

APPENDIX E - CULTURAL HERITAGE EVALUATION REPORT

**Cultural Heritage Evaluation Report
St. Paul Street West CNR Bridge Replacement**

**Lots 19-20, Concession 7
Former Grantham Township, County of Welland
City of St. Catharines
Regional Municipality of Niagara**

Prepared for:

Associated Engineering Ltd.
509 Glendale Avenue East, Suite 300
Niagara-on-the-Lake, ON L0S 1J0

ASI File 18CH-157

February 2019 (Revised April 2019)



**Cultural Heritage Evaluation Report
St. Paul Street West CNR Bridge Replacement**

**Lots 19-20, Concession 7
Former Grantham Township, County of Welland
City of St. Catharines
Regional Municipality of Niagara**

EXECUTIVE SUMMARY

ASI was contracted by Associated Engineering Ltd. to conduct a Cultural Heritage Evaluation Report (CHER) of the St. Paul Street West CNR Bridge Replacement as part of transportation improvements to St. Paul Street West (Regional Road 81). The subject bridge (Structure No. 081215) is a three-span, slab on steel girder structure that carries two lanes of east and westbound St. Paul Street West vehicular traffic over the Canadian National Railway (CNR) at Mile 11.68 of the Grimsby Subdivision in the City of St. Catharines. The preferred alternative involves the complete removal and replacement of the subject bridge to address structural deficiencies, section loss, and poor road geometry.

This report will evaluate the cultural heritage significance of the subject bridge, assess preliminary impacts of the proposed undertaking in consideration of its determined cultural heritage value, and recommend preliminary mitigation measures. The existing bridge was constructed circa 1922¹ and was rehabilitated in 1977.

Based on the results of archival research, an analysis of bridge design and construction in Ontario, field investigations, and application of Regulation 9/06 of the *Ontario Heritage Act*, the St. Paul Street West CNR Bridge was determined to possess heritage value. The St. Paul Street West CNR Bridge was determined to retain physical/design value as an early and representative example of a slab on steel girder structure in the local context and is the oldest of this type of structure owned by the Regional Municipality of Niagara. The structure also retains contextual value given the physical, functional, and historical links to its surroundings in the City of St. Catharines.

Given the identified heritage value of the St. Paul Street West CNR Bridge and the preferred alternative involving the complete removal and replacement of the structure, the following recommendations and mitigation measures should be considered and implemented:

1. Conservation Alternatives 1 - 3 are the preferred alternatives for the St. Paul Street West CNR Bridge, with Alternative 1 being the most preferred. As part of the selection of the preferred alternatives as part of the Environmental Assessment, a clear rationale for the proposed course of action should be documented.

¹ Data provided by the Region of Niagara list a construction date of 1910, however the subject bridge was constructed in 1922 to replace an earlier, existing crossing. The 1910 construction date is assumed to be related to the earlier structure that was replaced by the extant bridge.

2. Should retention of the subject bridge be chosen as the preferred alternative (one of Conservation Alternatives 1 – 7), the character-defining elements identified in Section 5.1 should be retained and treated sympathetically.
3. Should removal/replacement of the St. Paul Street West CNR Bridge be chosen as the preferred alternative (Conservation Alternative 8 or 9), three mitigation options should be considered:
 - a. Replacement/removal of existing bridge and construction of a new bridge with replication of the appearance of the heritage bridge in the new design, with allowances for the use of modern materials. The character-defining elements identified in Section 5.1 should be considered for replication.
 - b. Replacement/removal of existing bridge and construction of a new bridge with historically sympathetic design qualities to the heritage bridge, with allowances for the use of new technologies and materials.
 - c. In addition to (a) and (b), development of a commemorative strategy, such as plaquing, may be appropriate.
4. Should removal and/or replacement of the St. Paul Street West CNR Bridge be chosen, a Heritage Impact Assessment (HIA) should be completed by a qualified heritage specialist and filed with the City of St. Catharines Heritage Advisory Committee, the Ministry of Tourism, Culture and Sport, and any other heritage stakeholders that may have an interest in this project.
5. To mitigate direct impacts to the St. Catharines Train Station in the vicinity of the subject bridge, construction and staging activities should be suitably planned and executed to ensure that impacts are minimized and mitigated. Suitable staging activities may include temporary barriers and the establishment of no-go zones throughout construction. On-site workers should be notified of the cultural heritage significance of the subject bridge and the St. Catharines Train Station in advance of construction.
6. To mitigate indirect impacts to the mature trees adjacent to the subject bridge, construction and staging activities should be suitably planned and executed to ensure that impacts are minimized and mitigated. Tree protection zones should be established to protect the mature treeline in the west limit of Cameron Park adjacent to Great Western Street. On-site workers should be notified of the tree protection zones in advance of construction.



7. This report should be submitted to the City of St. Catharines Heritage Advisory Committee, the Ministry of Tourism, Culture and Sport, and other local heritage stakeholders that may have an interest in this project.



PROJECT PERSONNEL

<i>Senior Project Manager:</i>	Annie Veilleux, MA, CAHP <i>Senior Heritage Specialist Manager</i> <i>Cultural Heritage Division</i>
<i>Project Manager:</i>	John Sleath, MA <i>Archaeologist Cultural Heritage Associate</i> <i>Cultural Heritage Division</i>
<i>Project Coordinator:</i>	Sarah Jagelewski, Hon. BA <i>Archaeologist Assistant Manager Environmental</i> <i>Assessment Division</i>
<i>Project Administrator:</i>	Carol Bella, Hon. BA <i>Research Archaeologist</i>
<i>Archival Research:</i>	John Sleath
<i>Report Preparation:</i>	Michael Wilcox, PhD <i>Cultural Heritage Assistant Cultural Heritage</i> <i>Division</i>
<i>Graphics Preparation:</i>	Jonas Fernandez, MSc <i>Lead Archaeologist Assistant Manager - Fleet &</i> <i>Geomatics Specialist - Operations Division</i>
<i>Report Reviewer:</i>	Laura Loney, MPlan, CAHP <i>Cultural Heritage Specialist Project Manager,</i> <i>Cultural Heritage Division</i>
	Lindsay Graves, MA CAHP (Pending) <i>Senior Heritage Specialist Senior Project Manager</i> <i>Cultural Heritage Division</i>



TABLE OF CONTENTS

EXECUTIVE SUMMARY i

PROJECT PERSONNEL..... iv

TABLE OF CONTENTS v

1.0 INTRODUCTION 1

2.0 BUILT HERITAGE RESOURCE AND CULTURAL HERITAGE LANDSCAPE ASSESSMENT CONTEXT 2

 2.1 Legislation and Policy Context 2

 2.2 Municipal Policies 6

 2.2.1 Municipal Consultation 9

 2.3 Cultural Heritage Evaluation and Heritage Impact Assessment Report 10

3.0 HISTORICAL CONTEXT AND CONSTRUCTION 11

 3.1 Introduction..... 11

 3.2 Local History and Settlement 11

 3.2.1 *Grantham Township*..... 11

 3.2.2 *City of St. Catharines* 11

 3.3 History of the subject bridge, St. Paul Street West, and Previous Bridge Crossings 12

 3.4 Bridge Construction 18

 3.4.1 *Early Bridge Building in Ontario* 18

 3.4.2 *Beam and Girder Bridge Construction*..... 18

 3.4.3 *Construction of the St. Paul Street CNR Bridge* 18

4.0 EXISTING CONDITIONS AND INTEGRITY 21

 4.1 Comparative Geographic and Historic Context of Slab on Steel Girder Bridges 24

 4.2 Additional Cultural Heritage Resources..... 26

5.0 HERITAGE EVALUATION OF ST. PAUL’S STREET WEST CNR BRIDGE..... 27

 5.1 Draft Statement of Cultural Heritage Value- St. Paul Street West CNR Bridge 29

 5.1.1 Description of Property..... 29

 5.1.2 Cultural Heritage Value 29

 5.1.3 List of Heritage Attributes..... 29

6.0 ALTERNATIVES TO BE CONSIDERED FOR HERITAGE BRIDGES AS PART OF THE ENVIRONMENTAL ASSESSMENT PROCESS 29

7.0 ENVIRONMENTAL ASSESSMENT OPTIONS 30

 7.1 Evaluation of Impacts 30

8.0 CONCLUSIONS 34

9.0 RECOMMENDATIONS..... 34

10.0 REFERENCES 36

APPENDIX A: Photographic Plates 40

APPENDIX B: Select Structural Drawings 54

APPENDIX C: Comparative Bridges Owned and Maintained by the Regional Municipality of Niagara 73

APPENDIX D: Preliminary Conceptual Design Renderings (Select Pages from Ellis 2017) 74

LIST OF FIGURES

Figure 1: Location of the Subject Bridge..... 1

Figure 2: The location of the subject bridge overlaid on the 1862 Tremaine Map 14

Figure 3: The location of the subject bridge overlaid on the 1876 Page Map..... 14

Figure 4: The location of the subject bridge overlaid on the 1907 NTS map 15

Figure 5: The location of the subject bridge overlaid on the 1915 NTS map 15

Figure 6: The location of the subject bridge overlaid on the 1934 aerial image 16

Figure 7: The location of the subject bridge overlaid on the 1935 Fire Insurance plan for St. Catharines 16



Figure 8: The location of the subject bridge overlaid on the 1954 aerial image17
Figure 9: The location of the subject bridge overlaid on the 1963 NTS map17
Figure 10: St. Catharines Train Station circa 1910. Note a bridge over the rail track in the location of the subject bridge at far right (Niagara Falls Public Library 1910)20
Figure 11: St. Catharines Train Station circa 1915. Note a bridge over the rail track in the location of the subject bridge at far right (St. Catharines Public Library 1915)20
Figure 12: Orthographic image of the subject bridge and surrounding area23
Figure 13: Forty Mile Creek Bridge, Main Street West, Grimsby, built in 1922 (Google Streetview)25
Figure 14: 12 Mile Creek Bridge, Fourth Avenue, St. Catharines, built in 1978 (Google Streetview).....25
Figure 15: St. Catharines Train Station at 5 Great Western Street that is adjacent to the subject bridge (ASI, 31 January 2019)26
Figure 16: Colourized postcard of St. Catharines Train Station circa 1915 (St. Catharines Public Library 1915)27
Figure 17: Conceptual rendering of the existing St. Paul Street West CNR Bridge (Ellis 2017: Appendix C)32
Figure 18: Conceptual rendering of the proposed replacement St. Paul Street West CNR Bridge (Ellis 2017: Appendix C)33

LIST OF TABLES

Table 1: Evaluation of the St. Paul Street West Bridge using Ontario Regulation 9/0627



1.0 INTRODUCTION

ASI was contracted by Associated Engineering Ltd. to conduct a Cultural Heritage Evaluation Report (CHER) of the St. Paul Street West CNR Bridge Replacement as part of transportation improvements to St. Paul Street West (Regional Road 81). The subject bridge (Structure No. 081215) is a three-span, slab on steel girder structure that carries two lanes of east and westbound St. Paul Street West vehicular traffic over the Canadian National Railway (CNR) at Mile 11.68 of the Grimsby Subdivision in the City of St. Catharines (Figure 1). Due to significant structural deficiencies, the subject bridge is anticipated to be removed and replaced as part of the proposed undertaking.

This report will evaluate the cultural heritage significance of the structure and assess impacts of the proposed undertaking in consideration of its determined cultural heritage value.

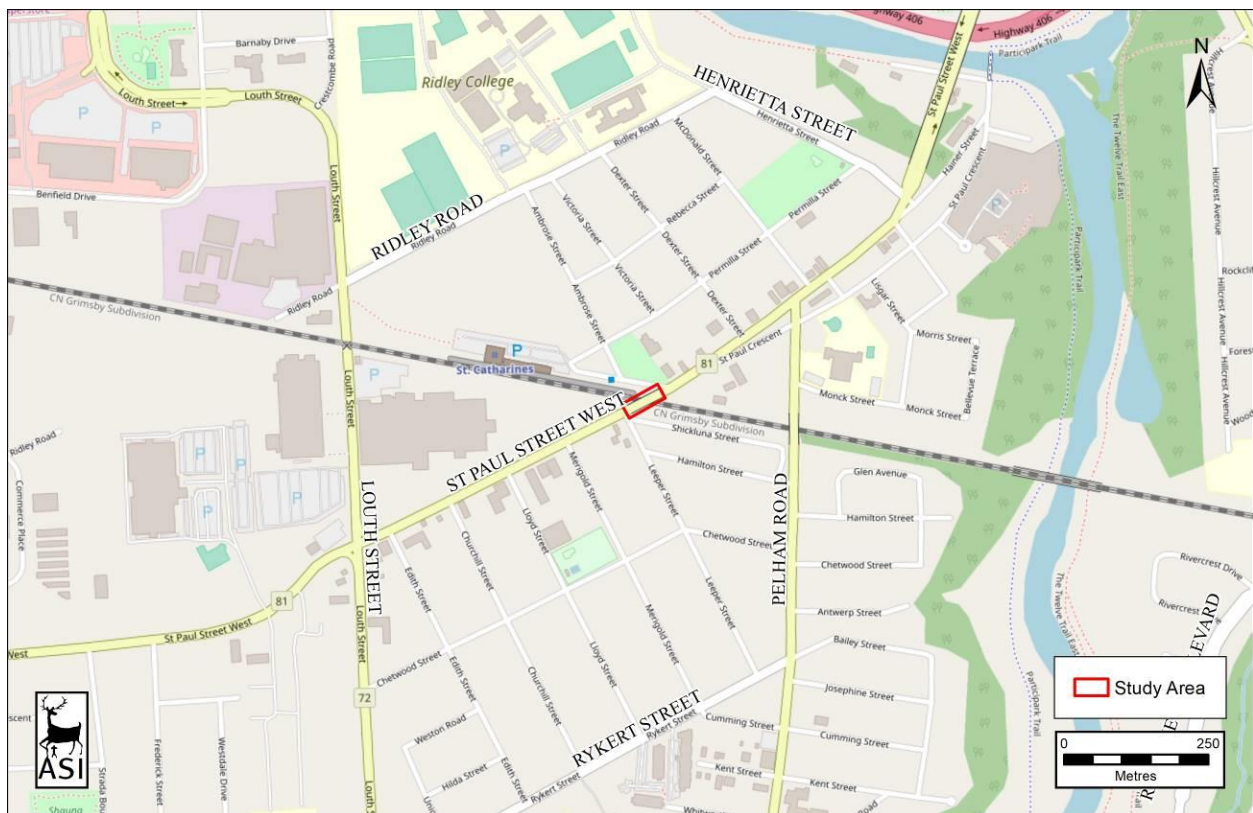


Figure 1: Location of the Subject Bridge.

Base Map: ©OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA ESRI Street Maps)

The following report is presented as part of an approved planning and design process subject to Environmental Assessment (EA) requirements. This portion of the EA study is intended to address the proposed replacement of the subject structure. The principal aims of this report are to:

- Describe the methodology that was employed and the legislative and policy context that guides heritage evaluations of bridges over 40 years old;

- Provide an historical overview of the design and construction of the structure within the broader context of the surrounding Regional Municipality of Niagara and bridge construction generally;
- Describe existing conditions and heritage integrity;
- Evaluate the bridge using Regulation 9/06 of the *Ontario Heritage Act* and draw conclusions about the heritage attributes of the structure; and
- Assess impacts of the undertaking, ascertaining sensitivity to change in the context of identified heritage attributes and recommend appropriate mitigation measures.

2.0 BUILT HERITAGE RESOURCE AND CULTURAL HERITAGE LANDSCAPE ASSESSMENT CONTEXT

2.1 Legislation and Policy Context

This cultural heritage assessment considers cultural heritage resources in the context of improvements to specified areas, pursuant to the *Environmental Assessment Act*. This assessment addresses above-ground cultural heritage resources over 40 years old. Use of a 40-year-old threshold is a guiding principle when conducting a preliminary identification of cultural heritage resources (Ministry of Tourism, Culture and Sport 2016). While identification of a resource that is 40 years old or older does not confer outright heritage significance, this threshold provides a means to collect information about resources that may retain heritage value. Similarly, if a resource is slightly younger than 40 years old, this does not preclude the resource from retaining heritage value.

For the purposes of this assessment, the term cultural heritage resources is used to describe both cultural heritage landscapes and built heritage resources. A cultural landscape is perceived as a collection of individual built heritage resources and other related features that together form farm complexes, roadsides and nucleated settlements. Built heritage resources are typically individual buildings or structures that may be associated with a variety of human activities, such as historical settlement and patterns of architectural development.

The analysis throughout the study process addresses cultural heritage resources under various pieces of legislation and their supporting guidelines. Under the *Environmental Assessment Act* (1990) environment is defined in Subsection 1(c) to include:

- cultural conditions that influence the life of man or a community, and;
- any building, structure, machine, or other device or thing made by man.

The Ministry of Tourism, Culture and Sport is charged under Section 2 of the *Ontario Heritage Act* with the responsibility to determine policies, priorities and programs for the conservation, protection and preservation of the heritage of Ontario and has published two guidelines to assist in assessing cultural heritage resources as part of an environmental assessment: *Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments* (1992), and *Guidelines on the Man-Made Heritage Component of Environmental Assessments* (1980). Accordingly, both guidelines have been utilized in this assessment process.

The *Guidelines on the Man-Made Heritage Component of Environmental Assessments* (Section 1.0) states the following:



When speaking of man-made heritage we are concerned with the works of man and the effects of his activities in the environment rather than with movable human artifacts or those environments that are natural and completely undisturbed by man.

In addition, environment may be interpreted to include the combination and interrelationships of human artifacts with all other aspects of the physical environment, as well as with the social, economic and cultural conditions that influence the life of the people and communities in Ontario. The *Guidelines on the Man-Made Heritage Component of Environmental Assessments* distinguish between two basic ways of visually experiencing this heritage in the environment, namely as cultural heritage landscapes and as cultural features.

Within this document, cultural heritage landscapes are defined as the following (Section 1.0):

The use and physical appearance of the land as we see it now is a result of man's activities over time in modifying pristine landscapes for his own purposes. A cultural landscape is perceived as a collection of individual man-made features into a whole. Urban cultural landscapes are sometimes given special names such as townscapes or streetscapes that describe various scales of perception from the general scene to the particular view. Cultural landscapes in the countryside are viewed in or adjacent to natural undisturbed landscapes, or waterscapes, and include such land uses as agriculture, mining, forestry, recreation, and transportation. Like urban cultural landscapes, they too may be perceived at various scales: as a large area of homogeneous character; or as an intermediate sized area of homogeneous character or a collection of settings such as a group of farms; or as a discrete example of specific landscape character such as a single farm, or an individual village or hamlet.

A cultural feature is defined as the following (Section 1.0):

...an individual part of a cultural landscape that may be focused upon as part of a broader scene, or viewed independently. The term refers to any man-made or modified object in or on the land or underwater, such as buildings of various types, street furniture, engineering works, plantings and landscaping, archaeological sites, or a collection of such objects seen as a group because of close physical or social relationships.

The Minister of Tourism, Culture, and Sport has also published *Standards and Guidelines for Conservation of Provincial Heritage Properties* (2014; *Standards and Guidelines* hereafter). These *Standards and Guidelines* apply to properties the Government of Ontario owns or controls that have cultural heritage value or interest. They are mandatory for Ministries and prescribed public bodies and have the authority of a Management Board or Cabinet directive. Prescribed public bodies include:

- Agricultural Research Institute of Ontario
- Hydro One Inc.
- Liquor Control Board of Ontario
- McMichael Canadian Art Collection
- Metrolinx
- The Niagara Parks Commission
- Ontario Heritage Trust
- Ontario Infrastructure and Lands Corporation



- Ontario Lottery and Gaming Corporation
- Ontario Power Generation Inc.
- Royal Botanical Gardens
- Toronto Area Transit Operating Authority
- St. Lawrence Parks Commission

The *Standards and Guidelines* provide a series of definitions considered during the assessment:

A provincial heritage property is defined as the following (14):

Provincial heritage property means real property, including buildings and structures on the property, that has cultural heritage value or interest and that is owned by the Crown in right of Ontario or by a prescribed public body; or that is occupied by a ministry or a prescribed public body if the terms of the occupancy agreement are such that the ministry or public body is entitled to make the alterations to the property that may be required under these heritage standards and guidelines.

A provincial heritage property of provincial significance is defined as the following (14):

Provincial heritage property that has been evaluated using the criteria found in *Ontario Heritage Act* O. Reg. 10/06 and has been found to have cultural heritage value or interest of provincial significance.

A built heritage resource is defined as the following (13):

...one or more significant buildings (including fixtures or equipment located in or forming part of a building), structures, earthworks, monuments, installations, or remains associated with architectural, cultural, social, political, economic, or military history and identified as being important to a community. For the purposes of these Standards and Guidelines, “structures” does not include roadways in the provincial highway network and in-use electrical or telecommunications transmission towers.

A cultural heritage landscape is defined as the following (13):

...a defined geographical area that human activity has modified and that has cultural heritage value. Such an area involves one or more groupings of individual heritage features, such as structures, spaces, archaeological sites, and natural elements, which together form a significant type of heritage form distinct from that of its constituent elements or parts. Heritage conservation districts designated under the *Ontario Heritage Act*, villages, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trails, and industrial complexes of cultural heritage value are some examples.

Additionally, the *Planning Act* (1990) and related *Provincial Policy Statement (PPS)*, which was updated in 2014, make several provisions relating to heritage conservation. One of the general purposes of the *Planning Act* is to integrate matters of provincial interest in provincial and municipal planning decisions. To inform all those involved in planning activities of the scope of these matters of provincial interest, Section 2 of the *Planning Act* provides an extensive listing. These matters of provincial interest shall be regarded when certain authorities, including the council of a municipality, carry out their responsibilities under the *Act*. One of these provincial interests is directly concerned with:



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

Part 4.7 of the *PPS* states that:

The official plan is the most important vehicle for implementation of this Provincial Policy Statement. Comprehensive, integrated and long-term planning is best achieved through official plans.

Official plans shall identify provincial interests and set out appropriate land use designations and policies. To determine the significance of some natural heritage features and other resources, evaluation may be required.

Official plans should also coordinate cross-boundary matters to complement the actions of other planning authorities and promote mutually beneficial solutions. Official plans shall provide clear, reasonable and attainable policies to protect provincial interests and direct development to suitable areas.

In order to protect provincial interests, planning authorities shall keep their official plans up-to-date with this Provincial Policy Statement. The policies of this Provincial Policy Statement continue to apply after adoption and approval of an official plan.

Those policies of relevance for the conservation of heritage features are contained in Section 2- Wise Use and Management of Resources, wherein Subsection 2.6 - Cultural Heritage and Archaeological Resources, makes the following provisions:

2.6.1 Significant built heritage resources and significant cultural heritage landscapes shall be conserved.

Several definitions that have specific meanings for use in a policy context accompany the policy statement. These definitions include built heritage resources and cultural heritage landscapes.

A built heritage resource is defined as: “a building, structure, monument, installation or any manufactured remnant that contributes to a property’s cultural heritage value or interest as identified by a community, including an Aboriginal community” (Ministry of Municipal Affairs and Housing 2014).

A cultural heritage landscape is defined as “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 Aboriginal community. The area may involve features such as structures, spaces, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association” (Ministry of Municipal Affairs and Housing 2014). Examples may include, but are not limited to farmscapes, historical settlements, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trailways, and industrial complexes of cultural heritage value.

In addition, significance is also more generally defined. It is assigned a specific meaning according to the subject matter or policy context, such as wetlands or ecologically important areas. Regarding cultural heritage and archaeology resources, resources of significance are those that are valued for the important



contribution they make to our understanding of the history of a place, an event, or a people (Ministry of Municipal Affairs and Housing 2014).

Criteria for determining significance for the resources are recommended by the Province, but municipal approaches that achieve or exceed the same objective may also be used. While some significant resources may already be identified and inventoried by official sources, the significance of others can only be determined after evaluation (Ministry of Municipal Affairs and Housing 2014).

Accordingly, the foregoing guidelines and relevant policy statement were used to guide the scope and methodology of the cultural heritage assessment.

2.2 Municipal Policies

The City of St. Catharines has developed an Official Plan (*The Garden City Plan*, 2012) which sets out several policies regarding cultural heritage resources. Policies that are relevant to this study are included below.

Part C: General Policies

3. CULTURAL HERITAGE

Cultural Heritage is the legacy of physical artifacts, including buildings, structures, sites, or landscapes, either individually or in groups, which are considered to be of cultural heritage value or interest at the community, regional, provincial, or national level.

Conserving and enhancing our cultural heritage is important not only because it connects us to our past and helps us to interpret our history, but also because it makes economic sense. Heritage can benefit the local economy by attracting visitors to the City, and favorably influencing the decisions of those contemplating new investment or residence in the city.

The City's cultural heritage resources have in the past been threatened by neglect, obsolescence, redevelopment, and the lack of the financial means necessary for protection or rehabilitation. The following policies provide the framework for the protection and enhancement of the City's cultural heritage resources.

3.1. General Policies

1. The City shall identify cultural heritage resources through a continuing process of inventory, survey, and evaluation.
2. The City shall foster awareness and appreciation of the city's cultural heritage and encourage public and private stewardship.
3. The City shall support the continuing use, reuse, care, and conservation of cultural heritage resources and properties.
4. All development/redevelopment shall have regard for identified cultural heritage resources and shall wherever feasible, incorporate these resources into any development plan.



5. The City may require a cultural heritage impact assessment where a proposed development/redevelopment or site alteration of lands, or on adjacent lands, has the potential to adversely affect cultural heritage resources. The City shall develop guidelines for the preparation of cultural impact assessments.
6. Development/redevelopment and site alteration may be permitted on adjacent lands to protected heritage property pursuant to Part IV and V of the Ontario Heritage Act, where the proposed development or 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.
7. All new development/redevelopment in established areas of cultural heritage value or interest shall also be subject to the City's Urban Design Guidelines to ensure development is in keeping with the overall character of these areas.
8. All City-owned cultural heritage resources shall be conserved and maintained in a state of good repair.
9. When a City-owned heritage property is sold, leased, or transferred to another owner, where possible a heritage easement agreement will be secured and barrier free public access maintained to areas with heritage value.
10. The City shall encourage the adaptive reuse of heritage properties. Any permitted
 - i. redevelopment shall ensure, where possible, that the original building fabric and
 - ii. architectural features are retained and restored and that any new additions will
 - iii. complement the existing building.

3.2. Heritage Designation

7. In reviewing proposals for the construction, demolition, or removal of buildings and structures or the alteration of existing buildings, the City shall be guided by the applicable heritage district plan and the following general principles where there is potential to impact any cultural heritage resources:
 - a) Heritage buildings, associated landscape features and archaeological sites including their surroundings shall be protected from any adverse effects of change;
 - b) Original building fabric and architectural features should be retained, repaired, or restored rather than replaced wherever possible;
 - c) New additions and features should generally be no higher than the existing building and wherever possible be placed to the rear of the building or set back substantially from the principle façade;
 - d) New construction and/or infilling should be compatible with surrounding buildings and streetscapes by being generally of the same height, width and orientation as adjacent buildings; being of similar setback; and using similarly proportioned windows, doors, and shape;
 - e) Design, style, materials and colours for new construction will be considered on an individual basis on the premise that contemporary styles can be more appropriate in certain cases than using design styles and motifs from previous periods;



- f) Public works and landscaping within a designated district should ensure that existing roads and streetscapes are maintained or enhanced and that proposed changes respect and are complementary to the identified heritage character of the district;
- g) The City shall have regard for cultural heritage resources in undertaking public works. When necessary, the City will require measures to mitigate any negative impacts on significant cultural heritage resources;
- h) The City shall encourage local utility providers to place equipment and devices in locations which do not detract from the visual character of cultural resources and which do not have a negative impact on the architectural integrity of those resources, where feasible;
- i) Required road rights-of-way indicated elsewhere in the Official Plan, will be required in designated districts but every effort shall be made to ensure that existing pavement widths, especially where they are major contributors to the character of the streetscapes, will be retained;
- j) The City shall have regard for cultural heritage resources especially in terms of the character of landscapes and streetscapes, tree lines, bridges and the prevailing pattern of settlement in considering the construction of new roads and road improvements including realignment and road widening. When necessary, the City will require measures to mitigate any negative impacts on significant cultural heritage resources.

3.5. Cultural Heritage Landscapes

1. A Cultural Heritage Landscape is a defined geographical area characterized by human settlement activities that have resulted in changes and modifications to the environment, which is now considered to be of cultural heritage value or interest. Cultural Heritage Landscapes may include but are not limited to designated heritage conservation districts, urban streetscapes and mainstreets, industrial complexes, neighbourhoods, and designed landscapes such as parks, cemeteries, gardens and rural landscapes.
2. The City shall prepare an inventory of Cultural Heritage Landscapes which may be included in the Register of Properties of Cultural Heritage Value or Interest, or may be considered for designation under the Ontario Heritage Act, and shall be protected in the carrying out of any undertaking subject to the Environmental Assessment Act or the Planning Act.

3.6. Cultural Heritage Impact Assessments

1. A cultural heritage impact assessment may be required by the City and submitted prior to or at the time of any application submission pursuant to the Planning Act where the proposed development, site alteration, or redevelopment of lands (private and public) has the potential to adversely affect cultural heritage resources through displacement or disruption, and including:
 - destruction, removal or restoration of any, or part of any, heritage attributes or feature;
 - alteration, including restoration, renovation, repair or disturbance;
 - shadows created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings;



- isolation of a heritage attribute from its surrounding environment, context or a significant relationship;
- direct or indirect obstruction of significant views or vistas from, within, or to a built or natural heritage feature;
- a change in land use allowing new development or site alteration to fill in formerly open spaces;
- soil disturbance including a change in grade, alteration of the drainage pattern, or excavation.

3.7. Implementation

The City may encourage the conservation and enhancement of cultural heritage resources through the following methods:

- a) Participation in the programs of senior levels of government intended for the protection and restoration of cultural heritage resources;
- b) The consideration of funding programs to aid in the protection and restoration of heritage resources;
- c) Support the engagement of the arts community and others in the promotion and development of cultural heritage programs and activities;
- d) Creation of partnerships with heritage foundations and other groups and organizations;
- e) The use of preferred or beneficial zoning in exchange for the preservation of on-site buildings, landscapes, or streetscapes of cultural heritage value or interest, as provided for in Part F, Section 16.8 of the Plan.
- f) The consideration of the preservation and enhancement of cultural heritage resources as a condition of planning approvals.

2.2.1 Municipal Consultation

The City of St. Catharines was also consulted for additional information on the subject bridge.² A response from the Chole Richer, Heritage Planner at the City of St. Catharines received on 3 April 2019 confirmed that the subject bridge was not subject to existing heritage recognition by the City of St. Catharines. This response also confirmed the heritage recognition of the St. Catharines Train Station located at 5 Great Western Street adjacent to the subject bridge. Further municipal consultation was conducted with the Regional Municipality of Niagara by Associated Engineering Ltd. on behalf of ASI. Additional documents including inspection reports and comparative bridge data were provided by the Regional Municipality of Niagara.

Additional consultation was carried out with the Special Collection Department of the City of St. Catharines Public Library (email communication 14 February 2019). A response confirmed that there was no additional information regarding the subject bridge in the Special Collections holdings.

² Email correspondence on 8 February 2019 using email contact form on www.stcatharines.ca. Follow-up correspondence was directed to Amanda Knutson on 3 April 2019 at aknutson@stcatharines.ca. A response was received 3 April 2019 by Amanda Knutson and Chole Richer at cricher@stcatharines.ca.



2.3 Cultural Heritage Evaluation and Heritage Impact Assessment Report

The scope of a Cultural Heritage Evaluation (CHE) is guided by the Ministry of Tourism, Culture and Sport's *Ontario Heritage Toolkit* (2006). Generally, CHEs include the following components:

- A general description of the history of the study area as well as a detailed historical summary of property ownership and building(s) development;
- A description of the cultural heritage landscape and built heritage resources;
- Representative photographs of the exterior and interior of a building or structure, and character-defining architectural details;
- A cultural heritage resource evaluation guided by the *Ontario Heritage Act* criteria;
- A summary of heritage attributes;
- Historical mapping, photographs; and
- A location plan.

Using background information and data collected during the site visit, the cultural heritage resource is evaluated using criteria contained within Regulation 9/06 of the *Ontario Heritage Act*.

Ontario Heritage Act Regulation 9/06 provides a set of criteria, grouped into the following categories which determine the cultural heritage value or interest of a potential heritage resource in a municipality:

- i) Design/Physical Value;
- ii) Historical/Associative Value; and
- iii) Contextual Value.

Should the potential heritage resource meet one or more of the above-mentioned criteria, a Heritage Impact Assessment (HIA) is required and the resource considered for designation under the *Ontario Heritage Act*.

The scope of a Heritage Impact Assessment (HIA) is provided by the MTC's *Ontario Heritage Tool Kit*. An HIA is a useful tool to help identify cultural heritage value and provide guidance in supporting environmental assessment work. As part of a heritage impact assessment, proposed site alterations and project alternatives are analyzed to identify impacts of the undertaking on the heritage resource and its heritage attributes. The impact of the proposed development on the cultural heritage resource is assessed, with attention paid to identifying potential negative impacts, which may include, but not limited to:

- Destruction of any, or part of any, significant heritage attributes or features;
- Alteration that is not sympathetic, or is incompatible, with the historic fabric and appearance;
- Shadows created that alter the appearance of a heritage attribute or change the viability of an associated natural feature or plantings, such as a garden;
- Isolation of a heritage attribute from its surrounding environment, context or a significant relationship;
- Direct or indirect obstruction of significant views or vistas within, from, or of built and natural features;
- A change in land use (such as rezoning a church to a multi-unit residence) where the change in use negates the property's cultural heritage value;
- Land disturbances such as a change in grade that alters soils, and drainage patterns that adversely affect a cultural heritage resource, including archaeological resources.



Where negative impacts of the development on the cultural heritage resource are identified, mitigative or avoidance measures or alternative development or site alteration approaches are considered.

3.0 HISTORICAL CONTEXT AND CONSTRUCTION

3.1 Introduction

The St. Paul Street West CNR bridge (Structure No. 081215) is a two-lane, three-span, slab on steel girder structure resting on concrete abutments that is located at Mile 11.68 of the CNR Grimsby Subdivision in the City of St. Catharines. The existing bridge was constructed circa 1922 and measures 41.5 metres in length and 13.9 metres in width. The subject bridge is historically in Lot 19 and 20 Concession 7 in Grantham Township, County of Welland (Figures 2 and 3).

Cultural heritage resources are those buildings or structures that have one or more heritage attributes. Heritage attributes are constituted by and linked to historical associations, architectural or engineering qualities, and contextual values. Inevitably, many, if not all, heritage resources are inherently tied to “place”; geographical space, within which they are uniquely linked to local themes of historical activity and from which many of their heritage attributes are directly distinguished today. In certain cases, however, heritage features may also be viewed within a much broader context. The following section of this report details a brief historical background to the settlement of the surrounding area. A description is also provided of the construction of the bridge within its historical context.

3.2 Local History and Settlement

3.2.1 Grantham Township

The land within Grantham Township was acquired by the British from the Mississaugas in 1784. The first township survey was undertaken in 1784, and the first legal settlers occupied their land holdings the same year. The township was named after a town in Lincolnshire, England. It may also have been named to honour Sir Thomas Robinson, 2nd Earl Grantham, who was British secretary of foreign affairs at the end of the American Revolutionary War in 1783. Grantham was initially settled by disbanded soldiers, mainly Butler’s Rangers, following the end of the American Revolutionary War. In 1805, Boulton noted that Grantham was in a good situation with good quality soil, but “indifferently circumstanced for roads.” There were no major battles fought in Grantham during the War of 1812, although several farms were plundered by forces from both sides. Grantham experienced greater economic prosperity following the construction of the Welland Canal. By the 1840s, the township was said to contain good land but that the farms were not well cultivated. The population was comprised mainly of Canadians, Americans, Irish, Scottish, and English settlers (Boulton 1805:80; Smith 1846:71; Armstrong 1985:144; Rayburn 1997:141; Grantham Women’s Institute 1940).

3.2.2 City of St. Catharines

St. Catharines was incorporated as a City in 1876. At that time, the municipal limits were contained within Lots 13 to 20, Concessions 5, 6 and 7. Since amalgamation in 1960, it has occupied parts of Grantham and Louth Townships. St. Catharines was incorporated as a town in 1845, and as a City in



1876. First settled by Loyalists and disbanded soldiers from Butler's Rangers during the 1780s, the village was a small mercantile and milling centre which grew slowly until after the War of 1812. It was named St. Catharines, possibly after the first church, which was built here in 1796. New growth and prosperity came to the community during and after the construction of the Welland Canal in the late 1820s. The town benefited from the construction of the Great Western Railway in the mid-1850s. The town was one of the terminal points on the Underground Railway during the 1850s and was once home to Harriet Tubman. Registered plans of subdivision for this village date from 1836-1867. During the 1870s, the town contained seven churches, three banks and insurance companies, several hotels, a commercial college, grammar and high schools, a convent, general hospital, four newspaper and printing houses, and several stores. Many industries were attracted here on account of the abundant water supply, the canal and the proximity of the railway. These included flour, saw and planing mills, foundries, machine shops, soap and candle factories, tanneries, woollen mills, breweries, a sewing machine factory and Shickluna's ship building yard. The town became a fashionable resort during the mid-nineteenth century on account of its celebrated mineral springs. In 1866, St. Catharines became the capital of Lincoln County at which time the county offices were relocated here from the town of Niagara. The population in 1873 was 7,864 (Crossby 1873:287; Winearls 1991:796-798; Scott 1997:195-196; Rayburn 1997:300).

3.3 History of the subject bridge, St. Paul Street West, and Previous Bridge Crossings

Historically, the subject bridge is located in the former Township of Grantham, County of Welland, in part of Lots 19-20, Concession 7.

