

Mid-rise Wood Frame Buildings in Ontario

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ONTARIO BUILDING
OFFICIALS ASSOCIATION
**Building Knowledge.
Growing Communities.**



ONTARIO BUILDING OFFICIALS ASSOCIATION



- Founded in 1956 when a group of 40 Building officials from across the Province convened in Hamilton.
- Chapter network was introduced in 1978 allowing provincial coverage - 21 chapters in 6 regions.
- Today the association represents over 1700 members in over 400 Municipalities

MID-RISE CONSTRUCTION IN ONTARIO

- The Ontario Building Code requirements for constructing up to 6 storey combustible buildings in Ontario
- Fire Safety During Construction for 5 and 6 storey wood buildings in Ontario – A Best Practice Guideline
- Case Studies. Plan review and inspection of projects constructed or currently under construction in Hamilton, Ontario
 - 6 Storey Sandman Hotel, and
 - 2 downtown infill projects.

THE *BUILDING CODE ACT*, 1992

- In effect since 1975 the Ontario Building Code (the Code), is a regulation under the Building Code Act, 1992
- The Ministry of Municipal Affairs administers the Building Code Act, 1992 and develops the Building Code, while municipalities are responsible for enforcing the Building Code
- The current building code came into force on January 1, 2014
- Building Officials in Ontario must pass qualification examinations with the Ministry and renew registration yearly



THE BUILDING CODE ACT, 1992

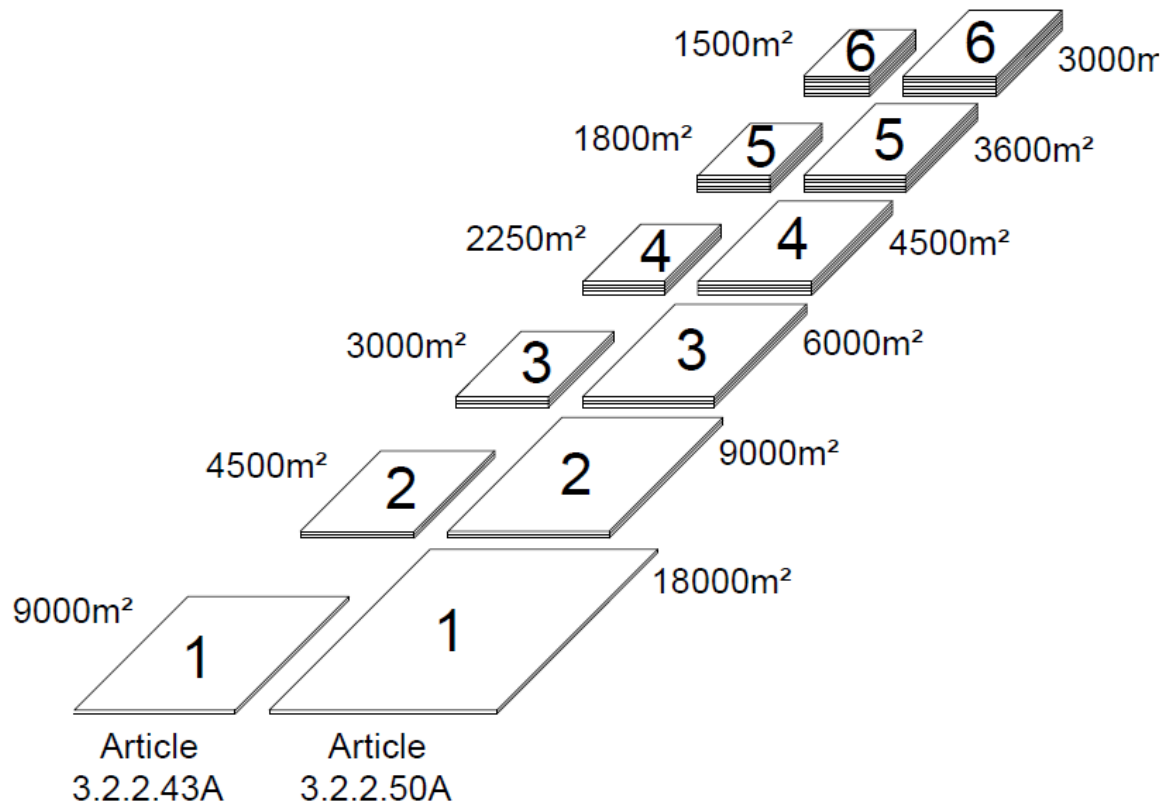
- Amendments to the Building Code that took effect on January 1, 2015 increased the permitted height of combustible buildings from to 6 storeys
- This change expanded the application of the code with previously had restricted the construction of combustible buildings to 4 storeys
- The province's objective for the change was to help increase opportunities for designers and builders to create innovative, flexible and affordable new buildings, but at the same time to maintain Ontario's high fire safety standards for both the public and fire safety personnel

Mid-rise Area/Height Limits

- New 3.2.2. classifications – 3.2.2.43A. (Group C) and 3.2.2.50A. (Group D) permit combustible construction up to and including 6 storeys

Storeys	3.2.2.43A.	3.2.2.45.	3.2.2.50A.
1	9 000 m ²	7 200 m ²	18 000 m ²
2	4 500 m ²	3 600 m ²	9 000 m ²
3	3 000 m ²	2 400 m ²	6 000 m ²
4	2 250 m ²	1 800 m ²	4 500 m ²
5	1 800 m ²	-----	3 600 m ²
6	1 500 m ²	-----	3 000 m ²

Mid-rise Area/Height Limits

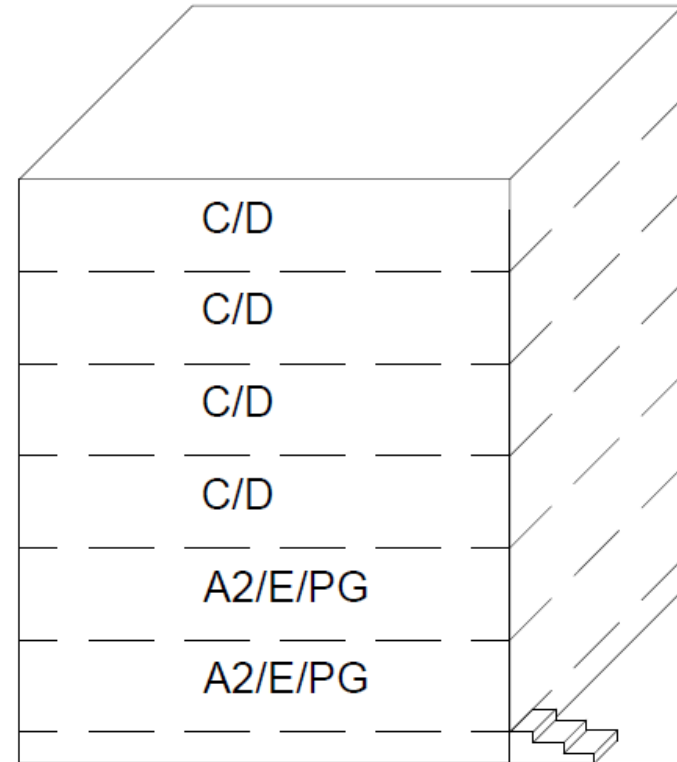


Major Occupancy Prohibition

- OBC prohibits Group A, Division 1 or 3, Group B and Group F, Division 1, 2 or 3 (other than parking garages) major occupancies
- NBCC is more lenient - in these midrise buildings Group F, Division 2 and 3 (other than parking garages) are not prohibited below the 3rd storey

