DESIGN AND CONSTRUCTION REPORT

REPLACEMENT OF THE ARGYLE STREET BRIDGE IN CALEDONIA, HALDIMAND COUNTY

DETAIL DESIGN AND CLASS ENVIRONMENTAL ASSESSMENT STUDY

MARCH 2020

G.W.P. 3805-01-00

wsp

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DETAIL DESIGN AND CLASS ENVIRONMENTAL ASSESSMENT STUDY

CLASS ENVIRONMENTAL ASSESSMENT FOR PROVINCIAL TRANSPORTATION FACILITIES GROUP 'B' PROJECT

G.W.P. 3805-01-00

DATE: MARCH 2020

PREPARED FOR THE ONTARIO MINISTRY OF TRANSPORTATION, WEST REGION

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DESIGN AND CONSTRUCTION REPORT

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DETAIL DESIGN AND CLASS ENVIRONMENTAL ASSESSMENT STUDY

MINISTRY OF TRANSPORTATION, WEST REGION

G.W.P. 3805-01-00

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This limitations statement is considered an integral part of this report.

THE PUBLIC RECORD

A copy of this document have been submitted to the following office of the Ministry of the Environment, Conservation and Parks to be placed in the Public Record:

Ministry of the Environment, Conservation and Parks
Hamilton District Office
119 King Street West, 9th Floor
Hamilton, Ontario

This Design and Construction Report is also available for a 30-day public review period during regular business hours at:

Haldimand County
Administration Office
45 Munsee Street North
Cayuga, Ontario

Haldimand County Public Library
Caledonia Branch
100 Haddington Street
Caledonia, Ontario

Ontario Ministry of Transportation
West Region
First Floor Lobby
659 Exeter Road
London, Ontario

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Notice of Filing: Design and Construction Report

Argyle Street Bridge Replacement in Caledonia, Haldimand County
Detail Design and Class Environmental Assessment Study (G.W.P. 3805-01-00)

THE STUDY

The Ontario **Ministry of Transportation (MTO)** retained **WSP** to complete the Detail Design and Class Environmental Assessment (EA) Study for the replacement of the Argyle Street Bridge over the Grand River in Caledonia, Haldimand County. The location of the bridge is shown in the key plan.

THE PROCESS

This study has followed the *Class Environmental Assessment* for *Provincial Transportation Facilities* (2000) process for Group 'B' projects.

A Transportation Environmental Study Report (TESR) was prepared to document the evaluation of rehabilitation and replacement alternatives and the recommended long-term strategy to replace the existing Argyle Street Bridge with a wider, 5-span steel arch bridge. EA approval for the replacement of the Argyle Street Bridge was obtained in 2009. A 5-year review was undertaken and determined that there are no significant changes to the EA approved plan and the study proceeded to Detail Design.

The Detail Design is nearing completion and a Design and Construction Report (DCR) has been prepared to document the EA process, detail design, construction staging, and potential environmental impacts and proposed mitigation measures. The DCR is being filed for public review from **March 11, 2020 to April 10, 2020,** and is available on the project website **(www.argylebridge.ca)** and at the following locations during regular business hours:

Ministry of the Environment, Conservation and Parks
Hamilton District Office
119 King Street West, 9th floor
Hamilton, Ontario

Haldimand County Public Library - Caledonia Branch
100 Haddington Street
Caledonia, Ontario

Haldimand County
Administration Office
45 Munsee Street North
Cayuga, Ontario

Ministry of Transportation
West Region
659 Exeter Road
London, Ontario

COMMENTS

Interested persons are encouraged to review this document and provide comments by **April 10, 2020**. If you wish to obtain additional information or provide comments, please contact:

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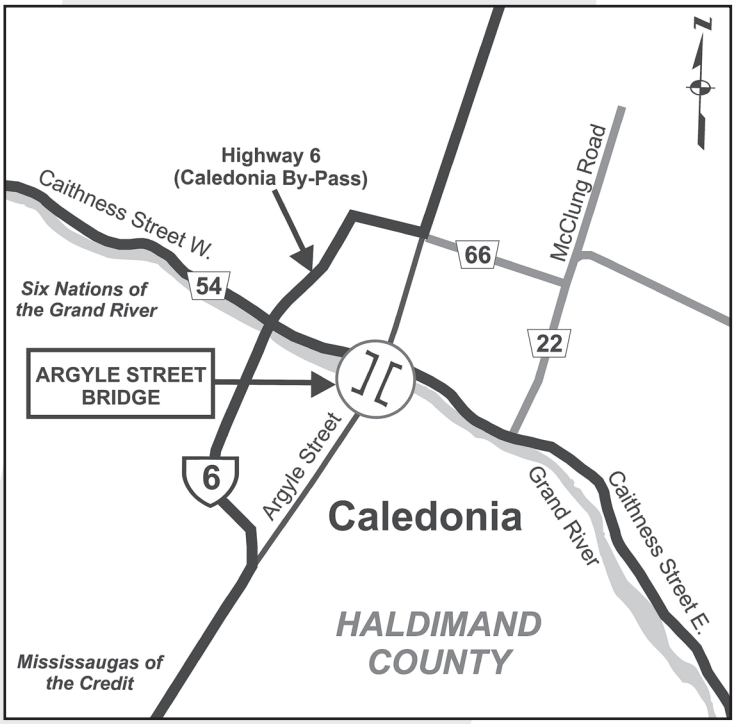
e-mail: project-team@argylebridge.ca



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Please visit our study website at www.argylebridge.ca

If you have any accessibility requirements to participate in this project, please contact one of the Project Team members listed above.

Comments and information will be collected to assist the MTO in meeting the requirements of the *Ontario Environmental Assessment Act. Information* will be collected in accordance with the *Freedom of Information and Protection of Privacy Act and the Access to Information Act.* With the exception of personal information, all comments will become part of the public record.

Ontario

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GLOSSARY

CIS	Community Information Session
Class EA	*Class Environmental Assessment for Provincial Transportation Facilities*
CNWA	*Canadian Navigable Waters Act* (2019)
CUM	Cultural Meadow
DCR	Design and Construction Report
DFO	Department of Fisheries and Oceans Canada
EA	Environmental Assessment
END	Endangered
ESA	Ontario *Endangered Species Act* (2007)
FOD	Deciduous Forest
GRCA	Grand River Conservation Authority
G.W.P.	Group Work Project
HIA	Heritage Impact Assessment
HSEW	Heritage Setting Enhancement Workshop
IAA	Canadian *Impact Assessment Act* (2019)
LIO	Land Information Ontario
MECP	Ontario Ministry of the Environment, Conservation and Parks
MHSTCI	Ontario Ministry of Heritage, Sport, Tourism and Culture Industries
MNRF	Ontario Ministry of Natural Resources and Forestry
MTO	Ontario Ministry of Transportation
NHIC	Natural Heritage Information Centre
PTTW	Permit to Take Water
SAR	Species at Risk
SARA	*Species at Risk Act* (2002)
SC	Special Concern
SCC	Species of Conservation Concern
SCP	Strategic Conservation Plan
TESR	Transportation Environmental Study Report
THR	Threatened

1 PROJECT OVERVIEW

1.1 BACKGROUND

In 2002, the Ontario Ministry of Transportation (MTO) initiated the Preliminary Design Study and Class Environmental Assessment study for the Argyle Street Bridge in Caledonia to identify and evaluate rehabilitation and replacement alternatives for the long-term strategy for the Argyle Street Bridge in Caledonia, Haldimand County. Based on the assessment, replacement of the existing structure and construction of an on-site detour with a temporary bridge crossing was selected as the preferred plan for the Argyle Street Bridge. A Transportation Environmental Study Report (TESR) was prepared to document the evaluation of rehabilitation and replacement alternatives and the recommended long-term strategy to replace the existing Argyle Street Bridge with a wider, 5-span steel arch bridge. The TESR was filed for a 30-day review period and was subsequently cleared to proceed to Detail Design in 2009.

In 2013, WSP (*formerly MMM Group Limited*) was retained by MTO to undertake the Detail Design and Class Environmental Assessment Study for the replacement of the Argyle Street Bridge over the Grand River in Caledonia, Haldimand County. The location of the bridge is shown in **Exhibit 1-1**.

Exhibit 1-1: Study Area Map

1.2 PROJECT DESCRIPTION

The proposed works include the replacement of the Argyle Street Bridge over the Grand River in Caledonia, Haldimand County. The replacement bridge will be a 3-lane, 5-span steel arch bridge with 40 m spans and a total length of 200 m. The Detail Design study includes the following work:

- Design of the new steel arch bridge;
- Landscaping and heritage setting enhancements; and
- Traffic staging and detours to facilitate construction staging.

The bridge replacement will be completed in an area of the Grand River where there are a number of sensitive natural, social and cultural environmental features. An overview of the features that are located at or near the bridge and could be impacted by the bridge replacement works is provided in **Section 4.0** of this report.

The Detail Design and construction of the project is being delivered under the Construction Manager General Contractor model. Under this model, MTO partners with both a design consultant and a contracting firm to develop the final design and construct the project.

This Detail Design study builds on the improvements identified in the approved TESR. This report documents the environmental aspects of the Detail Design and construction for the Argyle Street Bridge replacement.

1.3 ENVIRONMENTAL ASSESSMENT ACT PROCESS

1.3.1 *ONTARIO ENVIRONMENTAL ASSESSMENT ACT*

The Ministry of Transportation's (MTO) *Class Environmental Assessment for Provincial Transportation Facilities* (Class EA) was approved under the *Ontario Environmental Assessment Act* in the fall of 1999 and amended in 2000. Provided the Class EA process is followed, projects and activities included under the MTO Class EA do not require formal review and approval under the *Ontario Environmental Assessment Act*.

This study has followed the MTO Class EA process for Group "B" projects. Group "B" projects generally include realignments, improvements to existing highways and freeways, new interchanges or modifications to existing interchanges, new or modified water crossings or watercourse alterations, or new highway facilities. Group "B" projects are generally similar in nature, recur frequently, and have a generally predictable range of environmental effects for which standard mitigation can be used. **Exhibit 1-2** shows the MTO Class EA process for Group "B" projects. **Exhibit 1-3** provides the key steps in the Detail Design study. Additional information about the Class EA process for Group "B" projects is contained in the *Class Environmental Assessment for Provincial Transportation Facilities* (1999, as amended in 2000) available at: http://www.mto.gov.on.ca/english/engineering/ptf.shtml.

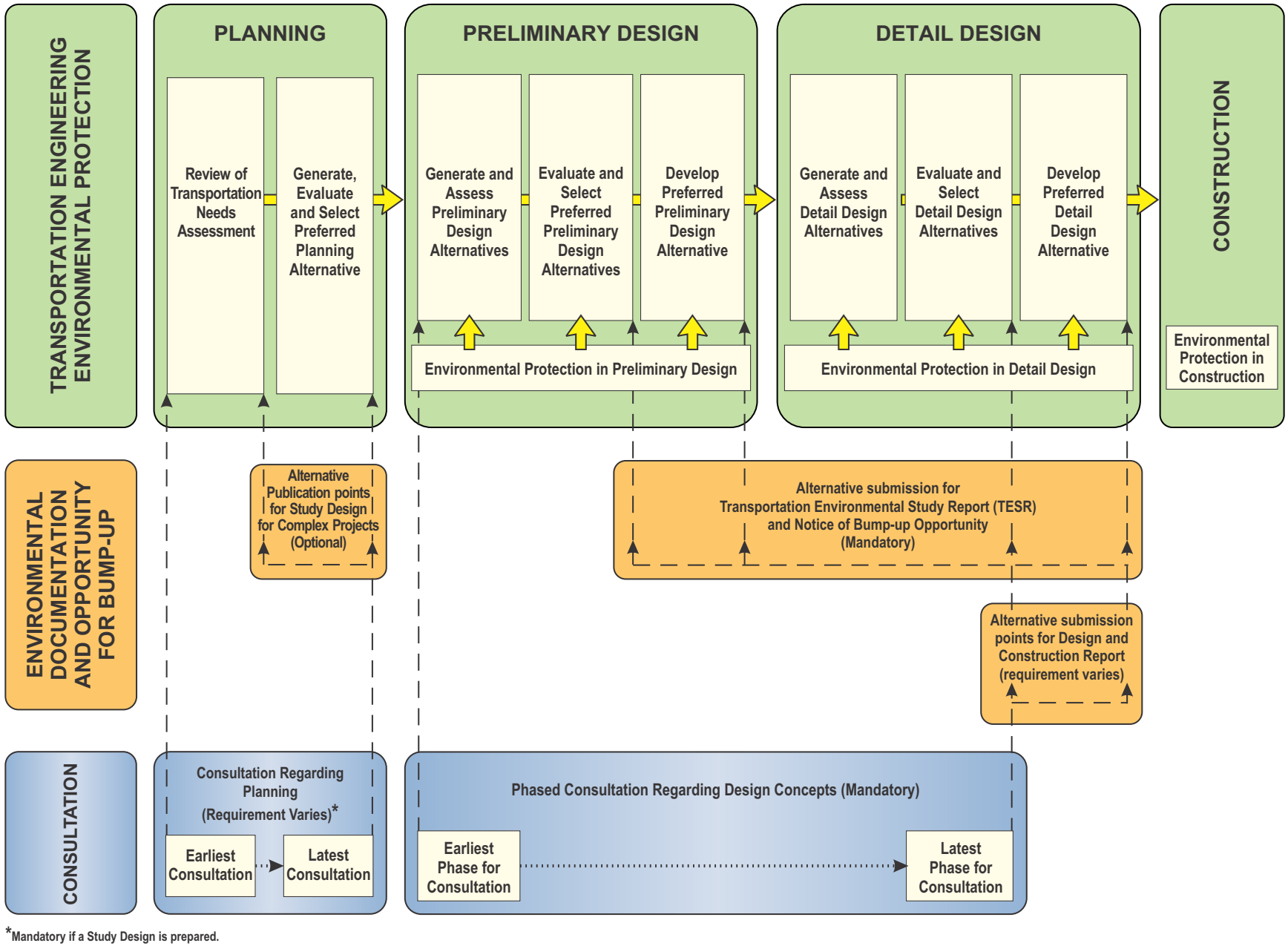
A Transportation Environmental Study Report (TESR) for the replacement of the Argyle Street Bridge was filed for public review following the completion of the Preliminary Design study and received approval in October 2009. The MTO Class EA requires the review of any project if construction has not been undertaken on the project within five years of the Notice of Submission for the TESR.