A review of historical mapping, archival records, and periodicals suggests that an earlier bridge crossing was originally constructed in the location of the present structure, perhaps around 1910. Documentation including a Board Order (No. 30337), the Ellis Engineering Load Capacity Evaluation (Appendix D) and the general arrangement drawings of the extant structure suggest that the 1922 structure was a replacement bridge to an earlier structure (Appendix B). This earlier bridge was a structure of unknown material and was removed when the extant structure was erected in 1922.

The 1862 *Tremaine's Map of the Counties of Lincoln and Welland* (Tremaine 1862), and the 1876 *Illustrated Historical Atlas of the County of Welland* (Page 1876) were examined to determine the presence of historic features within the study area during the nineteenth century (Figure 2 and Figure 3). The 1862 Tremaine map depicts only scattered development in the area around the railway. The area is largely agricultural, though there are a hotel and toll gate at the intersection of St. Paul Street West and Pelham Road. There is no bridge crossing the Great Western Railway tracks. The subject area remained on the periphery of the town of St. Catharines over the following decade, though there was some development. Many new streets to the north-east and south-west of the railway indicate that this part of St. Catharines, incorporated as a city in 1876, had started to urbanize.

It should be noted, however, that not all features of interest were mapped systematically in the Ontario series of historical atlases, given that they were financed by subscription, and subscribers were given preference regarding the level of detail provided on the maps. Moreover, not every feature of interest would have been within the scope of the atlases. In addition, the use of historical map sources to reconstruct/predict the location of former features within the modern landscape generally proceeds by using common reference points between the various sources. These sources are then geo-referenced in order to provide the most accurate determination of the location of any property on historic mapping sources. The results of such exercises are often imprecise or even contradictory, as there are numerous potential sources of error inherent in such a process, including the vagaries of map production (both past



and present), the need to resolve differences of scale and resolution, and distortions introduced by reproduction of the sources. To a large degree, the significance of such margins of error is dependent on the size of the feature one is attempting to plot, the constancy of reference points, the distances between them, and the consistency with which both they and the target feature are depicted on the period mapping.

In addition to nineteenth-century mapping, topographical maps from 1907, 1915, and 1963, aerial photographs from 1934 and 1954, and a Fire Insurance map from 1935 were examined as part of this study.

The 1907 and 1915 NTS Maps (Figure 4 and Figure 5) depict new buildings, including houses, schools, and churches, in the subject area. This evidence of urbanization might indicate that a bridge was becoming necessary, given the greater traffic crossing the railway and/or the greater volume of railway traffic itself. The 1907 map does not depict a bridge. However, a photograph from c. 1910 (Figure 10) and a postcard from 1915 (Figure 11) do show a bridge crossing the railway. Plus, a 1920 order from the Board of Railway Commissioners of Canada states that the Grand Trunk Railway be given permission to replace an existing bridge with the subject bridge (Board of Railway Commissioners of Canada 1920). Given this information, it is evident that a previous bridge was built at the crossing circa 1908-1910 before the subject bridge was constructed in 1922.

By the early 1930s, the population of St. Catharines had grown to just under 25,000. The expansion of the population required development outside the downtown core. The 1934 aerial photograph and the 1935 Fire Insurance map (Figure 6 and Figure 7) show this growth. While agricultural lands remain north and west of the subject bridge, many houses, as well as churches, schools, and other structures, are shown within its immediate vicinity. The Pelham Road bridge is visible just to the east of the subject bridge, and is made of wood, unlike the St. Paul Street West bridge which is made of steel. This might indicate that it was not as frequently travelled upon to warrant a more secure structure.

In the post-World War II era, St. Catharines continued its rapid population growth, jumping to almost 85,000 by 1961. The 1954 aerial photograph and the 1963 NTS map (Figure 8 and Figure 9) demonstrate that this considerable development occurred in the City of St. Catharines in the immediate environs of the subject bridge. Marked development is depicted to the north and east of the bridge. Many more houses and parks are visible than in previous maps, and distinct names for neighbourhoods have developed, including Hainer, Chelsea Green, and Pelham Road. To the west of the bridge, large industrial complexes have been constructed. Further to the west, agricultural lands remain the same as they had in earlier mapping.





Figure 2: The location of the subject bridge overlaid on the 1862 Tremaine Map

Base Map: Tremaine 1862



Figure 3: The location of the subject bridge overlaid on the 1876 Page Map

Base Map: Page 1876





Figure 4: The location of the subject bridge overlaid on the 1907 NTS map
Base Map: NTS Sheet No. 3 (Niagara) (Department of Militia and Defence, 1907)



Figure 5: The location of the subject bridge overlaid on the 1915 NTS map
Base Map: NTS Sheet No. 3 (Niagara) (Department of Militia and Defence, 1915)



Figure 6: The location of the subject bridge overlaid on the 1934 aerial image
Base Map: Canada, Department of Energy, Mines, and Resources, 1934

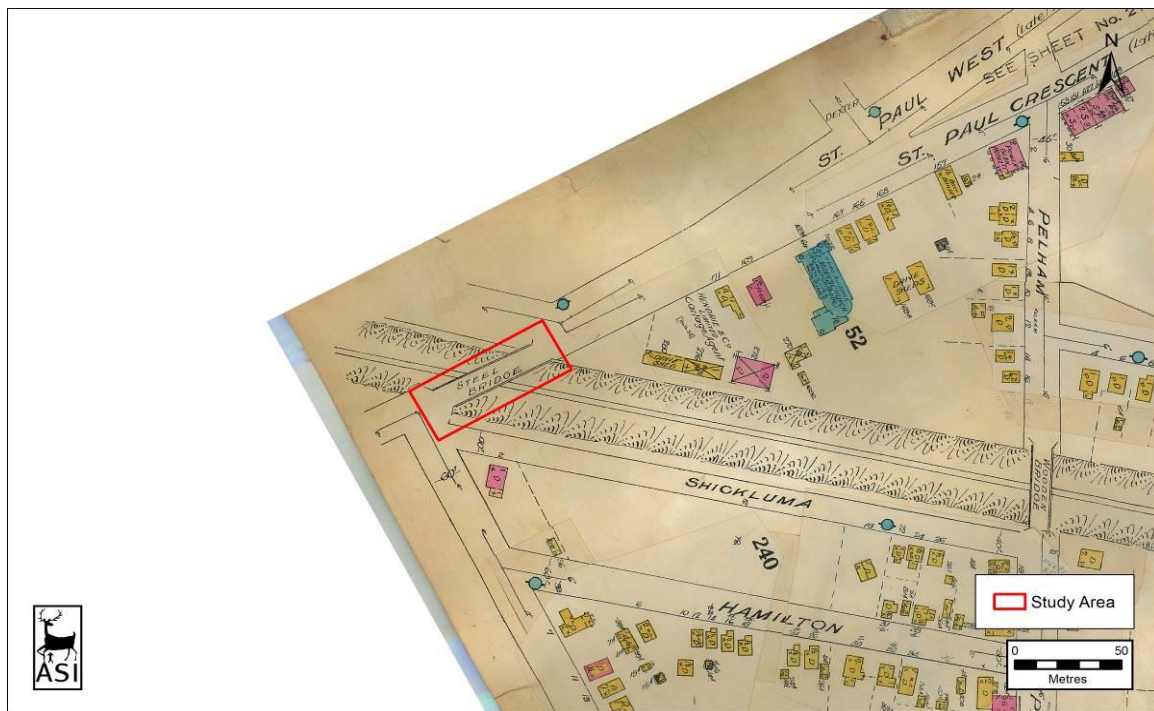


Figure 7: The location of the subject bridge overlaid on the 1935 Fire Insurance plan for St. Catharines
Base Map: Sheet No. 22 (Goald 1935)



Figure 8: The location of the subject bridge overlaid on the 1954 aerial image
Base Map: Plate 432.792 Hunting Survey Corporation 1954



Figure 9: The location of the subject bridge overlaid on the 1963 NTS map
Base Map: NTS Sheet 30M/3f (Port Dalhousie) (Army Survey Establishment, 1963)

3.4 Bridge Construction

3.4.1 Early Bridge Building in Ontario

Up until the 1890s, timber truss bridges were the most common bridge type built in southern Ontario. Stone and wrought iron materials were also employed, but due to their higher costs and a lack of skilled craftsman, these structures were generally restricted to market towns. By the 1890s, steel was becoming the material of choice for bridge construction as it was less expensive and more durable than wood or wrought iron. Steel truss structures and steel girder bridges were very common by 1900. The use of concrete in constructing bridges was introduced at the beginning of the twentieth century, and by the 1930s it challenged steel as the primary bridge construction material in Ontario (Heritage Resource Centre 2008:7-8).

The increased use of automobiles in the 1930s directly impacted the course of highway design and planning, thus impacting the design and construction of highway bridges. Factors impacting bridge design included increasing road allowances and clearance requirements, heavier traffic, higher speeds, safety standards, and most importantly, cost limitations (Cuming 1983:56). From the 1930s to the early 1950s, fewer bridges were constructed because of a steel shortage, and builders were challenged to develop more efficient ways to build structures with a heavier emphasis on concrete and minimal steel usage. Some of the new techniques developed included: pre-casting concrete components off site; “Hi-bond type” of reinforcing concrete; and pre-stressed concrete beam construction (Heritage Resource Centre 2008:9). The rigid frame, hollow concrete box beam and post-tensioned voided slab are some of the bridge types to develop during this period.

3.4.2 Beam and Girder Bridge Construction

Beam or girder technology was commonly used for bridge construction in Ontario. This bridge type is comprised of girders, members placed perpendicular to the ford, supported by abutments and piers, when necessary. Simple girder bridges were constructed in the nineteenth century out of wood to support rail, pedestrian, and vehicular traffic primarily across water obstacles. At the turn of the twentieth century, steel beams were introduced and were supported first by stone and then concrete abutments and piers. However, the large, rolled steel girders were difficult to transport and thus costlier. Plate girders afforded an economic and logistical solution as they consisted of smaller steel segments that could be welded and riveted together on site. These plate girder bridges proliferated and were commonly used to support railways in both urban and rural settings throughout the twentieth century (Cleary 2007: 50).

3.4.3 Construction of the St. Paul Street CNR Bridge

According to a board order from the Board of Railway Commissioners of Canada signed 15 November 1920 (Board Order No. 30337), the Grand Trunk Railway (GTR) was permitted to replace a structure over the rail line with the extant bridge. According to this Board Order, the GTR would pay for the replacement of the structure and the City of St. Catharines would pay for the construction and maintenance of the roadway and sidewalk (The Board of Railway Commissioners of Canada 1920).

While no information was available regarding the previous structure that was replaced by the subject bridge in 1922, historical images depict the previous bridge. An historical photograph taken in 1910



(Figure 10) and a colourized postcard from 1915 (Figure 11) depict the St. Catharines Train Station and a bridge crossing over the rail line in the location of the subject bridge. Details of this bridge are vague in the historical images, however, they confirm that the subject bridge was a replacement to an earlier structure.

The original structural drawings, entitled *Grand Trunk Railway System London Division- 17th District. Proposed Renewal O.H. Bridge M.P. 11.68 St. Catharines* were reviewed as part of this assessment. The design drawings for the subject bridge were prepared 13 April 1921 by an engineer with the Grand Trunk Railroad Office of Chief Engineer with the initials “H.F.”. No additional information regarding this individual is known.

Based on a review of available data, the subject bridge was constructed in 1922. During this time, the Structural Engineer was H.B. Stuart and the Chief Engineer was J.L.C. Bondy. While it is likely one or both engineers at the very least granted approval for the construction, the engineer responsible for designing the subject bridge is unknown.

The subject bridge was subject to extensive rehabilitation in 1977 to address structural concerns (Appendix B). These rehabilitations included:

- Full depth replacement of portions of the reinforced concrete bridge deck;
- Replacement of concrete on portions of the transverse stringers;
- Replacement of both reinforced concrete sidewalks;
- Repairs to the north end of the east abutment;
- Waterproofing and asphalt paving; and
- Removal of stairs and construction of a new reinforced concrete retaining wall at the northwest corner (Ellis 2018).

According to available documentation (CNR 2008, Ellis 2018), the subject bridge underwent minor undocumented repairs to the concrete abutments at an unknown date.





Figure 10: St. Catharines Train Station circa 1910. Note a bridge over the rail track in the location of the subject bridge at far right (Niagara Falls Public Library 1910)

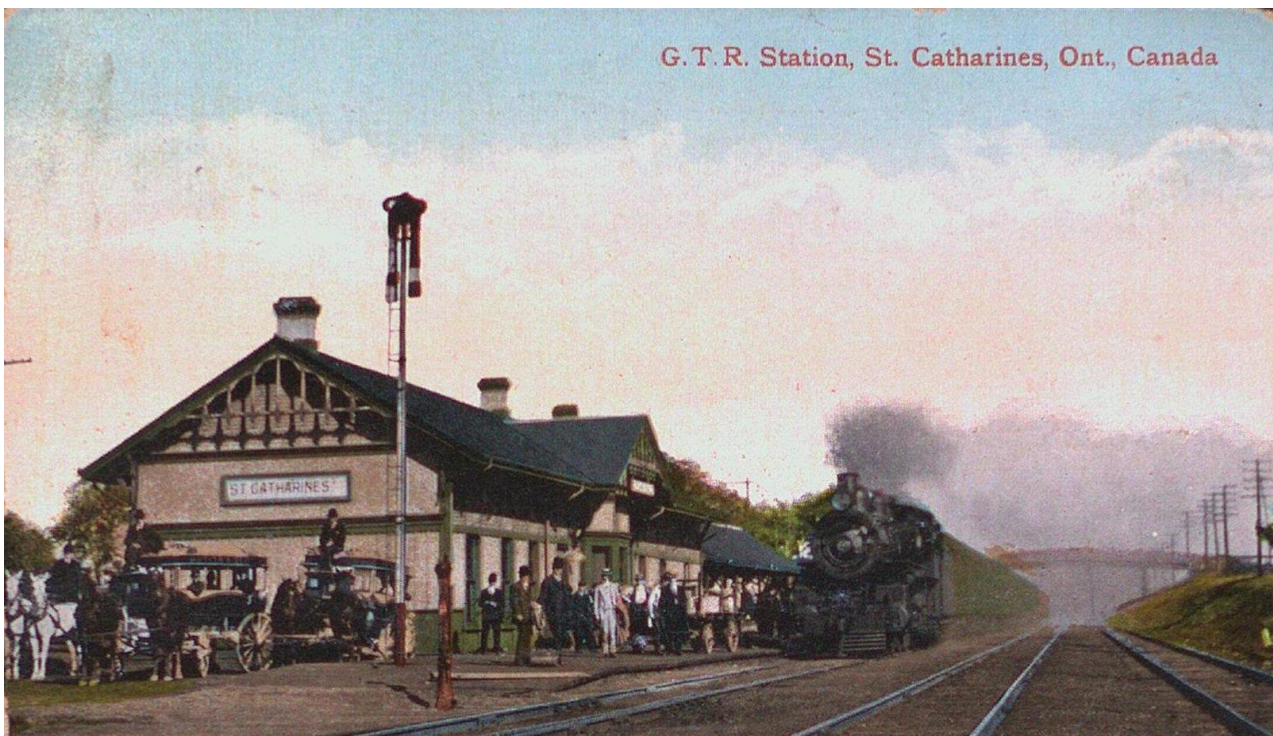


Figure 11: St. Catharines Train Station circa 1915. Note a bridge over the rail track in the location of the subject bridge at far right (St. Catharines Public Library 1915)

4.0 EXISTING CONDITIONS AND INTEGRITY

A field review was undertaken by John Sleath and Michael Wilcox on 31 January 2018 to conduct photographic documentation of the crossing and to collect data relevant for completing a heritage evaluation of the structure. Results of the field review and bridge inspection reports received from the client 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 location of the subject bridge is provided in Figure 12, photographic documentation of the bridge crossing is provided in Appendix A (Plates 1-28), and select structural drawings are provided in Appendix B.

Historically, the subject bridge is located within Lot 19-20, Concession 7 in the former Township of Grantham, Niagara County. The subject bridge is a three-span, slab on steel girder structure that carries two lanes of St. Paul Street West vehicular traffic east and westbound over two lines of the Canadian National Railway (CNR) at Mile 11.68 of the Grimsby Subdivision in the City of St. Catharines.

The substructure of the subject bridge features two steel bents and cast-in-place concrete abutments with the formwork joints visible on some exterior surfaces. Both the east and west abutments feature steel-to-steel bearings that support the riveted steel plate girders that form the main support element of the superstructure. The two bents feature steel girders with vertical, horizontal, and diagonal members. The structural elements of the bents are joined by rivets, with additional plates at the intersection of vertical and diagonal members. The bents rest on concrete footings.

The superstructure of the subject bridge features two riveted through-plate girders that carry the center span of the bridge. The portion extending below the deck rests on the bents and abutments, while the portion extending above the deck provides a barrier between the pedestrian sidewalk and the roadway. Transverse steel stringers are riveted to the through-plate girders at 6-foot (1.8 metres) intervals (Appendix B), which in turn support the cast-in-place concrete deck and cast-in-place concrete sidewalks. The bridge has an overall length of 41.5 metres, with an east span, center span, and west span measuring 9.3 metres, 17.4 metres, and 14.8 metres, respectively. The east and west spans feature steep approach grades, and the entire structure features a skew of 51 degrees.

The deck of the subject bridge carries two lanes of east and westbound undivided vehicular St. Paul Street West traffic. The roadway has a travel width of 30 feet (9.1 metres) (Appendix B), and an overall width of 13.9 metres. There is a pedestrian sidewalk on the north and south of the bridge that is divided from the roadway by the top portion of the through-plate girders. Steel lattice railings are located on the outer margin of the sidewalks. The deck lacks street furniture, signage, and lighting.

The approaches of the bridge are at a lower grade than the bridge, resulting in steep grades of 7.3% and 7.74% in the approach spans to accommodate the necessary bridge height above the rail line (Appendix B). This results in poor visibility over the structure and requires a reduced vehicular speed limit of 20 km/h over the bridge to ensure safety.

The subject bridge is currently owned/maintained by the Regional Municipality of Niagara. According to a board order from the Board of Railway Commissioners of Canada signed 15 November 1920 (Board Order No. 30337), the Grand Trunk Railway (GTR) was permitted to replace the structure over the rail line with the extant bridge. According to this Board Order, the GTR would pay for the replacement of the structure, and the City of St. Catharines would pay for the construction and maintenance of the roadway and sidewalk (The Board of Railway Commissioners of Canada 1920). It is not known when the



ownership and maintenance responsibilities were transferred from the City of St. Catharines to the Regional Municipality of Niagara.

According to inspections undertaken in 2018, the structure was in generally poor condition due to severe deterioration and section loss and was recommended for immediate replacement (Ellis 2018:iii). This evaluation notes:

Due to severe deterioration and section loss, we recommend inspecting the structure for further deterioration and displacements every six months until the structure is replaced. The structural steel shall be checked for any increase in section loss or perforations, particularly at the bottom flanges and the webs of the main girders. The concrete deck shall be inspected for punch holes. If further deterioration is found, an updated load capacity evaluation may be required.

We agree with the 2017 inspection report that, due to the deteriorated state of the bridge and poor roadway geometry, the structure should be replaced NOW (Ellis 2018:9).

The bridge crossing is bounded by commercial structures fronting on St. Paul's Street West on the southeast, a wooded area and residences to the southwest on Shickluna Street, undeveloped lands adjacent to an industrial/warehouse facility on the northwest, and a low-rise apartment and Cameron Park adjacent to Great Western Street to the northeast. The west limit of Cameron Park adjacent to Great Western Street features an established treeline that appears to be mature striped maple trees. Great Western Street provides access to St. Catharines GO/Via train station, which is located to the immediate northwest of the subject bridge.





Figure 12: Orthographic image of the subject bridge and surrounding area

Base Map: ESRI DigitalGlobe



4.1 Comparative Geographic and Historic Context of Slab on Steel Girder Bridges

The subject bridge is a three-span, slab on steel girder structure that carries two lanes of east and westbound St. Paul Street West vehicular traffic over the Canadian National Railway (CNR) at Mile 11.68 of the Grimsby Subdivision in the City of St. Catharines. The bridge was constructed in 1922 and is 41.5 metres in length and 13.9 metres in width. An inventory of bridges within the Region of Niagara was consulted for this comparative analysis (Regional Municipality of Niagara 2018). According to this inventory, the subject bridge is one of 17 slab on steel girder structures owned and maintained by the Regional Municipality of Niagara (Appendix B). Five of these 17 comparative bridges carry municipal roadways over the CNR lines in the region.

The subject bridge, constructed in 1922, is the oldest of the 17 bridges (along with the Forty Mile Creek Bridge on Main Street West in Grimsby, also constructed in 1922) (Figure 13). Most of the slab on steel girder bridges within the Regional Municipality of Niagara were constructed in the 1950s, 1960s, and 1970s. The subject bridge is significant in terms of its age of construction.

The subject bridge, measuring 41.5 metres in overall length, is the tenth-longest of the 17 bridges in the comparative sample. The 12 Mile Creek Bridge on Fourth Avenue in St. Catharines with a total length of 246.9 metres is the longest (Figure 14). The subject bridge is not significant in terms of the overall length.

Based on the review and comparison of the available bridges in this comparative sample, the three-span, slab on steel bridge on St. Paul Street West, constructed in 1922 and measuring 41.5 metres in length is considered to be significant in terms of age but not in terms of overall length.

The following images are included to provide a comparison between like structures (Figure 13 and Figure 14).



Figure 13: Forty Mile Creek Bridge, Main Street West, Grimsby, built in 1922 (Google Streetview)



Figure 14: 12 Mile Creek Bridge, Fourth Avenue, St. Catharines, built in 1978 (Google Streetview)

4.2 Additional Cultural Heritage Resources

There is one previously-identified cultural heritage resource adjacent to the subject bridge. The St. Catharines Train Station (Figure 15 and Figure 16), located at 5 Great Western Street to the north-west of the subject bridge, is currently a Priority 1 property on the *St. Catharines Register of Non-Designated Cultural Heritage Properties*. Since 2009, St. Catharines has been accumulating a register of non-designated properties of cultural heritage value. Buildings or structures on the register, particularly those with a Priority 1 ranking, may be designated under the *Ontario Heritage Act* upon further review and assessment.

The St. Catharines Train Station is also designated as a Canadian Heritage Railway Station under the *Heritage Railway Stations Protection Act* (Parks Canada 2017).



Figure 15: St. Catharines Train Station at 5 Great Western Street that is adjacent to the subject bridge (ASI, 31 January 2019)

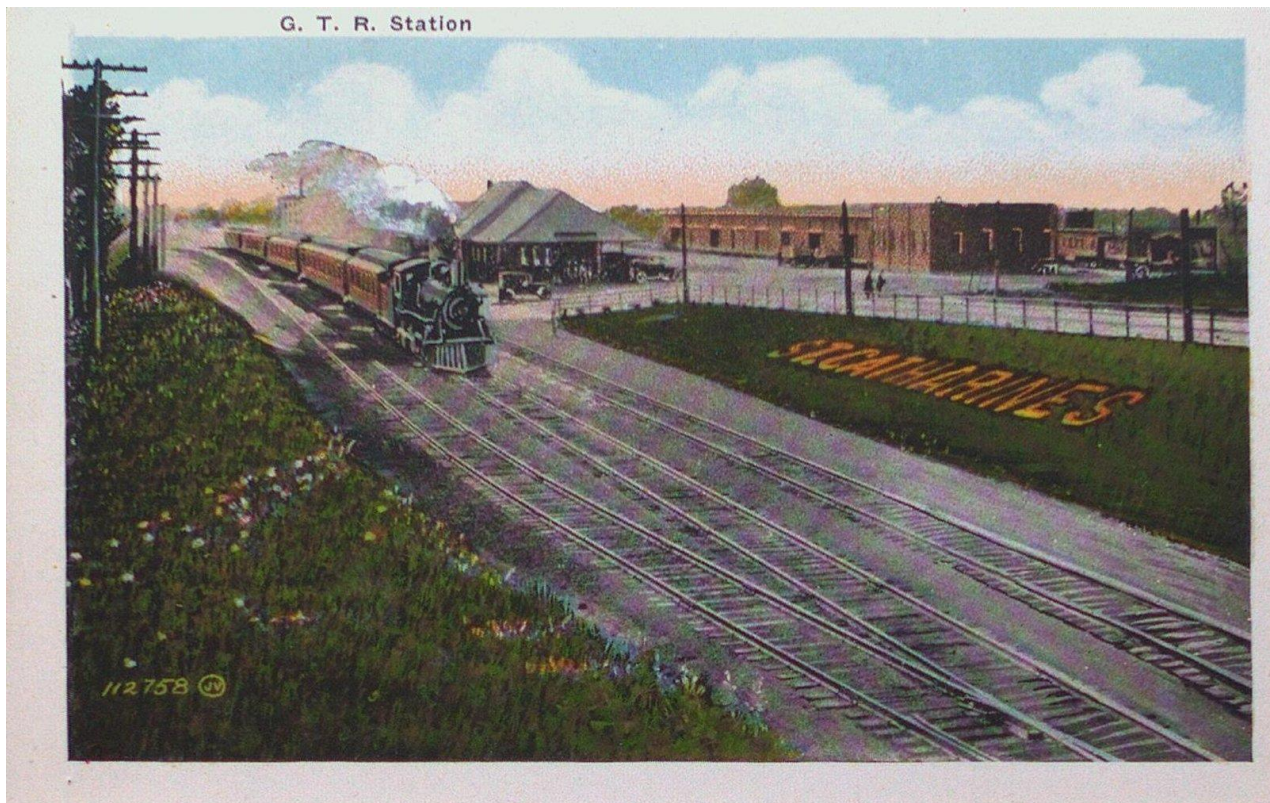


Figure 16: Colourized postcard of St. Catharines Train Station circa 1915 (St. Catharines Public Library 1915)

5.0 HERITAGE EVALUATION OF ST. PAUL'S STREET WEST CNR BRIDGE

Table 1 contains the evaluation of the subject against criteria as set out in Regulation 9/06 of the *Ontario Heritage Act*. Within the Municipal EA process, Regulation 9/06 is the prevailing evaluation tool when determining if a heritage resource, in this case bridges, have cultural heritage value.

Table 1: Evaluation of the St. Paul Street West Bridge using Ontario Regulation 9/06

1. The property has design value or physical value because it:

<i>Ontario Heritage Act</i> Criteria	Analysis
i. is a rare, unique, representative or early example of a style, type, expression, material or construction method;	The subject bridge is a three-span, slab on steel girder structure that carries two lanes of east and westbound St. Paul Street West vehicular traffic over the Canadian National Railway (CNR) at Mile 11.68 of the Grimsby Subdivision in the City of St. Catharines. The bridge was constructed in 1922 and is 41.5 metres in length and 13.9 metres in width. The subject bridge is the oldest example of a concrete slab on steel girder bridge in the Regional Municipality of Niagara and is a representative example of a steel through girder bridge constructed by the GTR in the City of St. Catharines. The subject bridge meets this criterion.
ii. displays a high degree of craftsmanship or artistic	The subject bridge does not display a high degree of craftsmanship or artistic merit and does not meet this criterion.

Table 1: Evaluation of the St. Paul Street West Bridge using Ontario Regulation 9/06

merit, or;	
iii. demonstrates a high degree of technical or scientific achievement.	The subject bridge exhibits a low degree of technical achievement, and as such, does not meet this criterion.

2. The property has historical value or associative value because it:

<i>Ontario Heritage Act Criteria</i>	Analysis
i. has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community;	The structure was constructed in the early-twentieth century in the City of St. Catharines by the GTR. While St. Paul Street West is an historically surveyed road, the extant structure is not original to the roadway, and was constructed as a replacement to an earlier structure. As such it does not retain a significant association with early settlement themes in the community. The subject structure does not meet this criterion.
ii. yields, or has the potential to yield, information that contributes to an understanding of a community or culture, or;	This criterion is not satisfied given that the structures do not contribute to an understanding of a community or culture.
iii. demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.	The subject bridge was designed by an engineer with the GTR Office of Chief Engineer with initials "H.F." and approved by JLC Bondy, Chief Engineer. The impact of these two individuals in the local context is unknown, and as such, the subject structure does not meet this criterion.

3. The property has contextual value because it:

<i>Ontario Heritage Act Criteria</i>	Analysis
i. is important in defining, maintaining or supporting the character of an area;	The subject bridge provides access to St. Paul Street West motorists over the CN rail line in the City of St. Catharines. However, it is the bridging point and not the structure that maintain this character. Therefore, the subject structure does not meet this criterion.
ii. is physically, functionally, visually or historically linked to its surroundings, or;	The location of the subject bridge has served as an historical bridging point for vehicles over the CN (and formerly GTR) rail and is physically associated with St. Paul Street West, an historically surveyed road. The subject bridge is physically, visually, and historically linked to its surroundings, and as such, the subject bridge meets this criterion.
iii. is a landmark.	While visible to motorists on St. Paul Street West and to passengers travelling on the rail line, subject bridge is not considered a defining element to the setting or a waypoint along the roadway and does not meet this criterion.

The above evaluation confirms that this structure does not meet the criteria contained in Regulation 9/06 of the *Ontario Heritage Act* and therefore is currently not considered to be a cultural heritage resource eligible for designation under the *Ontario Heritage Act*.

5.1 Draft Statement of Cultural Heritage Value- St. Paul Street West CNR Bridge

5.1.1 Description of Property

The subject bridge is a three-span, slab on steel girder structure that carries two lanes of east and westbound St. Paul Street West vehicular traffic over the Canadian National Railway (CNR) at Mile 11.68 of the Grimsby Subdivision in the City of St. Catharines. The bridge was constructed in 1922 by the Grand Trunk Railways (GTR) and rehabilitated in 1977. The structure measures 41.5 metres in length and 13.9 metres in width.

5.1.2 Cultural Heritage Value

The St. Paul Street West CNR Bridge was determined to retain physical/design value as an early and representative example of a slab on steel girder structure in the local context. The subject bridge is the oldest of the slab on steel girder bridges owned by the Regional Municipality of Niagara. The structure also retains contextual value given the physical, functional, and historical links to its surroundings in the City of St. Catharines.

5.1.3 List of Heritage Attributes

In summary, character-defining elements associated with St. Paul Street West CNR Bridge include, but are not limited to:

- Riveted steel plate through girders, transverse steel stringers, and other steel structural members;
- Riveted steel bents;
- Steel lattice railing; and
- Cast-in-place concrete abutments.

Key heritage attributes that embody the historical, associative, and contextual value of the subject bridge include:

- Early and representative example of a slab on steel girder bridge in the local context;
- Physically, historically, and functionally carries St. Paul Street West over the CNR (formerly GTR) in the City of St. Catharines.

6.0 ALTERNATIVES TO BE CONSIDERED FOR HERITAGE BRIDGES AS PART OF THE ENVIRONMENTAL ASSESSMENT PROCESS

Following the evaluation of the subject cultural heritage resource, the St. Paul Street West CNR Bridge was determined to retain cultural heritage value. The following nine conservation options/alternatives are



arranged according to the level or degree of intervention from minimum to maximum. The conservation options are based on the *Ontario Heritage Bridge Program* (1991), which is regarded as current best practice for conserving heritage bridges in Ontario and ensures that heritage concerns, and appropriate mitigation options, are considered.

1. Retention of existing bridge and restoration of missing or deteriorated elements where physical or documentary evidence (e.g., photographs or drawings) can be used for their design;
2. Retention of existing bridge with no major modifications undertaken;
3. Retention of existing bridge with sympathetic modification;
4. Retention of existing bridge with sympathetically designed new structure in proximity;
5. Retention of existing bridge no longer in use for vehicle purposes but adapted for pedestrian walkways, cycle paths, scenic viewing etc.;
6. Relocation of bridge to appropriate new site for continued use or adaptive re-use;
7. Retention of bridge as heritage monument for viewing purposes only;
8. Replacement/removal of existing bridge with salvage elements/members of heritage bridge for incorporation into new structure or for future conservation work or displays;
9. Replacement/removal of existing bridge with full recording and documentation of the heritage bridge.

The proposed undertaking involves the removal and replacement of the subject bridge. Given that the bridge was found to retain cultural heritage value under Regulation 9/06, all nine of these conservation options should be considered as part of the proposed undertaking.

7.0 ENVIRONMENTAL ASSESSMENT OPTIONS

The proposed undertaking involves the removal and replacement of the subject bridge and proposed modification of surrounding roadway geometry. Conceptual design renderings are provided in Figure 17 and Figure 18, and in Appendix D.

The scope of the environmental assessment includes evaluating the bridge width (existing width with 2 lanes and sidewalk versus widened bridge with 2 lanes, bike lanes and sidewalk) as well as investigate which bridge material will optimize the design and safety of the roadway (improve sight lines) (Associated Engineering Ltd. Email communication, 15 March 2019).

As the subject bridge was determined to retain cultural heritage value under Ontario Regulation 9/06, the nine conservation alternatives listed in Section 6.0 should be considered as bridge improvement alternatives.

7.1 Evaluation of Impacts

To assess the potential impacts of the proposed alternatives, the identified heritage attributes of the subject bridge were considered against a range of possible impacts as outlined in the Ministry of Tourism and Culture document entitled *Screening for Impacts to Built Heritage and Cultural Heritage Landscapes* (November 2010), which include:

- Destruction of any, or part of any, significant heritage attribute or feature (III.1).



- Alteration which means a change in any manner and includes restoration, renovation, repair or disturbance (III.2).
- Shadows created that alter the appearance of a heritage attribute or change the visibility of a natural feature of plantings, such as a garden (III.3).
- Isolation of a heritage attribute from its surrounding environment, context, or a significant relationship (III.4).
- Direct or indirect obstruction of significant views or vistas from, within, or to a built and natural feature (III.5).
- A change in land use such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces (III.6).
- Soil disturbance such as a change in grade, or an alteration of the drainage pattern, or excavation, etc. (III.7)

Conservation Alternatives 1 - 3 are the preferred alternatives for the subject bridge, with Alternative 1 being the most preferred due to the limited degree of impacts. As part of the selection of the preferred alternatives as part of the Environmental Assessment, a clear rationale for the proposed course of action should be documented, with the option involving the lowest degree of impact selected, where feasible.

Should retention of the subject bridge be chosen as the preferred alternative (one of Conservation Alternatives 1 – 7), the character-defining elements identified in Section 5.1 should be retained and treated sympathetically.

Should retention and rehabilitation of the subject bridge prove to be infeasible within the constraints of the project, a clear rationale for the proposed replacement should be documented (i.e. if the safety of the bridge is compromised to the extent that rehabilitation is not possible, if cost of rehabilitation is prohibitive compared to replacement, if cost of long-term maintenance of the existing structure is prohibitive compared to replacement, or replacement is required to meet demand requirements etc.).

Should removal and replacement of the St. Paul Street West CNR Bridge be chosen as the preferred alternative (Conservation Alternative 8 or 9), the replacement bridge should be designed in a manner that is sympathetic to the identified heritage value of the structure outlined in Section 5.1. Where feasible, the replacement structure should be designed to replicate the appearance of the heritage bridge in the new design, with allowances for the use of modern materials. The character-defining elements identified in Section 5.1 should be considered for replication.

Should removal and/or replacement of the St. Paul Street West CNR Bridge be chosen, a Heritage Impact Assessment (HIA) should be completed by a qualified heritage specialist and filed with the City of St. Catharines Heritage Advisory Committee, the Ministry of Tourism, Culture and Sport, and any other heritage stakeholders that may have an interest in this project.





Figure 17: Conceptual rendering of the existing St. Paul Street West CNR Bridge (Ellis 2017: Appendix C)





Figure 18: Conceptual rendering of the proposed replacement St. Paul Street West CNR Bridge (Ellis 2017: Appendix C)



8.0 CONCLUSIONS

Based on the results of archival research, an analysis of bridge design and construction in Ontario, field investigations, and application of Regulation 9/06 of the *Ontario Heritage Act*, the St. Paul Street West CNR Bridge was determined to possess cultural heritage value. The subject bridge is a three-span, slab on steel girder structure that carries two lanes of east and westbound St. Paul Street West vehicular traffic over the Canadian National Railway (CNR) at Mile 11.68 of the Grimsby Subdivision in the City of St. Catharines. The bridge was constructed in 1922 by the Grand Trunk Railways (GTR) and rehabilitated in 1977. The structure measures 41.5 metres in length and 13.9 metres in width.

The St. Paul Street West CNR Bridge was determined to retain physical/design value as an early and representative example of a slab on steel girder structure in the local context and is the oldest of this type of structure owned by the Regional Municipality of Niagara. The structure also retains contextual value given the physical, functional, and historical links to its surroundings in the City of St. Catharines.

9.0 RECOMMENDATIONS

Based on the results of archival research, an analysis of bridge design and construction in Ontario, field investigations, and heritage evaluation, the St. Paul Street West CNR Bridge was determined to retain cultural heritage value following application of Regulation 9/06 of the *Ontario Heritage Act*, and therefore should be considered for municipal designation.

The proposed undertaking involves the removal and replacement of the subject bridge and proposed modification of surrounding roadway geometry. Structural replacement will address structural deficiencies, section loss, and poor road geometry.

Following the evaluation of potential impacts to the St. Paul Street West CNR Bridge, it was determined that Conservation Alternatives 1 – 3 are the preferred alternatives, given that no impacts are expected to the heritage resource and its identified heritage attributes, with Alternative 1 being the most preferred. The remaining conservation alternatives (4 – 9) have a range of impacts, with Alternatives 8 and 9 being the least preferred options given the level and nature of the impacts resulting from removal of the bridge.

As part of the selection of the preferred alternatives as part of the Environmental Assessment, a clear rationale for the proposed course of action should be documented, with the option involving the lowest degree of impact selected, where feasible.

Given the identified heritage value of the St. Paul Street West CNR Bridge and the preferred alternative involving the complete removal of the structure, the following recommendations and mitigation measures should be considered and implemented:

1. Conservation Alternatives 1 - 3 are the preferred alternatives for the St. Paul Street West CNR Bridge, with Alternative 1 being the most preferred. As part of the selection of the preferred alternatives as part of the Environmental Assessment, a clear rationale for the proposed course of action should be documented.
2. Should retention of the subject bridge be chosen as the preferred alternative (one of Conservation Alternatives 1 – 7), the character-defining elements identified in Section 5.1 should be retained and treated sympathetically.