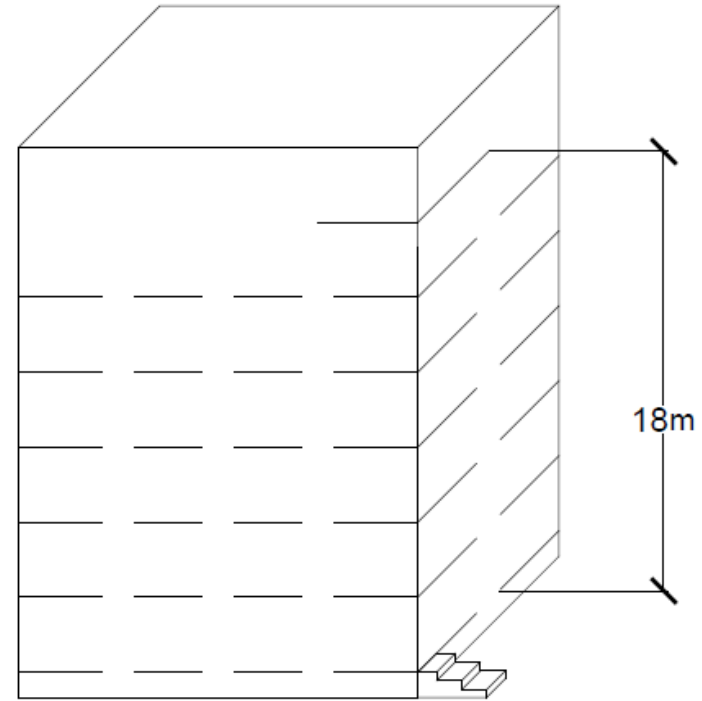
Mixed Use Occupancies

- May include some “mixed use” occupancies :
- Group A, Division 2 and Group E such as restaurants and grocery stores as well as Group F, Division 3 parking garages below the 3rd storey (subject to increased rating of fire separations)
- NBCC permits parking garages below the 4th storey



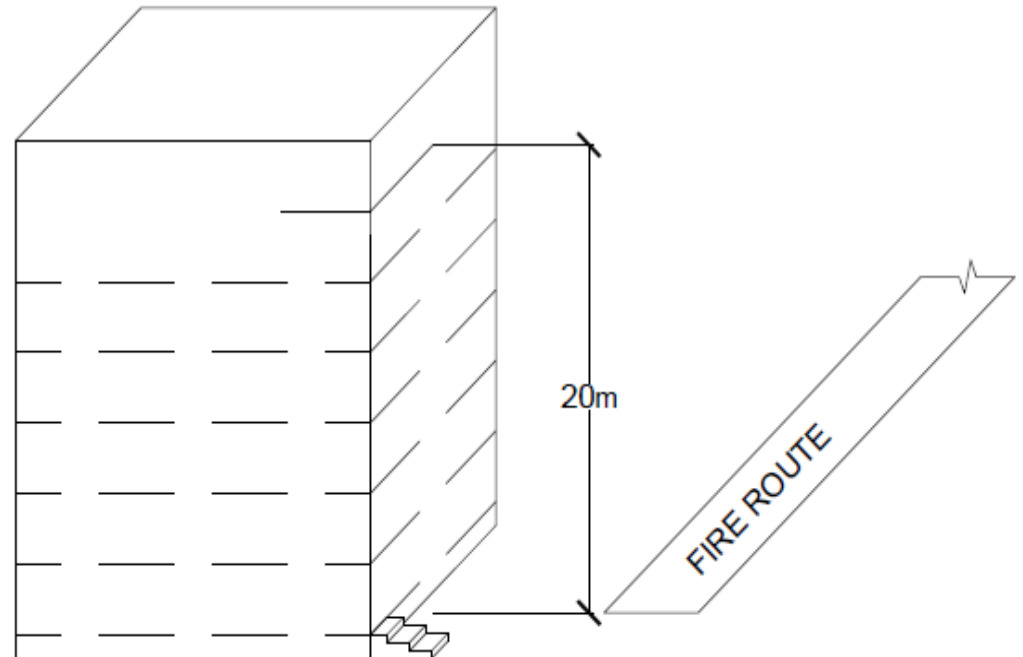
Mid-Rise Building Height Limitations

- Building height is limited to 18 m measured between the floor level of the 1st storey and the floor level of the uppermost storey or mezzanine



Mid-Rise Building Height Limitations

- Building height also limited to 20 m between the required fire access route and the floor level of the uppermost storey or mezzanine (OBC specific provision)



OBC Mid-Rise Fire Separation Requirements

- 1-hour ratings are required for floor separations
- Fire separations of exits are required to be of non-combustible construction
- 1.5 –hour ratings are required for exits (instead of 1 hour as usually required for buildings having floors constructed as 1 hour fire separations)

Exterior Cladding

- Non-combustible cladding is required for the 5th and 6th storeys of these buildings and for buildings located nearer property lines (less than 10% unprotected openings) EXCEPT
- cladding that complies with certain parameters of CAN/ULC-S134 is permitted
- NBCC requirements similar

Combustible Piping

- Combustible piping and tubing and associated adhesives is required to have a flame-spread rating not more than 25
- This does not apply to smaller diameter plumbing and elements

