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CITY OF VANCOUVER

POLICY REPORT
DEVELOPMENT AND BUILDING

Report Date:	July 8, 2009
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Meeting Date:	July 21, 2009

TO: Vancouver City Council

FROM: Chief Building Official

SUBJECT: Building By-law Amendments to Enable Construction of Five and Six Storey Residential Wood Frame Buildings

RECOMMENDATION

A. THAT Council approve the proposed amendments to the Building By-law, generally as set out in Appendix A, to enable construction of five and six storey residential wood frame buildings, and

B. THAT Council authorize the Director of Legal Services to bring forward the By-law amendments generally as shown in Appendix A to this report.

GENERAL MANAGER'S COMMENTS

The General Manager of Community Services recommends approval of A and B.

CITY MANAGER'S COMMENTS

The City Manager recommends approval of A and B.

COUNCIL POLICY

Under Section 306(a) of the Vancouver Charter, the City may pass By-laws to regulate the design and construction of buildings and may adopt any code relating to the design and construction of buildings, with any amendments Council considers appropriate in accordance with Section 306(w).

On June 18, 2009, Council approved the Short Term Incentives for Rental (STIR) Program to encourage and facilitate the development of new residential market rental housing. The recommendations contained in this report will assist this program by providing designers and property owners with more material options for constructing residential apartment buildings.

SUMMARY

This report proposes a set of amendments to the Building By-law that enables building owners the option of constructing five and six storey residential buildings using wood frame construction. Currently, the Building By-law only permits this option for residential buildings up to four storeys in height. With the exception of two requirements aimed at providing a greater level of fire and life safety, the recommendations presented in this report are identical to that of the new British Columbia Building Code (BCBC) requirements that were enacted earlier this year. Staff believe that these two additional requirements provide a greater level of fire and life safety for five and six storey wood frame buildings and at the same time, address the fire fighting concerns expressed by the Vancouver Fire and Rescue Services (F & RS). It should be noted that the Building By-law amendments proposed in this report are represent an insignificant increase in construction cost when compared to a six storey wood frame residential building constructed under the new BCBC requirements.

PURPOSE

The purpose of this report is to propose a set of amendments to the Building By-law to enable construction of five and six storey residential wood frame buildings. In order to maintain consistency as much as possible between the Building By-law and the BCBC, this report adopts the BCBC requirements for five and six storey residential wood frame buildings with two minor enhancements that are intended to mitigate the spread of fire in vertical concealed cavities and provide greater reliability of the exit system in five and six storey residential wood frame buildings.

It should be noted that issues of materials are separate and somewhat neutral from issues of building scale. For example, there are zones where six storey forms are already permitted regardless of whether the Building By-law allows six-storey wood frame. Zoning processes will continue to consider planning issues of scale, density and massing, separate from issues of material.

BACKGROUND

As stated in the Policy section of this report, Vancouver is enabled under the Vancouver Charter to adopt By-laws to regulate the design and construction of buildings. The Building By-law regulates the design and construction requirements for buildings as well as the administrative provisions for permitting, inspection, and enforcement of these requirements.

Vancouver's ability to adopt its own Building By-law regulating the construction of buildings is unique in the Province and unusual in the rest of Canada. It is an important authority which allows Council the opportunity to be responsive to local issues impacting on building safety much more effectively and quickly than other municipalities. Using this ability, Vancouver has been a leader in adopting a number of Building By-law provisions, many of which have eventually been adopted both nationally and provincially. Notable examples of this leadership are mandatory sprinkler systems, energy efficiency, rain screen cladding, enhanced accessibility, green building requirements, and upgrading of existing buildings. Many of these requirements have now been emulated in the current editions of the National Building Code of Canada (NBCC) and BCBC.

Historically, residential wood frame buildings in Canada were limited in height to three storeys. On June 1, 1987, Vancouver was the first municipality in Canada to allow four storey residential wood frame construction. The 1990 Edition of the NBCC followed Vancouver's leadership and allowed four storey residential wood frame buildings for the first time. The Province followed this direction on July 21, 1992.

In May 2008, the Premier and Housing Minister of British Columbia announced the intention to amend the BCBC to allow five and six storey residential wood frame buildings. Through the summer and fall of 2008, the Province engaged in a broad stakeholder consultation process to identify the technical issues

in enabling the construction of taller residential wood frame buildings. The outcome of this process was a set of amendments to the 2006 BCBC, adopted by Ministerial order on January 8, 2009 and enacted on April 6, 2009. As a result, with the exception of Vancouver residential wood frame buildings up to six storeys may be constructed throughout the Province of BC. Should Council accept the recommendations contained in this report, Vancouver will follow this direction.

