

APPENDIX M

Cultural Heritage Evaluation Report – Islington Avenue Bridge

GO Rail Network Electrification TPAP

Final Cultural Heritage Evaluation Report:

Islington Avenue Bridge

For



Prepared by:



Reviewed by:



MORRISON HERSHFIELD



Gannett Fleming

Gannett Fleming Project No. 060277

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Prepared By: John Sleath Date: February 15, 2017

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Approved By: Rebecca Sciarra Date: September 8, 2017
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2. Checked for completeness and accuracy by the appointed discipline reviewers and that the discipline reviewers did not perform the original work.
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REVISION HISTORY

Revision	Date	Comments
0	August 30, 2016	Initial Release to Metrolinx
1	February 15, 2017	Revised report reflecting new information, corrected information, client review comments, etc.
2	September 8, 2017	Final Report to Metrolinx reflecting new template and finalization

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APPENDIX A: Cultural Heritage Evaluation Report Sample Questionnaire

REPORT DISCLAIMER

NOTWITHSTANDING the results and recommendations presented in this study, Archaeological Services Inc. notes that no cultural heritage assessment, no matter how thorough or carefully completed, can necessarily identify every property and/or structure that has not been previously identified as a known or potential cultural heritage resource. Cultural heritage assessments for transportation related projects are limited to the public right-of-way, and as such, potential cultural heritage resources on private property may be screened from view by vegetation and/or other barriers. In the event that a potential cultural heritage resource is found during subsequent construction activities, the consultant cultural heritage specialist and approval authority should be immediately notified.

Executive Summary

ASI was contracted by Morrison Hershfield on behalf of Metrolinx to conduct a Cultural Heritage Evaluation Report (CHER) and Cultural Heritage Evaluation Recommendation Report (CHERR) of the Islington Avenue Bridge on the Lakeshore West rail corridor as part of the GO Rail Network Electrification Transit Project Assessment Project (TPAP). Metrolinx is undertaking a TPAP study under Ontario Regulation 231/08 - Transit Projects and Metrolinx Undertakings for electrification of the GO Rail Network. The Islington Avenue Bridge was identified as a Conditional Heritage Property as part of the Cultural Heritage Screening Report completed for the GO Rail Network Electrification TPAP.

The Islington Avenue Bridge is located at Mile 7.46 of the GO Transit Lakeshore West rail corridor, and is owned by the City of Toronto. The bridge, built in 1979, carries four lanes of vehicular traffic in a north and south direction across the Willowbrook Maintenance Facility, between Kipling Avenue and Royal York Road, in the City of Toronto.

Part 1 of this CHER provides a description of the potential cultural heritage resources, including a summary of its historical and current context (Section 1), a description of methodology and sources (Section 2), existing heritage recognition of the resource (Section 3), a description of adjacent lands (Section 4), summary of previous archaeological assessment (Section 5), community input (Section 6), and discussion of cultural heritage value (Section 7). A data sheet is provided in Section 8 and figures, including mapping and photographs, are provided in Section 9. Part 2 of this CHER contains the Recommendations Report which presents the evaluation tables outlining criteria set out in *Ontario Regulations 9/06* and *10/06* and recommended outcome of the evaluation.

The CHER was conducted by John Sleath, Cultural Heritage Assistant, and under the senior project management of Lindsay Graves, Assistant Manager of the Cultural Heritage Division, both of ASI.

1 Introduction

ASI was contracted by Morrison Hershfield on behalf of Metrolinx to conduct a Cultural Heritage Evaluation Report (CHER) and Cultural Heritage Evaluation Recommendation Report (CHERR) of the Islington Avenue Bridge, Lakeshore West rail corridor, Mile 7.46, as part of the GO Rail Network Electrification Transit Project Assessment Process (TPAP). Metrolinx is undertaking a Transit Project Assessment study under *Ontario Regulation 231/08 - Transit Projects and Metrolinx Undertakings* for electrification of the GO Rail Network. The purpose of the Project is to convert the GO Network from diesel to electric power. The Islington Avenue Bridge was identified as a Conditional Heritage Property as part of the Cultural Heritage Screening Report completed for this Project.

The objective of this CHER is to provide evidence about reasons why the subject resource may be of cultural heritage value or interest, and identify the physical elements that contribute to its heritage value. Research for this CHER was conducted under the senior project management of Lindsay Graves, Assistant Manager of the Cultural Heritage Division, ASI.

1.1 Description of Property

The Islington Avenue Bridge is located at Mile 7.46 of the GO Transit Lakeshore West rail corridor, and is located in the City of Toronto (Figure-1 and Figure 1-2). The bridge is a seven-span, segmental cantilever prestressed concrete structure that carries four lanes of vehicular traffic in a north and south direction over the Willowbrook Maintenance Facility and Via Rail's Toronto Maintenance Facility. The bridge is located within one ownership parcel: PIN 07601-0262. The bridge is currently owned and maintained by the City of Toronto.

1.2 Historical Summary

The Islington Avenue Bridge is located in part of Lot 6, Meridian Concession II and Lot 3, Concession I Fronting the Lake, in the historic Township of Etobicoke in the former County of York. The bridge is located west of the historic town of Mimico, founded in 1856, and later amalgamated with the Borough of Etobicoke in 1967, which was in turn amalgamated into the City of Toronto in 1998.

The Islington Avenue Bridge was built in 1979 with a unique gantry system to minimize disruption to rail traffic below. It the first segmental bridge to be constructed in a major urban center in North America, and the first segmental bridge to be constructed anywhere in Ontario.

1.3 Current Context

The Islington Avenue Bridge is located on a major north-south roadway in the City of Toronto. The area around the bridge is an industrial/commercial neighbourhood to both the immediate north and south, with residential areas located further to the northeast.

The properties adjacent to the bridge include: a parking lot to the northeast, warehouse to the northwest; and, two one-storey warehouses to the southeast and southwest.

Figure 1-1: Location of Islington Avenue Bridge study area in the City of Toronto, Ontario (Open Street Map)



Figure-1-2: East Elevation of the Islington Avenue Bridge



2 Methodology and Sources

2.1 Legislation and Policy Context

This cultural heritage evaluation considers cultural heritage resources in the context of improvements to specified areas, pursuant to Ontario Regulation 231/08: Transit Projects and Metrolinx Undertakings (Transit Projects Regulation) and the Ontario *Environmental Assessment Act* (EAA 1990). Pursuant to the *Environmental Assessment Act*, applicable infrastructure projects are subject to assessment so as to determine related impacts on above ground cultural heritage resources (MTO 2006). Infrastructure projects have the potential to impact cultural heritage resources in a variety of ways such as loss or displacement of resources through removal or demolition and the disruption of resources by introducing physical, visual, audible or atmospheric elements that are not in keeping with the resources and/or their setting.

When considering cultural heritage resources in the context of improvements to specified areas, a 40 year old threshold is used as a guiding principle when identifying cultural heritage resources. 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.

The TPAP is defined in sections 6-17 in *Ontario Regulation 213/08: Transit Projects and Metrolinx Undertakings*, and provides a series of relevant provisions and definitions. The TPAP Guide (January

2014) includes provisions to consider when the proposed project may have a negative impact on a matter of provincial importance, which is defined as follows (2014: 2):

“...a matter of provincial importance that relates to the natural environment or has cultural heritage value or interest...”

The TPAP Guide further notes that identification and assessment of potentially impacted built heritage resources, cultural heritage landscapes, and protected heritage properties are relevant in determining if a matter is of ‘provincial importance’ (2014: 10). It should be noted that the TPAP Guide acknowledges that a built heritage resource, cultural heritage landscape, or protected heritage property does not necessarily need to meet criteria set out under *Regulation 10/06* of the *Ontario Heritage Act* to be considered of ‘provincial importance’.

The analysis used throughout the cultural heritage resource assessment process addresses cultural heritage resources under other various pieces of legislation and their supporting guidelines:

- *Environmental Assessment Act* (R.S.O. 1990, Chapter E.18)
 - *Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments* (MCC – MOE 1992)
 - *Guidelines on the Man-Made Heritage Component of Environmental Assessments* (MCR – MOE 1981)
- *Ontario Heritage Act* (R.S.O. 1990, Chapter O.18) and a number of guidelines and reference documents prepared by the Ministry of Tourism and Culture (MTC):
 - *Standards and Guidelines for the Conservation of Provincial Heritage Properties* (MTC 2010)
 - *Ontario Heritage Tool Kit* (MCL 2006)
- *Planning Act* (R.S.O. 1990, Chapter P.13) and the 2014 *Provincial Policy Statement*

This assessment was also guided by the *Metrolinx Interim Cultural Heritage Management Process* (Metrolinx 2013b), the *Draft Terms of Reference for Consultants: Cultural Heritage Evaluation Report and Cultural Heritage Evaluation Report Recommendations* (Metrolinx 2014); and the City of Toronto *Terms of Reference for Heritage Impact Statements* (August 2011).

2.2 Approach to Cultural Heritage Evaluation Report

The scope of a CHER is guided by the Ministry of Tourism, Culture and Sport’s *Ontario Heritage Toolkit* (2006) as well as the Metrolinx *Draft Terms of Reference for Consultants: Cultural Heritage Evaluation*

Report and Cultural Heritage Evaluation Report Recommendations (2014). Generally, CHERs 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.

A site visit was conducted by John Sleath, Cultural Heritage Assistant, and Joel Konrad, Cultural Heritage Specialist, both of ASI on 10 August, 2016, to conduct photographic documentation of the subject resource. The assessment was conducted from the Willowbrook Maintenance Facility and from publicly-accessible areas.

