DEPARTMENT OF LABOR AND INDUSTRY

Meeting Notes: Single Exit Stairway Apartments Technical Advisory Group

Date: Thursday, April 10, 2025
Time: 9:00 a.m.
Location: DLI, 443 Lafayette Rd. N., St. Paul, MN 55155 / WebEx

Members

1. Mary Barnett
2. Tom Brace
3. Nathan Bruhn
4. Nick Erickson
5. Patrick Farrens
6. Stephen Kartak
7. Greg Metz (Coordinator, DLI)
8. Jerry Norman
9. Tom Pitschneider
10. Ryan Rehn (Coordinator, DLI)
11. Melisa Rodriquez
12. David Selinsky (WebEx)
13. Stephen Smith (WebEx)
14. Amanda Swenson

Members Absent

Adam Casillas
Jim Fischer

WJE/Crux Consultants

Carl Baldassarra – Wiss, Janney, Elstner Assoc. (WJE)
Kyle Christiansen – Crux Consulting
Brian Meacham – Crux Consulting
Nick Ozog – WJE

Staff & Visitors

Kate Perushek – DLI Deputy Commissioner (WebEx)
Jeff Lebowski – Atty for CCAC, DLI (WebEx)
Lyndy Logan – DLI
Mike Bunnell – DLI (WebEx)
Alexis Johnson – DLI (WebEx)
Tim Manz – DLI
Britt McAdamis – DLI
Chad Payment – DLI (WebEx)
Wendy Rannenberg – DLI (WebEx)
Adam Schminski – DLI (WebEx)
Steve Shold – DLI (WebEx)
Amanda Spuckler – DLI

Staff & Visitors continued…

Paul Swett – DLI (WebEx)
Dan Anderson – City of Golden Valley (WebEx)
Scott Anderson – City of Minneapolis
Adam Barthel – City of Minneapolis (WebEx)
Jerry Bazcklund – AMBO (WebEx)
Jeremie Bresnahan – City of Savage (WebEx)
Aaros Briggs – Local 9
Eric Bullen – City of Albertville (WebEx)
John Burrow – City of Savage (WebEx)
Brian Carstensen – City of Lakeville (WebEx)
Jacob Dashiell – City of Golden Valley (WebEx)
Dori Dufresne – U of M (WebEx)
Dave Giddings – Shakopee Fire Dept.
Dale Gronberg – City of Minnetonka (WebEx)
Lisa Hartwig – City of Minneapolis (WebEx)
Alex Hassel – MNFAC/LGN
Richard Hauffe – ICC (WebEx)
Tom Jenson – SFMD
BJ Jungmann – City of Burnsville (WebEx)
Brian Kiffmeyer – City of St. Cloud (WebEx)
Stephen Kraus – City of Chaska (WebEx)
Ed Lisinski – AWC (WebEx)
Andrew Moe – City of Minneapolis (WebEx)
Britt Nelson – City of Lakeville (WebEx)
Mike Nelson – Shakopee Fire Dept.
Robert Nelson – Local 9
Jerry Novak – Maplewood Fire Dept.
Greg Peterson – City of White Bear Lake (WebEx)
Alisa Schuster – City of Golden Valley
Jeff Sedlacek – Maplewood Fire Dept.
Andrew Slama – City of Edina (WebEx)
Brian Stemwedel – City of Golden Valley
Clayton Talbot – U of M (WebEx)
James Van Eyll – City of Orono (WebEx)
Nate Voye – City of Burnsville (WebEx)
Kate Wagner – MNFAC/LGN
Chris Weaver – City of Minnetonka (WebEx)
Forrest Williams – DPS (WebEx)

Instruction/Procedures

- The meeting was called to order at 9:01 a.m., with 13 members present in person or remotely. David Selinsky joined the meeting remotely at 9:26 a.m., resulting in 14 members present. A quorum was maintained throughout the meeting.
- WebEx Instructions/Procedures
    - **TAG members:** TAG members attending online may mute and unmute their microphones to participate openly and actively as if they are attending in the room. You can also click the hand icon to be recognized if you find it difficult to get into the conversation.
    - **Interested parties/members of the public:** As the Technical Advisory Group is a legislatively mandated body tasked with providing insights for a legislative safety study and is not directly involved in rulemaking, members of the public are welcome to attend and listen to the meeting but will not be allowed to participate.