Firewalls and Fire Blocking

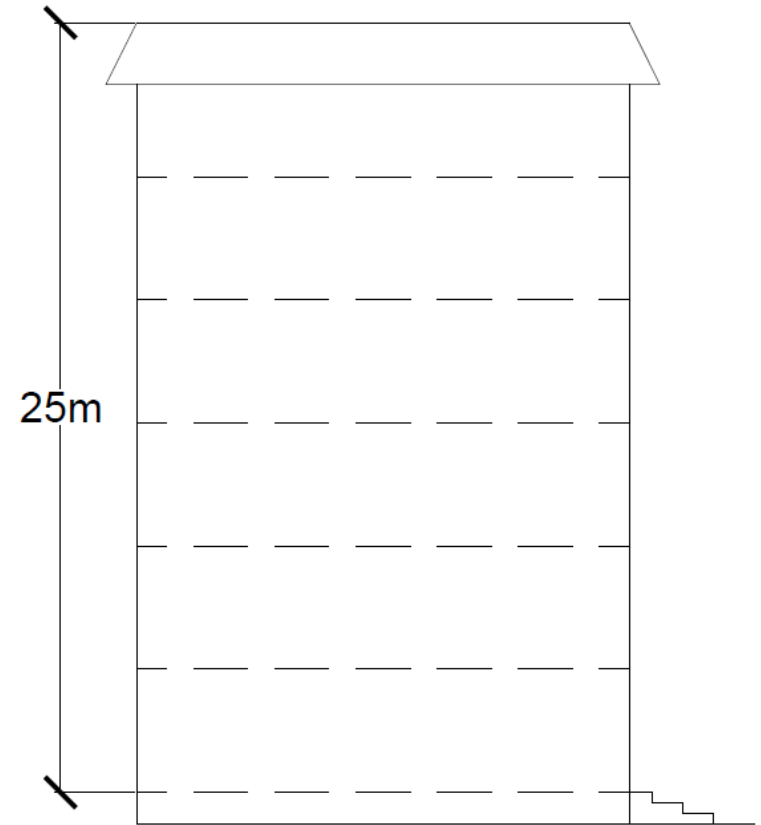
- Firewalls separating these buildings from other buildings that are permitted to have a 2-hour fire-resistance rating must be of masonry or concrete construction unless the buildings on both sides of the firewall are sprinklered
- Even though buildings are sprinklered fire blocking is required in horizontal concealed spaces within floors or roofs unless the space is filled with non-combustible insulation

Roof Construction and Coverings

- Roof assemblies must have a 1-hour fire-resistance rating
- Typically the OBC allows roof ratings to be waived in sprinklered buildings – this relaxation is not permitted for these types of buildings
- Combustible roof coverings **must** have Class A Classification (NBCC requires Class A Classification for all roofs where the height is greater than 25 m)

Roof Construction and Coverings

- Roof assemblies must be constructed of non-combustible construction or fire-retardant treated wood if the roof assembly has a height greater than 25 m measured from the floor of the first storey to the highest point of the roof assembly (same as NBCC)



Street Requirements

- For these buildings to face one street not less than 10% of the building perimeter must be located within 15 m of a street or streets (NBCC requires 25%)
- Helps emergency responders access the building
- Building height also limited to 20 m between the required fire access route and the floor level of the uppermost storey or mezzanine (OBC specific provision)

Sprinkler Requirements

- Buildings must be sprinklered to the more robust requirements of NFPA13
- Balcony fires are a common fire risk
- Exterior balconies > 610 mm wide must be sprinklered

Seismic Requirements

- Required to resist seismic loads that are 20% greater than those that would apply to other buildings
- Also required to meet requirements for alignment of shear walls
- additional seismic requirements for mid-rise wood buildings provides an additional margin of safety in regard to these types of loads

Occupancy Permits

- These buildings are not permitted to be occupied until an occupancy permit has been issued
- Requirements for occupancy are more robust than current provisions for large buildings – current provisions allow for large buildings to be occupied on a floor by floor with fire safety systems complete only on the occupied floors
- Mid-rise buildings will require a final inspection confirming:
 - Building envelope complete
 - Required fire separations complete and closures installed
 - Exits fire separated and self-closing devices installed
 - Shafts and closures installed
 - Means of egress free of loose materials and other hazards
 - Lighting in corridors, stairs and exits complete and operational
 - Standpipe, sprinkler and fire alarm systems complete and operational
 - Fire extinguishers installed
 - Fire access route requirements

Fire Safety During Construction of Mid-Rise Buildings

- Released in May 2016
- Developed by MMA in consultation with MOL and OFMEM
- Other stakeholders consulted including fire services, buildings, designers, building officials, insurance companies, RESCON, CWC, OHBA, OBOA, City of Toronto and FP Innovations
- To minimize the risk of a significant construction site fire occurring in the first place as well as to reduce the spread and impact of such a fire should one occur
- This is a guideline not a regulation

FIRE SAFETY DURING CONSTRUCTION FOR
FIVE AND SIX STOREY WOOD BUILDINGS
IN ONTARIO:

A BEST PRACTICE GUIDELINE

May 2016



Fire Safety During Construction of Mid-Rise Buildings

Part 1 – Fire Safety Planning

- Construction Site Fire Safety Plan
- Fire Safety Co-Ordinator
- Fire Safety Training

Part 2 – Emergency Notification and Building Egress

- Emergency Notification Systems
- Egress Routes

Part 3 – Site Security

- Fencing
- Security Guards
- After-Hours Lighting and Cameras

Part 4 – Construction Processes

Fire Safety During Construction of Mid-Rise Buildings

Part 5 – Hot Work Protocol

- Hot Work Permits

Part 6 – Control of other Ignition Sources

- “No Smoking” Policy

Part 7 – Storage of Combustible and Highly Flammable Materials

Part 8 – Housekeeping and Waste Management

Part 9 – Fire Protection and Fire Fighting

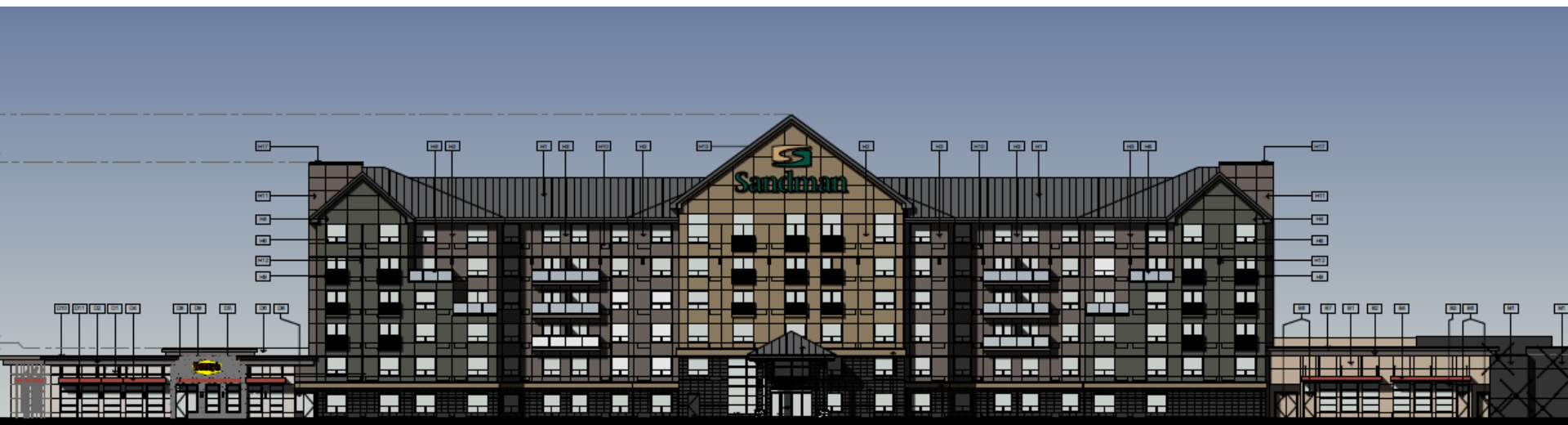
- Fire Department Access
- Fire Protection Water Supply
- Standpipes and Hoses
- Portable Fire Extinguishers
- Inspection, Servicing and Maintenance