Using background information and data collected during the site visit, the cultural heritage resource is evaluated using criteria contained within *Regulation 9/06* and *10/06* of the *Ontario Heritage Act*. The two criteria sets share a requirement to fully understand the history, design and associations of all cultural heritage resources of the property. The following differences between the two sets of criteria should be noted (Metrolinx 2014: 12):

- *Regulation 9/06* requires a consideration of the community context
- *Regulation 10/06* requires a consideration of the provincial context

2.2.1 List of Key Sources and Research Limitations

Key Sources

Background historical research, which includes the consultation of primary and secondary source documents, photos, and historic mapping, was undertaken to identify early settlement patterns and broad agents or themes of change in a study area. In addition, on-site archival research was undertaken at the following libraries and archives to build upon information gleaned from other primary and secondary materials:

- Toronto Archives

- Archives of Ontario

Where available, comprehensive bridge inventories were consulted for comparative analysis purposes to determine the potential design value of the subject bridge. The Metrolinx Master Bridge List (August 31, 2015) recording information such as bridge name, location, construction date, material, bridge type, number of spans and overall bridge length, was provided by Metrolinx and utilized for comparative purposes. Additional sources were considered for comparative analysis where relevant.

Available federal, provincial and municipal heritage inventories and databases were also consulted to obtain information about the property. These included:

- The City of Toronto's Heritage Properties Inventory;
- The Ontario Heritage Trust's *Provincial Plaque Program* database;
- Park's Canada's *Directory of Federal Heritage Designations*, a searchable on-line database that identifies National Historic Sites, National Historic Events, National Historic People, Heritage Railway Stations, Federal Heritage Buildings, and Heritage Lighthouses; and
- Park's Canada's *Historic Places* website: a searchable on-line register that provides information on historic places recognized for their heritage value at the local, provincial, territorial and national levels.

Previous consultant reports associated with potential above-ground cultural heritage resources and archaeological resources within and/or adjacent to the GO Rail Network Electrification TPAP included the following:

- Cultural Heritage Screening Report: GO Rail Network Electrification TPAP (ASI 2016a)

A full list of references consulted can be found in Section 11 of this CHER.

Research Limitations

No research limitations were identified.

2.3 Consultation

Consultation with the Ontario Heritage Trust, the Ministry of Tourism, Culture, and Sport (MTCS), and heritage staff at the City of Toronto regarding the subject properties took place as part of the Cultural Heritage Screening Report (ASI 2016a), and is summarized below.

Table 2-1: Results of Community Consultation for Islington Avenue Bridge

Contact	Organization	Contact Information	Date(s) of Communications	Description of Information Received
Kiki Aravopoulos, Easements Coordinator	Ontario Heritage Trust	Kiki.Aravopoulos@ heritagetrust.on.ca	November 12, 2015 November 27, 2015	Heritage Easement List
Sherry Pedersen, Program Manager	City of Toronto, Heritage Preservation Services	speders@ toronto.ca	November 3, 2015 November 13, 2015 November 27, 2015 December 8, 2015 February 18, 2016	No information received at the time of report writing.
Karla Barboza, Heritage Advisor	Ministry of Tourism, Culture and Sport	Karla.Barboza@ ontario.ca	November 27, 2015 December 8, 2015	Confirmed known PHPs along corridors; provided direction on other reports/EA studies to review.

3 Heritage Recognitions

3.1 Municipal

The subject resource does not retain heritage recognition at the municipal level for the following reasons:

- The property is not listed on the City of Toronto's Heritage Properties Inventory.

3.2 Provincial

The subject resource does not retain heritage recognition at the provincial level for the following reasons:

- The property has not previously been identified as a Provincial Heritage Property; and
- The property has not been commemorated by the Ontario Heritage Trust.

3.3 Federal

The subject resource does not retain heritage recognition at the federal level for the following reasons:

- The property does not contain a Federal Heritage Building; and
- The property is not a National Historic Site.

4 Adjacent Lands

The Islington Avenue Bridge is not adjacent to any known heritage properties.

5 Summary of Archaeological Assessments

The Stage 1 Archaeological Assessment for the GO Rail Network Electrification TPAP is currently underway (ASI, in progress). Once completed, this report will provide information about archaeological potential in the study area.

6 Community Input

A number of stakeholder groups were contacted and asked to complete a questionnaire to collect any information relating to the Islington Avenue Bridge in Toronto. See Appendix A for blank questionnaires and Table 6-1 for a list of organizations contacted and a description of information received. At the time of writing, no responses were received from any of the community groups contacted. No concerns regarding the heritage value or local community interest were identified.

A review of various online sources did not reveal any interest from the community in the potential heritage value of the Islington Avenue Bridge.

Table 6-1: Results of Community Consultation for Islington Avenue Bridge

Contact	Organization	Contact Information	Date(s) of Communications	Description of Information Received
n/a	Heritage Toronto	email@heritagetoronto.org	August 5, 2016	No response received to date
n/a	Toronto Railway Historical Association	info@trha.ca	August 5, 2016	No response received to date
n/a	Toronto Historical Association	info@torontohistory.net	August 5, 2016	No response received to date

7 Discussion of Cultural Heritage Value

7.1 Discussion of Historical or Associative Value

7.1.1 Settlement History

Township of Etobicoke

The land in Etobicoke Township was acquired by the British from the native Mississaugas, and was included in the terms of the Toronto Purchase of September 25, 1787. The township was originally under the authority of the Nassau District Land Board which sat at Newark (Niagara) until the district boards were abolished by John Graves Simcoe in November 1794. When Simcoe redefined the administrative and electoral boundaries for Upper Canada, the area which covers the modern City of

Toronto and also Etobicoke formed part of the County of York in the East Riding of York in the Home District.

The first survey of Etobicoke was made by Abraham Iredell in April 1795, with the first “legal settler” taking up land in 1800 (Armstrong 1985:143). Several of the modern streets in Etobicoke follow the survey lines set down by Iredell, and his field notes were used by William Hawkins (PLS) when he corrected and confirmed parts of the township survey in 1856-7. Other parts of Etobicoke, such as the extensive tract in the southwest corner of the township which was granted to the Hon. Samuel Smith, remained unsurveyed until this work was undertaken by Samuel Wilmot in 1811 (Hawkins 1857). Other early township surveys were undertaken by Augustus Jones (1797) and Hambly (1798). A survey of a road leading across the township to the King’s Mill was undertaken by Ridout and some soldiers from the garrison at York during the summer of 1814. The irregular shape of the township, as well as the various surveyors who laid out the concessions, caused Etobicoke to be “laid out in a fragmentary and unsystematic fashion” (Robinson, 1914 vol. 1: 97). Canniff also speculated that part of the haphazard survey found in Etobicoke may have been in an effort to permit as many settlers as possible to “obtain a frontage upon a water way” (Miles and Co. 1878:xxi).

In 1805, Etobicoke was briefly described by D’Arcy Boulton: “further to the westward (that is, between the Humber and the head of the lake Ontario) the Tobicoake, the Credit, and two other rivers, with a great many smaller streams, join the main waters of the lake; they all abound with fish, particularly salmon. At this place is a small house for the entertainment of travelers.” He further noted that “the tract between the Tobicoake and the head of the lake is frequented only by wandering tribes of Mississagues” (Boulton 1805:48). It should be noted here that one of the early alternate names given to the Etobicoke Creek was “Smith’s River” (Firth 1962:29).

In 1846, Etobicoke was described as “a well settled township, containing good land” although some of the land near the lake was “generally poor and sandy.” The timber was principally pine and hardwood, including beech, maple, elm and basswood. The township contained five grist mills and nine sawmills. The village of Mimico was of sufficient size to warrant notice at that time. The population of the township in 1842 had reached 2,467 (Smith 1846:57).

In 1851, it was noted that although Etobicoke was a small township, it was well settled and property values had increased greatly. During the late 1820s and early 1830s, land was available for purchase at \$6 per acre, but by 1851 it had increased to £10-12 (about \$50-60) per acre. The population in that year was 2,904. The township contained five grist mills and seven saw mills. The primary crops enumerated in the Agricultural census included wheat, barley, oats, peas, potatoes, wool, cheese and butter (Smith 1852:18).

7.1.2 Significant Themes, Events and/or People

Railway Development

The Lakeshore West rail corridor follows the tracks initially laid in the mid 1850s from Toronto to Hamilton by the Great Western Railway (GWR), who were leasing the land from the Hamilton & Toronto Railway Company (H&TRC). The H&TRC was established by Sir Allan MacNab and a number of other investors, with additional financial support from England, and a charter was granted in 1852.

Construction on the line began in 1853 and it was completed in 1855. The line was initially leased to the Great Western Railway (GWR), who in turn supplied railway stations along the corridor and constructed the GWR branch between Hamilton and Toronto (Paterson & George 1988:13). Given that the GWR was headquartered in Hamilton, mileage started in Hamilton. Extending from Hamilton, the first train stations were as follows (Reynolds 2011):

- Hamilton, Stuart St. (Mile 0.00);
- Bronte (Mile 13.33);
- Oakville (Mile 17.57);
- Clarkson (Mile 22.82);
- Lorne Park (Mile 23.89)
- Port Credit (Mile 25.84);
- Mimico (Mile 32.26); and
- Sunnyside (Mile 35.18).

The establishment of the railway through Mimico slowly brought change to the village. In the 1850's a group of Toronto businessmen purchased land along the railway line, and subdivided it into lots. Unfortunately, the economic recession following the Crimean War slowed development, and most of the subdivided land remained undeveloped for a considerable time (Mika and Mika 1983). The 1878 Illustrated Historical Atlas Map (Figure 9-1) demonstrates that the area retained a rural, agricultural character well into the late nineteenth century, with large tracts of land reserved by the government, and few subdivided residential lots containing structures (Miles & Co. 1878)

By the 1870s, there were five trains running daily between Toronto and Hamilton (Hicks 2007). Locomotives were now powered by coal rather than wood and air brakes had been developed which allowed for trains to attain greater speeds. By 1872, iron rails were being replaced by the more resilient steel rails, greatly improving safety standards and reducing expenses. It was also around this time that the H&TR was absorbed into the GWR and the single track between Hamilton and Toronto became known as the Toronto Branch. Other lines constructed by, or purchased by, the GWR included: the Galt & Guelph Railway; the London & Port Sarnia Railway; and the Canada Air Line Railway (Reynolds 2011).