Agenda Items

- 09:00 – 09:05 **Roll Call, Opening Statement, and Open Meeting Laws Statement** – Ryan Rehn
    - The study examines safety in single-exit stairway apartment buildings up to six stories. The Technical Advisory Group guides the study by identifying key safety criteria, metrics, and comparable standards, without creating rules on their construction.
    - The Technical Advisory Group (TAG) follows Open Meeting Laws, ensuring transparency and open discussions. TAG members, totaling 16, must avoid any private or indirect communication leading to quorum-related discussions outside public forums. Communications should be directed to Ryan Rehn or the speaker.
    - Meeting-related notes and correspondence during the active TAG timeframe (now until December 31) are public data, subject to requests, and must be retained until December 31, 2026.
    - In Webex meetings, there is no chat function for TAG members, and all discussions are accessible to the public. TAG members may speak freely, while the public can observe and comment when permitted. Public participants using Webex will be unmuted by the administrator for recognized comments or questions.

- 09:05 – 09:20 **Introductions for Wiss, Janney, Elstner Associates (WJE), Crux Team, TAG Members, and DLI Staff** – All
    - **Nick Ozog** – WJE: Leads a four-person team conducting this study. As a licensed fire protection engineer with a master's degree, he helped develop a risk assessment tool for combustible facades, reviewing over a thousand buildings worldwide. He serves on NFPA and ICC committees and contributes to SFPE.
    - **Kyle Christiansen** – Crux Consulting: Fire protection engineer with a master's from Worcester Polytechnic Institute. His career began in nuclear fire risk analysis before transitioning to fire protection in sectors such as energy storage, LNG, wastewater, and federal facilities. He is an SFPE member and serves as secretary for the SFPE Greater Charlotte chapter.
    - **Brian Meacham** – Crux Consulting: Director of risk and regulatory consulting at Crux Consulting, has 40 years of experience in fire risk assessments and regulatory environments. Holding a master’s in fire protection engineering and a PhD in risk and

public policy, he has chaired several fire safety committees and advised governments worldwide. His fire safety career began as a volunteer firefighter, and he brings extensive expertise to this project.

- **Carl Baldassarra** – WJE: Fire protection engineer with 50 years of experience, has conducted risk analysis across various property types. He has served on NFPA and ICC committees, including Life Safety Code, NFPA 13, and Smoke Control. He sees Minnesota's approach to single exit stairways as nationally significant and is eager to contribute to the study.

- 09:20 – 09:45 **Clarify the Work Scope: Background, aims, and objectives** – Greg Metz
  - **Metz** said that the study takes a unique, data-driven approach to evaluate single-egress stairway apartment buildings, focusing on risk assessment and avoiding reliance solely on existing codes. Mandated by the Minnesota Legislature, the study employs techniques like smoke and egress modeling, fire loss history analysis, and interviews with stakeholders. The technical advisory group members, representing diverse organizations, are tasked with gathering relevant data and contextualizing the life safety outcomes of these buildings compared to others. Ultimately, the study will provide recommendations for potential code updates without developing specific rules, with findings delivered to the Legislature by December 31st for further legislative action.
  - **Jerry Norman**, TAG member, City of Rochester, asked how this might impact the 1305 TAG Committee's recommendation regarding the amendment currently included in the code for single-exit buildings. Does this have any bearing on that or will this proceed independently?
  - **Metz** said the 1305 TAG has decided to pursue a code change proposal that would permit an additional story beyond the current three-story limit for single egress stairway buildings, contingent on meeting several added requirements. This decision was made in anticipation of future model code changes at the ICC level. Suppose this study reveals that the proposed code change poses a significantly higher risk or fails to meet acceptable safety standards as determined by staff. In that case, they will advise the Construction Codes Advisory Council (CCAC) against adopting the recommendation from the TAG. Ultimately, recommendations from TAGs are submitted to the CCAC, which provides a final recommendation to the DLI Commissioner for rulemaking.

David Selinsky joined the meeting remotely at 9:26 a.m., resulting in 14 members present.

