

BUILDING CODE COMMISSION

IN THE MATTER OF Subsection 24(1) of the *Building Code Act*, S.O. 1992, c. 23, as amended.

AND IN THE MATTER OF Sentences 3.3.1.2.(3), 3.2.2.43.(2), 3.2.2.16.(1) and 3.1.5.3.(2) of Regulation 403, as amended by O. Reg. 22/98, 102/98, 122/98, 152/99, 278/99, 593/99, 597/99, 205/00 and 283/01 (the “Ontario Building Code”).

AND IN THE MATTER OF an application by Pat Caulfield, Queen’s University, for the resolution of a dispute with Terry Willing, Chief Building Official, City of Kingston, to determine whether the proposed natural gas fireplaces to be located in the Fireplace Lounges, which constitute extensions of public corridors leading to exits in sites 1 and 3, provide sufficiency of compliance with Sentence 3.3.1.2.(3), and whether the proposed use of glued-laminated heavy timber beams and purlins as well as plywood sheathing for attachment of copper roofing in the construction of the roof assembly of the fireplace lounge in site 3, provides sufficiency of compliance with Sentences 3.2.2.43.(2), 3.2.2.16.(1) and 3.1.5.3.(2) of the Ontario Building Code at the Student Residence Buildings for Queen’s University, 23 Albert Street (site 1) and 194 Stuart Street (site 3), Kingston, Ontario.

APPLICANT	Pat Caulfield Queen’s University Kingston, Ontario
RESPONDENT	Terry Willing Chief Building Official City of Kingston
PANEL	Len King, Vice-Chair John Guthrie Gary Burtch
PLACE	Toronto, Ontario
DATE OF HEARING	August 1, 2002
DATE OF RULING	August 1, 2002
APPEARANCES	Peter Colquhoun, Consultant Arencon Inc. Agent for the Applicant Ted Marecak Building Official City of Kingston Designate for the Respondent

RULING

1. The Applicant

Pat Caulfield, Construction Manager, Queen's University, has received a building permit under the *Building Code Act*, S.O. 1992, c. 23, as amended, and is constructing two new student residence buildings at Queen's University, 23 Albert Street (site 1) and 194 Stuart Street (site 3), Kingston, Ontario.

2. Description of Construction

The Applicant is constructing two buildings having Group C occupancy classifications and intended for use as student residences in conjunction with Queen's University. The buildings, referred to as site 1 and site 3, have building areas of 1,288 m² and 2,906 m² respectively. The site 1 structure is 6 storeys in building height and the site 3 building reaches 5 storeys in building height. Both structures also include mechanical penthouses. The buildings are comprised of noncombustible construction and are equipped with sprinkler, standpipe and hose and fire alarm systems.

The two buildings are being constructed concurrently and share certain design features such as resident room layouts, amenity spaces and construction techniques. As part of the design of both structures, lounge areas have been provided in the one storey portions of the buildings. These lounges, termed fireplace lounges, are open to the adjacent public corridors and are intended to include a natural gas fireplace as an amenity feature for the residents.

There are three items of construction in dispute, one of which is common to both buildings. The common dispute involves the provision of natural gas fuelled fireplaces in the fireplace lounges of both residences. The lounges are situated on the ground floor of each building and are open to the adjacent public corridor which provides access to exits. To address concerns with allowing a fuel fired appliance in an access to exit, the following measures have been offered by the Applicant.

- “Provision of an automatic shut off of the fuel supply to the fireplace on activation of the fire alarm system,
- An enclosure (e.g. glass doors) that will prevent the occupants from coming in contact with the open flame,
- Carbon monoxide detectors, connected to the building fire alarm system, will be provided in each Fireplace Lounge, between the fireplace and the main circulation area of the public corridor,
- The buildings are sprinklered throughout and the sprinkler systems are supervised by the building fire alarm system,
- The fireplaces will be controlled by a thermostat in each Fireplace Lounge that will limit temperature in the fireplace lounges as a result of operation of the fireplace,
- Choices of exits are available for the public corridor and from the Fireplace Lounges that do not pass close to the fireplaces, and
- The fireplaces are located at the most remote points of the Fireplace Lounges from the main circulation area of the public corridors leading to the exits serving the Ground Floors of the buildings.”