As a Design and Construction Report (DCR) had not been submitted for the Argyle Street Bridge replacement within five years of the Notice of Submission for the TESR, a five-year review of the project was undertaken to determine if there are any significant changes to the existing environmental conditions (e.g. natural, socio-economic, cultural-heritage), new government policies, new engineering standards or new technologies for mitigating measures that may affect the EA-Approved Plan. Based on this review, it was determined that changes in the existing conditions and Detail Design bridge replacement strategy are not significant and do not warrant an Addendum to the TESR.

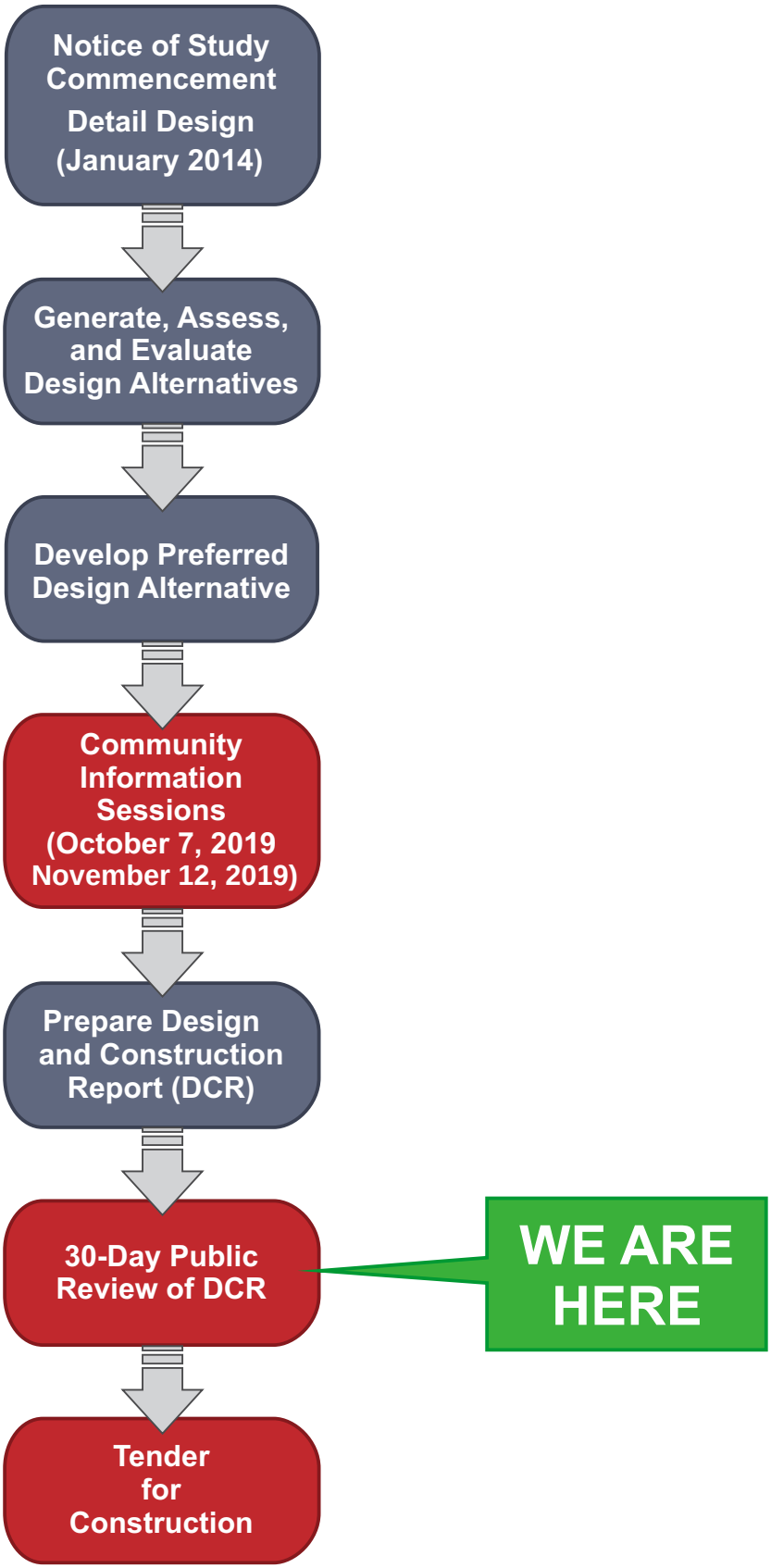
This DCR has been prepared to document the EA process, detail design, consultation, construction staging, potential environmental impacts and proposed mitigation measures for the replacement of the Argyle Street Bridge.

1.3.2 CANADIAN *IMPACT ASSESSMENT ACT*

The *Impact Assessment Act*, 2019 (IAA 2019) and associated regulations came into effect on August 28, 2019. Under *IAA* 2019, a federal impact assessment is required for "designated projects." A designated project is one that includes one or more physical activities that are set out in the regulations under IAA 2019 or by order of the Federal Minister of the Environment and Climate Change. More information about the *Impact Assessment Act* (2019) is available at: https://www.canada.ca/en/impact-assessment-agency.html.



*Mandatory if a Study Design is prepared.


Notice of Study Commencement Detail Design (January 2014)
Generate, Assess, and Evaluate Design Alternatives
Develop Preferred Design Alternative
Community Information Sessions (October 7, 2019 November 12, 2019)
Prepare Design and Construction Report (DCR)
30-Day Public Review of DCR
WE ARE HERE
Tender for Construction

The Project Team reviewed this Detail Design and Class Environmental Assessment Study against the Federal Regulations Designating Physical Activities and determined that the study is not “designated” and therefore will not require a federal impact assessment.

1.4 PURPOSE OF THE DESIGN AND CONSTRUCTION REPORT

This Design and Construction Report (DCR) documents the anticipated effects on environmental features and traffic operations associated with aspects of the design and construction for the replacement of the Argyle Street Bridge in Caledonia, Ontario. This DCR has been prepared to:

- Document the EA process;
- Describe the improvements to be constructed;
- Document specific environmental effects associated with the project and proposed mitigation;
- Identify measures that have been incorporated into the design and contract drawings;
- Address any commitments to future work identified in the 2009 TESR; and
- Summarize the consultation undertaken with external agencies, affected/adjacent property owners, Indigenous Communities, and interested members of the public during Detail Design.

This DCR is being made available to the public, other interested parties and external agencies for a 30-day review period as required under the MTO Class EA. A notice of DCR submission was posted on the project website (https://argylebridge.ca), published in local newspapers (i.e. *Turtle Island News*, *Two Row Times*, and *The Sachem*), and sent to external government agencies, Indigenous Communities, local municipalities, utilities, affected property owners, local stakeholder groups, and members of the public on the project mailing list.

There is an opportunity at any time during the MTO Class EA process for interested persons to provide comments and review outstanding issues. The DCR is available for a 30-day public and external agency review period from **March 11, 2020 to April 10, 2020**.

Any concerns raised by members of the public, interested groups or technical and external agencies during this review period should be discussed with MTO or their consultants identified in the project notice, as all comments received during the review period will be considered by the MTO. Additional information about this project is also available by contacting the key Project Team members involved in this project, as follows:

Mr. Mark Velicevic, P.Eng.
Consultant Project Manager
WSP
610 Chartwell Road
Oakville, ON L6J 4A5
tel: 289-835-2629
toll-free: 1-877-562-7947
fax: 905-823-8503
e-mail: project-team@argylebridge.ca

Mr. Graydon Botsford, P.Eng.
Project Engineer
Ministry of Transportation
West Region
659 Exeter Road
London, ON N6E 1L3
tel: 519-200-4604
fax: 519-873-4600
e-mail: project-team@argylebridge.ca

There is a possibility that the final design plans may identify minor design modifications or refinements that may occur as part of the standard progression of Detail Design development. However, modifications anticipated to adversely affect the general intent of the EA Commitments made herewith will not be made without further consultation with parties which may be affected by such changes.

2 CONSULTATION / ENGAGEMENT PROCESS

Engagement has been an integral component of this study. Building on the consultation completed during Preliminary Design, this Detail Design study included an extensive stakeholder consultation program. External agencies, regional and local municipalities, Indigenous communities, emergency service providers, local school boards, utilities, and members of the public (including adjacent property owners, interest groups, and the general public) were engaged throughout the study.

A mailing list was developed at the beginning of the study based on the Preliminary Design contact list. Members of Provincial Parliament, external government agencies, Indigenous communities, local municipalities, emergency service providers, school boards, utilities, interest groups, adjacent property owners, potentially impacted property owners, and members of the public were included on the study mailing list.

Stakeholders and interested parties were engaged throughout the study through direct letter mailing, Canada Post unaddressed ad-mail (i.e. bulk mail), direct contact with the Project Team (e.g. via email, phone, or fax), local newspaper advertisements (i.e. *Turtle Island News*, *Two Row Times*, *The Sachem*), a project website (https://argylebridge.ca), and at key consultation milestones (Study Commencement, Community Information Sessions, and DCR Filing), and meetings with local municipalities and external government agencies.

Members of the public, interest groups, agencies, stakeholders and Indigenous communities were encouraged to participate throughout the duration of the study.

2.1 EXTERNAL AGENCY CONSULTATION

On January 23, 2014, project notification letters were sent to the mailing list to announce commencement of this Detail Design study. The letters to agencies included the project website address and a comment form to provide stakeholders with an opportunity to provide comments and/or background information relevant to the study.

Agencies were invited to participate in the Community Information Session (CIS) held on October 10, 2019 and November 12, 2019. Notification letters were distributed by direct mail to stakeholders on the mailing list on September 23, 2019 and November 4, 2019.

