was recently clarified to “*indicate the **first unit must arrive within 4 minutes’ travel time** and all units must arrive within 8 minutes travel time*” (emphasis added).¹³ Further information relating to response times is included below.
41. The UFU notes, with emphasis, that the fast-developing New Growth areas in Victoria like, for example, Armstrong Creek, Clyde North, Wallan, Woodstock, contain modern homes that were built with modern construction material.

¹² UFF Position Statement “Effect of Crew Size on Firefighter Health and Safety”, <https://www.nfpa.org/-/media/Files/Membership/member-sections/Metro-Chiefs/Urban-Fire-Forum/2021/3-Crew-Size-and-FF-HS-UFF--Adopted.ashx>, accessed 14 November 2021.

¹³ NFPA 1700, 2020 Edition. Full copy of NFPA 1700 available for purchase via <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1700>.

Part 4: Maintaining transparency via response time reporting

42. In undertaking its analysis, the FDRP will inevitably require accurate fire service response time data. It is important that both the FDRP, and the community, understand that accepted response times are underpinned by fire science.
43. Fire science dictates that firefighters must **rapidly respond** and should **contain the fire to its room of origin**. Fire stations should be **strategically located** (as opposed to historically located) to ensure a brigade/station can rapidly respond to the emergency and arrive on scene with adequate time, qualified personnel and appropriate appliances/equipment to commence firefighting operations.
44. Since 2017, MFB and CFA (and now FRV) response time data has been published online.¹⁴ This data is published quarterly and encourages transparency of fire service performance.
45. This data is particularly important as all Victorian property owners pay a Fire Services Property Levy. Since 1 July 2020, all Victorians have paid the same property levy (classified by property type) irrespective of whether they are covered by FRV or CFA.¹⁵ That is, irrespective of the standard of fire cover, all Victorians pay the same Fire Services Property Levy.

Attempts to shift the goal post:

Brigade Area Response

46. CFA response time data includes: Number of incidents within the Brigade Area, number of emergency incidents within the Brigade Area, Community Response and Brigade Area Response.
47. Brigade Area Response is a crucial component of response time data. This component of the data assesses the specific brigade or station's own response. After three years of reporting Brigade Area Response, CFA removed this component from its published data for Quarter 1 July – 30 September 2020. CFA kept the "Community Response" component of the data. In doing this, CFA distorted the response for the particular Brigade, as "Community Response" could (and does) reflect, for example, response

¹⁴ See, for example: <https://www.cfa.vic.gov.au/about-us/publications/emergency-response-times> and <https://www.frv.vic.gov.au/response-times>.

¹⁵ Fire Safety State Revenue Office, <https://www.sro.vic.gov.au/fire-services-property-levy>, accessed 17 November 2021.

times being met for a CFA area due to FRV appliances responding out of the FRV area and into the CFA area and arriving first on scene.

48. With the matter having been raised, subsequent CFA datasets published have reinserted the “Brigade Area Response” data. The “Brigade Area Response” component of response time data is crucial to maintaining integrity of this published data.

The move away from Response Time Data as a Performance Measure via the Fire Services Implementation Monitor

49. The Fire Services Implementation Monitor (**the FSIM**) is a further statutory body established in 2019 as a result of Fire Services Reform. The FSIM is tasked with assessing the progress of FRV and CFA in carrying out the Minister’s Implementation Plan.¹⁶ The FSIM publishes its quarterly reports online.
50. In the FRV Outcomes Framework Year 1, under Domain 2.1, FRV mentions ‘Responses to benchmarks’ as an Outcome Indicator. However, in the CFA Outcomes Framework Year 1, under Domain 2.2, the CFA refers to a vague Outcome of ‘Fires are suppressed quickly and effectively’. One of the Indicators is ‘Increase in containment to room of origin’ as an output. This appears to be the only indicator that the CFA measure in the FSIM.
51. Historically, response times to structure fire benchmarks have been an **output**, but the CFA did not include this crucial data. Instead, the CFA has introduced a new indicator of ‘Decrease in average time spent suppressing structure fires (time spent on scene)’. This language is also apparent in the FSIM 2020-2021 Quarter 3 Report. The CFA uses language of ‘Fires are suppressed quickly and effectively’, whereas FRV uses ‘Response time benchmarks’ as a Key Performance Indicator. The use of this new “measure”, being ‘decrease of an average time spent suppressing structure fires’ is a poor performance measure and, in the view of the UFU, reduces transparency and accountability.
52. The above two examples provide insight into the importance of true **response time data** and emphasise the need for raw datasets (from the fire agencies) coupled with further datasets provided by ESTA. As can be seen by the above, relying solely on the information provided by the agencies may skew the true state of fire cover in Victoria.

¹⁶ The Minister’s Implementation Plan addresses a wide range of matters including financial sustainability and funding of the FRV and CFA, and improvements in staff training.

Part 5: Conclusion

53. Planning Victoria's own reporting indicates that Victoria is the fastest growing state in Australia.¹⁷ The significant growth that the State has already experienced in both population and infrastructure, and will continue to experience through to the 2050s, confirms the necessity of the establishment of the FDRP.
54. The significant growth in Victorian population and infrastructure must also be considered against the backdrop of increasing pressures on volunteers and volunteer organisations. More than ever, volunteer organisations are experiencing drops in volunteering rates¹⁸, an ageing volunteer population, pressures on volunteers' work/life balance resulting in many volunteers being too time poor to volunteer and an uptake in virtual volunteering (which results in a natural decline in face-to-face volunteering). The significant pressures on Australian volunteers and volunteer organisations must also be considered in the context of the work of the Fire District Review Panel.
55. In conclusion, the UFU respectfully reiterates the following suggested amendments and considerations for the draft Paper:
- That ESTA datasets are included in the list of datasets to be obtained by the FDRP;
 - That the draft Paper is amended to include standards of fire cover in Victoria; and
 - That the draft Paper is amended to include detailed information about the differences in agency standards of fire cover.
56. The UFU thanks the FDRP for the opportunity to make a submission and can be contacted to provide further information or clarification.

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19 November 2021

¹⁷ Victoria in Future, <https://www.planning.vic.gov.au/land-use-and-population-research/victoria-in-future>, accessed 17 November 2021.

¹⁸ State of Volunteering in Australia Report 2016, Price Waterhouse Coopers, page xi and 2.