The second and third items of construction in dispute are particular to the site 3 building. In this regard, it is proposed that glued-laminated (glu-lam) heavy timber beams and purlins will be used to support a roof assembly consisting of a metal roof deck, insulation, Z girts supporting a nailing surface and

copper sheet roofing, in the construction of the fireplace lounge pavilion. The proposed beams would exceed the minimum size requirements outlined in the Code and, according to the Applicant, will provide a heavy timber alternative to a 45 minute fire resistance rating in lieu of the nonrated, noncombustible assembly which would be permitted by the Code. The fireplace lounge pavilion is a one storey portion of the building which will be separated from the adjacent upper storeys by 1.5 m to the south and 3 m to the north. Further, sprinklering of the pavilion will exceed the minimum requirements of NFPA13.

The final item of construction in dispute, again particular to the site 3 building, involves the use of 19 mm exterior grade plywood as a nailing surface for the copper sheet horizontal seam roof proposed for the fireplace lounge pavilion. To compensate for the use of this combustible plywood roof sheathing the Applicant is proposing the installation of a thermal barrier consisting of 16 mm thick water resistant gypsum board above the metal deck and below the rigid insulation and plywood sheathing. Further, fast response sprinklers are to be installed with deflectors to within 150 mm of the underside of the ceiling.

3. Dispute

The dispute between the Applicant and Respondent is threefold. The first issue involves whether the gas fuelled fireplaces located in the fireplace lounges, which constitute extensions of the public corridors, provide sufficiency of compliance with Sentence 3.3.1.2.(3) of the Ontario Building Code (OBC). Secondly, at issue is whether the use of glued-laminated heavy timber beams and purlins in the roof framing of the fireplace lounge of the site 3 building provides sufficiency of compliance with Sentences 3.2.2.43.(2) and 3.2.2.16.(1). And lastly, at dispute is whether the use of plywood sheathing as a nailing surface for the proposed copper sheet roofing will provide sufficiency of compliance with Sentence 3.1.5.3.(2) of the OBC.

In respect to the proposal to include gas fuelled fireplaces within the lounge areas of the site 1 and 3 buildings, Sentence 3.3.1.2.(3) states that a fuel-fired appliance shall not be located in a corridor serving as an access to exit. As noted, the lounge areas of both buildings are considered to be extensions of the public corridors which provide access to exits. As discussed above, however, certain measures of compensation are being offered to address concerns with the proposal and achieve sufficiency of compliance with the requirements of the Code. These measures include the provision of an automatic shut off feature and carbon monoxide detectors (both of which would be activated by the fire alarm system), and enclosure of the fireplace opening, etc.

On the second issue, Sentence 3.2.2.43. which governs the construction of buildings up to six storeys in building height and containing a Group C occupancy, stipulates that such buildings shall be of noncombustible construction and specifies the fire resistance ratings for floor assemblies and mezzanines. In addition, Sentence 3.2.2.16.(1) permits the use of heavy timber beams in the roof assembly of buildings up to two storeys in building height if sprinklering is provided. The subject site 3 building proposes the use of glu-lam heavy timber beams and purlins in the construction of the fireplace lounge roof assembly. The size of the proposed heavy timber beams and purlins will exceed the minimum size requirements outlined for such materials in the Code and would, arguably, provide the equivalent of a 45 minute fire resistance rating, whereas a nonrated, noncombustible assembly would be permitted.

Lastly, Sentence 3.1.5.3.(2), applicable to the project for its proposed use of combustible roofing materials, provides that combustible roof sheathing and supports installed above a **concrete** (emphasis added) deck are permitted, upon condition, in buildings required to be of noncombustible construction.