The following federal and provincial government agencies, municipalities and school boards, Indigenous communities, stakeholder / interest groups, emergency services, and utilities were provided with project notifications during Detail Design:

Federal and Provincial Government Agencies

- Indigenous and Northern Affairs Canada
- Department of Fisheries and Oceans Canada
- Environment and Climate Change Canada
- Parks Canada
- Transport Canada
- Ministry of Agriculture, Food and Rural Affairs
- Ministry of Community Safety and Correctional Services
- Ministry of the Environment, Conservation and Parks (formerly *Ministry of the Environment and* Climate Change)
- Ministry of Energy, Northern Development and Mines
- Ministry of Indigenous Affairs
- Ministry of Infrastructure
- Ministry of Municipal Affairs and Housing
- Ministry of Natural Resources and Forestry
- Ministry of Heritage, Sport, Tourism and Culture Industries
- Ontario Provincial Police
- Grand River Conservation Authority
- MPP - Haldimand – Norfolk

Indigenous Communities and Organizations

- Six Nations of the Grand River
- Mississaugas of the Credit First Nation
- Haudenosaunee Development Institute

Municipalities and School Boards

- Haldimand County
- Student Transportation Services – Brant, Haldimand and Norfolk
- Grand Erie District School Board
- Brant / Haldimand / Norfolk Catholic District School Board
- Conseil scolaire de district du Centre-Sud-Ouest
- Conseil scolaire de district catholique Centre-Sud
- Conseil scolaire catholique MonAvenir

Stakeholder / Interest Groups

- Architectural Conservancy of Ontario
- Caledonia Business Improvement Association
- Caledonia Old Mill Corporation
- Caledonia Regional Chamber of Commerce
- Canadian Society for Civil Engineering
- Cayuga Fest
- Clark Companies
- Dunnville District Heritage Association
- Ducks Unlimited Canada
- Edinburgh Square Heritage and Cultural Centre
- Grand Strategy Heritage Working Group
- Haldimand ATV Club
- Haldimand County Museum and Archives
- Haldimand Grand River Rowing Club
- Haldimand – Norfolk Health Unit
- Heritage Canada Foundation
- Heritage Haldimand
- Heritage Mount Pleasant
- International Council on Monuments and Sites Canada
- Kinsmen Club of Caledonia
- Lower Grand River Land Trust
- Ontario Cycling Association
- Ontario Federation of ATV Clubs
- Ontario Heritage Trust
- Ruthven Park National Historic Site
- River Heights Public School
- Sharp Student Transportation
- Southern Ontario Railway
- Trout Unlimited Canada
- Tourism Caledonia
- Tourism Haldimand
- York Grand River Historical Society

Emergency Services

- Haldimand County Emergency Services
- Haldimand County Fire Services

Utilities

- Bell Aliant
- Eastlink
- Haldimand County Hydro
- Hydro One
- Rogers Communications Inc.
- Telus Communications Inc.
- Union Gas

2.1.1 *EXTERNAL AGENCY MEETINGS*

External agencies were consulted with directly, as needed, throughout the study to discuss project impacts, mitigation measures, and obtaining required permits / approvals for the project, including the Ministry of Heritage, Sport, Tourism and Cultural Industries, Department of Fisheries and Oceans, Ministry of Natural Resources and Forestry, Ministry of Environment, Conservation and Parks (MECP), and Transport Canada.

Comments received are outlined in **Exhibit 2-1**, and relevant agency correspondence is included in **Appendix B**.

Haldimand County

Haldimand County has been actively engaged throughout the Detail Design study and the project team met with representatives from Haldimand County on a number of occasions to discuss the project, emergency service provisions, utilities, heritage enhancement / mitigation, traffic management plan, and regarding design details. Presentations were also made to Haldimand County Council at key milestones during the study and Haldimand County Engineering, Public Works and Planning staff were consulted to coordinate various aspects of the project with Haldimand County's plans for upgrades within the study area.

Ministry of Heritage, Sport, Tourism, and Culture Industries

Representatives from the Ministry of Heritage, Sport, Tourism, and Culture Industries (MHSTCI) attended the Bridge Design Features and Heritage Setting Enhancement Workshop February 11 and February 12, 2014 to discuss the project, including the heritage enhancements for the selected design (e.g. 5-span steel arch structure), and additional enhancements being considered by the project team. Additional information on the Bridge Design Features and Heritage Setting Enhancement Workshop is provided in **Section 2.2**.

The Project Team held a teleconference with MHSTCI on December 10, 2019 to provide an update on the project, review the cultural heritage assessments and mitigation measures incorporated into the design for the Argyle Street Bridge, and discuss next steps, timing and approach for the cultural heritage work to be completed for the toll keeper's house (4 Argyle Street).

Exhibit 2-1: Summary of Agency / Stakeholder Correspondence

Agency	Input Received	Action Taken
Federal Agencies		
Indigenous and Northern Affairs Canada	Email received January 24, 2014 provided guidance regarding how to identify Aboriginal groups who should be consulted as part of the study.	MTO has confirmed that Six Nations of the Grand River and Mississaugas of the Credit First Nation will be consulted for this study.
Department of Fisheries and Oceans Canada (DFO)	Email received February 10, 2014 provided correct contact information and noted that there are significant Species at Risk issues for the study. Noted that DFO input will be required throughout project development.	DFO contact information updated. The Project Team consulted with DFO throughout the study.
Parks Canada Canada Heritage Rivers Boards Secretariat	Webform submission received February 2, 2014 provided contact information for a Ministry of Natural Resources and Forestry (formerly Ministry of Natural Resources) representative, noting that they are the government agency responsible for Ontario's Heritage Rivers.	The Ministry of Natural Resources and Forestry contact was sent study notifications throughout the Detail Design study and was invited to the Bridge Design Features and Heritage Setting Enhancement Workshop and Community Information Sessions.
Transport Canada	Comment received November 8, 2019 noting that Transport Canada does not require receipt of all individual or Class EA related notifications and summarizes which project they require notification for.	Removed from contact list. No further action required.

Agency	Input Received	Action Taken
Provincial Agencies		
Ministry of Heritage, Sport, Tourism and Culture Industries	Email received January 15, 2014 provided suggestions for organizations to invite to the Bridge Design Features and Heritage Setting Enhancement Workshop.	Response sent via email on January 14, 2014 confirmed that the organizations suggested by MHSTCI were invited to the Bridge Design Features and Heritage Setting Enhancement Workshop. A MHSTCI representative also attended the workshop.
Ministry of Indigenous Affairs	Letter sent March 26, 2014 identified that Six Nations of the Grand River Territory and Mississaugas of the Credit First Nations may have existing or asserted rights or claims that may be impacted by the study. Requested to be removed from the study mailing list.	Six Nations of the Grand River and Mississaugas of the Credit First Nations were confirmed on the project mailing list. Ministry of Indigenous Affairs was removed from the contact list.
Grand River Conservation Authority	Comment received October 1, 2019 noting that there is GRCA-owned lands approximately 0.5 km upstream from the bridge and copied the Resource Planner, Nathan Garland, from the GRCA Planning Department for input.	No further action required.
Infrastructure Ontario	Comment received October 3, 2019 noting that there are no properties owned by the Minister of Government and Consumer Services within the project study area and it is the proponent's duty to verify if any provincial government properties are within the study area.	No further action required.

Agency	Input Received	Action Taken
Municipalities		
Haldimand County Facility and Parks Operations Division	Comment form received January 31, 2014 noted interest in impacts to Haldimand parks and trails systems during construction and the connecting links between the new bridge and the municipal parks and trails, including the underpass at the south abutment.	Response sent via mail May 6, 2014 indicated that the approved plan is to install a temporary modular bridge (TMB) while the existing bridge is replaced, which will include a pedestrian crossing. During construction, the trails under the bridge will be closed. Following construction of the new bridge, the pedestrian trail at the south end of the bridge and the River Walk gateway at the northwest approach will be reinstated, while the pedestrian trail at the north end of the bridge will remain closed.
Haldimand County Emergency Services	Comment sheet received January 31, 2014 noted concerns related to emergency access during the project, traffic staging and detours, and weight capacities.	Response sent via mail May 6, 2014 noted that a TMB would be installed during construction, which will be designed to meet the Canadian Highway Bridge Design Code and will be sufficient to carry emergency vehicles during construction. Also noted that traffic staging, emergency access and potential detours were still in development and would be presented at the Community Information Session.

Agency	Input Received	Action Taken
Haldimand County Community Development and Partnerships, Heritage and Culture Unit	Comment sheet received February 3, 2014 provided comments that the character-defining elements of the previous and existing structures should be retained in the new bridge design.	Response sent via mail on May 6, 2014 noted that one of the objectives of the current study is to determine design treatments for the replacement bridge and ensure that the new structures reflects the heritage of the community and the historic significance of the bridge crossing. Also noted that the Project Team anticipates incorporating many of the design features discussed at the Bridge Design Features and Heritage Setting Enhancement Workshop into the new bridge design, subject to feasibility and agreement from Haldimand County.
Mayor Haldimand County	Comment sheet received February 5, 2014 indicated interest in participating in the study.	Response sent via mail on May 6, 2014 indicated that the Project Team would be presenting to Haldimand County Council at an upcoming Council-in-Committee meeting. Haldimand County Council was involved and consulted through the duration of the study.
Haldimand County Roads Operations	Email received April 4, 2014 noted new Manager of Roads Operations. Follow up email on April 7, 2014 noted interests are operational restrictions and impacts.	Response sent via email on April 7, 2014 confirmed that Haldimand County Roads would be kept apprised throughout the study.

Agency	Input Received	Action Taken
Stakeholder and Interest Groups		
Caledonia Old Mill Corporation	Comment sheet received January 27, 2014 identified concerns of heritage and annoyance of construction.	Response sent via mail on May 6, 2014 noted that workshops were held during Preliminary Design to engage stakeholders regarding heritage considerations, and a Bridge Design Features and Heritage Setting Enhancement Workshop was held in February 2014 to receive further stakeholder input regarding potential bridge design details and enhancements that reflect, respect and respond to the heritage setting. Also noted that standard best practices and mitigation measures for noise and dust during construction will be applied to minimize annoyance.
Rotary Club of Caledonia	Comment sheet received January 28, 2014 identified concerns with traffic, access and parking, the new bridge, and timing for completion of a new Grand River crossing at McClung Road.	Response sent via mail on May 6, 2014 noted that one of the objectives of the current study is determining bridge design treatments to reflect the heritage of the community and historic significance of the bridge crossing. Also noted that construction staging plans for the temporary and replacement bridge are being developed and identified that the approved plan is to install a TMB adjacent to the existing structure to carry traffic during the bridge replacement. Indicated that a new bridge crossing at McClung Road is not part of this Class EA study and is the responsibility of Haldimand County.

Agency	Input Received	Action Taken
Heritage Haldimand	Comment sheet received January 29, 2014 identified concerns about the new replacement structure differing from the existing structure in regard to materials and number of arches and noted that the concrete arches were featured in promotional and tourist advertisement materials.	Response sent via mail on May 6, 2014 noted that although a new 9-span structure was considered during Preliminary Design, the approved long-term strategy was ultimately determined to be a widened, 5-span, steel arch bridge structure. The selection of this alternative considered environmental factors, including minimizing impacts to local cultural heritage in Caledonia. Noted that the Detail Design study included identification of design treatments for the replacement bridge to reflect the community heritage and historical significance of the bridge crossing.
Grand Erie Business Centre	Webform submission received February 6, 2014 identified concerns with the location of and access to the TMB, requested impacts to local businesses along Argyle Street and local parks be minimized, and questioned whether or not a replacement bridge is required as opposed to constructing a new bridge across the Grand River at another location.	Response sent via email on May 5, 2014 indicated that the commitment to replace the existing bridge was made during the Preliminary Design study. The construction of a new bridge crossing is beyond the scope of the current study and would be a municipal undertaking for which Haldimand County would be responsible. Noted that construction staging plans, including the installation of a TMB adjacent to the existing bridge, are being developed to minimize impacts to local businesses and downtown amenities. During construction, trails under the bridge will be closed. Following construction of the new structure, the pedestrian trail at the south end of the bridge and the River Walk gateway at the northwest approach will be reinstated, while the pedestrian trail at the north end of the bridge will remain closed.

Agency	Input Received	Action Taken
Caledonia Regional Chamber of Commerce Tourism Caledonia	Comment sheet received January 30, 2014 indicated concerns about business and tourism impacts, and how long construction would take to complete. Noted preference for construction to be completed 24 hours a day. Also identified concern about the safety of the walkways at the north and south ends of the bridge.	Response sent via mail on May 9, 2014 indicated that construction staging plans were being developed to minimize impacts to local businesses and downtown amenities. Noted that a construction schedule had not yet been finalized but it was anticipated that it will require two construction seasons to complete construction of the new bridge. Also noted that the pedestrian trails under the bridge would be closed during construction, but the trail at the south end of the bridge and the Riverwalk gateway at the northwest approach would be reinstated following construction of the new bridge.
Architectural Conservancy of Ontario Hamilton Region Branch	Webform submission received and voicemail left on February 10, 2014 expressed concerns that the design scope of the new bridge has already been determined. Concerned that there was not an opportunity to provide input to the final bridge design.	Response sent via mail on May 6, 2014 noted that the approved design (5-span, steel arch bridge) for the replacement bridge was determined during Preliminary Design. The new structure has been designed in a context-sensitive manner to reflect the historic character of the existing structure.
The Haldimand Press	Comment received October 2, 2019 inquiring for digital copies of information boards/discussion notes from the community sessions in Caledonia.	Response set via email on October 3, 2019 noting that the information boards will be made available on the project website following the October 10th Community Information Sessions at Haldimand County Caledonia Centre – Remax Room.
	Comment received October 11, 2019 inquiring about 3D photo renditions of what the bridge will look like.	Response sent via email on October 15, 2019 indicating that a 3D fly-through video was available on the Consultation page of the project website.