- 09:45 – 10:30 **Discuss approach, preliminary results of literature review, data analysis, probabilistic approach, benchmarking, scenario definition** – WJE, Crux
  - The WJE and Crux team delivered a presentation, as outlined in **Attachment A**.
  - **Nick Ozog**, WJE, noted that today's presentation is preliminary—there are no conclusions yet. It serves to outline their approach, set the stage for their thought process, and highlight what they aim to bring to this study. They're excited to collaborate with all tag group members. As the principal contact, he will be reaching out for individual meetings in the coming months. Throughout this process, they'll be seeking data from various sources, especially local insights. Any information you can share will help shape their risk-informed approach.

- **Brian Meacham**, Crux, emphasizes that risk is an unavoidable part of life, including in building safety. Codes are designed to address most scenarios but cannot eliminate all risks. A risk-informed approach quantifies fire hazards, examining past loss data and the likelihood of incidents, similar to seismic and structural reliability-based design. The study aims to analyze fire risk at national and Minnesota levels, considering housing stock history, local fire incidents, response capabilities, and demographic trends. By assessing past and present data, the team seeks to project future risks and develop informed solutions. Nick and Kyle will outline the study's process, facilitating discussions on risk assessment to address any concerns. Success relies on collaboration and access to local data, ensuring a comprehensive evaluation for Minnesota. Meacham concludes by reaffirming the importance of stakeholder input.
- **Kyle Christensen**, Crux, introduces the team's risk-informed approach, starting with a literature review to understand key concerns. The study examines the impact of single-stair buildings amid the U.S. housing crisis, where cost limitations often make a second stair impractical. Reducing stair requirements can optimize land use and expand housing availability, but safety considerations must be thoroughly evaluated. Seattle and British Columbia have implemented single-stair allowances with added safeguards like sprinklers, pressurized stairwells, and exit distance restrictions. However, these measures lack a comprehensive quantitative risk assessment. The team aims to fill this gap by analyzing fire risks through historical data, sprinkler reliability, and hazard identification. Using event trees, they will model fire scenarios by assessing initiating events and mitigation systems, applying proven risk-based methods from structural engineering and nuclear safety. Since risk is inherent in daily life, mitigation strategies—such as fire codes, regulations, and safety systems—are essential for maintaining acceptable safety levels. This study leverages data and modeling to guide informed decisions on single-stair buildings, ensuring a balance between housing needs and fire safety. Stakeholder contributions and local data will be vital in shaping findings. Event trees will play a central role in evaluating fire safety, assigning probabilities to system successes and failures to pinpoint critical risk factors. The analysis will begin with a baseline risk assessment for a three-story single-stair building and then explore risk variations as additional stories or units are introduced. Key factors include ignition sources, detection systems, suppression measures, evacuation processes, and failures like sprinkler malfunctions or emergency lighting outages. By integrating probability and consequence analysis, the study quantifies risk levels, compares design alternatives, and informs decisions on safety measures. This comparative framework ensures that safety remains a priority while accommodating housing needs. The process will evolve with stakeholder insights and modeling refinements. Nick will take over to discuss the modeling approach.
- **Nick Ozog** emphasizes that all presented information, including the preliminary literature review, serves as an initial framework to align the team and stakeholders on the study's approach. No conclusions have been drawn yet, as further input and literature research are needed. The modeling component will address the consequence side of the risk equation, combining probability and impact assessments. The team will use validated, open-source computational models—PyroSim with Fire Dynamics Simulator (FDS) for fire modeling and

Pathfinder for egress modeling. These tools have been extensively verified by industry experts. Preliminary fire modeling examples include simulations of smoke movement in a four-story building and visibility conditions at different heights. Industry standards focus on factors such as carbon monoxide levels, visibility, and temperature to evaluate tenability over time. Egress modeling assesses occupant movement, incorporating variables such as individual mobility and building layout. Literature reviews and stakeholder input will help refine these models. Housing data gathered from sources like Rent Café provides a general starting point but will be supplemented by local insights to reflect Minnesota's specific needs. This data will guide scenario modeling, including considerations such as unit sizes, apartment layouts, and demographic trends. Early architectural sketches illustrate theoretical single-stair designs for lower-rise buildings. The examples feature four-unit floor layouts conforming to existing model codes, with exit pathways based on common travel distances. Stakeholder input will shape demographic considerations, unit configurations, and additional features like elevator requirements for taller buildings. Next steps include scheduling stakeholder interviews beginning in May, with a goal to complete most by late May. Data collection, fire scenario definitions, and assessments of mitigation systems will run in parallel, informed by literature reviews and stakeholder contributions. The team encourages immediate data-sharing through designated contacts to enhance interview productivity. Once scenario models are established, fire modeling will proceed independently, feeding into the final risk analysis and draft report.

