

File No. 04-1000-20-2017-035

February 24, 2017

s.22(1)

Dear s.22(1)

Re: Request for Access to Records under the Freedom of Information and Protection of Privacy Act (the "Act")

I am responding to your request of January 18, 2016 for:

A copy of the "Equivalencies Report" (now known as "Alternate Solutions") City ID No. 96-432, from the Building Review Branch, for project address 869 Beatty Street. The Report was issued in 1997 under base building permit BU404758.

All responsive records are attached.

Under section 52 of the Act you may ask the Information & Privacy Commissioner to review any matter related to the City's response to your request. The Act allows you 30 business days from the date you receive this notice to request a review by writing to: Office of the Information & Privacy Commissioner, info@oipc.bc.ca or by phoning 250-387-5629.

If you request a review, please provide the Commissioner's office with: 1) the request number assigned to your request (#04-1000-20-2017-035); 2) a copy of this letter; 3) a copy of your original request for information sent to the City of Vancouver; and 4) detailed reasons or grounds on which you are seeking the review.

Please do not hesitate to contact the Freedom of Information Office at foi@vancouver.ca if you have any questions.

Yours truly,



Barbara J. Van Fraassen, BA
Director, Access to Information
City Clerk's Department, City of Vancouver

Encl.

:kt

RLM

CITY I.D. No. 96-432



CITY OF VANCOUVER DEPARTMENT OF PERMITS & LICENSES

96 August 20
(Date) (YY MM DD)

REQUEST FOR MINOR RELAXATION/EQUIVALENCY

FOR: BA
Print (Permit Application Number)

871 Beatty Street
(Print Address)

Enclosed Payment \$ 665 Cheque No. 0407
certified professional program

Invoice No. 097244

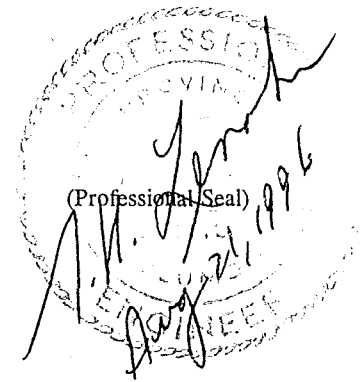
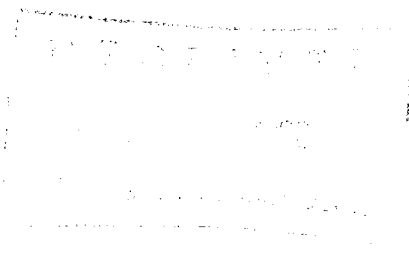
PROPOSED BY W.M. Maudsley / Gage Babcock & Associates Ltd.

ADDRESS 207-1099 West 4th Avenue, Vancouver, BC
William M. Maudsley

Phone No. 732-3751

(1) DESCRIPTION CODE REFERENCE(S) OF DEVIATION: Sentence 3.4.2.1.(5)
[Include all relevant details and list all compensatory features.]

The artist live/work studios on the third and fourth floors contain mezzanines which will be used as sleeping lofts. Sentence 3.4.2.1.(5) requires that mezzanines be provided with exits on the same basis as floor areas, unless the mezzanines conform to the requirements of Sentence 3.4.2.1.(6). The proposed mezzanines conform to all of the requirements in Sentence 3.4.2.1.(6) except for the travel distance requirement for the Group F-2 occupancy. The Group C occupancy complies with Sentence 3.4.2.1.(6).



(2) (Continue Over)
PROPOSED EQUIVALENCY IS

REFUSED (For the following reason) _____

ACCEPTABLE [Subject to the following conditions(s)]:

ACCEPTABLE (As proposed)

[Signature]
CITY BUILDING INSPECTOR
Others _____ Department
Date out 15/96

- cc: Sender/Certified Professional
- City Building Inspector
- Assistant Director, Inspection
- Manager, Building Code Review Branch
- Engineer/Plan Checker SL
- Codes Engineer
- Supervisor, Building Inspection Branch
- Supervisor, Plumbing & Gas Inspection Branch
- Supervisor, Electrical Inspection Branch
- Inspector, DBI / DPI / DEI Branch
- FILE

(See over)

(1) SUMMARY OF MINOR RELAXATION/EQUIVALENCY (Cont'd.)

A minor relaxation is requested on the travel distance requirement for the Group F, Division 2 occupancy on the following basis:

- The 1995 NBC permits a 25 m travel distance from a mezzanine to a suite egress door in a sprinklered building [See Clause 3.4.2.2.(d) in the 1995 NBC]. The travel distance from all of the mezzanines is within this distance.
- Both the Group C and the Group F, Division 2 occupancies within the suite will be provided with a smoke alarm, which will provide early warning in the event of a fire. The smoke alarm is required for a Group C occupancy but it is not required for a Group F, Division 2 occupancy. Since the Group F, Division 2 occupancy will be provided with a smoke alarm, a relaxation on the travel distance requirement is requested on the basis that early warning will compensate for the increased of travel distance.
- Both the Group C and the Group F, Division 2 occupancies within the suite will be protected with quick-response sprinklers. Sentence 3.3.1.4.(7) only requires that suites of residential occupancy be protected with quick-response sprinklers in order to increase the travel distances for all occupancies by 50%. Therefore, the Group F, Division 2 occupancy would be permitted an increase in travel distance with the use of standard sprinklers.

An analysis performed on FPETOOL demonstrates that the quick-response sprinklers respond 33 seconds prior to standard sprinklers and that the maximum fire output was less when quick-response sprinklers were used than when standard heads were used.

Therefore, the mezzanines conform to the requirements of a Group C occupancy. A minor relaxation is requested to increase the allowable travel distance for the Group F-2 occupancy on the basis of provisions contained in the 1995 NBC and on the basis that the suites will be provided with a smoke alarm and quick response sprinklers. The smoke alarm and quick response sprinklers will provide an added level of safety which will compensate for the increased travel distance.

SEE GBA REPORT DATED AUGUST 20, 1996

(3) STAFF COMMENTS AND RECOMMENDATIONS:

+ smoke alarm
+ QRS
+ NPA 95
✓

Comments By: *[Signature]*
Branch _____
Date *DEC 15/96*

Agreed By: _____
Supervisor _____
Branch _____
Date _____



CITY OF VANCOUVER DEPARTMENT OF PERMITS & LICENSES

96 August 20
(Date) (YY MM DD)

REQUEST FOR MINOR RELAXATION/EQUIVALENCY

FOR: BA
Print (Permit Application Number)

871 Beatty Street
(Print Address)

Enclosed Payment \$ 665

Cheque No. 0407

Invoice No.

PROPOSED BY W.M. Maudsley / Gage-Babcock & Associates Ltd.

ADDRESS 207- 1099 West 8th Avenue Vancouver, BC

Phone No. 732-3751

(1) DESCRIPTION CODE REFERENCE(S) OF DEVIATION: Articles 3.2.2.15 and 3.2.2.28
[Include all relevant details and list all compensatory features.]
William M. Maudsley

The captioned building is an existing building that contains combustible construction. The building is required to be constructed to Articles 3.2.2.15 and 3.2.2.28, which require that the building be constructed of noncombustible construction. It is proposed to allow the existing combustible construction on the following basis:

- All new additions will be of noncombustible construction.
- Provisions in Section 3.8 of the By-law would permit this building to be of combustible construction. The building will comply with all of the appropriate requirements in Section 3.8.
- The building will be fully sprinklered with quick response sprinklers which will provide an additional level of safety.
- There will be a small occupant load on the storeys above the first storey.
- There is a restaurant/pub on the first storey, however these occupants will be able to discharge directly to grade.

SEE GBA REPORT DATED AUGUST 20, 1996

(Continue Over)

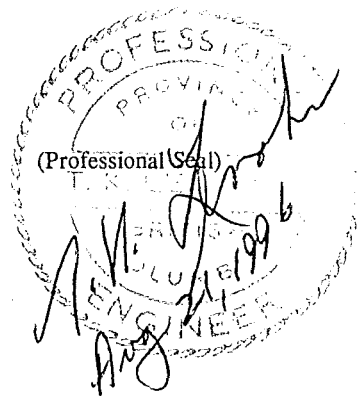
(2) PROPOSED EQUIVALENCY IS

REFUSED (For the following reason) submission doesn't demonstrate compliance with 3.8. (increasing non-compliance, misl use)

ACCEPTABLE [Subject to the following conditions(s)]:

ACCEPTABLE (As proposed)

- cc:
- Sender/Certified Professional
 - City Building Inspector
 - Assistant Director, Inspection
 - Manager, Building Code Review Branch
 - Inspector, DBI / DFI Branch
 - Engineer/Plan Checker SL
 - Codes Engineer
 - Supervisor, Building Inspection Branch
 - Supervisor, Plumbing & Gas Inspection Branch
 - Supervisor, Electrical Inspection Branch



for
W.M. Maudsley
CITY BUILDING INSPECTOR
Others _____ Department _____
Date Oct 17/96

FILE

(See over)



CITY OF VANCOUVER DEPARTMENT OF PERMITS & LICENSES

26 August 20
(Date) (YY MM DD)

REQUEST FOR MINOR RELAXATION/EQUIVALENCY

FOR: BA 871 Beatty Street
Print (Permit Application Number) (Print Address)

Enclosed Payment \$ 665 Cheque No. 0407 Invoice No.

PROPOSED BY W.M. Maudsley / Gage-Babcock & Associates Ltd.

ADDRESS 207-1099 West 8th Avenue, Vancouver, BC Phone No. 732-3751

(1) DESCRIPTION CODE REFERENCE(S) OF DEVIATION: Sentence 3.4.2.1.(5)
[Include all relevant details and list all compensatory features.]

The pub/restaurant and the washrooms in the basement are required to be handicapped accessible. As such, areas of refuge conforming to Article 3.7.3.27 are required on both of these levels. For compliance with Article 3.7.3.27, two smoke protected spaces measuring 1220 mm x 1220 mm are required in each of the exit stairs. Because of space limitations in the existing exit stairs, it is not feasible to comply with Article 3.7.3.27. It is therefore proposed to provide protected floor spaces based on provisions contained in the 1995 NBC, in lieu of refuge areas.

Sentence 3.3.1.7.(1) of the 1995 NBC permits accessible floor areas above or below the first storey in a non-sprinklered building to be divided into two zones by a minimum 1 h fire separation so that persons with disabilities can be accommodated in each zone [3.3.1.7.(1)(b)(i)].

