Peninsula Heritage Ltd.

Archaeology & Built Heritage

Heritage Impact Assessment, Bridges 21-WG, 29-WG and 30-WG, Township of Centre Wellington, Ontario

Project Number: 2025-0014

Date: June 30, 2025

Prepared For: RJ Burnside & Associates Ltd.

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Client Address: 3 Ronell Crescent, Collingwood, Ontario, L9Y 4J6

1.0 Executive Summary

Peninsula Heritage Ltd. (Peninsula Heritage) was retained by R.J. Burnside & Associates Limited (R.J. Burnside) to undertake a Heritage Impact Assessment (HIA), on behalf of the Township of Centre Wellington (the Proponent) for bridges 21-WG, 29-WG, and 30-WG. The bridges are all associated with Irvine Creek, with Bridge 21-WG being located on First Line, and Bridges 29-WG and 30-WG being located on Sideroad 15. Bridges 21-WG and 30-WG have been closed to vehicular traffic. Bridge 29-WG remains open to vehicular traffic but has a weight limit and height restriction in place. A Cultural Heritage Evaluation Report (CHER) identified all three bridges to exhibit cultural heritage value or interest (CHVI) under Ontario Regulation (O. Reg.) 9/06 (as amended by O. Reg. 569/22) (Peninsula Heritage 2025).

The purpose of the HIA is to review the identified CHVI of the bridges (Peninsula Heritage 2025), evaluate potential direct and indirect impacts to the bridge based on the proposed changes, and recommended mitigation measures aimed at reducing impacts to the identified CHVI of the bridges. The Proponent is exploring options for the potential rehabilitation, replacement, or closure and removal of the specified bridges under the Municipal Class Environmental Assessment (MCEA) process.

The evaluation of potential direct and indirect impacts to all three bridges through the proposed removal, rehabilitation, or replacement options found that proposed removal of each bridge would result in the loss of physical heritage attributes and lead to impacts to the view toward the bridges. Proposed rehabilitation of each bridge is anticipated to result in minimal to no impacts to the physical heritage attributes of the bridges (pending final design plans). The evaluation of impacts found proposed replacement would result in the loss of the physical heritage attributes of each bridge and may also lead to impacts to the view towards the bridge (pending final design).

Bridges 21-WG, 29-WG, and 30-WG are visually appealing and largely retain their as-built forms. As such, the bridges reflect the design and style of a past time and contribute to the rural agricultural landscape of the area. As such, the following recommendations are made for bridges 21-WG, 29-WG, and 30-WG, based on the options for improvements being considered as part of study:

1.1 Removal

1. The CHER and HIA reports be provided to local historical societies, libraries, and the municipal archives, at the discretion of the Township of Centre Wellington.

1.2 Rehabilitation

1. Rehabilitation of the bridge(s) in their current form allows for the retention of all identified heritage attributes, but bridges 21-WG, 29-WG, and 30-WG can be considered to be in a state of which “the safety of the existing structure is compromised to the extent that rehabilitation is not a practical option” and “replacement is required to meet demand requirements that are not achievable through rehabilitation or upgrading of the existing structure” (MTO 2008).

2. If rehabilitation is pursued, all efforts be made to retain physical heritage attributes.
3. If rehabilitation is pursued, the Township consider Designation of the bridge(s) under Part IV of the Ontario Heritage Act.
4. The CHER and HIA reports be provided to local historical societies, libraries, and the municipal archives, at the discretion of the Township of Centre Wellington.

1.3 Replacement

1. Any replacement of bridges 21-WG and 29-WG be designed to reflect the existing "bowstring arch" design, thereby providing a conservation measure for the identified physical heritage attributes. Examples of bridge replacements where this conservation approach was utilized by the Township of Centre Wellington are provided in Figures 47 to 49.
2. An interpretive plaque be affixed to the replacement bridges for 21-WG and 29-WG to identify the original bridge (see Figure 47), thereby providing a conservation measure for the identified historical and contextual value. The plaque should reference the Designated bowstring arch bridge on Irvine Street, and a physical example. For bridge 29-WG, consideration should be given to the salvage of concrete pieces where bridge workers names are inscribed, with these pieces either incorporated into the new bridge design, or incorporated into a commemoration of the bridge.
3. Any replacement of bridge 30-WG be designed to consider incorporation an imprint of the original through-truss design, similar to what the Township of Centre Wellington has already accomplished with replacement bowstring arch bridges.
4. An interpretive plaque be affixed to the replacement bridge for 30-WG to identify the original bridge, thereby providing a conservation measure for the identified historical and contextual value.
5. The CHER and HIA reports be provided to local historical societies, libraries, and the municipal archives, at the discretion of the Township of Centre Wellington.

The *Provincial Planning Statement* (2024) notes that CHVI is identified for cultural heritage resources by communities. Thus, the system by which heritage is administered in Ontario places emphasis on the decision-making of local municipalities regarding matters of heritage. It is hoped that the information presented in this report will be useful in decisions pertaining to the bridge.

2.0 Table of Contents

1.0 Executive Summary 1
1.1 Removal 1
1.2 Rehabilitation 1
1.3 Replacement 2
2.0 Table of Contents 3
3.0 Personnel 6
Acknowledgements 6
4.0 Project Context 7
4.1 Site Description and Context 7
4.2 Client Contact Information 8
5.0 Legislative and Policy Framework 11
5.1 Provincial Legislation and Policy 11
5.1.1 Ontario Heritage Act (OHA), Revised July 1, 2024 11
5.1.2 Planning Act, Revised July 1, 2024 11
5.1.3 Provincial Planning Statement 12
5.1.4 Municipal Class Environmental Assessment (MCEA) Manual (2023) 13
5.2 Municipal Policies 14
5.2.1 Township of Centre Wellington Official Plan 14
5.2.2 County of Wellington Official Plan 14
6.0 Existing Conditions Review 17
6.1 Bridge 21-WG 17
6.1.1 Design and Construction 17
6.1.2 Current Condition 17
6.1.3 Documentation 18
6.2 Bridge 29-WG 26
6.2.1 Design and Construction 26
6.2.2 Current Condition 27
6.2.3 Documentation 28
6.3 Bridge 30-WG 34
6.3.1 Design and Construction 34
6.3.2 Current Condition 35
6.3.3 Documentation 36
7.0 CHVI Review 45
7.1 Bridge 21-WG 45
7.2 Bridge 21-WG Draft Statement of Cultural Heritage Value 45
7.3 Bridge 29-WG 46
7.4 Bridge 29-WG Draft Statement of Cultural Heritage Value 46
7.5 Bridge 30-WG 47
7.6 Bridge 30-WG Draft Statement of Cultural Heritage Value 47
8.0 Heritage Impact Assessment 48
8.1 Bridge 21-WG 48
8.1.1 Description of Proposed Work 48
8.1.2 Potential Direct and Indirect Impacts 48

8.2 Bridge 29-WG 49
8.2.1 Description of Proposed Work 49
8.2.2 Potential Direct and Indirect Impacts 50
8.3 Bridge 30-WG 51
8.3.1 Description of Proposed Work 51
8.3.2 Potential Direct and Indirect Impacts 52
9.0 Mitigation Options and Recommendations 54
9.1 Recommendations 57
9.1.1 Removal 57
9.1.2 Rehabilitation 57
9.1.3 Replacement 58
10.0 Closure 59
11.0 References and Bibliography 60

Figures

Figure 1: Location of bridges 9
Figure 2: Location of bridges on aerial image 10
Figure 3: West side of Bridge 21-WG, looking east 18
Figure 4: East side of Bridge 21-WG, looking northwest 19
Figure 5: Northern approach to Bridge 21-WG, looking south 19
Figure 6: Southern approach to Bridge 21-WG, looking north 20
Figure 7: Western arch of Bridge 21-WG 20
Figure 8: Eastern arch of Bridge 21-WG 21
Figure 9: Underside of road deck of Bridge 21-WG and southern abutment 21
Figure 10: Underside of road deck of Bridge 21-WG and northern abutment 22
Figure 11: Typical example of abutment wing, note visible impressions of planking used in the forming process and the separations between lifts of concrete 22
Figure 12: Close up of detail cast into arch and associated supports and guardrail, west side 23
Figure 13: Close up of detail cast into arch and associated supports and guardrail, exterior of east side 23
Figure 14: Retrofit steel 'I' Beam used to replace original upper cord tie 24
Figure 15: Close up of typical recessed 'floret' cast into guard rail supports 24
Figure 16: Example of concrete spalling revealing underlying steel reinforcement material 25
Figure 17: Example of smooth round reinforcement bar used in construction of guardrails 25
Figure 18: Example of smooth square reinforcement bar used in vertical support members 26
Figure 19: Eastern approach to Bridge 29-WG, looking east 28
Figure 20: North side of Bridge 29-WG 28
Figure 21: Southside of Bridge 29-WG 29
Figure 22: West approach to Bridge 29-WG 29
Figure 23: Underside of Bridge 29-WG, note presence of imprints of original wood forms 30
Figure 24: Bridge deck 30
Figure 25: Example of connection between Bridge 29-WG abutments and superstructure 31
Figure 26: West bridge abutment 31
Figure 27: Original cast concrete tie beam 32
Figure 28: Typical example of the details present in the original guard rail and support structure 32
Figure 29: Focus on detail cast into arch and associated supports and guardrail, exterior of north side 33

Figure 30: Example of exfoliated concrete exposing underlying smooth steel reinforcement 33
Figure 31: Two names carved into the concrete, census records suggest both were labourers involved in the construction of Bridge 29-WG 34
Figure 32: South side of Bridge 30-WG 36
Figure 33: North side of Bridge 30-WG 37
Figure 34: Eastern end of bridge which has been subject to previous restoration, with major structural components having been replaced and fastened with bolts and nuts 37
Figure 35: Western approach to bridge which exhibits deformation due to past collision with heavy equipment 38
Figure 36: Side view of west end damage 38
Figure 37: Condition of road surface 39
Figure 38: Underside of bridge deck, multiple signs of past repairs as evident by the use of modern bolt and not fasteners 39
Figure 39: Example of typical deterioration of structural steel 40
Figure 40:Example of original riveted construction 40
Figure 41: Example of past repair as seen on northwest corner of bridge 41
Figure 42: Non-original guard rail installed using modern welding techniques 41
Figure 43: Example of superstructure as seen on northeast corner of bridge 42
Figure 44: Example of original riveted construction and later bolt and nut repair 42
Figure 45: Maker's mark identifying original steel to be a product of 'Carnegie USA' 43
Figure 46: Maker's mark identifying original steel to be a product of 'INLAND' 44
Figure 47: Township of Centre Wellington bridge 24-WG, First Line (image provided by Township of Centre Wellington) 56
Figure 48: Close up of design detail of bridge 24-WG (see Figure 47), First Line (image provided by Township of Centre Wellington) 56
Figure 47: Township of Centre Wellington bridge 4-WG, Fifth Line (image provided by Township of Centre Wellington) 57