DISCUSSION

Residential wood frame buildings in Canada are limited in size in terms of their height and footprint area. The current Building By-law limits residential wood frame buildings to a maximum of four storeys with a maximum footprint area of 1,800 m^2. Should Council accept the recommendations contained in this report, residential wood frame buildings will be permitted up to a maximum of six storeys, with a footprint area not exceeding 1,200 m^2 (1,440 m^2 for a five storey residential wood frame building), in accordance with the new BCBC requirements along with two additional enhancements aimed at mitigating fire spread in vertical concealed cavities and providing greater reliability of the exit system in five and six storey residential wood frame buildings.

There is a strong desire on the part of the Provincial Government to support and reinvigorate BC's forest industry. This desire was embodied in the goals laid out in the Throne Speech on February 16, 2009. One of the key statements was "We will lead the way in safe, six storey wood frame construction that lowers building and housing costs." In addition to the effort here in BC, there is an effort in the United States to eliminate barriers that prevent wood frame buildings higher than four storeys. Jurisdictions such as Bellevue, Washington, Boise City, Idaho, and Portland, Oregon recently amended their building regulations to allow five storeys of residential wood frame construction. It should also be noted that European countries such as the United Kingdom and Germany have amended their Building Regulations to allow wood frame up to six storeys. Italy and New Zealand are researching similar amendments in order to allow larger residential wood frame buildings. Therefore, there is precedence that reinforces local efforts in eliminating barriers to use of wood to create taller residential wood frame buildings.

Expanding the use of wood frame construction in residential buildings to six storeys from the current limit of four storeys enables new opportunities for lowering the environmental impact of building stock. Studies[1] conducted by the Canadian Wood Council indicate that, when compared to wood construction, light steel frame and concrete construction respectively

- Embody and consume 12% to 20% more energy;
- Emit 15% and 29% more greenhouse gases;
- Release 10% and 12% more air pollution
- Discharge 3 and 2.25 times more water pollution;
- Use 7% and 50% more resources; and
- Produce 6% and 16% more solid wastes

Despite the obvious environmental advantages noted above, the Province of BC along with local design professionals noted that fire, life safety, building envelope, and structural issues associated with taller wood frame buildings required study. As a result, these issues were studied by a Provincially led consultant team along with extensive stakeholder public consultation, in which the City of Vancouver took part. The results of this work led to the development and adoption of amendments to the BCBC allowing residential wood frame buildings up to six storeys in height throughout the Province with the exception of Vancouver.

[1] Canadian Wood Council Publication, Sustainable Building Series No. 1, "Energy and the Environment in Residential Construction"

Early in 2009, the Chief Building Official's Office reviewed the BCBC requirements for residential wood frame buildings up to six storeys, as well as the supporting material used to develop the requirements, to determine their suitability for adoption into the Building By-law. The BCBC requirements, including the risks the requirements address are summarized in Table 1, "Identification of Risks and BC Building Code Requirements to Mitigate Identified Risks".

Table 1: Identification of Risks and BC Building Code Amendments to Mitigate Identified Risks

Issue	Associated Risk	Solution to Address Risk (BC Building Code Requirement)
Building height	Increased challenge for fire fighting operations due to the larger amount of combustible materials (wood) and height of building.	Limit building height to 18 m, measured between grade and the uppermost level of the top storey. Limit building area to 1440 m^2 if five storeys in building height and 1200 m^2 if six storeys in building height.
Exterior fire spread	Increased probability of fire spread up the building face due to additional height and combustible materials.	Require exterior cladding to be resistant to fire spread in residential wood frame buildings up to six storeys in height.
Seismic design	Increased risk of failure in an earthquake due to lack of structural design criteria for wood frame buildings over four storeys.	Introduce new seismic design force levels specific to five and six storey structures along with a requirement to mandate continuous shear walls in residential wood frame buildings up to six storeys in height.
Materials shrinkage	Increased risk of damage or deterioration of building elements due to shrinkage properties associated with constructing buildings up to six storeys with wood.	Add a requirement through the appendix of the Building Code to require designers to follow a technical and practice bulletin which addresses these issues as it applies to structural, fire protection, and building envelope design for residential wood frame buildings up to six storeys in height.

