Cultural Heritage Evaluation Report (CHER)
Old Shiloh Bridge on Old Shiloh Road (Concession Road 2)
(Geographic Township of Georgina)
York Region

Submitted to

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EXECUTIVE SUMMARY

This report describes the results of the 2023 Cultural Heritage Evaluation Report (CHER) of Old Shiloh Road bridge carrying Old Shiloh Road over Pefferlaw Brook, Concession 2 (Geographic Township of Georgina), County of York, conducted by AMICK Consultants Limited. This investigation was undertaken as part of an Environmental Assessment process with respect to proposed improvements to the crossing at this location. All work was conducted in conformity with the Ontario Heritage Act (OHA) (RSO 2005). Old Shiloh Road bridge was evaluated using the Act's Regulation 9/06: Criteria for Determining Cultural Heritage Value or Interest.

The existing Town of Georgina's Old Shiloh Road Bridge is an early and idiosyncratic example of a very common built form throughout the province. This bridge does meet the criteria set forth in O. Reg. 9/06: Criteria for Determining Cultural Heritage Value or Interest. The primary reasons for this determination are that it is a rare or unique example of a bridge structure, and it may express or reflect the work or ideas of a specific designer that has been executed in an idiosyncratic fashion by another builder. In addition, this bridge has previously been identified as a structure of cultural heritage value and significance within Arch, Truss, and Beam: The Grand River Watershed Heritage Bridge Inventory (Benjamin et al. 2013). Accordingly, a Heritage Impact Assessment (HIA) was completed. As the bridge is a reinforced concrete structure that has surpassed the serviceable life of concrete as a viable engineering material, there is little option but to replace the bridge.

Given this evaluation of the structure, the following recommendations should be considered and implemented:

1) This report should be filed with the Town of Georgina.
2) This report should be filed with the Ministry of Citizenship and Multiculturalism for review and comment.
3) Due to the significance of this bridge an HIA is recommended.

1.0 INTRODUCTION

This report describes the results of the 2023 Cultural Heritage Evaluation Report (CHER) of Old Shiloh Road bridge carrying Old Shiloh Road over Pefferlaw Brook, Concession 2 (Geographic Township of Georgina), County of York, conducted by AMICK Consultants Limited. This investigation was undertaken as part of an Environmental Assessment process with respect to proposed improvements to the crossing at this location. All work was conducted in conformity with the Ontario Heritage Act (OHA) (RSO 2005). Old Shiloh Road bridge was evaluated using the Act's Regulation 9/06: Criteria for Determining Cultural Heritage Value or Interest.

Under the municipal Class EA criteria Old Shiloh Road bridge meets the criterion of being over 40 years old and as such, the Ontario Ministry of Citizenship and Multiculturalism (MCM) considers that the bridge may have cultural heritage value. Therefore, a cultural heritage evaluation prepared by a qualified heritage consultant is required for this project. This report has been prepared to address this requirement. The proponent is advised that they should file this report with the MCM for the purpose of review by MCM Heritage Planning Staff. AMICK Consultants Limited was engaged by the proponent to undertake this study on 18 January 2022.

2.0 LOCATION AND DESCRIPTION

The Old Shiloh Road bridge is located over the Pefferlaw Brook and is located approximately 750 meters west of the Town of Udora, (Geographic Township of Georgina) York Region. The location of the bridge is illustrated in Figure 1 of this report. This report consists of a CHER for the Old Shiloh Road bridge over Pefferlaw Brook as part of a bridge replacement and rehabilitation project. The bridge is located within the Lake Simcoe Region Conservation Authority (LSRCA) regulated area.

The existing bridge is a single span cast-in-place concrete bowstring arch structure which carries Old Shiloh Road over a Pefferlaw Brook and was constructed in 1925.

In 2020, a bridge condition survey was undertaken as per the Ontario Structural Inspection Manual (OSIM) that indicated the bridge was approaching the end of its lifecycle and recommended that planning should commence for its replacement (Georgina.ca, 2022b).

The Bridge is a single-lane, concrete bowstring arch structure on conventional closed abutments. There are four wing walls extending beyond the bridge to provide roadside stability. There are four concrete pilasters located at each of the four corners of the structure. The structure was built in 1925 and has a deck length of 24 metres. The travel width is 5.2 metres between barriers and the overall structure width is 6.5 m. Concrete barriers are located on each side of the structure and form part of the overall arch system. Each of the two arches is tied to the deck at each end and through the use of four evenly spaced vertical columns. This configuration classifies the structure as a single load path

structure, which means that if the railings were significantly damaged it, could result in total bridge failure. The existing bridge may not meet current road or bridge safety standards and may be operating beyond its expected lifespan.