The Single-Exit Stairway Apartments TAG paused for a break from 10:30 AM to 10:45 AM.

- **Greg Metz**, CCLD, requested a review of previous slides for clarification on the TAG's interface points.
- In response, **Nick Ozog** explained that after completing individual interviews and initial data analysis, the team plans to regroup in mid-June for a TAG meeting. During this meeting, members will review proposed scenarios and provide feedback on various building layouts. While evaluating every possible scenario is impractical, the team will present key options and seek input from TAG members before finalizing the modeling of selected scenarios.
- **Brian Meacham** emphasized the importance of analyzing housing trends, including building size, demographic shifts, and community growth or decline, to assess risk profiles effectively. Key considerations include aging-in-place challenges and fire service capacity, such as response times, staffing levels, and water supply availability. The study requires detailed sprinkler and detection system data, including Minnesota fire loss reports, which may lack certain specifics. Evaluating the age of building stock helps establish benchmarks by correlating construction codes with historical fire incidents. Initially, the team will examine all available data to identify risk-significant factors. Contributions from government agencies, fire services, architects, and housing experts will shape scenario development, ensuring risk assessments align with existing building stock safety levels**.**

- **Nick Ozog** highlights the importance of considering maintenance aspects in the study. Many jurisdictions require building owners to conduct and report annual sprinkler, fire pump, and fire alarm tests, which could provide valuable data. If such reporting systems already exist, sharing that information would help assess ongoing maintenance practices. He also notes that infrastructure projects, such as municipal water supply upgrades, can impact fire safety. For example, in his town, hydrant testing was halted due to frequent water main breaks, prompting a large-scale replacement project. Gathering as much data as possible will improve the study's findings, though not all collected information may be included in the final report. Understanding what is available will help refine the research.

- 10:35 – 11:15 **Q&A with stakeholders on approach** – All
  - **Melissa Rodriguez** expressed uncertainty about how her group could contribute but suggests it would be useful to understand local perspectives on fire protection. She mentioned that, as chapter president, she could organize a separate meeting for interested members, depending on turnout at the next chapter meeting.
  - **Ozog** acknowledged the value of gathering local insights and explained that broad information is preferable at this stage to avoid overlooking key issues. He said he was hesitant to schedule a preliminary meeting, preferring to let stakeholders bring forward concerns and relevant data. **Rodriguez** proposes discussing potential ideas, and Ozog agrees to continue the conversation.
  - During the discussion, **Nathan Bruhn** inquired about the timeframe for data collection and whether historical construction trends should be included to reflect real-world conditions for modern building practices.
  - **Carl Baldassarra** emphasized the importance of compiling an inventory of residential buildings in St. Paul, including construction type, number of stories, and date of construction. He also stressed the need for fire loss data at both the city and state levels.
  - **Ozog** explained that analyzing older buildings was crucial to understanding past code requirements and how acceptable risk levels had evolved. Historical data had the potential to reveal shifts in fire risk over time.
  - **Baldassarra** noted that assumptions about older buildings being safer due to noncombustible construction might not be accurate, as factors such as sprinkler systems and material changes needed consideration. The team aimed to analyze fire and building data together to identify risk trends rather than selecting scenarios based on assumptions.
  - **Metz** summarized the data analysis goal: establishing a baseline risk assessment of Minnesota's current residential building stock to compare risks associated with proposed single-stair buildings. **Baldassarra** confirmed that this assessment applied to non-single-family dwellings.
  - **Tom Brace** highlighted the importance of considering human decision-making in fire emergencies, noting that individuals often do not make optimal choices in crises. He suggested incorporating this factor into the study's approach. He also inquired about the funding for the project.