Appendices

Appendix A - Qualifications of Author

Appendix B – Original Bridge Drawings

3.0 Personnel

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Jamie Lemon, M.A.	Project Manager, Cultural Heritage Consultant

Acknowledgements

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Adam Dickieson	Township of Centre Wellington
Iain Hankinson	MTO Structures Office

4.0 Project Context

Peninsula Heritage Ltd. (Peninsula Heritage) was retained by R.J. Burnside & Associates Limited (R.J. Burnside) to undertake a Heritage Impact Assessment (HIA), on behalf of the Township of Centre Wellington (the Proponent) for bridges 21-WG, 29-WG, and 30-WG. The bridges are all associated with Irvine Creek, with Bridge 21-WG being located on First Line, and Bridges 29-WG and 30-WG being located on Sideroad 15. Bridges 21-WG and 30-WG have been closed to vehicular traffic. Bridge 29-WG remains open to vehicular traffic but has a weight limit and height restriction in place. A Cultural Heritage Evaluation Report (CHER) identified all three bridges to exhibit cultural heritage value or interest (CHVI) under Ontario Regulation (O. Reg.) 9/06 (as amended by O. Reg. 569/22) (Peninsula Heritage 2025).

The purpose of the HIA is to review the identified CHVI of the bridges (Peninsula Heritage 2025), evaluate potential direct and indirect impacts to the bridges based on the proposed changes, and recommended mitigation measures aimed at reducing impacts to the identified CHVI of the bridges. The Proponent is exploring options for the potential removal and closure, rehabilitation, or replacement of the specified bridges under the Municipal Class Environmental Assessment (MCEA) process.

A site visit was conducted on April 22, 2025, to document the bridges and surrounding landscapes. Documentation took the form of high-resolution photographs using a Nikon D5300 DSLR camera and the collection of field notes. The site visit consisted of visual inspection of the bridges from publicly accessible areas. The assessment strategy was derived from the *Canadian Inventory of Historic Buildings* (Parks Canada 1980), *Well Preserved: The Ontario Heritage Foundation Manual on the Principles and Practice of Architectural Conservation* (Fram 2003), the *Guide to Field Documentation* (HABS 2011), and the *Standards and Guidelines for the Conservation of Historic Places in Canada* (Parks Canada 2010).

This HIA was written for a project located on the Treaty lands and Territory of the Mississaugas of the Credit First Nation and the traditional territory of the Haudenosaunee and the Attiwandaronk.

4.1 Site Description and Context

Bridge 21-WG is a bowstring arch bridge located northeast of Fergus on First Line, north of Sideroad 15. The bridge crosses Irvine Creek and has been closed to vehicular traffic since February 6, 2024. The lands surrounding the bridge are gently rolling and dominated by agricultural use.

Bridge 29-WG is a bowstring arch bridge located northeast of Fergus on Sideroad 15. The bridge provides egress across Irvine Creek. The bridge's location results in a curve in Sideroad 15 which is otherwise straight. The bridge is located within a small valley and is largely obscured from view from any distance. At the time of assessment, the bridge remained open to vehicular traffic but was subject to load and height restrictions. The lands surrounding the bridge are gently rolling and dominated by agricultural use.

Bridge 30-WG is a six-panel rivet-connected fixed Pratt through-truss bridge located northeast of Fergus on Sideroad 15. The bridge provides egress over Irvine Creek. The bridge is located

within a valley and is clearly visible from the rim of the valley. At the time of assessment, the bridge was closed to vehicular traffic. Communication with a local resident indicated the bridge has been closed for an extended period of time since it was damaged following a collision with a piece of heavy equipment that was being trailered. The lands surrounding the bridge are tree covered and were swampy at that time of assessment.

4.2 Client Contact Information

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Map 1: Location of Bridges



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Map 2: Location of Bridges on Aerial Image



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5.0 Legislative and Policy Framework

The following provides a review of provincial and municipal legislation and policies designed to protect cultural heritage resources within Ontario and the Township of Centre Wellington. This CHER has been prepared to meet industry best practices, the OHA, the *Planning Act*, and the *Provincial Planning Statement* (2024).

5.1 Provincial Legislation and Policy

5.1.1 Ontario Heritage Act (OHA), Revised July 1, 2024

The OHA was first enacted in 1975, with the current version being Revised Statutes of Ontario (RSO) 1990, and prescribes the legal requirements of regulatory bodies to address, protect and administer heritage within their jurisdiction. The OHA prescribes the criteria by which cultural heritage value of interest is assessed by way of O. Reg. 9/06 (as amended by O. Reg. 569/22).

Under Section 27 of the OHA, the municipal clerk is required to keep a current register of properties of cultural heritage value or interest within the municipality, including properties Designated under Part IV, Section 29 of the OHA. Heritage protections within the OHA fall into the following categories:

- Listed Properties (Part IV, Section 27), minimal protection (60 days interim protection from demolition), potentially candidates for Designation
- Designated Properties (Part IV, Section 29), protection under Municipal By-law
- Heritage Conservation Districts (Part V), protection under Municipal By-law

5.1.2 Planning Act, Revised July 1, 2024

The Planning Act (1990) provides the legislative framework for land use planning in Ontario. Part 1, Section 2 (d) and (r) of the Act identifies matters of provincial interest.

Part I, Section 2

The Minister, the council of a municipality, a local board, a planning board and the Tribunal, in carrying out their responsibilities under this Act, shall have regard to, among other matters, matters of provincial interest such as,

(d) the conservation of features of significant architectural, cultural, historical, archaeological or scientific interest;

(e) the promotion of built form that,

(i) is well-designed,

(ii) encourages a sense of place, and

(iii) provides for public spaces that are of high quality, safe, accessible, attractive and vibrant.

5.1.3 Provincial Planning Statement

The Provincial Policy Statement (PPS), issued under Section 3 of the Planning Act, came into effect on October 20, 2024. The PPS provides policy direction on matters of provincial interest related to land use planning and development and replaced the Provincial Policy Statement (2020) and A Place to Grow: Growth Plan for the Greater Golder Horseshoe (2019). The PPS provides direction for the appropriate regulation for land use and development while protecting resources of provincial interest, and the quality of the natural and built environment, which includes cultural heritage and archaeological resources. These policies are specifically addressed in Section 4.6:

1. Protected heritage property, which may contain built heritage resources or cultural heritage landscapes, shall be conserved.

2. Planning authorities shall not permit development and site alteration on lands containing archaeological resources or areas of archaeological potential unless the significant archaeological resources have been conserved.

3. Planning authorities shall not permit development and site alteration on adjacent lands to protected heritage property unless the heritage attributes of the protected heritage property will be conserved.

4. Planning authorities are encouraged to develop and implement:

a) archaeological management plans for conserving archaeological resources; and

b) proactive strategies for conserving significant built heritage resources and cultural heritage landscapes.

5. Planning authorities shall engage early with Indigenous communities and ensure their interests are considered when identifying, protecting and managing archaeological resources, built heritage resources and cultural heritage landscapes.

The Provincial Planning Statement provides the following definitions:

Built heritage resource: means a building, structure, monument, installation or any manufactured or constructed part or remnant that contributes to a property's cultural heritage value or interest as identified by a community, including an Indigenous community.

Conserved: means the identification, protection, management and use of built heritage resources, cultural heritage landscapes and archaeological resources in a manner that ensures their cultural heritage value or interest is retained. This may be achieved by the implementation of recommendations set out in a conservation plan, archaeological assessment, and/or heritage impact assessment that has been approved, accepted or adopted by the relevant planning authority and/or decision-maker. Mitigative measures and/or alternative development approaches should be included in these plans and assessments.

Cultural heritage landscape: means a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Indigenous community. The area may include features such as buildings,

structures, spaces, views, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association.

Heritage attributes: means, as defined under the Ontario Heritage Act, in relation to real property, and to the buildings and structures on the real property, the attributes of the property, buildings and structures that contribute to their cultural heritage value or interest.

Protected heritage property: means property designated under Part IV or VI of the Ontario Heritage Act; property included in an area designated as a heritage conservation district under Part V of the Ontario Heritage Act; property subject to a heritage conservation easement or covenant under Part II or IV of the Ontario Heritage Act; property identified by a provincial ministry or a prescribed public body as a property having cultural heritage value or interest under the Standards and Guidelines for the Conservation of Provincial Heritage Properties; property protected under federal heritage legislation; and UNESCO World Heritage Sites.

Significant: means e) in regard to cultural heritage and archaeology, resources that have been determined to have cultural heritage value or interest. Processes and criteria for determining cultural heritage value or interest are established by the Province under the authority of the Ontario Heritage Act.

5.1.4 Municipal Class Environmental Assessment (MCEA) Manual (2023)

The following are relevant excerpts from the MCEA Manual (2023).

“Cultural environment” refers to archaeological resources, built heritage resources and cultural heritage resources in the environment. Areas of archaeological potential must be identified in accordance with the *Ontario Heritage Act*. Relevant terms can be found in the glossary.

Significant cultural heritage resources must be conserved. Where significant cultural heritage resources cannot be avoided, adverse impacts are to be mitigated in accordance with provincial and municipal policies, procedures, best practices and guidelines.

Relevant glossary terms are as follows:

Archaeological resources includes artifacts, archaeological sites and marine archaeological sites, as defined under the *Ontario Heritage Act*. The identification and evaluation of such resources are based upon archaeological fieldwork undertaken in accordance with the *Ontario Heritage Act.*

Areas of archaeological potential Means areas with the likelihood to contain archaeological resources. Criteria to identify archaeological potential are established by the Province. The *Ontario Heritage Act* requires archaeological potential to be confirmed by a licensed archaeologist.

Built heritage resources means a building, structure, monument, installation or any manufactured or constructed part or remnant that contributes to a property’s cultural heritage value or interest as identified by a community, including an Indigenous Community. Built heritage resources are located on property that may be designated under Parts IV or V of the *Ontario Heritage Act,* or that may be included on local, provincial, federal and/or international registers.