In 1882, the Grand Trunk Railway (GTR) merged with the GWR. Track mileage was reversed at this time, with Union Station in Toronto now at Mile 0.00. In the 1880s and 1890s, a plan was developed by the

GTR to fix the 'Dip' at the Credit River, in which the tracks would be raised by 12 feet. At the same time, the Toronto Branch rail corridor was doubled and to accommodate the new track and the raised roadbed (Reynolds 2011).

Due to financial difficulty, control of the GTR was assumed by the Canadian Government in 1919 and by 1923, the GTR was amalgamated with Canadian National Railways (CNR) (Andreae 1997). The CNR continued to operate freight and passenger trains along the Lakeshore West rail corridor on a regular basis, making this one of the busiest rail corridors in Canada. By the 1950s, automobiles and highways were replacing trains and railways as the preferred mode of transportation, which meant that it was becoming economically unviable for the CNR to continue passenger services. The following decades saw the introduction of GO Transit commuter rail service and the creation of VIA Rail Canada by the federal government to ensure the continuity of intercity passenger train services (VIA Rail n.d.).

GO Transit service began in May 1967, with the CN Oakville Subdivision rail line renamed the Lakeshore West rail corridor.

In the early 2000s, increase rail traffic on the Lakeshore West rail corridor necessitated the addition of a third track. Triple tracking was completed by 2008 and consisted of more than 29 miles (48 kilometres) of new track, 15 interlockings, and 25 bridges (AECOM n.d.).

The Lakeshore West rail corridor was Canada's busiest railway corridor during the nineteenth and most of the twentieth century (Paterson & George 1988: 15, 24).

Willowbrook Maintenance Facility

The Willowbrook Maintenance Facility was constructed in 1906 by the GTR as a light maintenance and servicing yard for locomotives, cars, and coaches travelling along the rail line between Hamilton and Toronto. The newly formed CNR took over the bankrupt GTR in 1923, at which time they assumed control of the newly named the CNR Mimico Terminal.

The CNR Mimico Terminal housed three separate railway departments, including the motive power department that operated the roundhouse and serviced steam engines, the car department that repaired freight cars, and the yard and traffic department that schedule and arranged the individual engine and cars into the 'consists' that make up each train. By the mid 1960s the facility was in a state of poor repair, and was in the process of being decommissioned by CNR (Mackenzie 2015).

GO Transit acquired the property in 1965, at which time they changed the name to the Willowbrook Maintenance Facility. The facility began to operate as a light maintenance yard for GO commuter trains, which involved cleaning, inspecting, and performing routine and preventative maintenance, and short-term storage of diesel engines and passenger coaches. Currently, the Willowbrook Maintenance Facility is separated into three operating yards, with the north yard consisting of four tracks leading to a

maintenance building, with space for 14 cars, the south yard consisting of four tracks for servicing locomotives and coaches, and the storage yard consisting of two tracks that serve as an overflow storage site.

Prestressed Concrete

Prestressed, precast concrete girder bridges were introduced as a cost-effective alternative to steel. The method was adopted in Canada during the 1950s after it proved successful in Europe and the United States (Fowler 2000). Notable bridges, such as the Champlain Bridge spanning the St. Lawrence and the Kinnaird Bridge over the Columbia River, were built during the late 1950s and early 1960s, demonstrating that prestressed, precast concrete could be effectively adapted to the Canadian landscape (Fowler 2000).

Precast Prestressed Segmental Construction

Precast prestressed concrete structures, including bridges, became commonly used in the 1970s as a means of quickly and efficiently creating consistent and structurally sound designs with the most economical means possible. By precasting components with prestressed concrete, a means to increase strength with tensioning cables, engineers were able to contract the work to large factories where supply and quality control could be highest. Also, precasting components reduced the amount of formwork needed for pouring components in-situ (Sanabra-Loewe and Capella-Llovera 2014, Podolny 1979).

Segmental construction is particularly useful for bridges with limited access to the underside of the spans due to traffic or environmental factors, as it primarily employs construction methods where components are lowered into place from the deck of the bridge by means of a gantry or crane. Precast prestressed segmental bridges, such as the Islington Avenue Bridge, employ many individual precast prestressed concrete components that are attached in place with epoxy and then post-tensioned by cables to permanently secure in place. The Islington Avenue Bridge is an example of Incremental Launching, where a predetermined number of precast sections are assembled and post-tensioned near the bridge site, and then moved as a large segment by a launching device into place on the bridge (Podolny 1979).

AASHTO (American Association of State Highway and Transportation Officials)

The American Association of State Highway and Transportation Officials (AASHTO) is a non-partisan affiliation that sets standards for the specifications to which public highways and transportation infrastructure are constructed. Founded in 1914, the organization is composed of primarily members from various state transportation agencies within the United States with several non-voting international members, including Canada. During the late twentieth century, AASHTO safety standards were widely used to ensure a uniform high level of quality in member jurisdictions, and were a common design benchmark for many public works initiatives in Canada (AASHTO n.d.)

J.A.B. Lovell and Planmac Consultants Ltd.

Planmac Consultants Ltd was formed in 1974 from an earlier successor firm, Maksymec and Associated Ltd, and is a Toronto based firm that has been a part of several major construction and engineering projects within Toronto and Ontario in addition the Islington Avenue Bridge. Notable works include the rehabilitation of the Garden City Skyway, a 7000 foot long, six lane bridge spanning the Welland Canal, the Morningside Bridge that carries the roadway over Highway 401, the Metropolitan Toronto West Detention Center in Etobicoke, and many other local transportation, commercial, residential, and institutional structures.

J.A.B. Lovell is noted as introducing the segmental prestressed concrete bridge design in North America, which allows for longer spans and therefore fewer piers, reducing the impact to the area under the bridge. Lovell first used this construction method successfully for the first time in North America in 1972 for the Bear River Bridge near Digby, Nova Scotia, an effort for which he was granted an award by the Prestressed Concrete Institute. Following the success of the Bear River Bridge, Lovell employed the same techniques for the Islington Avenue Bridge, which marks the first use of this technique in a major urban center in North America.

7.2 Discussion of Design and Physical Value

7.2.1 Physical Characteristics

The following description of the Islington Avenue Bridge is based on the original design drawings, historical photographs, site visit, inspection reports, rehab drawings, and bridge inventory. The following documents were available for review:

- Structural Drawings for the Islington Avenue Bridge, Planmac Consultants Ltd., 1977
- “The Islington Avenue Bridge”. Prestressed Concrete Institute Journal, May-June 1980 (Lovell 1980)
- Metrolinx Bridge Inspection Report (2013)
- Planmac Inc Consulting Engineers and Planners (formerly Planmac Consultants Ltd.) website, accessed 2 August, 2016 at http://www.planmac.com/structures_01.htm

The Islington Avenue Bridge was constructed in 1979 to carry vehicular traffic over the Willowbrook Maintenance Facility in the City of Toronto, Ontario. Currently the bridge carries a total of four lanes of traffic, with a wide curb lane serving as a shoulder in both directions and permit future expansion. The seven-span bridge features prestressed segmental concrete box beam construction, and spans a length of 491 metres. The abutments are made of reinforced concrete.

The bridge was fabricated by the Pitts Engineering and Construction Ltd. under a unique set of constraints due to the heavy rail traffic beneath. The project was initially opposed by the CNR, as it was expected to interfere with the busy Willowbrook Maintenance Facility. However, when the design for the bridge was unveiled with a segmental construction installed by means of a movable truss gantry, impacts to the rail traffic were proved to be minimal (Lovell 1980). The movable gantry was temporarily affixed to the abutments with a large segment of the gantry overhanging the bridging point. A prestressed concrete section of the deck composed of a number of connected, post-tensioned precast concrete segments was then moved within the truss gantry and lowered into place, entirely from above. This innovative cantilever construction method reduced impacts to the maintenance facility to primarily construction involving the reinforced concrete piers (Lovell 1980).

In order to accommodate the necessary grade separation, the abutments and the thickness of the deck needed to be altered in order to carry Islington Avenue over the maintenance facility while limiting grade alteration at the abutments, in an effort to reduce negative impacts for adjacent properties. Even with these modifications taken into account, the bridge approaches had to be raised substantially and supported by tall abutment retaining walls, with obvious impacts to local residents.

Modifications

No known modification or repairs have been conducted.

Existing Conditions

According to a 2013 Bridge Inspection Report (Metrolinx 2013), the 1979 structure carrying Islington Avenue over the Willowbrook Maintenance Facility, Via Rail's Toronto Maintenance Facility, and the Oakville Subdivision of the Lakeshore West rail corridor is generally in good condition. The bridge deck and the superstructure were in good condition overall, and the substructure consisting of reinforced concrete abutments and piers was in good condition. The report also commented that a mesh is proposed to be added to the underside of the decking after complaints of falling concrete (Metrolinx 2013).

The Islington Avenue Bridge consists of an east structure and a west structure, carrying northbound and southbound vehicular traffic, respectively. The bridge features a concrete with asphalt deck that is seven spans in length, supported by six piers consisting of two pillars of reinforced concrete each (Figures 9-19 to 9-22). The individual span lengths are, from south to north, 49 metres, 83 metres, 83 metres, 83 metres, 83 metres, 61 metres, and 49 metres for an overall length of 491 metres. The structure has an overhead clearance of 11.2 metres above the Lakeshore West rail corridor, located in the approximate center of the structure. The piers are affixed to the deck above by means of a large metal bearing (Figure 9-23)

The underside of the deck clearly demonstrates the segmental construction technique, where seams connecting the individual precast prestressed concrete segments that were connected and post-

tensioned are clearly noted (Figures 9-21 and 9-22). The undersides of several spans are blackened with soot from diesel locomotives passing underneath on the way to the Diesel Service bays in the Willowbrook Maintenance Facility (Figure 9-24). The underside of the deck also supports piping to leading from catch basins to the base of the abutments to drain rainwater of the structure (Figure 9-25).