Agency	Input Received	Action Taken
	Comment received October 17, 2019 inquiring about the following: the purpose of the third lane (i.e. middle lane) in that specific version of the bridge; if a version has been decided upon; if stage 1 work will begin in Summer 2020; and the expected duration of the project (from construction start to completion).	Response sent via email on October 21, 2019 indicating that the purpose of the third lane is to provide accommodation for extending turning lanes at either end of the bridge and that a decision on the final lane configuration has not been reached yet. The response also indicates that comments are accepted during the 30-day public review period after the Community Information Session and the 30-day public review period after the Design and Construction report is filed. Additionally, the response notes that the ministry anticipates beginning construction as early as June 2020 and the project is anticipated to take four years to complete.
The Caledonia Business Improvement Area	Comment received October 24, 2019 noting an interest in organizing a “Bridge Closing” and “Bridge Opening” Parties and suggesting some ideas regarding parking accommodation in the area of construction. Additionally, the response suggests adding a river walk path on the North side of the bridge (similar to that on the South side) in order to provide pedestrians with a safer alternative. The response also inquires about the possibility of the River walk path being extended under the bridge to connect with an existing path that leads to the Fairgrounds and the Exhibition Centre.	Response sent via email on January 21, 2020 noting that the Ministry is willing to consider “Bridge Closing/Retirement” and/or “Bridge Opening/Commissioning” parties, however, the hosting organization/committee would need to coordinate timing and logistics with Haldimand County and MTO so as to not adversely affect construction. The response also indicated that widening of the municipal parking lot was completed in order to mitigate the portion of the parking lot to be utilized for the construction and that any modification to the parking lot is under the jurisdiction of Haldimand County. Additionally, the response notes that the pedestrian trail on the south end of the bridge and the River Walk gateway at the northwest approach will be

Agency	Input Received	Action Taken
		reinstated, however, the suggested pedestrian trail on the north side will not be constructed due in part to the storm sewer outlet at that location.
	Comment received January 22, 2020 noting that they will consult with Haldimand County on how to proceed and thanking the Ministry for sharing the logic behind not installing a north end pedestrian trail.	No further action required.
Haldimand House Market and the Oasis	Comment received October 30, 2020 noting concerns regarding: penalties for delays in construction, compensation for economic impacts to business due to the construction, and signage for the public regarding construction as well as signage for consumers indicating shops are open for business.	Response was sent via email on January 21, 2020 outlining that any penalties for delays in construction by MTO from the contractor are used towards the cost of administering the project and no additional funds are retained from the contractor and the process that is in place for claims from businesses that are impacted by the construction and who to forward claims to. Additionally, the responses noted that signage will be installed to notify the public of detour routes, “Businesses are Open” signage will be installed, and that the MTO is open to working with the county on enhanced signage to promote business/tourism during construction.
Calvin Christian School	Comment received November 8, 2019 noting interest in timeframes when traffic will be compromised due to the potential impact to the organization of transportation for Calvin Christian School as they are dependent on the bridge for transportation services.	Response sent via email on January 21, 2020 noting that information regarding the construction start date and final construction staging plan will be sent to them prior to the start of construction, and that traffic will generally be maintained on the existing bridge except for the third year of construction where passenger car traffic will be

Agency	Input Received	Action Taken
		detoured to a new temporary detour bridge and trucks will be detoured to the Highway 6 by-pass. The response also indicates full bridge closure is unavoidable and that full closure of the bridge is scheduled for 2 weeks in spring and 3 weeks in late fall of year 3 of construction.

Ministry of Natural Resources and Forestry, Ministry of Environment, Conservation and Parks, and the Department of Fisheries and Oceans

The Project Team consulted with the Ministry of Natural Resources and Forestry (MNRF), the Ministry of Environment, Conservation and Parks (MECP) and the Department of Fisheries and Oceans (DFO) throughout the project to discuss the Species-at-Risk (SAR) fish and mussels present in the Grand River within the vicinity of the project (i.e. Eastern Sand Darter, Black Redhorse, River Redhorse, Greenside Darter, and Silver Shiner), permitting, and mitigation strategies and overall-benefit required.

Grand River Conservation Authority

The Project Team consulted with the Grand River Conservation Authority (GRCA) on April 30, 2014 to introduce the project, including in-water staging being proposed as part of the bridge replacement, and to obtain comments and feedback from the GRCA. A second meeting with the GRCA was held on March 11, 2015 to provide GRCA with an update on the project, including construction sequencing, construction schedule, the results of river flow modelling completing using flow data from GRCA, and ice jamming analysis. A third meeting with GRCA was held on February 10, 2019 to provide a project update including staging, schedule and results of ice jamming analysis, and discussed the potential coordination of GRCA with MTO and the contractor during construction.

River Heights Public School

River Heights Public School is located approximately 150 m from the south end of the Argyle Street Bridge. The Ministry met with the principal of River Heights Public School on June 25, 2014 to discuss the project and anticipated impacts to the school as a result of construction for the replacement of the Argyle Street Bridge. Based on discussions, the Ministry understands the school is concerned with the loss of parking spots/student drop-off area, and students crossing Argyle Street. During construction, the Contractor will be required to provide access to the school parking off Forfar Street to the extent possible. The school crossing at the intersection of Renfrew Street and Argyle Street will also be upgraded to a pedestrian crossover with flashing beacon, requiring traffic to yield to pedestrians.

Haldimand County Chamber of Commerce and Caledonia Business Improvement Area

The Project Team consulted with the Haldimand County Chamber of Commerce and Caledonia Business Improvement Area on June 9, 2014 to discuss the bridge replacement strategy, particularly the heritage enhancements and proposed mitigation to preserve the Argyle Street Bridge's heritage significance, traffic management during construction, and construction schedule.

2.2 BRIDGE DESIGN FEATURES AND HERITAGE SETTING ENHANCEMENT WORKSHOP

Consistent with the commitments made during the Preliminary Design stage, a Bridge Design Features and Heritage Setting Enhancement Workshop was held during the Detail Design study to consider and select potential bridge design details and enhancements for the selected design (5-span steel arch structure) that reflect, respect and respond to the heritage setting.

The workshop took place in Caledonia, at the Haldimand County Caledonia Centre at 100 Haddington Street. The workshop included:

- An evening session (6:30 p.m. to 8:30 p.m.) held on Tuesday, February 11, 2014; and
- A full day workshop session (9:30 a.m. to 4:00 p.m.) held on Wednesday, February 12, 2014.

Participants reflecting a range of interests were invited to attend the two workshop sessions. The 22 participants represented some of the external agencies, Indigenous Communities and interest groups listed in **Section 2.1**.

Using a collaborative, interdisciplinary process, workshop participants shared perspectives and offered value-adding ideas on potential bridge enhancements. The meaningful and substantive exploration of the issues, coupled with the suggestions put forward, provided MTO with a solid foundation to assist wise and informed decision-making as the project moved through the Detail Design phase.

Key topic areas that were discussed included:

- Heritage commemoration and interpretation opportunities;
- Viewing opportunities;
- Traffic barriers / railing design opportunities;

- Lighting opportunities; and
- Other design opportunities.

A summary report of the Bridge Design Features and Heritage Setting Enhancement Workshop proceedings was prepared and distributed to participants following the workshop. For an overview of the Detail Design bridge design features and heritage setting enhancements, refer to **Section 4.2.2**.

2.3 PUBLIC CONSULTATION

In order to encourage public awareness, introduce the project and promote public engagement throughout the Detail Design study, a notice of study commencement was published in the *Turtle Island News* and *Two Row Times* on January 29, 2014 and *The Sachem* on January 30, 2014. Copies of the newspaper publication is provided in **Appendix A**.

2.3.1 *PROJECT WEBSITE*

A project website (https://argylebridge.ca) was launched to coincide with the notification of Study Commencement in January 2014 and has remained active with regular updates occurring throughout the course of the Detail Design study. The website provides an opportunity for the public and stakeholders to review up-to-date study information, download study materials and reports, and contact the Project Team through the project email address (project-team@argylebridge.ca) which is provided on the "Contact Us" page. The "Contact Us" page also includes a webform feature, where comments can be entered and sent directly to the Project Team from the website to facilitate feedback from interested parties at any time during the study. As of February 20, 2020, the website had 21,346 page-views, and 12,499 sessions by 10,634 users.

2.3.2 *COMMUNITY INFORMATION SESSION*

Community Information Sessions (CISs) were held for the study in two locations. The first CIS was held on October 10, 2019 at the Haldimand County Caledonia Centre Remax Room in Caledonia from 4:00 p.m. to 8:00 p.m. The CIS was preceded by sessions for local business owners from 2:00 p.m. to 3:00 p.m., and agency representatives and municipalities from 3:00 p.m. to 4:00 p.m. A second CIS was held on November 12, 2019 at the Six Nations Community Hall for the Six Nations of the Grand River community from 6:00 p.m. to 8:00 p.m. A third CIS is planned to occur prior to construction at the Mississaugas of the Credit First Nation.

The Ontario Government Notice was advertised in the *Turtle Island News* and *Two Row Times* on October 2, 2019 and November 6, 2019, and in *The Sachem* on October 3, 2019 and November 7, 2019. Notification letters were also distributed by direct mail or email on September 23, 2019 and November 4, 2019 to the project mailing list. Letters were also sent to advise property owners within proximity of the proposed replacement of the Argyle Street Bridge.

In addition, the CISs were advertised via Canada Post unaddressed bulk mailing to approximately 5,300 households in the N3W postal code area in Caledonia. The CISs were also advertised on local radio stations *New Country 92.9 FM* and *CKRZ Radio 100.3 FM*, and on a mobile sign placed adjacent to Argyle Street, south of the bridge.

The CISs were informal drop-in sessions where representatives of MTO and the consultant team were available to answer questions and receive comments. The main purpose of the CISs was to provide agencies, members of the public, local business owners, Indigenous Communities, and other stakeholders an opportunity to review the study process and background, the recommended bridge design, including heritage enhancement features, traffic management and construction staging plans, as well as discuss the project with members of the Project Team. A copy of the display panels presented at the CISs are available in **Appendix C**.

A three-dimensional video rendering of the replacement bridge was available for viewing at the CISs and is available on the project website.

The CIS held on October 10, 2019 was attended by approximately 190 people and the CIS held on November 12, 2019 was attended by six people.

Input was received from external agencies and members of the public. In total, 38 comments were received prior to, during or following the CISs. **Exhibit 2-2** contains a summary of the common comments and concerns that were received and the responses that were provided.

Exhibit 2-2: Summary of Community Information Session Comments

Comments Expressed	How the Comment was Addressed
Concerns about impacts to businesses during construction, and question if there is compensation for these businesses.	MTO will consider claims provided that losses are documented and demonstrated to the satisfaction of MTO after completion of the construction work. In the case of alleged business loss, MTO would typically want to see financial statements covering the two to three years prior to construction, the time during construction, and one to two years after construction to see trends in the business.
Question about the construction staging plan.	Traffic will be generally maintained on the existing bridge during construction except for the third year of construction where passenger cars will be detoured to the new bridge on a temporary alignment while trucks will continue to be detoured to the Highway 6 by-pass. In year 3, a full closure of the bridge is required, and is currently expected to be 2 weeks in the spring and 3 weeks in late fall where all traffic will be detoured to the Highway 6 by-pass. For further details on the proposed construction staging plan, please see the display panels presented at the Community Information Session available on the project website.
Request for a ceremonial 'bridge closing' and 'bridge opening' parties.	The Ministry is willing to consider "Bridge Closing / Retirement" and / or "Bridge opening / Commissioning" parties. The hosting organization/committee would need to coordinate timing and logistics with Haldimand County and MTO so as to not adversely affect construction.
Request for enhanced signage to encourage tourism during construction	Signage indicating "Businesses are Open" will also be installed by the contractor, however, the Ministry is open to working with the County for enhanced signage to promote business / tourism during construction.
Concerns about closing pedestrian access to the bridge during construction, particularly to students.	Signage will be provided to direct pedestrians to detour to safe pedestrian crossings. The school crossing at the intersection of Renfrew Street and Argyle Street will be upgraded during construction to a pedestrian crossover with flashing beacon, requiring traffic to yield to pedestrians.

Comments Expressed	How the Comment was Addressed
Concerns about loss of parking space during construction.	The widening of the municipal parking lot was completed to mitigate the portion of the parking lot to be utilized for the bridge construction. As a requirement of the Argyle Street Bridge contract, the parking lot beyond the fenced staging area will not be utilized for construction crew parking. During construction the contractor will work to minimize the disruptions and impacts in the municipal parking.