Part 10 – Protection of Exposures to Adjacent Properties



Hamilton Projects – Sandman Hotel

- Fall 2014 foundation permit issued
- March 2015 permit issued for 1st mid-rise 6 storey combustible building
- 6-storey, sprinklered, total GFA 10,800 m², 209 unit Sandman Hotel
- Building is actually 4 buildings separated by fire walls
- Building #1 is a 1-storey restaurant
- Buildings 2 & 3 are the 6-storey hotel portions with a ground floor pool
- Building #4 is a 2-storey banquet/meeting centre and restaurant



Hamilton Projects – Sandman Hotel

- Hybrid construction (wood, concrete, steel, ICF)
- Wood framed floors, partition and exterior walls
- ICF stair/elevator shafts and shear walls
- Combination of non-combustible exterior finish (tile) and Hardie Board Panels



Hamilton Projects – Sandman Hotel



Hamilton Projects - Sandman Hotel



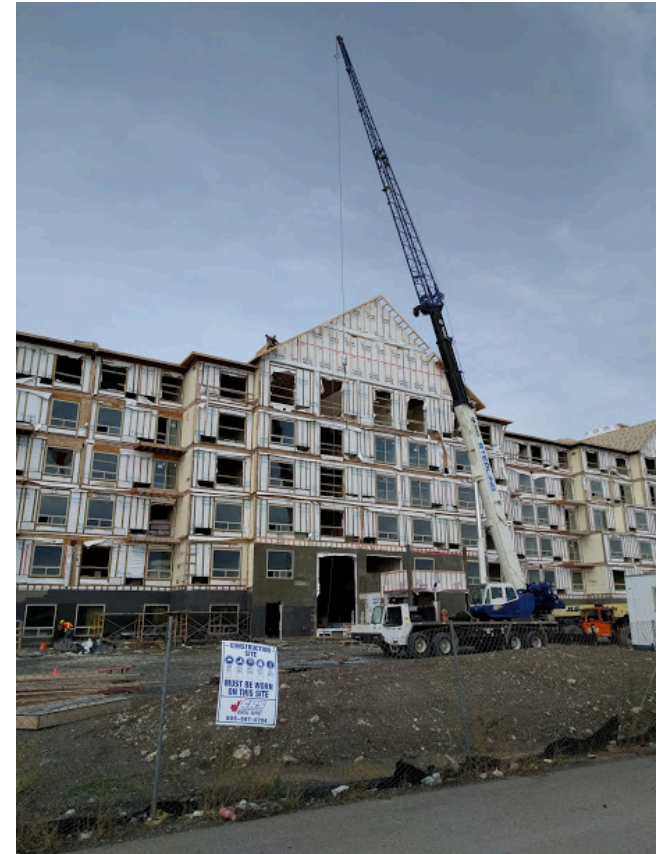
Hamilton Projects – Sandman Hotel



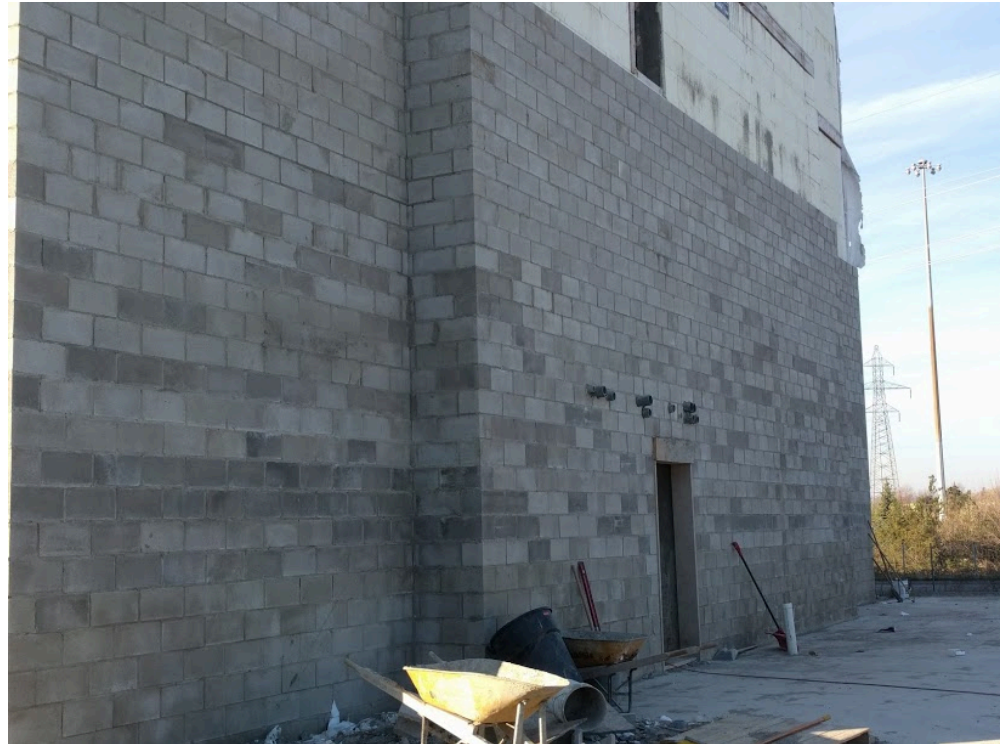
Hamilton Projects – Sandman Hotel



Hamilton Projects – Sandman Hotel



Hamilton Projects – Sandman Hotel



Firewall construction

Hamilton Projects – Sandman Hotel

The “pool and spa”



Hamilton Projects – Sandman Hotel



Dry Sprinkler System in Attic

Compartmentalization of Attic Space



Hamilton Projects – Sandman Hotel



Hamilton Projects – Sandman Hotel

Plans Examination Stage

- Missed some Ontario specific mid-rise requirements (exit rating, FAR notes, etc.)
- Horizontal exits, restricted use, door swing, FHC
- Continuity of fire separations behind electrical panels and FHC
- Required sprinklers missing on exterior balconies
- Floor assembly ULC L502
 - Load restricted for use in Canada
 - Incorrect joist size specified

Hamilton Projects – Sandman Hotel

Inspections Stage

- Continuity of floor fire separations – non-loading bearing interior partitions directly framed to the underside of the floor joists the continuity of the required 5/8” gypsum board for the floor assembly was interrupted at the intersecting wall framing.