The top of the structure features two lanes with wide curb-lane shoulders to accommodate future expansion of Islington Avenue in each of the northbound and southbound lanes. Southbound traffic is carried on the western structure of the bridge, and is separated from the northbound traffic on the eastern structure by a concrete median (Figures 9-26 and 9-27). The road deck features grated metal catch basins for collecting rainwater, and the whole structure is bound by pedestrian sidewalks and metal railings (Figures 9-28 and 9-29)

The abutments are reinforced concrete, with the north abutment located approximately 96 metres south of Judson Street, and the south abutment approximately 170 metres north of New Toronto Street (Figure 9-30). In order to achieve the clearance required over the rail corridor, as well as maintain an appropriate slope for vehicular traffic travelling over the bridge, the grade of Islington Avenue was raised by several metres on both the north and south approaches (Figure 9-31). This resulted in dramatic impacts to adjacent structures south of the bridge, where warehouses and residences on the west and east sides of Islington Avenue, south of New Toronto Street had their views and access restricted with the increase in grade level (Figures 9-32 and 9-33).

At the time of field inspection, the bridge appeared to be in good condition, with minimal wear noted. Lack of public access to the underside of the bridge has resulted in a complete lack of graffiti and garbage surrounding the piers and abutments.

7.2.2 Comparative Analysis

The seven-span, 1979 Islington Avenue Bridge is a segmentally constructed prestressed concrete box beam structure, installed by a unique cantilevered method involving a mobile steel truss gantry. This bridge was constructed while segmental prestressed concrete designs were in their infancy, and presented additional planning and logistical considerations as the first example of this construction in a major urban center. The only earlier example of this precast segmental technique on a large bridge is the Bear River Bridge in Nova Scotia, designed by the same engineer, J.A.B. Lovell and built in 1973. This type of bridge is commonly used where longer span lengths or fewer piers are desired. In the case of the Islington Avenue Bridge, arranging spans so that piers were placed to avoid rail lines, as well as minimizing impact to the daily operation of the rail facility made precast segmental construction highly favourable. The City of Toronto required that the bridge be constructed according to AASHTO HS20-44 Standards (Lovell 1980), which outlined the structural specifications and integrity of the structure. AASHTO was a common standard for road and bridge construction in Canada during the late twentieth century, and provides a large sample of comparable structures.

According to a review of the Ministry of Transportation (MTO) Bridge List (MTO n.d.) and Metrolinx Bridge Inventory (Metrolinx 2013) there are many other similar municipally and provincially-owned prestressed precast concrete box beam bridges built in Southern Ontario. Bridges built using segmental construction are far rarer, with only eight structures in Ontario constructed in this manner (Kinnunen 2011). Notable examples include:

- Burnhamthorpe Road Bridge over the Credit River in the City of Mississauga, constructed in 1979 using segmental construction. This bridge measures 390 metres in length over five spans (City of Mississauga 2007, Chin 2010).
- Fairway Road Bridge over the Grand River in Kitchener-Waterloo, constructed in 2013. This bridge measures 237 metres in length over four spans, and is the first bridge in over 20 years to be constructed using segmental construction in Ontario (Ontario Concrete Awards 2013, Kinnunen 2011).
- Highway 406 over Twelve Mile Creek in St. Catharines, constructed in 1982. This precast concrete box beam structure was post-tensioned in place, and measures 398 metres over six spans (Bassi and Lin 1982, MTO n.d.).

Based on this review, at seven spans and an overall length of 491 metres, the Islington Avenue Bridge is longer than any other comparable segmentally constructed bridge, prestressed precast concrete bridge, or box beam bridge. Further, the Islington Avenue Bridge was constructed using segmental construction during its infancy, and is the first example of its use in Ontario, and first example of its use in a major urban center in all of North America. To date, only eight bridges in Ontario have been fabricated using segmental construction of precast concrete components, making this construction method a rarity in the province (Ontario Concrete Awards 2013, Kinnunen 2011). In each of these three comparative examples, the subject bridges involve long spans over waterways where environmental and cultural factors necessitated a design with minimal impact to the river and river valley below. One of the benefits of segmental construction using precast components is the ability to build incrementally from the top of the bridge deck and create longer spans, which is a serious benefit when minimal impact is required (Lovell 1980).

The following images of the Burnhamthorpe Road Bridge over the Credit River, Fairway Road Bridge over the Grand River, and the Highway 406 Bridge over Twelve Mile Creek are included to provide a comparison between like bridges, as well as between the subject bridge and bridges with a comparable overall length (Figures 9-34 to 9-36).

7.3 Discussion of Contextual Value

7.3.1 Description of Setting and Character of the Property and Surroundings

The subject bridge provides continuous passage along Islington Avenue, a main north-south thoroughfare in the City of Toronto, and provides an elevated crossing between Kipling Avenue to the west and Royal York Road to the east. The bridge connects the industrial/commercial areas south of the Willowbrook Maintenance Facility along New Toronto Street and the residential area further south on Birmingham Street to the industrial and residential areas north along Judson Street. The subject bridge spans the Willowbrook Maintenance Facility, a large light maintenance yard constructed in 1906 and comprised of approximately 19 tracks on the north of the Lakeshore West rail corridor. At this bridging point, the Lakeshore West rail line is four tracks in width, with the Mimico GO Station located slightly more than a kilometer to the east.

The Islington Avenue Bridge is located to the west of the historic village of Mimico in Etobicoke, Ontario. The village of Mimico was first settled in 1856, incorporated into the Borough of Etobicoke in 1967, and amalgamated with the City of Toronto in 1998.

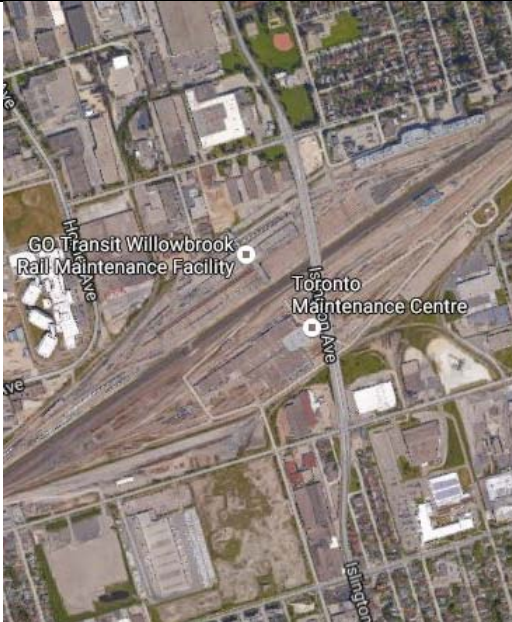
A review of historical mapping and aerial photography (Figures 9-1 to 9-6) demonstrates that the study area surroundings have only undergone minor changes since the construction of the Willowbrook Maintenance Facility in the early twentieth century. Late nineteenth-century mapping demonstrates that the study area existed in a suburban context, immediately outside the village of Mimico. In order to provide rail maintenance services, the GTR constructed the Mimico Maintenance Facility in 1906, which is first depicted in detail in the 1947 aerial photograph. Development occurred gradually within the surrounding area in the mid-twentieth century, with the surrounding environs taking the present industrial/ commercial and residential context in the latter-half of the twentieth century, as depicted in the 1975 aerial photograph. Constructed in 1979, the Islington Avenue Bridge is clearly visible in the 1981 aerial photograph in the orientation and alignment as extant in the study area, with surrounding industrial and commercial establishments shown in the same location as at the time of the field inspection. Grading occurred on the northern and southern approaches, with the destruction of some houses on the southern approach of the structure and the subsequent re-alignment of a small portion of Islington Avenue. By the late twentieth century, the study area is depicted in the same context as during the field inspection.

In summary, the character of the general vicinity of the Islington Avenue Bridge is strongly tied to the rail infrastructure located in the immediate vicinity, with associations to the Lakeshore West rail line, founded in 1856, and the large Willowbrook Maintenance Facility, founded in 1906. The industrial/commercial areas adjacent to the rail line and the residential areas in nearby Mimico pre-date the Islington Avenue Bridge, the construction of which improved transportation access for businesses and residents alike.

7.3.2 Community Landmark

The Islington Avenue Bridge is an important crossing for the residents and businesses of the Etobicoke area, and provides unimpeded access along one of the areas main thoroughfares. Grade-separated crossing are located approximately one kilometer to the east and one kilometer to the west, over the Royal York Road Bridge and the Kipling Avenue Bridge. Also, significant views of the Lakeshore West rail corridor and of the Willowbrook Maintenance Facility are also noted, as it provides the public with a rarely seen glimpse of train maintenance activity. While not considered a landmark, crossing in this location has been identified by residents as an important transportation route and a necessity for urban planners trying to relieve vehicular congestion in other local roadways (Lovell 1980).