2.4 INDIGENOUS COMMUNITY ENGAGEMENT

Six Nations of the Grand River, Mississaugas of the Credit First Nation and the Haudenosaunee Development Institute received notification at key milestones during the Detail Design study, including the Notice of Study Commencement, the Notice of Community Information Sessions, and the Notice of Submission for the Design and Construction Report. As noted in **Section 2.3**, project notifications were also published in the *Turtle Island News* and the *Two Row Times* newspapers, and the Community Information Sessions were advertised on CKRZ Radio 100.3 FM, 'The Voice of the Grand', a local Six Nations radio station.

Six Nations of the Grand River, Mississaugas of the Credit First Nation, and the Haudenosaunee Development Institute representatives have been engaged throughout the study, receiving project status updates at regularly scheduled meetings with the Ministry. The Ministry presented the project to the Six Nations Elected Council on October 8, 2019. In addition, representatives participated in the Bridge Design Features and Heritage Setting Enhancement Workshop and discussion on the design of heritage enhancement features and invited to attend the CISs. A CIS was held on November 12, 2019 at the Six Nations Community Hall for the Six Nations of the Grand River community from 6:00 p.m. to 8:00 p.m. A CIS is planned to occur prior to construction at the Mississaugas of the Credit First Nation.

The Ministry also contacted the Mississaugas of the Credit First Nation, Six Nations of the Grand River, and the Haudenosaunee Development Institute to identify whether the communities had an interest in being involved with the Stage 2 archaeological assessment for the project. All communities expressed an interest and indigenous monitors from the three communities were present at the archaeological field investigations.

3 DESCRIPTION OF THE DETAIL DESIGN PLAN

This section of the report provides a detailed description of the major features of the proposed work.

The existing Argyle Street crossing of the Grand River in Caledonia must be replaced due to the deteriorated condition of the bridge. During Preliminary Design, replacement was chosen as the preferred planning alternative as it fully addresses the key study challenges and structural and operational deficiencies of the existing structure, and addresses construction staging and traffic management needs. The approved long-term strategy identified the replacement of the existing bridge with a three-lane, five span, steel arch, bridge. A conceptual illustration of the new Argyle Street Bridge is provided in **Exhibit 3-1**.

Exhibit 3-1: Conceptual Illustration of the Replacement Argyle Street Bridge

3.1 MAJOR FEATURES OF THE WORK

The existing Argyle Street Bridge was constructed in 1927 and is a 200 m long, nine span, concrete, bowstring arch bridge. This bridge has reached the end of its service life and will be replaced with a wider five span steel arch bridge. The new bridge will accommodate two through lanes, one auxiliary lane, sidewalks. Three scenic lookouts will be provided on each side of the bridge. The existing and proposed typical cross-sections for the Argyle Street Bridge are presented in **Exhibit 3-2** while the General Arrangement for the new bridge is provided in **Appendix D**.

To minimize the impacts to fish and fish habitat, the replacement bridge piers will be composed of two column shafts instead of a single continuous pier shaft. Additionally, the reduction in spans from nine to five eliminates four pier locations.

Temporary access and a temporary work platform are required within the river to remove the old bridge and build the replacement bridge. Rock platforms known as causeway pods will be constructed in the river to allow the contractor to access the bridge piers and foundation during construction.

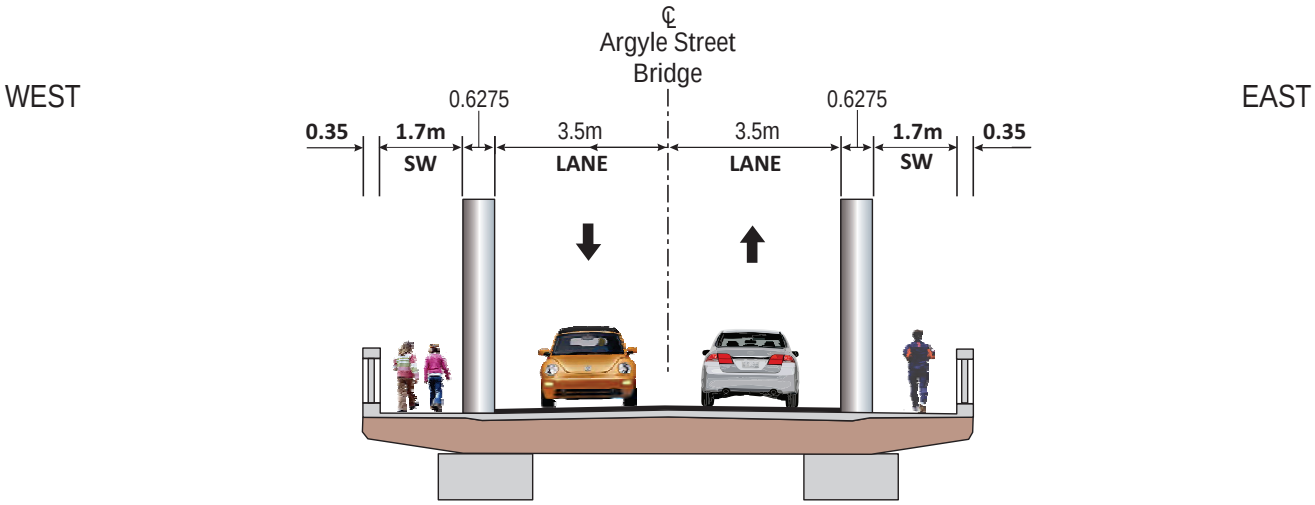
3.2 ACTIVE TRANSPORTATION

Pedestrian sidewalk crossings will be compliant with the requirements outlined in the *Accessibility for Ontarians with Disabilities Act* at all legs of the intersection of Argyle Street and Wigton Street, and Argyle Street and Forfar Street. Pedestrian sidewalks on Argyle Street and the multi-use trail along the Grand River will be reconstructed where impacted by construction. The retaining wall along the south side of the river requires replacement and extension to accommodate the realigned walkway.

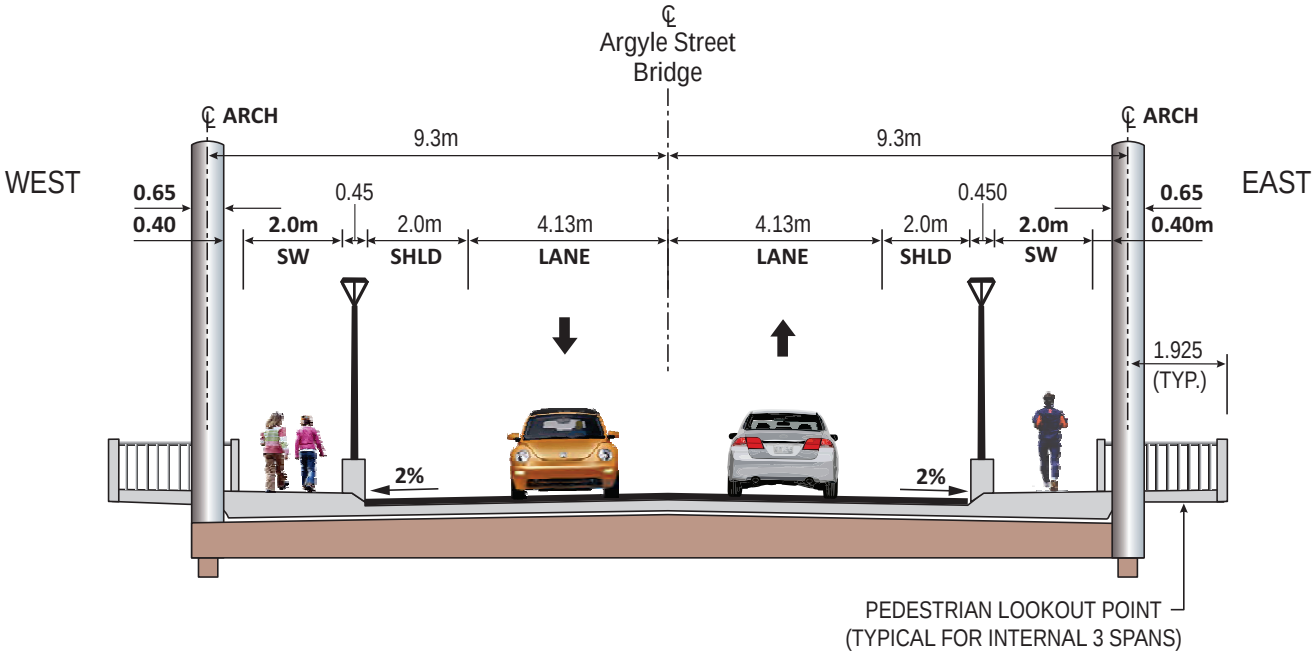
Upon completion, the sidewalks and the multi-use trail will be incorporated into the approach work for the bridges.

During construction, the multi-use trail will be closed and detoured to the sidewalks. A minimum of one sidewalk will be kept open during construction, to permit pedestrian traffic to cross the river with the exception of a short period, when a shuttling service will be provided for pedestrians.

There are no current or future cycling facilities planned for the project location.



EXISTING ARGYLE STREET BRIDGE



PROPOSED ARGYLE STREET BRIDGE

3.3 DRAINAGE IMPROVEMENTS

The existing urban drainage features within the vicinity of the Argyle Street Bridge will be replaced and adjusted to accommodate the new bridge design. The south sewer outlet pipe will be adjusted with the outfall location remaining in the existing location. The north storm sewer will be realigned to the centre of the new bridge and the existing storm sewer outlet will be removed along with the headwall and concrete blocks.

3.4 SIGNAGE AND TRAFFIC SIGNALS

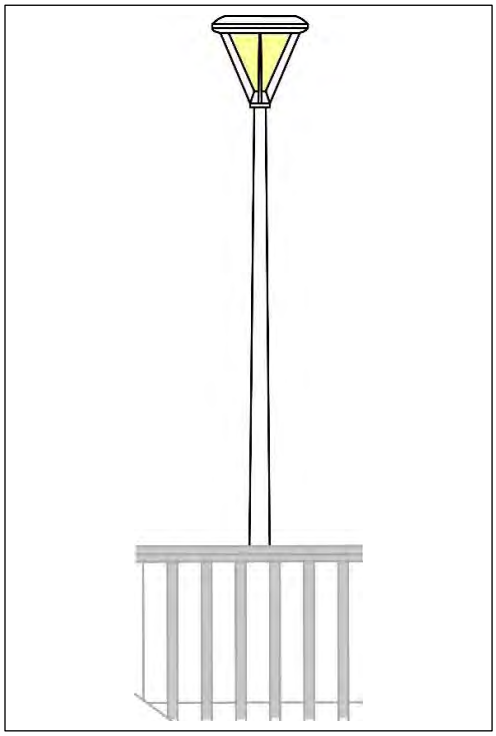
Existing traffic signals will not be modified. Existing signs will be replaced after construction is completed.

Signage indicating “Businesses are Open” will also be installed by the contractor during construction. In addition, the Ministry is open to working with the County for enhanced signage to promote business and tourism during construction.

3.5 ILLUMINATION

The existing illumination on the bridge will be replaced using lighting that is sensitive to the heritage character of the setting. Discussions at the Bridge Design Features and Heritage Setting Enhancement Workshop recommended the light post locations and style be designed to be sympathetic with the other new bridge components. A simple fixture inspired by tradition to achieve a “timeless” effect was also recommended. Based on these recommendations, 4.5 m white poles with center tendon spider mount luminaires were incorporated into the Detail Design. An example of the light poles that will be installed on the new bridge is provided in **Exhibit 3-3**.

Exhibit 3-3: Light Post



Considering the significance of the new bridge, white accent lighting will be incorporated into the approaches and the new bridge structure to enhance the significance of the structure.

3.6 CONSTRUCTION STAGING

There will be seven major stages for the construction. Each stage is described in **Exhibit 3-4** and illustrated in **Exhibit 3-5a-g**.