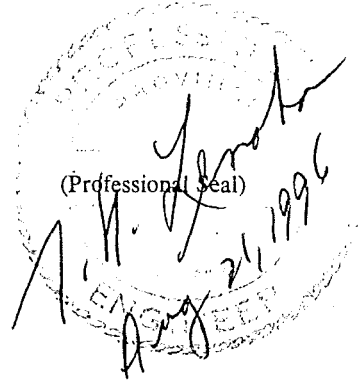
(2) (Continue Over)
PROPOSED EQUIVALENCY IS

REFUSED (For the following reason) submission doesn't demonstrate compliance with 3.3.3.6 (other options available)

ACCEPTABLE [Subject to the following conditions(s)]:

ACCEPTABLE (As proposed)

- cc: Sender/Certified Professional
- City Building Inspector
- Assistant Director, Inspection
- Manager, Building Code Review Branch
- Engineer/Plan Checker SL
- Codes Engineer
- Supervisor, Building Inspection Branch
- Supervisor, Plumbing & Gas Inspection Branch
- Supervisor, Electrical Inspection Branch
- Inspector, DBI / DFI Branch
- FILE



[Signature]
CITY BUILDING INSPECTOR
Others _____ Department
Date Oct 17/96

(1) SUMMARY OF MINOR RELAXATION/EQUIVALENCY (Cont'd.)

It is proposed to divide the basement and first floors into two smoke zones by a fire separation. The doors leading into these zones will be weatherstripped. Under the 1995 NBC, this building is not required to have protected floor spaces because it is sprinklered. Also, the main floor would not require protected floor spaces in an unsprinklered building. This building will be fully sprinklered with quick response sprinklers, therefore the requirements in the 1995 NBC are exceeded.

The provision of separate zones is further justified by Sentence 3.3.3.6.(1) of the Vancouver By-law, which permits zones (ie. fire compartments) in hospitals and nursing homes to be used as refuge areas in a sprinklered building.

Therefore, based on provisions for protected floor areas contained in the 1995 NBC and Subsection 3.3.3 of the VBBL and because the building is sprinklered with quick response sprinklers, it is our opinion that a level of safety intended by the VBBL will be provided to the building occupants.

SEE GBA REPORT DATED AUGUST 20, 1996

(3) STAFF COMMENTS AND RECOMMENDATIONS:

+ GRS

Fire Safety Plan?

Comments By: _____
Branch _____
Date _____

Agreed By: _____
Supervisor _____
Branch _____
Date _____





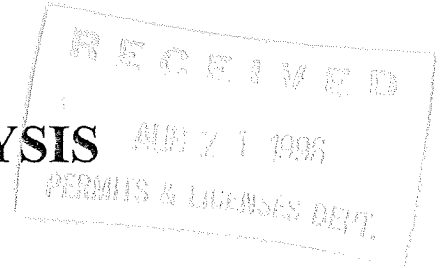
GAGE-BABCOCK & ASSOCIATES LTD.

SUITE 207-1099 WEST 8th AVENUE, VANCOUVER, B.C., CANADA V6H 1C3 • TEL. (604) 732-3751 FAX (604) 732-1277

BUILDING CODE ANALYSIS

FOR THE

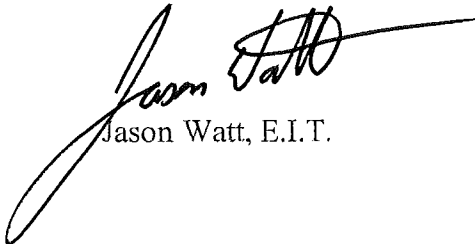
DEVELOPMENT AT 871 BEATTY STREET VANCOUVER, B.C.



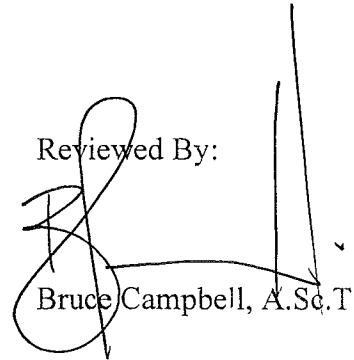
Prepared For:

Acton Johnson Ostry Architects Inc.
1575 West 5th Avenue
Vancouver, B.C.
V6J 5H4
Tel: (604) 739-3344
Fax: (604) 739-3355

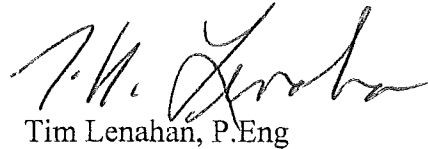
Prepared By:


Jason Watt, E.I.T.

Reviewed By:


Bruce Campbell, A.Sc.T

Reviewed By:


Tim Lenahan, P.Eng

August 20, 1996

PN 960670

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1. INTRODUCTION

This report has been prepared for the captioned project based on drawings dated June 21, 1996 prepared by Acton Johnson Ostry Architects Inc. The analysis is limited to an evaluation of major building elements and systems for compliance with the fire and life safety requirements of Part 3 - Use and Occupancy of the Vancouver Building By-Law (VBBL). It does not attempt to access all aspects of the building in question. Items not specifically addressed are assumed to comply with the appropriate By-Law requirements. Departures from the By-law have been **bolded**. Equivalent means of achieving By-law compliance are proposed where conformance with the literal requirements of the By-law is impractical due to existing or special design, function, or operational requirements. The equivalent measures proposed which provide a level of life safety intended by the By-law.

This project involves the renovation and conversion of a three storey and basement industrial (warehouse) building of heavy timber, masonry and concrete construction. The building will be converted into a four storey and basement building containing artists' live/work studios, a pub/restaurant and general storage. The pub/restaurant will be located on the first storey. The artists' live/work studios will be located on the second, third and new fourth storeys. The basement will be used as storage space for both the pub and the live/work studios. The basement will also contain washrooms used by the pub/restaurant and also a music rehearsal room which will be used by the occupants of the live/work studios. There will also be a roof deck which will be used for recreational use by the occupants of the live/work studios.

2. OCCUPANCY CLASSIFICATION

Pub/Restaurant:	Group A, Division 2 - major occupancy
Artists' Live/Work Studios:	Group C and Group F, Division 2 - major occupancy [See note below]
Basement:	Group F, Division 2 - storage - subsidiary occupancies Group A, Division 2 - washrooms - major occupancy Group A, Division 2 - music rehearsal - subsidiary occupancy

Note: Artists' live/work studios are a unique occupancy in that they integrate residential occupancies with F-2 medium hazard industrial arts facilities. The City of Vancouver has issued Bulletin 94-11 which deals with the evaluation of these buildings. A copy of this bulletin can be found in Appendix A.

3. BUILDING DATA

Building Area: 558 m²
Building Height: 4 storeys
Streets Faced: 1 [See note below]
Grade: 30.3'
Height of Top Floor Above Grade: 78.1' - 30.3' = 47.8' (14.6 m)

Note: The rear lane meets the criteria of Article 3.2.5.2, but has not been considered as a street because of the degree of obstruction common to lanes.

4. GENERAL CONSTRUCTION REQUIREMENTS

This building contains a residential major occupancy which is located entirely above an assembly major occupancy (ie. the pub). Sentence 3.1.3.1.(4) requires that the construction and sprinklering requirements in Subsection 3.2.2 for each portion of the building containing a major occupancy be applied to that portion as if the entire building is of that major occupancy and the sprinklering requirements are required to apply to all stories below such portion.

The pub/restaurant on the first floor is required to be constructed to the requirements of Article 3.2.2.15 - Group A, Division 2, up to 5 storeys, Any Area. Specifically:

Article 3.2.2.15	Group A, Division 2, up to 5 Storeys, Any Area
Construction:	Noncombustible construction is required.
Maximum Area:	Unlimited.
Floor Assemblies:	Fire separations with a 1 h rating.
Mezzanines:	1 h fire-resistance rating [not applicable].
Roof Assembly:	1 h fire-resistance rating [not applicable].
Loadbearing:	All loadbearing members supporting an assembly are required to have a fire-resistance rating at least equivalent to that required for the supported assembly.

The artists' live/work levels above are required to be constructed in conformance with the most restrictive article arising from evaluation of the building as both a Group C and a Group F-2 occupancy [See Bulletin 94-11 in Appendix A]. In this case, Article 3.2.2.28 Group C, up to 6 Storeys governs. Specifically:

Article 3.2.2.28	Group C, up to 6 Storeys
Sprinklers:	The building is required to be sprinklered [See Note 1 below].
Maximum Area:	6000 m ² (sprinklered).
Construction:	Noncombustible construction is required [See Note 2 below].
Floor Assemblies:	1 h fire separations [See Note 3 below].
Mezzanines:	1 h fire-resistance rating.
Roof Assembly:	1 h fire-resistance rating [Waived - See Notes 4 and 5].
Loadbearing:	All loadbearing members are required to have a fire-resistance rating at least equivalent to that required for the supported assembly.

Note 1: Since the artists' live/work storeys are required to be sprinklered, the restaurant level and the basement are also required to be sprinklered [3.1.3.1.(4)].

Note 2: This building is required to be of noncombustible construction. The new 4th storey and all other additions will be of noncombustible construction however the existing 3 storeys are of combustible construction. **An equivalency is proposed to allow the existing combustible construction in this building [See Section 19.2 - Equivalent Measures].**

Note 3: The third and fourth storey floor assemblies are required to be 1 h fire separations. The existing third floor and columns supporting this floor will remain. The existing third floor assembly has an assessed fire-resistance rating of 80 minutes.

The existing floors are 6" thick laminated wood decking (to which will be added a 1.5" thick concrete topping) on 22" by 24" solid timber beams. The columns supporting the third floor are 17" x 17". The wood decking has a critical depth of less than 4" (minimum depth required to support the design loads) and, at a constant charring rate of 1/40 in/min (0.6 mm/min)¹, the standard fire exposure time required to reduce the decking to its critical depth is 80 minutes. The formulae in the NBC Supplement indicates that the beams have a calculated fire-resistance of almost 3 hours and that the columns supporting the third floor have a calculated fire-resistance rating of 1.7 hours [See Appendix F].

¹ SFPE Handbook of Fire Protection Engineering, Society of Fire Protection Engineers / National Fire Protection Association, Quincy, Ma., USA, 1988, p3-133.

A 2 h fire separation is required between the basement and the first storey and between the first and second storeys to maintain the major occupancy separation required between Groups A-2 and F-2 major occupancies (discussed later). It is proposed to leave existing heavy timber beams exposed. Based on the formulae in the NBC, the beams supporting the main and second floors have calculated fire-resistance rating of almost 3 h and the columns have a calculated fire-resistance rating of at least 2 hours [See Appendix F]. The existing wood decking will be upgraded to achieve a 2 h rating; currently it only has an 80 min rating.