8 Data Sheet

	
Property Name:	Islington Avenue Bridge
Municipal Address:	Islington Avenue
Location:	43°36.640', 79°30.449', Datum WGS84
Municipality:	City of Toronto
Metrolinx/GO Transit Rail Corridor:	Lakeshore West
PIN:	07601-0262
Ownership:	City of Toronto
Date of Construction:	1979 (Lovell 1980)
Date of Significant Alterations:	None
Architect/Designer/Builder:	Designed by J. Lovell at Planmac Consultants Ltd., constructed by Pitts Engineering Construction Ltd. (Lovell 1980)
Previous Owner(s)/Occupant(s):	n/a
Current Function:	Road Bridge
Previous Function(s)	n/a
Heritage Recognition/Protection:	None identified
Local Heritage Interest:	None identified
Adjacent Lands:	No protected heritage properties

9 Figures

9.1 Historic Map Review

Figure 9-1: View of the study area on 1878 historic mapping (Miles & Co. 1878)

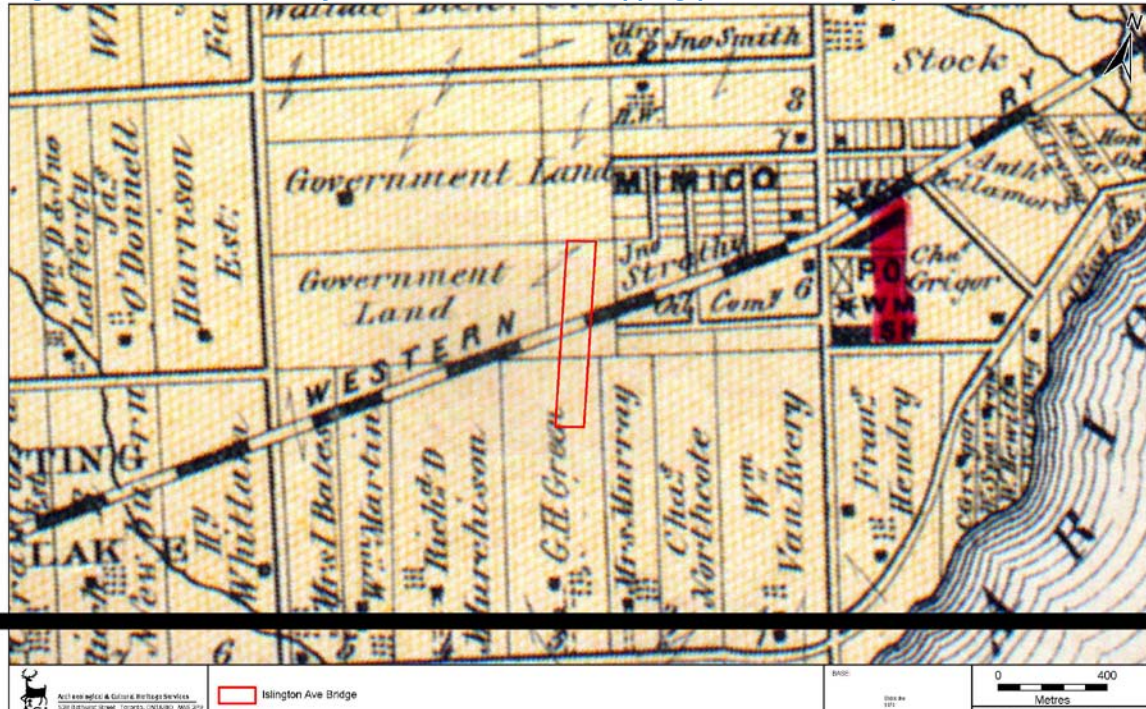


Figure 9-2: View of the study area on 1947 aerial photograph (Toronto Archives 1947)



Figure 9-3: View of the study area on 1966 aerial photograph (Toronto Archives 1966)



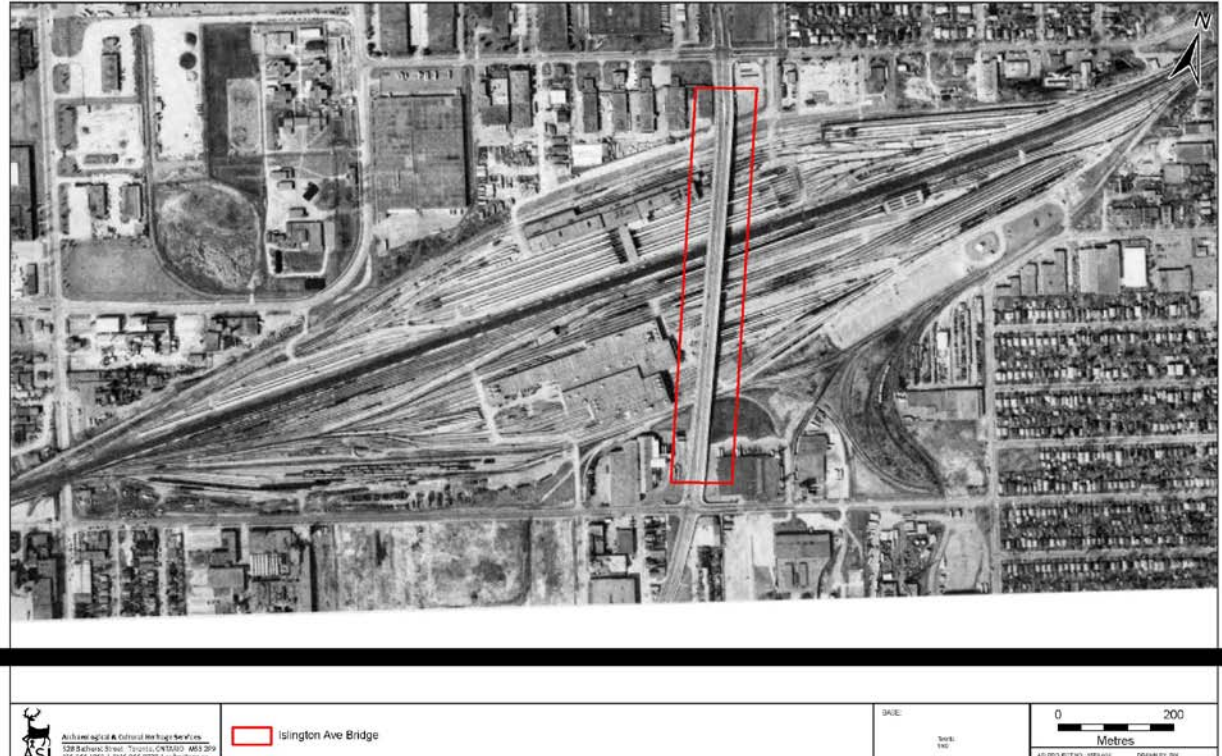
Figure 9-4: View of the study area on 1975 aerial photograph (Toronto Archives 1975)



Figure 9-5: View of the study area on 1981 aerial photograph (Toronto Archives 1981)



Figure 9-6: View of the study area on 1992 aerial photograph (Toronto Archives 1992)



9.2 Historical Photographs

Figure 9-7: Construction of the Islington Avenue Bridge (Planmac Inc.)



Figure 9-8: Construction of the Islington Avenue Bridge (Planmac Inc.)



Figure 9-9: Construction of the Islington Avenue Bridge (Planmac Inc.)



Figure 9-10: Construction of the Islington Avenue Bridge (Lovell 1980:42)

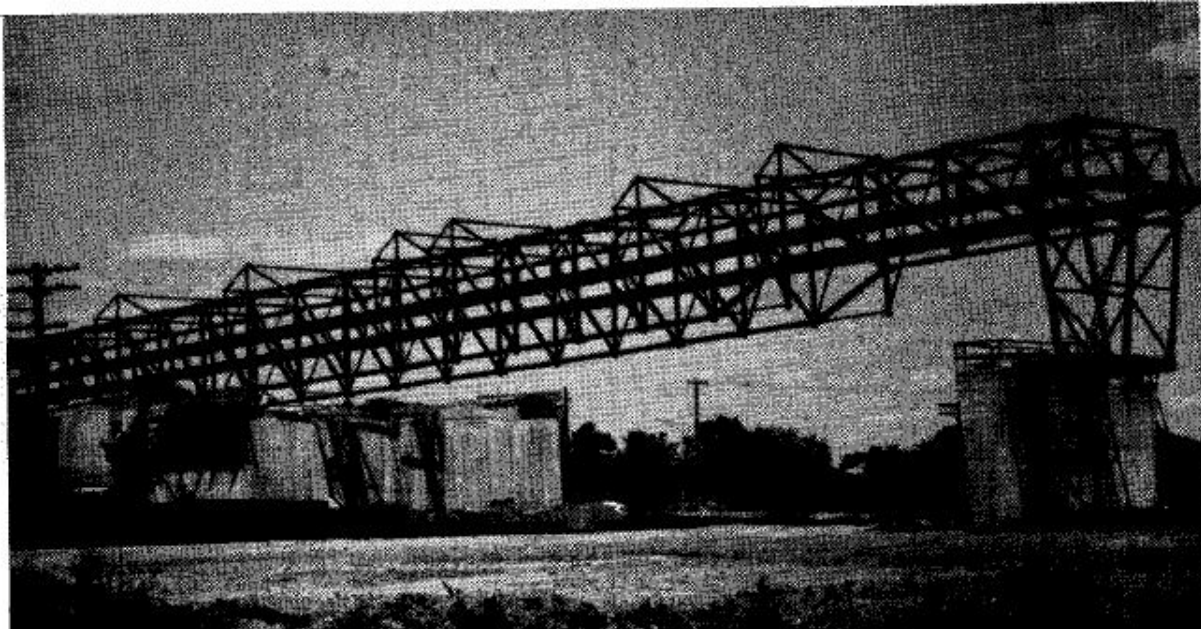
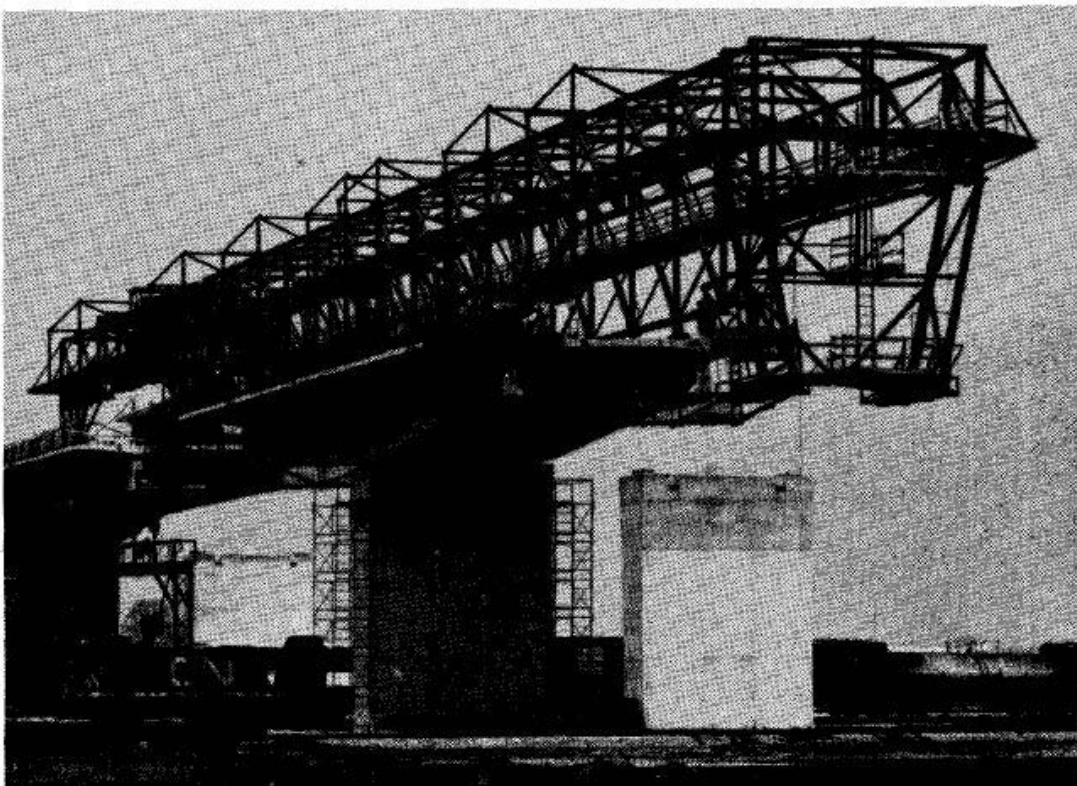