Cultural heritage landscape means a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Indigenous Community. The area may include features such as buildings, structures, spaces, views, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association. Cultural heritage landscapes may be properties that have been determined to have cultural heritage value or interest under *the Ontario Heritage Act*, or have been included on federal and/or international registers, and/or protected through official plan, zoning by-law, or other land use planning mechanisms.

Cultural heritage resources include built heritage, cultural heritage landscapes, and marine and other archaeological sites. The Minister of Citizenship and Multiculturalism (MCM) is responsible for the administration of the *Ontario Heritage Act* and is responsible for determining policies, priorities and programs for the conservation, protection and preservation of Ontario's heritage, which includes cultural heritage landscapes, built heritage and archaeological resources. MCM has released a series of resource guides on the *Ontario Heritage Act,* entitled the Ontario Heritage Tool Kit.

5.2 Municipal Policies

5.2.1 Township of Centre Wellington Official Plan

Section C.2 of the Official Plan (OP) of the Township of Centre Wellington (consolidated February 2024) outlines four Goals and Objectives to the management of Cultural Heritage Resources:

- *To protect the Township's heritage resources from neglect, deterioration, demolition, alteration, redevelopment or changes in use which threaten their existence or integrity*
- *To encourage and support the functional and economic use of heritage buildings*
- *To identify, and protect and enhance natural areas*
- *To encourage public awareness and appreciation of the heritage resources of the Township and the value of protecting these resources to both residents and visitors*

5.2.2 County of Wellington Official Plan

Section 4.1 of the County of Wellington Official Plan deals with cultural heritage and archaeological resources:

Cultural heritage and archaeological resources form an important and in many cases highly visible part of the community fabric. These resources are a source of civic pride for the residents, a benefit to the local economy through tourism, and are important to our understanding of the settlement of the County. The policies of this Plan, in conjunction with the Ontario Heritage Act, provide a framework for the protection and enhancement of cultural heritage resources in Wellington.

Built Heritage

Wellington has a rich history reflected in many buildings and structures, either individually or in groups, which are considered to be architecturally or historically significant to the community, county, province or country.

Cultural Heritage Landscapes

A cultural heritage landscape is a defined geographical area of heritage significance which has been modified by human activities and is valued by a community. It involves a grouping(s) of individual heritage features such as structures, spaces, archaeological sites and natural elements, which together form a significant type of heritage form, distinctive from that of its constituent elements or parts. Examples may include, but are not limited to, heritage conservation districts designated under the Ontario Heritage Act, and villages, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trailways and industrial complexes of cultural heritage value.

For cultural heritage landscapes to be significant, they must be valued for the important contribution they make to our understanding of a place, an event, or a people.

Section 4.1.5 provides policy direction related to cultural heritage resources:

a) significant built heritage resources and significant cultural heritage landscapes shall be conserved. Conserved means the identification, protection, use and/or management of heritage and archeological resources in such a way that their heritage values, attributes and integrity are retained. This may be addressed through a conservation plan or heritage impact assessment in accordance with Section 4.6.7.

b) The need for a Heritage Impact Assessment and/or Conservation plan will be based on the heritage attributes or reasons for which the resource is identified as significant, and will normally be identified in pre-consultation on development applications.

c) Wellington County will work with its local municipalities to identify significant cultural heritage landscapes. The identification of significant cultural heritage landscapes shall be implemented through at least one of the following options:

> *i. Added to an Official Plan through an Amendment that shows the resource as an overlay designation on the Schedule, and adds site-specific policies where needed;*
>
> *ii. included in the municipal register of properties that Council considers to be of cultural heritage value or interest but have been designated;*
>
> *iii. Designated under the Ontario Heritage Act.*

d) The need for a Heritage Impact Assessment.

e) Wellington will encourage the conservation of significant built heritage resources through heritage designations and planning policies which protect these resources.

f) The re-use of heritage buildings is often a valid means of ensuring their restoration, enhancement or future maintenance. Projects to re-use heritage buildings may be given favourable consideration if the overall results are to ensure the long term protection of a

heritage resource and the project is compatible with surrounding land uses and represents an appropriate use of land.

g) Where a property has been identified as a protected heritage property, development and site alteration may be permitted on adjacent lands where the proposed development and site alteration has been evaluated and it has been demonstrated that the heritage attributes of the protected heritage property will be conserved. Mitigative measures and/or alternative development approaches may be required in order to conserve the heritage attributes of the protected heritage property affected by the adjacent development or site alteration.

h) The County recognizes the important cultural significance of the Grand River as a Canadian Heritage River, and the need to conserve its inherent values.

6.0 Existing Conditions Review

6.1 Bridge 21-WG

6.1.1 Design and Construction

Bridge 21-WG is an example of a bowstring arch bridge. Bowstring arch bridges, also known as, 'rainbow arch bridges', became a defining feature of Wellington County's early 20th-century infrastructure. These bridges were popular for their elegant, curved design and structural efficiency, particularly in rural areas where moderate-span crossings were needed. The name "rainbow arch" comes from the characteristic arching form of the main support structure, which resembles a rainbow spanning the road below. This style was part of a broader trend in North America in the early 1900s, as reinforced concrete began to replace timber and steel in smaller bridge construction. In Wellington County, the adoption of these bridges was part of a larger modernization effort in transportation infrastructure. The design was popular as it required minimal material, was relatively simple to install and could easily accommodate vehicular traffic. The bowstring design was well suited to situations where riverbanks were low and there was limited room for below deck support. The bowstring design was popularized by Fergus architect Charles Mattaini. Mr. Mattaini was born in Italy and emigrated to Canada in 1892. Following his emigration to Canada, he settled in Fergus and started an engineering and construction firm where he employed the engineering skills he had developed while constructing tunnels through the Alps. Mattaini popularized the bowstring design and his company eventually built close to 70 bowstring bridges in Southern Ontario, with a high number of them being constructed in Wellington and Waterloo counties (Brennan 2019).

6.1.2 Current Condition

Note: the following condition assessment for bridge 21-WG does not serve as an assessment by qualified engineer and must not be taken as an assessment of the overall structural integrity of the bridge.

The bowstring arch bridge identified as 21-WG is currently closed to vehicular traffic. The bridge remains passable by foot traffic and is visually in fair condition. The bridge was constructed c.1930 and is constructed of cast in place reinforced concrete. The current bridge replaced an early wooden bridge and original design schematics show the extant bridge to have reused the previous bridges abutments (Appendix B). Plans show that the southern abutment was reinforced at the time of 21-WG's construction by way of underpinning in order to compensate for the northward lean of the abutment, a lean that remained prominent at the time of site visit.

Site inspection found bridge 21-WG to be fair overall condition based on the age of the structure and its retention of many of its as-built features. A notable departure from its as-built condition is the replacement of the original elliptical concrete tie brace with a modern steel 'I' beam. The original tie brace was damaged in 2012 after a vehicle strike. The steel beam bracing was installed in early 2013.

Bridge 21-WG does show signs of delamination of concrete in areas resulting in the exposure of the underlying reinforcement bar.

Overall, bridge 21-WG presents as a surviving example of a bowstring arch bridge, a prominent style of bridge constructed in Garafraxa Township, now the Township of Centre Wellington, in the early 20th century. The structure has visible degradation, which is not uncommon considering the structure has been in use and exposed to the elements for nearly a century. The state of deterioration and the increased load demands of modern vehicles would indicate that rehabilitation or replacement of the structure is likely required for the structure to reinstate this bridge for its current intended use as a vehicular bridge.

The 2024 Municipal Structure Inspection Form report for the bridge recommended structure replacement within 1-5 years (Peninsula Heritage 2025).

6.1.3 Documentation



Figure 3: West side of Bridge 21-WG, looking east



Figure 4: East side of Bridge 21-WG, looking northwest



Figure 5: Northern approach to Bridge 21-WG, looking south



Figure 6: Southern approach to Bridge 21-WG, looking north



Figure 7: Western arch of Bridge 21-WG



Figure 8: Eastern arch of Bridge 21-WG



Figure 9: Underside of road deck of Bridge 21-WG and southern abutment



Figure 10: Underside of road deck of Bridge 21-WG and northern abutment



Figure 11: Typical example of abutment wing, note visible impressions of planking used in the forming process and the separations between lifts of concrete



Figure 12: Close up of detail cast into arch and associated supports and guardrail, west side



Figure 13: Close up of detail cast into arch and associated supports and guardrail, exterior of east side



Figure 14: Retrofit steel 'I' Beam used to replace original upper cord tie



Figure 15: Close up of typical recessed 'floret' cast into guard rail supports



Figure 16: Example of concrete spalling revealing underlying steel reinforcement material



Figure 17: Example of smooth round reinforcement bar used in construction of guardrails



Figure 18: Example of smooth square reinforcement bar used in vertical support members

6.2 Bridge 29-WG

6.2.1 Design and Construction

Bridge 29-WG is an example of a bowstring arch bridge. Bowstring arch bridges, also known as, 'rainbow arch bridges', became a defining feature of Wellington County's early 20th-century infrastructure. These bridges were popular for their elegant, curved design and structural efficiency, particularly in rural areas where moderate-span crossings were needed. The name "rainbow arch" comes from the characteristic arching form of the main support structure, which resembles a rainbow spanning the road below. This style was part of a broader trend in North America in the early 1900s, as reinforced concrete began to replace timber and steel in smaller bridge construction. In Wellington County, the adoption of these bridges was part of a larger modernization effort in transportation infrastructure. The design was popular as it required minimal material, was relatively simple to install and could easily accommodate vehicular traffic. The bowstring design was well suited to situations where riverbanks were low and there was limited room for below deck support. The bowstring design was popularized by Fergus architect Charles Mattaini. Mr. Mattaini was born in Italy and emigrated to Canada in 1892. Following his emigration to Canada, he settled in Fergus and started an engineering and construction firm where he employed the engineering skills he had developed while constructing tunnels through the Alps. Mattaini popularized the bowstring design and his company eventually built close to 70 bowstring bridges in Southern Ontario, with a high number of them being constructed in Wellington and Waterloo counties (Brennan 2019).

6.2.2 Current Condition

Note: the following condition assessment for bridge 29-WG does not serve as an assessment by qualified engineer and must not be taken as an assessment of the overall structural integrity of the bridge.

The bowstring arch bridge identified as 29-WG is currently in active use by vehicular traffic but has been subject to weight and height restrictions. The bridge was constructed c.1929 and is constructed of cast in place reinforced concrete. The current bridge replaced an early wooden bridge and original design schematics show previous abutments were removed (Appendix B).