Note 4: The roof rating and the rating required for the loadbearing members supporting the roof is permitted to be waived provided the building is sprinklered with an electrically supervised sprinkler system conforming to 3.2.4.11.(5) and the operation of the sprinkler system causes a signal to be transmitted to the fire department in conformance with 3.2.4.7.(3) [3.2.2.8]. We have been informed that the sprinkler system will be electrically supervised, therefore the roof rating is waived.

Note 5: A 1 h fire separation is required for the portion of the roof that will support an occupancy (ie. the roof deck) [3.2.2.6.(1)]. The studio mechanical shafts which extend through the roof deck will be in a rated enclosure which will extend 5'-6' above the roof deck.

5. MAJOR OCCUPANCY SEPARATIONS

When one major occupancy is located entirely above another major occupancy, the fire-resistance of the floor assembly between such major occupancies is determined on the basis of the requirements in Subsection 3.2.2 or Article 3.1.3.2, whichever is more restrictive for the major occupancy on the storey immediately below [3.1.3.1.(5)]. Article 3.1.3.2 requires that major occupancies be separated from adjoining major occupancies by fire separations conforming to Table 3.1.3.A. Specifically:

<u>Major Occupancies</u>	<u>Fire Separation Required</u>
Between C and A-2	1 h Fire-resistance rating
Between F-2 and A-2	2 h Fire-resistance rating

The floor between the basement and the first storey and the floor between the first and second storeys are required to be 2 h fire separations to maintain the major occupancy separation. A 2 h separation is also required in the basement between the washrooms/music rehearsal (Group A-2) and the remainder of the floor area (Group F-2).

See Appendix B for the locations of required fire separations.

6. SPATIAL SEPARATION REQUIREMENTS

The spatial separation calculations were performed on Limit 7 software. The output from the program can be found in Appendix C. Sprinklering has been accounted for in these calculations. Spatial separation calculations for the artists' live/work studios have been based on a medium hazard industrial fire load (F-2) as required by Bulletin 94-11.

Exposure	Maximum Dimensions			Available Limiting Distance (m)	% Openings		Exterior Wall Construction		
	L (m)	H (m)	Area (m ²)		Perm.	Proposed	Const. Type	Fire Rating	Cladding Type
North - Basement	-	-	-	0	0	0	NC	2	NC
North - Level 1	-	-	-	0	0	0	NC	1	NC
North - Levels 2-4	-	-	-	0	0	0	NC	2	NC
South - Basement	-	-	-	0	0	0	NC	2	NC
South - Level 1	-	-	-	0	0	0	NC	1	NC
South - Levels 2-4	-	-	-	0	0	0	NC	2	NC
East - Basement	14.8	1.2	17.76	10.97	100	N/A	-	-	-
East - Level 1	-	-	-	10.97	100 3.2.3.6.(2)	N/A	-	-	-
East - Levels 2-4	7.8	5.0	39	10.97	100	N/A	-	-	-
West - Basement	21.8	1.3	28.34	7.92	100	N/A	-	-	-
West - Level 1 (pub comp)	13	3.9	50	7.92	100	N/A	-	-	-
West - Level 1 (artist comp)	4.3	3.9	16.8	7.92	100	N/A	-	-	-
West - Levels 2-4	7.8	5.0	39	7.92	100	N/A	-	-	-

The artists' studios will be separate fire compartments with a 1 h fire-resistance rating (discussed later), therefore the area of the exposing building face may be calculated for each fire compartment [Bulletin 94-11 #2]. For the artists' studios facing east and west, the largest compartments were analysed. If the largest compartment was permitted 100 % unprotected openings than it was assumed that all artists' studios facing in that direction are permitted 100 % unprotected openings.

The building is required to have a Class A, B or C roof covering [3.2.3.12.(1)].

7. OCCUPANT LOAD AND EXITING CAPACITY

Occupant Load

	<u>Area (m²)</u>	<u>Occupant Load Factor (m²/p)</u>	<u>Occupant Load</u>
BASEMENT			
Storage:	512	46	12
Common Room	46	9.3	5
Total			17
1ST STOREY			
Pub	162	see note	65
Restaurant	156	1.2	130
Kitchen/Bar	92	9.3	10
Total			205
2ND STOREY	3.1.14.1.(1)(b)	7 Units	14
3RD STOREY	"	7 Units	14
4TH STOREY	"	7 Units	14
Roof Deck	84	1.85	46
BUILDING TOTAL			310

Note: the liquor license for the pub limits the occupant load of the pub to 65 occupants.

Exiting Capacity

BASEMENT

2 exit stairs x 2 units/stair x 60 persons/unit = 240 persons >> 17 persons **O.K.**

FIRST FLOOR

The basement and first storeys of the building are interconnected by the stair and handicap lift at the main entrance to the pub/restaurant. These floors are permitted to be interconnected provided the provisions of Sentence 3.2.8.1.(8) are met. Clause 3.2.8.1.(8)(c) requires that occupants do not travel closer than 6 m to the floor opening when travelling to an exit. Because occupants come within 6 m of the floor opening when travelling to the main entrance, it will not be used as an exit.

2 exit stairs = 4 units x 60 persons/unit = 240 persons >> 205 **O.K.**

Note: The liquor licence of the pub is limited to 65. The exiting capacity can accommodate an additional 35 persons which will provide a factor of safety.

2ND TO 4TH FLOORS

2 exit doors x 1.5 units/door x 30 persons/unit = 90 persons >> 14 persons

ROOF DECK

2 exit stairs x 2 units/stair x 60 persons/unit = 240 >> 46 persons

Therefore, based on the above, there is sufficient exiting capacity to accommodate the proposed occupant load.

8. FIRE ALARM

General Requirements

A fire alarm system is required because the building is more than 3 stories, the occupant load of the A-2 occupancy is greater than 150 and also because the occupant load of the Group C major occupancy is greater than 10 [3.2.4.1.(1)].

Since the building will contain more than 1 major occupancy, a single system is required to serve all occupancies [3.2.4.2.(2)]. The fire alarm system is required to be installed throughout the building [3.2.4.2.(3)].

A single stage fire alarm system will be installed throughout the building as permitted by Clause 3.2.4.3.(1)(d). The fire alarm will be installed in conformance with CAN/ULC-S524-M86, "Standard for the Installation of Fire Alarm Systems" and tested in conformance with CAN/ULC-S537-M86, "Standard for the Verification of Fire Alarm Systems" [3.2.4.5.(1) & (2)].

Annunciation

An annunciator will be installed inside the main street entrance of the residential portion of the building and will have separate zone indicators for the actuation of the fire alarm initiating devices in each [3.2.4.8.(1)]:

- a) floor area so that the area of coverage for each zone is not more than 2000 m² [Waived by 3.2.4.8.(5)],
- b) in each fire compartment required to be separated by a vertical fire separation with a 2 h fire-resistance rating [Waived by 3.2.4.8.(5)]
- c) shaft required to be equipped with fire detectors, and
- d) air handling system required to be equipped with smoke detectors.

The sprinkler system will be used in lieu of heat detectors in conformance with Article 3.2.4.11, therefore the requirements of a) and b) are waived provided the actuation of the alarm initiating devices is indicated on the annunciator in conformance with the zone indication requirements for the sprinkler system [3.2.4.8.(5)].

An emergency power supply is required for the fire alarm system. The emergency power shall be capable of providing supervisory power for at least 24 h and emergency power under full load for at least a ½ h. The emergency power system shall be designed so that there will be an automatic transfer to emergency power in the event of a failure of the normal power source [3.2.4.9].

Sprinkler System

Article 3.2.4.11 allows the heat detectors required in Article 3.2.4.10 to be waived provided an automatic sprinkler system conforming to Sentences 3.2.4.11.(2) to (5) and Article 3.2.5.5 is installed throughout the floor area. Specifically:

- the automatic sprinkler system shall be equipped with water flow detecting devices so that each device serves an area on each storey that is not more than the system area limits as specified in NFPA 13, "Installation of Sprinkler Systems."
- the water flow detecting device will be connected to initiate an alarm signal on the fire alarm system.
- The activation of each water flow detecting device will be indicated separately on the fire alarm system annunciator.
- The sprinkler system will be electrically supervised to indicate a trouble signal on the building fire alarm system annunciator for each of the following:
 - movement of a control valve handle,
 - loss of excess water pressure required to prevent false alarms in a wet pipe system,
 - loss of air pressure in a pressure tank,
 - a significant change in water level in any storage container used for fire fighting purposes, and
 - a temperature approaching the freezing point in any dry pipe valve enclosure or water storage container used for fire fighting purposes,
 - loss of electrical power to any automatically starting electrical pump.

Smoke Detectors

Smoke detectors are required in the following areas [3.2.4.10.(4)]:

- every exit stair shaft, and
- public corridors serving the live/work studios

Every recirculating air handling system shall be designed to prevent the circulation of smoke upon a signal from a duct-type smoke detector where the air handling system [3.2.4.10.(5)]:

- serves more than 1 storey, and
- serves more than 1 suite in a storey.

Smoke Alarms

Smoke alarms conforming to CAN/ULC-S531-M, "Standard for Smoke Alarms" are required in each dwelling unit. They are required to be installed on or near the ceiling between each area containing sleeping rooms and the remainder of the dwelling unit [3.2.4.15.(1)&(2)&(3)].

The smoke alarms are required to be installed with permanent connections to an electrical circuit and shall have no disconnect switches between the overcurrent device and the smoke alarm [3.2.4.15.(4)].

Where more than 1 smoke alarm is required in a dwelling unit, they shall be wired so that the activation of 1 smoke alarm will cause all of the smoke alarms within the dwelling unit to sound [3.2.4.15.(5)].

Manual Pull Stations

Manual pull stations shall be installed so that in no case shall it be possible to leave a floor area by a required exit or the principal entrance without passing a manual pull station [3.2.4.12].

9. PROVISIONS FOR FIRE FIGHTING

A fire department access route is required to the building face having a principal entrance [3.2.5.2.(1)]. The design and location of the access route is required to conform to the remainder of 3.2.5.2.

This building is required to have a standpipe and hose system because it is 4 storeys in building height [Tables 3.2.5.A forming part of 3.2.5.4.(2)]. A Class I system is required. A modified class II system is not required because the building will be sprinklered with quick-response sprinklers.

Portable extinguishers shall be provided and installed in accordance with the Vancouver Fire By-law No. 7004 1992 [3.2.5.6].

Equipment forming part of a fire protection system that may be adversely affected by freezing temperatures and that is located in an unheated area shall be adequately protected from freezing [3.2.5.7].

10. LIGHTING AND EMERGENCY POWER SYSTEMS

The exits and public corridors are required to be equipped to provide illumination to an average level of at least 50 lx at floor level and at all points such as angles and intersections at changes of level where there are stairs or ramps [3.2.7.1.(1)].