Figure 9-11: Construction of the Islington Avenue Bridge (Lovell 1980:53)



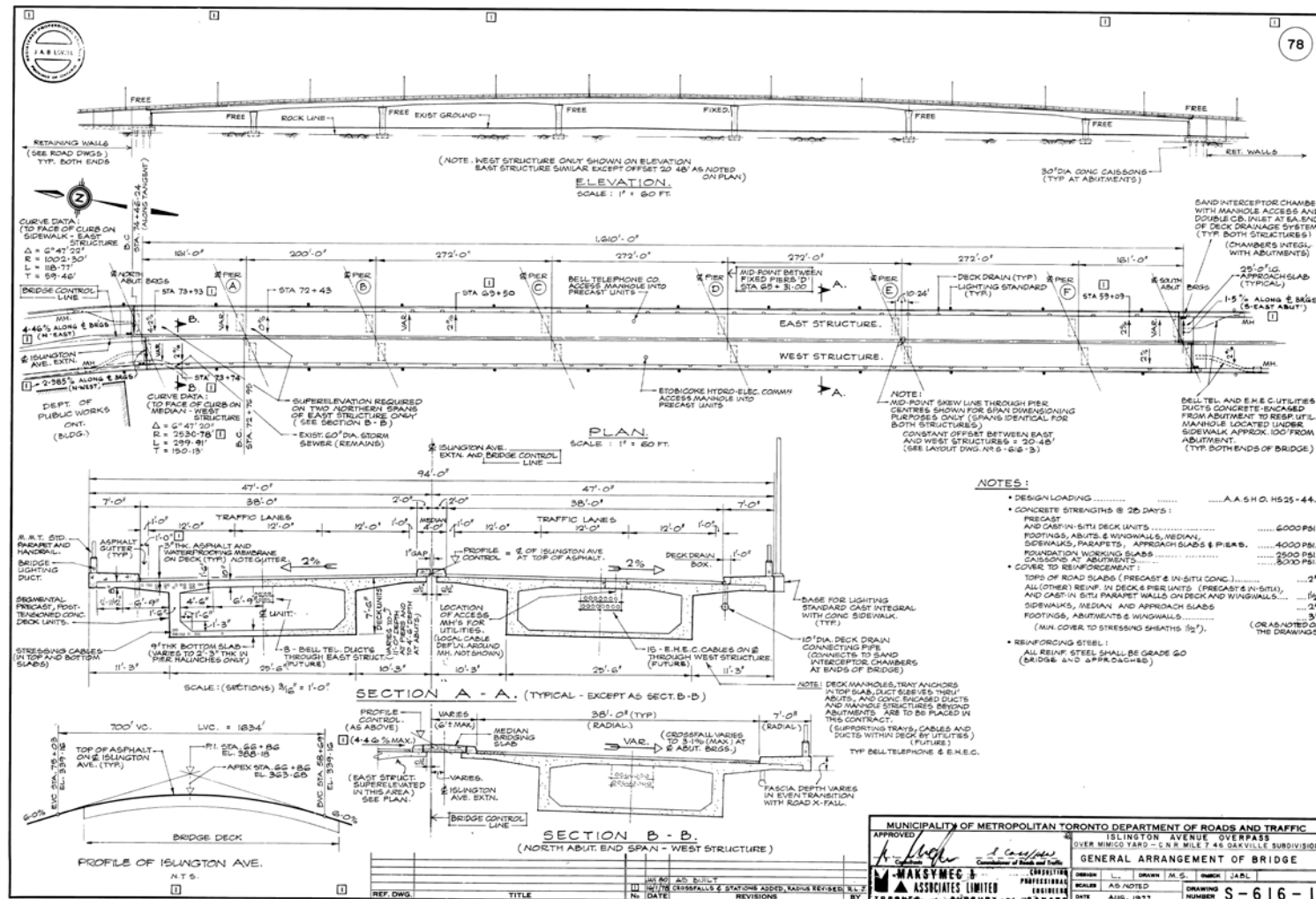
Figure 9-12: Construction of the Islington Avenue Bridge (Lovell 1980:52)



FINAL CULTURAL HERITAGE EVALUATION REPORT: ISLINGTON AVENUE BRIDGE

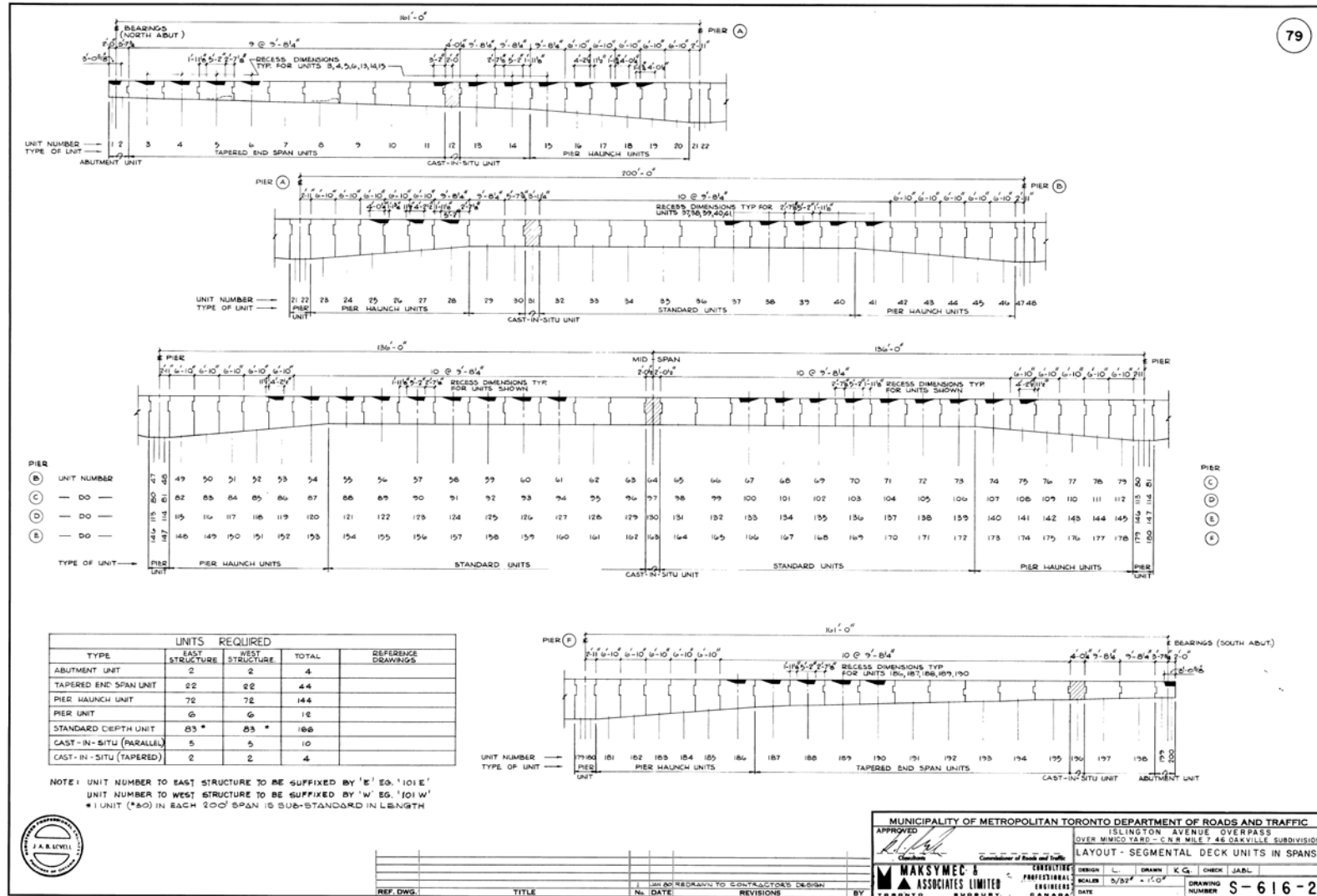
9.3 Select Structural Drawings

Figure 9-13: Original structural drawings showing elevation and sections of the bridge. (Makymec and Associates Ltd 1977)



FINAL CULTURAL HERITAGE EVALUATION REPORT: ISLINGTON AVENUE BRIDGE

Figure 9-14: Original structural drawings showing elevation and sections of the bridge. (Maksymec and Associates Ltd 1977)



SECTION 1 - EAST STRUCTURE
STA. 72+43 (0% TO NORTH ABUT. (4-35% ALONG E BRGS))
EAST STRUCTURE (X-FALL VARIES)
SOUTH ABUT. (1-5% TO STA. 59+03 (2-0% TO STA. 69+50 (2-0% TO STA. 72+43 (2-0% TO STA. 74+46+24))

SECTION 2 - BOTH STRUCTURES (2% FALL)
EAST STRUCT. STA. 59+09 TO STA. 69+50
WEST STRUCT. SOUTH ABUT. TO STA. 73+74

SECTION 3 - WEST STRUCTURE
STA. 72+76-95 TO SOUTH LIMIT OF MEDIAN BRIDGING SLAB.