Site inspection found bridge 29-WG to be fair overall condition based on the age of the structure and its retention of many of its as-built features. The addition of modern height restriction markers detracts from the overall design of the structure.

Bridge 29-WG show signs of delamination of concrete in areas resulting in the exposure of the underlying reinforcement bar. This delamination is most pronounced at the base of the bowstring on the northeast corner.

Overall, bridge 29-WG presents as a surviving example of a bowstring arch bridge, a prominent style of bridge constructed in Garafraxa Township, now Township of Centre Wellington, in the early 20th century. The structure has visible degradation, which is not uncommon considering the structure has been in use and exposed to the elements for nearly a century. The state of deterioration and the increased load demands of modern vehicles would indicate that rehabilitation or replacement of the structure is likely required for the structure to maintain this bridge for its current intended use as a vehicular bridge.

The 2024 Municipal Structure Inspection Form report for the bridge recommended structure replacement within 1-5 years (Peninsula Heritage 2025).

6.2.3 Documentation



Figure 19: Eastern approach to Bridge 29-WG, looking east



Figure 20: North side of Bridge 29-WG



Figure 21: Southside of Bridge 29-WG



Figure 22: West approach to Bridge 29-WG



Figure 23: Underside of Bridge 29-WG, note presence of imprints of original wood forms



Figure 24: Bridge deck



Figure 25: Example of connection between Bridge 29-WG abutments and superstructure



Figure 26: West bridge abutment



Figure 27: Original cast concrete tie beam



Figure 28: Typical example of the details present in the original guard rail and support structure



Figure 29: Focus on detail cast into arch and associated supports and guardrail, exterior of north side



Figure 30: Example of exfoliated concrete exposing underlying smooth steel reinforcement



Figure 31: Two names carved into the concrete, census records suggest both were labourers involved in the construction of Bridge 29-WG

6.3 Bridge 30-WG

6.3.1 Design and Construction

A through-truss bridge is a type of truss bridge in which the deck, or roadway, passes through the structure of the truss itself, with the main load-bearing trusses positioned on either side of the deck and connected overhead by cross-bracing. This creates a tunnel-like effect, allowing traffic to travel between the vertical truss walls while being enclosed above by a horizontal system of bracing. The design allows for efficient distribution of both vertical and horizontal loads, making it suitable for longer spans and heavier weights, such as those required by railways and major roadways. The open framework of the trusses provides strength while using relatively little material. Through-truss bridges were an economical and practical solution for many civil engineering challenges during the 19th and early 20th centuries.

Through-truss bridges emerged as a pivotal innovation in civil engineering during the 19th century and played a significant role in the expansion of railroads and road networks across the industrialized world. Their origins trace back to the early use of timber trusses, but with the advent of the Industrial Revolution, engineers began experimenting with wrought and cast iron. These materials provided the necessary strength and durability to span longer distances and support heavier loads than wood. The first iron truss bridges appeared in the early 1800s, with notable examples such as the Iron Bridge in England paving the way for widespread adoption. By the mid-19th century, through-truss designs were commonly used for both railroad and highway bridges across Europe and North America.

Iron through-truss bridges typically utilized either cast iron for compression members or wrought iron for tension members, due to their respective mechanical properties. Cast iron is brittle but stronger under compression, while wrought iron is more ductile and performs better under tensile stress. Engineers often combined these two types of iron to optimize performance. Popular truss configurations used in iron bridge construction included the Pratt, Warren, and Howe trusses, each differing in the arrangement and purpose of their diagonal and vertical members. The choice of truss type depended on the span length, the type of loads expected, and the available materials.

By the late 19th and early 20th centuries, steel began to replace iron in bridge construction due to its superior strength and ductility. However, many iron through-truss bridges remain in use or preserved as historic landmarks. Their design represents a significant period in engineering history, reflecting a time when new materials and structural theories were being tested and implemented on a grand scale. These bridges not only embody the ingenuity of 19th-century engineers but also serve as lasting monuments to the early industrial era and the expansion of modern infrastructure.

Bridge 30-WG is an example of a six-panel rivet-connected fixed Pratt through-truss. "Pratt" refers to the truss design, characterized by diagonal members that slope toward the center of the span and are under tension, while vertical members are in compression. This design, first patented in 1844 by Caleb and Thomas Pratt, became one of the most widely used truss types for its efficient handling of loads. The term "6-panel" indicates that the truss is divided into six distinct sections or panels between the end supports. "Rivet-connected" refers to the use of rivets — round-headed metal pins — to fasten the steel members together, a common method of joining structural components before the widespread use of welding. "Fixed" signifies that the bridge is non-movable, unlike swing, lift, or drawbridges, and is anchored in place to support static and dynamic loads.

At a June 2025 Public Information Centre, local residents identified that the truss for bridge 30-WG was believed to have been relocated to this location from a previous crossing of the Grand River in Belwood, prior to flooding of the Shand Dam. However, the Township, in consultation with the MTO, has been unable to find records of the original installation to confirm whether or not this statement is valid.

6.3.2 Current Condition

Note: the following condition assessment of bridge 30-WG does not serve as an assessment by qualified engineer and must not be taken as an assessment of the overall structural integrity of the bridge.

The riveted steel fixed through-truss bridge identified as 30-WG is currently closed to vehicular traffic but remains accessible to foot traffic. Bridge 30-WG presents as a surviving example of a once prevalent bridge design. The 2024 Municipal Structure Inspection Form identified the bridge to have been constructed in 1942, which would indicate it is a late example of the style.

Bridge 30-WG shows signs of advanced oxidation and structural decay at key structural points resulting from prolonged exposure to the elements. Visual assessment of the structure identified multiple occurrences of structural repair including the replacement of a large portion of the eastern end of the bridge. The galvanized corrugated steel deck pans supporting the

concrete deck indicate the current deck is not original to the structure. The western end of the bridge was found to be suffering from unrepaired structural damage resulting from vehicular impact.

Overall, Bridge 30-WG presents as being in poor structural condition but continues to serve as a monument to the historic use of riveted steel through-truss bridges.

The 2024 Municipal Structure Inspection Form report for the bridge recommended major rehabilitation/replacement be undertaken (Peninsula Heritage 2025).

6.3.3 Documentation



Figure 32: South side of Bridge 30-WG



Figure 33: North side of Bridge 30-WG



Figure 34: Eastern end of bridge which has been subject to previous restoration, with major structural components having been replaced and fastened with bolts and nuts



Figure 35: Western approach to bridge which exhibits deformation due to past collision with heavy equipment



Figure 36: Side view of west end damage



Figure 37: Condition of road surface



Figure 38: Underside of bridge deck, multiple signs of past repairs as evident by the use of modern bolt and not fasteners



Figure 39: Example of typical deterioration of structural steel



Figure 40:Example of original riveted construction



Figure 41: Example of past repair as seen on northwest corner of bridge



Figure 42: Non-original guard rail installed using modern welding techniques



Figure 43: Example of superstructure as seen on northeast corner of bridge



Figure 44: Example of original riveted construction and later bolt and nut repair



Figure 45: Maker's mark identifying original steel to be a product of 'Carnegie USA'

Carnegie Steel Company, often stylized historically as "Carnegie Steel USA," was one of the most influential and powerful steel companies in American history. Founded by industrialist Andrew Carnegie in the late 19th century, the company played a pivotal role in the rapid industrialization of the United States. Carnegie Steel revolutionized steel production by adopting the Bessemer process, which allowed for the mass production of high-quality steel at a much lower cost. This innovation helped fuel the construction of railroads, bridges, and skyscrapers during the Gilded Age. Based in Pittsburgh, Pennsylvania, the company became a cornerstone of the American steel industry and one of the largest manufacturing enterprises of its time. In 1901, Carnegie sold the company to financier J.P. Morgan, who merged it into U.S. Steel, the first billion-dollar corporation in the world. Carnegie Steel's legacy is deeply embedded in American industrial history, both for its contributions to infrastructure and for its role in shaping labour relations and corporate capitalism.



Figure 46: Maker's mark identifying original steel to be a product of 'INLAND'

The Inland Steel Company was a major American steel producer based in East Chicago, Indiana, and played a significant role in the development of the U.S. steel industry throughout the 20th century. Founded in 1893, Inland Steel grew rapidly during the industrial boom of the early 1900s, becoming known for its innovation, quality, and vertically integrated operations, which included mining, transportation, and steel manufacturing. The company was especially prominent in the production of sheet steel, which was widely used in the automotive, appliance, and construction industries. Inland Steel also gained a reputation for progressive labor practices and modern management. In 1998, the company was acquired by Ispat International, and the Inland name was removed from active use.

7.0 CHVI Review

7.1 Bridge 21-WG

Evaluation of bridge 21-WG against the nine criteria outlined by O. Reg. 9/06 (as amended by O. Reg. 569/22) identified bridge 21-WG to meet five criteria related to physical/design value, historical/associative value, and contextual value. Per the terms of the OHA, the bridge meets the requirement for consideration for Listing under Part IV, Section 27 of the OHA or consideration for Designation under Part IV, Section 29 of the OHA.

7.2 Bridge 21-WG Draft Statement of Cultural Heritage Value

Bridge 21-WG is located on First Line, north of Sideroad 15 in the road allowance between Lots 15 and 16, Concession 1, former Township of Garafraxa, now Township of Centre Wellington, Ontario. Bridge 21-WG was constructed to replace an earlier wood structure and to provide egress across Irvine Creek.

Bridge 21-WG is an example of a bowstring arch bridge constructed of reinforced concrete. This style of bridge is colloquially referred to as a 'rainbow arch bridge'. Original design schematics of the bridge show it to have been designed in 1929 and is assumed to have been constructed in 1930.

Bridge 21-WG represents one of the few remaining bowstring arch bridges in the county, a bridge style that the Wellington County was once known for. The bowstring arch design was developed in the early 20th century and reached its height of popularity in the 1920's and 1930's. The design was popular as it required minimal material, was relatively simple to install and could easily accommodate vehicular traffic.

The bowstring design was popularized in the Township of Centre Wellington by local Fergus architect Charles Mattaini. Mr. Mattaini was born in Italy and emigrated to Canada in 1892. Following his emigration to Canada, he settled in Fergus and started an engineering and construction firm where he employed the engineering skills he had developed while constructing tunnels through the Alps. Mattaini popularized the bowstring design and his company eventually built close to 70 bowstring bridges in Southern Ontario, with a high number of them being constructed in Wellington and Waterloo counties (Brennan 2019). While no record found support that the bridge was designed or built by Mr. Mattaini, the bridge stands as a surviving example of the style.