3. Should removal/replacement of the St. Paul Street West CNR Bridge be chosen as the preferred alternative (Conservation Alternative 8 or 9), three mitigation options should be considered:
 - a. Replacement/removal of existing bridge and construction of a new bridge with replication of the appearance of the heritage bridge in the new design, with allowances for the use of modern materials. The character-defining elements identified in Section 5.1 should be considered for replication.
 - b. Replacement/removal of existing bridge and construction of a new bridge with historically sympathetic design qualities to the heritage bridge, with allowances for the use of new technologies and materials.
 - c. In addition to (a) and (b), development of a commemorative strategy, such as plaquing, may be appropriate.
4. Should removal and/or replacement of the St. Paul Street West CNR Bridge be chosen, a Heritage Impact Assessment (HIA) should be completed by a qualified heritage specialist and filed with the City of St. Catharines Heritage Advisory Committee, the Ministry of Tourism, Culture and Sport, and any other heritage stakeholders that may have an interest in this project.
5. To mitigate direct impacts to the St. Catharines Train Station in the vicinity of the subject bridge, construction and staging activities should be suitably planned and executed to ensure that impacts are minimized and mitigated. Suitable staging activities may include temporary barriers and the establishment of no-go zones throughout construction. On-site workers should be notified of the cultural heritage significance of the subject bridge and the St. Catharines Train Station in advance of construction.
6. To mitigate indirect impacts to the mature trees adjacent to the subject bridge, construction and staging activities should be suitably planned and executed to ensure that impacts are minimized and mitigated. Tree protection zones should be established to protect the mature treeline in the west limit of Cameron Park adjacent to Great Western Street. On-site workers should be notified of the tree protection zones in advance of construction.
7. This report should be submitted to the City of St. Catharines Heritage Advisory Committee, the Ministry of Tourism, Culture and Sport, and other local heritage stakeholders that may have an interest in this project.



10.0 REFERENCES

- Armstrong, Frederick H.
1985 *Handbook of Upper Canadian Chronology*. Toronto: Dundurn Press.
- Army Survey Establishment
1963 *National Topographic Survey (NTS) Sheet 30M/3f (Port Dalhousie)*
- Board of Railway Commissioners for Canada
1920 Order No. 30337. Report on file at ASI.
- Boulton, D.
1805 *Sketch of His Majesty's Province of Upper Canada*. London: C. Rickaby.
- City of St. Catharines
2009 *St. Catharines Register of Non-Designated Cultural Heritage Properties (Approved by Council on July 13, 2009)*. Accessed Online At
<https://www.stcatharines.ca/en/documents/documentuploads/OfficialDocumentsAndPlans/doc_634842625456138922.pdf>.
2012 *Official Plan (The Garden City Plan)*. Adopted in 2010 and received formal approval in 2012. Accessed online at: <https://www.stcatharines.ca/en/buildin/resources/City-of-St.Catharines-Official-Plan-Garden-City-Plan-as-amended.pdf>
2013 *Designated Properties under the Ontario Heritage Act. Revised February 2013* Accessed online at:
<https://www.stcatharines.ca/en/documents/documentuploads/OfficialDocumentsAndPlans/doc_635028458522966427.pdf>.
- Cleary, Richard L.
2007 *Bridges*. New York: W.W. Norton and Co.
- Crossby, P.A.
1873 *Lovell's Gazetteer of British North America*. Montreal: John Lovell.
- Cuming, David
1983 *Discovering Heritage Bridges on Ontario's Roads*. Erin: The Boston Mills Press.
- Department of Energy, Mines, and Resources.
1934 Aerial photograph. A4701-93. Available at
<https://brocku.ca/library/collections/mdg/maps-geodata/1934-air-photo-mosaics-of-niagara/>
- Department of Militia and Defence
1907 *National Topographic Survey (NTS) Sheet No. 3 (Niagara)*
1915 *National Topographic Survey (NTS) Sheet No. 3 (Niagara)*
- Ellis Engineering
2017 *Conceptual and Preliminary Design Plans for the Replacement of St. Paul West CNR Bridge (Structure No. 081215), Mile 11.68 Grimsby Subdivision*. Report on file at ASI



- 2018 *Load Capacity Evaluation of St. Paul Street West CNR Bridge (Structure No. 081215) in the City of St. Catharines, Mile 11.68 Grimsby Subdivision.* Report on file at ASI.

Goad, Charles

- 1935 *Fire Insurance Plan of the City of St. Catharines, Sheet No. 22.*

Government of Ontario

- 2006 *Ontario Regulation 9/06* under the Ontario Heritage Act. Accessed online at: <https://www.ontario.ca/laws/regulation/060009>
- 2006 *Environmental Assessment Act, R.S.O. 1990, c. E18.* Accessed online at: <https://www.ontario.ca/laws/statute/90e18>
- 2009 *Ontario Heritage Act, R.S.O. 1990, c. O.18.* Accessed online at: <https://www.ontario.ca/laws/statute/90o18>
- 2017 *Ontario Planning Act, R.S.O. 1990, c. P.13.* Accessed online at: <https://www.ontario.ca/laws/statute/90p13>

Grand Trunk Railways (GTR) Office of Chief Engineer

- 1921 *Grand Trunk Railway System London Division- 17th District. Proposed Renewal O.H. Bridge M.P. 11.68 St. Catharines.* Office of Chief Engineer, April 13, 1921. Structural drawings on file at ASI.
- 1922 *Grand Trunk Railway System London Division- 17th District. O.H. Bridge M.P. 11.68, St. Paul Avenue, St. Catharines.* Office of Chief Engineer, August 1922. Structural drawings on file at ASI.

Grantham Women's Institute

- 1940 *Tweedsmuir History of Grantham Township.* (no publisher cited).

Heritage Resource Centre

- 2008 *Heritage Bridges: Identification and Assessment Guide 1945-1965* prepared for the MTO and the MCL.

Hunting Survey Corporation Limited

- 1954 *Plate 432.792.* Digital Aerial photographs, Southern Ontario. [online]. <http://maps.library.utoronto.ca/data/on/AP_1954/indexwest.html>

Ministry of Culture, Ontario

- 2006 *Ontario Heritage Tool Kit.* Accessed online at: http://www.mtc.gov.on.ca/en/heritage/heritage_toolkit.shtml

Ministry of Culture and Communication, Ontario

- 1992 *Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments.*

Ministry of Culture and Recreation, Ontario (MCR)

- 1980 *Guidelines on the Man-Made Heritage Component of Environmental Assessments.* Prepared by Weiler. Toronto: Historical Planning and Research Branch, Ontario Ministry of Culture and Recreation.



Ministry of Municipal Affairs and Housing, Ontario

2014 *Provincial Policy Statement*. Toronto: Ministry of Municipal Affairs and Housing.

Ministry of Tourism and Culture, Ontario

2010 *Check Sheet for Environmental Assessments: Screening for Impacts to Built Heritage Resources and Cultural Heritage Landscapes*

Ministry of Tourism, Culture and Sport, Ontario (MTCS)

2011 *Standards and Guidelines for Consultant Archaeologists*. Toronto: Cultural Programs Branch, Ontario Ministry of Tourism and Culture.

2014 *Standards & Guidelines for the Conservation of Provincial Heritage Properties*
http://www.mtc.gov.on.ca/en/heritage/MTCS_Heritage_IE_Process.pdf

Ministry of Transportation

2013 *Bridge Inventory*. Report on file at ASI.

2006 *Cultural Heritage – Built Heritage and Cultural Heritage Landscapes: Technical Requirements for Environmental Impact Study and Environmental Protection/Mitigation*.

2007 *Environmental Guide for Built Heritage and Cultural Heritage Landscapes*

Niagara Falls Public Library

1910 *Railway Station in St. Catharines*. Photograph in the Francis J. Petrie Collection, D418046. Accessed online at:
<http://www.nflibrary.ca/nfplindex/show.asp?b=1&ref=oo&id=101335>

Ontario Department of Public Works

1899 *Department of Highways Annual Report, 1899*.

1900 *Department of Highways Annual Report, 1900*.

Page, H.R.

1876 *Illustrated Historical Atlas of the Counties of Lincoln and Welland, Ont.* Toronto: H.R. Page.

Parks Canada

2017 *The Directory of Designated Heritage Railway Stations in Ontario*. Accessed online at <<https://www.pc.gc.ca/en/culture/clmhc-hsmbc/pat-her/gar-sta/on>>.

Rayburn, Alan

1997 *Place Names of Ontario*. Toronto: University of Toronto Press.

Regional Municipality of Niagara

2018 *Niagara Region Structure Database*. Data on file at ASI.

Scott, David E

1997 *Ontario Place Names. The Historical, Offbeat or Humorous Origins of More Than 1,000 Communities*. Edmonton: Lone Pine Publishing.

Smith, W.H.

1846 *Smith's Canadian Gazetteer*. Toronto: H. & W. Roswell.



St. Catharines Public Library

- 1915 *Grand Trunk Railway Station*. Postcard. File No. 02/pt5/1-2.1. Accessed online at: <<http://bmd.stcatharines.library.on.ca/en/3395869/data>>.
- 1915 *The G.T.R. Station, St. Catharines, Ontario. c1915*. File no. 03/pt1/31-1.3. Accessed online at: <<http://bmd.stcatharines.library.on.ca/en/3239660/data?n=3>>.

Tremaine, G

- 1862 *Tremaine's Map of the Counties of Lincoln and Welland, Canada West*. Toronto: George C. Tremaine.

Winearls, Joan.

- 1991 *Mapping Upper Canada, 1760-1867. An Annotated Bibliography of Manuscript and Printed Maps*. Toronto: University of Toronto Press.

Record of Email Communication

City of St. Catharines Planning and Building Department (8 February 2019)

Special Collections Department, St. Catharines Public Library (14 February 2019)



APPENDIX A: Photographic Plates



Plate 1: East portion of the south elevation of the subject bridge, looking north.



Plate 2: West portion of the south elevation, looking east.



Plate 3: East portion of the north elevation including east abutment looking south.



Plate 4: Substructure of the bridge, looking west from the east abutment.



Plate 5: East bent, looking south.



Plate 6: West abutment and transverse steel stringers, looking west.



Plate 7: Bridge soffit showing lower portion of riveted through-plate girder and transverse stringers supporting the concrete sidewalk, looking southwest.



Plate 8: Bridge soffit showing transverse stringers and riveted through-plate girder, looking south.



Plate 9: Riveted through-plate girder extending below the bridge deck.



Plate 10: Detail of connections between steel plate girder and transverse stringers, looking south.



Plate 11: East abutment and soffit of eastern span. Note the skew of the structure.



Plate 12: South and west faces of the east abutment, looking east.



Plate 13: South face of the west abutment, looking north.



Plate 14: East bent, looking northeast.



Plate 15: Detail of riveted connection on east bent, looking southwest.



Plate 16: Detail of riveted connection on west bent, looking northeast.



Plate 17: East span of the bridge at deck level, looking west. Note the steep slope of the approaches.



Plate 18: East span of the bridge at deck level, looking south. Note the steep slope of the approaches.



Plate 19: Northern pedestrian sidewalk, looking west from the center span. Note the riveted steel plate through girder at left and steel lattice railing at right.



Plate 20: Detail of north riveted steel plate through girder at deck level, looking southwest.



Plate 21: Detail of concrete pillar at deck level that integrates the steel plate girders to the bents.



Plate 22: Steel lattice railing with steel newel post, looking northwest.



Plate 23: West bridge approach, looking east.



Plate 24: Rail corridor to the north of the subject bridge. Note St. Catharines Train Station platform at right.



Plate 25:
Commercial
structures to the
east of the subject
bridge fronting on
St. Paul Street
West, looking
southeast from
Great Western
Street.



Plate 26: Great
Western Street,
looking north
towards St.
Catharines Train
Station from St.
Paul Street West.
Note the mature
treeline on the right
of the roadway in
Cameron Park.

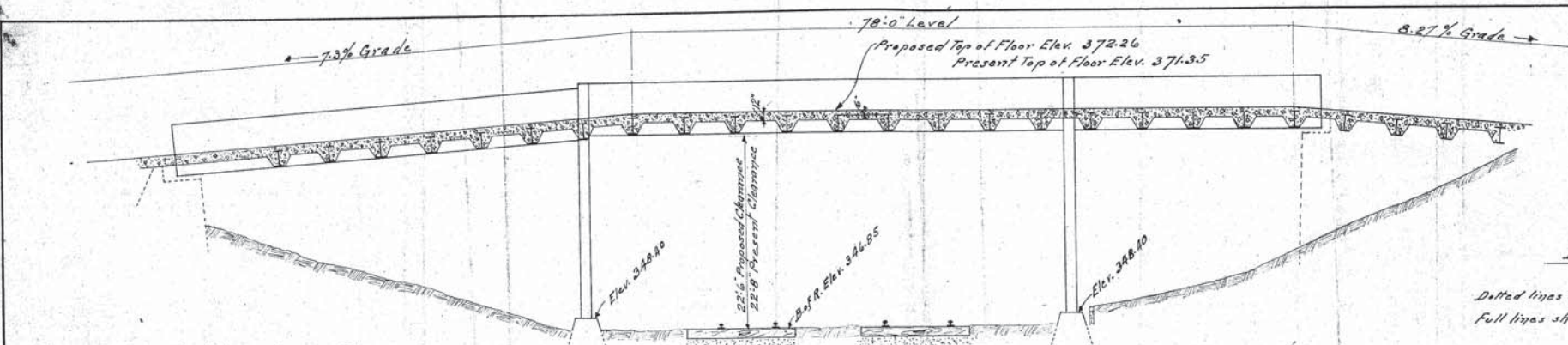


Plate 27: Great Western Street, looking south from the St. Catharines Train Station towards St. Paul Street West. Note the mature trees in Cameron Park at left and the subject bridge at rear right.



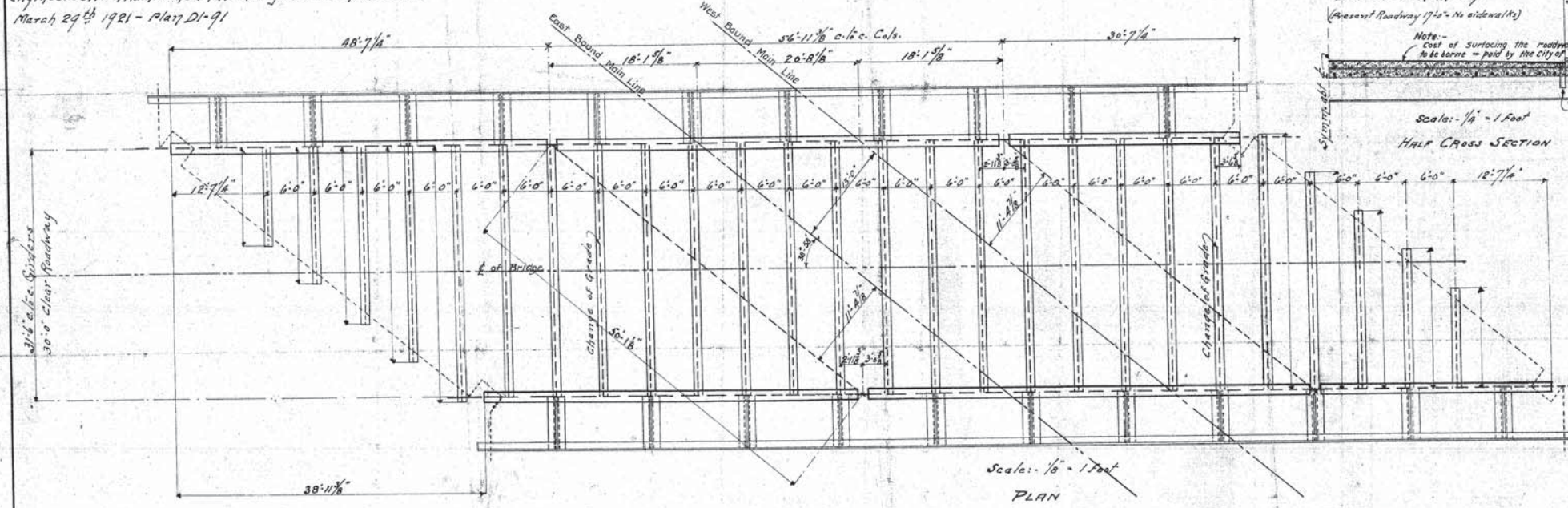
Plate 28: North elevation of the subject bridge, looking south from the platform of the St. Catharines Train Station.

APPENDIX B: Select Structural Drawings

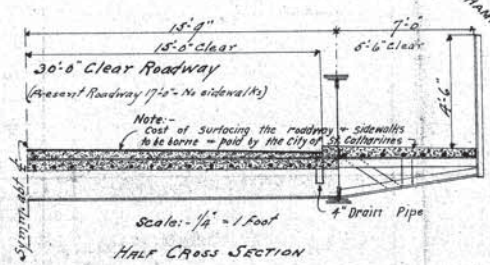


For details of Piers and Abuts, see Masonry Plan.
 Information obtained from blue print prepared in Assistant Engineer's Office, Hamilton, Ont., dated August 23rd 1918, revised March 29th 1921 - Plan DI-91

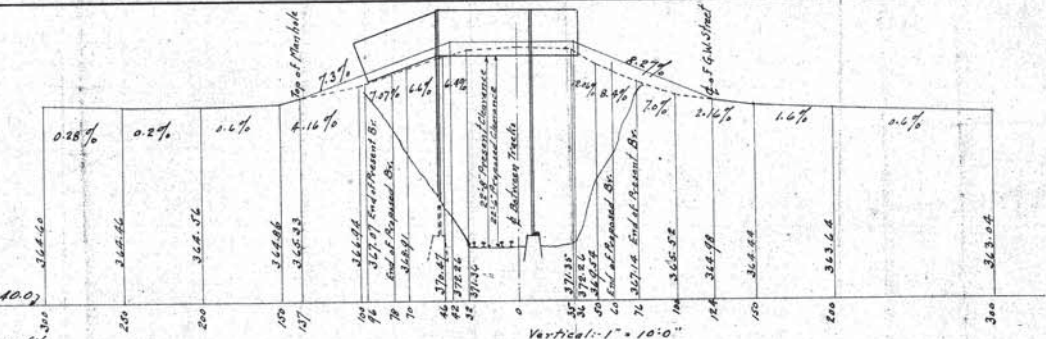
ELEVATION OF BRIDGE
 Scale: 1/8" = 1 foot



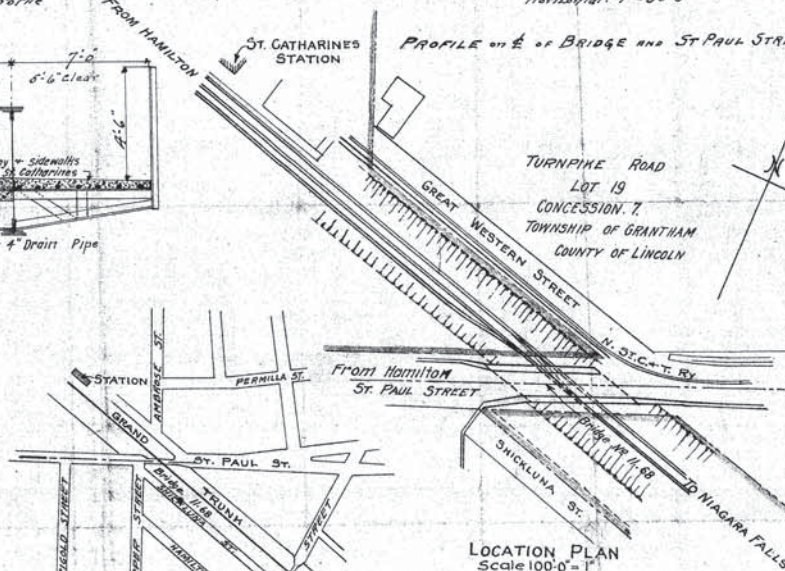
PLAN
 Scale: 1/8" = 1 foot



HALF CROSS SECTION
 Scale: 1/8" = 1 foot



PROFILE OF BRIDGE AND ST. PAUL STREET
 Vertical: 1" = 10.0'
 Horizontal: 1" = 30.0'



LOCATION PLAN
 Scale 100.0' = 1"

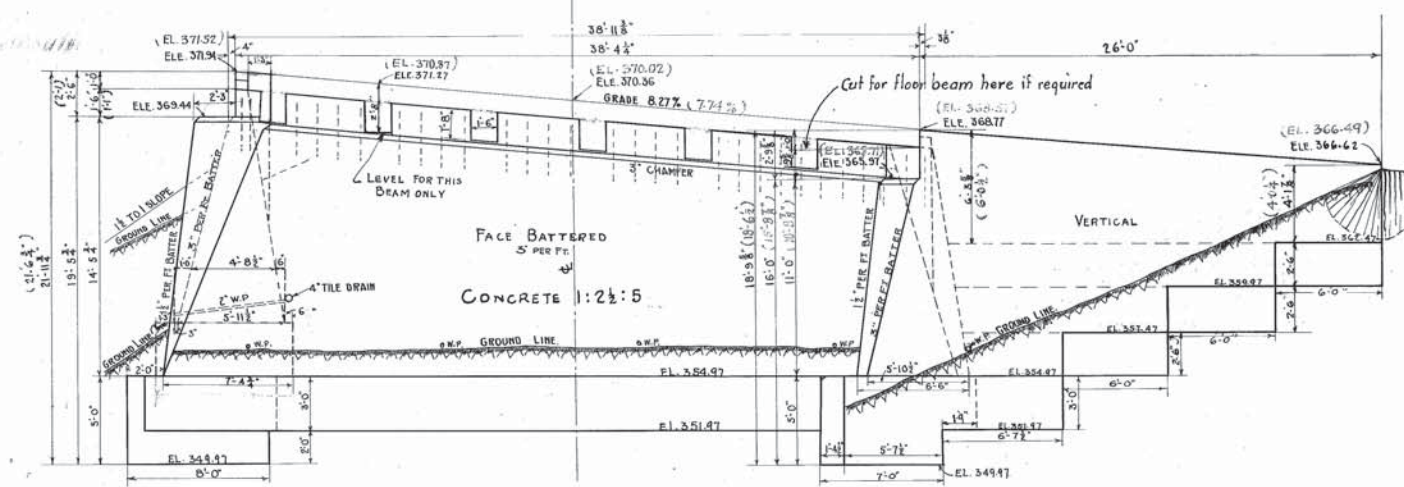
MAP OF STREETS
 Scale 400 Feet to an Inch.

SPECIFICATION:-
 Steel Highway Bridges for Province of Ontario dated 1917.
 CAPACITY:- 20 Ton Truck - Class 'C'

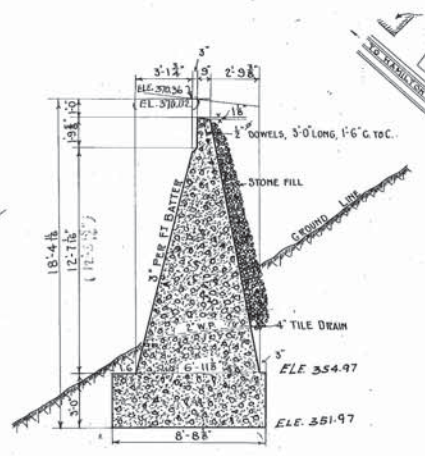
EXAMINED: *W. J. ...* Structural Engineer
 APPROVED: *H. F. ...* Chief Engineer
 APPROVED: *...* General Superintendent
 APPROVED: *...* Vice President

GRAND TRUNK RAILWAY SYSTEM
 LONDON DIVISION - 17th DISTRICT
 Proposed Renewal
 O.H. Bridge - M.R. 11.68
 St. Catharines
 Designed by H.F. - Drawn by H.A.
 Scales as noted.
 Office of Chief Engineer April 13th 1921
 Jnl. No. 2800
 File No. ...

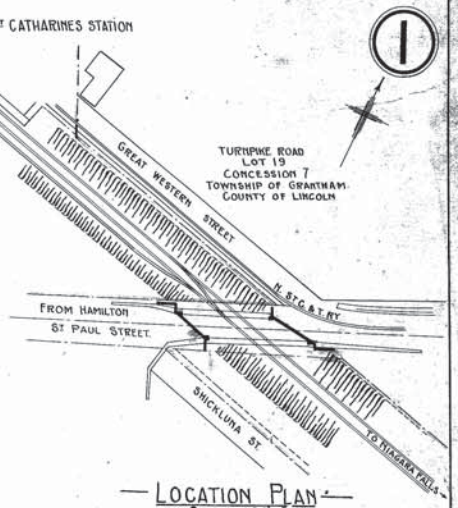
30337 15 Feb 20
 T.K.S. Munn
 May 4 20



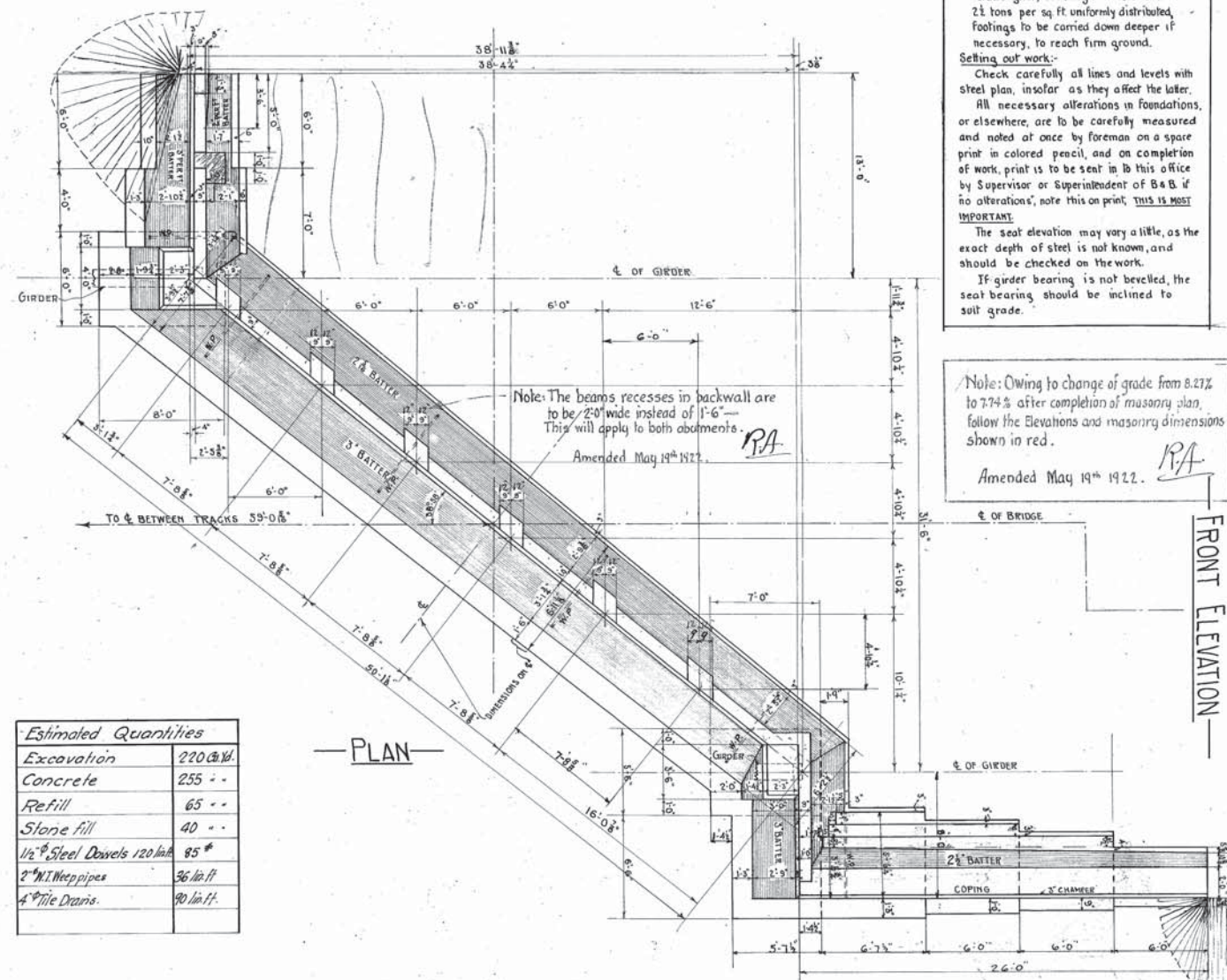
SIDE ELEVATION



CROSS SECTION ON C-C
(ON SQUARE)



LOCATION PLAN
SCALE 100'-0"-1"

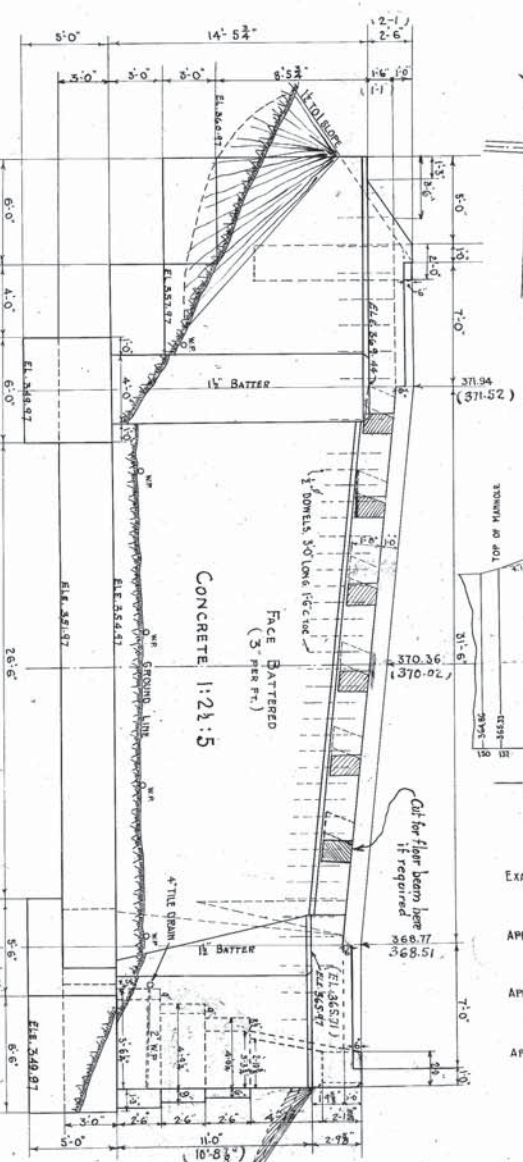


PLAN

NOTES
 Foundations reported 'Good' (GAM) but no details given, loading therefore limited to 2 1/2 tons per sq ft uniformly distributed. Footings to be carried down deeper if necessary, to reach firm ground.
 Setting out work:
 Check carefully all lines and levels with steel plan, insofar as they affect the latter. All necessary alterations in foundations, or elsewhere, are to be carefully measured and noted at once by foreman on a spare print in colored pencil, and on completion of work, print is to be sent in to this office by Supervisor or Superintendent of B & B. If no alterations, note this on print, THIS IS MOST IMPORTANT.
 The seat elevation may vary a little, as the exact depth of steel is not known, and should be checked on the work.
 If girder bearing is not beveled, the seat bearing should be inclined to soil grade.

Note: Owing to change of grade from 8.21% to 7.74% after completion of masonry plan, follow the Elevations and masonry dimensions shown in red.
 Amended May 19th 1922.

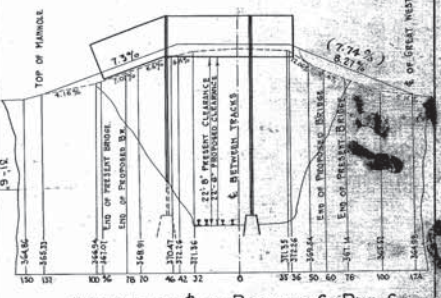
Estimated Quantities	
Excavation	220 cu ft.
Concrete	255 "
Refill	65 "
Stone fill	40 "
1/2" Steel Dowels 120 lbs.	85 #
2" WT. Weep pipes	36 lin. ft.
4" Tile Drains	30 lin. ft.



FRONT ELEVATION



MAP OF STREETS
SCALE 400'-0"-1"



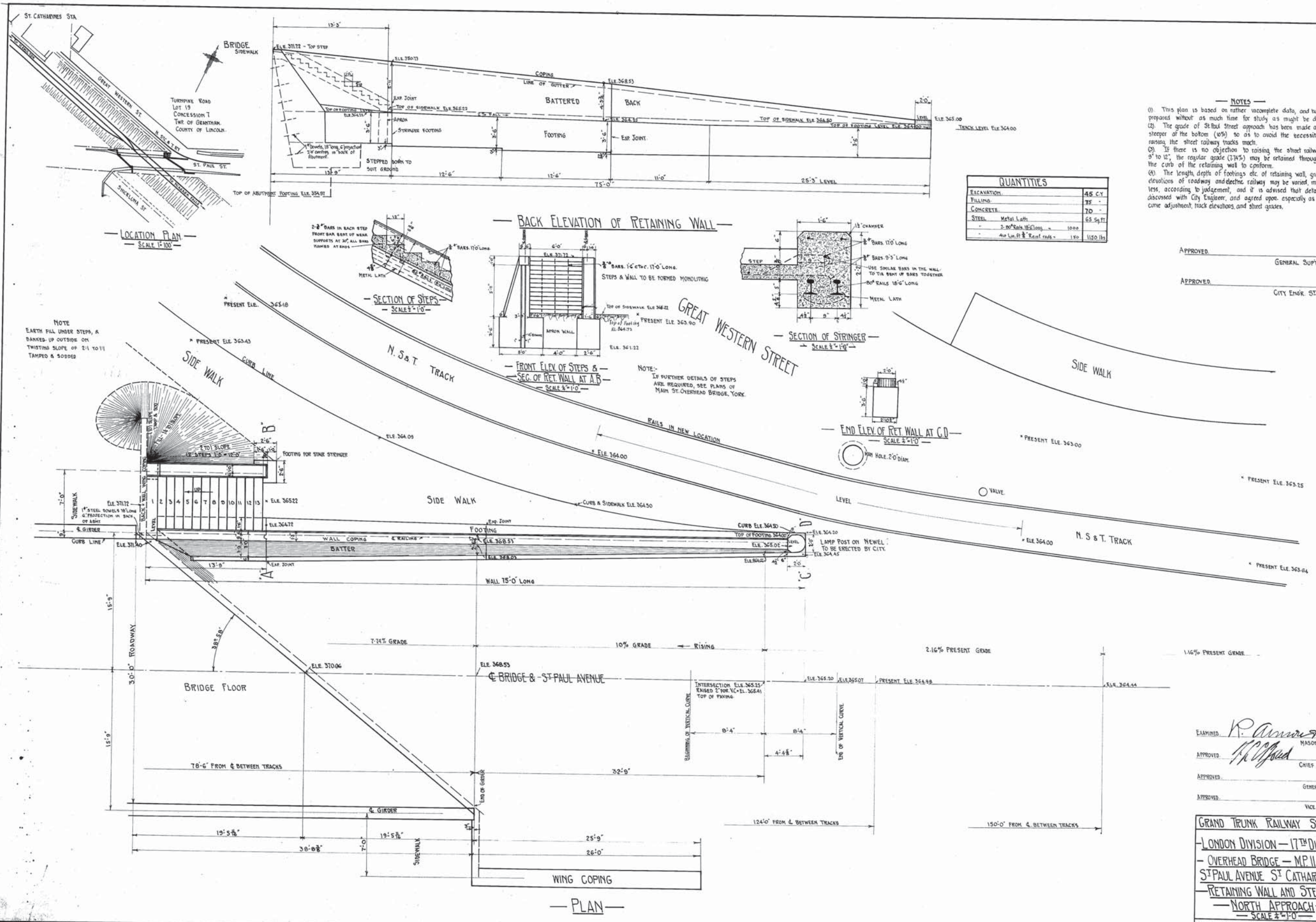
PROFILE ON C-C OF BRIDGE & ST. PAUL ST
 SCALES: VERTICAL 1"=10.0'
 HORIZONTAL 1"=50.0'

EXAMINED: R. Am... MASONRY ENGINEER
 APPROVED: [Signature] CHIEF ENGINEER
 APPROVED: [Signature] GENERAL SUPERINTENDENT
 APPROVED: [Signature] VICE PRESIDENT

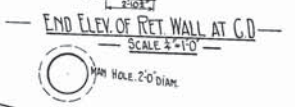
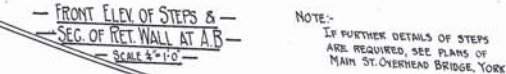
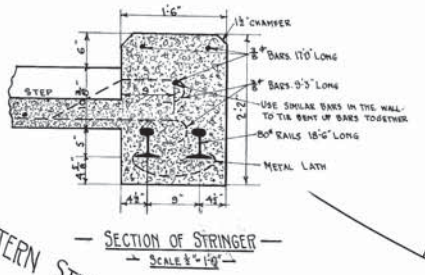
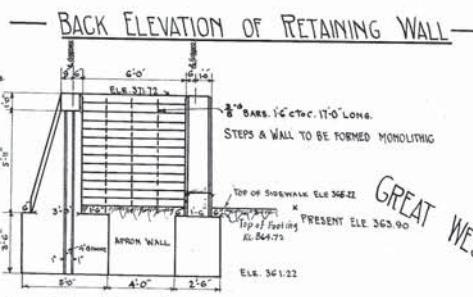
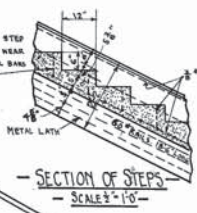
GRAND TRUNK RAILWAY SYSTEM
 LONDON DIVISION - 17th DISTRICT
 OVERHEAD BRIDGE MP: 11.68
 ST. CATHARINES
 NORTH ABUTMENT
 SCALE 1/4"=1'-0"

AMENDED NOV. 18th 1921

Drawn by S.L.
 Checked for Steel by H.F.



