

Russel Christie House Condition Assessment Rev1

1541 Fiddlers Green Road
Ancaster, Ontario



Prepared by:



155 Frobisher Drive West, Suite F220
Waterloo, ON
TW-00969-23

August 17, 2023

1. Introduction

Tacoma Engineers has been retained by Leanne Dekaneas to carry out a structural condition assessment of a 2-storey farmhouse building located at 1541 Fiddlers Green Road in Ancaster, also known as the Russel Christie House.

Tacoma Engineers was retained by Leanne Dekaneas on July 19, 2023. The undersigned attended the site on July 24, 2023.

This report includes a summary of the following items for the building:

- major structural systems;
- existing structural conditions and areas of potential concern;
- conceptual repair options for any areas that may require remedial work

2. Background

Leanne Dekaneas is the property owner. Tacoma Engineers is being retained as a consultant directly by the owner.

This report is being produced in support of an application to demolish a heritage building. As part of the assessment to support a demolition of a heritage building, Tacoma Engineers considers the feasibility of repairing the building. With a number of Canadian Association of Heritage Professionals (CAHP) members, it is Tacoma Engineer's preference to save heritage buildings where possible.

This report is based on a visual inspection only and does not include any destructive testing. The structure was in a state of collapse at the time of this review, and portions of the interior of the building could not be accessed. No further structural analysis or building code analysis has been carried out as part of this report unless specifically noted.

No previous work has been completed by Tacoma Engineers on this building for this or any other owner.

No sub-consultants have been retained to participate in this assessment.

3. Building History

The farmhouse was reportedly built by John "Squire" Russell in 1860.

The building is constructed as a two-storey brick and wood building. It measures approximately 2000 ft² in gross building area. A fire occurred in c. 2017.

The property is Part IV designated on the register of designated heritage properties by the City of Hamilton.

4. Scope and Methods

No documents were provided to the undersigned prior to the preparation of this report:

The assessment of the building is based on a visual assessment from grade. Access to the interior of the building was only partially possible due to unsafe conditions.

A site visit was carried out by Michael Zwart, P.Eng., on July 24, 2023. A visual review of all accessible spaces was completed on this date, and photographs were taken.

5. Definitions

The following is a summary of definitions of terms used in this report describing the condition of the structure as well as recommended remedial actions. Detailed material condition definitions are included in Appendix A of this report.

- **Condition States¹:**
 1. Excellent – Element(s) in “new” condition. No visible deterioration type defects present, and remedial action is not required.
 2. Good – Element(s) where the first signs of minor defects are visible. These types of defects would not normally trigger remedial action since the overall performance is not affected.
 3. Fair – Element(s) where medium defects are visible. These types of defects may trigger a “preventative maintenance” type of remedial action where it is economical to do so.
 4. Poor – Element(s) where severe or very severe defects are visible. These types of defects would normally trigger rehabilitation or replacement if the extent and location affect the overall performance of that element.
- **Immediate remedial action¹:** these are items that present an immediate structural and/or safety hazards (falling objects, tripping hazards, full or partial collapse, etc.). The remedial recommendations will need to be implemented immediately and may include restricting access, temporary shoring/supports or removing the hazard.
- **Priority remedial action¹:** these are items that do not present an immediate hazard but still require action in an expedited manner. The postponement of these items will likely result in the further degradation of the structural systems and finishes. This may include interim repairs, further investigations, etc. and are broken down into timelines as follows:
 1. **Short-term:** it is recommended that items listed as short-term remedial action are acted on within the next 6 months (**before the onset of the next winter season**).
 2. **Medium-term:** it is recommended that items listed as medium-term remedial action are acted on within the next 24 months.
 3. **Long-term:** it is recommended that items listed as long-term remedial action are acted on within the next 5-10 years. Many of these items include recommendations of further review/investigation.
- **Routine maintenance¹:** these are items that can be performed as part of a regularly scheduled maintenance program.