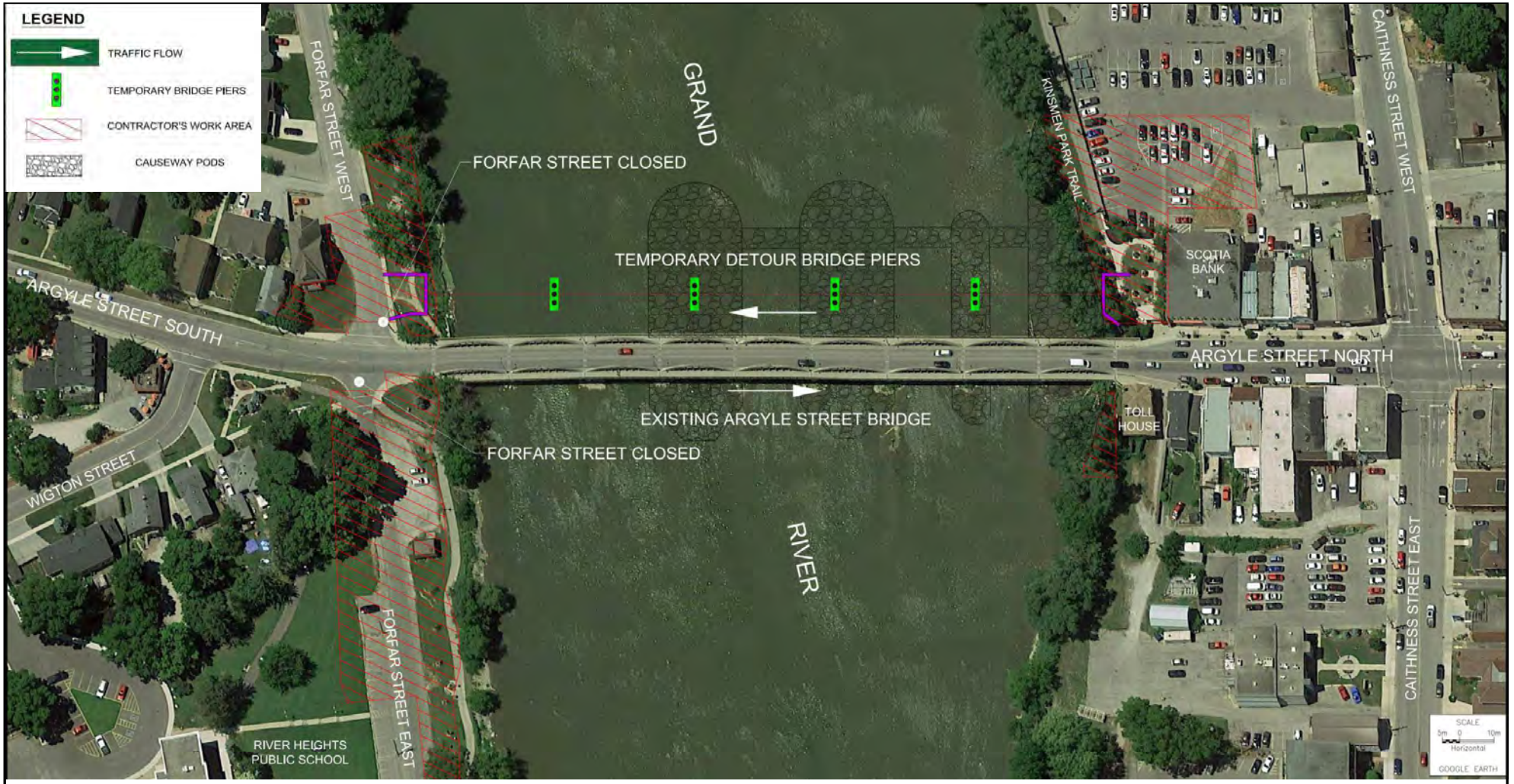
During construction, impacts to traffic will be minimized to the extent possible. Generally, existing traffic lanes will be maintained during construction, however, temporary closure of the bridge will be required, as described in **Exhibit 3-4**. Signage will be installed and maintained during construction to notify pedestrians and motorists of construction and the detour route.

Pedestrian access to cross the Argyle Street Bridge will be maintained throughout construction except for approximately one week during Stage 5 when the new bridge is slid into place. A shuttle service will be provided when pedestrian access across the bridge is closed.

Exhibit 3-4: Summary of Construction Stages and Associated Traffic Management Plan

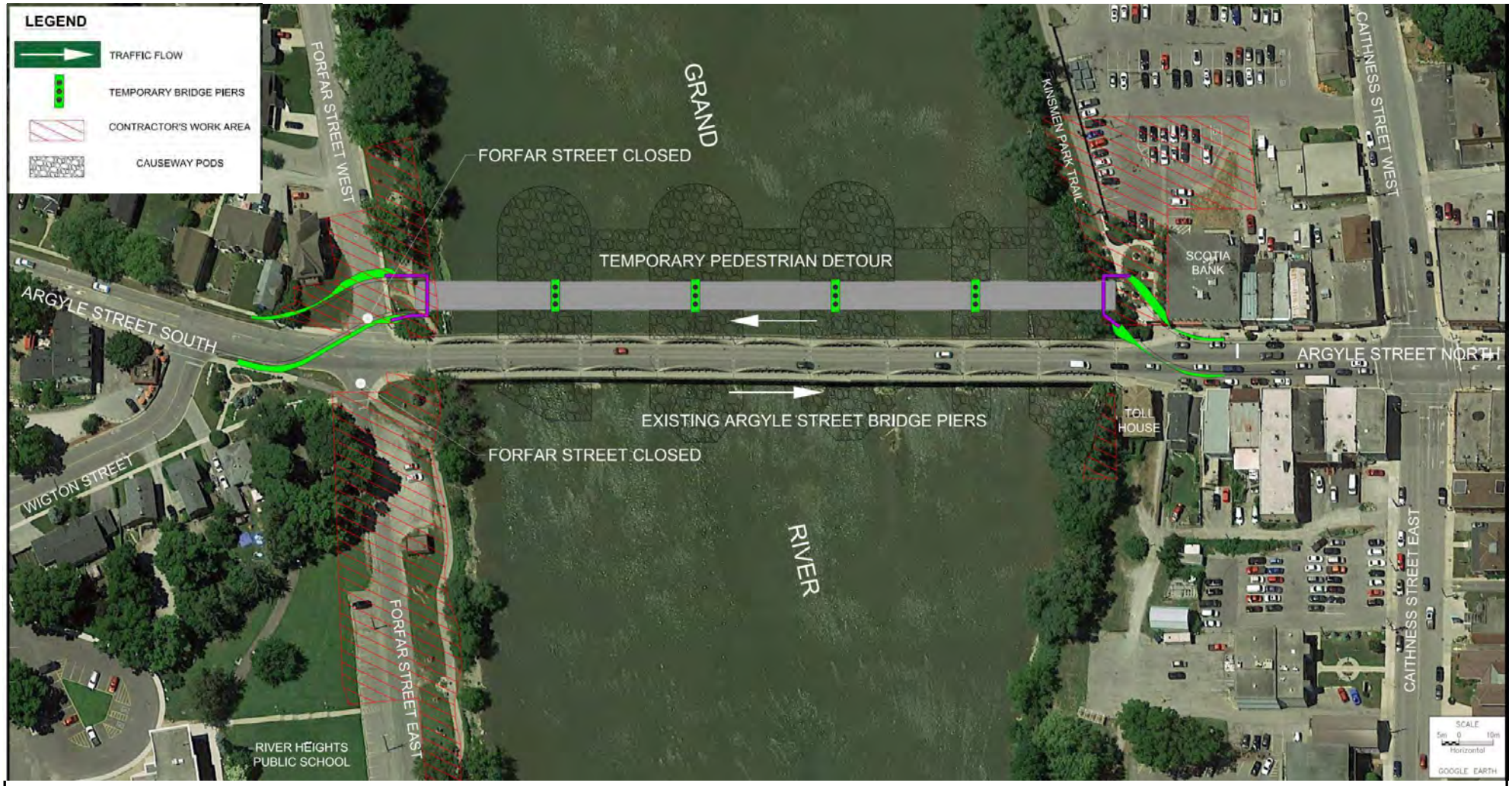
Stage	Construction Work	Traffic Management Plan
1 and 2	► Grand River in-water construction of temporary causeway pods and temporary construction bridges that will be accessed from the northwest quadrant of Argyle Bridge site. ► Construction of new/temporary piers and temporary abutments.	► Truck traffic will be detoured to Highway 6 By-pass. ► Forfar Street closed to traffic. ► Motorists will use existing bridge. ► Pedestrian access across the Argyle Bridge will be maintained on the east-side of the bridge.
3	► Tie-in construction of temporary alignment into Argyle Street; ► Illumination will be provided on the temporary bridge alignment.	► Full vehicle closure for 14 calendar days, vehicles detoured to Highway 6 By-pass. ► Forfar Street closed to traffic. ► Pedestrian access across the Argyle Bridge will be maintained on the east-side of the bridge.

Stage	Construction Work	Traffic Management Plan
4	► Removal of the Argyle Bridge. ► Construction of the new abutments.	► Traffic on the temporary alignment with truck traffic continue detoured to Highway 6 By-pass. ► Forfar Street closed to traffic. ► Pedestrian access across the Argyle Bridge will be maintained.
5	► Slide new bridge into the permanent alignment. ► Complete tie-in of new bridge.	► Full vehicle closure for 21 calendar days, vehicles detoured to Highway 6 By-pass. ► Forfar Street closed to traffic. ► Pedestrian access across the bridge will be closed for approximately one week. A shuttle service will be provided during this time.
6	► Removal of temporary piers and abutments. ► Removal of the causeway pods.	► New bridge will be opened for motorists and pedestrians. ► Forfar Street closed to traffic.
7	► Complete bridge lighting. ► Complete streetscaping and landscaping.	► Forfar Street open to traffic.



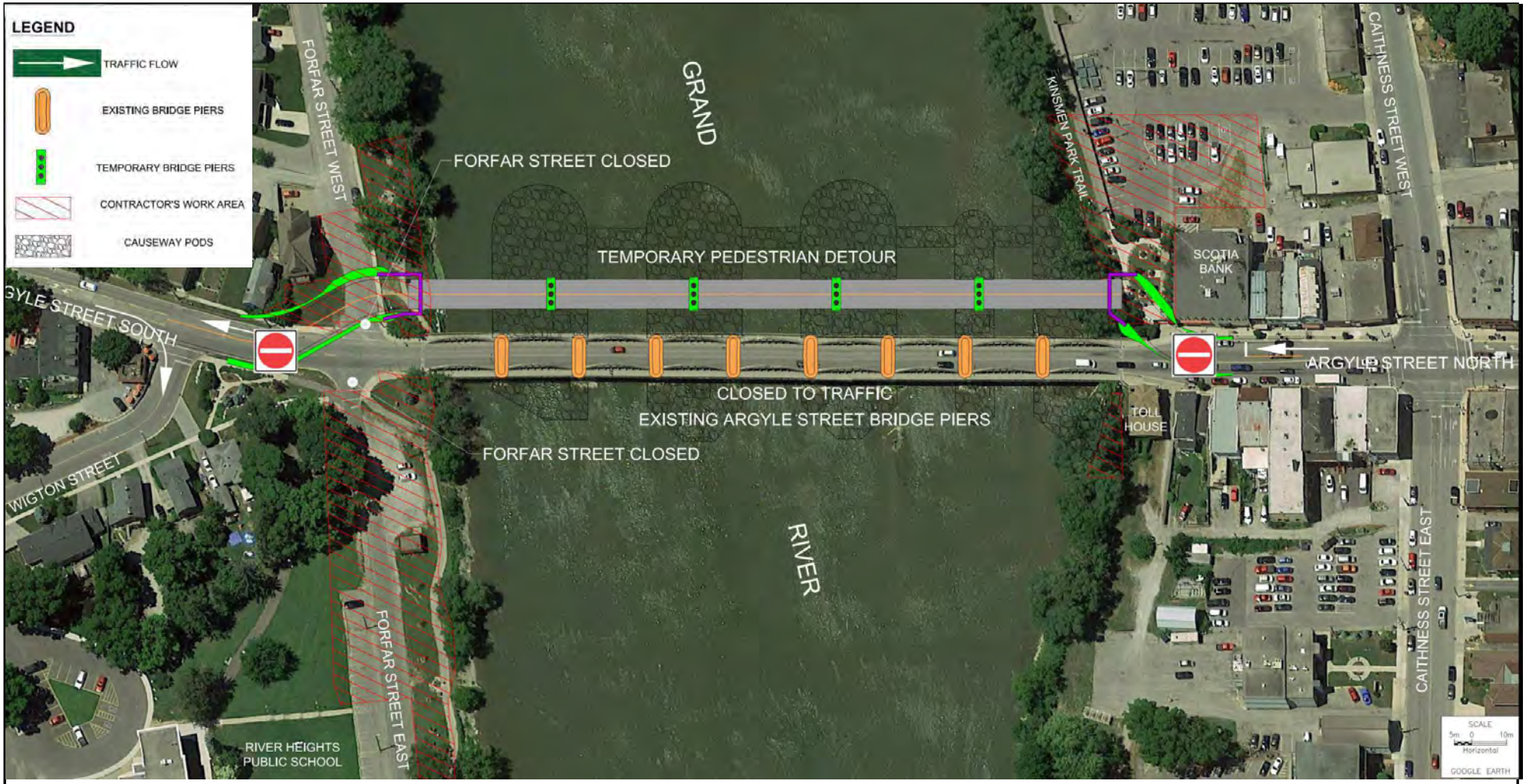
CONSTRUCTION STAGING AND TRAFFIC MANAGEMENT - STAGE 1

Construction Stage	Construction Access	Traffic Management
• Relocate Mussels • Build river access and causeway pods to build piers • Construct new and temporary bridge pier footings • Bridge girder erection and span construction on detour alignment	• NW shore - From municipal parking lot behind Scotia bank • SW shore (Forfar Street)	• Non-truck traffic will continue to use the existing bridge in both directions. • Pedestrian access will be open on the east side of the existing bridge but closed on the west side • Traffic signals for passage of emergency vehicles