Bridge 21-WG has stood for nearly a century and retains examples of all original finishes but exhibits significant degradation resulting in the exposure of the underlying square steel reinforcement bar. A single steel tie beam has been added to the upper limit of the arches and replaces the original concrete tie. Evaluation of Bridge 21-WG found the bridge to be a candidate for Listing under Section 27 of the OHA, or Designation under Section 29 of the OHA.

Defining Characteristics

- Bowstring design

- Subtle design details: chamfered corners, recessed panels, impressed florets, integrated guardrail
- Proximity to bowstring arch bridge 29-WG

7.3 Bridge 29-WG

Evaluation of bridge 29-WG against the nine criteria outlined by O. Reg. 9/06 (as amended by O. Reg. 569/22) identified bridge 29-WG to meet five criteria related to physical/design value, historical/associative value, and contextual value. Per the terms of the OHA, the bridge meets the requirement for consideration for Listing under Part IV, Section 27 of the OHA or consideration for Designation under Part IV, Section 29 of the OHA.

7.4 Bridge 29-WG Draft Statement of Cultural Heritage Value

Bridge 29-WG is located on Sideroad 15 in the road allowance between Lots 15 and 16, Concession 2, former Township of Garafraxa, now Township of Centre Wellington, Ontario. Bridge 29-WG was constructed to replace an earlier wood structure and to provide egress across Irvine Creek.

Bridge 29-WG is a surviving example of a bowstring arch bridge constructed of reinforced concrete. This style of bridge is colloquially referred to as a 'rainbow arch bridge'. Original design schematics of the bridge show it to have been designed in 1928 and is assumed to have been constructed in 1929.

Bridge 29-WG represents one of the few remaining bowstring arch bridges in the county, a bridge style that the former Wellington County was historically known for. The bowstring arch design was developed in the early 20th century and reached its height of popularity in the 1920's and 1930's. The design was popular as it required minimal material, was relatively simple to install and could easily accommodate vehicular traffic.

The bowstring design was popularized in the Township of Centre Wellington by local Fergus architect Charles Mattaini. Mr. Mattaini was born in Italy and emigrated to Canada in 1892. Following his emigration to Canada, he settled in Fergus and started an engineering and construction firm where he employed the engineering skills he had developed while constructing tunnels through the Alps. Mattaini popularized the bowstring design and his company eventually built close to 70 bowstring bridges in Southern Ontario, with a high number of them being constructed in Wellington and Waterloo counties (Brennan 2019). While no record found support that the bridge was designed or built by Mr. Mattaini, the bridge stands as a surviving example of the style.

Bridge 29-WG has stood for nearly a century and retains examples of all original finishes but exhibits significant degradation resulting in the exposure of the underlying square steel reinforcement bar. Evaluation of bridge 29-WG found the bridge to be a candidate for Listing under Section 27 of the OHA, or Designation under Section 29 of the OHA.

Defining Characteristics

- Bowstring design

- Subtle design details: chamfered corners, recessed panels, impressed florets, integrated guardrail
- Proximity to bowstring arch Bridge 21-WG

7.5 Bridge 30-WG

Evaluation of bridge 30-WG against the nine criteria outlined by O. Reg. 9/06 (as amended by O. Reg. 569/22) identified bridge 30-WG to meet two criteria related to physical/design value and contextual value. Per the terms of the OHA, the bridge meets the requirement for consideration for Listing under Part IV, Section 27 of the OHA or consideration for Designation under Part IV, Section 29 of the OHA.

7.6 Bridge 30-WG Draft Statement of Cultural Heritage Value

Bridge 30-WG is located on Sideroad 15 in the road allowance between Lots 15 and 16, Concession 6, former Township of Garafraxa, now Township of Centre Wellington, Ontario. Bridge 30-WG was constructed to replace an earlier wood structure and to provide egress across Irvine Creek.

Through-truss bridges emerged as a pivotal innovation in civil engineering during the 19th century and played a significant role in the expansion of railroads and road networks across the industrialized world. Their origins trace back to the early use of timber trusses, but with the advent of the Industrial Revolution, engineers began experimenting with wrought and cast iron. These materials provided the necessary strength and durability to span longer distances and support heavier loads than wood. The first iron truss bridges appeared in the early 1800s, with notable examples such as the Iron Bridge in England paving the way for widespread adoption. By the mid-19th century, through-truss designs were commonly used for both railroad and highway bridges across Europe and North America.

Bridge 30-WG is a surviving automotive use example of a fixed riveted steel through Pratt truss bridge. The bridge retains its original overall design and showcases the evolution of steel bridge construction through ongoing repairs that employed bolt and nut and later welded elements. Bridge 30-WG stands as a locally rare surviving example of a style. Evaluation of Bridge 30-WG found the bridge to be a candidate for Listing under Section 27 of the OHA, or Designation under Section 29 of the OHA.

Defining Characteristics

- Original riveted construction
- Pratt truss system
- Legibility of repairs detailing the evolution of steel working

8.0 Heritage Impact Assessment

8.1 Bridge 21-WG

8.1.1 Description of Proposed Work

Bridge 21-WG is currently part of a study which is evaluating several alternatives for the currently closed bridge, including removal, rehabilitation, and replacement. The structure has deteriorated to a point of significant structural concern, which has resulted in its current closure to traffic and, even if rehabilitated, it is anticipated that it would still have limited load carrying capacity. No design plans for the options under consideration are available at this time.

8.1.2 Potential Direct and Indirect Impacts

Bridge 21-WG was found in the CHER to exhibit physical value, historical/associative value, and contextual value (Peninsula Heritage 2025). The following heritage attributes were specifically identified:

- Bowstring design
- Subtle design details: chamfered corners, recessed panels, impressed florets, integrated guardrail
- Proximity to bowstring arch bridge 29-WG

To evaluate the potential impacts of the proposed improvements to bridge 21-WG, the guidelines of the MCM's *Heritage Resources in the Land Use Planning Process Info Sheet #5 Heritage Impact Assessment and Conservation Plans*, were reviewed (MCM 2006):

Destruction of any, or part of any significant heritage attributes or features:

- Proposed removal of bridge 21-WG would result in the loss of physical heritage attributes.
- Pending final design plans, the proposed rehabilitation of bridge 21-WG may result in the loss of physical heritage attributes.
- The proposed replacement of bridge 21-WG will result in the loss of physical heritage attributes.

Alteration that is not sympathetic, or incompatible, with the historic fabric and appearance:

- Proposed removal of bridge 21-WG would result in the loss of physical heritage attributes.
- Proposed rehabilitation of bridge 21-WG should consider approaches that avoid alteration to physical heritage attributes.
- Proposed replacement of bridge 21-WG should consider design plans that reflect and pay tribute to the original design of the bridge.

Shadows created that alter the viability of a heritage attribute or an associated nature feature or plantings, such as a garden:

- Proposed removal of bridge 21-WG would not result in the creation of new shadows.
- It is not anticipated proposed rehabilitation would create new shadows that would impact physical heritage attributes.
- Proposed replacement would remove physical heritage attributes, rendering the impact of shadows not applicable.

Isolation of a heritage attribute from its surrounding environment, context, or a significant relationship:

- Proposed removal would not result in isolation of a heritage attribute but would result in the loss of physical heritage attributes.
- It is not anticipated proposed rehabilitation would lead to isolation of physical heritage attributes.
- Proposed replacement would remove physical heritage attributes, rendering the impact of isolation as not applicable.

Direct or indirect obstruction of significant views or vistas within, from, or of built and natural features:

- Proposed removal would impact views towards the bridge.
- It is not anticipated proposed rehabilitation would lead to indirect or direct obstruction of views and vistas.
- Proposed replacement could impact views towards the bridge, particularly if a design is chosen that does not reflect the original design.

A change in land use where the change may impact the property's CHVI:

- A change in land use is not being proposed through the proposed options.

Land disturbances such as a change in grade that alters soils and drainage patterns that may adversely affect archaeological and/or cultural heritage resources:

- It is not anticipated that changes in grade through proposed rehabilitation will occur that would adversely affect archaeological and/or cultural heritage resources.
- Proposed removal or replacement would remove physical heritage attributes, rendering the impact of land disturbances as not applicable.

8.2 Bridge 29-WG

8.2.1 Description of Proposed Work

Bridge 29-WG is currently part of a study which is evaluating several alternatives for the bridge, which is currently posted with a 5 tonne load limitation. Alternatives being considered include

removal, rehabilitation and replacement. The structure has deteriorated to a point of significant structural concern, which has resulted in the load posting. Even if rehabilitated, it is anticipated that it would still have limited load carrying capacity. No design plans for the options under consideration are available at this time.

8.2.2 Potential Direct and Indirect Impacts

Bridge 29-WG was found in the CHER to exhibit physical value, historical/associative value, and contextual value (Peninsula Heritage 2025). The following heritage attributes were specifically identified:

- Bowstring design
- Subtle design details: chamfered corners, recessed panels, impressed florets, integrated guardrail
- Proximity to bowstring arch bridge 21-WG

To evaluate the potential impacts of the proposed improvements to bridge 29-WG, the guidelines of the MCM's *Heritage Resources in the Land Use Planning Process Info Sheet #5 Heritage Impact Assessment and Conservation Plans*, were reviewed (MCM 2006):

Destruction of any, or part of any significant heritage attributes or features:

- Proposed removal of bridge 29-WG would result in the loss of physical heritage attributes.
- Pending final design plans, the proposed rehabilitation of bridge 29-WG may result in the loss of physical heritage attributes.
- The proposed replacement of bridge 29-WG will result in the loss of physical heritage attributes.

Alteration that is not sympathetic, or incompatible, with the historic fabric and appearance:

- Proposed removal of bridge 29-WG would result in the loss of physical heritage attributes.
- Proposed rehabilitation of bridge 29-WG should consider approaches that avoid alteration to physical heritage attributes.
- Proposed replacement of bridge 29-WG should consider design plans that reflect and pay tribute to the original design of the bridge.

Shadows created that alter the viability of a heritage attribute or an associated nature feature or plantings, such as a garden:

- Proposed removal of bridge 29-WG would not result in the creation of new shadows.
- It is not anticipated proposed rehabilitation would create new shadows that would impact physical heritage attributes.
- Proposed replacement would remove physical heritage attributes, rendering the impact of shadows not applicable.