In order to address the deteriorating condition of the bridge a number of alternatives are being considered. The Town, at a minimum, sees the list below as potential alternatives:
1. Do nothing;
2. Rehabilitate the existing bridge:
3. Remove and replace the bridge: and
4. Construct a new bridge adjacent to the existing bridge.

The Town of Georgina is commencing a Municipal Class Environmental Assessment under the Environmental Assessment Act to determine the preferred method of improvement to Old Shiloh Road bridge. The goal is to determine the recommended alternative for the future of the structure and alternatives for the water crossing on Old Shiloh Road (Georgina.ca, 2022).

3.0 CULTURAL HERITAGE EVALUATION

3.1 Overview of Local Historical Context

3.1.1 Euro-Canadian Settlement

North of Lake Ontario, evidence suggests that early occupation began around 9000 B.C. People probably began to move into this area as the glaciers retreated and glacial lake levels began to recede. The early occupation of the area probably occurred in conjunction with environmental conditions that would be comparable to modern Sub-Arctic conditions. Due to the great antiquity of these sites, and the relatively small populations likely involved, evidence of these early inhabitants is sparse and generally limited to tools produced from stone or to by-products of the manufacture of these implements.

York County's boundaries were originally from Lake Ontario to Lake Simcoe, until 1834. The County of York was originally comprised of ten townships and the Town of York (now Toronto) until Toronto separated and incorporated in 1834 (Town of Whitchurch-Stouffville, 2010).

The present-day Town of Georgina was created through the amalgamation of the Township of Georgina and the Township of North Gwillimbury in 1971. The largest of the communities now within the Town of Georgina were Keswick and Sutton. Keswick was once known as Medina and is the largest urban community within the Town of Georgina. Keswick was originally a village in the Township of North Gwillimbury before amalgamation with Sutton to form the Town of Georgina. Sutton was originally a mill site named Bouchier Mills in honour of the builder of the dam on the Black River which was constructed in 1831. In 1864 the village name was changed to Sutton (Town of Georgina 2012).

3.1.2 The Old Shiloh Road Bridge over Pefferlaw Brook

The existing bridge is a single span cast-in-place concrete bowstring arch structure which carries Old Shiloh Road over Pefferlaw Brook. This bridge is an increasingly rare example of a concrete rainbow (through) arch bridge, often called a concrete bowstring bridge. A very beautiful and graceful structure type, a number of these bridges were built throughout Ontario. This one retains good historic integrity including original railings.

A field review was undertaken by Michael Henry on 17 January 2023 to conduct photographic documentation of the bridge crossing and to collect data relevant for completing a heritage evaluation of the structure. Results of the field review were then utilized to describe the existing conditions of the bridge crossing. This section provides a general description of the bridge crossing and associated cultural heritage features.

The rural context of the bridge suggests that the erection of this bridge was likely in response to the proliferation of automotive traffic and mechanized farm machinery in the early 20th century. The selection of a concrete arch construction in preference to a steel truss bridge was probably made on the basis of a perceived need for added strength.

Historically, the bridge is situated along an early settlement road. Given the settlement history of the area and that this bridge was constructed in 1925, there was likely at least one previous crossing at this location. Figure 2 shows the bridge location today superimposed on a Historic County map of 1860. Figure 3 shows the bridge location today superimposed on a Historic Atlas map of 1878. Research into this likelihood has not resulted in the location of further information on the history of the crossing itself.

3.1.3 Overview of Ontario Bridge Construction History

The history of settlement in Ontario is inextricably tied to the history or the development of overland transportation. As David Cuming notes in his Discovering Heritage Bridges on Ontario Roads (n.d.: 31). "Ontario with its myriad of rivers, creeks, streams and lakes has resulted in a substantial number of minor barriers to communication". As a result, bridges have always formed a significant component of overland transportation and communication routes. The first major roads in Ontario followed settlement by the United Empire Loyalists after the American War of Independence. These early roads were built for strategic military purposes but soon attracted settlement along these routes. Subsequent road construction, whether built by government agencies or private concerns also served to attract settlement and initial settlement promoted construction of further roadways as settlement moved inland from the Great Lakes and the initial transportation corridors (Cuming n.d.: 32).

Bridges were a necessity from the earliest days of road construction. The earliest bridges consisted of nothing more than two parallel logs stretching from one bank to the other with logs overlying these at a right angle. These bridges could be easily and quickly replaced as they rotted or should they be swept away by floodwaters or ice flows (Cuming n.d.: 32).