SECTION 4 - WEST STRUCTURE
AT MEDIAN BRIDGING SLAB.
(TO NORTH ABUT.)
SEE ALSO PLAN.

SECTION 5 - EAST & WEST STRUCTURES
AT ABUTMENT CENTRE WALL.

SECTION 6 (TYPICAL ALL ABUTMENTS)
CONST. JOINTS IN SIDEWALK AND PARAPET WALL TO BE TRULY VERTICAL AS SHOWN (NOT PERPENDICULAR TO GRADE)
JOINTS IN PARAPET TO LINE UP WITH SIDEWALK JOINTS.

SECTION 7 (AS DRAWN FOR MEDIAN SIDE OF ROADWAY)
TOP OF JOINT FLUSH WITH ROAD LEVEL
OUTLINE OF SIDEWALK
OUTLINE OF MEDIAN
JOINT SUPPORTS
JOINT SUPPLY
EXTEND AT N-W ABUT ONLY. SEE NOTE ON DWG. S-616-57

DETAILS OF CONC. BASE FOR LIGHTING STANDARDS
(FOR DETAILS OF ANCHORS & DUCTS SEE DWG. NS 5-GIG-192)
CONST. JOINT
STYROFOAM FORM
CUT 2" X 6" GROOVE IN ONE END OF STYROFOAM FORMS TO RECEIVE STYROFOAM STRIP
RUN 2" STYROFOAM ALONG DECK AND DOWN THE JOSE OF DECK - SEE DET. 1 (TYPICAL AT LOW END OF EACH POUR OF SIDE WALK)

PLAN
SCALE: 1/4" = 1'-0"
FOR LAYOUT OF JOINTS SEE DWG. S-616-47.

EXTERIOR ELEVATION AT CONST. JOINTS

CHAMFERS AT CONST. JOINTS
SCALE: 1/4" = 1'-0"
FOR LAYOUT OF JOINTS SEE DWG. S-616-47.

SECTION 9
WEST BRIDGE ONLY
SEE DWG. S-616-47 FOR EXTENT

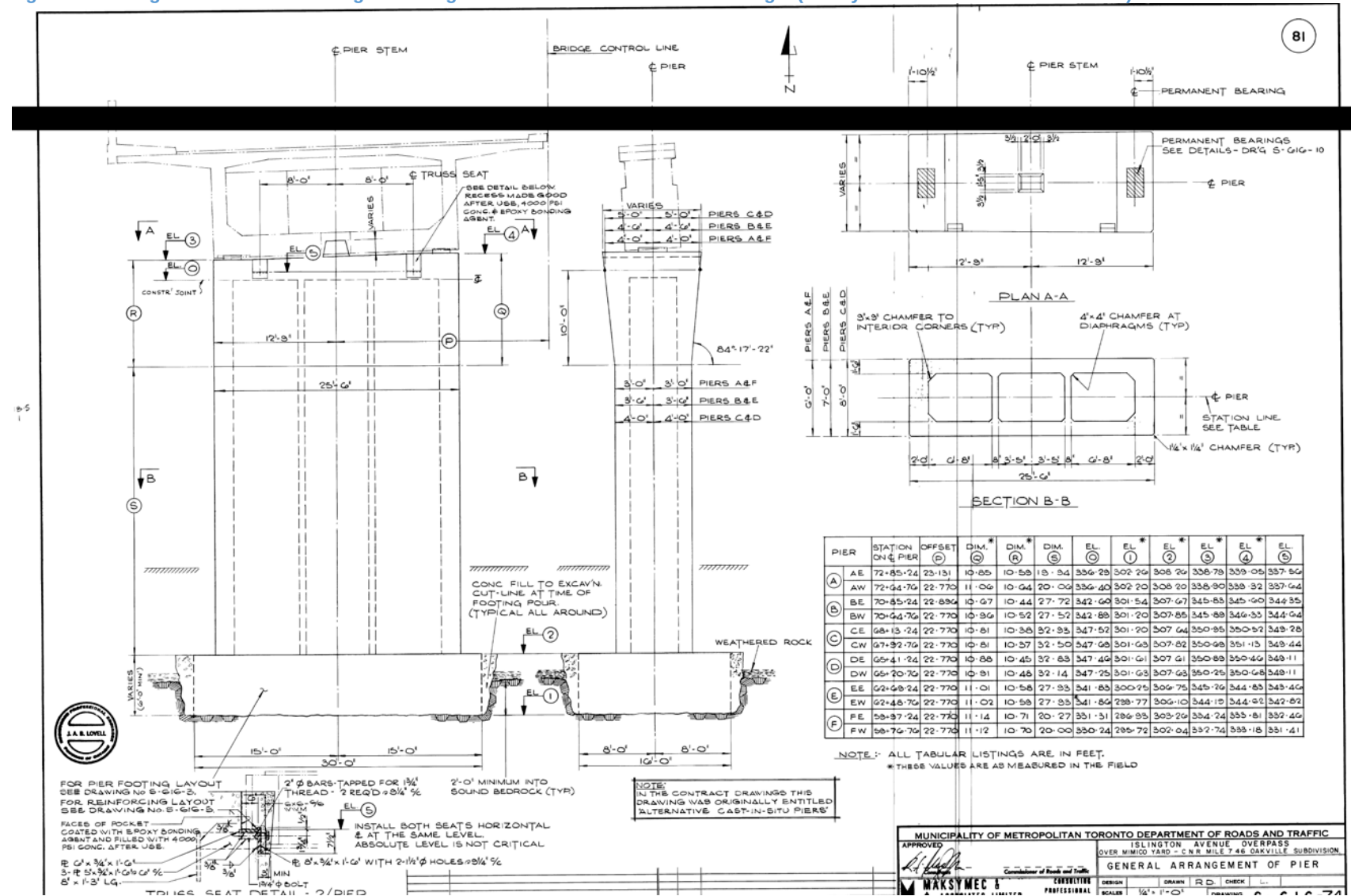
TYPICAL SECTIONS THROUGH DECK
SCALE: 3/4" = 1'-0"

NOTE: SECTIONS 1 TO 7 ALSO SHOWN ON DWG. NS 5-GIG-47 (SHOWN AS 1-1, 2-2, ETC.)

MUNICIPALITY OF METROPOLITAN TORONTO DEPARTMENT OF ROADS AND TRAFFIC
ISLINGTON AVENUE OVERPASS
OVER MISSISSAUGA & S. 1/2 MILE 1.48 SUBDIVISION
DECK SECTIONS AND DETAILS
APPROVED: *[Signature]*
DESIGNED BY: *[Signature]*
CHECKED BY: *[Signature]*
DATE: AUG. 1977
DRAWING NO.: S-616-48

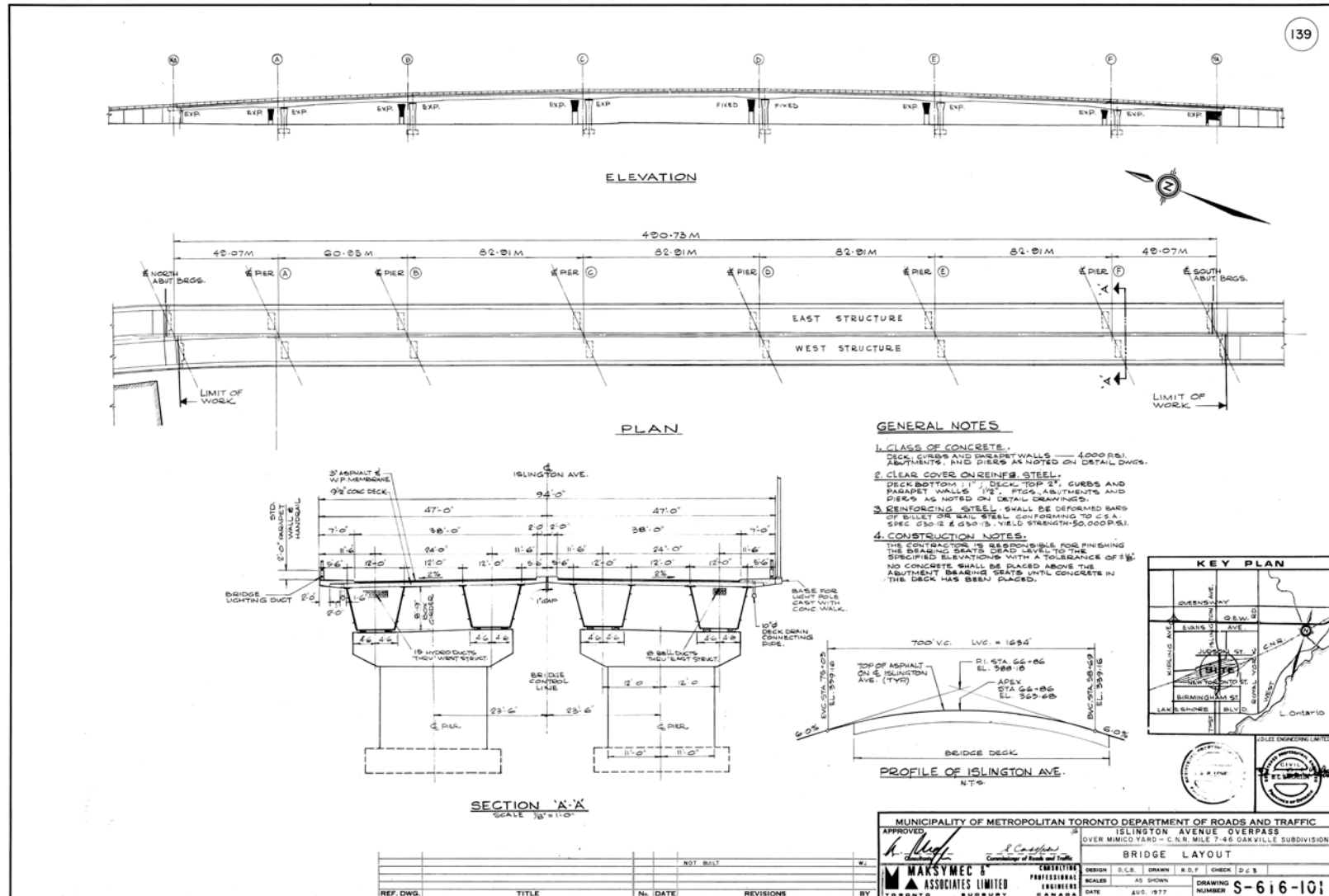
FINAL CULTURAL HERITAGE EVALUATION REPORT: ISLINGTON AVENUE BRIDGE

Figure 9-16: Original structural drawings showing elevation and sections of the bridge. (Maksymec and Associates Ltd 1977)