LOCATION PLAN
SCALE 1"=100'



QUANTITIES	
EXCAVATION	45 C.Y.
FILLING	75 "
CONCRETE	70 "
STEEL Metal Lath	65 Sq. Ft.
2" x 2" BARS 18' x 10' long	1000
4" x 4" BARS 18' x 10' long	100

- NOTES
- This plan is based on rather incomplete data, and has been prepared without as much time for study as might be desired.
 - The grade of St Paul Street approach has been made a little steeper at the bottom (4%) so as to avoid the necessity of raising the street railway tracks much.
 - If there is no objection to raising the street railway say 9" to 12", the regular grade (1.74%) may be retained throughout, the curb of the retaining wall to conform.
 - The length, depth of footings etc. of retaining wall, grade elevations of roadway and electric railway may be varied, more or less, according to judgement, and it is advised that details be discussed with City Engineer, and agreed upon, especially as regards curve adjustment, track elevations, and street gasses.

APPROVED _____ GENERAL SUPT G.T.R.
APPROVED _____ CITY ENGR. ST CATHARINES

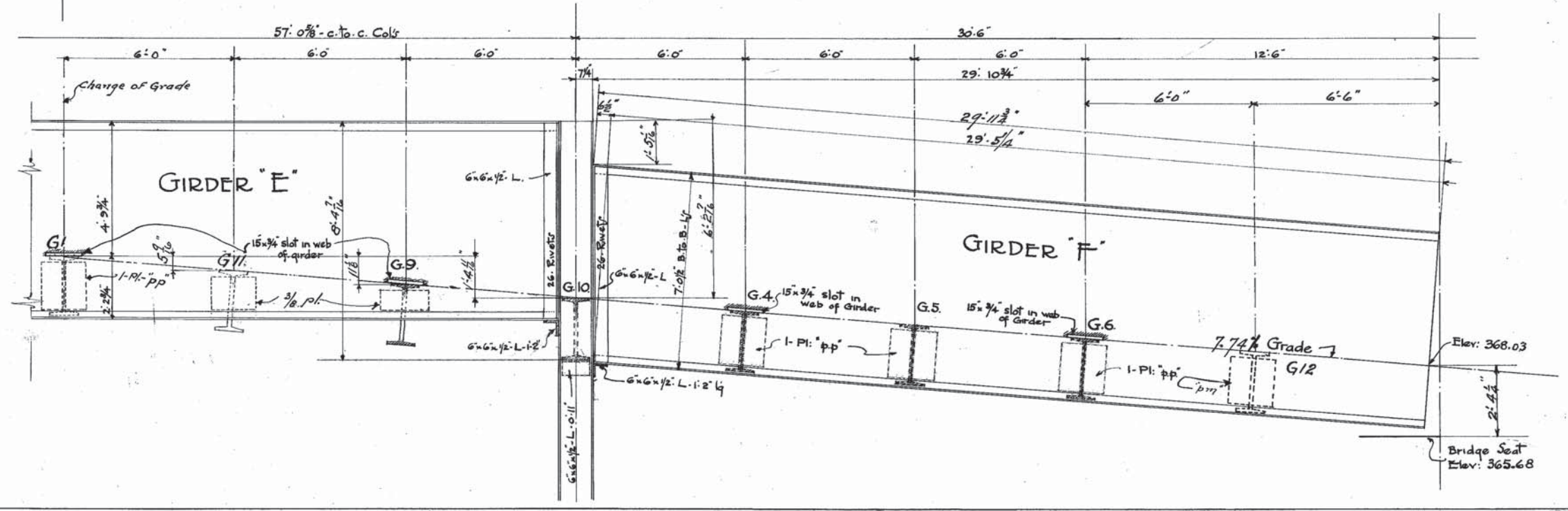
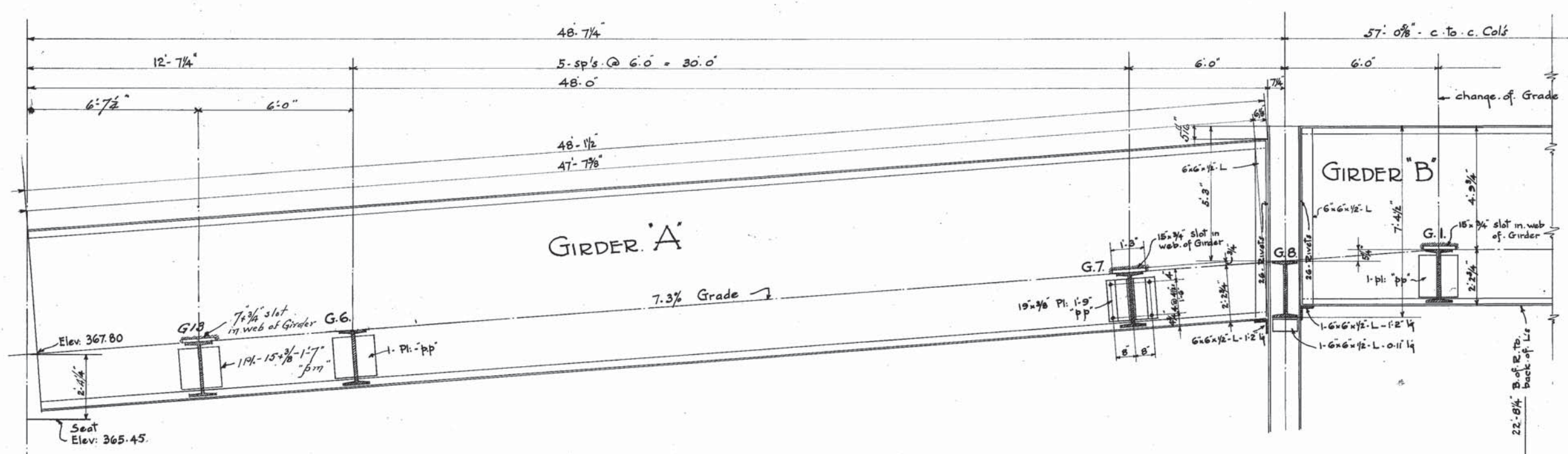
NOTE
EARTH FILL UNDER STEPS, &
BANKED UP OUTSIDE ON
TWISTING SLOPE OF 2:1 TO 1:1
TAMPED & SODDED

PLAN

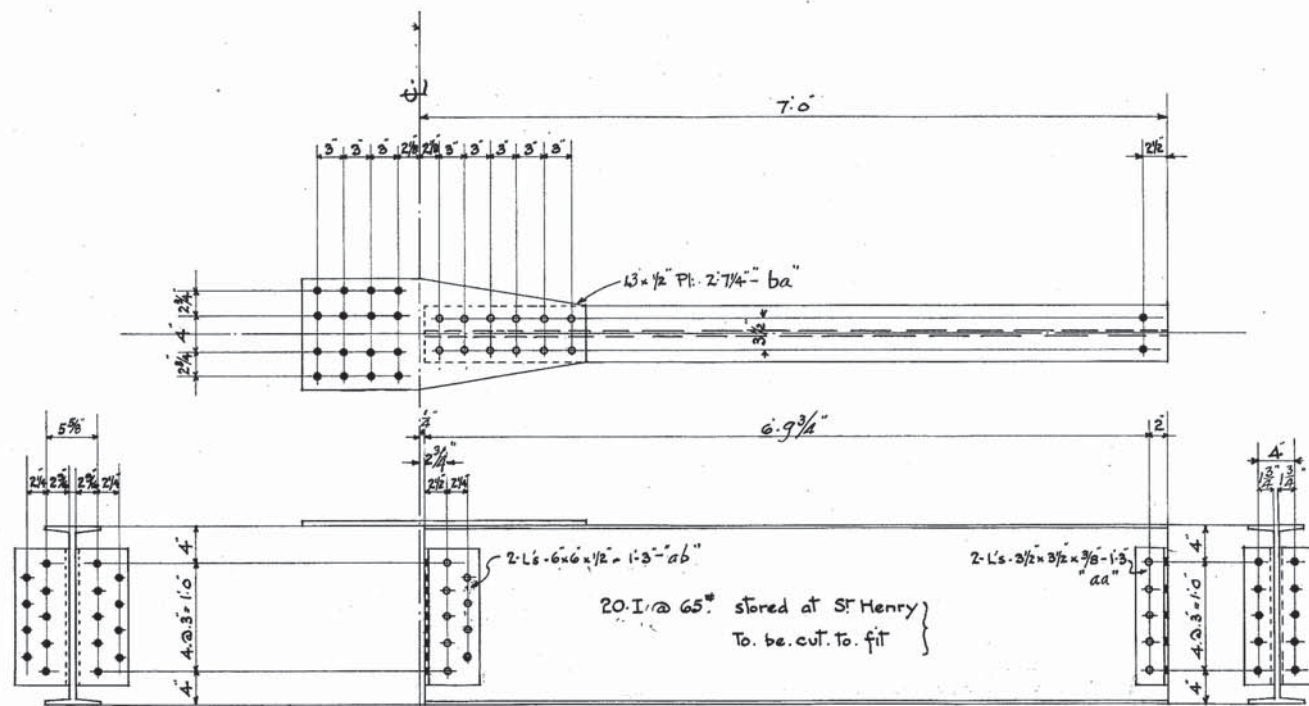
EXAMINED *R. Amundson* MASONRY ENGINEER
APPROVED *M. J. O'Neil* CHIEF ENGINEER
APPROVED _____ GENERAL SUPERV'T
APPROVED _____ VICE PRESIDENT

GRAND TRUNK RAILWAY SYSTEM
- LONDON DIVISION - 17TH DISTRICT -
- OVERHEAD BRIDGE - M.P. 11.68 -
ST PAUL AVENUE ST CATHARINES
RETAINING WALL AND STEPS
- NORTH APPROACH -
SCALE 1"=1'-0

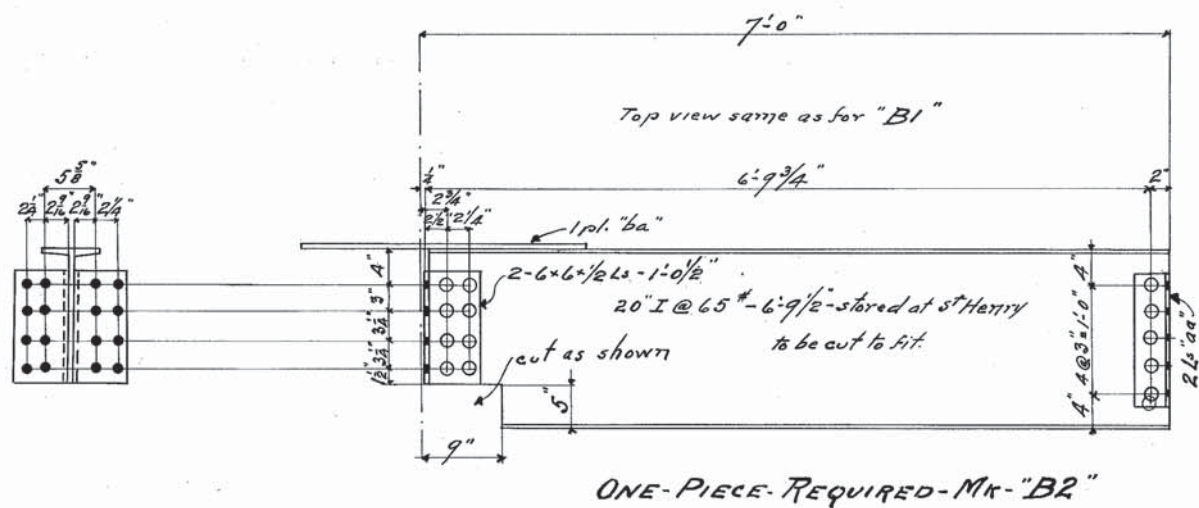
OFFICE OF CHIEF ENGINE, MONTREAL AUG. 21ST 1922



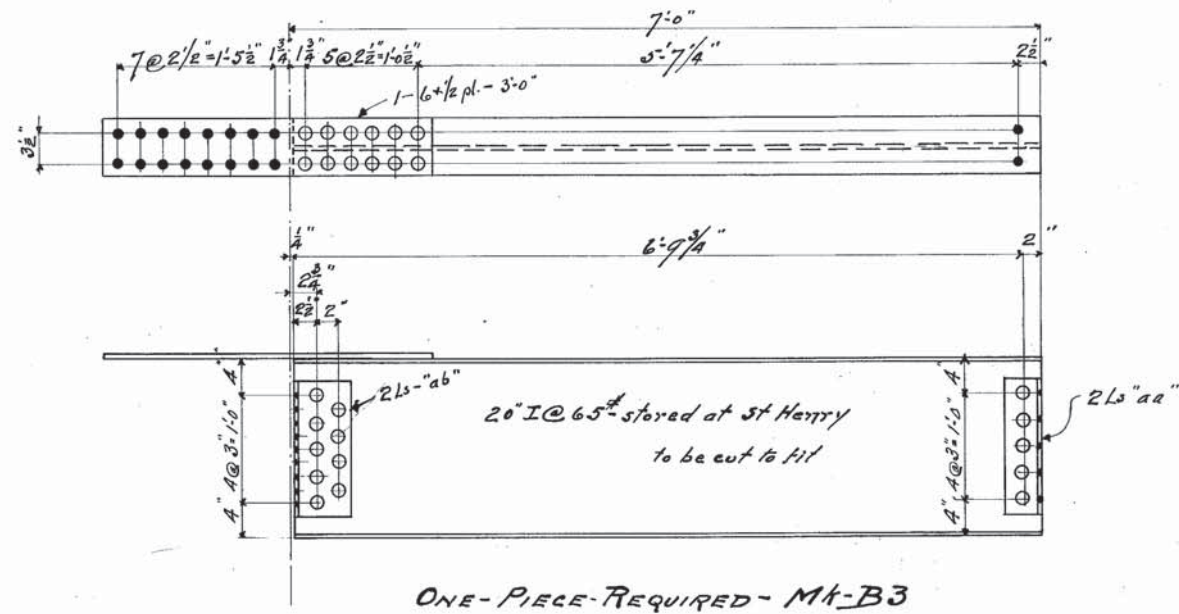
GRAND TRUNK RAILWAY SYSTEM
 LONDON DIVISION ••• 17TH DISTRICT
ST. CATHERINES •
 ST. PAUL ST. O'H. BRIDGE •• MILE 11.68.
 • STEEL DETAILS •
 Designed by H.F. - Drawn by L.M.W. Scale 3/8" to 1'-0"
 Office of Chief Engineer Jnl. No. 890.2
 Montreal Que. August 1921. File No. 484.35



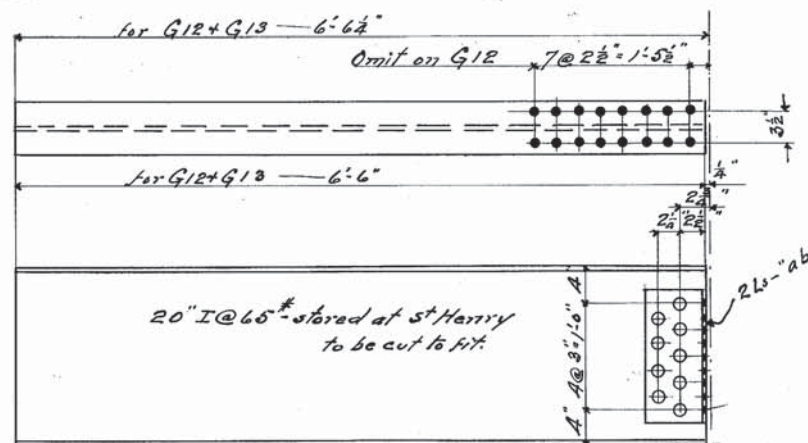
19-PIECES-REQUIRED - MK-B1



ONE-PIECE-REQUIRED - MK-B2



ONE-PIECE-REQUIRED - MK-B3



ONE-PIECE-REQUIRED - MK-G12
ONE- " - " - " - G13

NOTES:-

Rivets: = 3/4" φ
Holes: = 1/2" φ

8- 20" I @ 65# - 25'-4" to be shipped to York, Ont.

Examined:-

H. Stuart
Structural Engineer.

GRAND TRUNK RAILWAY SYSTEM
LONDON DIVISION - 17th DISTRICT

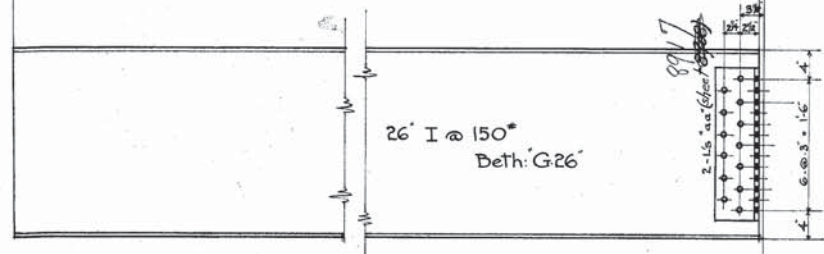
ST CATHARINES
ST PAUL ST - O.H. Bridge - Mile 11.68
Steel Details

Designed by H.F. - Drawn by H.F. - Scale: 1" = 1 foot

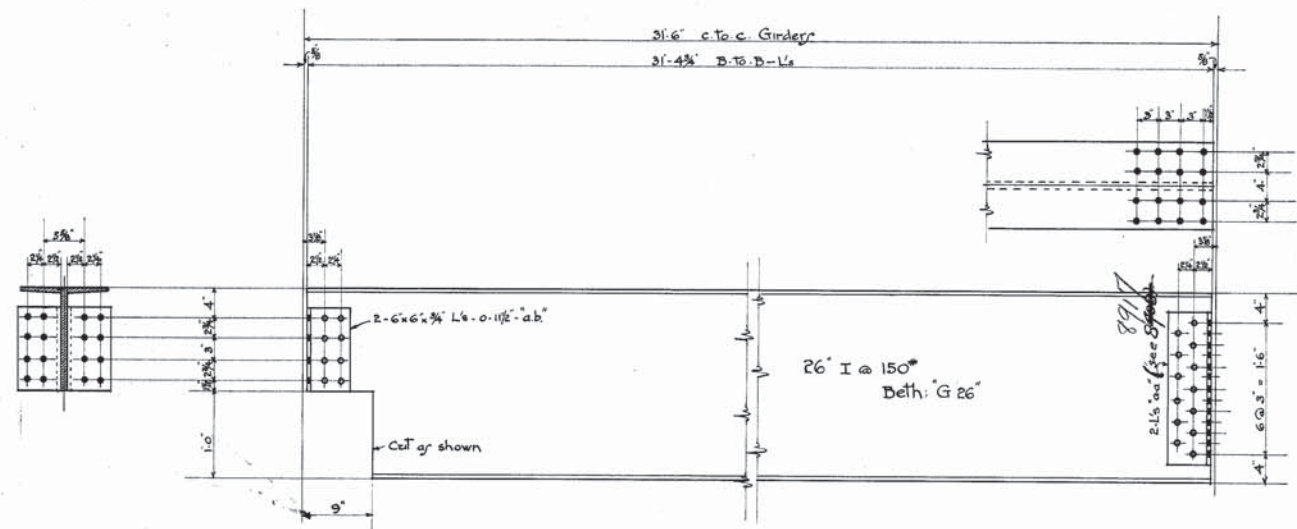
Office of Chief Engineer Jnl. No. 8904
Montreal - August 20th 1921 - File No. 484-35

30'-9"	for G.2. ϕ of Girder to end of Steel
25'-11"	G.3.
21'-0"	G.4+G4 ^A
16'-2"	G.5+G5 ^A
11'-4"	G.6+G6 ^A
30'-9"	G.2 End to End of Steel
25'-11"	G.3.
21'-0"	G.4.
16'-2"	G.5.
11'-4"	G.6.

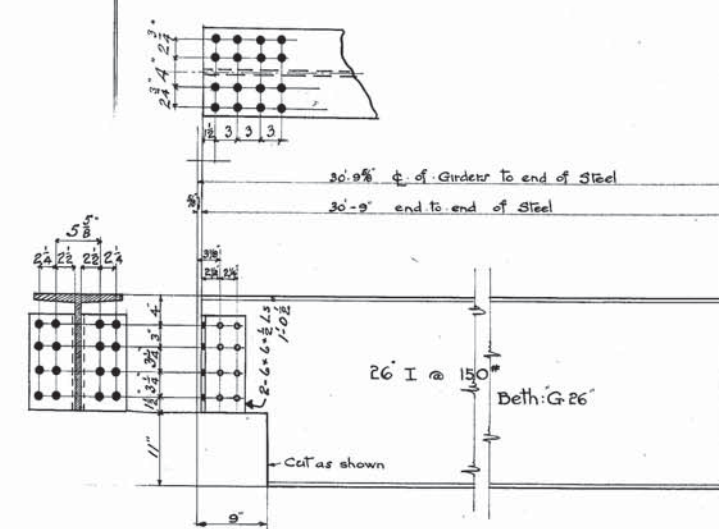
On G.3, G4^A, G5^A, G6^A



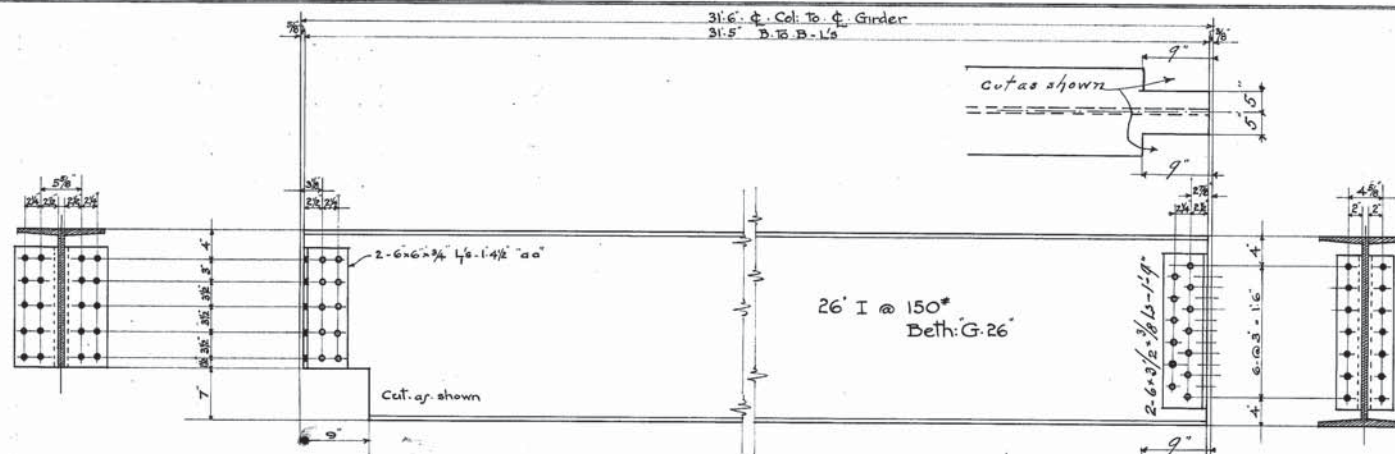
- One Piece - MK - G.2.
- MK - G.3.
- Two Pieces - MK - G.4.
- MK - G.5.
- MK - G.6.



One Piece - MK-G.7



One Piece - MK-G.9



One Piece - MK-G.8

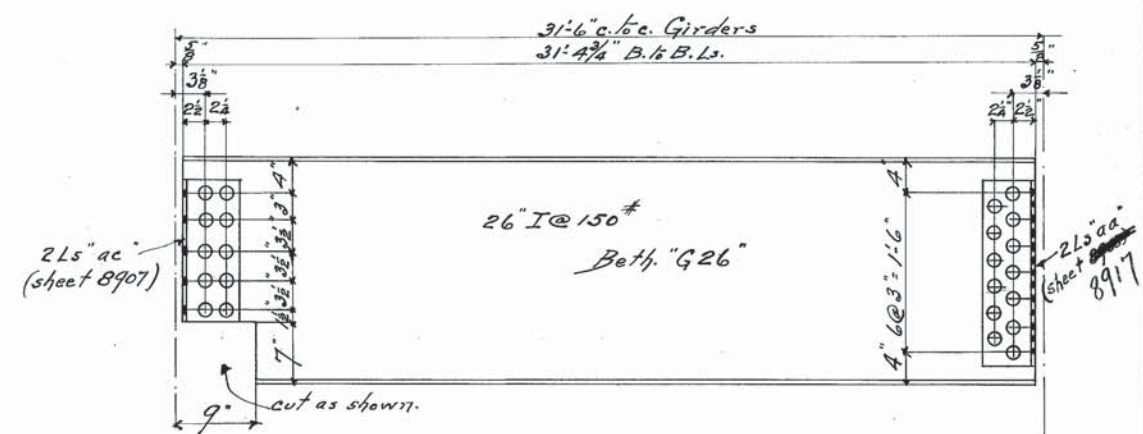
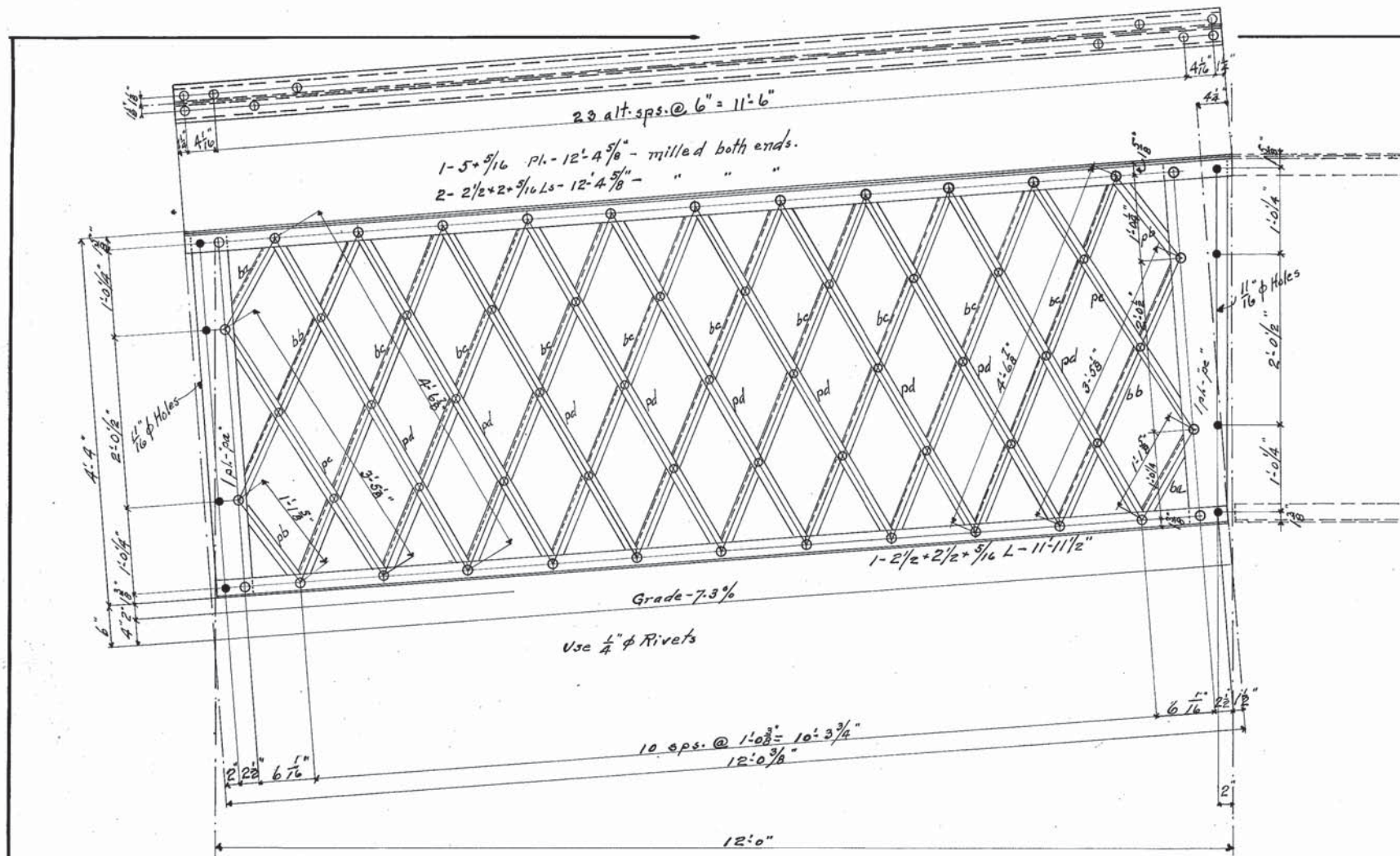
Note:
Rivets = 3/4" ϕ
Holes = 5/16" ϕ

Examined by *W. Stewart* Structural Engineer
Approved by *J. L. O'Boyle* Chief Engineer

GRAND TRUNK RAILWAY SYSTEM
LONDON DIVISION - 17TH DISTRICT

ST. CATHERINES
ST. PAUL - ST. O-H BRIDGE - MILE 11-68.
STEEL DETAILS
Designed by H.F. Drawn by L.M.W. Scale: 1" to 1'-0"

Office of Chief Engineer Montreal Que. August 1921. Jnl. No. 8927
File No. 484-35



One Piece Required - Mk - G11

- 1-5 3/16 PL - 4' 3/8" - "pa"
- 2-1 1/2 x 1/4 PLs - 1' 2 3/8" - "pb"
- 2-1 1/2 x 1/4 PLs - 3' 6/8" - "pc"
- 9-1 1/2 x 1/4 PLs - 4' 7/8" - "pd"
- 2-1 1/2 x 1/2 x 1/4 Ls - 1' 2 3/8" - "ba"
- 2-1 1/2 x 1/2 x 1/4 Ls - 3' 6/8" - "bb"
- 9-1 1/2 x 1/2 x 1/4 Ls - 4' 7/8" - "bc"
- 1-9 3/4 x 5/16 PL - 4' 3/8" - "pe" (cut as shown)

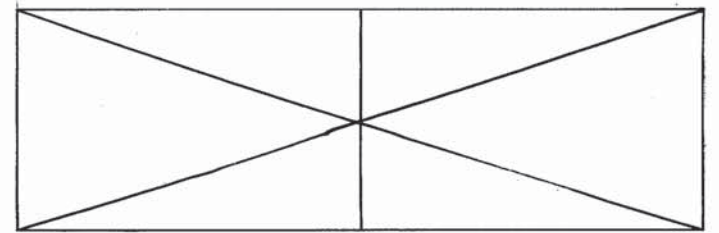
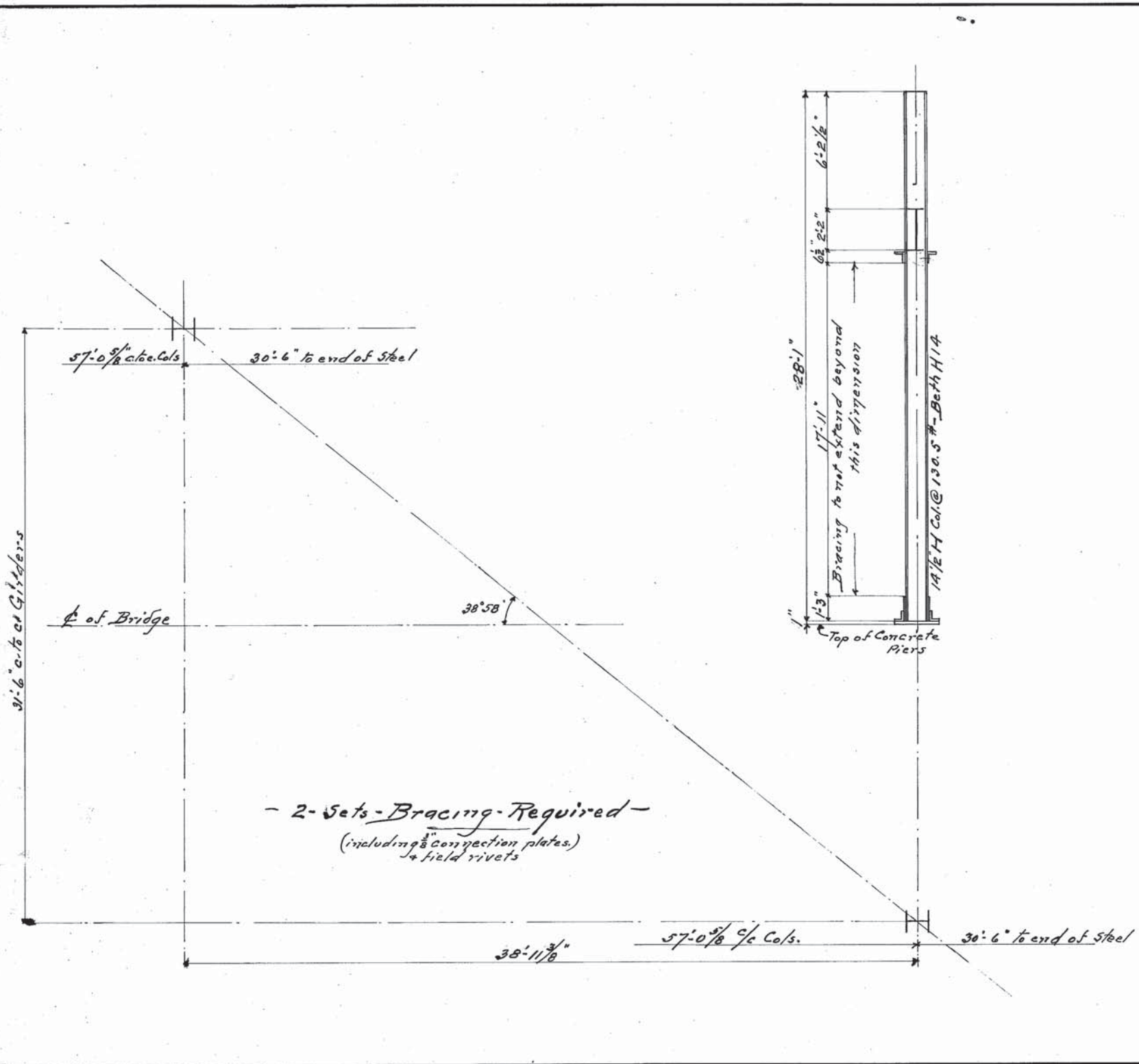
One Piece Required - Mk - F1

NOTES:-
 Rivets = 3/4" phi except on "F1" = 1/4" phi
 Holes = 13/16" phi " " " = 1/2" phi

Examined: *H. Stuart*
 Structural Engineer

Approved: *J. L. O. Bond*
 Chief Engineer

GRAND TRUNK RAILWAY SYSTEM
 LONDON DIVISION - 17th DISTRICT
 ST CATHARINES
 ST PAUL ST. - D. H. BRIDGE - MILE 11.68
 STEEL DETAILS
 Designed by H. - Drawn by H. F. - Scale 1" = 1'-0"
 Office of Chief Engineer - Jnl. No. 8909
 Montreal - August 23rd 1921 - File No. 48435



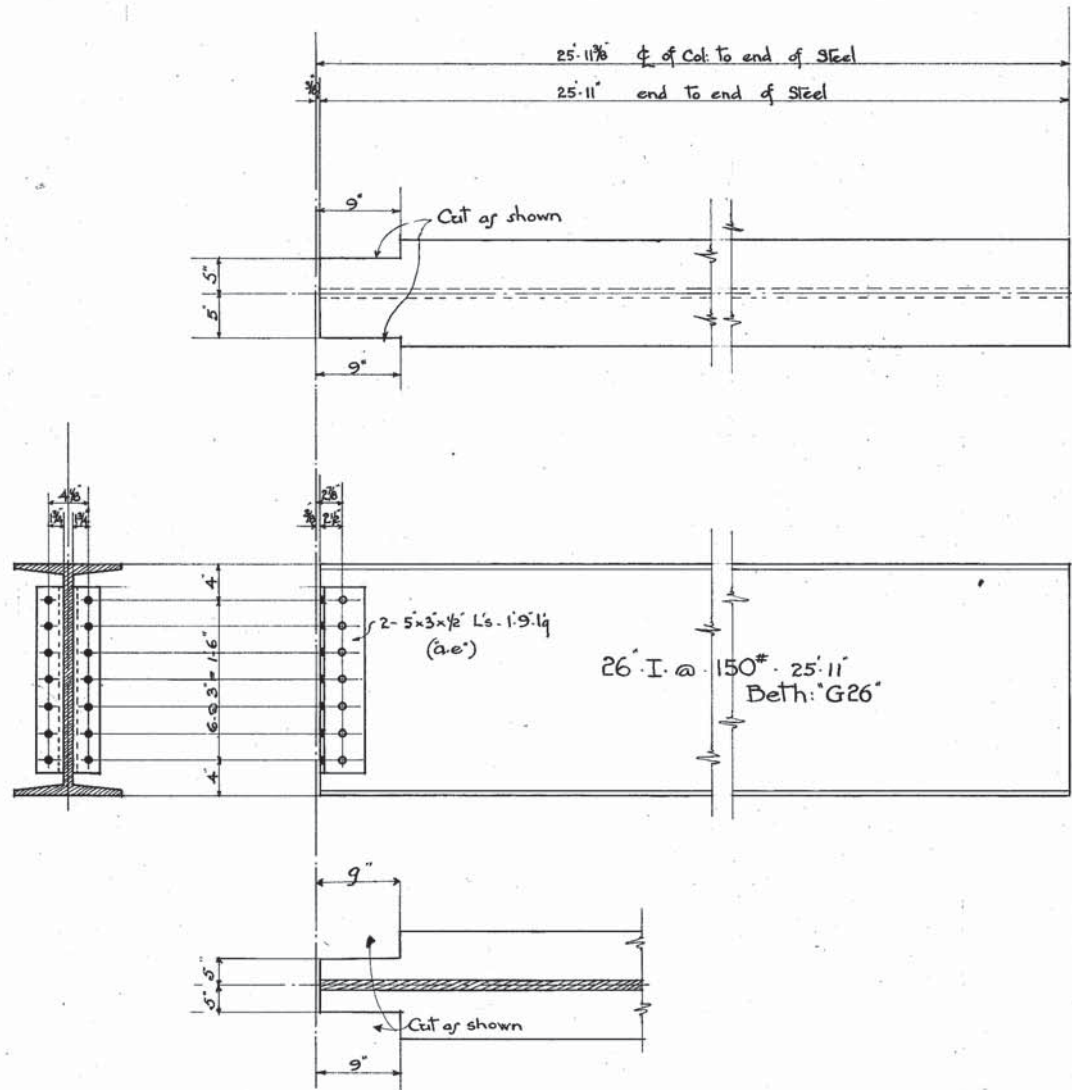
Top + Bottom Struts = 2-12" E @ 25# []
 Diagonals = 2-6" x 4" 3/8 Ls
 Hangers = 2-3 1/2" x 3 1/2" 3/8 Ls

SPECIFICATIONS:-
 Steel Highway Bridges for Province of Ontario dated 1917
 CAPACITY:- 20 Ton Truck - Class "C"
 Material to receive one coat of shop paint # 400 Dominion Paint Works - Walkerville - Ont.