Bridges needed to cover larger spans were constructed by early settlers based on principles employed in the construction of early houses and barns. Truss systems used in the framing of structures were employed. Two such standard bridge types emerged fairly early on: the King Truss Bridge and the Queen Truss Bridge. The King Truss was built by setting a vertical beam supported by two inclined beams midway along a horizontal beam. The King Truss Bridge could span a gap of up to sixty (60) feet. The Queen truss system was employed for wider spans. This bridge was constructed with two vertical beams supported by one inclined beam for each and joined by a horizontal top beam. The Queen Truss Bridge could span a gap of up to one hundred and twenty (120) feet (Cuming n.d.: 35).

In the years between 1841 and 1849, the Department of Public Works spent $1,300,564 on roads in Canada West, including the construction of forty-three major bridges at a total cost of $206,928. A full third of these bridges were timber-built Queen Truss Bridges. During this same period numerous bridge designs were patented in the United States under fierce competition to increase the length and strength of bridges. As a result, bridge construction in North America began a period of transition from wood to metal structures (Cuming n.d.: 36).

Many road bridge designs that evolved were based on principles derived from railroad construction. Other designs that had a major impact on bridge engineering evolved independently. The Whipple Truss was first built in 1841. This new design consisted of a totally metal bowstring arch bridge. The arch of the bridge and the vertical supporting members were manufactured of cast iron while the diagonal bracing used wrought iron. The typical bridge built in the middle of the 19th century in the United States was entirely made of wrought iron (Cuming n.d.: 37). In Ontario the timber bridge dominated the landscape in rural areas from 1780-1880 and persisted into the early twentieth century. Wrought iron bridges were built in areas with higher population densities such as the thriving market towns of Brantford, Peterborough, London, and Paris. These communities all had wrought iron bridges that were constructed during the 1870s (Cuming n.d.: 38).

Metal bridges were sold in separate components produced in factories and shipped to the location of construction and assembled on site. Bridge components were ordered through catalogues. To simplify construction, the first metal bridges were assembled using "pin connections," which were essentially threaded bolts that obviated the need for specialists or specialized equipment such as rivets required. Construction of such bridges could be completed with unskilled local labour in two to three weeks. These bridges were ideally suited to bridge construction in small communities or rural contexts (Cuming n.d.: 38).

Beginning in the 1880s, designers began to replace wrought iron elements in bridges with steel. This marked the beginning of a transition from wrought iron to steel bridges (Cuming n.d.: 41). Several factors contributed to the rapid development and proliferation of steel bridges at the beginning of the twentieth century. Portable pneumatic tools allowed for the use of rivets on even rural sites of bridge construction and pin

connections rapidly disappeared. Rivets allowed for longer and sturdier construction. New production methods made steel as cheap as wrought iron. The concurrent developments in heavier vehicle and agricultural machinery required bridges capable of taking heavier loads which made construction of timber bridges impractical even in rural areas. "Through truss" style construction was employed over larger spans or in locations where traffic loads were heavy. Steel bridges were erected in quantity throughout Ontario following 1900 (Cuming n.d.: 42). The improvement in highway and bridge construction was particularly notable following the end of the First World War, with massive increases in automobile traffic and the development of heavy construction machinery (Cuming n.d.: 51-53).

Experimentation with reinforced concrete bridge construction began in the 1880s in France, followed by the United States. The first concrete arch bridge was constructed in Ontario in 1905 and was comprised of mass concrete. The first steel reinforced bridge was constructed in 1906. The appeal of reinforced concrete as a construction technology stemmed from its great strength, length of use and low maintenance requirements compared to steel or iron which required regular painting and rust removal (Cuming n.d.: 44). The strength of a reinforced tied concrete arch above the deck was early recognized as a design suitable for almost any location, particularly in crossings with low banks where arched construction below the deck was unsuitable (Cuming n.d.: 47). By 1914 it was clear that concrete would dominate the construction of bridges for the future (Cuming n.d.: 49). Concrete bridge construction of two types, the tied arch and the concrete beam, boomed in the 1920s (Cuming n.d.: 51).

In the 1930s a new innovation in bridge design challenged more traditional arched designs. The rigid frame reinforced concrete bridge employed a shallow arch below the deck and could be easily widened to accommodate demands of growing traffic pressures. This was a major advantage over earlier bridge designs such as the tied arch for which such an alteration was impossible (Cuming n.d.: 52).

Conde McCullough achieved his reputation in bridge engineering largely due to his facility for recognizing cost-effective designs based on long-term maintenance costs. His Economics of Bridge Design was a well-received treatise on this subject when published in 1929. This promoted the rise of composite bridge construction during the Depression years of the 1930s. Composite design using steel, wood, and concrete arose; each material has individual strengths and weaknesses for use in bridge design. These range from weight capacity, durability, and, of course, cost.