Hamilton Projects – Sandman Hotel

- Continuity of fire-rated shaftwall assemblies at floor assemblies



Hamilton Projects – Sandman Hotel

- **Roof Assembly Issues**
 - Membrane ceiling vs. roof assembly



Hamilton Projects – Sandman Hotel

- Use of ICF
 - Cost savings
 - Time saving?
 - Fire Department Issues

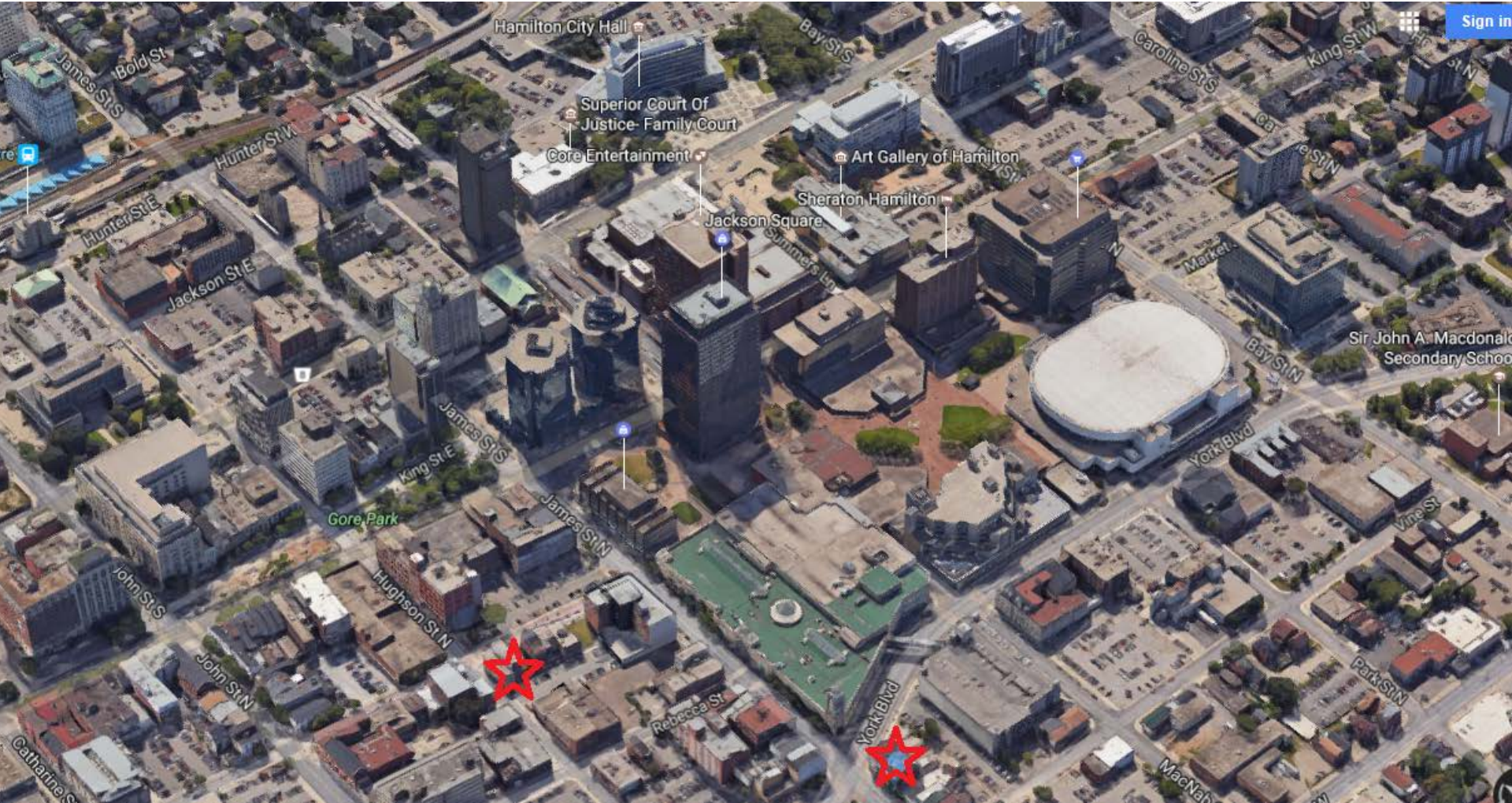


Hamilton Projects – Sandman Hotel

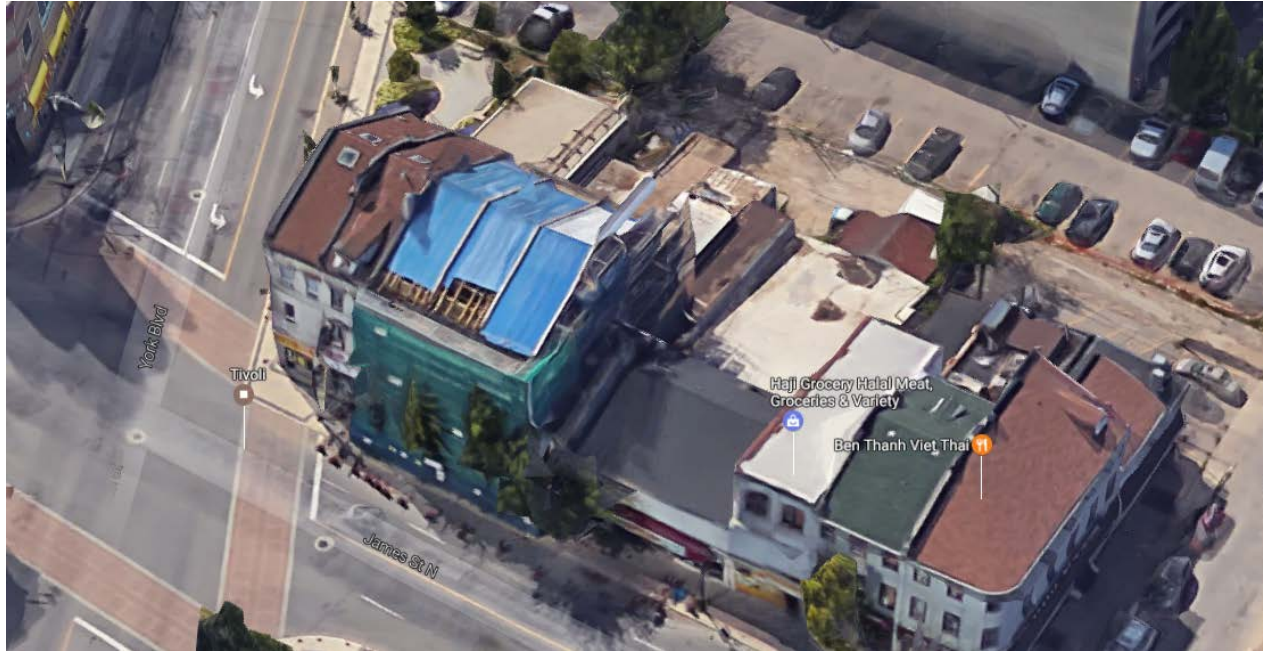
Firestopping



Downtown Mid-Rise Infill Projects



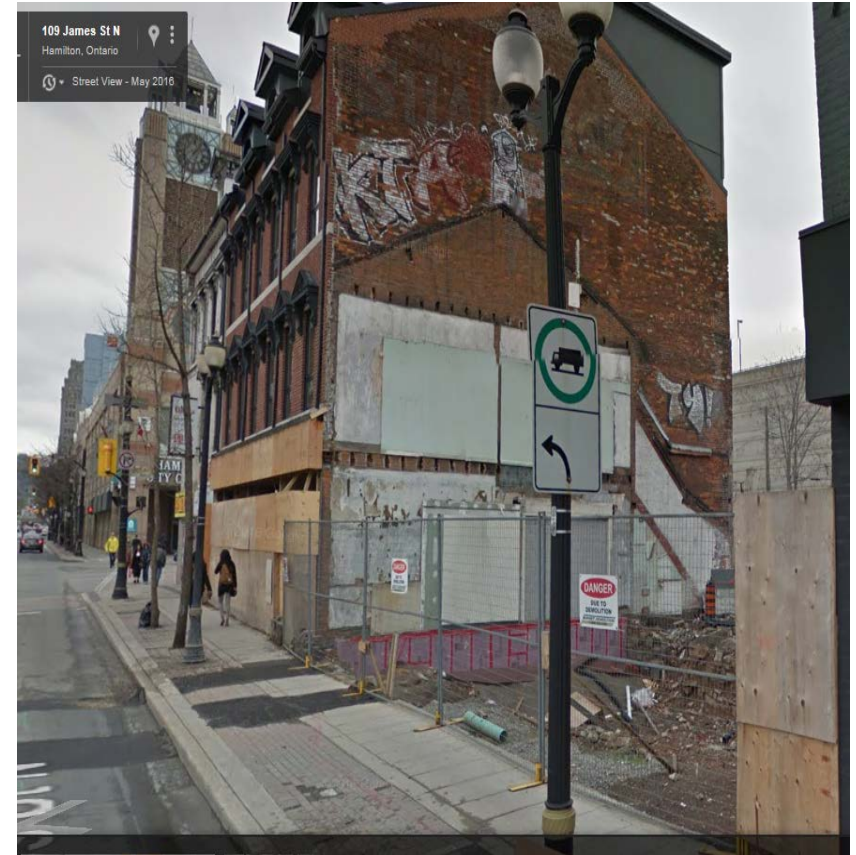