Staff agreed with the risks and BCBC solutions identified by the Province to address these risks and found them to be compatible with the Building By-law. However, staff were also aware that throughout the Provincial public consultation process, concerns from Fire Departments in the Lower Mainland surfaced. Of particular concern was the perceived inability of fire departments to fight fires in taller residential wood frame buildings, and the perceived increase in occupant evacuation time due to the additional wood frame floor levels. These concerns were echoed by the (F & RS), but to a much lesser degree; F & RS indicated that their equipment and training was sufficient to handle taller residential wood frame buildings, provided provisions were added to the Building By-law to address fire spread in vertical concealed cavities and reliability of the exit stair systems. As a result, the CBO Office worked with F & RS to develop Building By-law solutions to address these two concerns. These two enhancements are summarized in Table 2, "Additional Risks and Proposed Enhancements to the BC Building Code Requirements".

Table 2: Additional Risks and Proposed Enhancements to the BC Building Code Requirements

Issue	Associated Risk	Enhancement to BCBC requirements (Proposed Vancouver Building By-law Amendment)
Interior fire spread	Increased risk of fire spread through concealed cavities.	Require fire blocking of vertical concealed cavities to reduce the risk of rapid fire spread in residential wood frame buildings up to six storeys in height.
Building exit system reliability	Increased risk of delays in occupant evacuation and emergency response if both exits are compromised due to smoke migration into both exit stairs.	Restrict use of contiguous exit stairs (scissor stairs) in residential wood frame buildings up to six storeys in height.

Currently, the Building By-law does not clearly address fire spread within vertical concealed cavities within wood frame construction. In typical wood frame construction, these cavities create a potential pathway for fire and smoke to spread rapidly throughout the building. To address this concern, staff recommend that an additional requirement be added to the Building By-law to compartmentalize vertical concealed cavities in order to reduce the risk of rapid fire spread in a building should a fire condition occur.

Buildings with small floor plates, usually high rise type towers, are often constructed with their required exit stairs built in a common enclosure, creating a stacked stairway system. This type of stair design is known as a contiguous or "scissor" stair system. The contiguous stair design saves overall floor space, thereby allowing additional residential floor area. Due to material shrinkage and construction quality, this type of stair is difficult to implement with wood frame materials; as a result, there is an increased risk of compromise of both exit stairs. A breach in the separation between stairs could result in fire and smoke contamination of the building's entire exit system. To address this concern, staff recommend that the Building By-law be amended to restrict construction of contiguous exit stairs in five and six storey residential wood frame buildings.

Should council accept these two enhancements F & RS concerns will be addressed and a greater level of fire safety will be achieved in five and six storey residential wood frame buildings.

Enabling the expanded use of wood in residential buildings provides more material options for designers along with some opportunities for cost savings, even with the above noted Building By-law enhancements. The Cost Analysis section of this report shows that the construction cost of a five and six storey residential wood frame building is less than a comparable building constructed of either concrete or light steel frame.

COST ANALYSIS

Earlier this year, the Urban Development Institute commissioned the BTY Group, a Cost Management and Project Management consulting firm, to compare the cost of constructing a six storey residential wood frame building with both a six storey residential concrete building and a six storey residential light steel frame building using the new BCBC requirements. The results of this analysis indicated the following construction costs (excluding land value):

- Concrete construction: $265 per square foot
- Light steel frame construction: $264 per square foot
- Wood frame construction: $237 per square foot

The cost difference between six storey residential wood frame and six storey concrete or light steel frame is $27 to $28 per square foot, respectively. If expressed as a percentage, six storey residential wood frame is approximately 11% less expensive than six storey residential concrete or light steel frame.

The proposed Building By-law enhancements will carry minimal additional cost when added to the new BCBC requirements for five and six storey residential wood frame buildings. The amendment related to contiguous exit stairs represents the most significant of the two enhancements from a cost perspective; an increase in cost results from the fact that additional area per floor plate is required to construct separate exit stair enclosures with an adjoining public corridor. Assuming that the usable area per floor plate is 80% of the maximum 1200 m^2 permitted, the construction cost of a six storey residential concrete building is $20,538,030 and the construction cost of a six storey residential light steel frame building is $20,460,528. The cost to build a six storey residential wood frame building, including the cost of the contiguous stair enhancement, is shown in Table 3, "Cost of Implementing Enhancements to the BCBC requirements".

