Dr. Ahmed Kashef and team
National Research Council
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Dear Dr. Kashef and Team,

Thank you for including the Canadian Association of Fire Chiefs (CAFC) in the National Research Council (NRC) meetings on single egress construction and for inviting feedback and input as you develop your research study and report.

We'd like to begin our letter by stating that single egress construction requires the removal an emergency exit from future construction of a designated height. This challenges the fundamentals of fire safety in Canada. It may be akin to challenging the importance of handwashing in healthcare or seat belts in vehicle safety. Given the potential consequences, we believe that a comprehensive approach should be considered in scoping this research.

We would like to offer the following suggestions:

1. **Clarifying the context and motivation for the research:** We are recommending to NRC that it develop a research-based discussion for why we are exploring this type of trade off in the first place. This is common practice in research. We would be interested in understanding whether the issue is financial, political, social, or substantive and what the benefits would be. The topic is already polarized and politicized. Grounding the research in a strong contextual analysis including a literature review, environmental scan, situational analysis, and interviews with key informants would be helpful.

2. **Recognizing historical issues in building code research when choosing a baseline:** Historically, building codes research has focused primarily on quantitative analysis of scientific, safety, economic, and environmental implications. It has been driven by the research needs of parties proponing a code change who would sometimes derive material benefit from the code change and for whom there is a business case for building the research evidence. Research considerations have not traditionally included fire sector readiness for emergency response, training, equipment, or operations[1]. Examples are the recent introduction of encapsulated mass timber construction and tall wood buildings. The new

[1] https://www.firefightingincanada.com/building-and-fire-codes-2020-and-2025/

codes process and a firefighter safety objective which will be introduced in 2030 may mitigate these issues going forward. However, the historical overlay of such multiple innovations means that the comparison to "current safety standards" is a precarious baseline, considering the baseline was often attained against fire sector advice.

3. **Fire Sector Capacity and Context:** We would like to offer NRC that in December 2024, the CAFC will be releasing the results of the Great Canadian Fire Census 2024. This annual survey, the sample for which represents the fire services of all types and covers the catchment areas of 24M Canadians**.** The 2024 Census will paint a picture of the fire sector and will show that communities of all types, particularly in cities are being significantly impacted by high levels of housing construction as well as other challenges. This is another contextual issue that should be considered in the research process.

4. **Addressing bias and bracketing:** NRC researchers are known and trusted sources. We believe they are best positioned to undertake this research. That said, everyone has biases, whether conscious or not. To address this, across all types of research, it is customary to "bracket" or declare and discuss any possible sources of bias. For this reason, we would suggest that the research paper have a full discussion of potential sources of bias from timelines to traditions, to mandate, to external pressures, to commonly used or less used research methods.

5. **Research traditions:** With full understanding that the slide decks were developed to help guide the conversation, it is important to note that slide 4 of the September 27 meeting differentiating qualitative from quantitative research presents some concerns for us. We would recommend a review of qualitative traditions since it is these traditions that may be required to better understand the fire safety perspective and lived experience of firefighters that is currently missing from the literature[2]. CAFC would be pleased to work with you on this if so desired.

6. **Ingress, egress, evacuation and fire behavior:** It is the experience of the fire sector and noted in the scientific literature that evacuation times increase when we decrease exits[3] .It has also been noted that **"**observers, and perhaps designers, do not always anticipate how occupants will behave in emergency …importance of behavioral evaluations for egress safety".[4] It has also been noted that during evacuation exit choice (and whether people exit) influenced by size and proportion of the egressing crowd"[5] Time to flashover has decreased to 5 minutes due to new construction materials. As such, more exit options are needed, not less[6] A common heuristic used by firefighters is that fire grows exponentially by the minute and that every minute lost, a fire doubles in size. We also suggest considering ingress, issues with elevators and conducting a critical analysis of the assumptions of the Jensen Hughes report about the acceptable level of fires in hallways and about whether that data could even be under-reported given the age of the dataset and the sampling methodology.

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[2] Works by John W. Creswell may be helpful in this regard.
[3] Wei et al, 2023, Johnson and Feinberg, 1997.
https://www.sciencedirect.com/science/article/abs/pii/S0272494497900475.
[4] (Kinateder and Warren, 2021).
https://www.sciencedirect.com/science/article/abs/pii/S0378437121000182
[5] (Kinateder and Warren, 2021).
[6] NFPA 1700 https://www.nfpa.org/news-blogs-and-articles/nfpa-journal/2021/06/08/1700.