The nature of materials often leads to their combination in bridge construction, where steel deck girders support a concrete floor or a timber bridge that rests upon a steel or concrete series of piers or abutments. These structures are referred to as "composite" design and by and large most bridges utilize more than a single material, if only for the wearing surface of the roadbed. For purposes of categorization their primary material, usually in reference to the structural support system, classifies bridges. As a result, a steel beam bridge with laminated wood deck and concrete piers is deemed a steel beam bridge.

Slab, beam, and girder bridges are essentially similar and related designs, building upon the same basic structural principle, with a single member in tension that spans a void between two fixed points. Structurally a "slab" is the simplest, relying solely upon the inherent strength of a single member for both structure and road surface. A beam bridge is, in essence, a slab (the road deck) that is additionally strengthened by some number of longitudinal members. A girder bridge is a beam bridge with additional transverse supports between the beams (Kramer 2004: 7). Beam and Girder bridge types introduced in the 1930s remained in use throughout the post WWII period (Kramer 2004: 25).

Steel as used in composite bridge construction can be divided into two basic categories that reflect temporal advances in construction technology — rolled section beams versus the later use of welded members. Rolled sections refer to "H" or "I" or other shapes that are manufactured whole (the earlier of the technologies). Welded section beams are made of flat plates, welded into various shapes.

3.2 Heritage Legislative Requirements

Within the Province of Ontario there are a number of legislative requirements which necessitate the consideration of potential heritage features during the planning process.

1. The provincial interest in cultural heritage and the conservation of heritage resources is articulated in the Ontario Heritage Act (RSO 2005). This legislation provides the legislative framework for the conservation of Ontario's heritage.
2. Heritage resource conservation is also identified as a provincial interest within the Provincial Policy Statement (2014).
3. Heritage resource conservation is also identified as a provincial interest within the Planning Act (RSO 1990a).
4. Heritage resource conservation is also identified as a provincial interest within the Environmental Assessment Act (RSO 1990b). This legislation considers cultural and built components to be integral elements of the environment. The impact of proposed undertakings to cultural heritage resources must be addressed as part of the standard environmental assessment process in the Province of Ontario.
5. The Public Transportation and Highway Improvement Act (RSO 1990c) and Ontario Regulation 104/97 address the design, construction, and maintenance of bridges.

In partnership with other provinces, territories and the federal government, Ontario is also a participant in the Historic Places Initiative, which is a national program to encourage heritage conservation across Canada.

3.3 Municipal Planning Policy Context

The Town of Georgina and York Region encourages the protection and conservation of cultural heritage features.

3.3.2 Municipal Consultation

Community engagement and consultation was undertaken as a standard procedure within the Environmental Assessment (EA) process.

3.4 Criteria for Determining Cultural Heritage Value or Interest

The pace of development over the past two decades and projected ongoing development, places many potential heritage bridges under threat. Although most evidence of landscape changes can be seen in the expansion of established communities, the increase in population and commercial activities in these centres results in a greater volume of traffic on regional roads which necessitates improvements to the overall road network. The need for improvements in overland communication and shipping routes has required, and will continue to require, improvements to roadways and associated water crossings.

O. Reg. 9/06: Criteria for Determining Cultural Heritage Value or Interest establishes the criteria by which all types of cultural heritage resources are evaluated:

"1. The property has design value or physical value because it,
   i. is a rare, unique, representative, or early example of a style, type, expression, material, or construction method,
   ii. displays a high degree of craftsmanship or artistic merit, or
   iii. demonstrates a high degree of technical or scientific achievement.

2. The property has historical value or associative value because it,
   i. has direct associations with a theme, event, belief, person, activity, organization, or institution that is significant to a community,
   ii. yields, or has the potential to yield, information that contributes to an understanding of a community or culture, or
   iii. demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.

3. The property has contextual value because it,
   i. is important in defining, maintaining, or supporting the character of an area,
   ii. is physically, functionally, visually, or historically linked to its surroundings, or
   iii. is a landmark. O. Reg. 9/06, s. 1 (2)."

3.5 Cultural Heritage Evaluation of Town of Georgina Old Shiloh Bridge Road

A property is generally considered to be of cultural heritage value or interest if it meets one or more of the criteria set forth under O. Reg. 9/06. The Old Shiloh Road bridge over Pefferlaw Brook has been evaluated against the three main criteria and their various

subsets. The results are described in the following table and descriptive sections:

Design or Physical Value	
is a rare, unique, representative, or early example of a style, type, expression, material, or construction method	Yes
displays a high degree of craftsmanship or artistic merit	No
demonstrates a high degree of technical or scientific achievement	No
Historical or Associative Value	
has direct associations with a theme, event, belief, person, activity, organization, or institution that is significant to a community,	No
yields, or has the potential to yield information that contributes to an understanding of a community or culture, or	No
demonstrates or reflects the work or ideas of an architect, artist, builder, designer, or theorist who is significant to a community.	Yes
Contextual Value	
is important in defining, maintaining, or supporting the character of an area,	No
is physically, functionally, visually, or historically linked to its surroundings, or	No
is a landmark.	Yes

3.5.1 Design or Physical Value

The Old Shiloh Road bridge is a simple single span reinforced concrete bowstring arch bridge, constructed in 1925. The structure is typical of the cast in place concrete bowstring arch type. It has not undergone any significant modifications since construction and shows signs of age through weathering and accumulated damage through time. It does not demonstrate a high degree of either craftsmanship or of scientific achievement. It is the only bridge of its kind in York Region.

