



November 30, 2023

Reference Number: 23344

Joel Parke

Owner's Representative
Shaw Festival
10 Queen's Parade, Box 774
Niagara-on-the-Lake, ON L0S 1J0

Dear Joel,

RE: Royal George Theatre Structural Assessment

1.1 BACKGROUND

At your request, we completed a review of the Royal George Theatre at 85 Queen St in Niagara-on-the-Lake. We also reviewed the structures at 79 Queen St, 178 & 188 Victoria St., and the Gallery building behind 85 Queen St. The purpose of the review was to assess the current structures with a view to incorporating the existing buildings into an expanded new theatre.

1.2 EXISTING INFORMATION

As part of our study, we visited the site on May 5, 2023 to visually review the existing structures. Our review was visual and only the structural elements exposed to view were observed. No finishes were removed as part of the review. Additionally, we reviewed the following documents that were supplied to us:

- ▶ Original Theatre Architectural Drawings by architect Chas M. Wilmont circa 1913;
- ▶ Theatre Alteration Drawings by architect John M. Collins circa 1940;
- ▶ Stage Addition Drawings by Lett/Smith Architects dated December 1984; and
- ▶ Preliminary Architectural Drawings for the new Theatre by Lett Architects dated January 2023.
- ▶ "Early Theatre in Niagara-on-the-Lake including the history of The Royal George" by Faye Goodwin and Nancy Butler – April 2010
- ▶

Based on our visual review, the arrangement and sizes of the existing structure appeared to generally match the existing drawings provided, with the exception of the balcony at the front of the theatre building and the façade facing Queen Street which we understand was modified in 1975 and again in the 1980s.

No drawings for the structures at 79 Queen St., 178 & 188 Victoria St., or the Gallery building were provided.



1.3 BUILDING DESCRIPTIONS

1.3.1 83 Queen Street

The existing Royal George Theatre structure at 83 Queen St was completed in 1915 as a Moving Picture and Vaudeville Theatre. The original construction is a single-story building with a basement and a fly tower over the stage. At the front of the building there is a balcony and projection booth. The basement construction consists of 16" concrete foundation walls and slab on grade. The ground floor is wood framed consisting of 2x12 wood joists spanning between steel beams sloping toward the stage. The steel beams are supported by the foundation walls and steel columns along the centre of the basement. The stage is also wood framed consisting of 2x14 joists. The roof is wood framed with 2x14 joists spanning between steel beams which are supported by steel columns at the exterior of the building. The exterior walls are non-load bearing hollow terra cotta block also known as speed tile. The walls infill the spaces between the steel columns supporting the roof structure.

The 1940s renovation expanded the balcony and the projection booth. The project also reworked the façade facing Queen Street, removing windows and awnings.

The 1984 Stage Addition project expanded the backstage and sidestage to the north and east respectively. The work included removing the north and east speed tile walls to a height of approximately 30'-0" and supporting the remaining fly tower walls above on new steel beams and columns. The expanded back and side stage are enclosed with 12" concrete masonry walls and a sloped 1 ½" steel deck roof supported by steel I beam rafters. We understand that in 1984 the front façade, foyer, and balcony were also modified, however no drawings for this work were provided. The balcony framing was reviewed through a trap door in the projection booth and consisted of wood joists and plywood that appeared to be built on top of the earlier balcony structure.

Behind the theatre building there is a two-story structure known as the Gallery. We understand this building is approximately 25 years old. No drawings were made available for this structure; however it appears to be of wood framed construction and does not have a basement.

1.3.2 79 Queen Street

The structure at 79 Queen Street is a single-story building with a gable roof. The exterior is finished in stucco and the interior ground floor is finished such that the above grade framing is unknown. However, based on experience it is likely a wood framed roof bearing on either masonry or wood stud walls. The basement was unfinished and the structure was observed to consist of concrete basement / foundation walls supporting a wood joist floor.