Examined: *W. Stuart*
 Structural Engineer
 Approved: *J. H. Bond*
 Chief Engineer

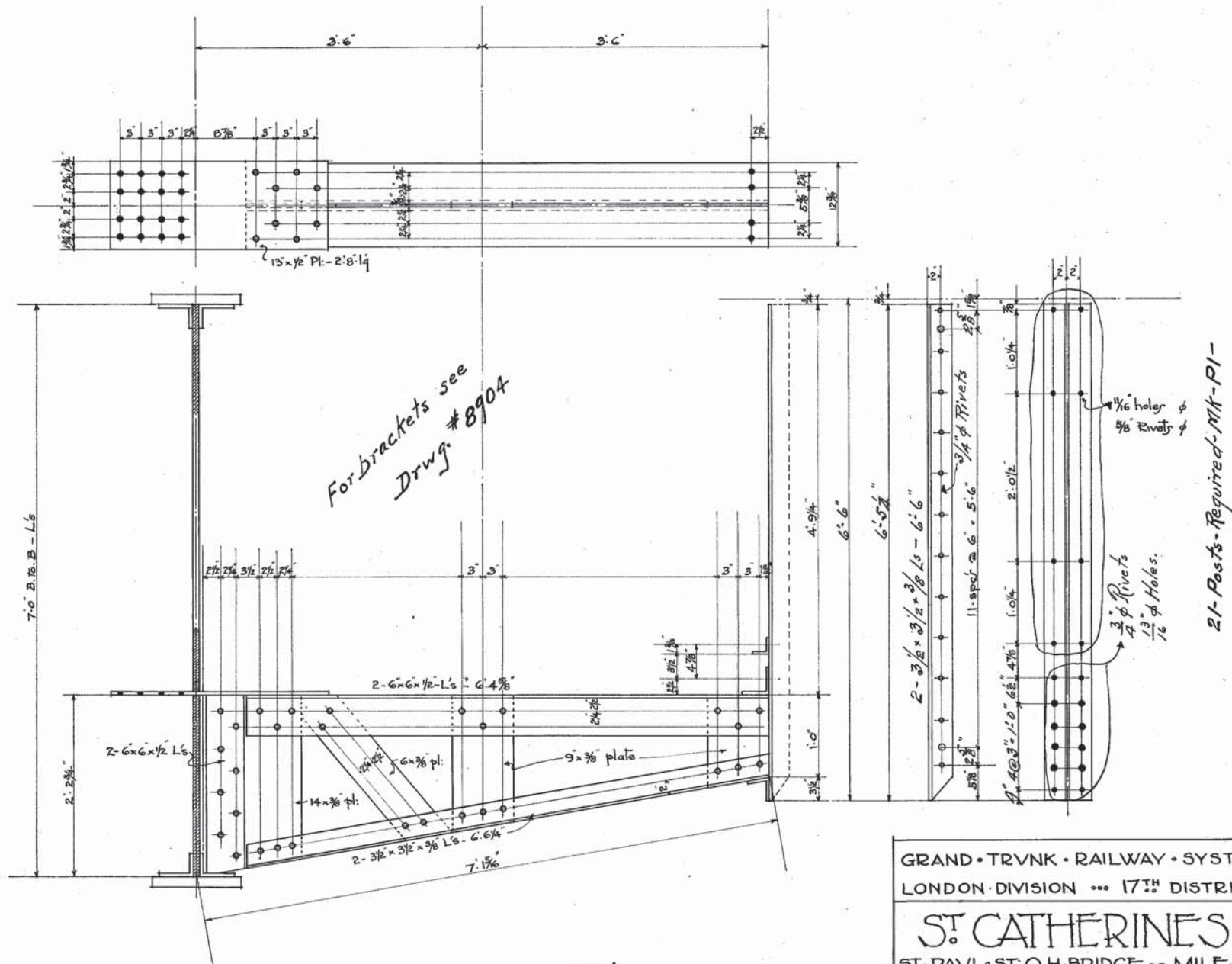
GRAND TRUNK RAILWAY SYSTEM
 LONDON DIVISION - 17th DISTRICT
 Proposed Renewal
 O.H. Bridge - M.R. 11.68
 St Catharines
 Bracing between Columns
 Office of Chief Engineer - 8-27-21

Jnl. No. 8913
 File No. 484-35



One Piece Required - MK-G10

Note: Rivets = $\frac{3}{4}$ " ϕ
 Holes = $\frac{13}{16}$ " ϕ

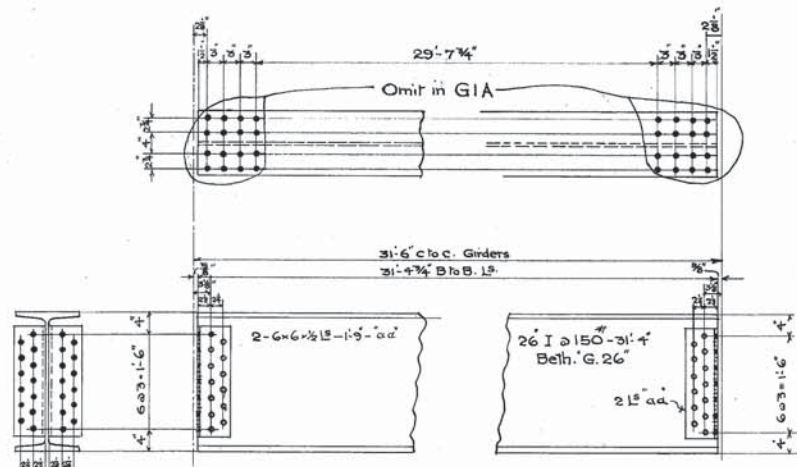


For brackets see
 Drwg #890A

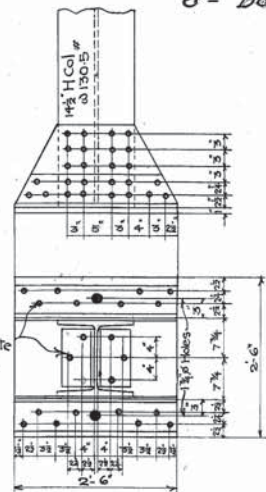
Examined by *W. Stewart* Structural Engineer
 Approved by *J. H. Bond* Chief Engineer

GRAND TRUNK RAILWAY SYSTEM
 LONDON DIVISION ... 17TH DISTRICT
 ST. CATHERINES
 ST. PAUL ST. O.H. BRIDGE -- MILE 11.68.
 STEEL DETAILS
 Designed by H.F. Drawn by L.M.W. Scale 1 to 1'0"
 Office of Chief Engineer Int. No. 8914
 Montreal, Que. August, 1921. File No. 484-35

21 Posts Required - MK-P1-



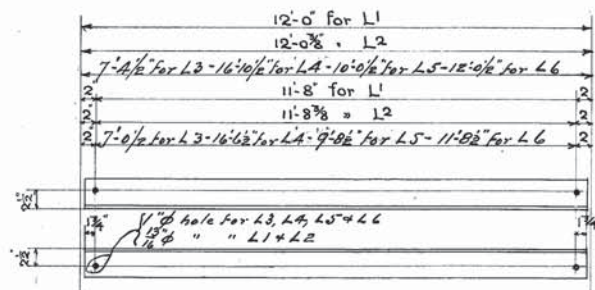
7-Pieces - Marked "G1"
6- Do - Do - "G1A"



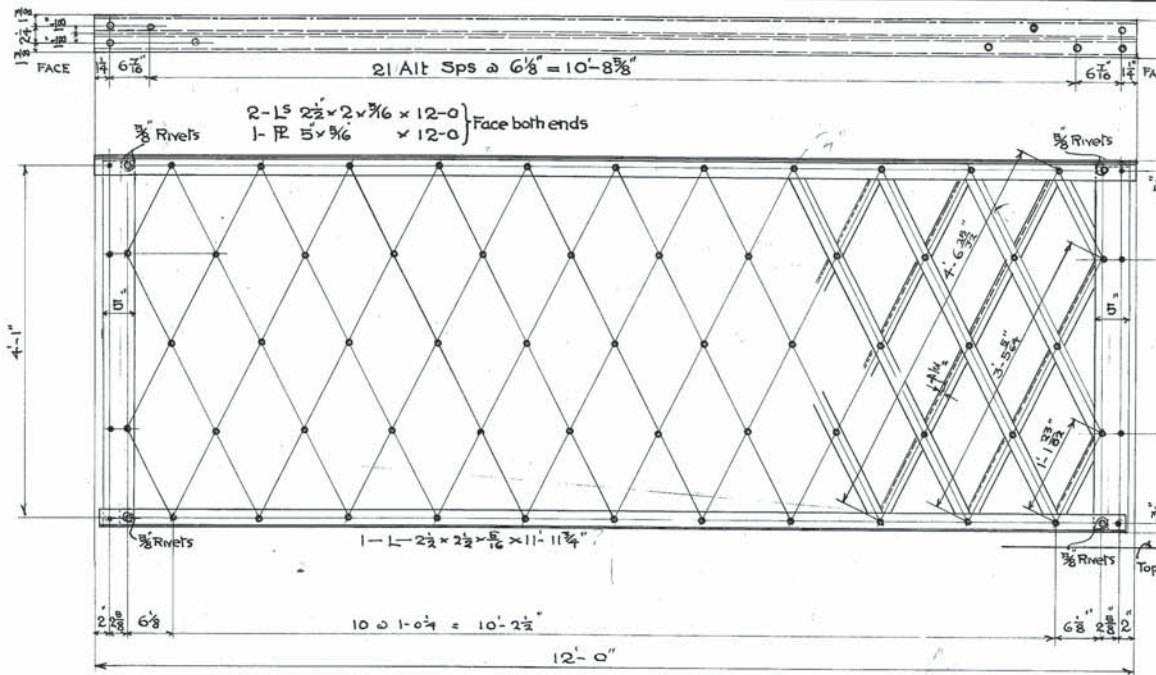
All Rivets on Base Plate to be countersunk and chipped on far side

Material Required for One Base & Required

- 1- 30"x1" pl - 2'-6"
- 2- 6'-6" x 1/2" L^s - 2'-6"
- 2- 15" x 3/8" pls - 1'-11" average
- 2- 6'-6" x 1/2" L^s - 0'-11"



- 12- 4' x 4' x 3/8" L^s - 11'-11 1/2" - MK-L1
- 7- do - 11'-11 1/2" - MK-L2
- 1- do - 7'-4" - MK-L3
- 1- do - 16'-10" - MK-L4
- 1- do - 10'-0" - MK-L5
- 1- do - 12'-0" - MK-L6

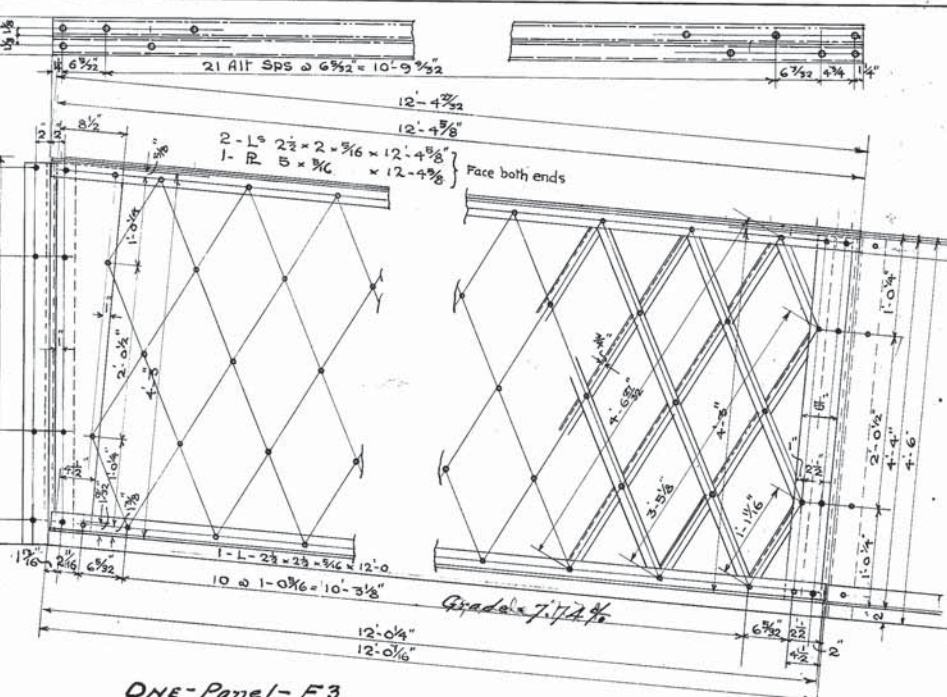


12- Panels - F2

- 2- Bars - 5 x 3/8 x 4'-5 1/2
- 2- Bars - 1 1/2 x 1/4 x 1'-2 3/8
- 2- Bars - 1 1/2 x 1/4 x 3'-6 5/8
- 3- Bars - 1 1/2 x 1/4 x 4'-7 3/8
- 2- 1 1/2 x 1 1/2 x 1/4 x 1'-2 3/8
- 2- 1 1/2 x 1 1/2 x 1/4 x 3'-6 5/8
- 3- 1 1/2 x 1 1/2 x 1/4 x 4'-7 3/8

Bridge Co. to furnish also:-

- Necessary field rivets
- 4- 3/4" Anchor Bolts - 0'-9" } 3" thread
- 12- 1/4" Anchor Bolts - 1'-0" } at each end



ONE-Panel - F3

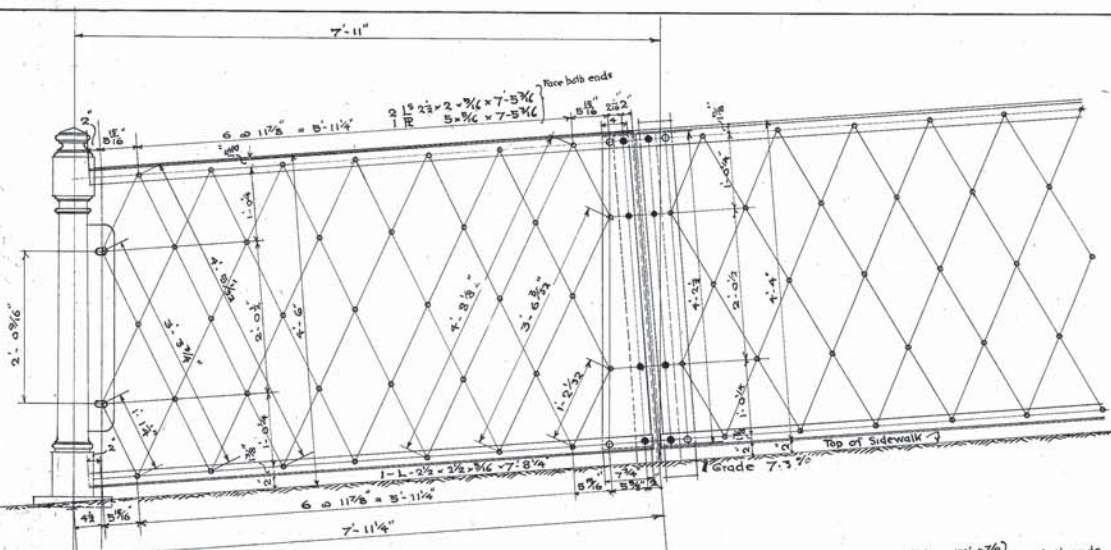
- 1- Bar - 3 1/2 x 3/4 x 4'-5
- 1- Bar - 5 x 3/16 x 4'-3
- 2- Bars - 1 1/2 x 1/4 x 1'-2 3/8
- 2- Bars - 1 1/2 x 1/4 x 3'-6 1/8
- 3- Bars - 1 1/2 x 1/4 x 4'-7 3/8
- 2- 1 1/2 x 1 1/2 x 1/4 x 1'-2 3/8
- 2- 1 1/2 x 1 1/2 x 1/4 x 3'-6 1/8
- 2- 1 1/2 x 1 1/2 x 1/4 x 4'-7 3/8

For Fences:
1/4" Rivets
Connections to Posts = 3/8" Rivets.
F2 & F3 to be checked by Bridge Company.

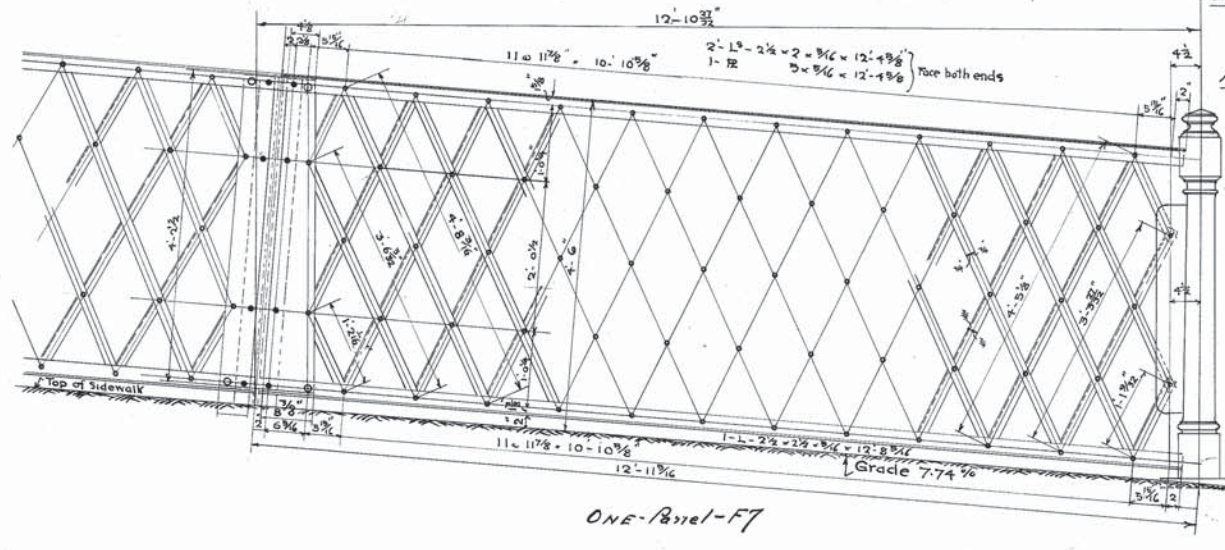
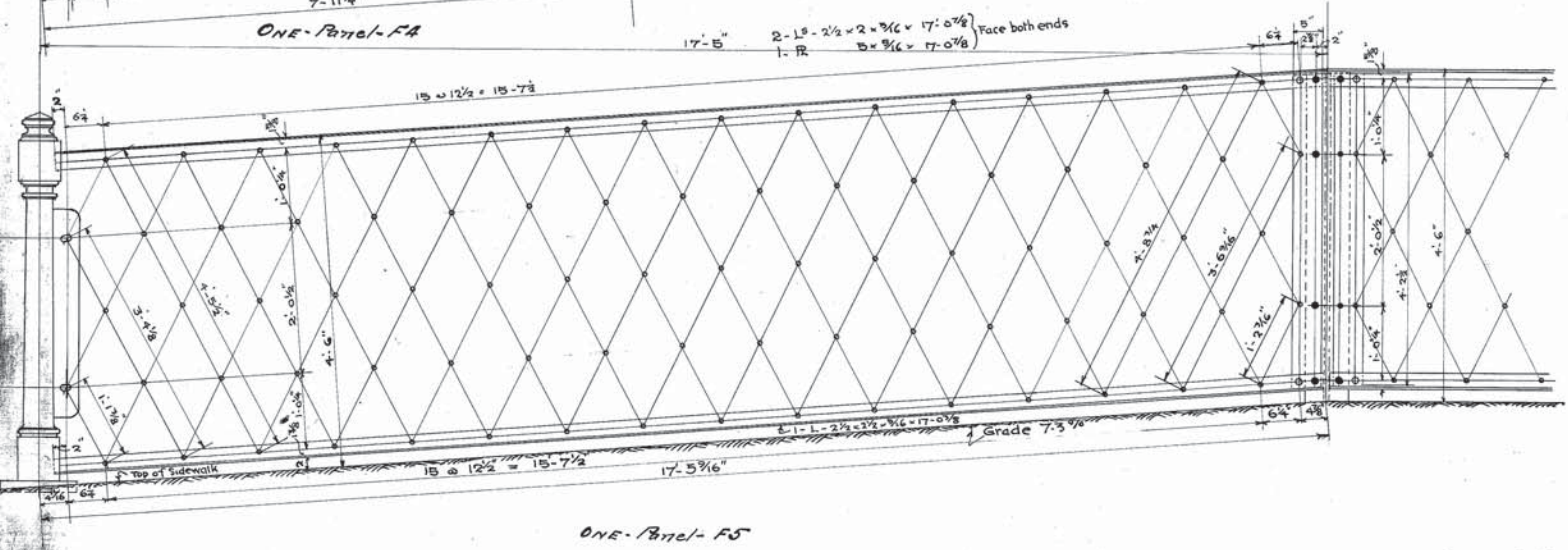
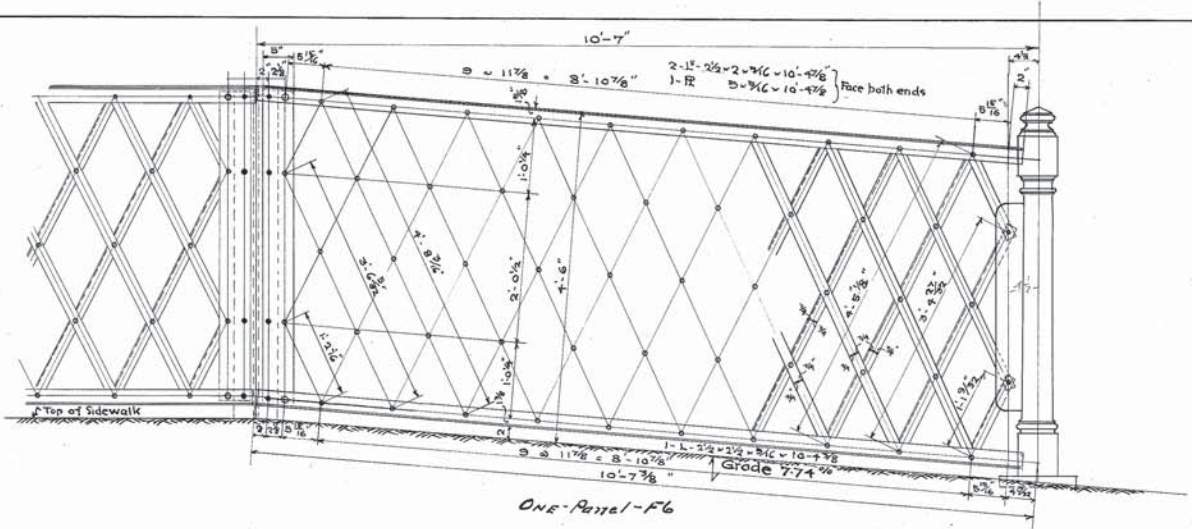
Examined: *W. Stewart*
Structural Engineer

Approved: *J. L. O. Bond*
Chief Engineer

GRAND TRUNK RAILWAY SYSTEM
LONDON DIVISION 17TH DISTRICT
ST CATHERINES
ST PAUL ST OH BRIDGE - MILE 11-68
STEEL DETAILS
Designed by H.F. Drawn by E.E.B Scale 1" = 1'-0"
Office of Chief Engineer Montreal Aug 1921
J.M. No 8917
File No 484-35



- | | |
|--|--|
| 1-Bar $7\frac{3}{4} \times \frac{3}{4} = 4'-2\frac{1}{2}$ | 1-Bar $5 \times \frac{3}{4} = 4'-3$ |
| 2-Bars $1\frac{1}{2} \times \frac{1}{4} = 1'-2\frac{1}{4}$ | 2-Bars $1\frac{1}{2} \times \frac{1}{4} = 1'-3\frac{1}{4}$ |
| 2-Bars $1\frac{1}{2} \times \frac{1}{4} = 2'-4\frac{3}{4}$ | 2-Bars $1\frac{1}{2} \times \frac{1}{4} = 2'-7\frac{3}{4}$ |
| 5-Bars $1\frac{1}{2} \times \frac{1}{4} = 4'-6\frac{1}{2}$ | 8-Bars $1\frac{1}{2} \times \frac{1}{4} = 4'-9\frac{3}{4}$ |
| 2- $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4} = 1'-3\frac{1}{2}$ | 2- $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4} = 1'-2\frac{1}{2}$ |
| 2- $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4} = 3'-7\frac{3}{4}$ | 2- $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4} = 3'-5\frac{3}{4}$ |
| 5- $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4} = 4'-9\frac{1}{8}$ | 8- $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4} = 4'-6\frac{1}{8}$ |
-
- | | |
|---|---|
| 1-Bar $8 \times \frac{3}{4} = 4'-2\frac{1}{2}$ | 1-Bar $8 \times \frac{3}{4} = 4'-2\frac{1}{2}$ |
| 2-Bars $1\frac{1}{2} \times \frac{1}{4} = 1'-2\frac{1}{8}$ | 2-Bars $1\frac{1}{2} \times \frac{1}{4} = 1'-3\frac{1}{8}$ |
| 2-Bars $1\frac{1}{2} \times \frac{1}{4} = 3'-5\frac{3}{8}$ | 2-Bars $1\frac{1}{2} \times \frac{1}{4} = 3'-7\frac{3}{8}$ |
| 14-Bars $1\frac{1}{2} \times \frac{1}{4} = 4'-6\frac{1}{2}$ | 10-Bars $1\frac{1}{2} \times \frac{1}{4} = 4'-9\frac{3}{4}$ |
| 2- $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4} = 1'-3\frac{1}{4}$ | 2- $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4} = 1'-2\frac{3}{4}$ |
| 2- $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4} = 3'-4\frac{3}{4}$ | 2- $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4} = 3'-4\frac{3}{4}$ |
| 17- $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4} = 4'-9\frac{3}{4}$ | 10- $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4} = 4'-6\frac{1}{8}$ |

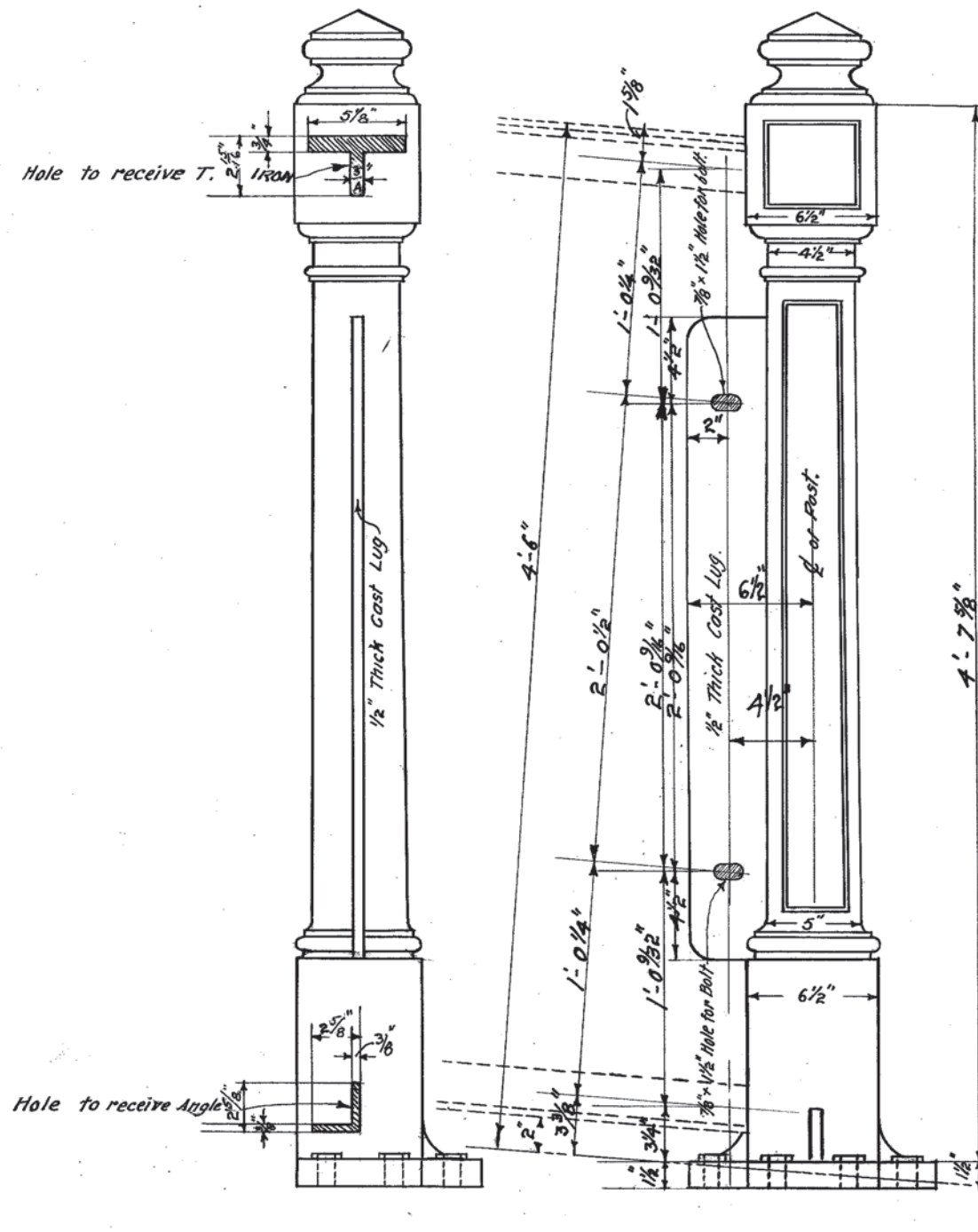


Also Req. - 5 Panels F8 similar to F1-F3 except end connections.

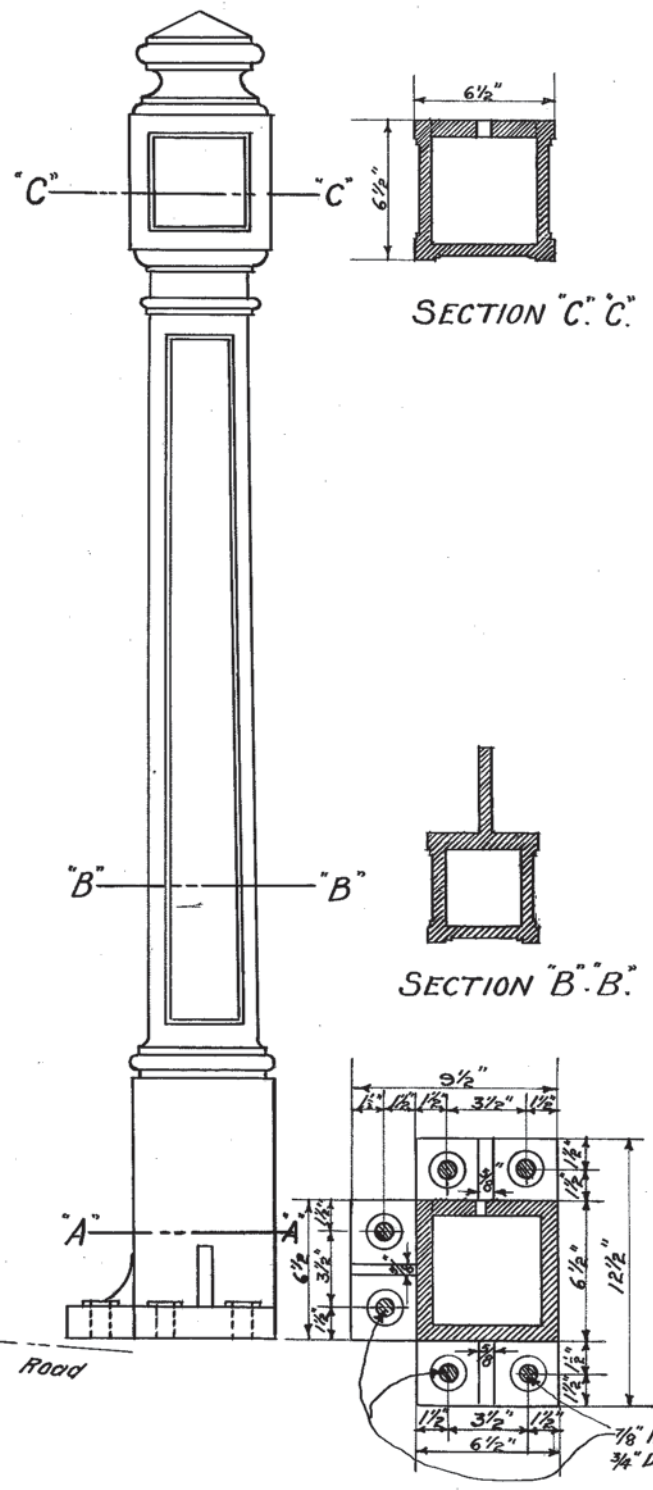
Examined: *H. Stewart*
Structural Engineer
Approved: *J. L. O'Connell*
Chief Engineer

Notes:
 $\frac{1}{4}$ " Rivets
Connections to Posts - $\frac{3}{8}$ " Rivets.
F4-F5-F6-F7-F8 to be checked
by Bridge Co.