As noted above, the Applicant is proposing the use of a plywood sheathing above a metal deck for the purposes of providing a nailing base for the attachment of copper sheet roof materials. To compensate for deviation from the requirements of the Code in this regard, the Applicant is proposing the installation of a thermal barrier between the deck and the sheathing as well as the use of quick response sprinkler heads with deflectors positioned within 150 mm from the ceiling.

4. Provisions of the Ontario Building Code

3.3.1.2. Hazardous Substances, Equipment and Processes

- (3) A fuel-fired *appliance* shall not be installed in a corridor serving as an *access to exit*.

3.2.2.43. Group C, up to 6 Storeys

- (2) The *building* referred to in Sentence (1) shall be of *noncombustible construction*, and
- (a) except as permitted by Sentence (3), floor assemblies shall be *fire separations* with a *fire-resistance rating* of not less than 1 h,
 - (b) *mezzanines* shall have a *fire-resistance rating* of not less than 1 h,
 - (c) if the *building* is not *sprinklered*, roof assemblies shall have a *fire-resistance rating* not less than 1 h, and
 - (d) *loadbearing walls*, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.16. Heavy Timber Roof Permitted

- (1) Unless otherwise permitted by Articles 3.2.2.20. to 3.2.2.83., a roof assembly in a building up to 2 *storeys in building height* is permitted to be of *heavy timber construction* regardless of *building area* or type of construction required, provided the *building* is *sprinklered*.

3.1.5.3. Combustible Roofing Materials

- (2) *Combustible* roof sheathing and roof sheathing supports installed above a concrete deck are permitted on a *building* required to be of *noncombustible construction* provided
- (a) the concrete deck is not less than 50 mm (2 in) thick,
 - (b) the height of the roof space above the deck is not more than 1 000 mm (3 ft 3 in),
 - (c) the roof space is divided into compartments by fire stops in conformance with Article 3.1.11.5.,
 - (d) openings through the concrete deck other than for *noncombustible* roof drains and plumbing piping are protected by masonry or concrete shafts
 - (i) constructed as *fire separations* having a *fire-resistance rating* not less than 1 h, and
 - (ii) extending from the concrete deck to not less than 150 mm (5⁷/₈ in) above the adjacent roof sheathing,
 - (e) the perimeter of the roof is protected by a *noncombustible* parapet extending from the concrete deck to not less than 150 mm (5⁷/₈ in) above the adjacent sheathing, and
 - (f) except as permitted by Clause (d), the roof space does not contain any *building services*.

5. Applicant's Position

The Agent for the Applicant stated that there are three areas of construction in dispute in the

construction of the two new student residences. He submitted that all issues were particular to the proposed fireplace lounges included in the design and layout of the subject buildings.

In outlining the first issue in dispute, the Agent stated that the Applicant is proposing the installation of natural gas fireplaces in the fireplace lounges. He noted that these lounges, while distinct in their function, were open to the adjacent public corridors serving as access to exits. The Agent acknowledged the position of the municipality in this regard and advised that, to address any concern in this regard and to achieve sufficiency of compliance, he was proposing certain compensating measures.

As part of the proposal, the Agent advised that the fireplaces would be provided with a shut off valve which would cut off the natural gas supply to the units when the fire alarm system is activated. Further, carbon monoxide detectors are proposed in the lounges which would also be activated by the fire alarm system. It is also intended that the fireplace openings will be enclosed in glass and that thermostats will limit the temperature in the lounge areas. He further noted that the fireplaces themselves were to be situated at the farthest point from the path of travel through the public corridors. These measures, he argued, demonstrated sufficiency of compliance with the provisions of the Code and were also consistent with measures included in two previous Building Code Commission Rulings approving of similar proposals.

In respect to the second issue in dispute, the Agent advised that glu-lam heavy timber beams and purlins were being proposed in the construction of the roof assembly of the fireplace lounge pavilion at site 3. These beams, he stated, will exceed the minimum size requirement dictated by the Code and will provide the equivalent of a 45 minute fire resistance rating. He suggested that this is an improvement over what would be permitted by the Code, including nonrated noncombustible assemblies.