Isolation of a heritage attribute from its surrounding environment, context, or a significant relationship:

- Proposed removal would not result in isolation of a heritage attribute but would result in the loss of physical heritage attributes.
- It is not anticipated proposed rehabilitation would lead to isolation of physical heritage attributes.
- Proposed replacement would remove physical heritage attributes, rendering the impact of isolation as not applicable.

Direct or indirect obstruction of significant views or vistas within, from, or of built and natural features:

- Proposed removal would impact views towards the bridge.
- It is not anticipated proposed rehabilitation would lead to indirect or direct obstruction of views and vistas.
- Proposed replacement could impact views towards the bridge, particularly if a design is chosen that does not reflect the original design.

A change in land use where the change may impact the property's CHVI:

- A change in land use is not being proposed through the proposed options.

Land disturbances such as a change in grade that alters soils and drainage patterns that may adversely affect archaeological and/or cultural heritage resources:

- It is not anticipated that changes in grade through proposed rehabilitation will occur that would adversely affect archaeological and/or cultural heritage resources.
- Proposed removal or replacement would remove physical heritage attributes, rendering the impact of land disturbances as not applicable.

8.3 Bridge 30-WG

8.3.1 Description of Proposed Work

Bridge 30-WG is currently part of a study which is evaluating several alternatives for the currently closed bridge, including removal, rehabilitation, and replacement. The main structure elements have been significantly damaged due to a vehicle collision and there is significant section loss of the steel members throughout. A major rehabilitation would be required to re-open the structure, which would likely require the majority of the members to be replaced. Even if rehabilitated, it is anticipated that the structure would still have limited load carrying capacity. No design plans for the options under consideration are available at this time.

8.3.2 Potential Direct and Indirect Impacts

Bridge 30-WG was found in the CHER to exhibit physical value and contextual value (Peninsula Heritage 2025). The following heritage attributes were specifically identified:

- Original riveted construction
- Pratt truss system
- Legibility of repairs detailing the evolution of steel working

To evaluate the potential impacts of the proposed improvements to bridge 30-WG, the guidelines of the MCM's *Heritage Resources in the Land Use Planning Process Info Sheet #5 Heritage Impact Assessment and Conservation Plans*, were reviewed (MCM 2006):

Destruction of any, or part of any significant heritage attributes or features:

- Proposed removal of bridge 30-WG would result in the loss of physical heritage attributes.
- Pending final design plans, the proposed rehabilitation of bridge 30-WG may result in the loss of physical heritage attributes.
- The proposed replacement of bridge 30-WG will result in the loss of physical heritage attributes.

Alteration that is not sympathetic, or incompatible, with the historic fabric and appearance:

- Proposed removal of bridge 30-WG would result in the loss of physical heritage attributes.
- Proposed rehabilitation of bridge 30-WG should consider approaches that avoid alteration to physical heritage attributes.
- Proposed replacement of bridge 30-WG should consider design plans that reflect and pay tribute to the original design of the bridge.

Shadows created that alter the viability of a heritage attribute or an associated nature feature or plantings, such as a garden:

- Proposed removal of bridge 30-WG would not result in the creation of new shadows.
- It is not anticipated proposed rehabilitation would create new shadows that would impact physical heritage attributes.
- Proposed replacement would remove physical heritage attributes, rendering the impact of shadows not applicable.

Isolation of a heritage attribute from its surrounding environment, context, or a significant relationship:

- Proposed removal would not result in isolation of a heritage attribute but would result in the loss of physical heritage attributes.

- It is not anticipated proposed rehabilitation would lead to isolation of physical heritage attributes.
- Proposed replacement would remove physical heritage attributes, rendering the impact of isolation as not applicable.

Direct or indirect obstruction of significant views or vistas within, from, or of built and natural features:

- Proposed removal would impact views towards the bridge.
- It is not anticipated proposed rehabilitation would lead to indirect or direct obstruction of views and vistas.
- Proposed replacement could impact views towards the bridge, particularly if a design is chosen that does not reflect the original design.

A change in land use where the change may impact the property's CHVI:

- A change in land use is not being proposed through the proposed options.

Land disturbances such as a change in grade that alters soils and drainage patterns that may adversely affect archaeological and/or cultural heritage resources:

- It is not anticipated that changes in grade through proposed rehabilitation will occur that would adversely affect archaeological and/or cultural heritage resources.
- Proposed removal or replacement would remove physical heritage attributes, rendering the impact of land disturbances as not applicable.

9.0 Mitigation Options and Recommendations

Bridges 21-WG and 30-WG have been closed to vehicular traffic. Bridge 29-WG remains open to vehicular traffic but has a weight limit and height restriction in place. The 2024 Municipal Structure Inspection Form reports for bridges 21-WG and 29-WG recommended structure replacement within 1-5 years (Peninsula Heritage 2025). The 2024 Municipal Structure Inspection Form report for bridge 30-WG recommended major rehabilitation/replacement be undertaken (Peninsula Heritage 2025).

O. Reg. 9/06 evaluation of bridges 21-WG, 29-WG, and 30-WG in the CHER (Peninsula Heritage 2025) found the bridges to be candidates for Listing under Section 27 of the OHA, or Designation under Section 29 of the OHA.

The evaluation of potential direct and indirect impacts to all three bridges through the proposed removal, rehabilitation, or replacement options found that proposed removal of each bridge would result in the loss of physical heritage attributes and lead to impacts to the view toward the bridges. Proposed rehabilitation of each bridge is anticipated to result in minimal to no impacts to the physical heritage attributes of the bridges (pending final design plans). The evaluation of impacts found proposed replacement would result in the loss of the physical heritage attributes of each bridge and may also lead to impacts to the view towards the bridge (pending final design).

Although not provincially owned bridges, the *Ontario Heritage Bridge Guidelines* (MTO 2008) are useful to consult as they provide bridge-specific guidance with respect to conservation approaches. The *Ontario Heritage Bridge Guidelines* (MTO 2008) provides a listing of conservation options, ranked in order of degree of intervention (minimum to maximum). The ranked conservation options for bridges with CHVI are provided in Table 1, for reference purposes only.

Table 1: MTO Ranked Conservation Options for Bridges with CHVI

Ranking	Option	Description
1	Retain in Service	Retain bridge with no major modifications undertaken
2		Restore missing/deteriorated bridge elements
3		Retain bridge with sympathetic modification
4		Retain bridge with sympathetic modification
5	Retain for Other Uses	Adapt bridge for new use as pedestrian walkways, cycle paths, scenic viewing, etc.
6		Retain bridge as a heritage monument for viewing purposes only
7	Relocation	Relocate bridge to new location for continued or adaptive use
8	Removal and Replacement	Replace structure with a sympathetically designed structure and: a. Salvage bridge elements/members of bridge for incorporation into new structure or for future conservation work or display; b. Undertake full recording and documentation of existing structure

Under the current study, Conservation Option 8 would be the most appropriate for each bridge. In reviewing Section 4.4 of the *Ontario Heritage Bridge Guidelines* (MTO 2008) (Detailed Conditions for Conservation Option 8 – Removal or Replacement), bridges 21-WG, 29-WG, and

30-WG can be considered to be in a state of which “the safety of the existing structure is compromised to the extent that rehabilitation is not a practical option” and “replacement is required to meet demand requirements that are not achievable through rehabilitation or upgrading of the existing structure”, for the following reasons:

- Bridges 21-WG, 29-WG, and 30-WG are single-load-path structures in which the failure of a single primary component or connection would cause the structure to collapse. Failure of one of the arches or the steel truss members would cause the structure to collapse. Single-load-path structures are not recommended under current practices due to their risk of catastrophic failure.
- Bridges 21-WG, 29-WG, and 30-WG were designed in early 1900s, to accommodate a design of vehicle lighter than current standards. In order to address concerns related to loss of capacity due to concrete deterioration, corrosion of reinforcing steel, or damaged steel members and to increase the load carrying capacity of the truss to meet the capacity to carry current vehicle loads, the arch/trusses would be required to be replaced in their entirety, which would require all heritage attributes of the structure to be replaced and thereby significantly altering the bridge from its original form.
- The narrow bridge driving platforms of bridges 21-WG, 29-WG, and 30-WG do not meet the capacity requirements of a two-lane bridge under current standards. Widening of the structures to meet the minimum width for two-lanes is not feasible without removing the arch/truss heritage features. Retaining the bridges as a one-lane, two-way bridge is a safety hazard.
- The structural upper tie of 21-WG and 29-WG imposes a height restriction that does not facilitate the passage of modern vehicles, particularly modern farm equipment.

The Township of Centre Wellington has Designated one bowstring arch bridge under Part IV Section 29 of the OHA (by-law 2014-034), as an example of the once prevalent design in the immediate area. This Designated bridge is municipally identified as bridge 9-N and is located on Irvine Street, northwest of Nichol Road 15, and provides egress over Irvine Creek.

The Township of Centre Wellington has replaced several bowstring arch bridges in recent years and has utilized design elements to conserve the heritage attributes of the bridge. Examples photos are provided as Figures 47 to 49. In these examples, the Township of Centre Wellington employed designs of the replacement bridges that reflected the original bowstring arch bridge, with interpretive elements incorporated (see Figure 47).



Figure 47: Township of Centre Wellington bridge 24-WG, First Line (image provided by Township of Centre Wellington)



Figure 48: Close up of design detail of bridge 24-WG (see Figure 47), First Line (image provided by Township of Centre Wellington)



Figure 49: Township of Centre Wellington bridge 4-WG, Fifth Line (image provided by Township of Centre Wellington)

9.1 Recommendations

Bridges 21-WG, 29-WG, and 30-WG are visually appealing and largely retain their as-built forms. As such, the bridges reflect the design and style of a past time and contribute to the rural agricultural landscape of the area. As such, the following recommendations are made for bridges 21-WG, 29-WG, and 30-WG, based on the options for improvements being considered as part of study:

9.1.1 Removal

1. The CHER and HIA reports be provided to local historical societies, libraries, and the municipal archives, at the discretion of the Township of Centre Wellington.

9.1.2 Rehabilitation

1. Rehabilitation of the bridge(s) in their current form allows for the retention of all identified heritage attributes, but bridges 21-WG, 29-WG, and 30-WG can be considered to be in a state of which “the safety of the existing structure is compromised to the extent that rehabilitation is not a practical option” and “replacement is required to meet demand requirements that are not achievable through rehabilitation or upgrading of the existing structure” (MTO 2008).
2. If rehabilitation is pursued, all efforts be made to retain physical heritage attributes.