95 James Street North, Hamilton, Ontario Empire Square



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95 James Street North, Hamilton, Ontario

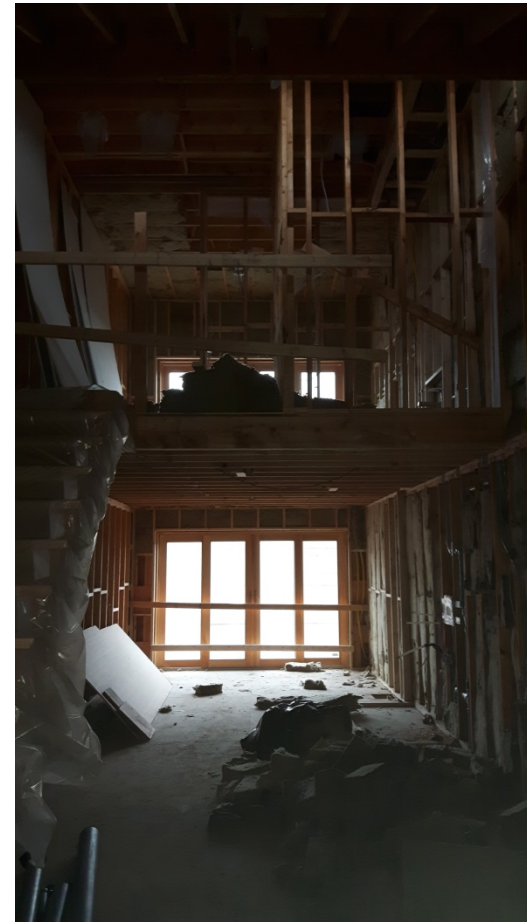
Empire Square

- Existing 3 1/2 storey brick building with basement
- 4th & 5th storey addition
- Ground floor commercial units – general store & business and personal services
- 2nd floor – 3 office tenant spaces
- 3rd floor – 2 residential units
- 4th floor – 2 residential units (2 storeys)

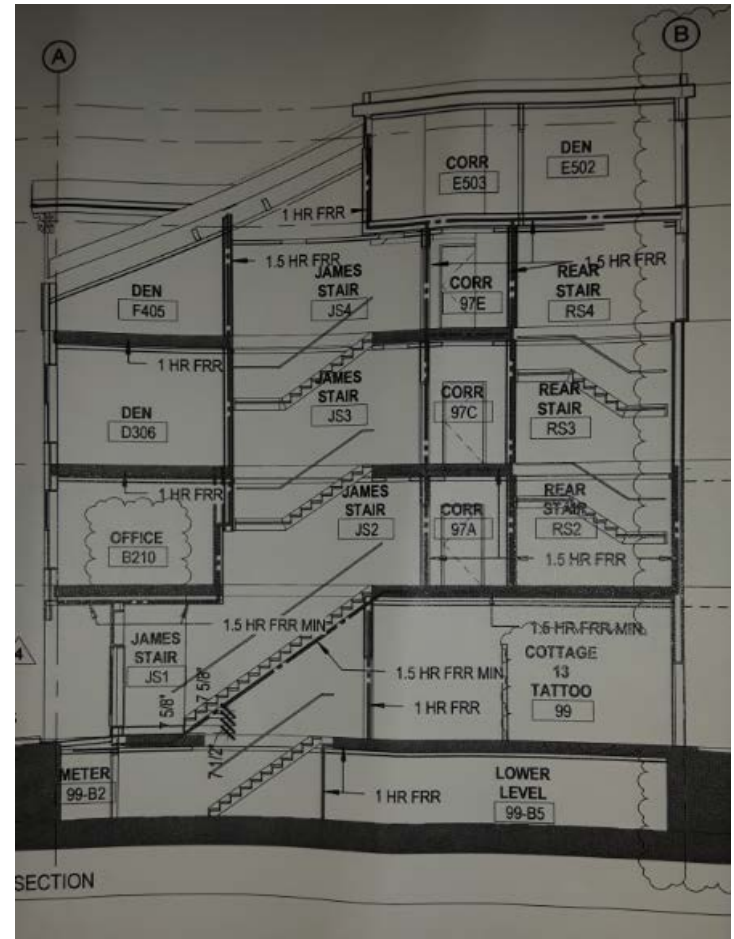
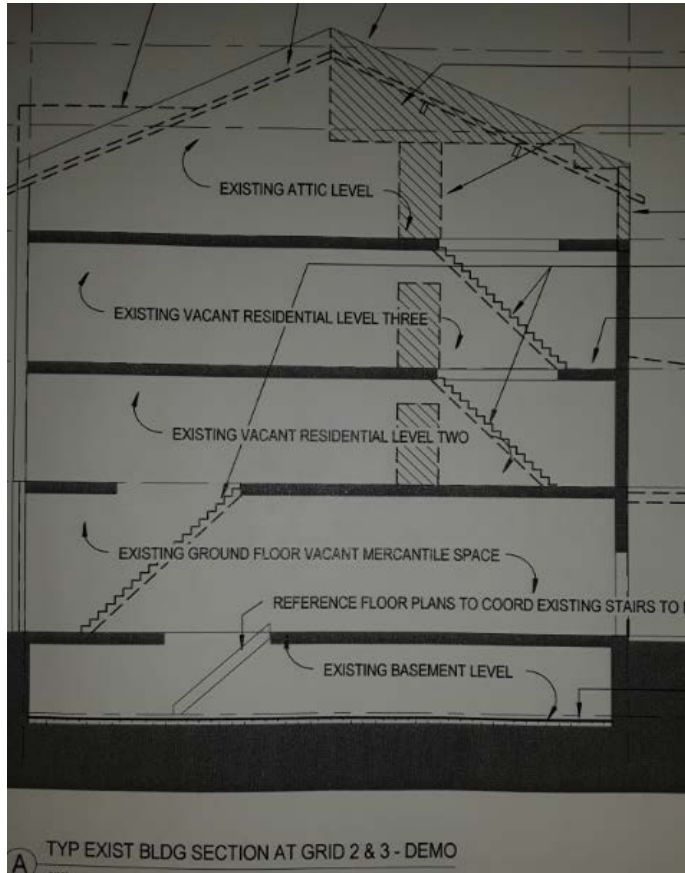