Rooms and spaces used by the public are required to be illuminated as described in Article 9.35.2.9 [3.2.7.1(2)].

Recessed lighting fixtures shall not be located in insulated ceilings unless the fixture is designed for such an installation [3.2.7.2].

Emergency lighting will be provided to an average level of 10 lx at floor or tread level in the following areas [3.2.7.3(1)]:

- exits,
- corridors used by the public,
- principal routes providing access to exit from the basement and roof deck,
- floor areas containing an A-2 occupancy with an occupant load greater than 60 (ie. restaurant/pub).

An emergency power supply that will maintain emergency lighting and be designed to assume the electrical load automatically for a period of 30 min upon the failure of regular power is required [3.2.7.3.(2)(c)].

11. GENERAL SAFETY REQUIREMENTS WITHIN FLOOR AREAS

Suite Separations

Suites of residential occupancy are required to be separated from each other and the remainder of the building by a fire separation with a 1 h fire-resistance rating [3.3.4.2.(2)].

Commercial Kitchens

In kitchens containing commercial cooking equipment used in processes producing grease-laden vapours, the equipment is required to be designed and installed in conformance with Part 6 [3.3.1.1.(3)].

Public Corridor

The public corridors serving the live/work studios are required to be separated from the remainder of the building by a 1 h fire-separation [3.3.1.3.(4)(a)].

There is a public corridor on the first floor adjacent to the elevator which serves both the common room (assembly occupancy) and pub/restaurant. There is also a public corridor in the basement, because the basement is used by both the pub and the live/work studios. This building is sprinklered, therefore these corridors are required to be separated from the remainder of the building by a non-rated fire separation [3.3.1.1.(4)(b)].

The minimum required width for public corridors is 1100 mm [3.3.1.7.(1)].

Egress Doors

Every room requires two egress doors placed in such a manner that one doorway could provide egress from the room should the other doorway be blocked by fire if the area of the room or the travel distance to an egress door exceeds the limits in Table 3.3.1.A [3.3.1.4.(1)(c)]. Two egress doors are also required if the room has an occupant load of more than 60. Since the building will be sprinklered with quick response sprinklers throughout, the maximum travel distances permitted in Table 3.3.1.A may be increased by 50% [3.3.1.4.(7)].

The suites are required to be considered as an F-2 occupancy. As such, the maximum permitted travel distance is 15 m ($10 \text{ m} \times 1.5 = 15 \text{ m}$). The travel distance from the sleeping lofts to the egress door exceeds this distance and is up to 21 m. **An equivalency is proposed to increase the permitted travel distance to 25 m based on provisions contained in the 1995 NBC and additional life safety features provided for the suites. See Section 19.3 - Equivalent Measures.**

Dead-End Corridors

Dead-end corridors are permitted only if [3.3.1.3.(3)(b)]:

- the length of the dead-end portion does not exceed 9 m from the most remote end of the corridor to the nearest exit, or
- 3 m from the most remote end of the corridor to a point in the corridor that provides means of egress in two directions.

The dead-end corridors in the building conform to the above requirements.

Stairs

Stairs are required to conform to Article 3.3.1.15. Steps are required to have treads and risers which conform to Table 3.3.1.15.A. The configuration of the stairs is required to be such that the sum of two risers plus a run be between 550-700.

Ramps

The ramp at the artists' live/work entrance is required to be handicapped accessible. This ramp is required to conform to Sentence 3.7.3.3.(1).

Guards

A guard at least 1070 mm in height is required around the portion of occupied roof, the landings in stairs and around the mezzanines in the artist live/work suites [3.3.1.12.(1)].

The size of openings in the guards is regulated by 3.3.1.12.(3).

Sentence 3.3.1.13.(6) requires that openable windows be restrained from opening more than 100 mm if the windows have a sill height less than 1070 mm and the windows are more than 600 mm above the ground on the other side of the window. The windows will either be provided with a restraining device that will prevent them from opening more than 100 mm or a guard will be provided.

Glass Doors

Glass in doors shall be safety glass of the tempered or laminated type conforming to CAN2-12.1" Glass, Safety. Tempered or Laminated" or wired glass conforming to CAN-12.11, "Glass, Wired, Safety" [3.3.1.13.(1)].

Storage Rooms

Storage rooms not contained within a suite, for the use of tenants in residential occupancies, shall be sprinklered and separated from the remainder of the building by a fire-separation with a 1 h rating [3.3.4.2.(4)]. This includes residential storage lockers in the basement.

Sound Transmission

Every dwelling unit is required to be separated from every other space in a building in which noise may be generated by a construction providing a sound transmission rating of at least 50, or shall have a sound rating of I as described in Tables 9.10.3.A and 9.10.3.B or in the Fire Resistance and Sound Control Manual published by the Gypsum association [3.3.4.5].

Building Security

Building security is required to conform to Subsection 3.3.8. Note that the skylights are required to conform to Sentence 3.3.8.1.(1).

Opening Hardware

Egress doors leading from the pub/restaurant are required to be equipped with opening hardware conforming to Article 3.3.2.6 (ie. door 102). Note that exit doors leading from the pub/restaurant also require opening hardware (discussed in next section).

12. MEZZANINES AND INTERCONNECTED FLOORS

The artist live/work studios on the third and fourth storeys contain mezzanines that are intended for use as studio and sleeping space. The mezzanines have a 1 h fire-resistance rating and are of noncombustible construction. The mezzanines also comply with Sentence 3.2.1.1.(3) and are not required to be considered as a storey in calculating building height. The mezzanines are not considered as "sleeping lofts" which are subject to compliance with Sentence 3.1.3.2.(6).

The basement and first storeys of the building are interconnected by the stair and handicap lift at the main entrance to the pub/restaurant as permitted by Sentence 3.2.8.1.(8).

13. REQUIREMENTS FOR EXITS

Travel Distance

Since the building is sprinklered the travel distance to an exit is permitted to be 45 m [3.4.3.1(1)]. The current design complies with the travel distance requirements.

Exit Width

The minimum width of an exit corridor is 1100 mm. Exit stairs are required to be a minimum 1100 mm in width. Doorways are required to be a minimum 790 mm in width [3.4.3.1.(2)]. If doors are accessible to disabled persons, they are required to be a minimum of 815 mm in width [Clause 3.7.3.8.(1)(a)].

Swinging doors in their swing are not permitted to reduce the effective width of stairs or landings to less than 750 mm [3.4.3.4.(3)].

No fixture or construction shall project into or be fixed within the required width of any exit [3.4.3.4.(1)].

Required Fire Separation For Exits

The exit stairs will be separated from basement and first floors by a 2 h fire separation and from the remainder of the floor areas by a 1 h fire separation [3.4.4.1.(1)].

Note that the walls of the exit stairs at roof level are not required to be constructed as fire separations provided they are open to the exterior. A 1 h separation is required between the north stair and the mechanical room [3.2.2.6.(3)].

Exit exposure conditions occur at the rear of the building. Exterior exit doors 101 and 106 are exposed by adjacent windows and louvres. Wired glass or sprinkler protected glazing conforming to Bulletin 94-8 [See Appendix D] is required for the windows [Sentence 3.4.4.1.(5)]. Supply air grills adjacent to these doors require fire dampers.

Integrity of Exits

A fire separation that separates an exit from the remainder of the building shall have no openings except for [3.4.4.2.(1)]:

- sprinkler piping,
- electrical wiring, noncombustible conduit and noncombustible piping that serve only the exit, and
- exit doorways.

Exit Signs

Exit signs are required over every exit door other than the main entrance the building because the building exceeds 2 storeys in building height [3.4.5.1.(1)].

Landings

Landings are required to be at least the length and width of stairways they serve except that in a strait run, the length of the landing need not exceed 1100 mm [3.4.7.4.(2)]. The design conforms.

Handrails

Every exit stairway is required to have a handrail on both sides [3.4.7.5.(1)].

Handrails on stairs shall not be less than 800 mm and not more than 920 mm in height, measured vertically from a line drawn through the outside edges of the stair nosing [3.4.7.5(4)].

Intermediate handrails in straight stairways and handrails at the sides of stairs and ramps are required to extend a minimum of 300 mm beyond the top riser parallel to the floor or ground surface and at the bottom, continue to slope one tread depth beyond the bottom tread and a further 300 mm horizontally beyond, except where the handrail is continuous [3.4.7.5.(7)].

Exit Doors

Exit doors are required to swing on a vertical axis in the direction of exit travel [3.4.7.12.(7)].

Exit doors from the pub/restaurant are required to be equipped with opening hardware conforming to Sentence 3.4.7.12.(13) (ie. doors 101, 105, 106, 108).

14. SERVICE FACILITIES

Fuel Fired Appliances

Fuel fired appliances that are located in a service room are required to be separated from the remainder of the building by a fire separation with a 1 h fire resistance rating [3.5.2.1.(2)(b)].

Vertical Service Spaces

Vertical service spaces and the elevator shaft are required to be separated from each adjacent floor area fire separations conforming to Table 3.5.3.A. Specifically:

- The elevator shaft will be separated from the basement and first floor areas by a 1.5h fire separation. The elevator shaft will be separated from the second to fourth floor areas by a $\frac{3}{4}$ h fire separation.
- Vertical service spaces will be separated from the basement and first floor areas by 1h fire separation. Vertical service spaces will be separated from the second to fourth floor areas by a $\frac{3}{4}$ h fire separation.

15. HEALTH REQUIREMENTS

The height, area and width of rooms in dwelling units is required to conform to Part 9 [3.6.1]. Specifically:

Room Height

The floor to ceiling height is a minimum 7' (2.1 m) under beams above the mezzanines. The ceiling height above all other areas is a minimum 2.4 m, therefore there is no problem with meeting the minimum requirements for room heights [See Table 9.5.2.A].

Room Areas

The minimum room areas and room dimensions are as follows:

Bachelor requirements

Living Rooms:	11 m ² (minimum dimension of 3 m)
Dining Rooms:	3.25 m ² (minimum dimension of 1.7 m)
Kitchens:	3.7 m ² (including area occupied by base cabinets)
Bedrooms:	9.8 m ² (minimum dimension of 2.7 m)
	4.2 m ² (minimum dimension of 2 m if bedroom in combination with other rooms)

Water Closet Requirements

Appendix note A-3.6.4.2.(6) requires that there be separate staff washrooms if the restaurant/pub has more than 25 seats or more than 2 staff. These have been provided in the basement.

There are currently 3 male and 3 female water closets. These water closets can accommodate an occupant load of 200. This is sufficient to accommodate the occupant load of 195 in the pub and the restaurant.