3.5.2 Historical or Associative Value

As above, the Old Shiloh Road bridge is a simple single span reinforced concrete bowstring arch bridge, constructed in 1925. The structure is typical of the cast in place concrete bowstring arch type. It has not undergone any significant modifications since construction and shows signs of age through weathering and accumulated damage through time. It does not demonstrate a high degree of either craftsmanship or of scientific achievement. It is the only bridge of its kind in York Region.

3.5.3 Contextual Value

The bridge is physically linked to its surroundings as a bridge that was constructed in-situ at this location at a long-established brook crossing. The bridge is functionally linked to its surroundings as a component of the rural road system and road network that has existed since at least the middle of the 19th century. This does suggest that this location and the associated crossing represents a landmark feature. However, as a rare example of a once common built form, this bridge has become a landmark feature owing to its distinctive character in contrast with other local and regional bridges.

3.5.4 Cultural Heritage Value

The revised procedures set out in the Municipal Class Environmental Assessment, October 2007 and in the amendment approved on August 17, 2011, by the Ontario Minister of the Environment and described in Section 1.2 advise that if the property meets the criteria in Ontario Regulation 9/06, pursuant to the Ontario Heritage Act, it is considered to be a cultural heritage resource.

Town of Georgina Old Shiloh Road bridge meets some of the criteria outlined in Regulation 9/06 of the Ontario Heritage Act. The bridge is a representative early example of concrete bowstring arch design. This built form was once common throughout Waterloo and Wellington Counties. However, this bridge is now a rare survivor of this once common form. The design is also associated with an early concrete bridge design firm known for constructing numerous bridges within the Grand River watershed.

The bridge meets criteria for associative and contextual value but meets them in ways that are not specific to the design or materials of the bridge itself or of the specific community's history. Any bridge structure at the site could contribute to the theme of rural transportation and be physically, functionally, historically, or visually linked to its surroundings. In this respect, a newly constructed bridge at this location would serve the precise function as does the existing bridge since in some respects, the location and not the nature of the bridge addresses these criteria at least in a partial way.

Given that the bridge is now a quite rare example of an early and introductory design in the use of reinforced concrete as the primary construction material for bridges, this bridge does have cultural heritage value or interest and a Heritage Impact Assessment must be completed.

3.6 Statement of Cultural Heritage Value or Interest

The above evaluation confirms that the Old Shiloh Road bridge meets at least one of the criteria contained in Regulation 9/06 of the Ontario Heritage Act. It has historic value as a local landmark that commemorates the establishment and growth of several prominent industries and the transportation networks that served population growth and commerce on land and water.

Accordingly, the Old Shiloh Road bridge is found to have further cultural heritage value based on criteria set forth in O. Reg. 9/06: Criteria for Determining Cultural Heritage Value or Interest.

4.0 HERITAGE IMPACT ASSESSMENT

Under the criteria set forth in O. Reg. 9/06, the Old Shiloh Road bridge is considered to represent a cultural heritage resource with cultural heritage value or interest (CHVI). Therefore, a Heritage Impact Assessment is required.

5.0 CONCLUSIONS & RECOMMENDATIONS

The existing Town of Georgina Old Shiloh Road bridge is an early and idiosyncratic example of a very common built form throughout the province. This bridge does meet the criteria set forth in O. Reg. 9/06: Criteria for Determining Cultural Heritage Value or Interest. The primary reasons for this determination are that it is a rare or unique example of a bridge structure, and it may express or reflect the work or ideas of a specific designer that has been executed in an idiosyncratic fashion by another builder. As the bridge is a reinforced concrete structure that has surpassed the serviceable life of concrete as a viable engineering material, there is little option but to replace the bridge.

Given this evaluation of the structure, the following recommendations should be considered and implemented:

1) This report should be filed with the Town of Georgina.

2) This report should be filed with the Ministry of Citizenship and Multiculturalism for review and comment.

3) Due to the significance of this bridge an HIA is recommended.