GRAND TRUNK RAILWAY SYSTEM
LONDON DIVISION 17 DISTRICT
ST CATHERINES
ST PAUL ST O.H. BRIDGE MILE 11.68
STEEL DETAILS
Designed by H.F. Drawn by E.E.B.
Scale 1"=1'-0"
Office of Chief Engineer Montreal Aug 1921 File No 484-35



ELEVATIONS



SECTION A.A.
2 RIGHT HAND Posts Req. As Shown
2 LEFT "

NOTE:-
All castings must be tough Gray Iron free from cold shuts or injurious blow holes, true to form and thickness, and of a workman like finish. Sample pieces 1" inch square cast from same heat of metal in sand moulds shall be capable of sustaining on a clear span of 12 inches a central load of 2400 pounds when tested in the Rough Bar

EXAMINED: *H. Stuart*
Structural Engineer
APPROVED: *J. L. O. Bond*
Chief Engineer

GRAND TRUNK RAILWAY SYSTEM
LONDON DIVISION 17TH DISTRICT
ST CATHERINES
ST PAUL ST O.H. BRIDGE MILE 11.68
DETAIL OF CAST IRON NEWEL POSTS
Scale 2"=1'-0"
Office of Chief Engineer Journal No. 9222
Montreal, April 29th 1922 File No. 484-35

A531
St. Cath

REGIONAL MUNICIPALITY OF NIAGARA

PUBLIC WORKS DEPARTMENT

REPAIRS TO STRUCTURE No. 71

St. Paul Street Over CNR

C.H. EIDT P. ENG.
DIRECTOR OF ENGINEERING

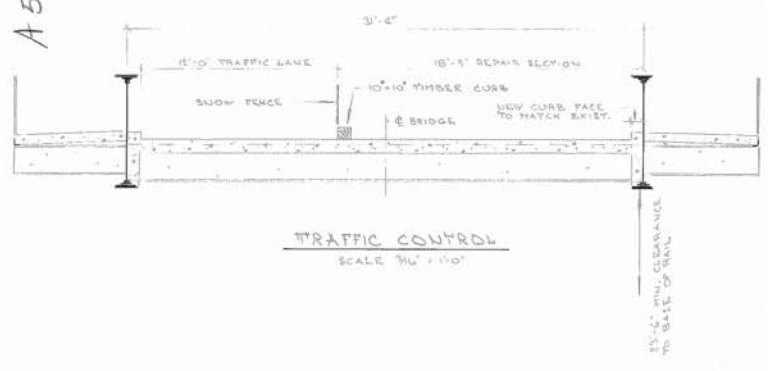


- Key Plan -

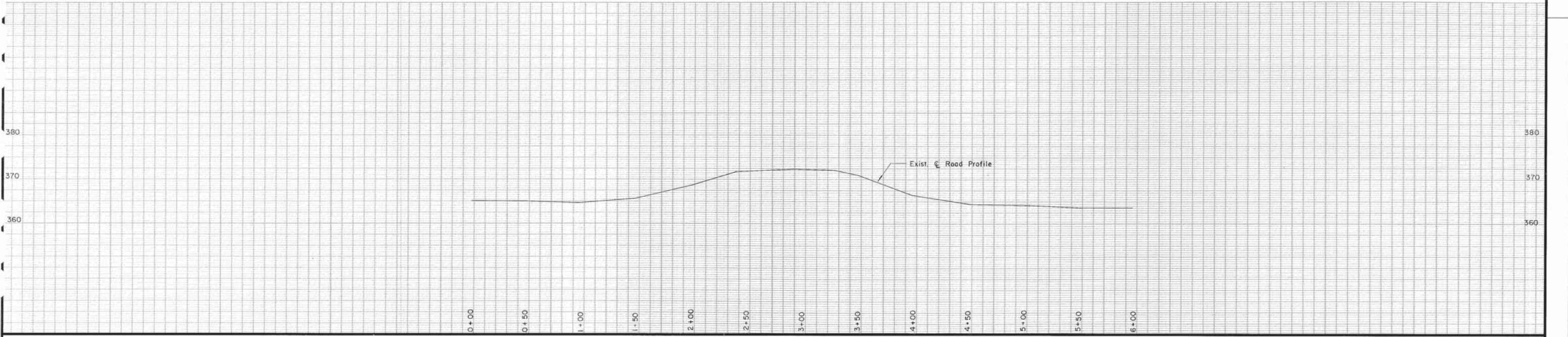
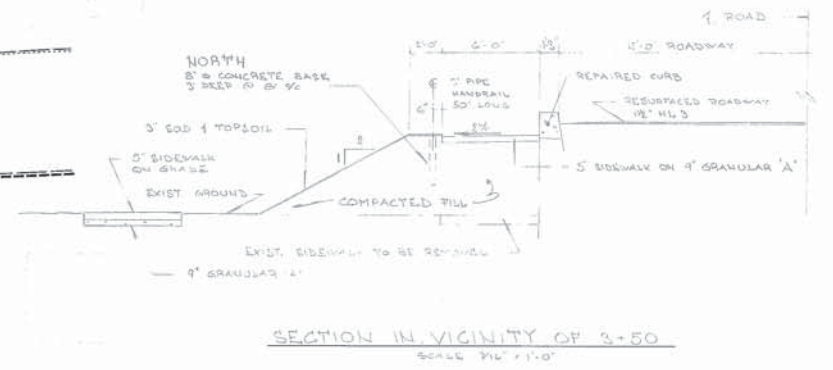
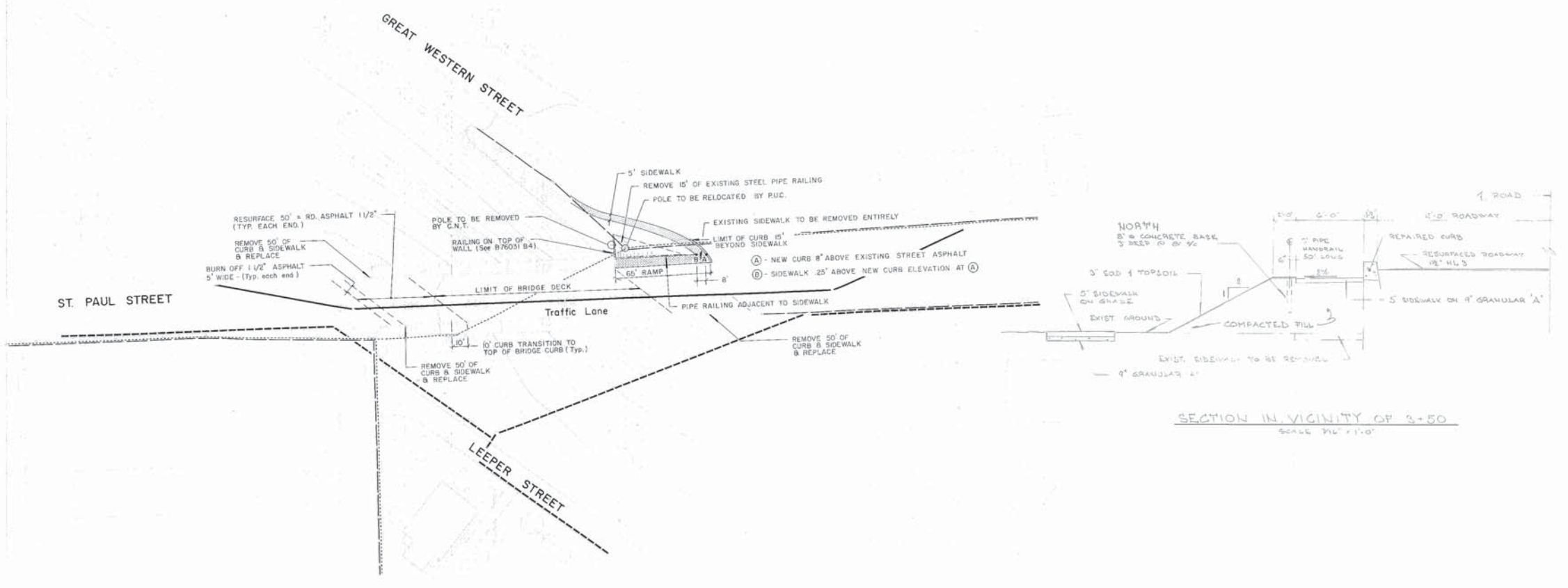
J.E. CAMPBELL
REGIONAL CHAIRMAN

CONTRACT NO. RN. 77 - 15

A531

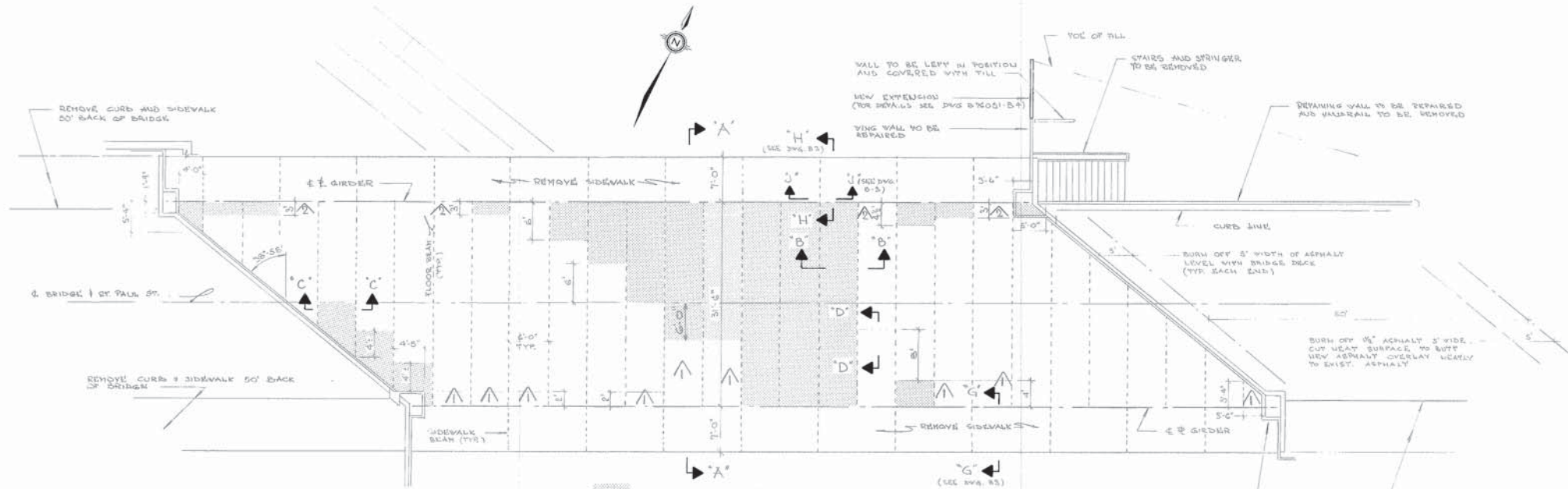


- LEGEND**
- - - - - O/H Primary (4000V)
 - - - - - O/H Secondary (120/240V)
 - - - - - Bell Canada
 - - - - - 10" x 10" Timber Curb

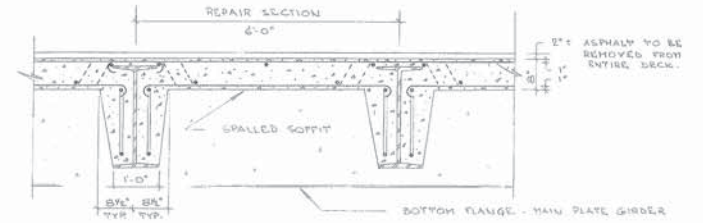


<p>NOTES</p> <ol style="list-style-type: none"> 1. MINIMUM CONCRETE STRENGTH AT 28 DAYS SHALL BE: Deck = 4000 psi Sidewalk = " Retaining Wall = " 2. REINFORCING STEEL SHALL BE HARD GRADE AND HIGH BOND WITH A MINIMUM YIELD STRENGTH OF 50000psi. 3. CLEAR COVER TO REINFORCING STEEL SHALL BE: 1' top of deck slab 1 1/2" bottom of deck & sidewalk & top of sidewalk 2" cover to retaining walls exposed to earth 3" cover to concrete poured against earth 4. ALL CONSTRUCTION JOINTS SHALL BE APPROVED BY THE ENGINEER. 5. ALL EXPOSED CORNERS SHALL BE CHAMFERED 1" x 1" UNLESS OTHERWISE NOTED. 6. APPROVED ADMIXTURES SUPPLIED BY THE CONTRACTOR SHALL BE ADDED TO ALL CONCRETE. 	<p>APPROVED</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO.</th> <th>REVISION</th> <th>DATE</th> <th>INITIAL</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	NO.	REVISION	DATE	INITIAL																	<p>Read-Harris Engineering 160 Duncan Mill Rd. Don Mills</p> <p>Approved: </p>	<p>REGIONAL MUNICIPALITY OF NIAGARA Structure No. 71 St. Paul Street West over CNR SITE PLAN</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>HORIZ. SCALE 1" = 40' or AS SHOWN</td> <td>VERT. SCALE 1" = 10'</td> <td>Cont. No. 77-15</td> <td>DATE MARCH / 77</td> </tr> <tr> <td>DRAWN BY J.S.</td> <td>CHECKED BY P.E.S.</td> <td>DWG. No.</td> <td>B76031 - B1</td> </tr> </table>	HORIZ. SCALE 1" = 40' or AS SHOWN	VERT. SCALE 1" = 10'	Cont. No. 77-15	DATE MARCH / 77	DRAWN BY J.S.	CHECKED BY P.E.S.	DWG. No.	B76031 - B1
NO.	REVISION	DATE	INITIAL																													
HORIZ. SCALE 1" = 40' or AS SHOWN	VERT. SCALE 1" = 10'	Cont. No. 77-15	DATE MARCH / 77																													
DRAWN BY J.S.	CHECKED BY P.E.S.	DWG. No.	B76031 - B1																													

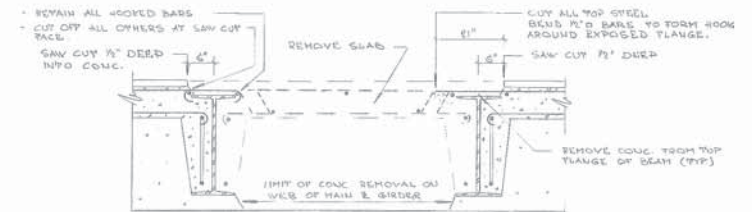
A531



PLAN
SCALE - 3/32" = 1'-0"

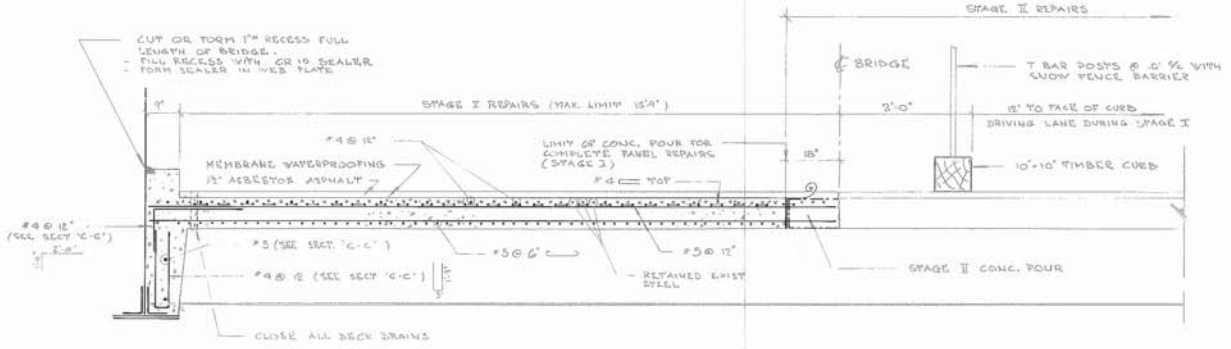


TYP DECK REPAIR SECTION
EXIST. CONDITIONS

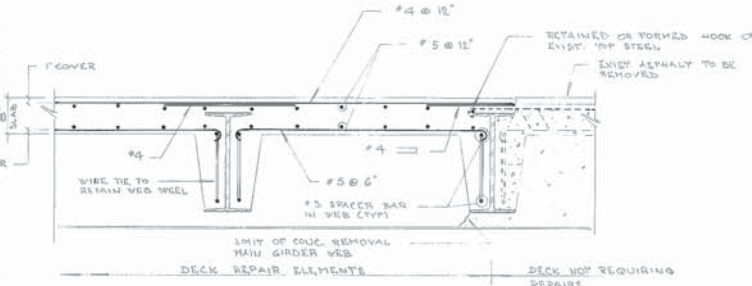


HOOK SECTION STRAIGHT SECTION

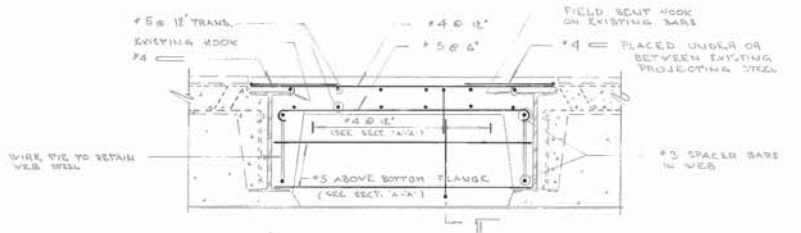
PORTION OF DECK TO BE REMOVED



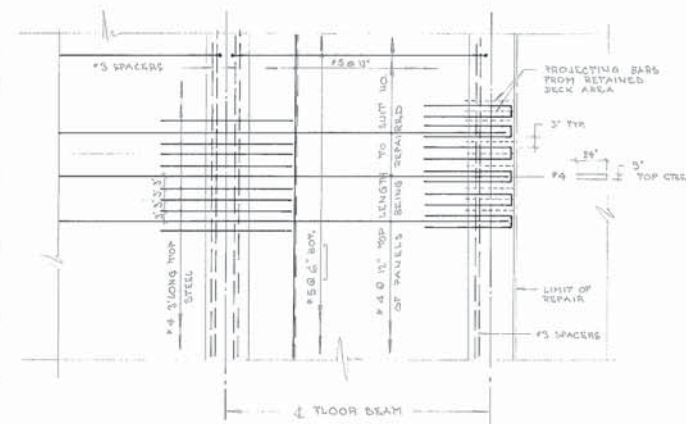
SECTION "A-A"
FULL SECTION REPAIRS



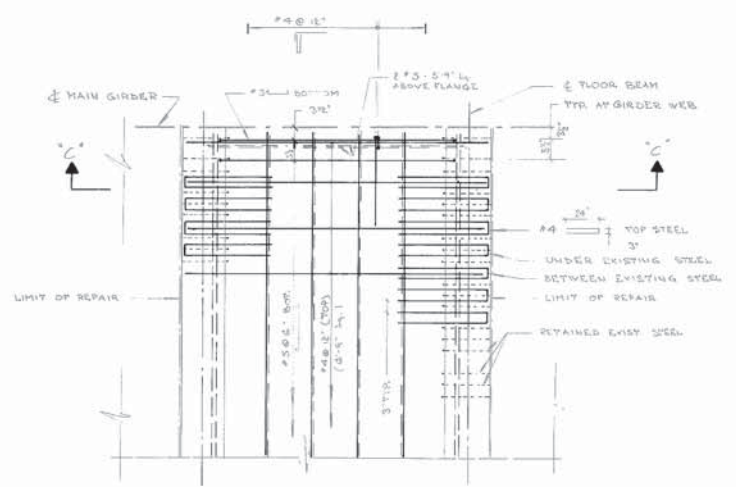
SECTION "B-B"



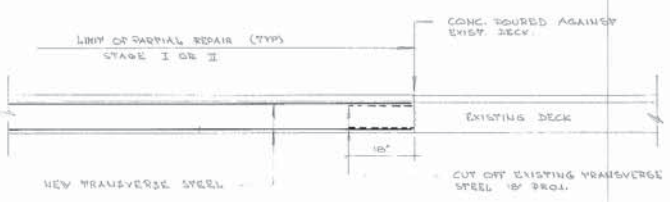
SECTION "C-C"



PLAN - MULTI PANEL REPAIR



PLAN - SINGLE PANEL REPAIR



SECTION "D-D"

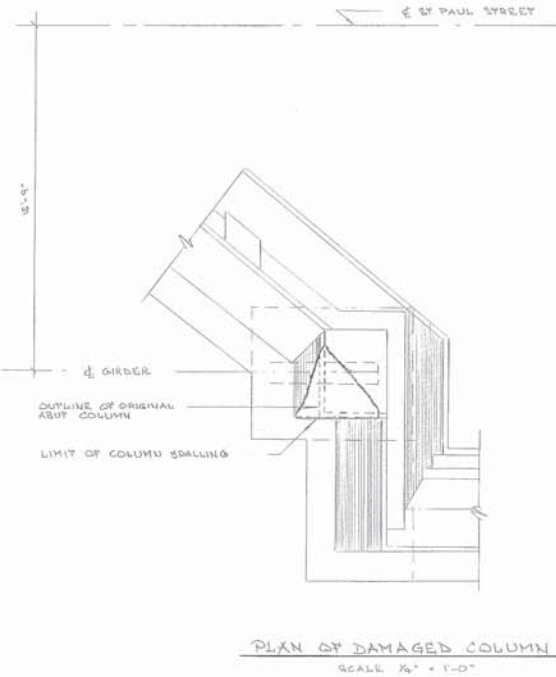
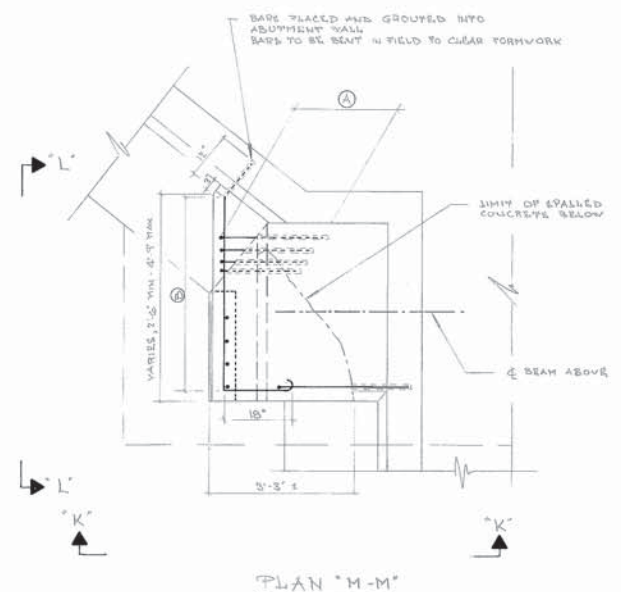
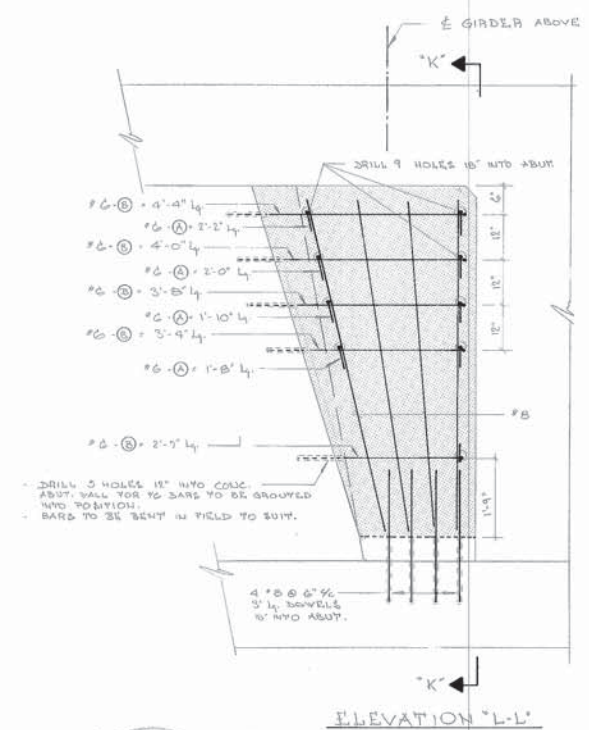
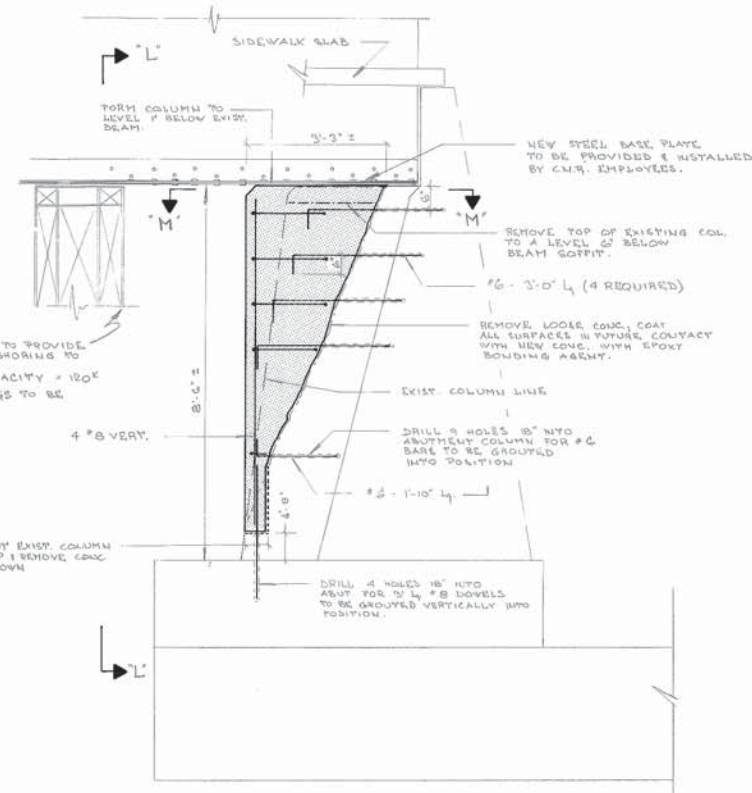
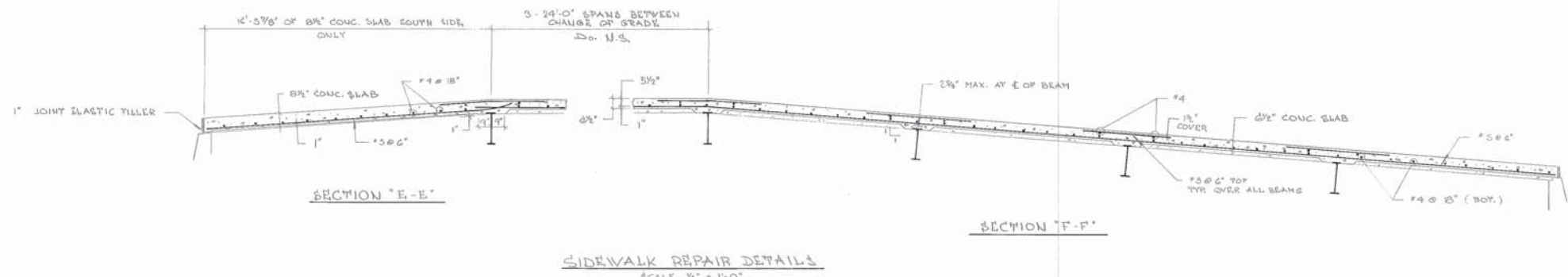
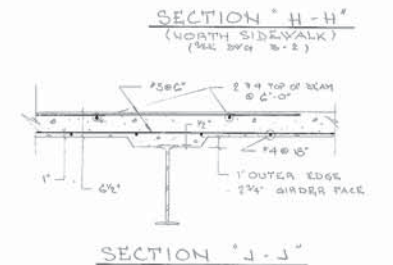
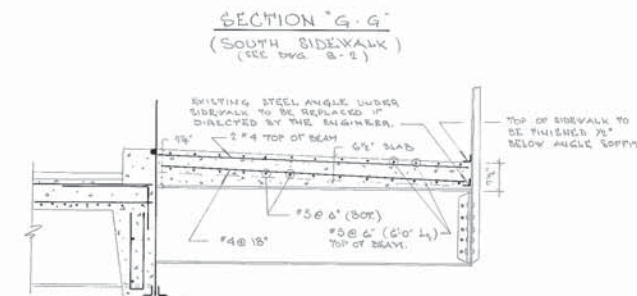
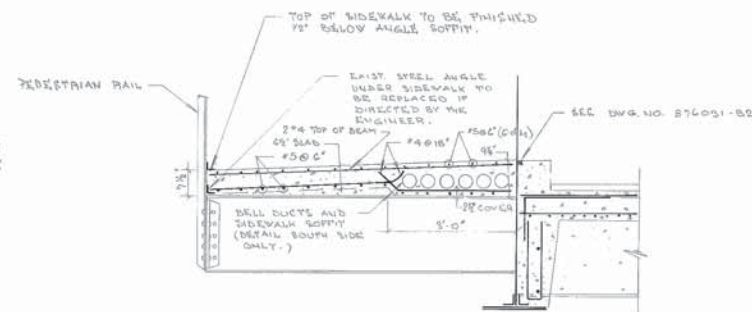
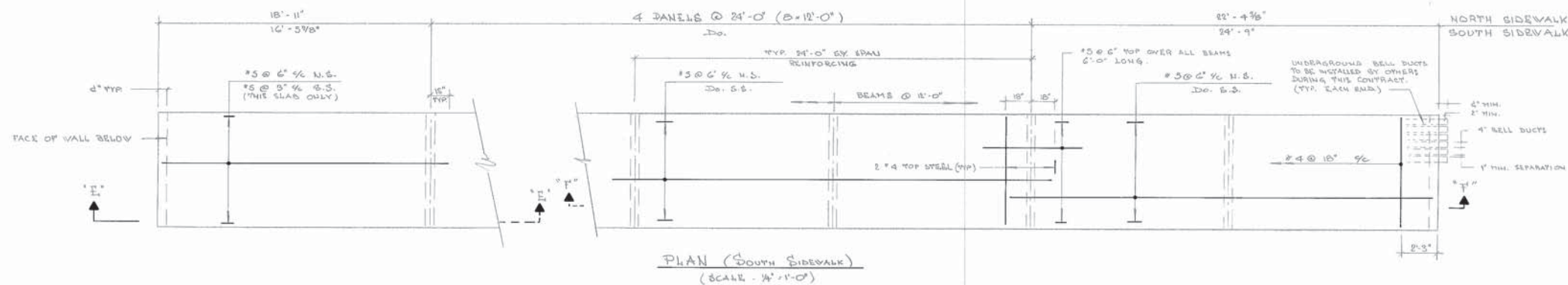


No.	DATE	TITLE	BY
1	SEPT/77	AS CONSTRUCTED DETAIL	
2	AUG 11/77	DELETE DECK REPAIRS	

Read-Harris Engineering
160 Duncan Mill Rd. Don Mills
Approved: [Signature]

REGIONAL MUNICIPALITY OF NIAGARA
Structure No. 71
St. Paul Street West over CNR
DECK REPAIR DETAILS

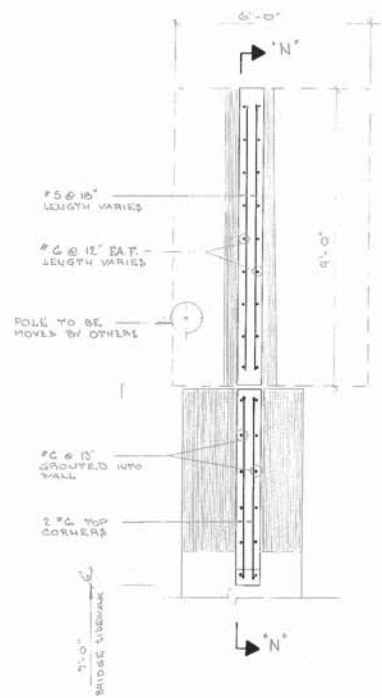
DRAWN BY: J.S. DESIGNED BY: P.E.S. CHECKED BY: P.E.S. Cont. No. 77-15
SCALE: 1/2" = 1'-0" OF AS SHOWN DWG. No. B76031 - B2
DATE: MARCH 1977



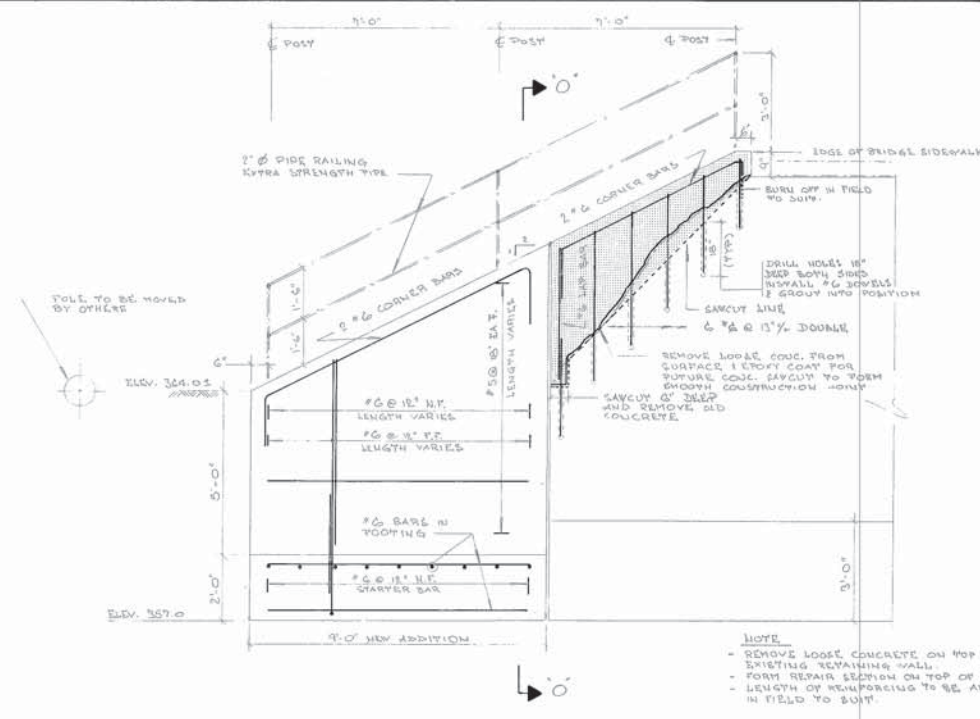
No.	TITLE	DATE	REVISIONS	BY

<p>Read-Harris Engineering 160 Duncan Mill Rd. Don Mills</p>	REGIONAL MUNICIPALITY OF NIAGARA Structure No. 71 St. Paul Street West over CNR SIDEWALK & ABUTMENT COLUMN REPAIRS	
	DRAWN BY: J.S. DESIGNED BY: P.E.S. SCALE: 1/2" = 1'-0" or AS SHOWN DATE: MARCH 1977	CHECKED BY: P.E.S. DWG. No. B76031-B3

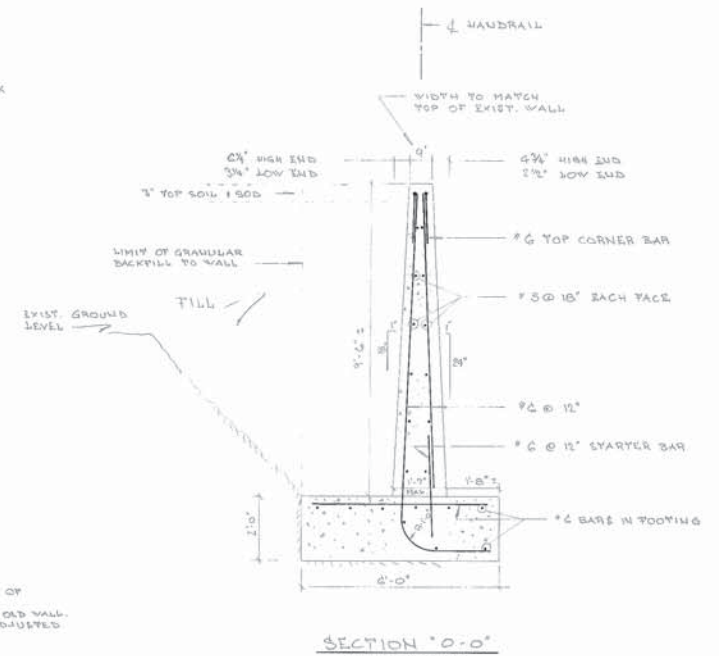
A531



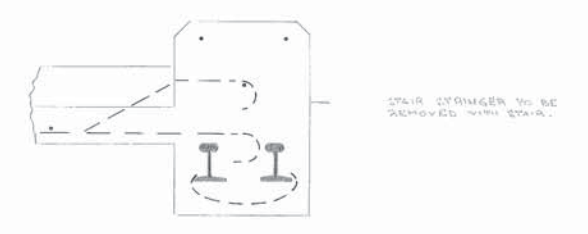
PLAN OF RETAINING WALL
SCALE 3/8" = 1'-0"



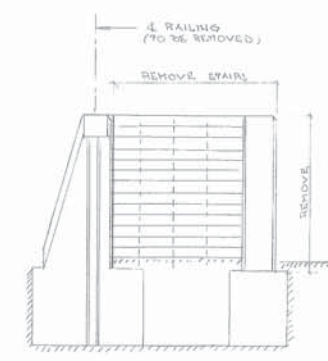
ELEVATION 'N-N'
SCALE 3/8" = 1'-0"



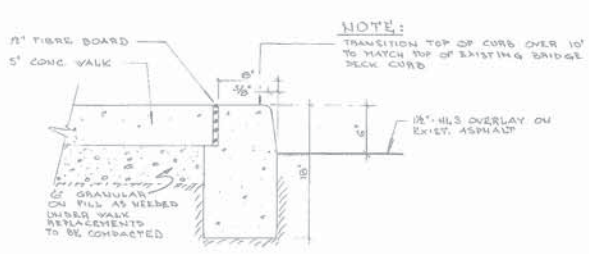
SECTION 'O-O'
SCALE 3/8" = 1'-0"



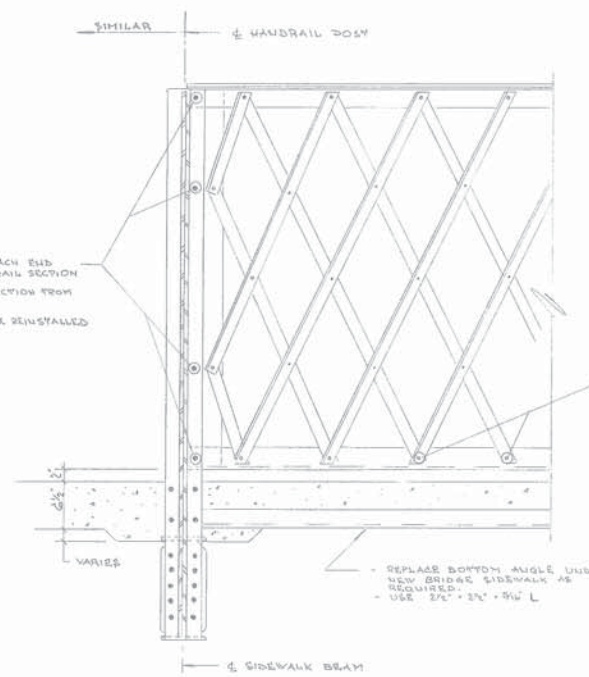
SECTION 'P-P'
SCALE 1" = 1'-0"



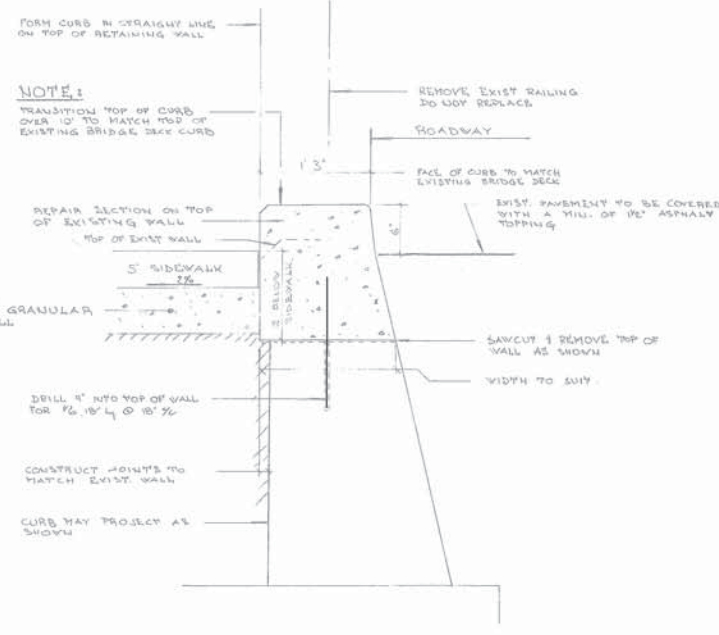
ELEVATION 'Q-Q'
SCALE 1" = 1'-0"



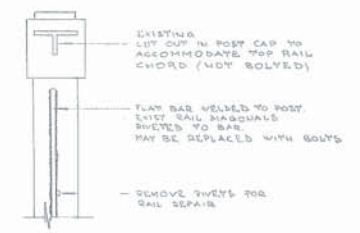
CURB & SIDEWALK DETAIL
SCALE 1" = 1'-0"



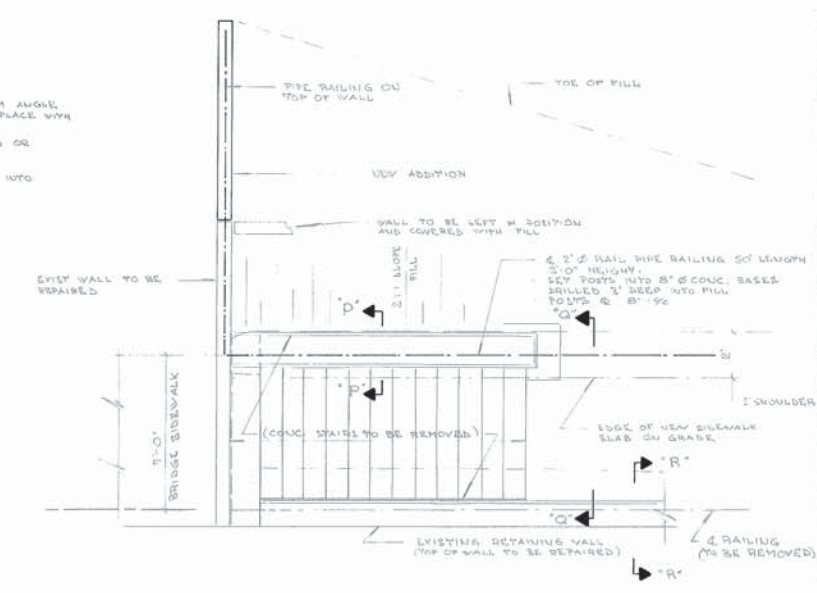
HANDRAIL REPAIR DETAILS
SCALE 1" = 1'-0"



SECTION 'R-R'
RETAINING WALL REPAIRS
SCALE 1" = 1'-0"



EXISTING RAIL END POST



PLAN - STAIR REMOVAL DETAILS
SCALE 1/4" = 1'-0"

NOTE:
- REMOVE LOOSE CONCRETE ON TOP OF EXISTING REMAINING WALL.
- FORM REPAIR SECTION ON TOP OF OLD WALL.
- LENGTH OF REINFORCING TO BE ADJUSTED IN FIELD TO SUIT.