95 James Street North, Hamilton, Ontario

Empire Square



95 James Street North, Hamilton, Ontario Empire Square



95 James Street North, Hamilton, Ontario

Empire Square

Plans Examination Stage

- Load restricted floor assembly
- SB-3 listings for a Part 3 building
- Distance between exits
- Natural lighting requirements and combination rooms
- Exits and exit strategy



95 James Street North, Hamilton, Ontario Empire Square

Inspections Stage

- Continuity of fire separations



95 James Street North, Hamilton Empire Square



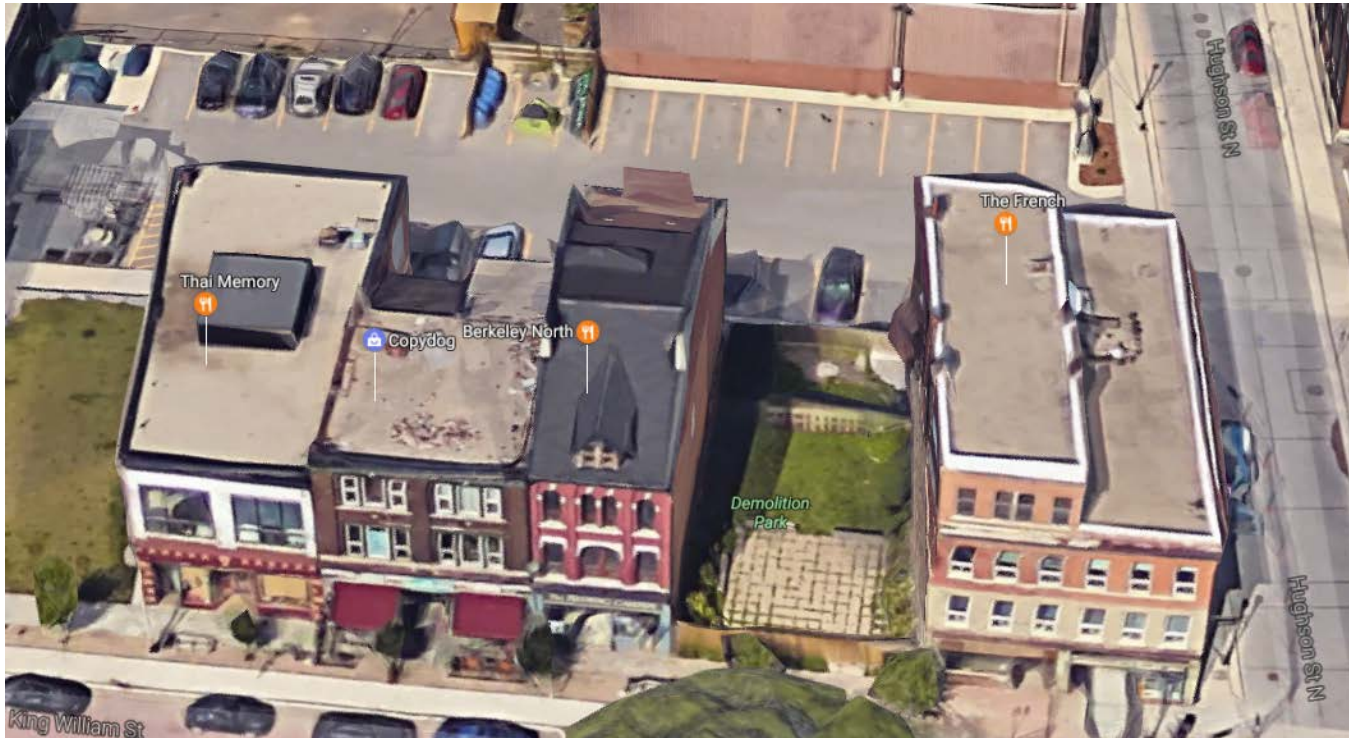
95 James Street North, Hamilton Empire Square

Inspections Stage

- Combustible piping must have a flame-spread rating not more than 25
- ABS installed had to be removed and replaced