7. **Fire Safety for all in the Built Environment:** Over the past several years, the CAFC has been extremely concerned about an aging demographic and the ability of the fire sector to respond to common fire and emergency response needs for a population that may have cognitive, sensory, mobility, or physical diversity. This was flagged well before the climate crises we are now experiencing. Working with the Rick Hanson Foundation as a platform to reach out to disability groups and a geriatrician at Mt. Sinai Hospital, and the NFPA, CAFC has received a grant from Accessibility Standards Canada to study the issues systematically. Single egress is one of the concerns among others. If so desired, we would be pleased to integrate our research with yours. We are still in the early stages of scoping the work.

8. **NFPA Interpretations (Standards 1710 and 14).** We would also like to flag the importance of understanding the implications of single egress construction on the expectations set by the NFPA standards which are required in some jurisdictions. This may apply to training, number of career firefighting staff required to deploy given the risk profile of the building, risk assessments due to single points of failure, presence of alternatives to the single point of failure, the combustibility of the construction materials, the response time requirements, and so on and so forth. Discussion of these issues is available on the CAFC website and in letters by the Greater Vancouver Fire Chiefs Association and the BC Association of Fire Chiefs.

9. **Standard for the Installation of Standpipe and Hose Systems:** provides the criteria on how to determine the size, location, and quantity of water needed for a standpipe / hose system. Historically based on multiple egress stairwells. Requires maximum travel distance between hose connections on the building floor level to ensure proper hose line coverage is met, to allow and ensure first responders can safely fight the fire.

10. **Implications of a climate crisis and concurrent innovations:** We also suggest considering the impact of climate emergencies on both building code choices and expectations of fire service capacity given recent events from Lytton, Yellowknife, Jasper, Halifax and so forth as well as the confluence of non-building code related issues from lithium-ion batteries to their chargers, Hydrogen, solar panels, green technologies, and more flammable contents inside of buildings.

11. **Comparative analyses:** We understand full well that some countries in Europe do single egress construction, but these are typically geographically smaller, culturally homogeneous countries that do not rely on combustible building materials and are not generally considered “ground zero” for climate crisis. The current cross-cultural comparisons look at building code considerations. They do not compare fire safety contexts, assumptions, and operations.

12. **Advice from Canada’s Metro Chiefs and the CAFC National Advisory Council:** It is worth noting that at a recent meeting of the fire chiefs of the country’s’ largest cities, known as Canadian Metro Chiefs, a motion was passed expressing concern about single egress construction. If the NRC would like to have further discussion with this group of fire departments are more likely than others to have advance fire protection engineers, training programs, and full career firefighters, we would be pleased to arrange such a meeting. The same is true for our national advisory council which includes all provincial, territorial, and national affiliate fire chiefs related organizations.

In closing, Dr. Kashef, we hope that this letter provides helpful direction for your research study. You will find further materials on the CAFC website at https://cafc.ca/page/single-egress. We appreciate the time and care that the team is putting into this work, and the unusual circumstances under which it may have been commissioned. We look forward to continued involvement and engagement. We are always available if you have questions or concerns.

Sincerely,

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Executive Director
Canadian Association of Fire Chiefs

CC: Chief Ken McMullen, CAFC President
Chief Paul Boissonneault, Secretary of the CAFC Board of Directors
Chief Keven Lefebvre, Chair CAFC Building Codes Committee
Chief Jason Whitely, Chair National Advisory Council and OAFC representative
Chief Ken Stuebing, Chair Metro Chiefs Group
Chief Larry Thomas, President, Greater Vancouver Fire Chiefs Association
Chief Phil Lemire and Chief Dan Derby, British Columbia Association of Fire Chiefs
Chief Mark McDonald, Mr. Shaun Cameron, Chief Andrea DeJonge, Ontario Assoc. of Fire Chiefs
Mr. Carmen Santoro, Ms. Sandy Hamamoto, International Association of Firefighters
Commissioner Marlo Pritchard, President, Canadian Fire Marshalls and Fire Commissioners and colleagues