Table 3: Cost of Implementing Enhancements to the BCBC Requirements

	Six Storey Wood Frame Building
BCBC requirements	$18,367,974
BCBC requirements with no contiguous stair	$18,657,462
Difference	$289,488
% Difference	1.6%

Therefore, the amendment related to contiguous exit stairs in a six storey wood frame residential building adds approximately 1.6% to the total cost of the building. The lower cost of residential wood frame construction versus residential concrete or light steel frame construction is maintained. Therefore staff believe that should Council accept the recommendations in this report, the proposed Building By-law enhancements will not add a significant cost when compared to that of the new BCBC requirements for five and six storey wood frame residential buildings.

FINANCIAL IMPLICATIONS

There are no financial implications for the City of Vancouver, should Council accept the proposed Building By-law amendments contained in this report.

PERSONNEL IMPLICATIONS

It is anticipated that there will be no personnel implications with respect to City resources to administer the new requirements enabling five and six storey wood frame residential buildings. Training will be required for plan review and inspection staff as outlined in the Implementation Plan section of this report.

IMPLEMENTATION PLAN

Should Council accept the Building By-law amendments proposed in this report, staff recommend that these amendments come into effect immediately. It should be noted that the proposed amendments

relate to topics that staff currently administer through their plan review and inspection procedures; therefore, extensive training will not be required. Should Council accept these recommendations training sessions will be provided to staff and industry immediately.

CONSULTATION

Interdepartmental Consultation

The Chief Building Official's Office engaged in an interdepartmental consultation process in April and June of this year. The affected City departments were supportive of the proposed Building By-law amendments. The results of the interdepartmental consultation are summarized in Table 4, "Summary of Interdepartmental Consultation".

Table 4: Summary of Interdepartmental Consultation

Department Group	Supportive of Adoption of BCBC requirements	Supportive of Proposed Vancouver Enhancements	Concerns Raised with Proposed Amendments	Action Taken to Address Concerns
Fire & Rescue Service	Yes, but had concerns	Yes	1. Interior fire spread through concealed spaces 2. Reliability of wood frame exit stair systems	Added enhancements to BCBC requirements, see Discussion section
Development Services	Yes	Yes	None	None
Planning	Yes	Yes	Will need to consider separately amendments to the Zoning & Development By-law to permit up to six storey residential buildings in more zones throughout the city.	See discussion below
Policy Impact Advisory Committee (PIAC)	Yes	Yes	None	n/a

During the consultation process, Planning staff noted that, in enabling taller residential wood frame buildings, the Zoning & Development By-law needed to be amended in certain locations and areas to allow building height beyond four storeys. They advised that further consultation with the Director of Planning was necessary. In subsequent meetings with the Director of Planning and supporting staff, it was noted that the proposed amendments to the Building By-law allow additional flexibility in terms of construction materials, which was a separate issue from the form and massing of the building. It was agreed that changes to the Zoning & Development By-law would be made only where appropriate from a planning and design perspective, namely where there was a desire to permit additional density or a different approach to form. Five and six storey residential buildings would therefore be enabled in any existing district where buildings higher than four storeys are permitted, without the need to immediately amend the Zoning & Development By-law.

Impacted Stakeholder Consultation

The Chief Building Official's Office engaged in a public consultation process with impacted industry stakeholders in June of this year. These stakeholders included the following:

- Architects Institute of BC (AIBC)
- Association of Professional Engineers and Geoscientists of BC (APEGBC)
- Greater Vancouver Homebuilders Association (GVHBA)
- Homeowner Protection Office (HPO)
- Urban Development Institute (UDI)

Responses were received from the majority of the above noted stakeholders. Those who responded were supportive of the City adopting the BCBC requirements, but had some minor concerns with the two proposed enhancements to the BCBC requirements. The two common concerns raised by these stakeholders were as follows:

- The proposed enhancement relating to vertical concealed cavities was not clear and was subject to misinterpretation; there was also confusion as to whether the new requirement would apply to vertical service shafts (i.e. elevator shafts).
- The proposed restriction of contiguous exit stairs created a design impediment which limited design flexibility

Staff addressed the vertical concealed cavity concern by revising the proposed language as suggested by APEGBC and making it consistent with requirements already required in the Building By-law for fire blocking within wall cavities. Staff also sent out clarification to industry that this requirement was not applicable to vertical service shafts (i.e. elevator shafts).

Staff addressed the contiguous exit stair concern by clarifying to industry that, should the restriction of such stairs prove to be a substantial impediment, designers may choose to utilize the City's Alternative Solution approach. This approach, currently permitted in the Building By-law, provides designers with a means to employ innovative design methods in their building projects; therefore, industry professionals can submit alternative design solutions that could be used to mitigate concerns related to contiguous exit stairs. These alternative solutions would be reviewed on a case by case basis and, over time, the solutions could be considered for adoption into the Building By-law once proven in the field. It should be noted that it is common practice for the Chief Building Official's Office to review accepted alternative solution requests on a regular basis to ensure that the Building By-law is reflective of current design and construction practices.

