EXECUTIVE SUMMARY

This project examines the rationale for the various requirements of the National Building Code of Canada that are applicable to combustible construction with a specific focus provided for the requirements of Subsection 3.2.2.

After defining the terminology, this report examines what limitations are specifically imposed upon combustible construction. These include height limitations, area limitations, requirements for sprinkler protection, requirements for fire resistant rated assemblies, and requirements for specific occupancy classifications.

The research is divided into two components consisting of a direct analysis and an indirect analysis. The direct analysis draws observations relating to the code's rationale for various limitations directly from either the National Building Code of Canada itself or from documents and publications linked directly to the code such as commentaries or revisions. In this manner a number of conclusions can be drawn as to the nature of the code requirements and how they came to be. Based on the available documentation, it is shown that the requirements that are imposed upon combustible construction are based on the assumption that combustible construction is wood-frame construction. It is also shown that the requirements are based on an assumed increased risk that is caused by increasing building height and building area dimensions. This risk is shown as being based on concerns that were present at the time of code development relating to the time required to evacuate and the time required for fire fighting efforts, as well as the increased difficulty in fighting a fire in a higher building.

One very important finding in this report is shown in the direct review of the objective and function statements of the 2005 National Building Code. This section highlights the important fact that the rationale for the requirement for the use of non-combustible construction in some buildings is based solely on fire spread properties and has no bearing on structural capacity. Structural capacity requirements are found as being provided by sprinkler protection and fire resistance rating and not by the factor of whether or not combustible construction is used. This is an important finding as it shows that specifying a requirement for non-combustible construction may be exceeding the actual intent of the code itself.

The indirect analysis also provides insight into the code rationale by observing various trends which lead to a number of conclusions. This is done by looking at historical trends as well as mathematical trends. Historically, it can be seen that the codes were (and still are) subject to a number of external influences that provide some degree of exertion upon the requirements found therein. It is shown that a number of the building code requirements were initially set in an arbitrary (albeit educated) manner. It is shown that building height limitations were based, for example, on the comfort level of those establishing the codes at that time as well as to the ability of the fire fighting services.

The indirect analysis demonstrates the mathematical support for the height and area relationship. Although this provides a sense of cohesiveness for the applicable

requirements, it fails to provide a rationale for why those requirements are what they are. However, these numbers serve to offer a rationale supporting changes to the building code that would allow for combustible structures to exceed the current dimensional limitations set by the building code.

Following these findings, a number of recommendations are presented showing how changes to the current limitations for combustible construction can be made while respecting the rationale for those requirements.

Overall, it is shown that despite the current code limitations that are imposed upon combustible construction, it is possible to provide a logical approach to dealing with combustible construction while respecting the overall rationale intended by the National Building Code of Canada.