16. BUILDING REQUIREMENTS FOR PERSONS WITH DISABILITIES

Handicapped access is required as follows:

- 1) The pub/restaurant is required to be handicapped accessible. Specifically:
 - Access from the street to a main entrance conforming to Article 3.7.3.5.
 - Access to all areas where work functions can be performed by disabled persons.
 - Accessible washrooms conforming to Clause 3.7.3.21.(1)(a) and Sentences 3.7.3.21.(2) to (8) or Sentence 3.7.3.21.(9). These washrooms are in the basement.
 - Areas of refuge conforming to Article 3.7.3.27.
 - Seating areas conforming to Article 3.7.2.15.
- 2) The handicapped requirements for the Group C major occupancy are determined by Article 3.7.2.28. Specifically access is required from:
 - the street to the main entrance which conforms to 3.7.3.5.(1),
 - from the main entrance to an elevator, and the elevator will conform to Article 3.7.3.13.

At the main entrance, the call buttons and speaker system shall be located so that no user function is located more than 1350 mm ± 25 mm above the finished paved area.

- 3) The washroom area in the basement is required to be handicapped accessible. Areas of refuge are required in the basement by Article 3.7.3.27.

An equivalency is proposed to waive the areas of refuge required in the basement and on the main floor. See Section 19.4 Equivalent Measures.

17. FIRE SEPARATIONS AND CLOSURES

Except as noted below, doors in fire separations are required to have fire-protection ratings conforming to Table 3.1.6.A.

A door assembly having a 20 min fire-protection rating is permitted between the public corridors and residential suites [3.1.6.7].

A duct that connects two fire compartments or that penetrates an assembly required to be a fire separation shall be equipped with a fire damper that has a fire protection rating conforming to Table 3.1.8.A unless it conforms to Sentences 3.1.6.5(3) to (8).

Since the building exceeds 3 stories in building height, there is a temperature rise criteria of 250 °C after ½ h for the unexposed side of exit doors. The maximum area of wired glass in these exit doors is limited 645 cm² [Table 3.1.6.B]. This requirement is waived for exit doors opening into corridors conforming to Sentence 3.1.6.11.(3).

18. INTERIOR FINISH

Except as otherwise provided in Subsection 3.1.11, the maximum flame spread rating of interior wall and ceiling finishes, including glazing shall not be more than 150 [3.1.11.2.(1)].

The maximum flame spread rating in exits shall not exceed 25 [Table 3.1.11.A].

19. EQUIVALENT MEASURES

19.1 General

Equivalent means of achieving By-law compliance are proposed where conformance with the literal requirements of the By-law is impractical due to existing or special design, function, or operational requirements. The design criteria specified for the alternate measures is based on good engineering practice, fire tests and fire research as appropriate and is, in all cases, considered to provide a level of protection at least equivalent to the minimum requirements of the VBBL.

Gage-Babcock and Associates are available to perform document and field reviews as necessary, to verify that the completed work substantially conforms to the criteria for the following equivalent measures:

- Combustible construction in a noncombustible building.
- Travel distance from the lofts in the artists' live/work studios.
- Deletion of areas of refuge.

19.2 Combustible Construction in a Noncombustible Building

This building is required to be of noncombustible construction. Above the floor of the of the 3rd storey, the new 4th storey and all other additions will be of noncombustible construction, however the existing building up to and including the floor of the third storey is of combustible construction. It is proposed to retain the existing combustible construction in this building on the basis of provisions contained in Section 3.8 of the VBBL which deals with the rehabilitation of existing buildings.

The proposed renovation will contain three major occupancies:

- 1) Group F, Division 2 - artist live/work studio

For this occupancy, the construction requirements for the building are governed by *Article 3.2.2.43 - Group F, Division 2, up to 4 storeys*. This article would permit the building to be of combustible construction.

- 2) Group C - artist live/work studio

For this occupancy, the construction requirements for the building are governed by *Article 3.2.2.28 - Group C, up to 6 storeys*. This article requires that the building be of noncombustible construction.

It is proposed to allow the existing combustible construction for this occupancy based on provisions contained in Section 3.8 of the VBBL. Article 3.8.2.8 would permit a Group C occupancy in 4 storey combustible building provided the building is upgraded to conform to the following provisions:

- Sentence 3.2.2.27.(2) which requires the following:
 - combustible or noncombustible construction,
 - ¾ h fire separations for floor assemblies,
 - ¾ h fire-resistance rating for mezzanines, and
 - loadbearing members which have a rating at least equivalent to that required for the supported assembly.
- Electrically supervised sprinkler system conforming to Sentence 3.2.4.11.(5), with signals to the fire department in accordance with Sentence 3.2.4.7.(3).
- Subsection 3.2.3. - spatial separation requirements.
- Structural requirements of Part 4.
- Fire containment requirements within a floor area in conformance with the By-law.
- Exits in conformance with Section 3.4.
- Upgraded to meet all other requirements of the Bylaw.

3) Group A, Division 2 - Pub/Restaurant

For this occupancy, the construction requirements for the building are governed by *Article 3.2.2.15 - Group A, Division 2, up to 5 storeys, Any Area*. This article also requires that the building be of noncombustible construction.

It is proposed to allow the existing combustible construction for this occupancy based on Article 3.8.2.4. This article permits a Group A-2 occupancy in 4 storey building of combustible construction provided the building is upgraded to conform to the following provisions:

- Sentence 3.2.2.14.(2) which requires the following:
 - combustible or noncombustible construction,
 - ¾ h fire separations for floor assemblies of combustible construction,
 - ¾ h fire-resistance rating for mezzanines of combustible construction,
 - ¾ h fire-resistance rating for a combustible roof assembly [waived 3.2.2.8],
 - loadbearing members require a ¾ h fire-resistance rating if they are of combustible construction.
- Fire alarm system conforming to Subsection 3.2.4.
- Emergency power systems conforming to Subsection 3.2.7.
- Subsection 3.2.3. - spatial separation requirements.
- Structural requirements of Part 4.

- Fire containment requirements within a floor area in conformance with the By-law.
- Exits in conformance with Section 3.4.
- Upgraded to meet all other requirements of the Bylaw.

The proposed building will conform to all of the above requirements in Section 3.8 for the Groups A-2 and C occupancies. Also,

- The building will be fully sprinklered with quick response sprinklers which will provide an additional level of protection.
- This is a relatively small building (ie. 558 m²).
- The 2nd, 3rd, and 4th storeys of the building contain a small occupant load (ie. 14 per floor). Therefore, small egress times can be expected from these floors.
- The restaurant is located on the ground floor, therefore occupants on this floor level will be able to discharge directly to grade.
- The new fourth storey and all new additions to this building will be constructed of noncombustible construction.
- The floor fire separations will exceed the ¾ h rating required by Section 3.8.

Based on provisions in Section 3.8 of the VBBL and additional life safety features provided in this building, it is our opinion that retaining the existing combustible construction will not decrease the level of life safety intended by the Vancouver By-law.

19.3 Travel Distance from the lofts in the Artists' Live/Work Studios

The artist live/work studios on the third and fourth floors contain mezzanines which will be used as sleeping lofts. Sentence 3.4.2.1.(5) requires that mezzanines be provided with exits on the same basis as floor areas, unless the mezzanines conform to the requirements of Sentence 3.4.2.1.(6). The proposed mezzanines conform to all of the requirements in Sentence 3.4.2.1.(6) except for the travel distance requirement. The travel distance from the mezzanines to a suite door is not permitted to exceed the distance limits in Table 3.3.1.A [Subclause 3.4.2.1.(6)(d)(i)]. Specifically, Table 3.3.1.A requires:

Occupancy of Suite	Maximum Area of Suite (m ²)	Maximum Distance to Egress Door (m)
Group C	100 (200) ⁽¹⁾	15 (22.5) ⁽²⁾
Group F, Division 2	150	10 (15) ⁽²⁾

(1) The maximum area for the residential occupancy may be doubled because the building is sprinklered with quick response heads [3.3.1.4.(6)].

- (2) The maximum travel distance for all occupancies may be increased by 50% because the building is sprinklered with quick response heads [Sentence 3.3.1.4.(7)]. Therefore, the maximum travel distances are 22.5 m for Group C and 15 m for Group F, Division 2.

The mezzanines conform to both the maximum area and travel distance requirements for a Group C occupancy. The mezzanines also conform to the maximum area requirements for the Group F, Division 2 occupancy but the maximum travel distance is exceeded for the following suites:

Suite Numbers	Mezzanine Area (m ²)	Travel Distance (m)
302 - 402	30.8	19.2
303 - 403	24.5	18.3
305 - 405	16.8	19.2
306 - 406	19.4	18.9
307 - 407	31.2	21.0

Note that the travel distance has been measured from the most remote point on the mezzanine to the suite egress door, in conformance with Subclause 3.4.2.1.(6)(d)(i).

A minor relaxation is requested on the travel distance requirement for the Group F, Division 2 occupancy on the following basis:

- The 1995 NBC permits a 25 m travel distance from a mezzanine to a suite egress door in a sprinklered building [See Clause 3.4.2.2.(d) in the 1995 NBC]. The travel distance from all of the mezzanines is within this distance.
- Both the Group C and the Group F, Division 2 occupancies within the suite will be provided with a smoke alarm, which will provide early warning in the event of a fire. The smoke alarm is required for a Group C occupancy but it is not required for a Group F, Division 2 occupancy. Since the Group F, Division 2 occupancy will be provided with a smoke alarm, a relaxation on the travel distance requirement is requested on the basis that early warning will compensate for the increased of travel distance.

- Both the Group C and the Group F, Division 2 occupancies within the suite will be protected with quick-response sprinklers. Sentence 3.3.1.4.(7) only requires that suites of residential occupancy be protected with quick-response sprinklers in order to increase the travel distances for all occupancies by 50%. Therefore, the Group F, Division 2 occupancy would be permitted an increase in travel distance with the use of standard sprinklers.

An analysis performed on FPETOOL [See Appendix E for results] demonstrates that the quick-response sprinklers respond 33 seconds prior to standard sprinklers and that the maximum fire output was less when quick-response sprinklers were used than when standard heads were used.

The mezzanines conform to the requirements of a Group C occupancy. A minor relaxation is requested to increase the allowable travel distance for the Group F-2 occupancy on the basis of provisions contained in the 1995 NBC and on the basis that the suites will be provided with a smoke alarm and quick response sprinklers. The smoke alarm and quick response sprinklers will provide an added level of safety which will compensate for the increased travel distance.

19.4 Deletion of Areas of Refuge

The pub/restaurant and the washrooms in the basement are required to be handicapped accessible. As such, areas of refuge conforming to Article 3.7.3.27 are required on both of these levels. For compliance with Article 3.7.3.27, two smoke protected spaces measuring 1220 mm x 1220 mm are required in each of the exit stairs. Because of space limitations in the existing exit stairs, it is not feasible to comply with Article 3.7.3.27. It is therefore proposed to provide protected floor spaces based on provisions contained in the 1995 NBC, in lieu of refuge areas.