1.3.3 178 & 188 Victoria Street

The structures at 178 and 188 Victoria Street are both two-story wood framed residential houses. 178 Victoria Street has a basement with concrete foundation walls. 188 Victoria Street does not have a basement and the foundation construction was not reviewed. No drawings were made available for either structure.



1.4 ASSESSMENT

The proposed structure for the new redeveloped theatre has a footprint that encompasses all the existing buildings described in section 1.3. The proposed structure is three stories tall with public lobbies in the area currently occupied by the buildings at 79 and 85 Queen Street, a new theatre in the rear of the existing theatre where the gallery building currently stands, and a rehearsal studio and administrative offices at the west side of the site currently occupied by the houses at 178 and 188 Victoria Street.

The existing Gallery building, 178 and 188 Victoria Street, appear to be built in accordance with Part 9: Housing and Small Buildings, of the Ontario Building Code (OBC) and could not easily be incorporated into the proposed theatre building. Part 9 of the OBC governs the design of residential housing and small buildings not exceeding 600m² and has reduced loading requirements. It is not be expected that these buildings would meet the structural requirements of Part 4: Structural Design of the OBC, which would be required if incorporated into the new theatre facility. The proposed new structure also has a basement where the existing structures are located. The Gallery building and 188 Victoria Street do not. The basement at 178 Victoria Street is not deep enough to match the proposed construction. Incorporating them could require constructing a new basement below them and/or underpinning the existing foundations.

Furthermore, we understand the existing basement of the theatre building at 83 Queen Street has experienced flooding in the past. To prevent this, permanent below slab drainage systems and waterproofing of the exterior basement walls would be necessary. Installation of below slab drainage would require removal and replacement of the basement slab-on-grade and would be a costly endeavour.

These buildings also do not have structural elements that would be compatible with the lateral force resisting systems required of the new construction as a whole. The existing theatre structure was designed and built before formal building codes existed. Further, lateral seismic loading requirements were not introduced into Canadian building codes until 1941 and have evolved over the intervening years. The construction of the existing theatre building, namely the hollow terra cotta exterior walls, are non-ductile materials that have a very low resistance to seismic forces. Commentary L of the National Building Code (NBC 2015) requires that existing buildings undergoing renovations or additions that have a total weight exceeding 10% of the existing building weight, undergo seismic upgrading such that the combined existing and new structures fully comply with the current building code. Any significant addition to the existing structure will require a full seismic upgrade of the existing lateral force resisting system.

To upgrade the existing lateral force resisting system, new structural elements would have to be constructed that are compatible with the existing stiff brittle terra cotta walls. Flexible structures such as steel moment frames or steel bracing would not be appropriate. Concrete shear walls could be utilized to strengthen the structure. New shear walls would need to be located strategically within the existing structure and would have to be built on new foundations sized for the gravity and overturning forces.

The proposed structure is significantly larger and taller than the existing structure. In order to incorporate existing structural elements into the new construction, significant reinforcing of walls, beams and foundations would be required. The location of the existing structural elements also does not provide much flexibility for a new building with a larger footprint and modern accessibility requirements. To retain the existing roof structure and incorporate it into a new floor, for example, the existing steel beams would need to be lengthened and reinforced and the existing wood framing would also require upgrading.



1.5 CONCLUSION

In our opinion, based on the information available and the level of study completed, incorporating the existing structures into a new larger, modern theatre structure would be impractical and cost prohibitive. The layout and composition of the structural elements in the existing buildings would require significant upgrades and interventions, to retain even small portions in the new scheme.

Likewise, renovations to the existing Royal George to modernize to meet current industry theatre practices and to achieve the desired functionality would also require significant structural interventions. In our opinion, the required structural interventions would also be impractical and cost prohibitive.

Should you have any questions or comments, please do not hesitate to contact us.

Yours truly,

LEA CONSULTING LTD.

John Kaczmarek, P.Eng.
Project Manager

John Ford, P.Eng.
Principal

cc: Lett Architects Inc.

Attachments: Limitations



LIMITATIONS

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