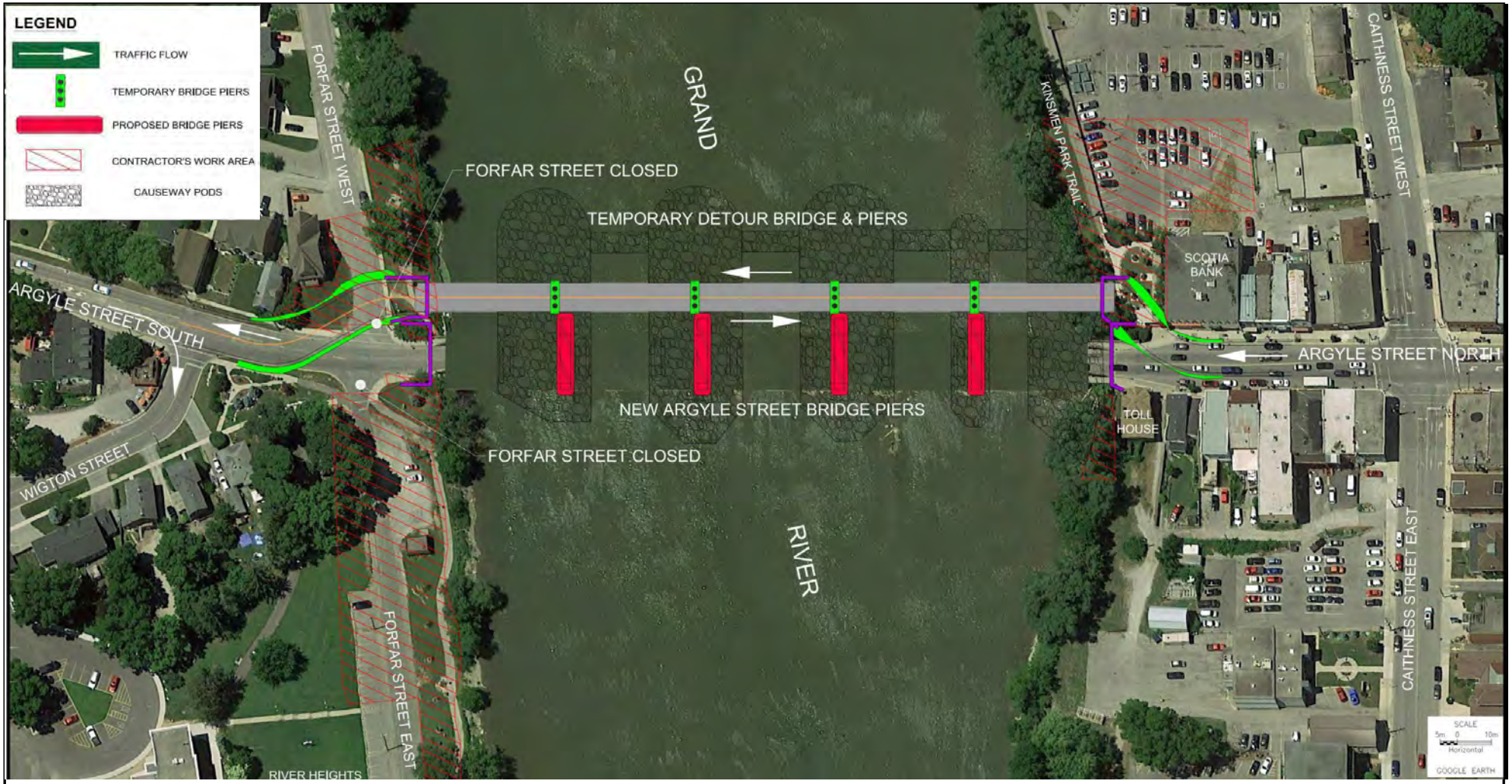
CONSTRUCTION STAGING AND TRAFFIC MANAGEMENT - STAGE 2

Construction Stage	Construction Access	Traffic Management
• Continue construction of new bridge on detour alignment	• NW shore - From municipal parking lot behind Scotia bank • SW shore (Forfar Street)	• Non-truck traffic will continue to use the existing bridge in both directions. • Pedestrian access will be open on the east side of the existing bridge but closed on the west side • Traffic signals for passage of emergency vehicles



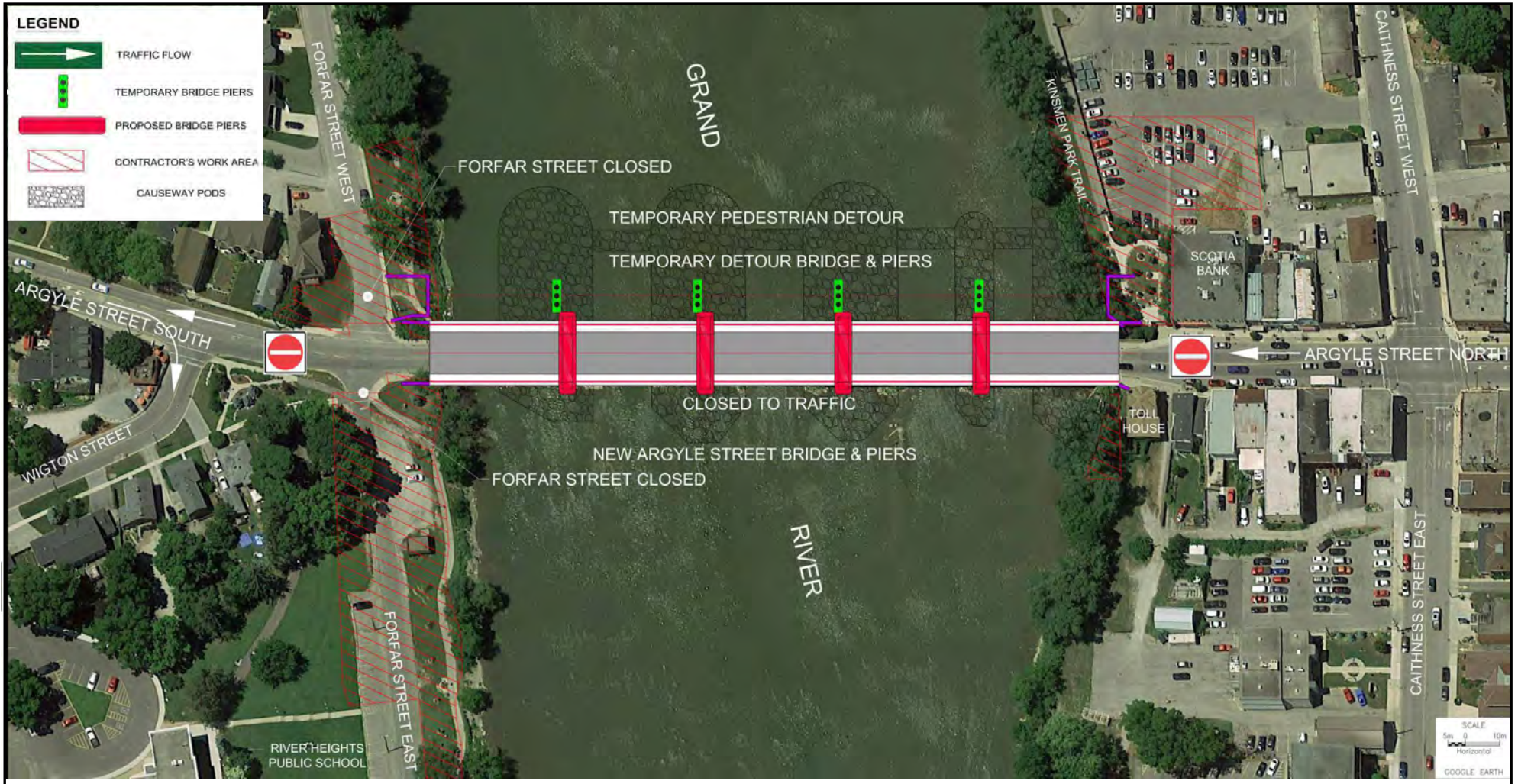
CONSTRUCTION STAGING AND TRAFFIC MANAGEMENT - STAGE 3

Construction Stage	Construction Access	Traffic Management
• Complete storm sewer and sanitary sewer work on Argyle Street • Complete on-site detour tie-ins to Argyle Street	• Access from Argyle Street	• Argyle Street Bridge closed for approximately 2 weeks. All traffic detoured to Highway 6 By-pass • Pedestrian traffic provided on either the east side of the existing bridge or the west side of the new bridge on the temporary detour alignment • Emergency vehicles will be placed temporarily on both side of the river to maintain response times



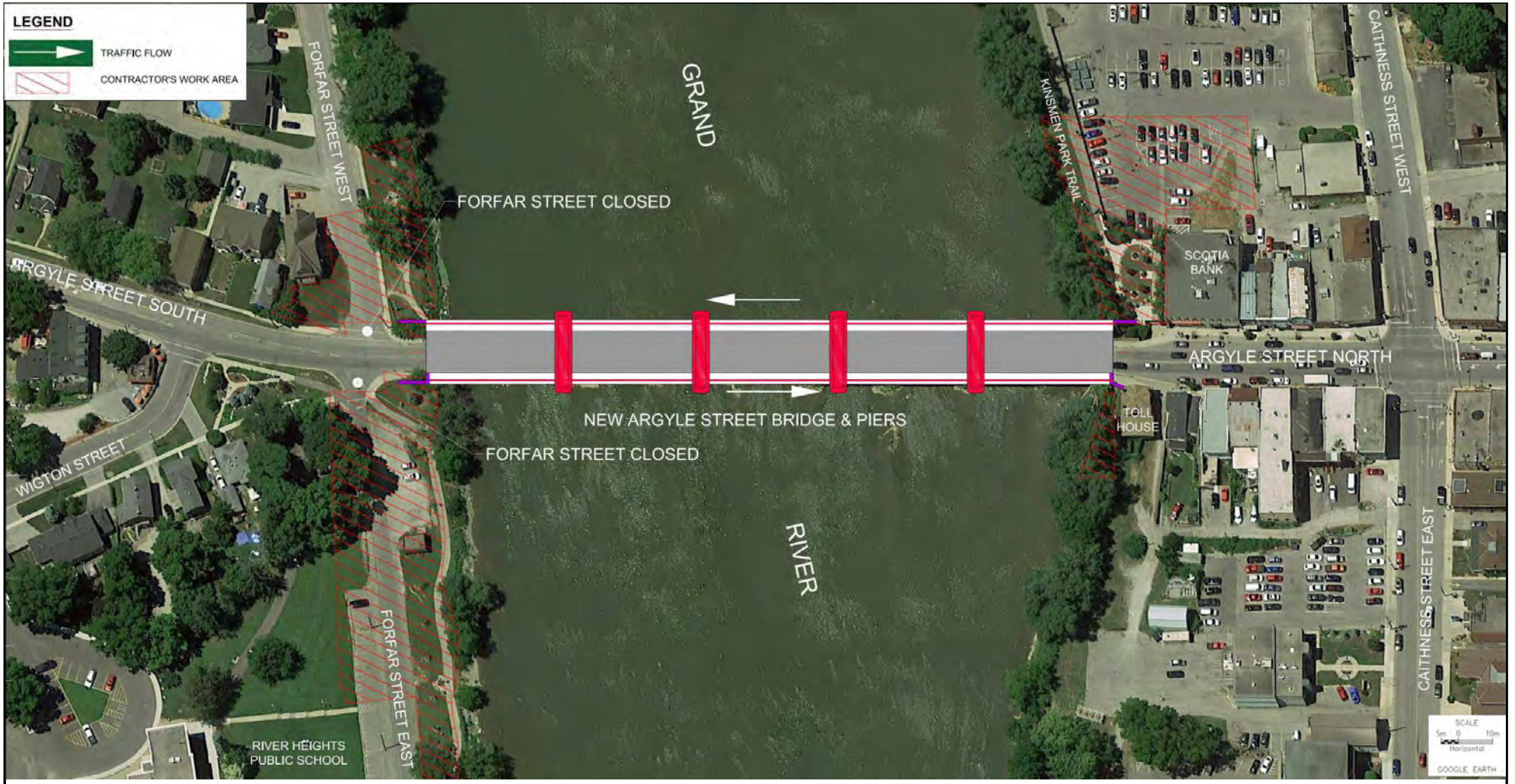
CONSTRUCTION STAGING AND TRAFFIC MANAGEMENT - STAGE 4

Construction Stage	Construction Access	Traffic Management
• Remove existing bridge • Complete north and south abutments • Install systems to jack and slide new bridge onto permanent	• From the closed portion of Argyle Street to the north and south shores	• Non-truck traffic will use Argyle Street and cross the new bridge on the detour alignment • Traffic will use new bridge in both directions • Pedestrian traffic maintained on the west side of the new bridge on the detour alignment