Sentence 3.3.1.7.(1) of the 1995 NBC permits accessible floor areas above or below the first storey in a non-sprinklered building to be divided into two zones by a minimum 1 h fire separation so that persons with disabilities can be accommodated in each zone [3.3.1.7.(1)(b)(i)]. It is proposed to divide the basement and first floors into two smoke zones by a fire separation. The doors leading into these zones will be weatherstripped. Under the 1995 NBC, this building is not required to have protected floor spaces because it is sprinklered. Also, the main floor would not require protected floor spaces in an unsprinklered building. This building will be fully sprinklered with quick response sprinklers, therefore the requirements in the 1995 NBC are exceeded.

The provision of separate zones is further justified by Sentence 3.3.3.6.(1) of the Vancouver By-law, which permits zones (ie. fire compartments) in hospitals and nursing homes to be used as refuge areas in a sprinklered building.

Therefore, based on provisions for protected floor areas contained in the 1995 NBC and Subsection 3.3.3 of the VBBL and because the building is sprinklered with quick response sprinklers, it is our opinion that a level of safety intended by the VBBL will be provided to the building occupants.

APPENDIX A

BULLETIN 94-11

CITY OF VANCOUVER

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BULLETIN 94-11

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ARTISTS LIVE\WORK STUDIOS

Artists live\work studios are a unique occupancy in that they integrate residential occupancies with F2 medium hazard industrial arts facilities. Accordingly, their fire safety design is required to incorporate the life safety requirements of residential buildings together with the higher fire load associated with F-2 occupancies. The following guidance is offered to assist designers in evaluating these buildings and to clarify City policy with respect to Building Code Reviews.

1. The construction and sprinklering requirements of Subsection 3.2.2. shall be based on the most restrictive requirement arising from evaluation of the building as both a Group F2 and a Group C occupancy. This will require that a 3 or 4 level combustible building shall meet the height limitations and other requirements of Article 3.2.2.27.
2. Spatial separation of the building shall be based on a medium hazard industrial fire load (F2) as per Table 3.2.3.B. The fire rating of internal compartmentation used to limit the size of the exposing building face need not exceed one hour.
3. Fire alarms shall generally be based on Group C requirements. Where a fire alarm is required, smoke detectors shall be installed in corridors and stair shafts per 3.2.4.10.(4). Smoke alarms shall be provided in individual suites as per 3.2.4.15.(1).
4. The building shall be sprinklered in conformance with NFPA 13. Design density shall generally conform to Ordinary Hazard Group 1 classification except that higher design densities may be required where studios are likely to contain significant amounts of hazardous materials or large amounts of combustible materials.
5. Standpipes shall be provided as required for a residential Group C occupancy.
6. The relaxations on light and ventilation and provision of a sleeping loft as given in sentence 3.1.3.2.(6) may be utilised.
7. Where a portion of the studio such as a dinette or sleeping loft, is used solely as living space, exit travel distance and suite area may be based on Group C occupancy only.
8. Facilities for persons with disabilities may be provided as per Group C occupancies only.
9. Structural floor loads shall be based on a light industrial occupancy, with a minimum live load of 3.6 kPa. Floor areas designated as solely residential, e.g. sleeping lofts, dinettes or bathrooms, may be designed for a minimum live load of 1.9 kPa.

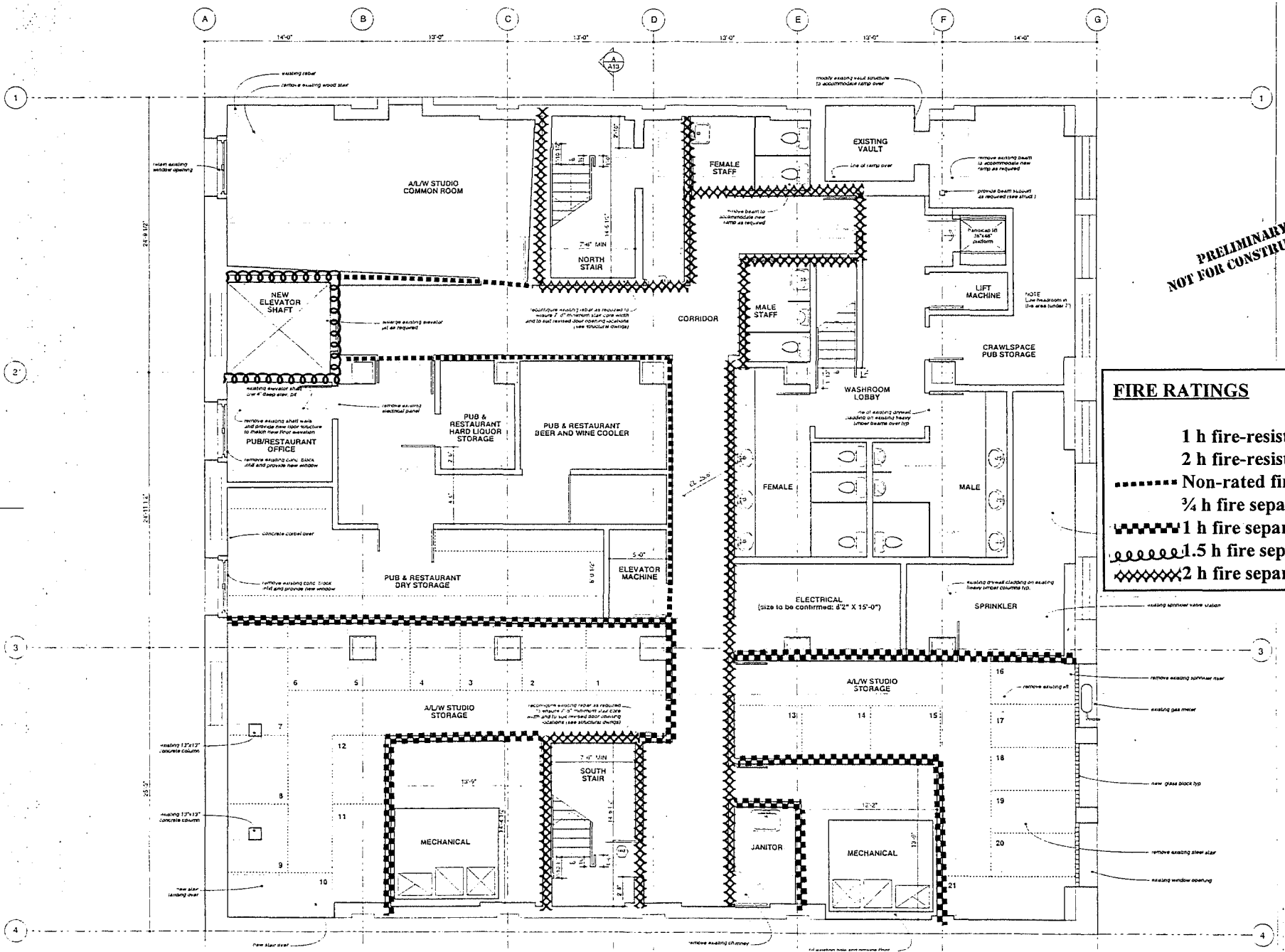

R. L. Maki, PEng
CITY BUILDING INSPECTOR

APPENDIX B
SKETCHES

**PRELIMINARY
NOT FOR CONSTRUCTION**

FIRE RATINGS

- 1 h fire-resistance rating
- 2 h fire-resistance rating
- Non-rated fire separation
- ▤ 1 h fire separation
- ⊖ 1.5 h fire separation
- ⊖ 2 h fire separation










BASEMENT

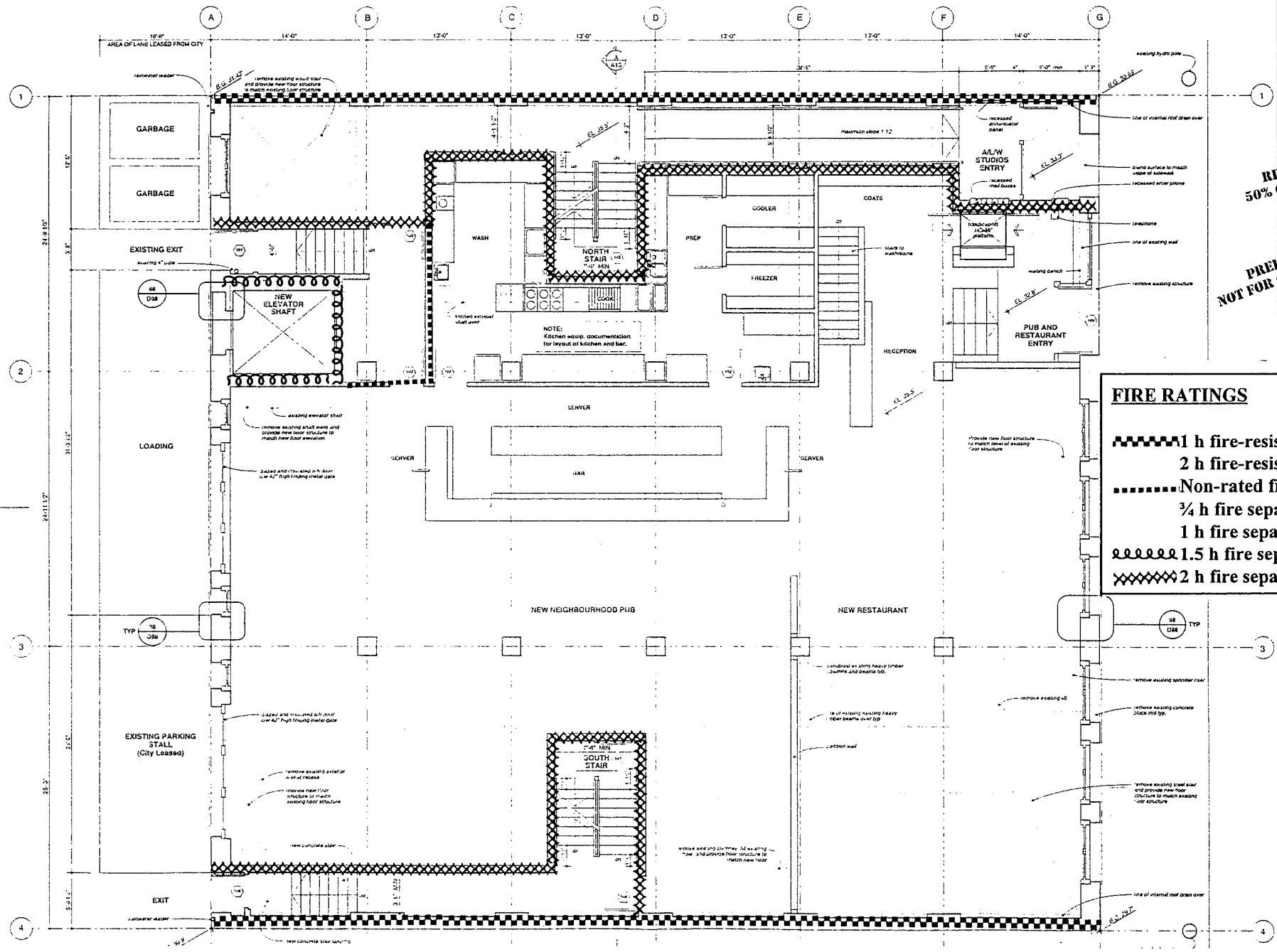
ARTIST LIVE/WORK STUDIOS
RESTAURANT & PUB PROJECT
871 Beatty Street, Vancouver
BASEMENT FLOOR PLAN