In addition to the above noted issues, UDI expressed concern regarding treatment of mixed use concrete and wood frame buildings and four storey wood frame buildings located on sloping sites. They noted that the BCBC requirements, and Vancouver enhancements, were based on the assumption that the entire building will have up to six floors of residential wood frame and that mixed use buildings or four storey buildings on sloping sites, both having fewer levels of wood construction, would be unfairly penalized. Staff responded to these concerns as follows:

- The Building By-law amendments were created based on an analysis of risk for residential occupancies only; introduction of a commercial occupancy into the building alters the risk, and therefore the level of safety afforded by the Building By-law amendments should not be reduced.
- Currently, four storey wood frame residential buildings located on sloping sites are subject to an alternative solution in order to allow construction to be wood frame and not concrete or light steel frame. The alternative solution approach typically involves incorporation of additional design features which are not fundamentally different from the proposed Building By-law amendments. As a result, the recommended By-law amendments will provide designers greater direction in this regard.

CONCLUSION

This report recommends adoption of the BCBC requirements for five and six storey residential wood frame buildings, along with two enhancements aimed at mitigating fire spread in vertical concealed cavities and providing greater reliability of the exit system, to enable construction of five and six storey residential wood frame buildings. Should Council accept the proposed Building By-law amendments, designers will be provided with additional material options to create wood frame residential buildings having lower environmental impacts as well as a lower construction costs when compared to buildings built using concrete and light steel frame.

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APPENDIX A

BY-LAW NO. _____

A By-law to amend Building By-law No. 9419
regarding five and six storey wood frame residential buildings

THE COUNCIL OF THE CITY OF VANCOUVER, in public meeting, enacts as follows:

1. This By-law amends the indicated provisions of the Building By-law.

2. In the fourth column of Table 1.3.1.2. of Part 1 of Division B, opposite:

   (a) "ASTM" in the first column, and "D2898-94" in the second column, and after "3.1.5.21.(1)"; and

   (b) "ULC" in the first column, and "CAN/ULC-S134" in the second column, and after "3.1.5.5.(1)";

   Council adds "3.2.2.45.(3)".

3. Council repeals Sentence 3.1.8.12.(1) of Part 3 of Division B, and substitutes:

   "1) A hold-open device is permitted on a door in a required *fire separation*, other than an *exit* stair door in a *building* more than 3 *storeys* in *building height*, and on a door for a vestibule required by Article 3.3.5.7., provided the device is designed to release the door in conformance with Sentences (2), (3), and (4)."

4. In Article 3.1.11.2., Council:

   (a) to the heading, at the end, adds "**and Vertical Concealed Spaces**";

   (b) to the end of the first paragraph of Sentence (1), after "assembly", adds "and any vertical concealed spaces in or attached to 5 or 6 *storey* wood-frame buildings"; and

   (c) to each of clauses (a), (b), and (c) of Sentence 2, after "wall space", adds "or vertical concealed space".

5. From the heading for Article 3.2.2.45. of Part 3 of Division B, Council strikes out "4", and substitutes "6".

6. From Sentence 3.2.2.45.(1) of Part 3 of Division B, Council repeals clauses (b) and (c), and substitutes:

"b) it is not more than 6 *storeys* in *building height*,

c) it has a maximum height of less than 18 m measured between *grade* and the uppermost floor level of the top *storey*, and

d) it has a *building area* not more than

i) 7 200 m^2 if 1 *storey* in *building height*,

ii) 3 600 m^2 if 2 *storeys* in *building height*,

iii) 2 400 m^2 if 3 *storeys* in *building height*,

iv) 1 800 m^2 if 4 *storeys* in *building height*,

v) 1 440 m^2 if 5 *storeys* in *building height*,

vi) 1 200 m^2 if 6 *storeys* in *building height*."