6.0 REFERENCES CITED

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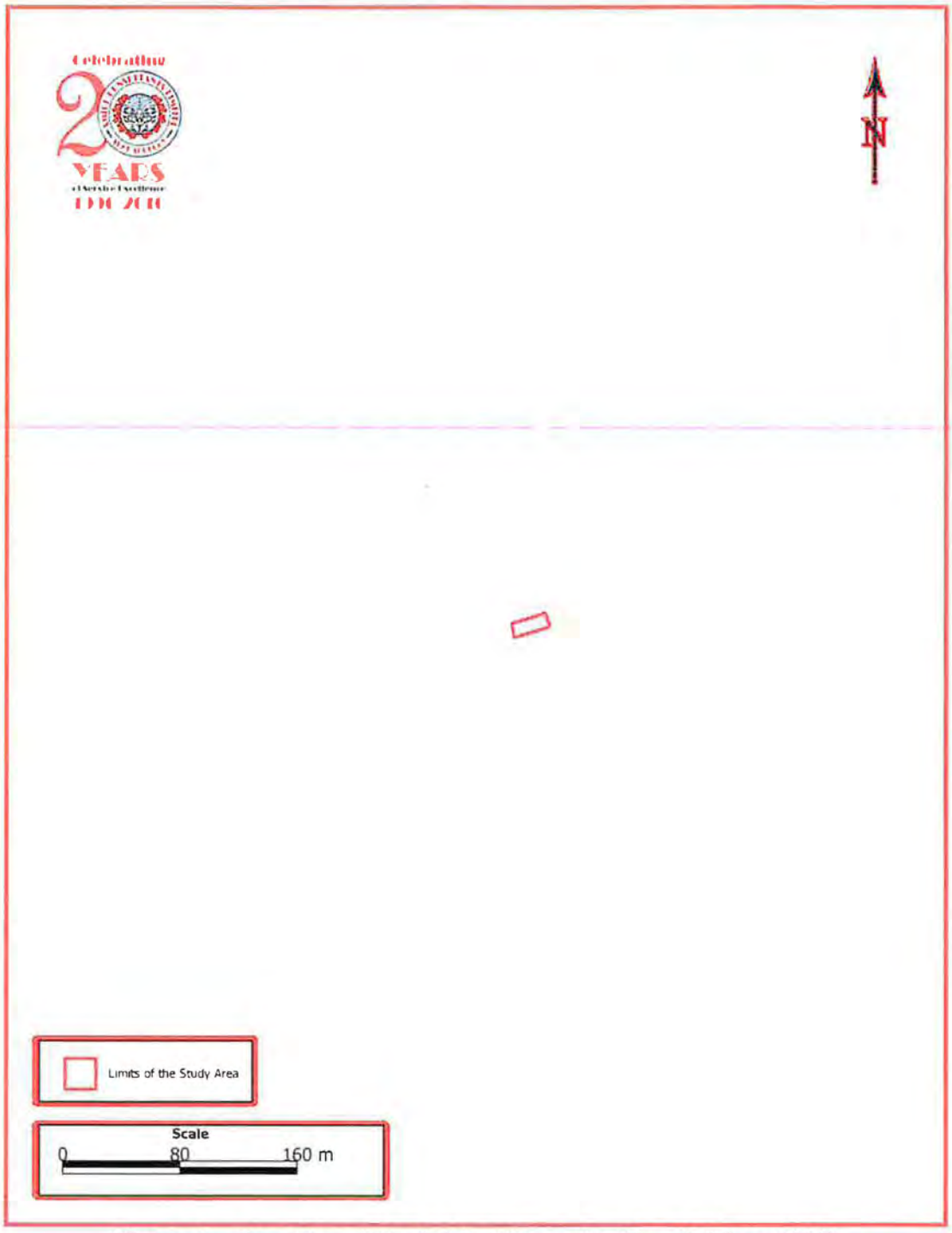

Figure 1 Location of the Subject Property (Google Maps 2020)