In addition to the definitions listed above, it should be noted that the building in question is of interest from the perspective of heritage. The Standards and Guidelines for the Conservation of Historic Places in Canada provide direction when a structural system is identified as a character-defining element of an historic place. They also provide direction on maintaining, repairing, and replacing structural components or systems². Refer to the General Guidelines for Preservation, Rehabilitation, and Restoration to further inform the development of more detailed remedial actions.

¹ Adapted from “Structural Condition Assessment”, 2005, American Society of Civil Engineers/Structural Engineering Institute

² “Standards and Guidelines for the Conservation of Historic Places in Canada”, 2nd Edition, 2010, www.historicplaces.ca

6. General Structural Conditions

The building is constructed as a two-storey wood-framed structure. Exterior walls are constructed with multi-wythe brick masonry construction. The interior structure was light wood framed construction with heavy timber beams. The foundations were assumed to be rubble stone masonry but could not be reviewed due to unsafe conditions.

6.1. Exterior Walls

Construction

The exterior walls were constructed with multi-wythe brick masonry construction. There were several interior brick chimneys.

Conditions

Portions of the exterior brick walls contain spalled bricks. A significant hole was found in the garage wall. The windows and roof were consumed in the c. 2017 fire. The skyward facing portions of the walls have allowed ingress of moisture into the multi-wythe walls leading to accelerated rates of deterioration. Missing, damaged, and failed eavestroughs and downspouts were directing water onto the walls resulting in increased moisture levels, and further degradation. The multi-wythe brick walls were found to be in poor condition.

With the roof and floors consumed in the fire, the exterior brick walls have lost their lateral support. As such, these walls are laterally unstable.

The three chimneys were found to be intact, but in very poor condition. The chimneys have loose bricks at the top that are considered a fall hazard.

The below grade walls are expected to be in poor condition and in need of significant remediation.

Feasibility of Repair

- The laterally unsupported brick walls are a hazard during any high wind event. Bracing of these walls must occur prior to any construction work on the building.
- The three chimneys are a falling hazard and would need to be removed and reconstructed.
- The below grade foundation walls are to be restored, but internally and externally.

6.2. Roof Framing

Construction

Roof framing was assumed to be constructed with light wood framing. The rear garage contained the only remaining visible roof structure. This structure consisted of conventionally framed rafters and ceiling joists.

Conditions

The main house roof framing was completely consumed in the c. 2017 fire. The roof of the rear link to the garage was in an advanced state of disrepair with holes in the roof. This roof structure is at risk of collapse and was found to be in poor condition. Prolonged exposure to water and the environment has damaged the rafters to the state that they are no longer considered sound.

Feasibility of Repair

- The roof framing of the main house and rear link requires complete replacement, along with associated sheathing and shingles.



Photograph 1: Rear Link Roof

6.3. Interior Framing

Construction

The interior framing consists of conventional wood framing, supported by load bearing wood walls. Heavy timber beams supported the main floor framing.

Conditions

The main floor framing has collapsed into the basement in the majority of the house and is not considered safe to enter. It was found to be in poor condition. The upper floor framing was mostly consumed in the c. 2017 fire and the remnants were at risk of collapse. The heavy timber basement beams have structurally failed and as such, were also in poor condition.

Feasibility of Repair

- The entire interior framing requires complete replacement, along with associated floor sheathing and finishes.
- The entire interior framing of the building poses a safety hazard. Removal of the remaining framing material is required prior to safe working conditions being established.



Photograph 2: Interior Framing



Photograph 3: Interior Framing

7. Feasibility of Repair

As noted above, almost all structural elements of the Russell Christie farmhouse are damaged in some manner or were consumed in the c. 2017 fire and require repair or replacement. To facilitate this repair, all

Tacoma Engineers Inc.
 Project No. TW-00969-23
 August 17, 2023

Structural Condition Assessment Rev1
 1541 Fiddlers Green Road
 Ancaster, Ontario

finishes and debris from the interior of the building would be required to be removed. Also, all chimneys would need to be removed.

There is no practical shoring plan that may be developed to provide adequate protection to workers entering the property to perform these repairs. Further, given the extent of the damage, after repair, almost none of the original historic materials would remain other than the exterior multi-wythe brick wall.