7. Council repeals Sentences 3.2.2.45.(3) and (4) of Part 3 of Division B, and substitutes:

"3) Except as required in Sentence (4), a *building* referred to in Subclause 3.2.2.45.(1)(d)(v) or (vi) shall

a) have an exterior wall cladding which

i) is noncombustible,

ii) has the exterior wall assembly constructed such that the interior surfaces of the wall assembly are protected by a thermal barrier conforming to Sentence 3.1.5.12.(3), and the wall assembly satisfies the criteria of Sentences 3.1.5.5.(2) and 3.1.5.5.(3) when subjected to testing in conformance with CAN/ULC-S134, "Fire Test of Exterior Wall Assemblies", or

iii) *is fire-retardant treated wood* tested for fire exposure after the cladding has been subjected to an accelerated weather test as specified in ASTM D 2898 "Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing.

4) Sub-clauses 3.2.2.45(3)(a)(ii) and (iii) are not permitted where an *exposing building face* is required by Article 3.2.3.7, to have *noncombustible* cladding.

5) In a *building* that contains *dwelling units* that have more than one *storey*, subject to the requirements of Sentence 3.3.4.2.(3), the floor assemblies, including floors over *basements*, which are entirely contained within these *dwelling units*, shall have a *fire-resistance rating* not less than 1 h but need not be constructed as *fire separations*.

6) In a *building* in which there is no *dwelling unit* above another *dwelling unit*, the *fire-resistance rating* for floor assemblies entirely within the *dwelling unit* is waived."

8. After Sentence 3.4.1.2.(2) of Part 3 of Division B, Council adds:

"3) Contiguous exit stairways (scissor stairs) are not permissible in a 5 or 6 *storey* wood frame *building*. [See Appendix A]"

9. In Table 3.9.1.1. of Part 3 of Division B, Council:

(a) in Article 3.1.11.2. to the heading, at the end, adds "**and Vertical Concealed Spaces**";

(b) in Article 3.4.1.2., at the end, adds:

(3)	[F10, F12, F05, F06-OS3.7] [F12,F06-OP1. 2] [F12, F06-OS1.5, OS1.2]

(c) in the heading "3.2.2.45. Group C, up to 4 Storeys, Sprinklered":

(i) from the heading, strikes out "4", and substitutes "6"; and

(ii) at the end, adds:

(3)	(a)	[F02-OS1.2, OP1.2]

10. After Sentence 4.1.8.10.(3) of Part 4 of Division B, Council adds:

"4) In cases where $I_E F_a S_a(0.2)$ is equal to or greater than 0.35, for *buildings* constructed with 5 or 6 *storeys* of continuous *combustible construction* as permitted by Article 3.2.2.45. and having any fundamental lateral period, T_a, walls forming part of the SFRS within the continuous *combustible construction* shall not have irregularities of Type 4 or 5 as described in Table 4.1.8.6."

11. After Sentence 4.1.8.11.(10) of Part 4 of Division B, Council adds:

"11) Where the fundamental lateral period, T_a, is determined by Clause 4.1.8.11.(3)(d) for *buildings* constructed with 5 or 6 *storeys* of continuous *combustible construction* as permitted by Article 3.2.2.45. and having an SFRS of nailed shear walls with wood-based panels, the lateral earthquake force, V, as determined in Sentence (2) shall be multiplied by 1.2."

12. To Sentence 4.1.8.12.(6) of Part 4 of Division B, after "Sentence (7)", Council adds "or (10)".

13. After Sentence 4.1.8.12.(9) of Part 4 of Division B, Council adds:

"10) The base shear, V_d, shall be taken as 100% of the lateral earthquake design force, V, as determined by Article 4.1.8.11. for *buildings*

a) constructed with 5 or 6 *storeys* of continuous *combustible construction* as permitted by Article 3.2.2.45.,

b) having an SFRS of nailed shear walls with wood-based panels, and

c) having a fundamental lateral period, T_a, as determined by Clause 4.1.8.11.(3)(d)."

14. Council strikes out the title to Subsection 4.3.1., and substitutes:

"4.3.1 Wood (See Appendix A)".

15. In Table 4.5.1.1. of Part 4 of Division B, under the heading "4.1.8.10. Additional System Restrictions", at the end, Council adds:

(4)	[F20-OS2, OP2.4] [F22-OS2.4, OP2.4]

16. A decision by a court that any part of this By-law is illegal, void, or unenforceable severs that part from this By-law, and is not to affect the balance of this By-law.

17. This By-law is to come into force and take effect on the date of its enactment.

ENACTED by Council this day of , 2009

_____
Mayor

_____
City Clerk

APPENDIX A

EXPLANATION

Building By-law amending by-law
re five and six storey wood frame residential buildings

The attached by-law will implement Council's resolution of July 21, 2009 to amend the Building By-law requirements for five and six storey wood frame buildings.

Director of Legal Services
July 21, 2009

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