- **Metz** responded that the legislature had allocated **$225,000 for the study**.
- **Brace** acknowledged the significance of the study, emphasizing that its findings would impact legislative decisions and require contributions from stakeholders, including time and resources.
- **Meacham** addressed the human factors concern, confirming that existing research on fire behavior and evacuation—including studies by the National Institute of Standards and Technology (NIST) and experts such as Erica Kuligowski—would be integrated into the risk-informed approach. He explained that tools like Pathfinder allow the modeling of individual occupant behaviors rather than assuming uniform movement patterns.
- **Meacham** emphasized the importance of stakeholder input in refining the study's scope and ensuring a comprehensive analysis.
- **Patrick Farrens** raised concerns about ensuring statewide representation in fire department data collection, noting that Minnesota ranks among the lowest in fire service spending and that most departments operate on a paid-on-call or volunteer basis. He questioned how the study would account for varying response capabilities, given that current data is heavily focused on St. Paul and Minneapolis.
- **Meacham** responded that meetings would be scheduled to gather data from a broader range of departments, aiming for a comprehensive cross-section rather than a city-specific analysis.
- **Farrens** expressed concerns about differing acceptable risk levels between jurisdictions with varying fire service capacities, citing NFPA standards as potential benchmarks. He also highlighted future risks, such as increased density leading to more micromobility use and lithium-ion fire hazards.
- **Meacham** acknowledged the need for mapping fire department capacities and their impact on risk assessments, noting that detailed data collection would be required. He also mentioned mitigation strategies for e-mobility concerns, such as limiting charging locations and enhancing fire protection measures.
- **Farrens** then asked whether the study would analyze restrictions on certain building uses, like Seattle's boarding home prohibition.
- **Meacham** confirmed that occupant demographics would be considered within Minnesota's building codes, though specific conclusions had yet to be determined.
- **Baldassarra** noted that building codes were written statewide and did not account for variations in local fire department capabilities. He acknowledged that while codes were intended to establish minimum safety standards, real-world conditions often differed. He pointed out that some high-rise buildings and large distribution warehouses were being constructed in areas with volunteer fire departments and limited firefighting resources, making fire protection a critical concern.
- **Farrens** stated that cost savings associated with single-stair buildings could lead to their use beyond high-density areas, potentially affecting communities throughout Minnesota.
- **Metz** clarified that the study was specifically focused on R2 occupancy apartment buildings, as directed by the legislature, and would not include other building types.

- **Jerry Norman** expressed concerns about how the study's findings would be used by the legislature, emphasizing the need for expert input from the Department of Labor and Industry. He highlighted various code provisions, such as elevator requirements for accessibility, trash disposal spaces, and reductions in fire separation ratings due to sprinklers. He questioned whether certain code assumptions were based on buildings having two exits and urged a thorough evaluation of fire safety considerations. Norman also pointed out the importance of municipal oversight, noting that Rochester had a housing inspection unit ensuring fire system maintenance. He stressed the need for an exhaustive analysis, including construction types and provisions like IBC 510, which could affect building height regulations. He hoped the study would provide comprehensive recommendations to guide legislative decisions accurately.
- **Stephen Smith** questioned why the study did not include single-family housing as part of the risk comparison, citing legislative language that did not explicitly limit the evaluation to multifamily buildings.
- **Metz** clarified that the study was focused on housing types under Minnesota Rule 1305, the Commercial Building Code, meaning single-family homes, duplexes, and townhouses were excluded due to different code requirements.
- **Tom Pitschneider** raised concerns about long-term building maintenance, noting that many Minnesota buildings lacked ongoing code enforcement after occupancy. He highlighted issues such as fire-rated enclosure breaches, door replacements with non-qualified materials, and failures in fire protection systems over time.
- **Nick Erickson** pointed out that cities had the authority to enact rental code enforcement policies if needed.
- **Farrens** expressed concerns about cities facing an unfunded mandate to provide staffing for inspections, potentially increasing risks in buildings relying on specific fire protection functions.
- **Metz** explained that the state building code was responsible for regulating health and safety in new construction and alterations, but did not comprehensively address maintenance of existing structures. He noted that fire incidents resulting from neglected maintenance would be reflected in the data analysis.
- **Farrens** acknowledged that maintenance issues were being addressed in the study.