A.01

REDUCED TO 50% ORIGINAL SIZE
 PRELIMINARY NOT FOR CONSTRUCTION

FIRE RATINGS

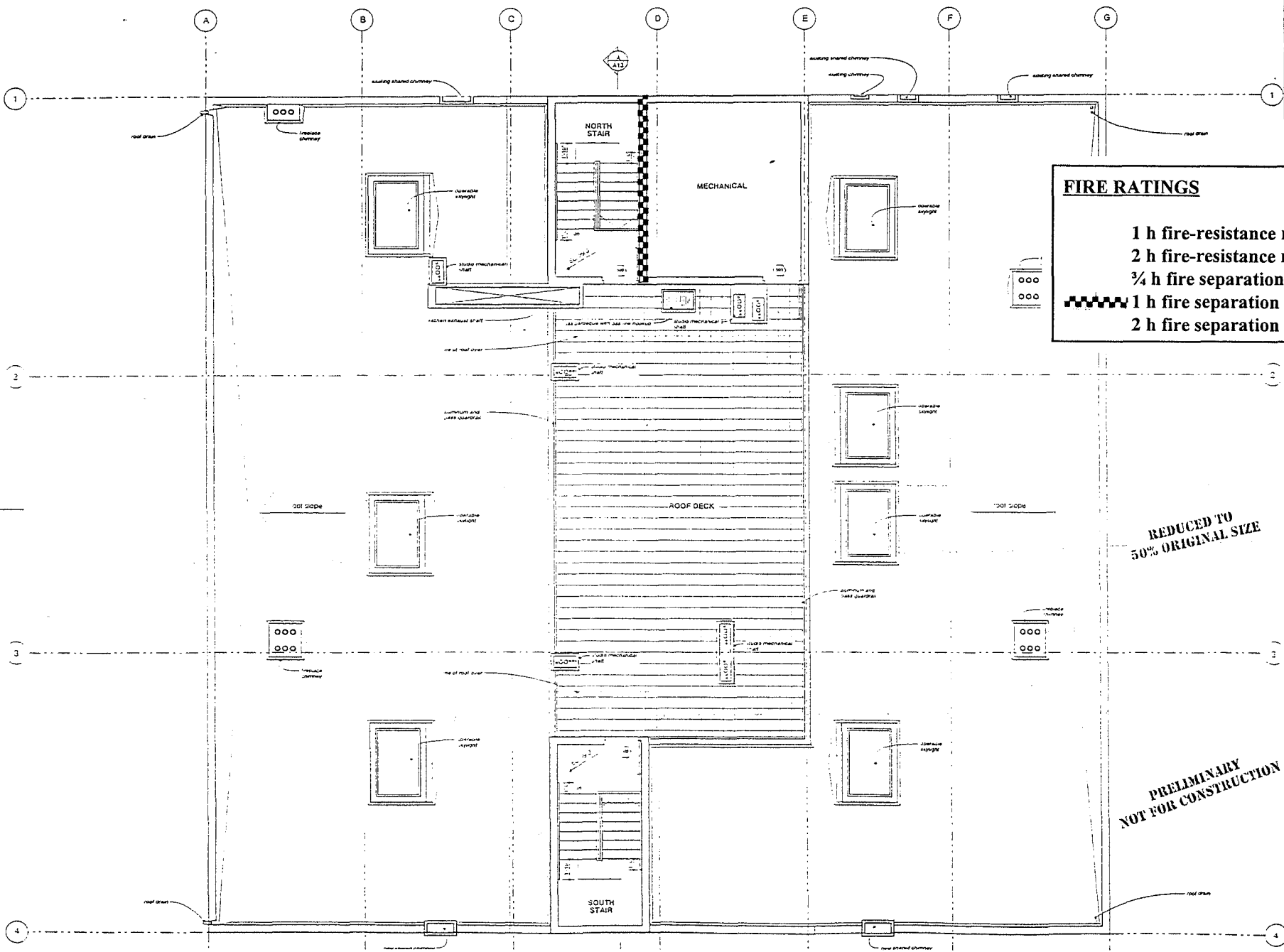
-  1 h fire-resistance rating
-  2 h fire-resistance rating
-  Non-rated fire separation
-  3/4 h fire separation
-  1 h fire separation
-  1.5 h fire separation
-  2 h fire separation



FIRST FLOOR

ARTIST LIVE/WORK STUDIOS
 RESTAURANT & PUB PROJECT
 871 Beatty Street, Vancouver
 MAIN FLOOR PLAN

A.02



FIRE RATINGS

- 1 h fire-resistance rating
- 2 h fire-resistance rating
- ¾ h fire separation
- 1 h fire separation
- 2 h fire separation

REVISION
21.12.14 - 15 - reduce roof deck size
22.02.15 - 16 - call revision
22.03.15 - 17 - call revision
22.04.15 - 18 - call revision
22.05.15 - 19 - call revision

ISSUED
15.07.14 - 20 - call revision
22.08.14 - 21 - call revision
22.09.14 - 22 - call revision
22.10.14 - 23 - call revision
22.11.14 - 24 - call revision

REDUCED TO
50% ORIGINAL SIZE

SCALE
1:20

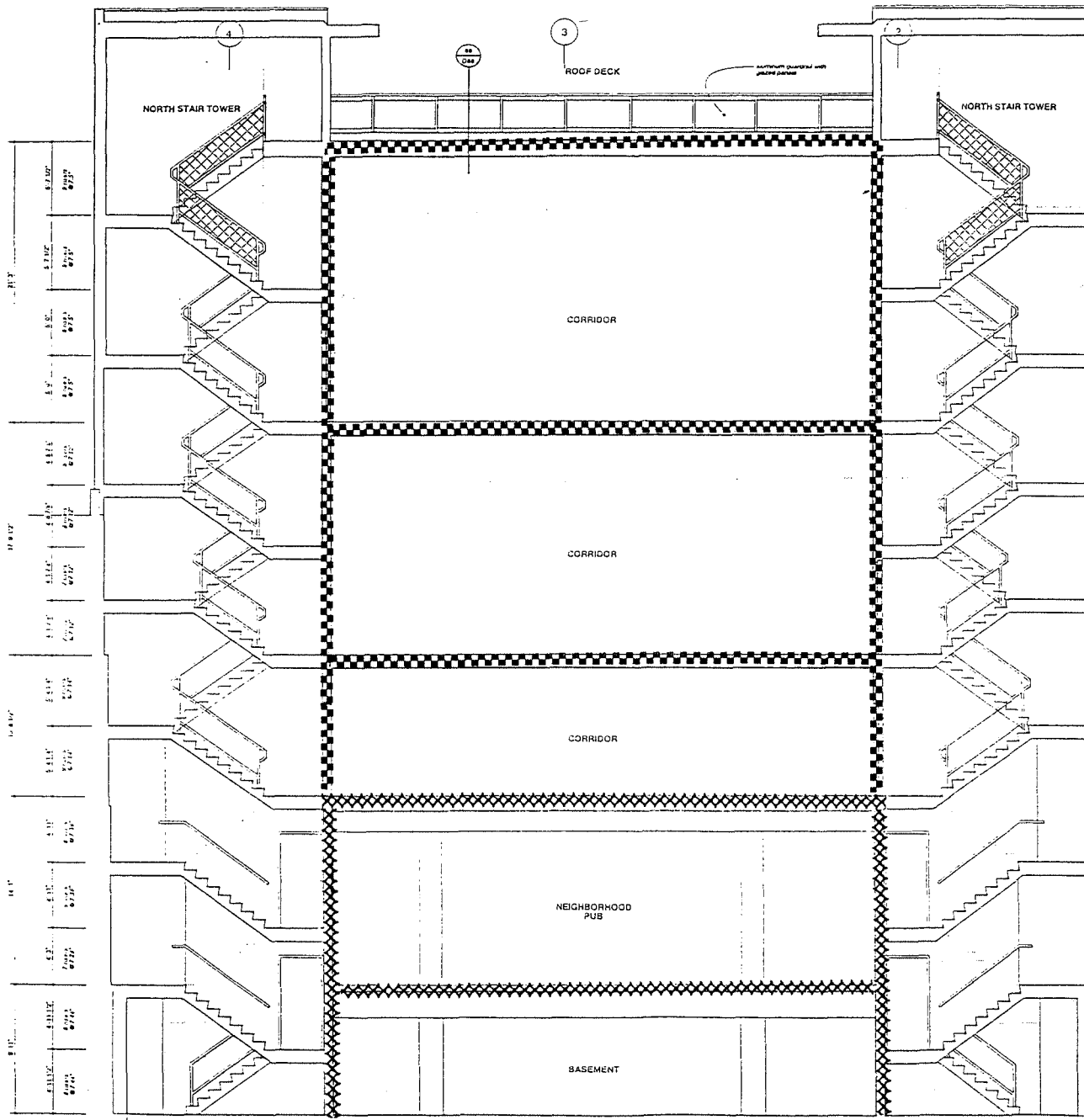
PRELIMINARY
NOT FOR CONSTRUCTION

ARTIST LIVE/WORK STUDIOS
RESTAURANT & PUB PROJECT
871 Beatty Street, Vancouver

ROOF PLAN

A.08

ROOF PLAN



TOP OF PENTHOUSE

1

ELEVATION 82' 0" TOP OF ROOF DECK

ELEVATION 78' 1" FOURTH FLOOR

ELEVATION 40' 0" THIRD FLOOR

ELEVATION 35' 0" GROUND FLOOR

ELEVATION 28' 0" BASEMENT

REDUCED TO 50% ORIGINAL SIZE

FIRE RATINGS

1 h fire-resistance rating

◆◆◆◆ 2 h fire-resistance rating

▧ 3/4 h fire separation

▣ 1 h fire separation

2 h fire separation

SECTION

NEW HOTEL/CONDOMINIUM CONSTRUCTION

WELL MAINTAINED BUILDING

ACTON JOHNS ARCHITECTS

REVISIONS

1. 11/11/11

2. 11/11/11

3. 11/11/11

ISSUED:

