



City of Richmond

Report to Committee

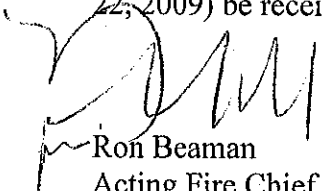
To: Community Safety Committee
From: Ron Beaman
Acting Fire Chief



Date: January 22, 2009
File:

Re: Impact of Six-storey Combustible Construction in Richmond

Staff Recommendation

That the "Impact of Six-storey Combustible Construction in Richmond" report (dated January 22, 2009) be received from the Acting Fire Chief for information.


Ron Beaman
Acting Fire Chief
604-303-2701

FOR ORIGINATING DEPARTMENT USE ONLY					
ROUTED TO:		CONCURRENCE		CONCURRENCE OF GENERAL MANAGER	
Building Approvals		Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Development Applications		Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
REVIEWED BY TAG		YES	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>
					
		REVIEWED BY CAO		YES	<input checked="" type="checkbox"/>
				NO	<input type="checkbox"/>
					

Staff Report

Origin

The Provincial Government has now amended the BC Building Code to permit construction of six-storey buildings using lightweight wood-frame combustible construction. This Code change is scheduled to come into effect on April 6, 2009, and it has raised several concerns within the Fire Services community. This report is intended to provide an overview for Council of staff's general concerns with this new construction classification. It is not intended to and does not provide a technical analysis of the Building Code changes.

Concerns

Existing Zoning permitting Six-storey Residential

There are a number of locations within the City where existing zoning would permit this type of building form. The sites generally fall into two distinct categories:

- sites within the City Centre that are zoned "Downtown Commercial District (C7)", and
- existing residential developments located in various areas throughout the City where upon redevelopment this type of construction could be used

The City Centre C7 zoned sites are more likely to experience redevelopment in the short term as many of these sites are currently under-developed. In general, the existing C7 zoned sites in the City Centre are located in the area bounded by Granville Avenue to the south, Lansdowne Road to the north, Cooney Road to the east and Gilbert Road to the west.

Where the existing zoning permits this form of development, a Council issued Development Permit is still required. Richmond Fire-Rescue and Development Applications staff will continue to work together as part of the Development Permit processes to help manage the firefighting considerations.

Maintaining Designed Structural Fire Resistance

Buildings using combustible construction are designed to meet or exceed the minimum fire resistance and structural safety standards of the BC Building Code. The experience of Richmond Fire-Rescue has been that the minimum requirements are rarely exceeded due to additional cost. The design may require the provision of features such as automatic sprinkler systems, fire-stops, and gypsum wallboard that contribute to the fire resistance rating and safety of a structure.

However, for these systems to work as intended they must be maintained as designed, built and approved over the life of the building.

Some modern innovations in construction such as engineered-wood silent-floor trusses and lightweight roof-trusses are structurally sound and in common usage, but may not have the inherent fire resistance of more traditional construction using dimensional lumber. Gypsum wallboard is an effective barrier to fire, but must be continuous, without gaps, cracks or other openings in order to provide that fire barrier.

Over time the fire resistance of combustible construction may become compromised. Buildings may settle unevenly, and the shrinkage and deflection of wood can cause gaps and openings in drywall, compromising the fire resistance of combustible wood construction. These problems can be exacerbated by the increased weight of additional storeys, and may also affect the closing of fire-rated doors in fire separations and exits.

Even though an approved new building can be expected to meet the Building Code requirements of the day, over time, code changes and maintenance issues can cause a building to fall below current standards. Renovations undertaken by homeowners and unqualified tradespersons without submitting plans, or applying for permits or building inspections may omit fire-stops, weaken structural components, and compromise fire resistance by leaving openings in drywall.

Tactical Firefighting Considerations

Ladder trucks are a resource commonly used by fire departments to extinguish fires in large and tall buildings, and especially in combustible construction. The use of ladder trucks has given Richmond Fire-Rescue a tactical firefighting advantage with the ability and capacity to reach balconies and roof-tops quickly and safely, and to make a rapid attack or rescue with minimal staff.

Defensively, ladder trucks can be used to direct water streams for exposure protection above, over, and between combustible structures to prevent fire spread. The City's current 75-foot ladder trucks can reach approximately 60 feet above the street under ideal conditions. Trees, power-lines and the setback of buildings from the street can further limit or reduce the ladder truck's effective reach; however, under the former four-storey limit to combustible construction, 75-foot ladder trucks have been adequate.

Increasing the height of combustible construction to six-storeys will exceed the 60-foot reach of the City's ladder trucks by as much as 12 meters or 40 feet. This will significantly reduce the effective tactical advantage that the City's existing ladder trucks provide.

Access

The concrete parkades of combustible apartment buildings are considered a separate building for construction requirement purposes and are not included when calculating the number or height of allowable storeys. In many jurisdictions this is a minor issue as the parkade is set below the natural grade or street level. However, the water table and flood plain requirements in Richmond can make this approach unfeasible.

Many projects in Richmond have the parkade level constructed above the existing or street grade, then artificially raise the local grade by installing berms around the parkade. While this is an acceptable alternative under the Building Code, it can present some challenges for access and tactical issues for firefighters who typically have to operate from the natural grade at street level. The artificial grade provided by berms can increase the height above the street of a four-storey building to a height similar to five storeys. Attics and lofts are also not counted in the definition of a storey, which may further increase the height above the street. To help manage these challenges the Fire Department is given the opportunity to review these developments as part of the Development Permit processes.

The new Code sets a six-storey height limit of eighteen meters or sixty feet. However, this is not an overall building height, but is measured to the highest floor level of the top storey. Again this can be measured from an artificially raised grade and need not include the parkade, the top storey itself, or the roof.

The net effect for firefighting purposes could be a six-storey fully Code-compliant building that might rise as high as 100 feet relative to the street. The roof-top and the upper floors in such cases would be well beyond the 60 foot reach of the City's current ladder trucks. To fight a fire effectively in such a structure will require new firefighting tactics, which could also require additional firefighting resources, more personnel, and higher reaching ladder trucks.

Without knowing the long-term effect of the new construction requirements, staff cannot determine a financial impact to the City with certainty. However, Richmond Fire-Rescue will need to re-assess the department's tactics, training, human and equipment resource requirements to ensure safe and effective firefighting and rescue operations in this new class of building.

Financial Impact

There is no financial impact of this report.

Conclusion

Because the Code change creates an entirely new building classification, there is no empirical fire performance data, or tactical firefighting models to reference or adopt regarding such buildings. It is therefore impossible to predict the full impact on Richmond of six-storey combustible construction until such buildings are constructed, tested, and evaluated over time.

There are a limited number of sites within the City, where the existing site zoning permits this building typology with most being located in the City Centre.

In addition to the existing zoned sites, this type of building may be proposed as part of future rezoning applications. Richmond Fire-Rescue will and Development Applications staff will continue to work together to help manage firefighting considerations during the Rezoning and Development Permit processes.

This report was prepared by Richmond Fire-Rescue in consultation with the Building Approvals, and Development Applications staff. It provides an overview of the anticipated issues concerning six-storey combustible construction, and is based on Richmond Fire-Rescue's empirical experience, modern firefighting tactics and safety concerns, current resources and equipment, and the building maintenance issues encountered in existing residential buildings using three- and four-storey combustible construction.



Dave Clou
Chief – Fire Prevention Officer
604-303-2707

DJC:djc