The TAG paused for a 15-minute break and resumed at 10:45 AM.

- **Robert Nelson** raised concerns about accessibility for residents living above the ground floor, emphasizing that elevators would be necessary in such buildings based on his 25 years of experience in the field,
- **Metz** clarified that the presented diagrams were conceptual examples intended to facilitate discussion, not final design proposals.

- **Alisa Schuster** highlighted gaps in the data, stressing that fire loss analysis should also account for firefighter response, suppression efforts, and operational impacts. She pointed out that human behavior in fire emergencies is unpredictable and difficult to model accurately. Additionally, she noted that fire department staffing levels in Minnesota's largest cities were significantly lower than in other metropolitan areas included in the study.
- **Scott Anderson** expressed concerns about unintended consequences in apartment design, particularly the lack of area limitations. He warned that new housing models might lead to buildings with high-density student housing configurations, which behave differently from traditional apartments.
- **Metz** responded that the team planned to model variables such as floor plate size, number of units, and occupant density. He emphasized that the study would take an open-ended approach without presupposing outcomes.
- **Tom Pitschneider** brought up the possibility of apartment layouts featuring common dining and assembly areas surrounded by individual bedrooms, similar to college dormitory designs.
- **Mary Barnett** questioned whether the study would include mixed or accessory occupancies within a single floor plate.
- **Metz** explained that mixed-use scenarios might be modeled in podium-style buildings, with commercial spaces on the ground floor and R2 residential units above. He confirmed that occupant density and egress requirements would be analyzed. Legislative discussions had highlighted a need for "missing middle" housing, referring to larger three- and four-bedroom apartments in urban areas. Metz noted that the study would evaluate this housing type within its risk analysis framework.
- **Pitschneider** added that rental models with individually leased bedrooms and shared common spaces should also be considered in the study.
- **Jerry Norman** raised concerns about the current code language allowing four dwelling units per story, questioning whether unit size should be considered in occupant load calculations. He noted that, theoretically, up to 48 people could occupy a single floor with only one means of egress, which could pose safety risks. He emphasized the need to factor in dead-end corridors, emergency illumination reliability, and other technical aspects in the analysis.
- **Melissa Rodriguez** highlighted the potential classification of certain housing types, such as boarding care and halfway houses, which could trigger additional regulations.
- **Patrick Farrens** pointed out that Seattle’s code excludes boarding housing and suggested it may be relevant to the study.
- **Metz** clarified that while codes reference six stories, the study placed a height limit of 75 feet to prevent buildings from being classified as high-rise structures.
- **Farrens** raised concerns about elevator access for emergency medical services in taller buildings, emphasizing the need for safe evacuation methods beyond stairwells.
- **Metz** confirmed that current codes require elevators in buildings with five or more stories.
- **Farrens** also noted challenges related to larger floor plates and narrower egress widths, questioning their impact on overall safety, law enforcement access, and resident usability.