Templar Flats, King William Street



Templar Flats, King William Street

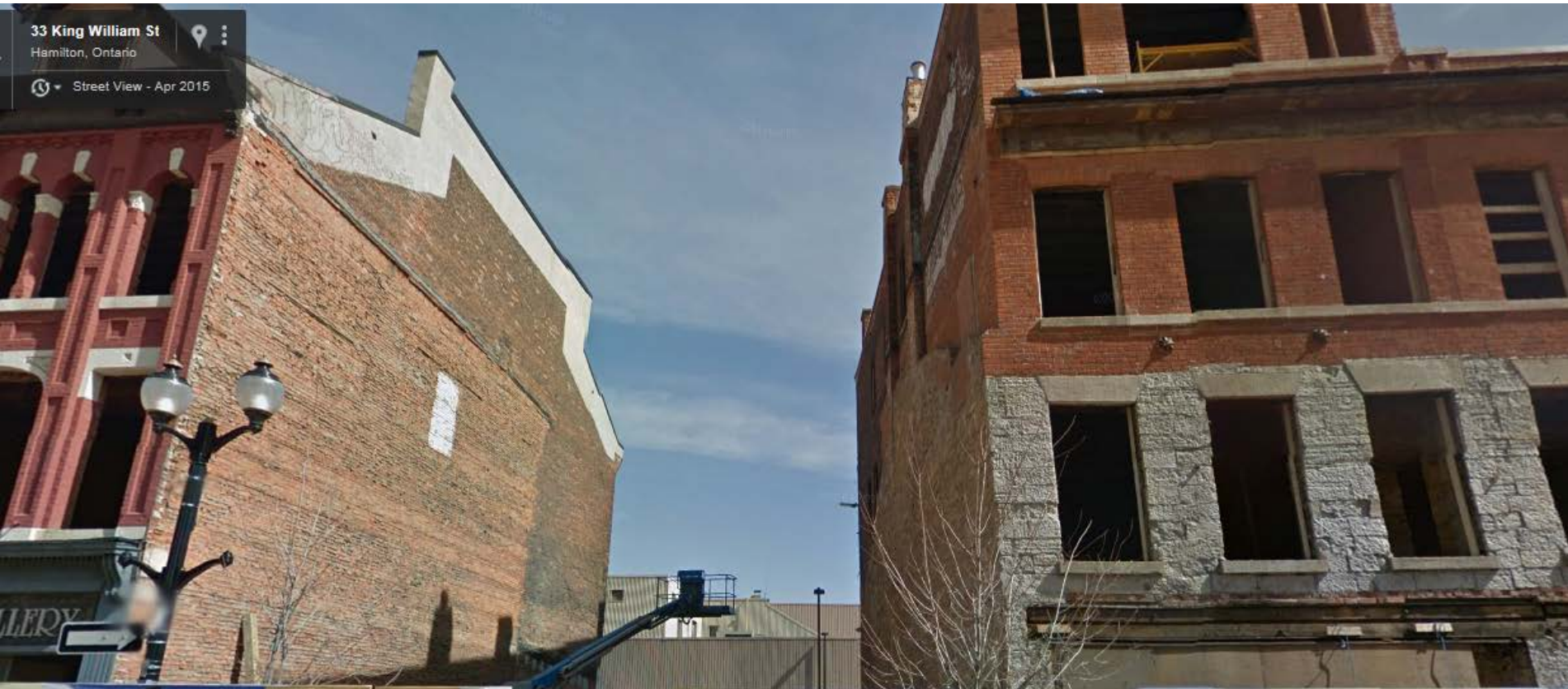
- Developed by Core Urban
- 1st completed 6 storey in Hamilton
- 2016 CWC “multi-unit wood design award” recognizing the use of wood
- Combines an empty lot between 2 older structures with new construction
- 25 rental residences and 4 new restaurant spaces



33 King William St

Hamilton, Ontario

Street View - Apr 2015



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& RESIDENTIAL
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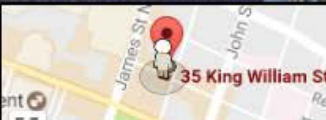
FLATS

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DRINK PLAY LIVE LOVE CITY EAT
PLAY LIVE LOVE CITY EAT DRINK
LIVE LOVE CITY EAT DRINK PLAY
LOVE CITY EAT DRINK PLAY LIVE
CITY EAT DRINK PLAY LIVE LOVE

**CONSTRUCTION
BEGINS SPRING 2015**

Hamilton's newest urban
hot spot, offering 25
residential rental flats and
4 restaurants.



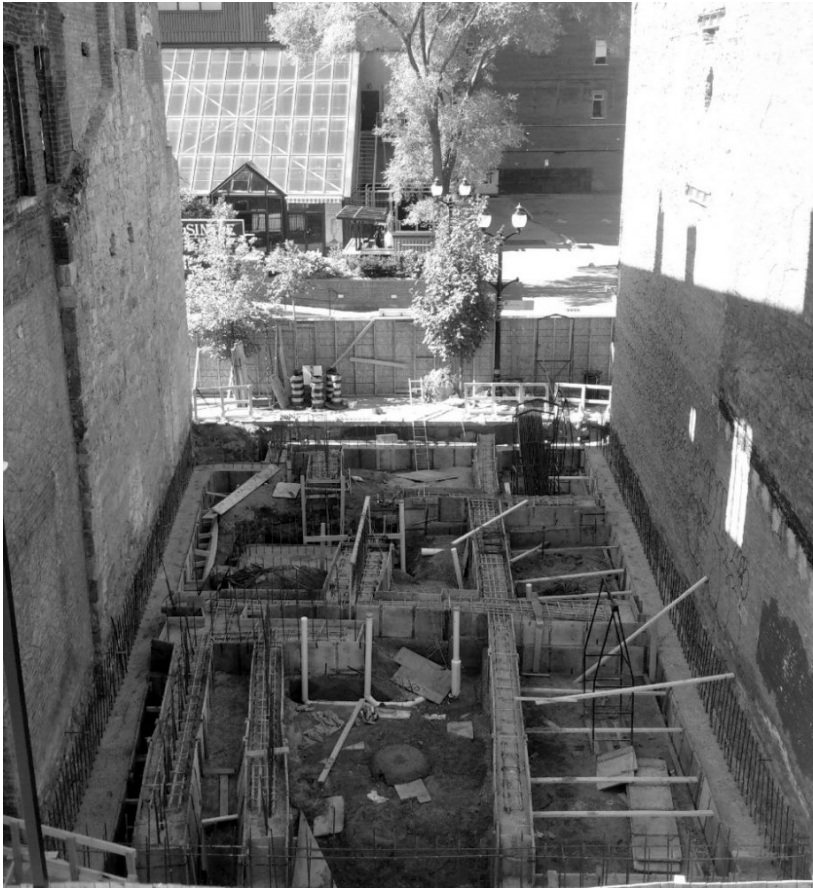
Templar Flats, King William Street



Templar Flats, King William Street



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Templar Flats, King William Street



Templar Flats, King William Street



Templar Flats, King William Street

Plans Examination Stage

- Load restricted floor assemblies
- Substituting engineered wood floor joists in ULC listed assemblies
- Exit stair requirements in Ontario
- Services through exits
- Room sizes, combination rooms and natural lighting

Training in Ontario

- Copies of the OBC updates reflecting changes brought in by Reg. 191/14. were made available to Building Officials in Late December 2014.
- Alternative Solutions
- Training
 - In house
 - Self-training
 - WoodWorks
 - Still on-going
- Collaboration with other municipalities

QUESTIONS



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Founded in 1956, the OBOA is a self-governing, not-for-profit professional association for Building Officials in the Province of Ontario; committed to maintaining the highest degree of professionalism in the field of building code enforcement and building safety; while promoting uniform code interpretation and enforcement, through training and education services, and related committee work. Please visit us at www.oboa.on.ca