While a restoration of this property may be contemplated, from a logistics, feasibility and safety perspective, the building is beyond the reasonable limits to be repaired given its current state.

8. Cost Estimate

Tacoma Engineers are not cost consultants and can only offer insight into costs for these repairs based on our experience, as an order of magnitude estimate. Based on this experience, it is anticipated that repairs to the structural framing of the subject property would range between \$1,000,000 and \$1,500,000. This would include temporary shoring as required, and new structural framing to match the existing geometry. This also includes middle quality new finishes, mechanical, electrical, windows, and other typical elements, but does not include exterior landscaping, well water, or septic beds.

However, we are of the opinion that plan to provide adequate protection to workers entering the property to perform these repairs is beyond the reasonable limits. The building is in such a state that repairs are beyond the reasonable limits of conservation and thus are not feasible.



Per

Michael Zwart, P.Eng., CPHD, CAHP Intern
 Structural Engineer, Associate
 Tacoma Engineers

Appendix A: Material Condition Definitions

Condition States¹:

1. Excellent – Element(s) in “new” condition. No visible deterioration type defects present and remedial action is not required.
2. Good – Element(s) where the first signs of minor defects are visible. These types of defects would not normally trigger remedial action since the overall performance is not affected.
3. Fair – Element(s) where medium defects are visible. These types of defects may trigger a “preventative maintenance” type of remedial action where it is economical to do so.
4. Poor – Element(s) where severe or very severe defects are visible. These types of defects would normally trigger rehabilitation or replacement if the extent and location affect the overall performance of that element.

Steel Corrosion¹:

- SC1. Light – Loose rust formation and pitting in the paint surface. No noticeable section loss.
- SC2. Medium – Loose rust formation with scales or flakes forming. Up to 10% section loss.
- SC3. Severe – Stratified rust with pitting of metal surface. Between 10% and 20% section loss.
- SC4. Very Severe – Extensive rusting with local perforation or rusting through, in excess of 20% section loss.

Timber Checks, Splits and Shakes¹:

- TCh1. Light – Extend less than 5% into the member.
- TCh2. Medium – Extend between 5% and 10% into the member.
- TCh3. Severe – Extend between 10% and 20% into the member.
- TCh4. Very Severe – Extend more than 20% into the member.

Timber Cracking, Splintering and Crushing¹:

- TCr1. Light – Damage is superficial with less than 5% section loss.
- TCr2. Medium – Considerable damage with 5% to 10% Section loss.
- TCr3. Severe – Significant damage with 10% to 20% Section loss.
- TCr4. Very Severe – Extensive damage with section loss in excess of 20%.

Timber Rot/Decay¹:

- TR1. Light – Slight change in colour. The wood sounds solid and cannot be penetrated by a sharp object. Damage is superficial with less than 5% section loss.
- TR2. Medium – Surface is discoloured with black and brown streaks. The wood sounds solid and offers moderate resistance to penetration by sharp object. Considerable damage with 5% to 10% Section loss.
- TR3. Severe – Surface is fibrous, checked or crumbly and fungal fruiting bodies are growing on it. The wood sounds hollow when tapped and offers little resistance to penetration by sharp object. Significant damage with 10% to 20% Section loss.
- TR4. Very Severe – The surface can be crumbled and disintegrated with ease. Extensive damage with section loss in excess of 20%.

¹ Adapted from “Ontario Structure Inspection Manual (OSIM), 2000 (Rev. 2008)” by the Ministry of Transportation Ontario (MTO)

Masonry Cracking¹:

- MC1. Hairline Cracks – Less than 0.1 mm wide.
- MC2. Narrow Cracks – Between 0.1 and 0.3 mm wide.
- MC3. Medium Cracks – Between 0.3 and 1.0 mm wide.
- MC4. Wide Cracks – Greater than 1.0 mm wide.