3. If rehabilitation is pursued, the Township consider Designation of the bridge(s) under Part IV of the Ontario Heritage Act.
4. The CHER and HIA reports be provided to local historical societies, libraries, and the municipal archives, at the discretion of the Township of Centre Wellington.

9.1.3 Replacement

1. Any replacement of bridges 21-WG and 29-WG be designed to reflect the existing "bowstring arch" design, thereby providing a conservation measure for the identified physical heritage attributes. Examples of bridge replacements where this conservation approach was utilized by the Township of Centre Wellington are provided in Figures 47 to 49.
2. An interpretive plaque be affixed to the replacement bridges for 21-WG and 29-WG to identify the original bridge (see Figure 47), thereby providing a conservation measure for the identified historical and contextual value. The plaque should reference the Designated bowstring arch bridge on Irvine Street, and a physical example. For bridge 29-WG, consideration should be given to the salvage of concrete pieces where bridge workers names are inscribed, with these pieces either incorporated into the new bridge design, or incorporated into a commemoration of the bridge.
3. Any replacement of bridge 30-WG be designed to consider incorporation an imprint of the original through-truss design, similar to what the Township of Centre Wellington has already accomplished with replacement bowstring arch bridges.
4. An interpretive plaque be affixed to the replacement bridge for 30-WG to identify the original bridge, thereby providing a conservation measure for the identified historical and contextual value.
5. The CHER and HIA reports be provided to local historical societies, libraries, and the municipal archives, at the discretion of the Township of Centre Wellington.

The *Provincial Planning Statement* (2024) notes that CHVI is identified for cultural heritage resources by communities. Thus, the system by which heritage is administered in Ontario places emphasis on the decision-making of local municipalities regarding matters of heritage. It is hoped that the information presented in this report will be useful in decisions pertaining to the bridge.

10.0 Closure

This report was prepared by Peninsula Heritage Ltd. for the exclusive use of the Township of Centre Wellington for their work associated with Bridges 21-WG, 29-WG and 30-WG.

All information, recommendations and opinions provided in this report are for the sole benefit of the Proponent. No other party may use or rely on this report or any portion thereof without the Proponent's or Peninsula Heritage Ltd.'s expressed written consent. Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Proponent in the design of the specific project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party.

We confirm this report conforms to accepted technical and ethical standards; the information included in this report is accurate to the best of our abilities, conforms to accepted technical and ethical standards, and reflects the professional opinion of Chris Lemon, Cultural Heritage Specialist.

Professional Qualifications for the primary author of this report are provided in Appendix A.

Sincerely,



Chris Lemon, B.Sc., Dip. Heritage, CAHP

Cultural Heritage Specialist

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Peninsula Heritage Ltd.
Archaeology & Built Heritage

Appendix A

Qualifications

Peninsula Heritage Ltd.
Archaeology & Built Heritage

Cultural Heritage Specialist – Chris Lemon, B.Sc., Dip. Heritage, CAHP Member in Good Standing: Chris Lemon is a Cultural Heritage Consultant and Licensed Archaeologist (R289) with 20 years' experience. He received an Honours B.Sc. in Anthropology from the University of Toronto and has completed course work towards an M.A. from the University of Western Ontario. Mr. Lemon has a Diploma in Heritage Carpentry and Joinery and a Certificate in Heritage Planning from Algonquin College. During his career Mr. Lemon has conducted archaeological and cultural heritage assessments across Ontario. He has managed field teams and projects ranging in value from <$5,000.00 to in excess of $1,000,000.00. Mr. Lemon is a member of the Ontario Archaeological Society and is a member in good standing with the Canadian Association of Heritage Professionals. Chris regularly assists clients with understanding heritage requirements, as it relates to their Project, and works with clients and approval authorities to ensure cultural heritage resources are appropriately protected. Chris has been working full time in Cultural Heritage since 2018.

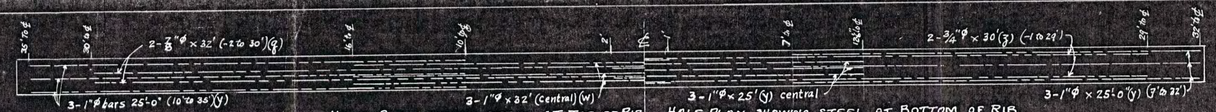
Chris' training at Algonquin College and extensive field experience have provided Chris with skills and knowledge in the identification of historical building materials and construction techniques, including the viability of salvageable materials.

Project Manager, Cultural Heritage Practitioner – Jamie Lemon, M.A.: Jamie Lemon, MA, is a Senior Archaeologist and Cultural Heritage Practitioner with Peninsula Heritage Ltd. and is responsible for managing projects and field staff across Ontario. She is the primary author of numerous archaeological license reports for archaeological assessments ranging from Stage 1 to Stage 4 investigations and is proficient at artifact and archaeobotanical analysis. In addition, she is a former field technician and field director with experience on precontact Indigenous and historical Euro-Canadian sites. She has worked on archaeological projects for mining, land development, transportation, aggregates, and energy sectors. Jamie received a BA in Anthropology from the University of Waterloo in 2007, an MA from Trent University in 2014, and has been active in Cultural Resource Management in Ontario for 18 years. Jamie holds a valid professional license with the Ontario Ministry of Citizenship and Multiculturalism (MCM). Jamie regularly assists clients with navigating the life cycle of archaeological and heritage assessments as it relates to their Project, including interpretation of MCM's Standards and Guidelines for Consultant Archaeologists and various policies and terms of reference related to heritage studies, scheduling of assessments to best suit the needs of the client, and engaging with Indigenous communities. Jamie has been a contributing author to cultural heritage reports since 2022.

Peninsula Heritage Ltd.
Archaeology & Built Heritage

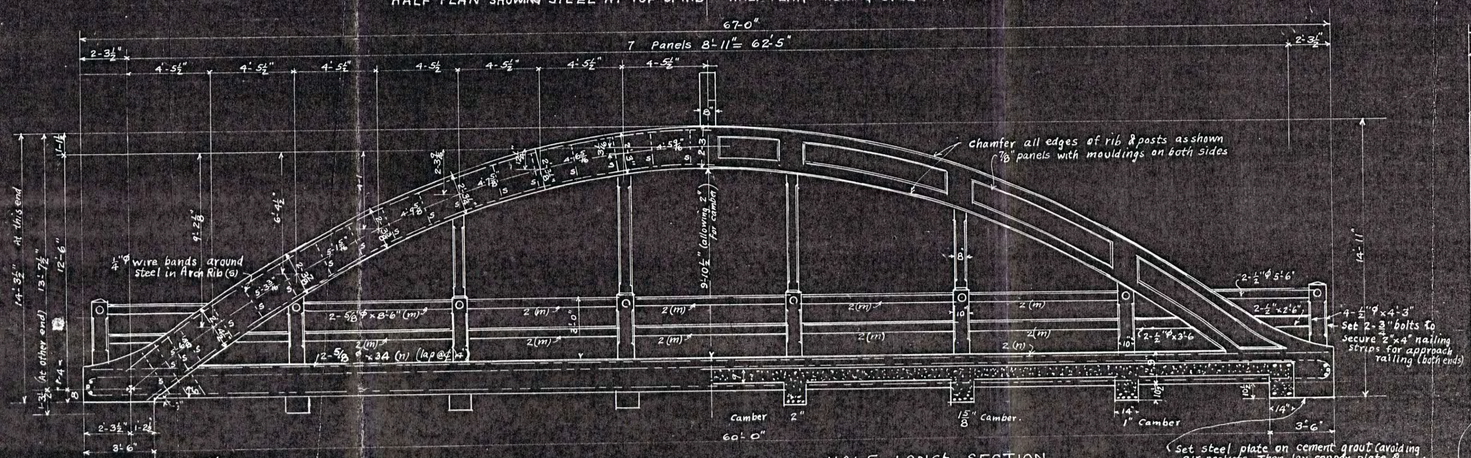
Appendix B

Original Bridge Drawings



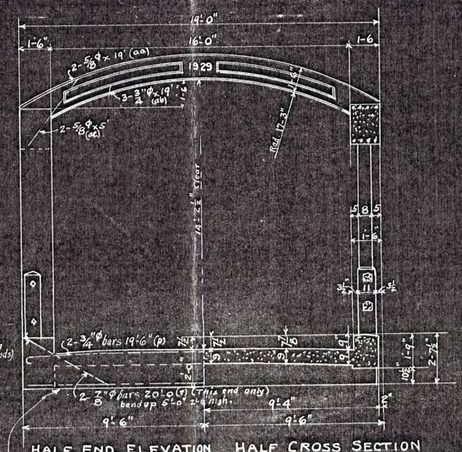
HALF PLAN SHOWING STEEL AT TOP OF RIB

HALF PLAN SHOWING STEEL AT BOTTOM OF RIB.