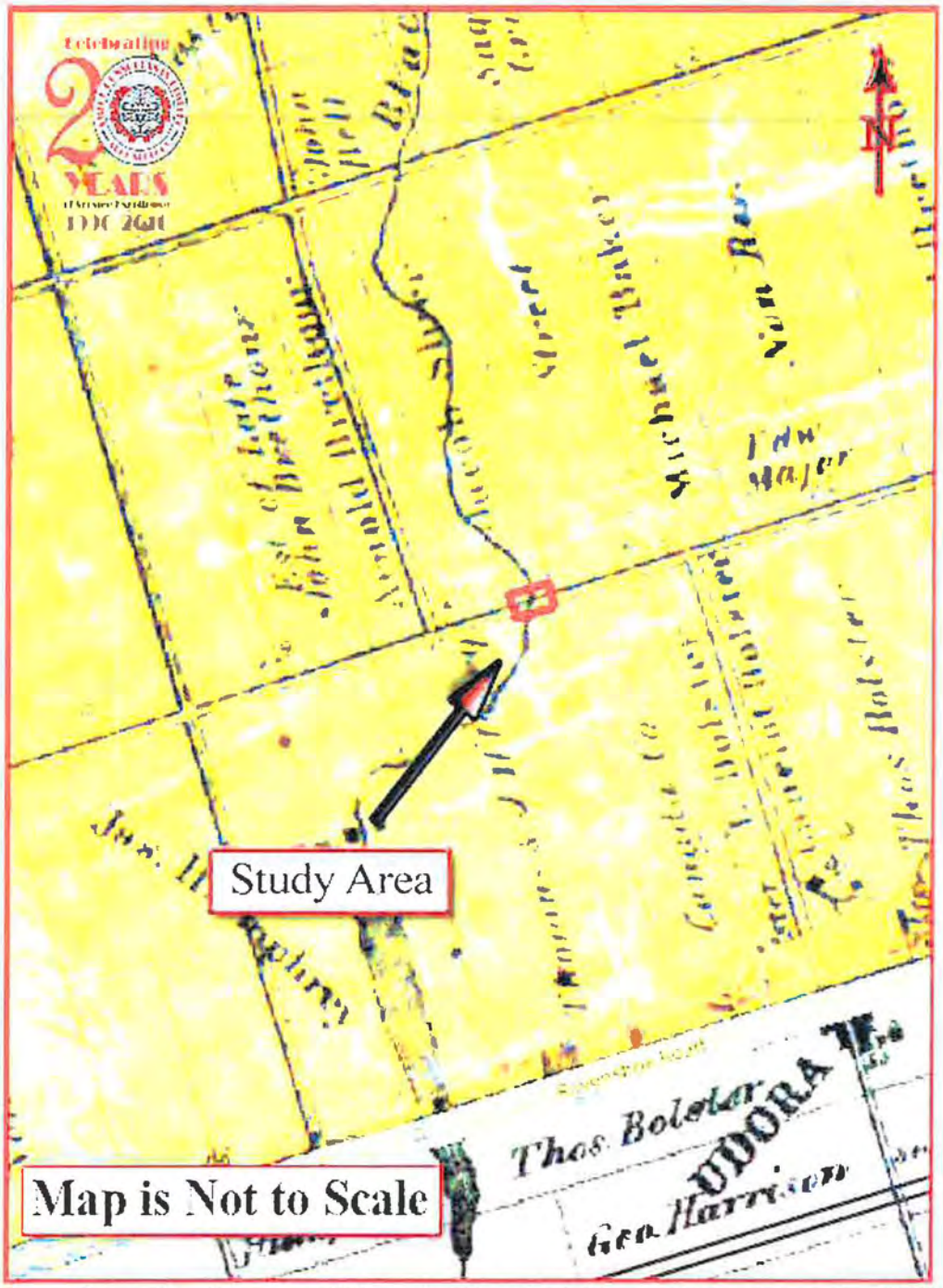

Figure 2 Segment of Ontario Historical County Maps (Tremaine 1860.)