Masonry Splitting, Spalling and Disintegration¹:

- MS1. Light – Hairline cracking and minor loss of stone surface with loss of section up to 50 mm.
- MS2. Medium – Considerable damage with 5% to 10% Section loss.
- MS3. Severe – Significant damage with 10% to 20% Section loss.
- MS4. Very Severe – Extensive damage with section loss in excess of 20%.

Mortar Deterioration

- MD1. Light – Mortar lost from the joints in a few places, to a depth of 10 mm.
- MD2. Medium - Mortar lost from the joints in a few places, to a depth of 20 mm
- MD3. Severe – Mortar lost from the joints over an extended area, to a depth between 20 and 50 mm.
- MD4. Very Severe – Extensive loss of mortar resulting in the loss of a few stones.

Concrete Scaling¹:

- CSc1. Light - Loss of surface mortar to a depth of up to 5 mm without exposure of coarse aggregate.
- CSc2. Medium - Loss of surface mortar to a depth of 6 to 10 mm with exposure of some coarse aggregates.
- CSc3. Severe - Loss of surface mortar to a depth of 11 mm to 20 mm with aggregate particles standing out from the concrete and a few completely lost.
- CSc4. Very severe - Loss of surface mortar and aggregate particles to a depth greater than 20 mm.

Concrete Spalling¹:

- CSp1. Light - Spalled area measuring less than 150 mm in any direction or less than 25 mm in depth.
- CSp2. Medium - Spalled area measuring between 150 mm to 300 mm in any direction or between 25 mm and 50 mm in depth.
- CSp3. Severe - Spalled area measuring between 300 mm to 600 mm in any direction or between 50 mm and 100 mm in depth.
- CSp4. Very Severe - Spalled area measuring more than 600 mm in any direction or greater than 100 mm in depth.

Concrete Delamination¹:

- CD1. Light - Delaminated area measuring less than 150 mm in any direction.
- CD2. Medium - Delaminated area measuring 150 mm to 300 mm in any direction.
- CD3. Severe - Delaminated area measuring 300 mm to 600 mm in any direction.
- CD4. Very Severe - Delaminated area measuring more than 600 mm in any direction.

Concrete Cracking¹:

- CC1. Hairline Cracks – Less than 0.1 mm wide.
- CC2. Narrow Cracks – Between 0.1 and 0.3 mm wide.
- CC3. Medium Cracks – Between 0.3 and 1.0 mm wide.
- CC4. Wide Cracks – Greater than 1.0 mm wide.

¹ Adapted from “Ontario Structure Inspection Manual (OSIM), 2000 (Rev. 2008)” by the Ministry of Transportation Ontario (MTO)

Corrosion of Reinforcement¹:

- CR1. Light - Light rust stain on the concrete surface
- CR2. Medium - Exposed reinforcement with uniform light rust. Loss of reinforcing steel section less than 10%
- CR3. Severe - Exposed reinforcement with heavy rusting and localized pitting. Loss of reinforcing steel section between 10% and 20%
- CR4. Very severe - Exposed reinforcement with very heavy rusting and pitting. Loss of reinforcing steel section over 20%.

Immediate remedial action¹: these are items that present an immediate structural and/or safety hazards (falling objects, tripping hazards, full or partial collapse, etc.). The remedial recommendations will need to be implemented immediately and may include restricting access, temporary shoring/supports or removing the hazard.

Priority remedial action¹: these are items that do not present an immediate hazard but still require action in an expedited manner. The postponement of these items will likely result in the further degradation of the structural systems and finishes. This may include interim repairs, further investigations, etc. and are broken down into timelines as follows:

1. **Short-term:** it is recommended that items listed as short-term remedial action are acted on within the next 6 months (before the onset of the next winter season).
2. **Medium-term:** it is recommended that items listed as medium-term remedial action are acted on within the next 24 months.
3. **Long-term:** it is recommended that items listed as long-term remedial action are acted on within the next 5-10 years. Many of these items include recommendations of further review/investigation.

Routine maintenance¹: these are items that can be performed as part of a regularly scheduled maintenance program.

¹ Adapted from "Structural Condition Assessment", 2005, American Society of Civil Engineers/Structural Engineering Institute