HALF ELEVATION

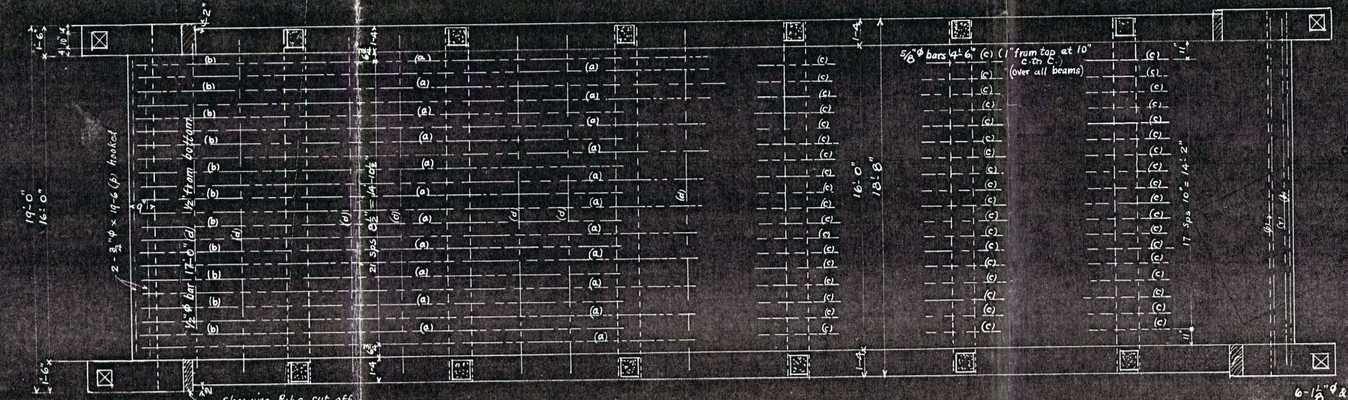
HALF LONGL SECTION



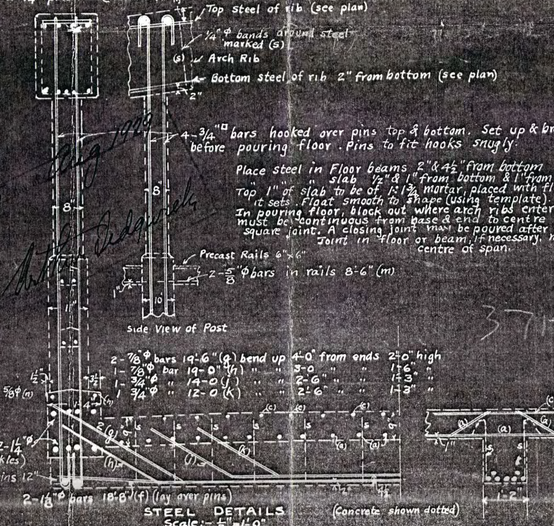
HALF END ELEVATION HALF CROSS SECTION



BENDING SKETCH FOR SLAB STEEL



PLAN OF FLOOR



STEEL DETAILS (concrete shown dotted)
Scale:- ½"=1'-0"

ESTIMATE

Concrete in Arch Ribs (1:1½:3)	=	cu yds
" " Posts & Rails	=	" "
" " Slab & beams (1:2:4)	=	" "
Total Concrete in Superstructure	=	" "
Concrete in Substructure	=	
Total Concrete	=	
Reinforcing Steel	=	lbs
Steel Tie rods	=	"
" Hanger "	=	"
Total Steel		lbs. (Supplied f.o.b. Fergus)

SUPERSTRUCTURE FOR
60' × 16' RETTIE BRIDGE
AT LOT 16 CON. I W. GARAFRAXA
FOR THE TOWNSHIP OF WEST GARAFRAXA
Scale:- 1"=1'-0"

A.W. CONNOR & CO. ENGRS
301 Metropolitan Bldg. TORONTO July 29

DWG C5-10

37187-1

35-201

Site 35-220

58'-10"

Present Road — El. 60.65 — 61.90 — New Floor ℄ Present Wooden Truss — New Road El. 61.90 — Present Road ℄ 60.75 — New Approach 6% — Present Road

Exp. End

WL 50.0

Present ground ℄

5'-2" ±

2'-0"

2'-6"

Concrete 1:2:4

SECTIONAL ELEVATION SHOWING PRESENT ABUTMENTS & UNDERPINNING

N.B. Underpinning to be done in sections & section to be set 2 weeks before excavating for adjoining section.

Contractor to supply temporary bridge & roadway on North side

Present Ballast Wall

Present Road Level & ℄ unchanged

New Floor ℄ (El. 61.9)

1'-3"

30'-1"

Present Road ℄

El. 60.65

Present Abutment

Fill in corner for appearance

2'-6"

El. 59.45

Level up with Concrete Present Abutment

PART ELEVN SHOWING OLD & NEW WORK
(New Superstructure shown hatched)

60.9

2'-6"

1-1

Edge of Road

60.65

1'-7"

2'-1"

61.65

60.65

18'-5½"

Edge of Road

60.65

1-1

Wood Truss

12'-10½" Width of present Bridge

Wood Truss

Stream

PLAN OF PRESENT ABUTMENTS

Approximate Extent of Underpinning to be done as shown dotted

1'-5"

60.2

2'-7"

59.45

1-1

Edge of Road

1'-5"

2'-4"

12'-10½"

60.5

East

Edge Road

59.45

2'-0"

10'-0"

59.9

"Overhang (abt.)

"Overhang abt.

Level over top of old wall

18'-5½"

18'-1"

2'-4"

2'-4"

60'-0" For Superstructure

58'-10" Clear of Abuts.

5"

9"

19'-0"

Remove this Ballast Wall

3'-6"

3'-6"

PART PLAN SHOWING LOCATION OF SHOES OF SUPERSTRUCTURE
Scale:- ½" = 1'-0"

SUBSTRUCTURE

FOR THE

58'-10" RETTIE BRIDGE

AT LOT 16 CON. 1 W. GARAFRAXA TP

FOR THE

TOWNSHIP OF WEST GARAFRAXA

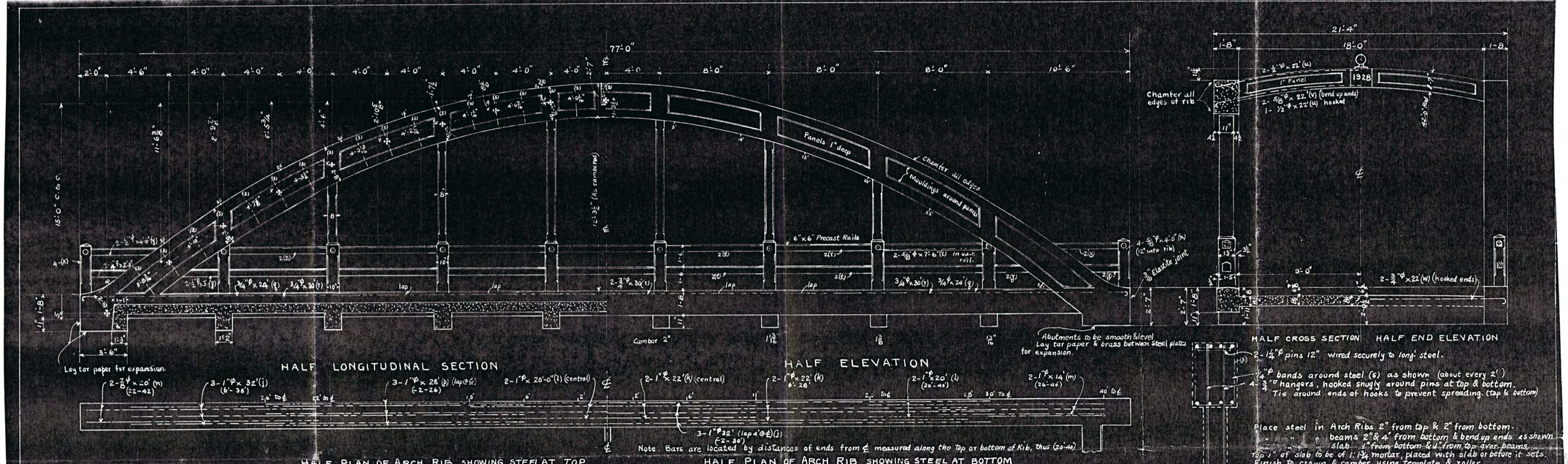
A.W. Connor & Co. Engrs
Metropolitan Bldg
Toronto. July/29

Scale:- ¼" = 1'0"

DWG E5108

3718-7

SITE MAP
N 35-201



Concrete in Arch Ribs (1:2:3½) = 28.0 cu. yds.
" Hangers, Posts, Railing & Strut = 7.0
" Slab, Curbs, beams & Coping (1:2:4) = 57.2
Total 92.2

Tie rods, Hangers & Steel Couplings = 8000 lbs
= 3000 "

Place steel in Arch Ribs 2" from top & 2" from bottom.
" " " beams 2" & 4" from bottom & bend up ends as shown
" " " slab 1" from bottom & 1" from top over beams.
Top 1" of slab to be of 1:1¾ mortar, placed with slab or before it sets.
Finish to crown & camber using template & roller.
Slab & beams must be poured together. Any break to be against vertical form at centre of slab.
Before pouring floor set up hangers, braced plumb in ctr line of rib
Set main tie rods in line, blocked up to prevent sagging, adjust length so all bear on end pins. Floor may be cast before ribs, but space must be blocked out where ribs enter so ribs may be cast without a break at ends. . . Rib is to be broken near centre by pouring against forms square with axis, pouring uniformly from each end to contraction joint which is to be filled after rib has set
Follow figures regardless of scale. for Substructure See Dwg # 335.
Follow specifications.

SUPERSTRUCTURE FOR A 70'x18' CONCRETE ARCHED TRUSS FOR THE LIVING SPRINGS BRIDGE

AT LOT # 15 CONCESSION 2 TOWNSHIP OF W. GARAFRAXA
ROAD # 1.5
FOR THE
TOWNSHIP OF WEST GARAFRAXA
Scale:- 1" = 4'-0"

A.W. CONNOR & CO. ENGRS
301 Metropolitan Bldg. TORONTO.
July / 28

DWG # C-6-9

35-202

PROFILE OF APPROACHES
Horizontal Scale:- 1"=20'
Vertical Scale:- 1"=5'

PLAN OF SITE
Scale:- 1"=20'

PART PLAN OF RETAINING WALL

PLAN OF NORTH ABUTMENT

PLAN OF S. ABUTMENT

ELEVATION OF RETAINING WALL

LONGITUDINAL SECTION (N. ABUT.)

SIDE ELEVATION N. ABUTMENT.

ELEVATION (S. ABUT)

END ELEVATION OF SOUTH ABUTMENT
(For Details of Retaining Wall see other Plan & Elev.)
AND CROSS SECTION OF ROAD AT END OF WING WALL

Reinforcing Steel shown thus _____
Place horizontal steel 2" From OUTSIDE of Walls
" Vertical " 2" " INSIDE " "
" " 2" " Both sides of Retaining Wall.

Concrete in Substructure (1:2½:5 or 1/6) = 1446 cu yds
" " coping 1:2:4 & Railing = 15 " "
" " Superstructure = 98.2 " "
Total Concrete = 240.3 " "

Reinforcing Steel = 15000 lbs/ supplied to Contractor
Tie Rods & Hangers = 8000 lbs

For Superstructure see Dwg C-6-9

SUBSTRUCTURE
FOR
70' x 18' CONCRETE ARCH TRUSS
LIVING SPRINGS BRIDGE
AT LOT 15 CON. #2 ROAD #15 W. GARAFRAXA TP
FOR THE
TOWNSHIP OF WEST GARAFRAXA

Scale:- 1"=4'-0"

A.W. Connor & Co. Eng'rs
301 Metropolitan Bldg.
Toronto.
July 4/28

Dwg # C-35

3379-1

SITE MAP
#35-202

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