REMOVE 4 BOLTS EACH END OF DEFECTIVE HANDRAIL SECTION
REMOVE HANDRAIL SECTION FROM POSITION
RAIL SECTION MAY BE REINSTALLED USING 41 BOLTS.

REMOVE RIVETS FROM BOTTOM ANGLE
REMOVE DEFECTIVE ANGLE & REPLACE WITH NEW 1 1/2" X 2" X 1/4" (10')
NEW ANGLE MAY BE BOLTED OR WELDED INTO POSITION
REPLACE HANDRAIL SECTION INTO ORIGINAL POSITION.

NOTE:
TRANSITION TOP OF CURB OVER 10' TO MATCH TOP OF EXISTING BRIDGE DECK CURB

No.	TITLE	DATE	REVISIONS	BY



<p>Read-Harris Engineering 160 Duncan Mill Rd. Don Mills</p>	<p>REGIONAL MUNICIPALITY OF NIAGARA Structure No. 71 St. Paul Street West over CNR RETAINING WALL & HANDRAIL REPAIRS</p>	
	<p>Approved: </p>	<p>DESIGNED BY: J.S. SCALE: AS SHOWN DATE: MARCH 1977</p>

APPENDIX C: Comparative Bridges Owned and Maintained by the Regional Municipality of Niagara

Bridge_No	Bridge_Name	On_Road	Location	Municipality1	Crosses	Intersect_Feature	Northing_Y	Easting_X	Year_Built	Material_Type	Structure_Type	Deck_Area	SPAN	CONDITION
077225	12 Mile Creek Bridge	Fourth Ave Louth	0.35 km South of RR 42 Ontario St	St. Catharines	O-Wat	Twelve Mile Creek	4779940	641618	1978	S-IB-C	SOSG	3127	246.9	Fair
089205	Glendale Road Bridge	Glendale Ave	0.30 km East of RR 69 Pelham Rd	St. Catharines	O-Wat	Twelve Mile Creek	4777115	642254	1975	S-IB-C	SOSG	2164	131.4	Good
124205	Central Avenue Bridge	Central Ave	0.25 km North of Wintemute St	Fort Erie	O-Rail	unknown	4754862	669837	2016	S-TT-S	SOSG	2084	124	Very Good
527205	Division Street Bridge	Division St	0.10 km West of RR 68 King St	Welland	O-Wat	Old Welland Canal	4761246	642501	1981	S-IB-C	SOSG	1914	112.5	Good
020230	Hydro Canal North Bridge	Lundy's Lane	0.60 km East of Montrose Road	Niagara Falls	O-Wat	HEPC Canal	4772451	653392	1965	S-IB-C	SOSG	908	85.2	Fair
077210	Fourth Avenue CNR Bridge	Fourth Ave Louth	0.90 km East of RR 34 Seventh St	St. Catharines	U-RWY	CNR Rwy	4779311	638481	1966	S-IB-S	SOSG	694	85.2	Fair
100210	St. Paul Avenue CNR Bridge	St. Paul Ave	0.55 km South of Hwy 405	Niagara Falls	U-RWY	CNR Rwy	4778288	654419	1966	S-IB-S	SOSG	562	73.2	Fair
034205	Seventh Street Bridge	Seventh St Louth	0.16 km North of RR 77 4th Ave Louth	St. Catharines	O-Rail	CNR Rwy	4779479	637616	1977	S-IB-S	SOSG	557	63.9	Fair
005205	Weir Bridge	Killaly St. W.	0.4 km East of Elm St.	Port Colborne	O-Wat	Canal Weir	4750279	642896	2004		SOSG	500	62.9	Good
627205	O'Reilly's Bridge	O'Reilly's Rd	0.15 km North of RR 27 River Rd	Wainfleet	O-Wat	Welland River	4759081	637187	2010	S-TT-S	SOSG	199	40.4	Very Good
087205	Frank E Weir Bridge	Lakeport Rd	0.18 km West of Michigan Ave	St. Catharines	O-Wat	Martindale Pond	4784355	640892	1959	S-IB-S	SOSG	473	34.4	Fair
054210	Prince Charles Drive Bridge	Prince Charles Dr	0.10 km North of RR 27 Main St	Welland	O-Wat	Welland River	4761393	641889	1954	S-IB-S	SOSG	1428	25.6	Fair
081215	St. Paul West CNR Bridge	St. Paul St W	0.50 km East of RR 72 Louth St	St. Catharines	O-Rail	CNR Rwy	4778644	641988	1910	S-IB-C	SOSG	584	16.8	Poor
054205	Prince Charles Drive Bridge	Prince Charles Dr	0.32 km North of RR 31 Broadway	Welland	O-Rail	CNR Rwy	4759741	642074	1960	S-IB-C	SOSG	678	14.9	Fair
063215	Beaver Creek Culvert	Canborough Rd	1.30 km East of RR 27 River Rd	West Lincoln	O-Wat	Beaver Creek	4762750	624902	1955	S-IB-S	SOSG	129	11.9	Poor
021210	Thompson Road Bridge	Thompson Rd	0.05 km North of RR 21 Thompson Rd	Fort Erie	U-RWY	unknown	4755133	667962	1945	S-IB-C	SOSG	673	10	Poor
081205	Forty Mile Creek Bridge	Main St W	0.16 km West of RR 12 Christie St	Grimsby	O-Wat	Forty Mile Creek	4783428	616755	1922	S-IB-F	SOSG	179	8.7	Fair



APPENDIX D: Preliminary Conceptual Design Renderings (Select Pages from Ellis 2017)



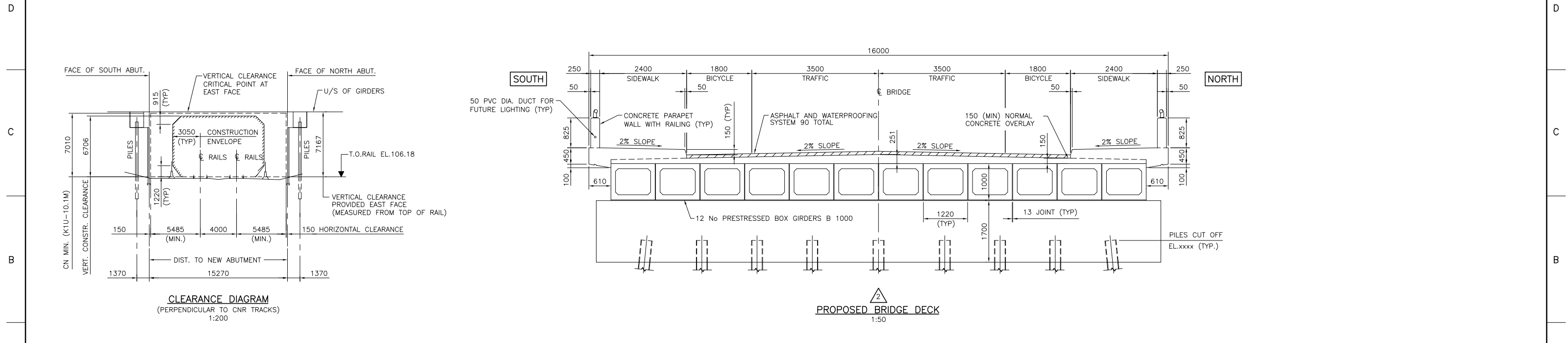
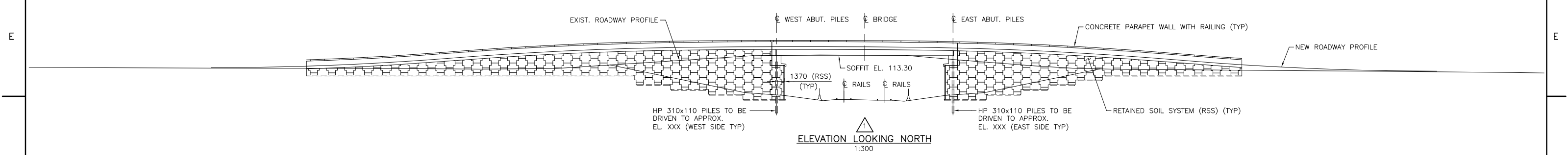
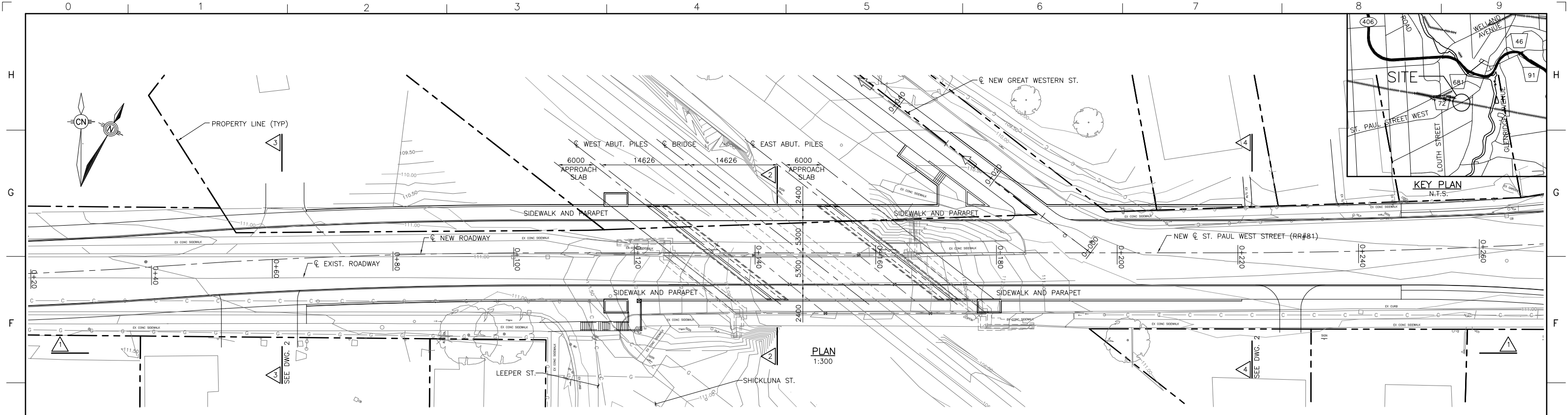
THE REGIONAL MUNICIPALITY OF NIAGARA

**CONCEPTUAL AND PRELIMINARY DESIGN PLAN
FOR THE REPLACEMENT OF
ST. PAUL WEST CNR BRIDGE
(STRUCTURE NO. 081215),
MILE 11.68 GRIMSBY SUBDIVISION**

APPENDIX 'B'

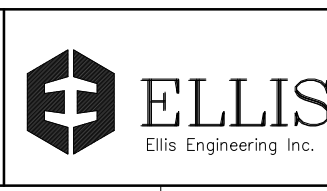
DRAWINGS

- DWG No. 1 - PRELIMINARY GENERAL ARRANGEMENT
- DWG No. 2 - APPROACH ROADWAY CROSS SECTIONS
- DWG No. 3 - STAGE 1 – PLAN AND SECTIONS
- DWG No. 4 - STAGE 2 – PLAN AND SECTIONS
- DWG No. 5 - STAGE 3 – PLAN AND SECTIONS



NO.	REVISION	DATE	INIT.
B	PROPOSED BRIDGE CONCEPT	02/11/17	AV
A	PRELIMINARY REVIEW	20/06/17	AV

NOTES

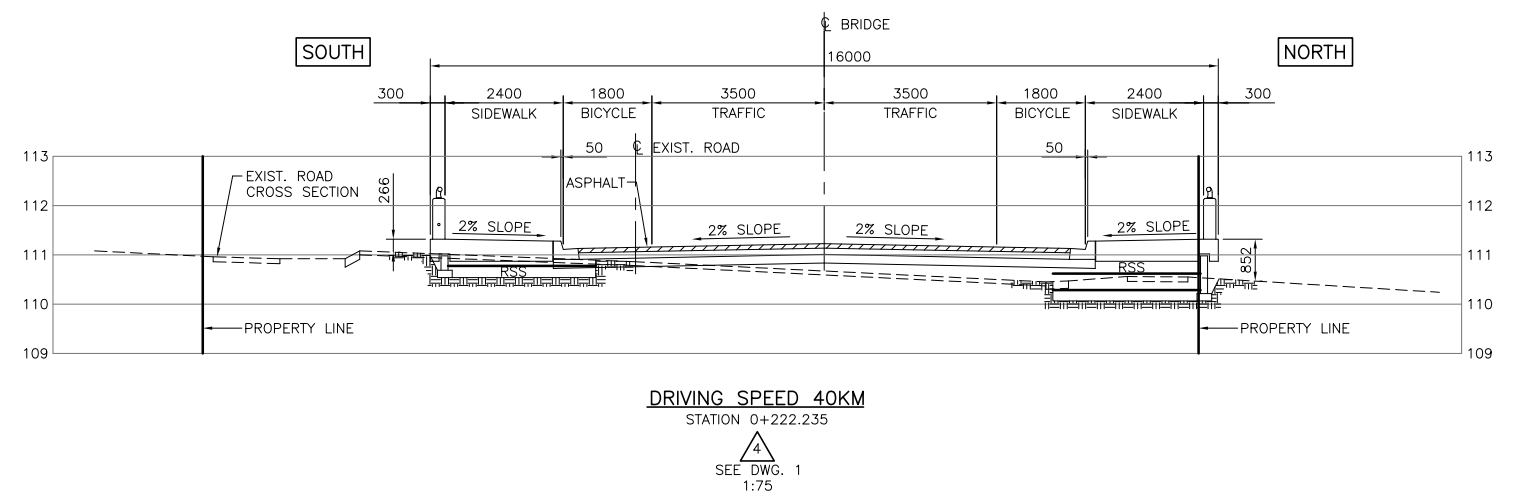
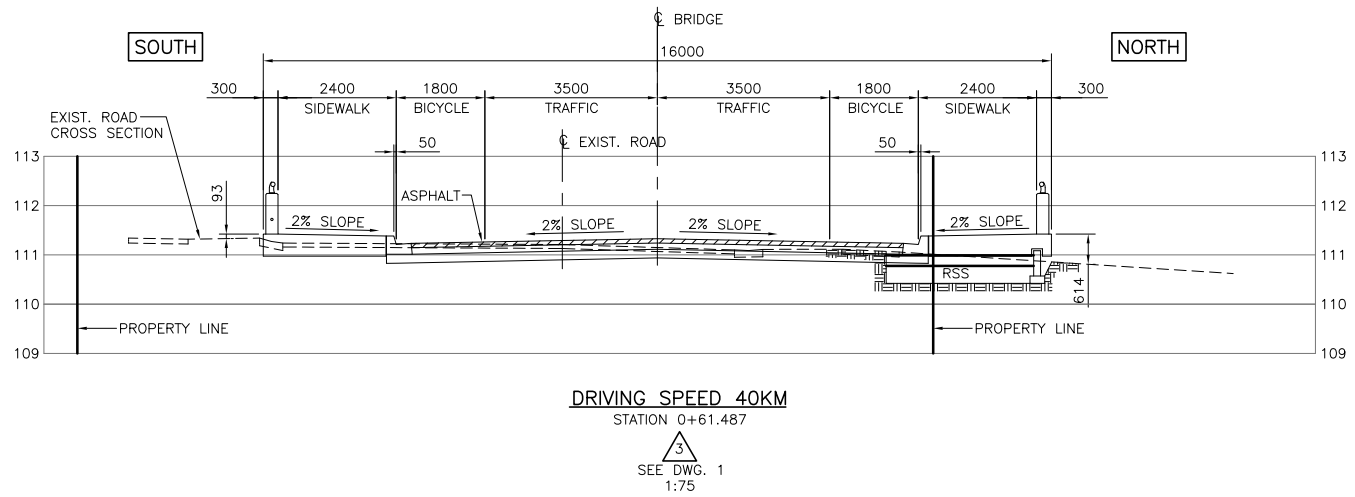


DRAFTING
AJV
DESIGN
DV
CHECKED BY
BE



REPLACEMENT OF THE ST. PAUL STREET WEST
CNR BRIDGE
(REGION STRUCTURE NO. 081215)
PRELIMINARY GENERAL ARRANGEMENT

DATE	NOVEMBER 2017
SCALE	AS SHOWN
DWG No.	1
MUN. REF. No.	
REV.	B



NOTES

NO.	REVISION	DATE	INIT.
B	PROPOSED BRIDGE CONCEPT	02/11/17	AV
A	PRELIMINARY REVIEW	06/20/17	AV



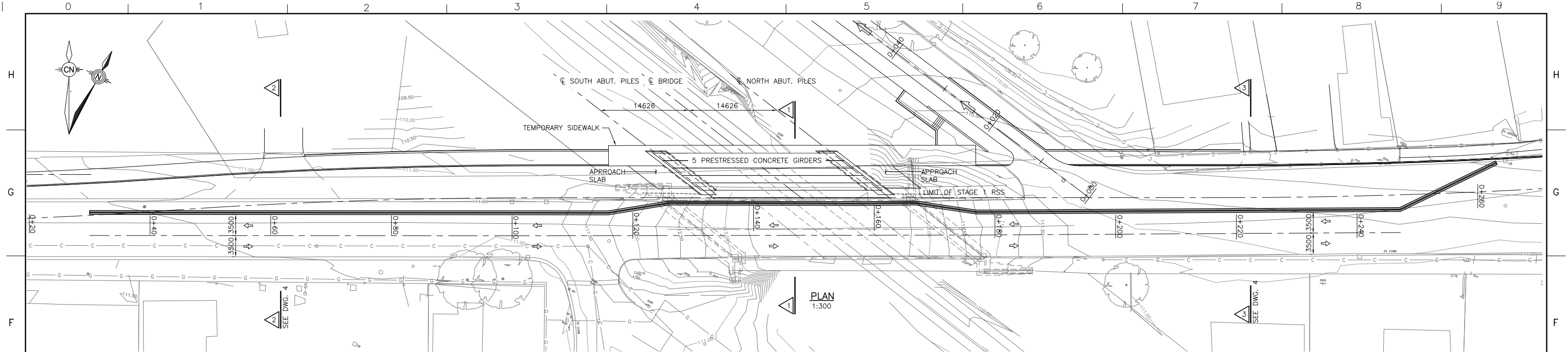
DRAFTING
AJV
DESIGN
DV
CHECKED BY
BE



REPLACEMENT OF THE ST. PAUL STREET WEST
CNR BRIDGE
(REGION STRUCTURE NO. 081215)

APPROACH ROADWAY CROSS SECTIONS

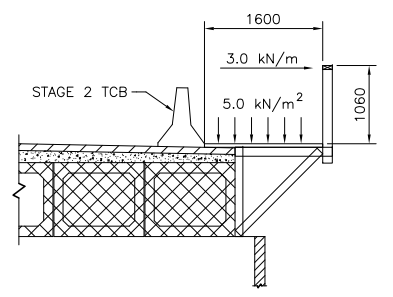
DATE	NOVEMBER 2017
SCALE	AS SHOWN
DWG No.	2
MUN. REF. No.	2010-T-117 (RN.10-17)
REV.	B



PLAN
1:300

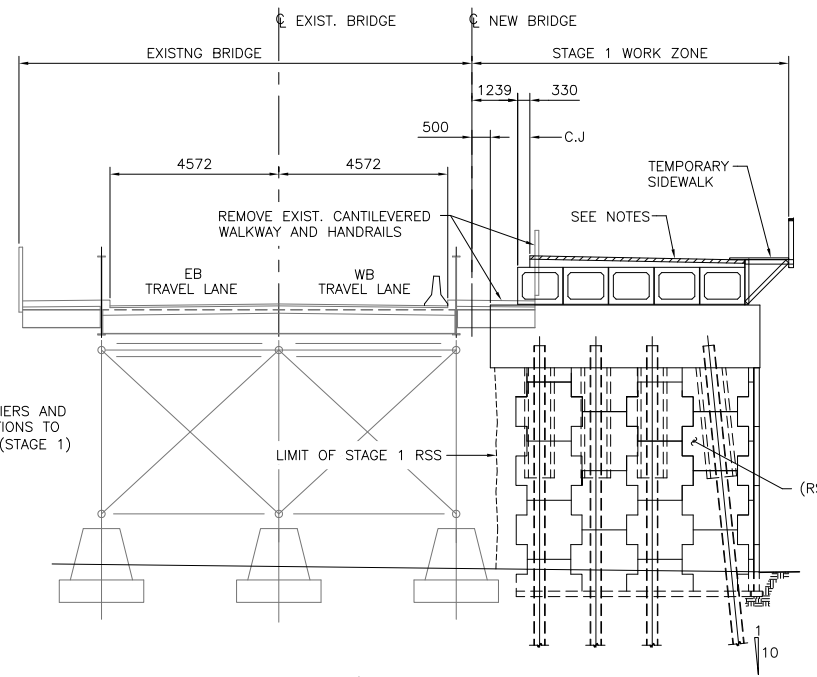
STAGE 1 CONSTRUCTION

1. REFER TO ROAD DRAWINGS FOR DETAILS OF TRAFFIC CONTROL AND OVERALL STAGING.
2. REFER TO DRAWINGS OF EXISTING BRIDGE STRUCTURE FOR DIMENSIONS AND DETAILS.
3. PLACE TEMPORARY CONCRETE BARRIERS (TCBs) ALONG NORTH SIDE OF ROAD AND INSIDE OF NORTH GIRDER OF EXISTING BRIDGE.
4. INSTALL ROADWAY PROTECTION.
5. INSTALL OVERHEAD RAILWAY PROTECTION.
6. REMOVE NORTH SIDEWALK AND SUPPORT BRACKETS FROM EXISTING BRIDGE.
7. DRIVE FOUR (4) PILES FOR EACH ABUTMENT.
8. DEMOLISH EXISTING NORTH WING WALLS AND PART OF ABUTMENTS. SEAL JOINT BETWEEN ROADWAY PROTECTION AND ABUTMENTS AS DEMOLITION PROGRESSES.
9. PLACE TCBs WITH CHAIN LINK FENCE ALONG RAILWAY CONSTRUCTION ENVELOPE AS SOON AS CONSTRUCTION PERMITS.
10. CONSTRUCT RETAINED SOIL SYSTEM (RSS) FOR NORTH SIDE OF NEW STRUCTURE, INCLUDING ABUTMENTS UP TO EXISTING NORTH PIER FOUNDATIONS. LOCALLY REMOVE EDGE OF PIERS IF NECESSARY.
11. CONSTRUCT PILE CAPS.
12. INSTALL FIVE (5) PRESTRESSED CONCRETE GIRDERS.
13. CAST BALLAST WALLS, APPROACH SLABS AND CONCRETE DECK OVERLAY TO STAGE 1 CONSTRUCTION JOINTS.
14. CONSTRUCT GRANULAR ROAD BASE TO ENDS OF APPROACH SLABS.
15. CONSTRUCT SIDEWALK, PARAPET WALLS AND PIERS BETWEEN APPROXIMATE STATIONS 0+450 TO 0+115 AND 0+175 TO 0+250.
16. PLACE BASE COURSE ASPHALT FOR STAGE 2 TRAFFIC DIVERSION.
17. CONSTRUCT TEMPORARY SIDEWALK BETWEEN APPROXIMATELY STATIONS 0+115 TO 0+175.
18. RELOCATE TCBs FOR STAGE 2 TRAFFIC DIVERSION.(SEE DWG.S5)
19. PLACE SIGNALS AND SIGNS FOR STAGE 2 TRAFFIC DIVERSION.
20. DIVERT TRAFFIC TO STAGE 2.



TEMPORARY SIDEWALK
FOR STAGE 2
1:50

1. CONTRACTOR TO DESIGN SIDEWALK FOR LOADINGS AND DIMENSIONS SHOWN.
2. OUTSIDE GUARD TO BE CLOSED ON INSIDE FACE WITH PLYWOOD OR SIMILAR SHEATHING.
3. WALKING SURFACE TO BE MIN. 20mm PLYWOOD OR CLOSE BOARDS FULL WIDTH TO TCB. COVER SURFACE WITH AN APPROVED NON-SLIP MATERIAL SUCH AS "WEATHERDEK"



1
1:100

NO.	REVISION	DATE	INIT.
B	PROPOSED BRIDGE CONCEPT	02/11/17	AV
A	PRELIMINARY REVIEW	20/06/17	AV

NOTES



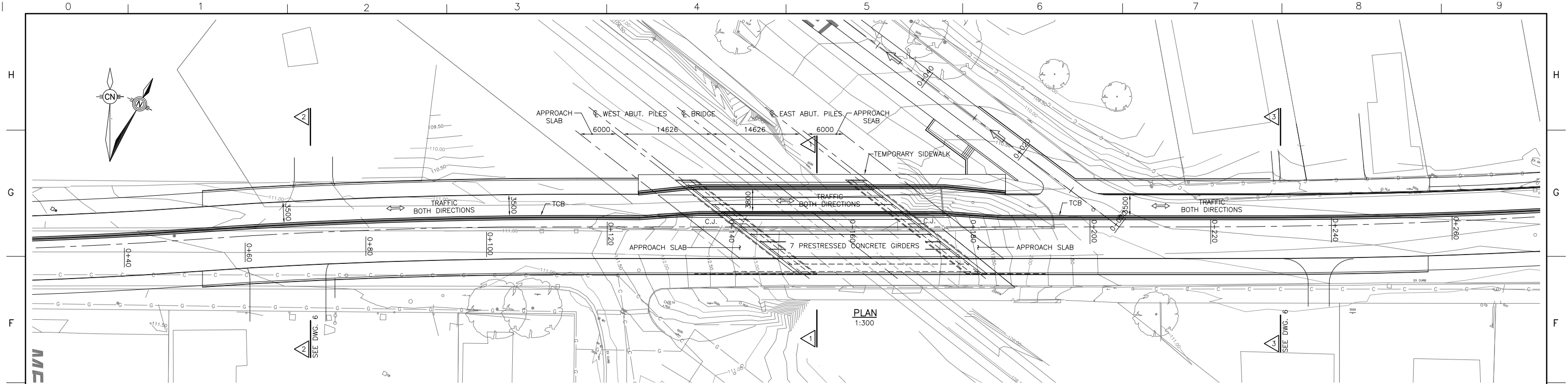
DRAFTING	AJV
DESIGN	DV
CHECKED BY	BE



REPLACEMENT OF THE ST. PAUL STREET WEST
CNR BRIDGE
(REGION STRUCTURE NO. 081215)

STAGE 1 – PLAN AND SECTIONS

DATE	NOVEMBER 2017
SCALE	AS SHOWN
DWG No.	3
MUN. REF. No.	
REV.	B



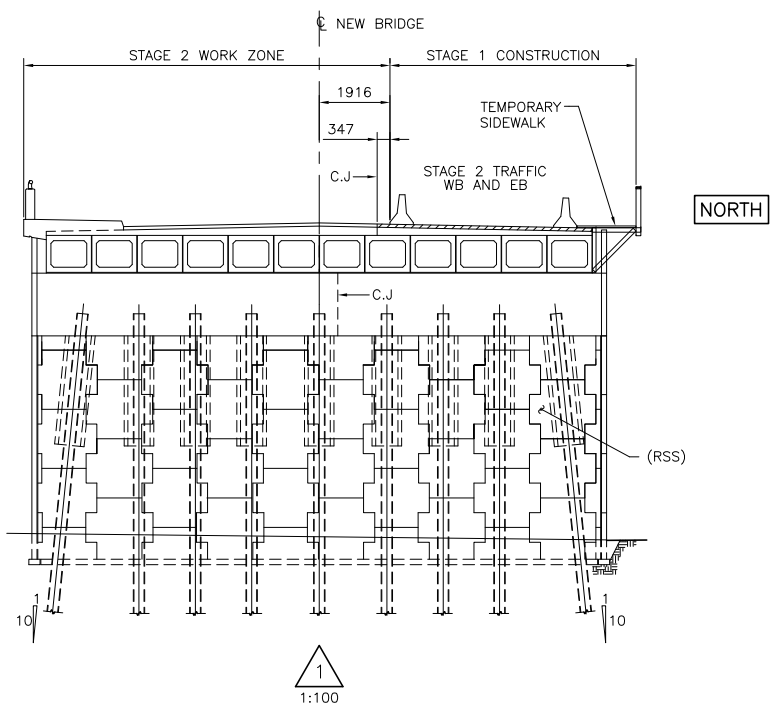
PLAN
1:300

STAGE 2 CONSTRUCTION

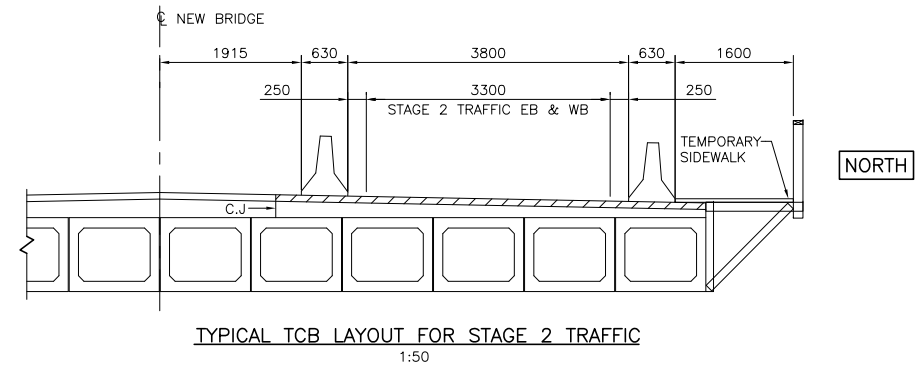
1. REMOVE BRIDGE SUPERSTRUCTURE.
2. EXCAVATE AND REMOVE PIER FOUNDATIONS.
3. DEMOLISH PART OF ABUTMENTS. EXCAVATE AND REMOVE PARTS OF SOUTH END OF ABUTMENTS, SOUTH WINGWALLS AND FOOTINGS.
4. DRIVE FIVE (5) PILES FOR EACH ABUTMENT.
5. CONSTRUCT RSS FOR SOUTH SIDE OF NEW STRUCTURE INCLUDING REMAINDER OF ABUTMENTS.
6. COMPLETE PILE CAPS.
7. INSTALL SEVEN (7) PRESTRESSED CONCRETE GIRDERS.
8. COMPLETE BALLAST WALLS, APPROACH SLABS AND CONCRETE DECK OVERLAY.
9. CONSTRUCT SIDEWALK, PARAPET WALLS, STAIR AND PIERS OVER FULL SOUTH LENGTH OF PROJECT.
10. PLACE WATERPROOFING AND BASE COURSE ASPHALT.
11. PLACE TCBs AND SIGNS FOR STAGE 3 TRAFFIC DIVERSION.
12. DIVERT TRAFFIC TO STAGE 3.

NOTES

1. TAPER LENGTH IS BASED ON ONTARIO TRAFFIC MANUAL, BOOK 7, FIGURE LT-17, SHIFT 1.045m.



1
1:100



TYPICAL TCB LAYOUT FOR STAGE 2 TRAFFIC
1:50

NO.	REVISION	DATE	INIT.
B	PROPOSED BRIDGE CONCEPT	02/11/17	AV
A	PRELIMINARY REVIEW	20/06/17	AV

NOTES



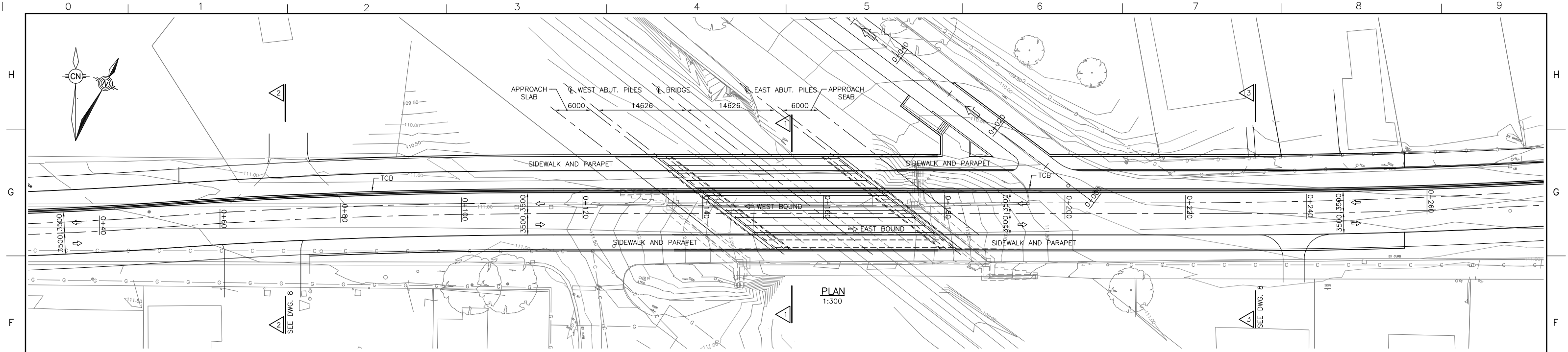
DRAFTING
AJV
DESIGN
DV
CHECKED BY
BE



REPLACEMENT OF THE ST. PAUL STREET WEST
CNR BRIDGE
(REGION STRUCTURE NO. 081215)

STAGE 2 – PLAN AND SECTIONS

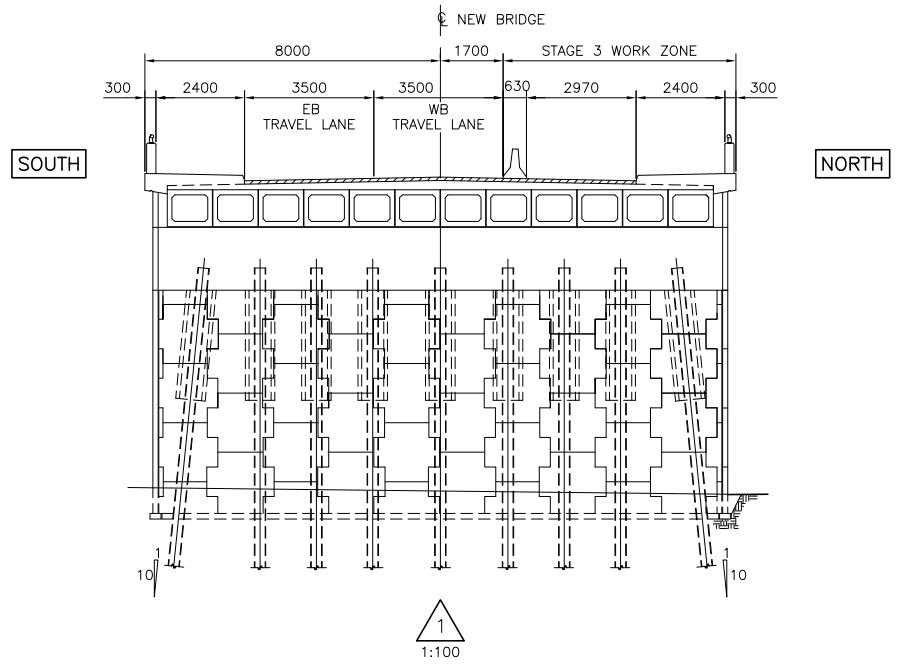
DATE	NOVEMBER 2017
SCALE	AS SHOWN
DWG No.	4
MUN. REF. No.	
REV.	B



PLAN
1:300

STAGE 3 CONSTRUCTION

1. REMOVE TEMPORARY SIDEWALK.
2. EXCAVATE TEMPORARY GRANULAR MATERIAL AND TEMPORARY BASE COURSE ASPHALT AT APPROACH SLABS AND SIDEWALK, NORTH SIDE.
3. CONSTRUCT CURB STRIP OF APPROACH SLAB.
4. CONSTRUCT SIDEWALK AND PARAPET WALL FROM APPROXIMATE STATION 0+115 TO BRIDGE AND FROM BRIDGE TO STATION 0+175.
5. COMPLETE BASE COURSE ASPHALT AND WATERPROOFING.
6. REMOVE STAGE 3 BARRIERS AND SIGNS.