- 11:15 – 11:45 Group discussion topics (10 min each) – All (WJE, Crux to facilitate). Approach to acceptable risk | Approach for event tree | Risk-informed analysis | Pros/cons to single stair
    - **Brian Meacham** provided a preliminary overview of the study, emphasizing the importance of understanding acceptable risk levels. He noted that risk is inherent in daily life and varies based on utility and safety measures, similar to legislative protections in driving and building codes. He acknowledged that while fire safety measures aim to prevent loss of life, no system can fully eliminate risk. Over time, building codes and societal standards have established a benchmark level of safety, balancing occupant decision-making, fire service capacity, and building maintenance. The study seeks to analyze these factors to determine the current level of life safety risk in apartment buildings. The first phase of the study involves data collection, fire department response evaluation, and human behavior analysis. Meacham stressed the importance of stakeholder input and discussion to refine the study's direction. He emphasized that the study would take an iterative approach, ensuring that all concerns were addressed. The study aims to benchmark existing risk levels before developing scenarios, analyzing gaps in available data, and considering various consequence factors. Meacham encouraged open discussion on whether the study's approach aligned with stakeholder needs and emphasized collaboration to ensure meaningful results.
    - **Nick Erickson** emphasized the importance of using data-driven risk analysis in building code development, stating that existing processes often rely on arbitrary numbers rather than real-world performance metrics.
    - **Greg Metz** raised concerns about emergency escape and rescue openings becoming obsolete in taller buildings, questioning what alternative measures could be implemented to ensure a secondary means of escape.
    - **Meacham** discussed risk acceptability in sprinkler-protected buildings, noting that occupants might safely shelter in place during a fire. He emphasized that the study would examine how different risk mitigation measures contribute to an acceptable safety level.
    - **Jerry Norman** inquired about sprinkler effectiveness assumptions in fire modeling and the typical design fire used for residential buildings.
    - **Kyle Christiansen** explained that event trees would assess sprinkler success or failure, modeling scenarios where sprinklers do not activate to understand their impact on occupant egress.
    - **Norman** pointed out the frequency of dryer duct fires as a risk factor.
    - **Christiansen** confirmed that fire scenarios would be informed by real-world data, analyzing fire incidents in concealed spaces and kitchens to refine risk assessments.
    - **Meacham** emphasized the importance of collecting comprehensive data to inform fire ignition and growth scenarios. He noted that NFPA data consistently identifies cooking and electrical fires as prevalent risks. Since analyzing every possible fire scenario is impractical, the study relies on data to shape deterministic models assessing fire spread, toxic combustion products, and potential building impact. The team planned a multi-phase approach, using event trees to determine unsuccessful fire scenarios before conducting detailed deterministic modeling. Meacham stressed that fire department response

conditions must be considered across various parameters. He highlighted the necessity of evaluating system reliability, acknowledging that no fire protection measure or individual response is 100% effective. A risk-based approach accounts for variability in performance metrics rather than relying on singular fire models. The goal was to identify likely fire occurrences and their impacts based on real-world data rather than isolated case studies.

- **Mary Barrett** inquired about how physical space factors, such as square footage, travel distances, and stair widths, would be incorporated into the inventory and analysis.
- **Christensen** explained that evacuation modeling would determine how long it takes for occupants to reach the egress, with spatial aspects of buildings integrated into the model alongside system response data from the inventory.
- **Nick Ozog** added that typical floor plans, including features like elevators and trash areas, would inform the modeling process. While every possible layout could not be analyzed, key variables would be considered based on stakeholder interests and fire scenario assessments.
- **Tom Brace** discussed the balance between risk and responsibility, arguing that assuming risk also involves ensuring systems, like brakes and steering in a car, function properly. He emphasized the importance of incorporating complete sprinkler systems into fire protection modeling, stating that a fully integrated system would enhance safety.
- **Metz** raised concerns about the complexity of performance-based design and suggested that the study should identify best practices based on risk levels. He emphasized the need for logical groupings of risk mitigation measures rather than a list of individual code amendments for the legislature to select from.
- **Meacham** confirmed that the study would aim to provide guidelines for rulemaking and recommendations based on risk analysis findings.
- **Norman** supported the idea of showing how specific mitigation measures reduce risk, suggesting examples such as stair width increases and kitchen fire protections to help the legislature make informed decisions.
- **Christensen** referenced the importance analysis used in nuclear power plant risk assessments, explaining that the study could identify the most critical safety systems and their dependencies.
- **Carl Baldassarra** asked whether the Minnesota legislature directly handled code writing.
- **Metz** clarified that the Department of Labor and Industry adopts model codes with amendments but that the legislature has the authority to mandate code changes. He noted that the study was initiated in response to a legislative proposal to allow single-exit stairway apartments up to 75 feet in height. The study aims to provide data before moving forward with potential legislation due to Minnesota's housing crisis.
- **Ozog** opened the discussion on acceptable risk thresholds, encouraging TAG members to share their perspectives based on experience.
- **Tom Pitschneider** noted that risk could never be entirely eliminated, citing a past fire incident where a visually impaired resident perished despite accessible exit routes. He emphasized the need for ongoing maintenance of safety features to ensure effectiveness over time.