In addition to the timber support assembly being proposed in the fireplace lounge pavilion, the Agent advised that they are intending to apply copper sheet roofing to this one storey portion of the site 3 residence. This material, he argued, ideally requires a plywood nailing base to allow for proper installation. He acknowledged that the plywood sheathing was not listed in the Code as an acceptable material for use in a building required to be of noncombustible construction and, as a result, is offering compensation in this regard.

To address concerns in respect to the use of the plywood sheathing, the Agent noted that a thermal barrier was being proposed on top of the metal deck and below the insulation and sheathing. This barrier, he argued, was not required by the Code. He further noted that the sprinkler protection in the fireplace lounge will exceed the requirements of NFPA13 and advised that quick response sprinkler heads equipped with deflectors were to be installed within 150 mm of the underside of the finished ceiling. These protective measures, he submitted, would provide sufficiency of compliance with the safety requirements anticipated by the OBC.

In summation, the Agent reiterated the design concept proposed and emphasized that all of the measures being offered where the proposed construction deviated from the strict prescriptive requirements of the Code will achieve an appropriate level of sufficiency of compliance. In his opinion, an equivalent level of life safety was being afforded to the occupants of the buildings in this regard.

6. Respondent's Position

The Designate for the Respondent submitted that the Code requirements in respect to the items in dispute were clearly set out and that their interpretation was not at issue in this regard. He stated that the proposed natural gas fireplaces in the lounge areas of the building and the use of heavy timber and

plywood sheathing in the roof assembly were contrary to the specific provisions of the Ontario Building Code.

The Designate acknowledged the proposal put forth by the Applicant and the compensating construction being offered, however, in his opinion, these measures did not fall within the scope of Section 2.7 of the Code governing the acceptance of equivalents. He further noted that the past BCC rulings referred to by the Agent for the Applicant could not be applied to the subject proposals. As such, he stated that he did not have the authority to grant permit approval in this regard.

7. Commission Ruling

It is the decision of the Building Code Commission that the proposed natural gas fireplaces to be located in the fireplace lounges, which constitute extensions of public corridors leading to exits in sites 1 and 3 do not provide sufficiency of compliance with Sentence 3.3.1.2.(3) of the Ontario Building Code.

It is also the decision of the Building Code Commission that the use of glued-laminated heavy timber beams and purlins as well as plywood sheathing for attachment of copper roofing proposed for use in the roof assembly of the fireplace lounge pavilion of site 3 provides sufficiency of compliance with Sentences 3.2.2.43.(2), 3.2.2.13.(1) and 3.1.5.3.(2) of the Ontario Building Code at the Student Residence Buildings for Queen's University, 23 Albert Street (site 1) and 194 Stuart Street (site 3), Kingston, Ontario.

8. Reasons

- i) The installation of a fuel fired appliance (gas fireplace) in a public corridor serving as an access to exit is not permitted by the Code. Furthermore, the compensating measures offered will not provide sufficiency of compliance to maintain the integrity of the access to exits.
- ii) The Commission is satisfied with the proposed roof assembly at the site 3 building in as much as the fireplace lounge sprinkler system exceeds the NFPA13 requirements set out in the OBC.
- iii) The sprinklers heads are to be equipped with deflectors within 150 mm of the underside of the ceiling.
- iv) The proposed use of combustible thermal insulating material is permitted by the Code.
- v) A 16 mm layer of water resistant gypsum board is being provided as a thermal barrier on top of the metal deck and below the rigid insulation and plywood sheathing.
- vi) The size of the beams and purlins used in the roof assembly of the fireplace lounge exceed the minimum specifications for heavy timber set out in the Code and the heavy timber components provide an alternative to a 45 minute fire resistance rating in lieu of the nonrated, non combustible assembly.
- vii) The proposed glu-lam beams and purlins offer better fire performance than elements of a decorative wood ceiling which would be permitted by the Code.

Dated at Toronto this **1st** day in the month of **August** in the year **2002** for application number **2002-19**.

Len King, Vice-Chair

John Guthrie

Gary Burtch