1. 11/11/11

2. 11/11/11

3. 11/11/11

SCALE

1/4" = 1'-0"

ARTIST LIVE/WORK STUDIOS RESTAURANT & PUB PROJECT
871 Beatty Street, Vancouver

SECTION A-A

A.13

APPENDIX C

SPATIAL SEPARATION CALCULATIONS -
LIMIT 7

APPENDIX D
BULLETIN 94-8

PERMITS & LICENSES DEPARTMENT

City Hall, East Wing
 453 West 12th Avenue
 Vancouver, British Columbia
 Canada V5Y 1V4
 Phone (604) 873-7611
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DIRECTOR:
 J.A. Perri

DEPUTY DIRECTOR:
 R.L. Maki, PEng
 Permits & Inspection Division

BULLETIN 94-8

October 13, 1994

EXPOSURE PROTECTION OF EXITS

Sentences 3.4.4.1.(3), (4) and (5) of the Vancouver Building By-law require protection of exits and exit routes exposed to fire from exterior openings in adjacent fire compartments. This protection may be achieved by means of:

" wired glass in fixed steel frames or glass block conforming to Article 3.1.6.10. or, where the building is sprinklered, glazing which is compatible with the adjacent sprinklers, "

The term "*compatible with the adjacent sprinklers*" is intended to define a condition where the glazing will remain in place under fire exposure conditions for a reasonable duration. The purpose of this requirement is to prevent a fire plume from discharging through the opening and to reduce the transmission of radiant energy through the opening.

In order for the glass to reliably remain in place during a fire exposure condition, the following criteria should be met:

1. The glazing shall be laminated or tempered glazing in fixed metal frames or top-hung metal frames that have been fabricated so as to restrict opening to 100 mm.
2. The sprinkler heads shall be designed and positioned to provide continuous wetting of the entire surface of the glass during fire conditions.

In order to achieve continuous wetting of the glass, recent research has indicated that placement of the sprinkler heads is critical and that the system should incorporate the following features:

- The sprinkler heads must be located within two (2) inches vertically and between six (6) to 12 inches horizontally from the glass. For openings wider than six (6) feet, multiple sprinkler heads shall be spaced at a maximum of six (6) feet on centre.
- The sprinkler heads shall be of the quick response type with a minimum flow rate of 18 gpm from each head when all sprinklers are activated. Discharge of "glazing protection" sprinklers shall be additional to the floor sprinkler design flow.

.../over

- The sprinkler heads shall be protected from spray and potential cold solder effects from the adjacent sprinklers by means of baffles, per NFPA 13.
- No horizontal mullions are permitted in the glazing unless protected by a subsequent row of sprinklers.
- The head of such windows shall be designed so that no drapes, blinds or other obstructions can be placed between the sprinklers and the glazing.

Accordingly, the City will require that the above conditions be met when providing exposure protection of exits by means of sprinklers and compatible glazing per Sentences 3.4.4.1.(3), (4) and (5) of the Vancouver Building By-law. When it complies with the above requirements, such protection will be accepted as consistent with the By-law and will not require submission of a request for equivalency. Where it is proposed to depart from the above conditions, a request for equivalency will be required.



R. L. Maki, PEng
CITY BUILDING INSPECTOR

APPENDIX E

OUTPUT FROM FPETOOL - SPRINKLER
RESPONSE TIMES

07-26-1996

FPETOOL V3.2

-----Sprinkler/detector response-----

Run title: QUICK RESPONSE HEADS

Fire to ceiling	Detector axial dist.	Room temp.	Device rating	RTI
m	m	C	C	(m/s) ^{0.5}
5.0	2.5	20	74	33.0

Minimum heat release rate necessary to activate the detector at the location described is 889 kW

Time(Sec)	RHR(kW)	Jet (C)	Head/det. (C)
0	0	20	20
10	1	21	20
20	5	22	20
30	11	23	21
40	19	24	21
50	29	25	22
60	42	27	23
70	57	29	24
80	75	30	25
90	95	32	27
100	117	34	28
110	142	36	30
120	168	38	32
130	198	40	34
140	229	42	36
150	263	44	38
160	300	46	40
170	338	48	42
180	379	50	44
190	422	53	47
200	468	55	49
210	516	57	51
220	566	60	54
230	619	62	56
240	674	65	59
250	731	67	61
260	791	70	64
270	853	72	66
280	917	75	69
290	984	78	71

---- Detector activation at 300 seconds ----

-----Sprinkler/detector response-----

Run title: STANDARD SPRINKLERS

Fire to ceiling	Detector axial dist.	Room temp.	Device rating	RTI
m	m	C	C	(m/s) ^{0.5}
5.0	2.5	20	74	83.0

Minimum heat release rate necessary to activate the detector at the location described is 889 kW

0	0	20	20
10	1	21	20
20	5	22	20
30	11	23	20
40	19	24	20
50	29	25	21
60	42	27	21
70	57	29	22
80	75	30	23
90	95	32	24
100	117	34	25
110	142	36	26
120	168	38	27
130	198	40	29
140	229	42	30
150	263	44	32
160	300	46	33
170	338	48	35
180	379	50	37
190	422	53	39
200	468	55	41
210	516	57	43
220	566	60	46
230	619	62	48
240	674	65	50
250	731	67	53
260	791	70	55
270	853	72	57
280	917	75	60
290	984	78	63
300	1053	80	65
310	1124	83	68
320	1198	86	71
330	1274	88	73

---- Detector activation at 333 seconds ----

APPENDIX **F**

EXCERPT FROM THE SUPPLEMENT TO THE
NBC AND
CALCULATIONS OF FIRE-RESISTANCE
RATINGS

2.11 Glued-Laminated Timber Beams and Columns

2.11.1. This Subsection applies to glued-laminated timber beams and columns required to have fire-resistance ratings greater than those afforded under the provisions of Article 3.1.4.5. of the National Building Code of Canada 1990.

2.11.2.

(1) The fire-resistance rating of glued-laminated timber beams and columns in minutes shall be equal to

- (a) $0.1 fB [4 - 2(B/D)]$ for beams which may be exposed to fire on 4 sides,
- (b) $0.1 fB [4 - (B/D)]$ for beams which may be exposed to fire on 3 sides,
- (c) $0.1 fB [3 - (B/D)]$ for columns which may be exposed to fire on 4 sides, and
- (d) $0.1 fB [3 - (B/2D)]$ for columns which may be exposed to fire on 3 sides,

where

f = the load factor shown in Figure 2.11.(a),

B = the full dimension of the smaller side of a beam or column in millimetres before exposure to fire (see Figure 2.11.(b)),

D = the full dimension of the larger side of a beam or column in millimetres before exposure to fire (see Figure 2.11.(b)),

k = the effective length factor obtained from CAN3-O86-M, "Engineering Design in Wood," and

L = the unsupported length of a column in millimetres.

(2) The allowable load on a beam or column shall be determined by using the allowable stresses specified in CAN3-O86-M, "Engineering Design in Wood."

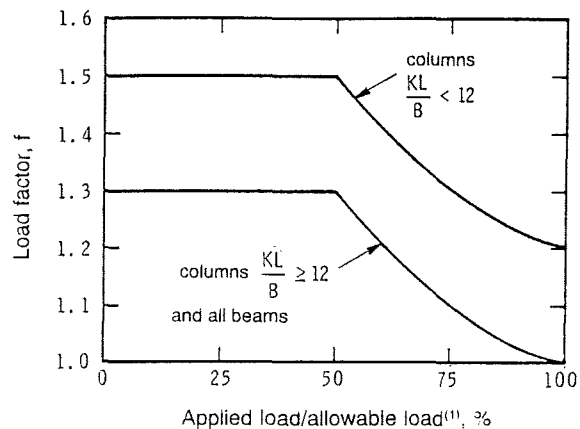


Figure 2.11.(a) Factors to compensate for partially loaded columns and beams

Note to Figure 2.11.(a):

⁽¹⁾ See Sentence 2.11.2.(2)

Calculation for the Fire-resistance Rating of the Wood Beams and Wood Columns

The wood beams are 22" x 24". These beams will be exposed to fire from 3 sides. The calculated fire-resistance rating (F.R.R.) is as follows:

$$\text{F.R.R. (minutes)} = 0.1 fB[4 - (B/D)]$$

f = the load factor -assumed to be 1.0 which is conservative (based on 100% loaded)

B = dimension of the smaller side of the beam (mm) - 22" (559 mm)

D = dimension of the larger side of the beam (mm) - 24" (610 mm)

therefore,

$$\text{F.R.R.} = 0.1(1.0)(559)[4 - (559/610)]$$

$$= 172.4 \text{ minutes}$$

$$= \mathbf{2.9 \text{ hours}}$$

The columns on the main floor are 20" x 20" and the columns in the basement are 22" x 22". The columns are exposed to fire from 4 sides. The calculated F.R.R. for the columns on the main floor (ie. smaller columns) is as follows:

$$\text{F.R.R.} = 0.1 fB[3 - (B/D)]$$

f = 1.2 - conservative (100% loaded) - See figure 2.11a -[kL/B = 3659/508 = 7.2 < 12]

B = D = 20" (508 mm)

k = 1.0 - effective length factor

L = 12' (3659 mm)

therefore,

$$\text{F.R.R.} = 0.1(1.2)(508)[3 - 508/508]$$

$$= 122 \text{ minutes}$$

$$= \mathbf{2 \text{ hours}}$$

A 2 h rating is required for the beams and columns which support the first and second floors. The calculated fire-resistance rating for both the beams and columns exceeds 2 hours. Therefore, they are permitted to be exposed and do not require any additional protection.

The column sizes on the second floor are 17" x 17". The calculated F.R.R. is as follows:

$f = 1.2$ - conservative (100% loaded) - See figure 2.11a - $[kL/B = 2744/432 = 6.4] < 12$

$B = D = 17"$ (432 mm)

$k = 1.0$ - effective length factor

$L = 9'$ (2744 mm)

therefore,

$$\text{F.R.R.} = 0.1(1.2)(432)[3 - 432/432]$$

$$= 103.7 \text{ minutes}$$

$$= \mathbf{1.7 \text{ hours}}$$

The columns on the second floor require a 1 h F.R.R. The calculated F.R.R. exceeds 1 h, therefore no further upgrading is required for these columns.