- **Erickson** stressed the importance of using the existing code as a baseline for comparison, stating that any proposed changes must be proven to be as safe or safer than current regulations.
- **Metz** expressed concern over occupiable roofs in single-stair buildings, particularly in high-density student housing where occupants might ignore safety limits.
- **Farrens** sought clarification on whether the study's recommendations needed to meet or exceed existing codes, such as Seattle's. Metz explained that the study was a comparative analysis specific to Minnesota and would not use other cities as direct baselines, though outside examples could provide context.
- **Barnett** questioned whether increasing density with single-stair designs was to be part of the legislative directive. **Metz** responded that density was a general consideration but had no specific minimum requirement. **Barnett** pointed out that single-stair designs might limit housing stock rather than expand it, as fewer units could fit within a given floor plate compared to buildings with two stairways. She suggested reconsidering whether single-stair designs truly align with broader housing expansion goals.
- **Steve Kartak** sought clarification on whether single-exit stairway buildings were intended to allow for modest increases in unit count on small urban lots rather than large-scale developments.
- **Metz** confirmed that urban infill was the primary goal but acknowledged that building codes could evolve in unexpected ways. He cited Georgia's approach, where multiple single-exit stairway buildings were built adjacent to each other, creating large apartment complexes.
- **Meacham** emphasized the importance of stakeholder input in defining building designs for modeling and risk analysis.
- **Norman** clarified that the study considered buildings up to 74 feet 11 inches above grade plane, meaning a potential inclusion of a basement beneath six stories.
- **Farrens** raised concerns about economy-based studio apartments potentially transitioning to lower-income housing and the associated risks. He noted that data would help determine fire risks and whether certain housing types, such as boarding homes, should be excluded.
- **Metz** explained that single-exit stairway buildings would feature smaller floor plates and fewer units, with elevators required for buildings five stories or taller. He emphasized that this construction type was not intended as affordable housing.
- **Barnett** noted that affordable housing could still exist within R2 occupancy, but Metz reiterated that the cost of construction would likely prevent it from being classified as low-income housing.
- **Erickson** clarified that building codes applied universally to all R2 structures, regardless of tenant income.
- **Norman** highlighted federal housing laws preventing discrimination against disabled tenants, emphasizing that accessibility must be considered, even in buildings without elevators. He pointed out that accessible units would be required at ground level if an elevator was not included.

- 11:45 – 12:00 Review Q&A takeaways, actions, define next steps, decision points, follow-up meetings – All
    - **Metz** suggested that the Department of Labor and Industry could recommend to legislators that upper-level units include both type A and type B accommodations for accessibility.
    - **Nathan Bruhn** raised concerns about inconsistent fire safety provisions in taller single-stair buildings, questioning whether a unified standard could be established to prevent exemptions that might reduce occupant protections.
    - **Metz** responded that legislative measures could establish limits on where single-exit stairway buildings are permitted, potentially allowing municipalities to adopt local requirements based on fire department capacity and performance criteria.
    - **Ozog** expressed appreciation for the opportunity to collaborate with the state, emphasizing the importance of stakeholder engagement.
    - **Ryan Rehn** expressed gratitude to TAG members for their contributions to the study, highlighting its importance in accurately representing Minnesota's legislative directives. He noted that members might receive direct communications from the WJB team, primarily through Greg Metz, for transparency. He also acknowledged the efforts of Wiss, Janey, Elstner, and Associates and reminded members to follow open meeting laws.
    - **Metz** expressed sincere gratitude to all Technical Advisory Group members for their contributions, acknowledging the significant effort required to gather data. He emphasized the importance of ensuring stakeholders understand the need for accurate data submission.
    - **Metz** clarified that the study is strictly an assessment of risk and not a rulemaking process, addressing concerns that it might directly influence building codes. He reassured participants that transparency would remain a priority throughout the study.

- 11:55 AM – meeting adjourned

Respectfully submitted,

Lyndy Logan
Executive Secretary to the CCAC

Green meeting practices
The State of Minnesota is committed to minimizing in-person environmental impacts by following green meeting practices. DLI is minimizing the environmental impact of its events by following green meeting practices. DLI encourages you to use electronic copies of handouts or to print them on 100% post-consumer processed chlorine-free paper, double-sided.