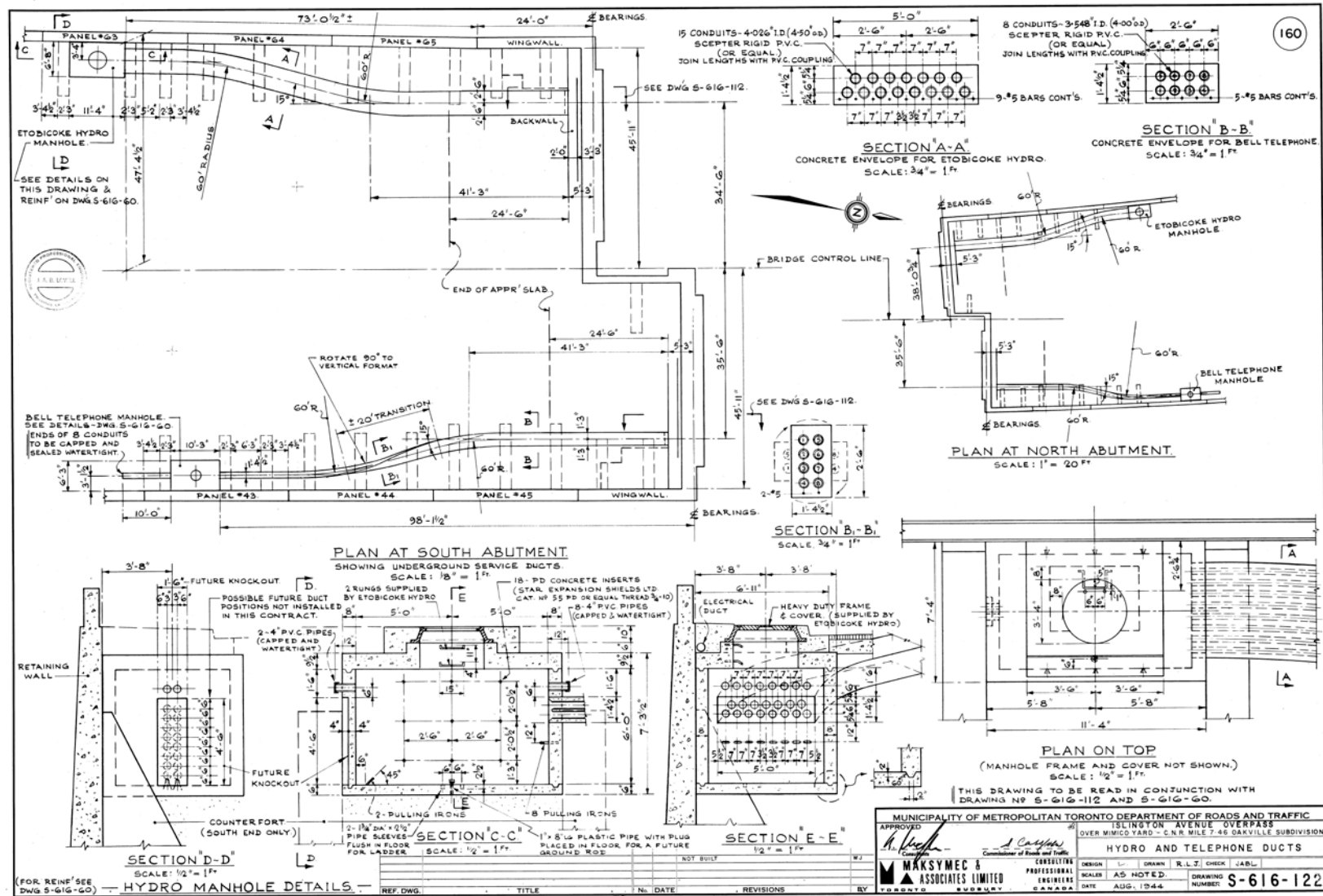
FINAL CULTURAL HERITAGE EVALUATION REPORT: ISLINGTON AVENUE BRIDGE

Figure 9-17: Original structural drawings showing elevation and sections of the bridge. (Maksymec and Associates Ltd 1977)



FINAL CULTURAL HERITAGE EVALUATION REPORT: ISLINGTON AVENUE BRIDGE

Figure 9-18: Original structural drawings showing elevation and sections of the bridge. (Maksymec and Associates Ltd 1977)



9.4 Site Visit Photographs

Figure 9-19: View of west elevation, looking southeast from the Willowbrook Maintenance Facility.



Figure 9-20: West elevation, looking east from the Willowbrook Maintenance Facility towards pier C.



Figure 9-21: Pier and underside of deck, showing individual prestressed precast concrete segments.



Figure 9-22: Pier A at rear and extreme right, looking west towards Preventative Maintenance Bays 1 and 2 in the Willowbrook Maintenance Facility



Figure 9-23: Metal pier bearing connecting to the deck, looking west.



Figure 9-24: Pier B and bridge deck underside showing soot from diesel engines passing underneath, looking south at the Willowbrook Maintenance Facility.



Figure 9-25: Underside of bridge deck with individual precast prestressed concrete segments visible. Note rainwater drainage piping, and concrete base supporting streetlight pole at right.



Figure 9-26: Bridge deck demonstrating downward slope, looking south towards New Toronto Street.



Figure 9-27: Northern portion of the bridge deck, looking north towards Judson Street.



Figure 9-28: Metal railing and pedestrian sidewalk on bridge deck, looking west.



Figure 9-29: Typical grated rainwater catch basin on bridge deck.



Figure 9-30: Underside of bridge deck and north abutment, looking north from pier B.



Figure 9-31: East elevation of the bridge, looking south from Judson Street. Note the tall abutment retaining wall at far right where the grade level of Islington Avenue was raised to accommodate the bridge.



Figure 9-32: Industrial facilities to the southwest of the bridge, looking northwest.



Figure 9-33: Impacts of raising grade level on southern bridge approach, looking west down New Toronto Street from Islington Avenue. Note the tall retaining wall at left and the roof level of the residence compared to street level.



9.5 Comparative Structures Photographs

Figure 9-34: Six span precast prestressed concrete Burnhamthorpe Road Bridge over the Credit River, Mississauga, constructed in 1979 (City of Mississauga 2007).



Figure 9-35: Four span precast prestressed concrete Fairway Road Bridge over the Grand River, Kitchener, constructed in 2013 (Ontario Concrete Awards 2013).



Figure 9-36: Six span post-tensioned segmentally-constructed concrete Highway 406 Bridge over Twelve Mile Creek, constructed in 1982 (Google Earth 2016).



10 Chronology

Date	Event	Reference
1855	Hamilton and Toronto Railway line established	Reynolds 2011
1906	Willowbrook Maintenance Facility constructed	ASI 2016
1923	Canadian National Railways assumes control of the Lakeshore West line	Reynolds 2011
1965-1967	GO Transit assumes control of rail line and begins commuter service	Mackenzie 2015
1979	Islington Avenue Bridge constructed	Lovell 1980

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12 Project Personnel

<i>Corporate Responsibility:</i>	Lisa Merritt, MSc (P094) <i>Partner</i> <i>Director, Environmental Assessment Division</i>
<i>Senior Project Manager:</i>	Lindsay Graves, MA, CAHP <i>Cultural Heritage Specialist</i> <i>Assistant Manager, Cultural Heritage Division</i>
<i>Cultural Heritage Specialist:</i>	John Sleath, MA <i>Cultural Heritage Assistant</i>
<i>Project Coordinator:</i>	Sarah Jagelewski, Hon. BA <i>Staff Archaeologist</i> <i>Assistant Manager, Environmental Assessment Division</i>
<i>Project Administration:</i>	Carol Bella, Hon. BA <i>Research Archaeologist</i> <i>Administrative Assistant</i>
<i>Report Preparation:</i>	John Sleath
<i>Graphics:</i>	Blake Williams, MLitt <i>Geomatics Specialist</i>
<i>Report Reviewer:</i>	Lindsay Graves

APPENDIX A: Cultural Heritage Evaluation Report Sample Questionnaire

Response by:

Name of Organization:

Date:

1. Have you collected any historical information on the property? If yes, please provide a short description of this collection:

2. Is there any local interest in the history of the property relating to:
 - a. Historical or Associative Value
 - b. Design or Physical Value
 - c. Contextual Value
 - d. Other

Please provide additional information regarding your selections above:

3. Do you know whether the lands where the property is located may be valued by the community, including First Nations? If yes, please provide a brief description:

4. Are there any other additional comments that you think are relevant?