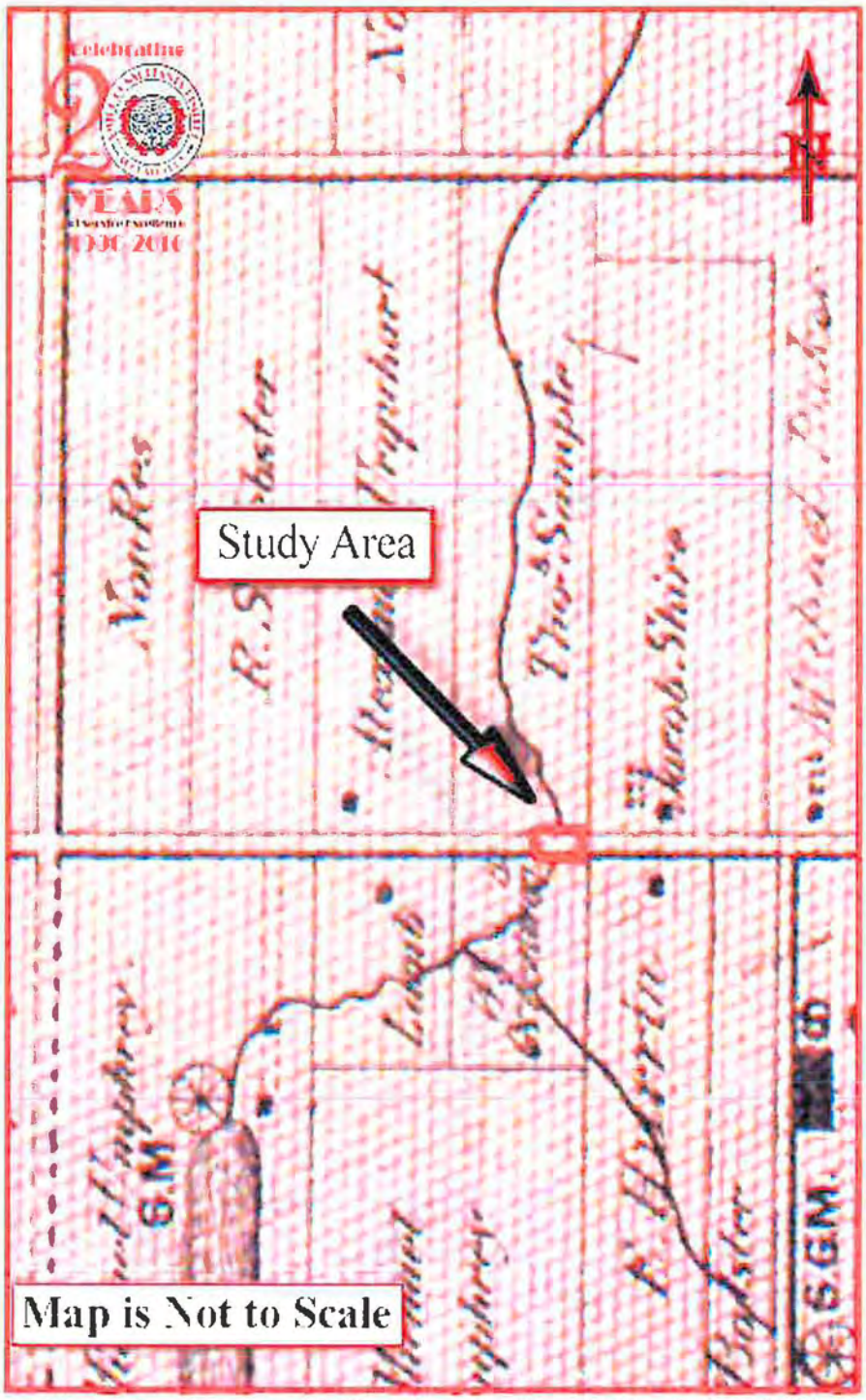

Figure 3 Segment of Historic Atlas Map (Miles & Co 1878.)

Plate 1 View of West Approach (Facing East)

Plate 2 View of East Approach (Facing West)

Plate 3 View of Deck (Facing Northwest)

Plate 4 View of the Eastern Side (Facing Southwest)

Plate 5 View of Deck (Facing West)

Plate 6 View of Pefferlaw Brook (Facing South)

Plate 7 View of Eastern Approach (Facing West)

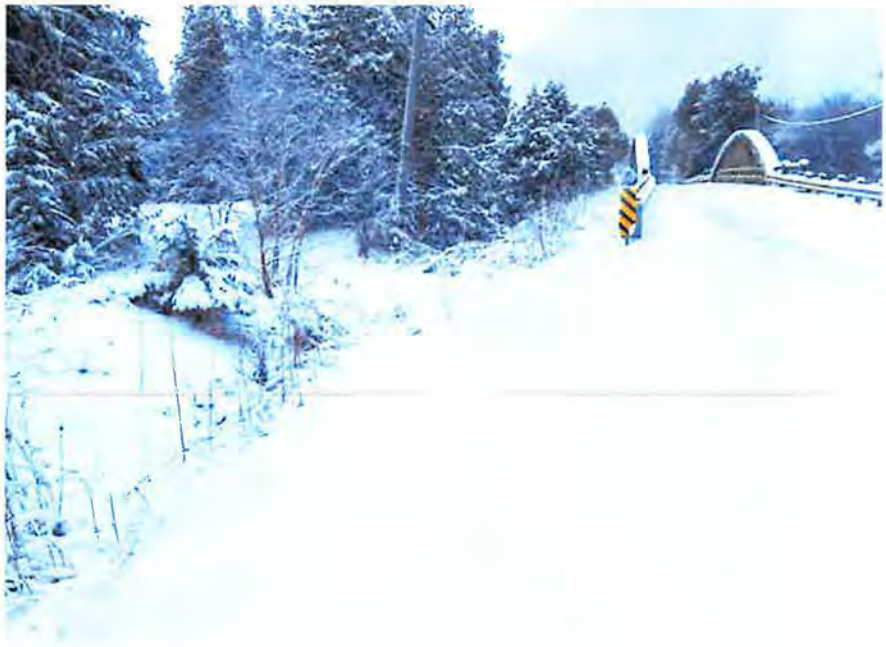

Plate 8 View of Western Approach (Facing East)

Plate 9 View of Pefferlaw Brook (Facing North)