NO.	REVISION	DATE	INIT.
B	PROPOSED BRIDGE CONCEPT	02/11/17	AV
A	PRELIMINARY REVIEW	20/06/17	AV

NOTES



DRAFTING
AJV
DESIGN
DV
CHECKED BY
BE



REPLACEMENT OF THE ST. PAUL STREET WEST
CNR BRIDGE
(REGION STRUCTURE NO. 081215)

STAGE 3 – PLAN AND SECTIONS

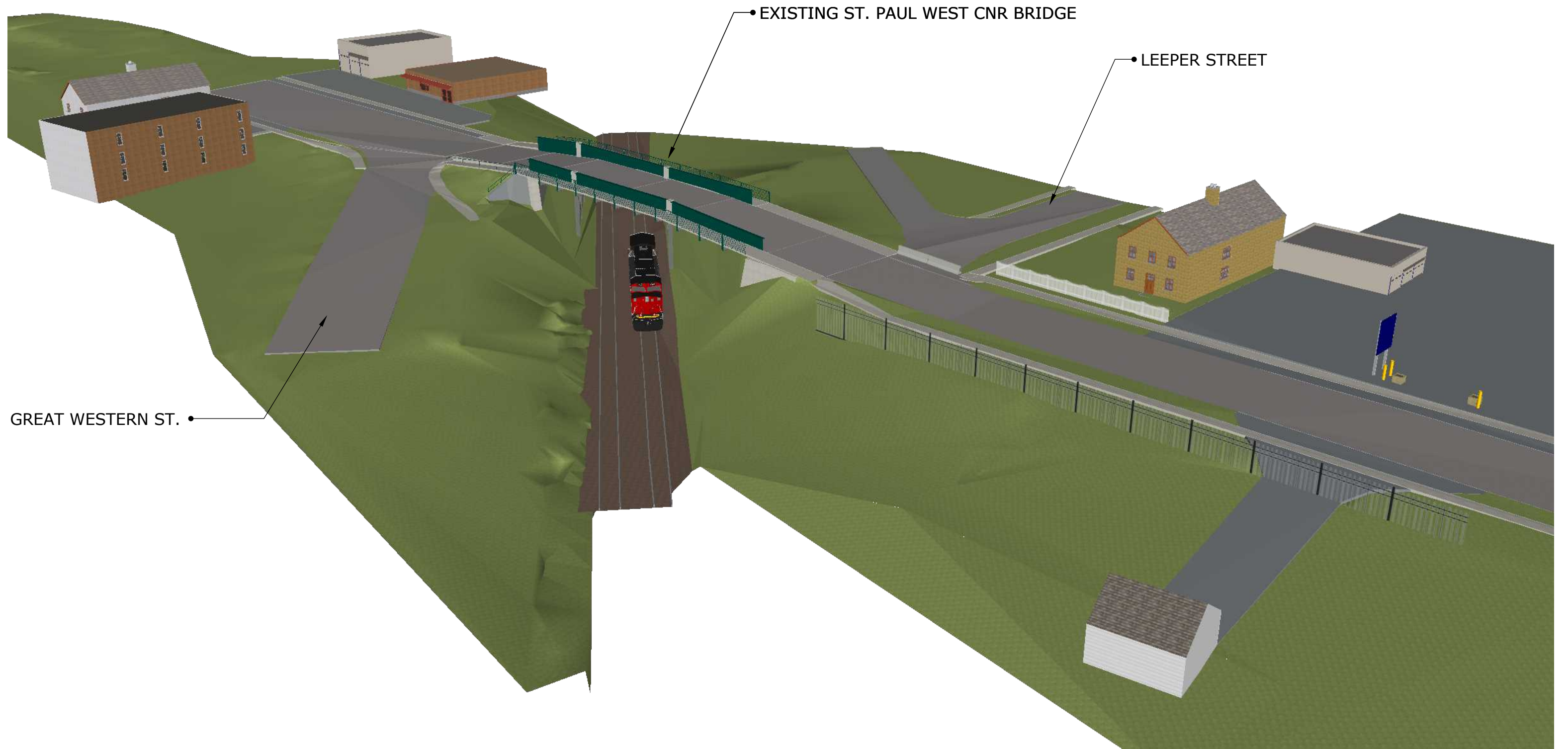
DATE	NOVEMBER 2017
SCALE	AS SHOWN
DWG No.	5
MUN. REF. No.	
REV.	B

THE REGIONAL MUNICIPALITY OF NIAGARA

**CONCEPTUAL AND PRELIMINARY DESIGN PLAN
FOR THE REPLACEMENT OF
ST. PAUL WEST CNR BRIDGE
(STRUCTURE NO. 081215),
MILE 11.68 GRIMSBY SUBDIVISION**

APPENDIX 'C'

3D SKETCHES (EXISTING BRIDGE AND NEW BRIDGE)



REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

EXISTING BRIDGE NORTH

DRAWN BY	J.C.	DATE JUN 2017	DWG. 1	REV. 0
----------	------	---------------	--------	--------

PLOTTED JUN 20, 2017

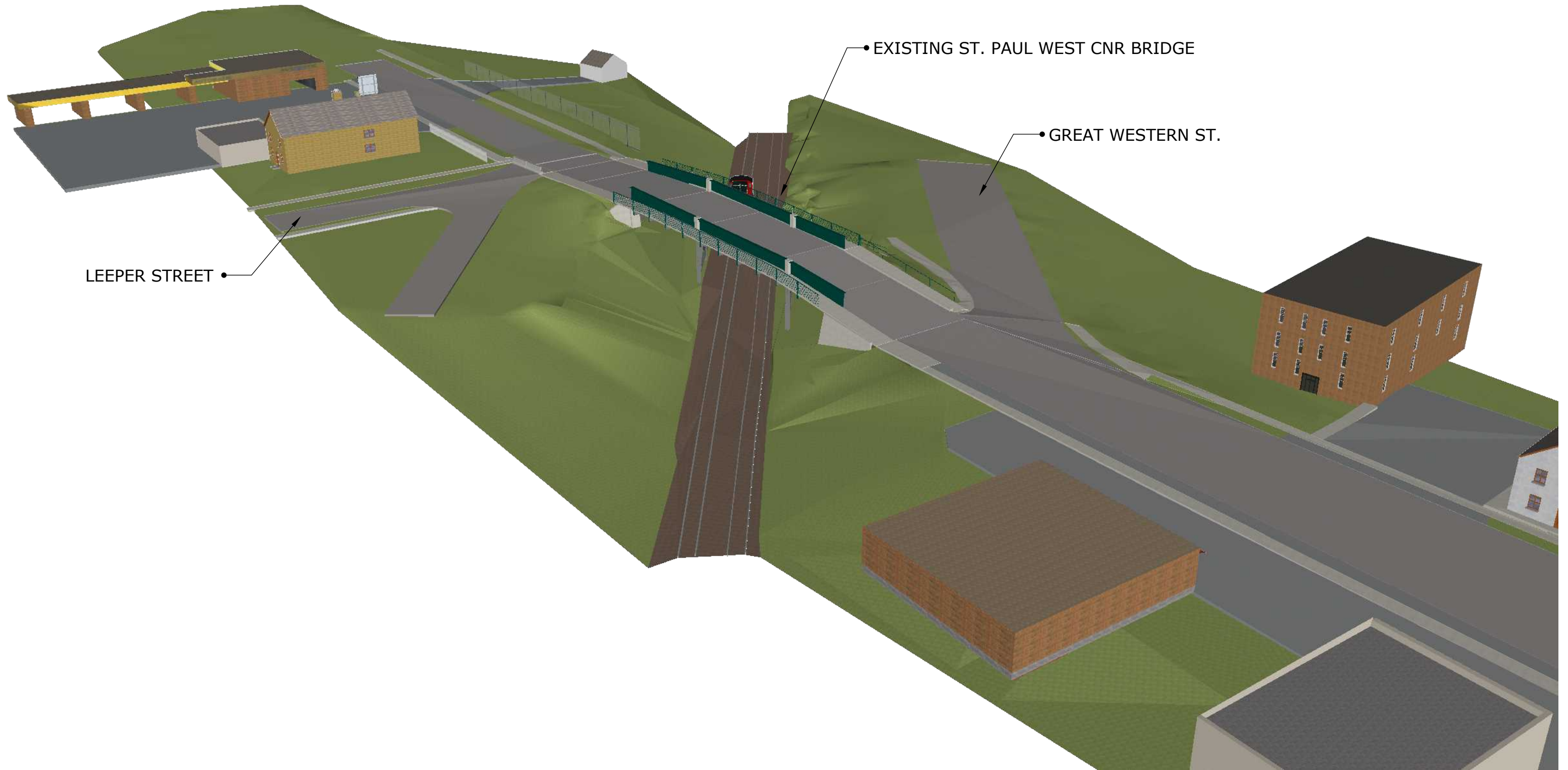


REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

NEW BRIDGE NORTH

DRAWN BY	J.C.	DATE JUN 2017	DWG. 2	REV. 0
----------	------	---------------	--------	--------

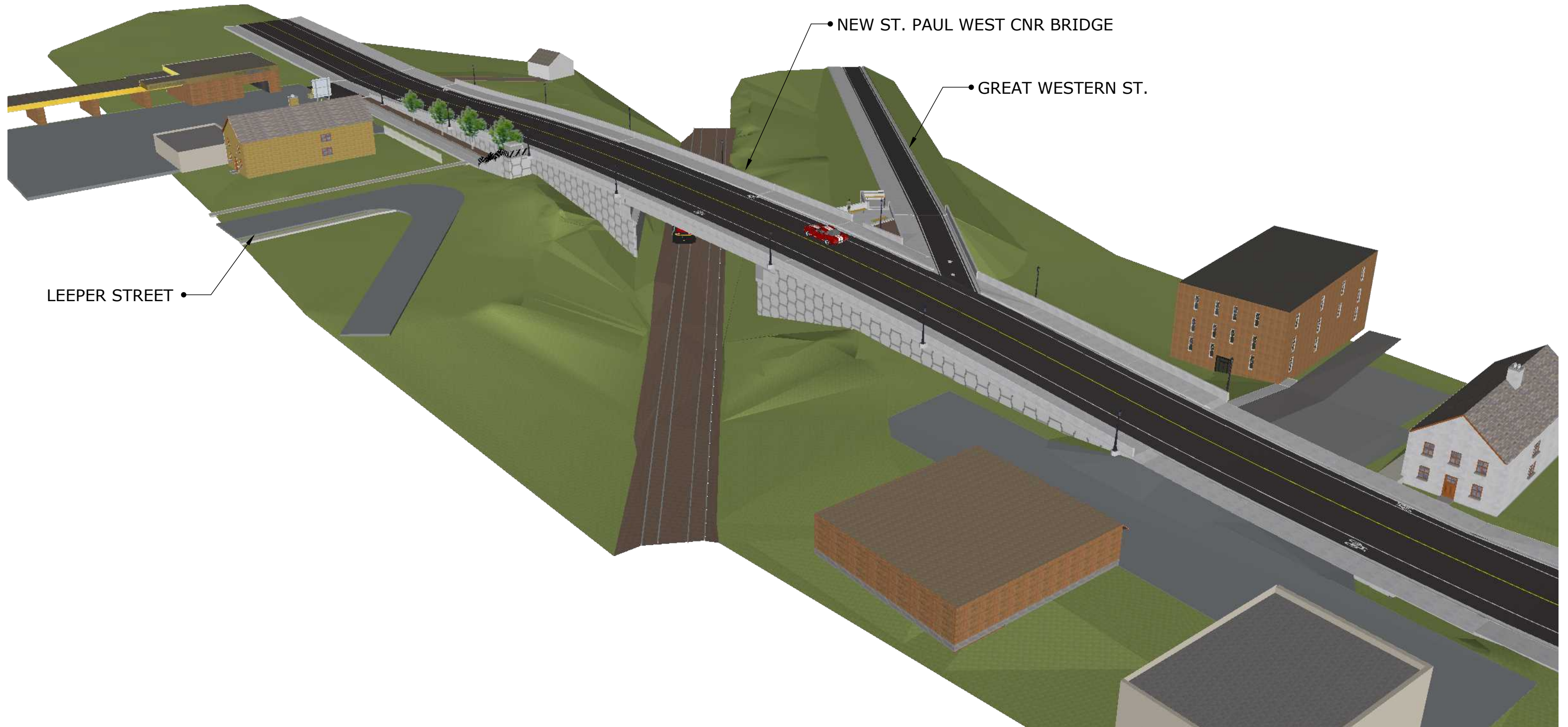
PLOTTED JUN 20, 2017



REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

EXISTING BRIDGE SOUTH

DRAWN BY	J.C.	DATE JUN 2017	DWG. 3	REV. 0
----------	------	---------------	--------	--------



LEEPER STREET

NEW ST. PAUL WEST CNR BRIDGE

GREAT WESTERN ST.

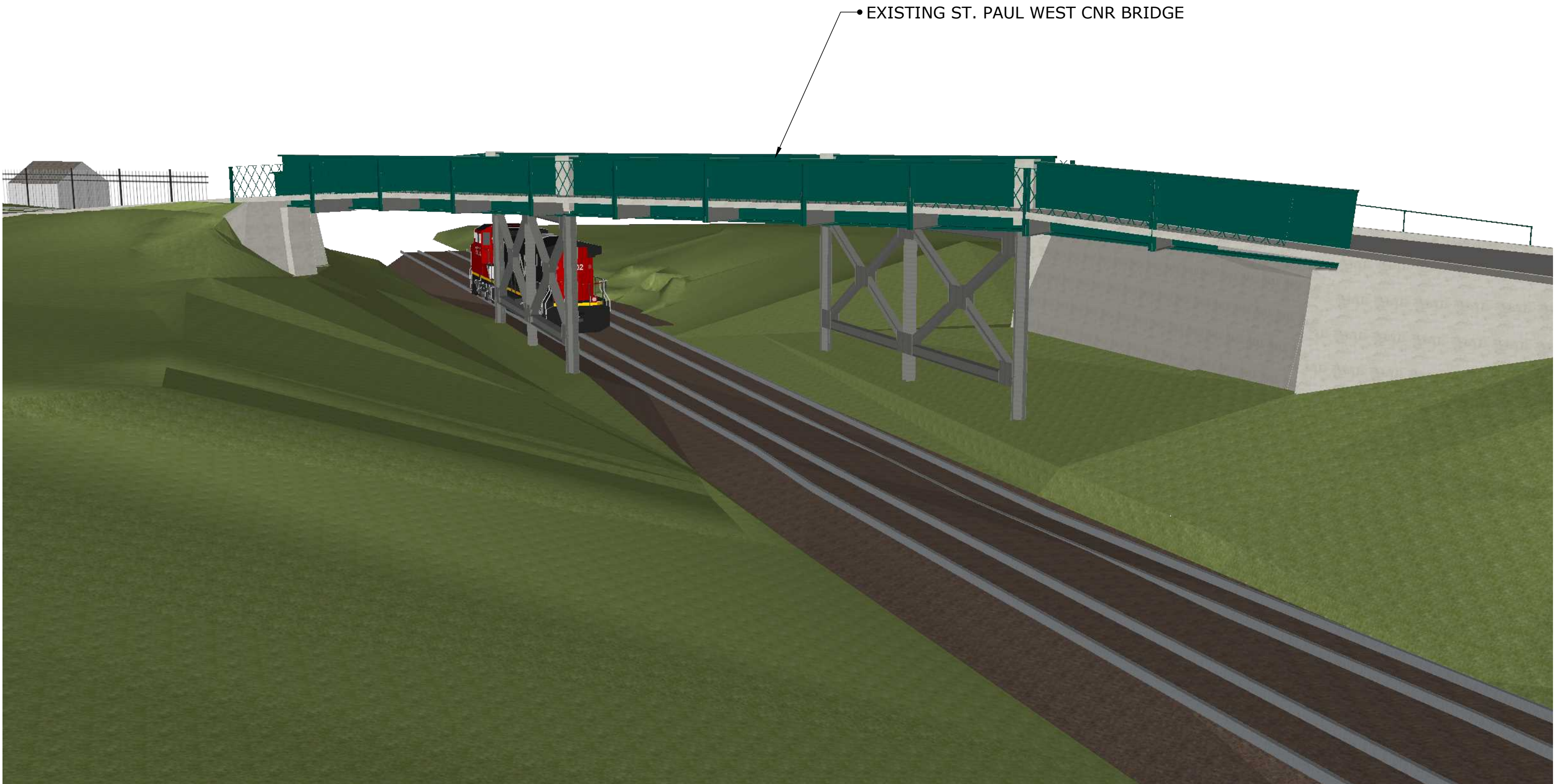


REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

NEW BRIDGE SOUTH

DRAWN BY	J.C.	DATE JUN 2017	DWG. 4	REV. 0
----------	------	---------------	--------	--------

PLOTTED JUN 20, 2017



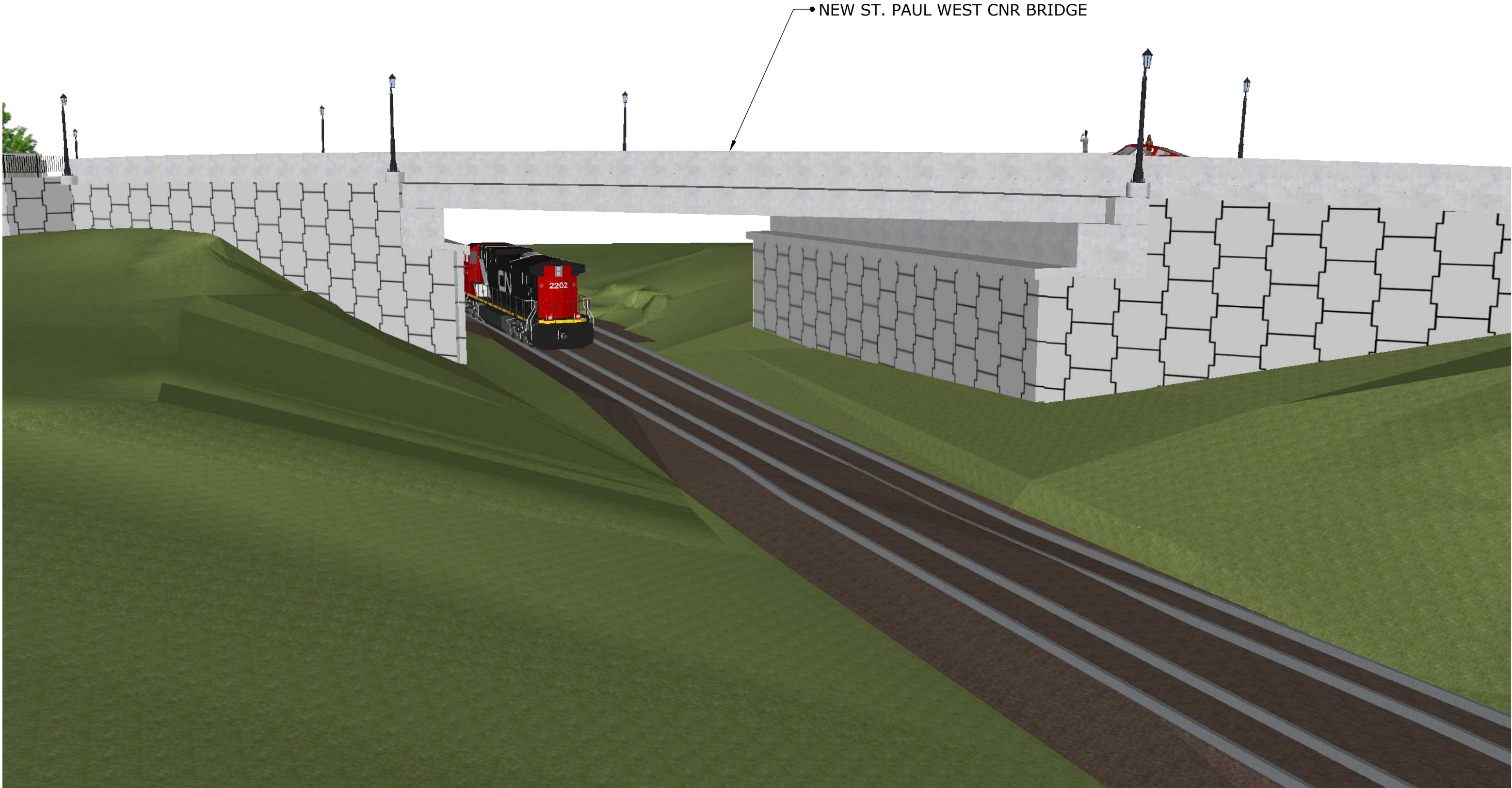
• EXISTING ST. PAUL WEST CNR BRIDGE



REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

EXISTING BRIDGE EAST FACE

DRAWN BY	J.C.	DATE JUN 2017	DWG. 5	REV. 0
----------	------	---------------	--------	--------



• NEW ST. PAUL WEST CNR BRIDGE

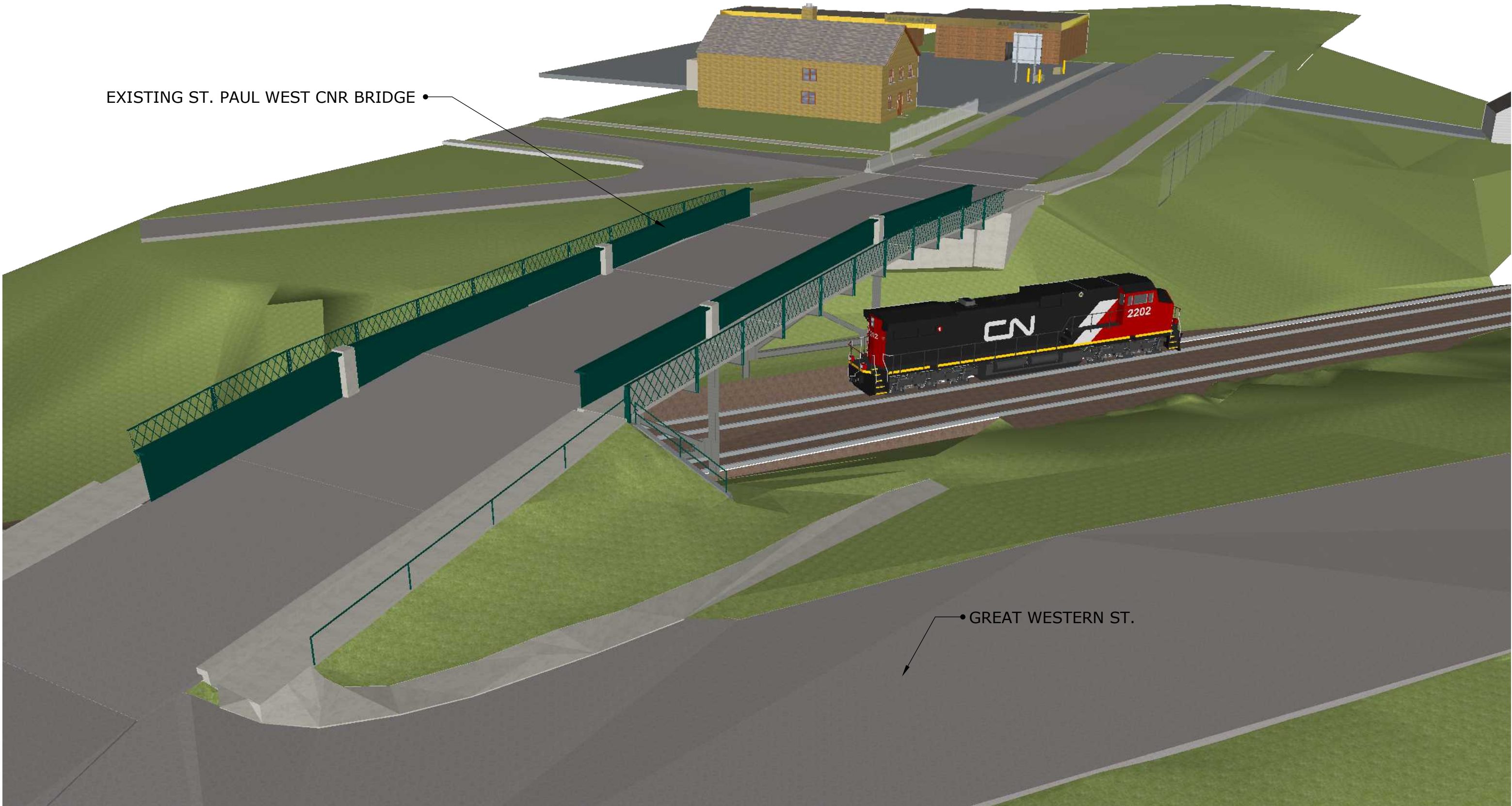


REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

NEW BRIDGE EAST FACE

DRAWN BY	J.C.	DATE JUN 2017	DWG. 6	REV. 0
----------	------	---------------	--------	--------

PLOTTED JUN 20, 2017



EXISTING ST. PAUL WEST CNR BRIDGE

GREAT WESTERN ST.



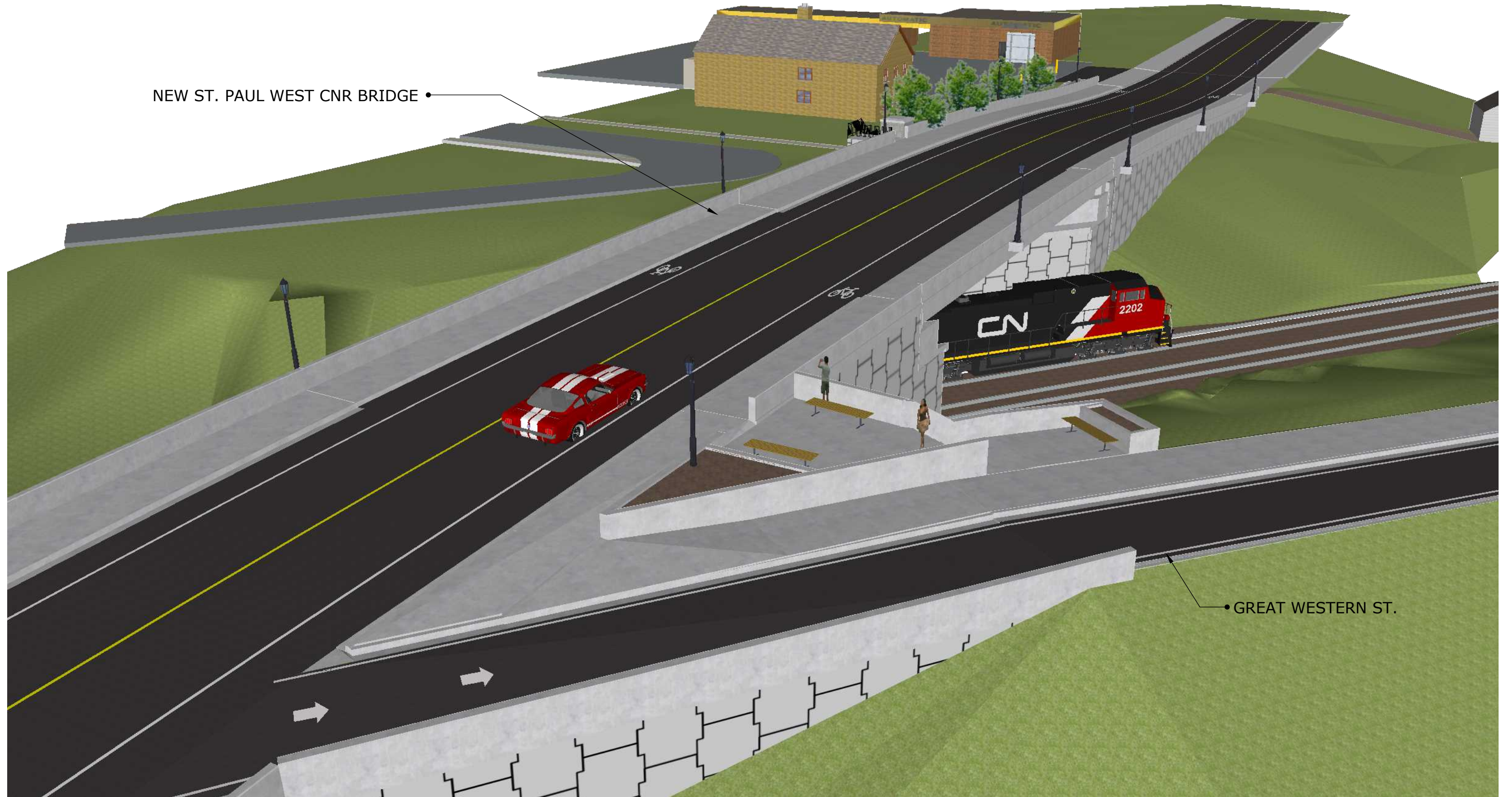
REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

EXISTING BRIDGE WEST FACE

DRAWN BY	J.C.	DATE JUN 2017	DWG. 7	REV. 0
----------	------	---------------	--------	--------

PLOTTED JUN 20, 2017

NEW ST. PAUL WEST CNR BRIDGE



GREAT WESTERN ST.



REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

NEW BRIDGE WEST FACE

DRAWN BY	J.C.	DATE JUN 2017	DWG. 8	REV. 0
----------	------	---------------	--------	--------

PLOTTED JUN 20, 2017



• GREAT WESTERN ST.

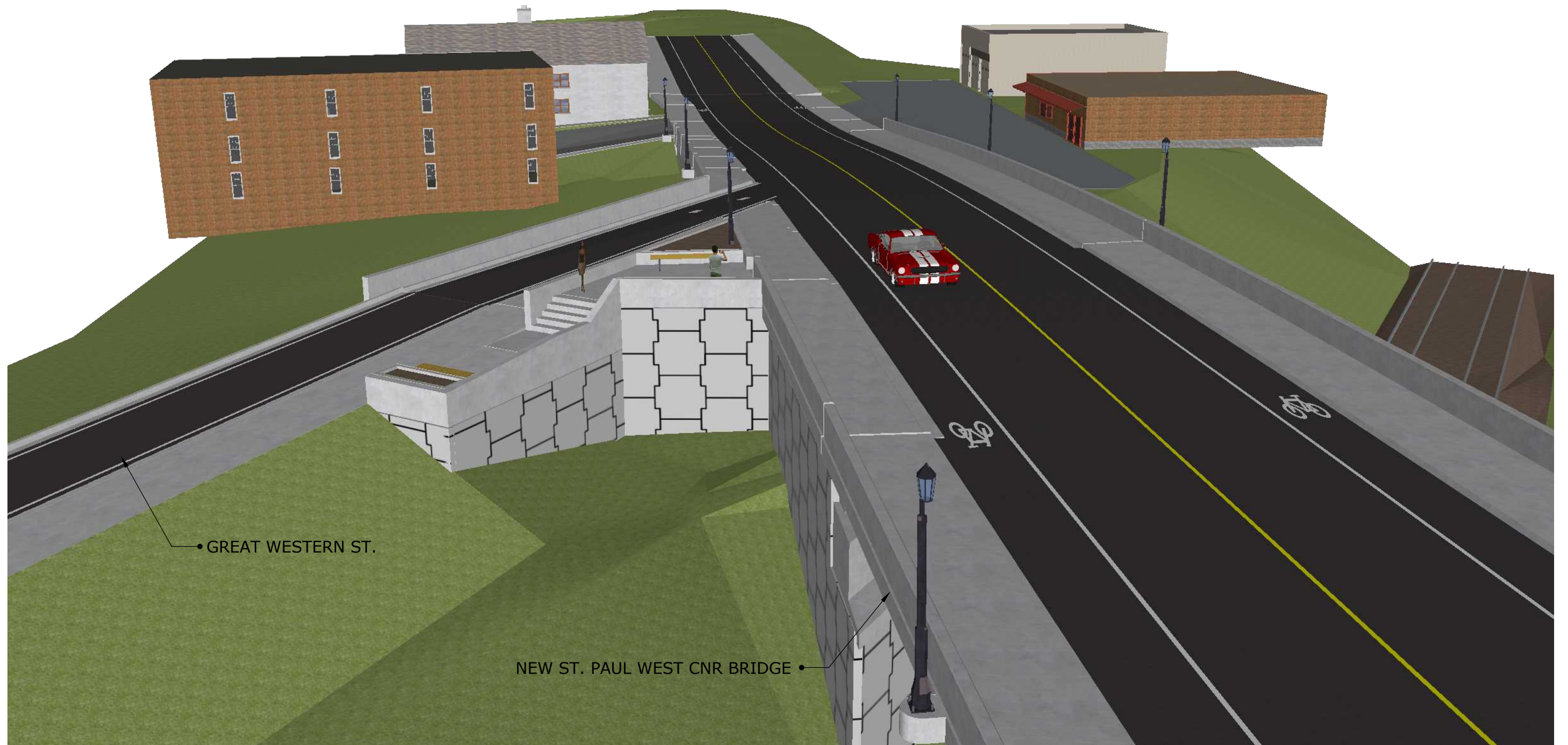
EXISTING ST. PAUL WEST CNR BRIDGE



REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

EXISTING GREAT WESTERN STREET

DRAWN BY	J.C.	DATE JUN 2017	DWG. 9	REV. 0
----------	------	---------------	--------	--------



• GREAT WESTERN ST.

NEW ST. PAUL WEST CNR BRIDGE



REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

NEW GREAT WESTERN STREET

DRAWN BY	J.C.	DATE JUN 2017	DWG. 10	REV. 0
----------	------	---------------	---------	--------



• EXISTING ST. PAUL WEST CNR BRIDGE

• GREAT WESTERN ST.



REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

EXISTING 98 ST. PAUL STREET WEST

DRAWN BY	J.C.	DATE JUN 2017	DWG. 11	REV. 0
----------	------	---------------	---------	--------

PLOTTED JUN 20, 2017



REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

NEW 98 ST. PAUL STREET WEST

DRAWN BY	J.C.	DATE JUN 2017	DWG. 12	REV. 0
----------	------	---------------	---------	--------



EXISTING ST. PAUL WEST CNR BRIDGE

LEEPER STREET



REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

EXISTING 182 ST. PAUL STREET WEST

DRAWN BY	J.C.	DATE JUN 2017	DWG. 13	REV. 0
----------	------	---------------	---------	--------



• NEW ST. PAUL WEST
CNR BRIDGE



REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

NEW 182 ST. PAUL STREET WEST

DRAWN BY	J.C.	DATE JUN 2017	DWG. 14	REV. 0
----------	------	---------------	---------	--------

PLOTTED JUN 20, 2017



LEEPER STREET

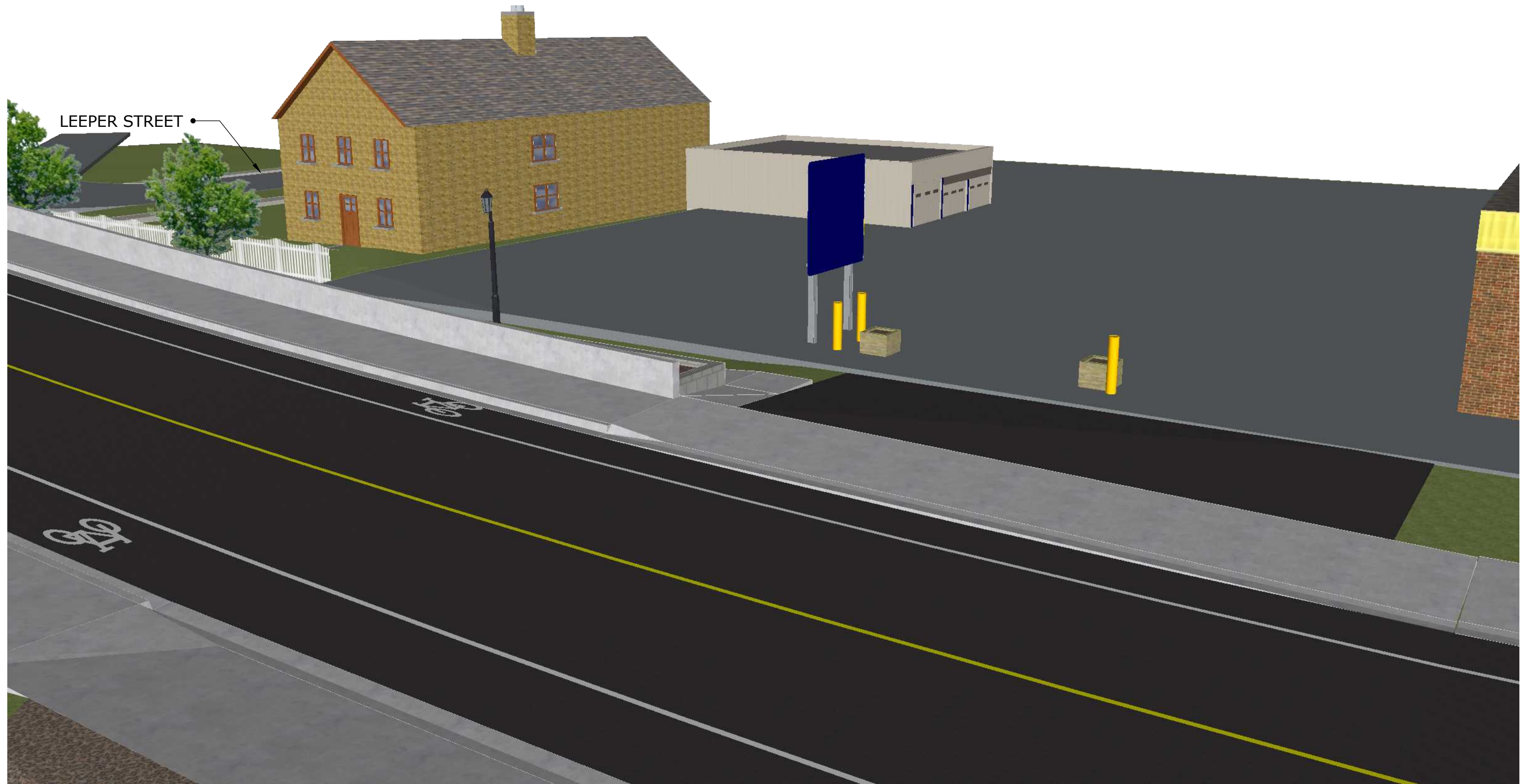


REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

EXISTING CAR WASH

DRAWN BY	J.C.	DATE JUN 2017	DWG. 15	REV. 0
----------	------	---------------	---------	--------

PLOTTED JUN 20, 2017



LEEPER STREET



REGION OF NIAGARA
ST. PAUL WEST CNR BRIDGE REPLACEMENT

NEW CAR WASH

DRAWN BY	J.C.	DATE JUN 2017	DWG. 16	REV. 0
----------	------	---------------	---------	--------

PLOTTED JUN 20, 2017