CONSTRUCTION STAGING AND TRAFFIC MANAGEMENT - STAGE 5

Construction Stage	Construction Access	Traffic Management
• Complete jacking of new bridge from temporary detour alignment to permanent alignment • Complete link slabs construction at piers	• Access from Argyle Street	• Argyle Street Bridge closed for approximately 3 weeks. All traffic detoured to Highway 6 By-Pass • Pedestrian traffic closed for the jacking and the link slab construction (5 days) • Emergency vehicles will be placed temporarily on both sides of the river to maintain response times



CONSTRUCTION STAGING AND TRAFFIC MANAGEMENT - STAGE 6

Construction Stage	Construction Access	Traffic Management
• Open new bridge • Remove temporary abutments and piers • Remove causeway pods	• NW shore from municipal parking lot behind Scotiabank • SW shore (Forfar Street)	• All traffic (emergency vehicles, cars and trucks) will use the new bridge, both directions • On the north side of the bridge, the River Walk gateway will be reinstated and reopened. Stairs and access to the river will be removed • On the south side, the regraded trail system will be re-opened • Pedestrian access will be provided on both sides of the new bridge

CONSTRUCTION STAGING AND TRAFFIC MANAGEMENT - STAGE 7

Construction Stage	Construction Access	Traffic Management
• Complete streetscaping / landscaping	• New bridge open to traffic.	• None required.

4 POTENTIAL ENVIRONMENTAL EFFECTS, MITIGATION MEASURES, AND COMMITMENTS

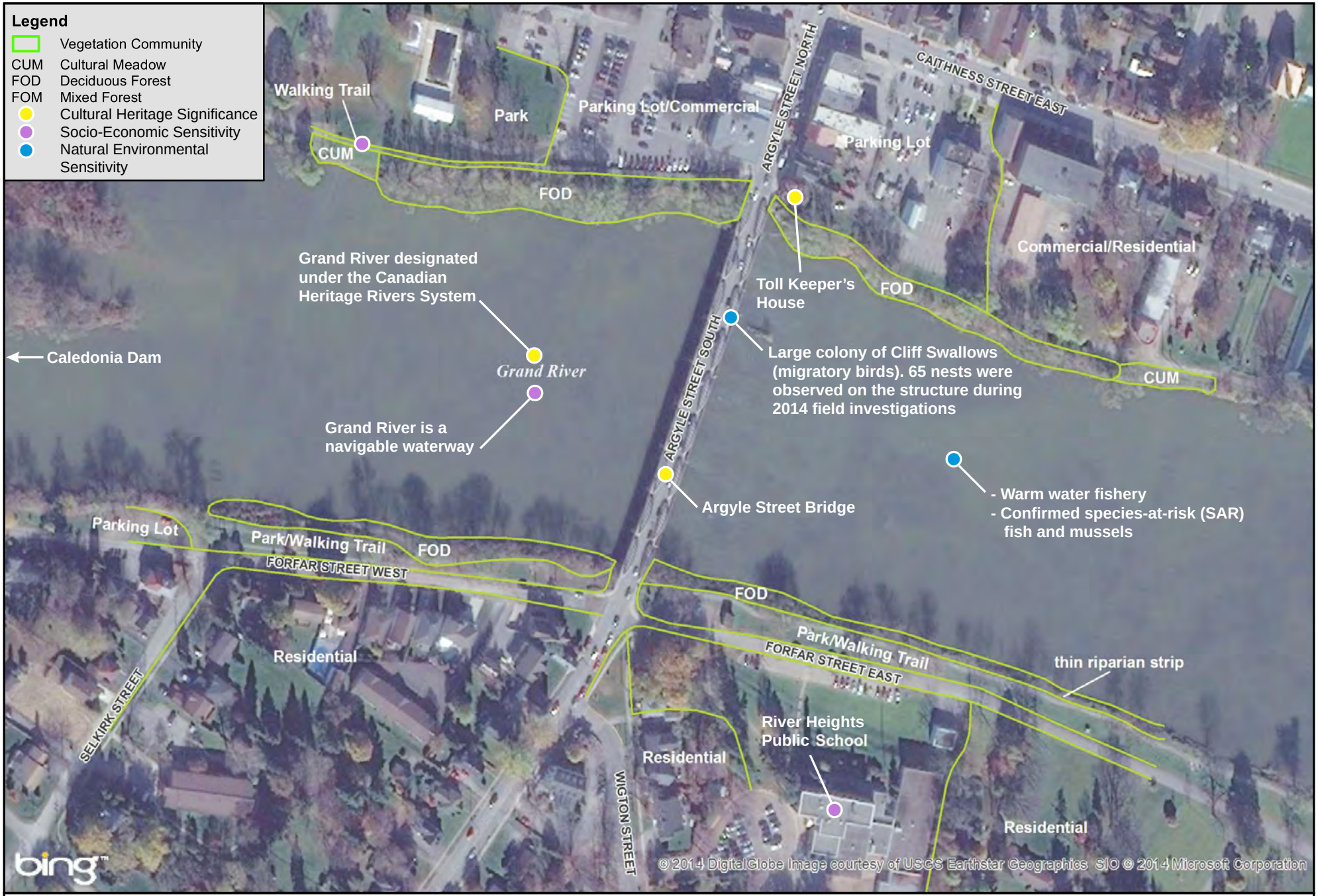
This section outlines the direct and indirect environmental effects associated with the project. It also describes the mitigation measures that will be implemented to minimize the effects and ensure compliance with legislated requirements. Mapping depicting the existing environmental conditions is presented in **Exhibit 4-1**.

Mitigation includes planning decisions, design features, construction requirements, and construction constraints. The mitigation measures documented in this report have been developed with due consideration for the potential adverse effects of the project. The identified mitigation measures have been carried forward into Detail Design and will be applied during the construction, operation, and maintenance phases of the project, as applicable. Refinements and enhancements to the mitigation measures will be made as warranted throughout all phases of the project to ensure that this project does not result in any significant adverse environmental effects.

The key to ensuring effective environmental quality control and risk management during the project is the development and proactive implementation of an approach that:

- Identifies the environmental sensitivities;
- Presents environmental protection measures in a way that can be translated into contractual requirements and for which compliance can be verified; and
- Includes a monitoring program that verifies that the environmental protection measures are being implemented and are effective.

It is important to ensure that the Contractor is made aware of, and is prepared to deal with, all environmental issues that may arise during construction. Environmental controls will be included in the construction specifications to address specific environmental and operational concerns.



Ontario

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Replacement of the Argyle Street Bridge
Detailed Design and Class Environmental Assessment Study
G.W.P. 3805-01-00

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Exhibit 4-1

Existing Environmental Constraints Mapping

4.1 NATURAL ENVIRONMENT

Background aquatic and terrestrial environmental existing conditions information was compiled for this study area during the Preliminary Design Study, and a summary of the findings are provided in the 2009 Transportation Environmental Study Report (TESR). As part of this Detail Design study, WSP updated and refined the natural features existing conditions information and completed an impact assessment for the Detail Design Plan and recommended mitigation measures.

WSP reviewed secondary background information and documents (e.g. Air photo mosaic, Natural Heritage Information Centre (NHIC) database, Land Information Ontario (LIO) data, Environmental Existing Conditions and Impact Assessment Report for the Argyle Street South Bridge (Draycott Environmental, 2007), 2009 TESR) and consulted with representatives from the Ministry of Natural Resources and Forestry (MNRF) (Guelph District) and the Department of Fisheries and Oceans (DFO) regarding potential Species at Risk (SAR) in the project area. To supplement the background information, a field survey was undertaken by WSP Ecologists in September 2014 to verify, update and refine existing aquatic, vegetation and wildlife resource conditions information identified in background reports.

4.1.1 *FISH AND FISH HABITAT*

Based on correspondence with the MNRF, the Grand River within these reaches supports a warmwater resident fish community with cold water migrants. However, given the dam immediately upstream of the project areas, MNRF agreed to the application of a warmwater timing window (permissible in-water work window between July 1 and March 15). The subject reaches of the Grand River flow through downtown Caledonia with walking trails along the banks. Riparian vegetation is patchy and influenced by anglers and other pedestrians accessing the river edges and informal boat launching activities. Many areas of the bank are eroding actively.

The Grand River within Caledonia is broad, relatively shallow, and low lying. The Caledonia Dam is located approximately 650 m upstream of the bridge. Flow over the dam is directed towards the south shoreline, however, a component of the flow is also directed over the dam adjacent to the north bank.

Morphology upstream of the bridge and downstream of each pier is comprised mostly of flats. A series of runs occur between the piers, becoming riffles downstream of the bridge that extend for approximately 50 m, beyond which morphology is also dominated by flats. Pool habitat is limited along the subject reach with the only deeper (i.e. >1 m) zone of pooling near the bridge located upstream along the main flow path near the south shoreline. Similar, deeper localized pool areas were found further upstream between the south shoreline and the island, and approximately 200 m downstream of the bridge near the north shoreline.

The substrates in the vicinity of the bridge are comprised of predominantly coarse materials with generally low proportions of fine material that would be susceptible to easy mobilization on disturbance. Patches of bare / exposed bedrock are fairly common, but more often bedrock is overlain by shallow accumulations of other substrates. Based on observations during WSP's field survey, substrates in the study reach consist of cobble (25%), gravel (30%), sand (20%), boulder (10%), exposed bedrock (10%), and silt (5%).

Aquatic Species at Risk

Background information on SAR fish was compiled from available sources, including status reports prepared by the Committee on the Status of Endangered Wildlife in Canada, Fisheries and Oceans Canada's (DFO's) 2014 distribution mapping of SAR fish in the Grand River and website information regarding habitat preferences of SAR, Ontario Freshwater Fishes Database, and information provided in consultation with DFO and MNRF staff at meetings on December 2, 2013 and January 9, 2015. Background existing conditions information compiled during the Planning and Preliminary Design phase of the project was also reviewed.

A habitat assessment was carried out by WSP on September 10, 2014, coordinated with Water Systems Analysts (WSA, a division of NRSI). A Species at Risk Coordinator from DFO (D. Balint) also joined the field crew at that time.

General habitat conditions extending further upstream to the vicinity of the island and downstream were also reviewed generally to provide context. Fish community sampling was not undertaken given the existing database and the known presence of SAR.

Five SAR fish were found in the vicinity of the Argyle Street Bridge, three of which are listed under both the provincial *Endangered Species Act* (ESA) and federal *Species at Risk Act* (SARA) based on recent species being up-listed under the *SARA*. SAR under the ESA and SARA, known to be in the Grand River, include:

- Eastern Sand Darter (*Ammocrypta pellucida*) (THR)
- Black Redhorse (*Moxostoma duquesnei*) (THR)
- Silver Shiner (*Notropis photogenis*) (THR)
- River Redhorse (*Moxostoma carinatum*) (SC)
- Greenside Darter (*Etheostoma blennioides*) (SC).

Mussel Species at Risk

Background information on SAR mussels was obtained from status reports prepared by the Committee on the Status of Endangered Wildlife in Canada for the relevant SAR mussels, Fisheries and Oceans Canada's (DFO's) 2014 distribution mapping of SAR mussels in the Grand River, and information provided by DFO during the meeting with DFO and MNRF.

The September 2014 habitat assessment focused on the width of the river from 30 m downstream to 50 m upstream of the existing bridge. Habitat in the vicinity of the upstream island was also assessed to determine potential relocation and control sites for the relocation and monitoring of SAR mussels. A report was completed to document the SAR mussel habitat assessment completed for the Grand River in Caledonia and is on file with the Ministry.

WSP reviewed updated SAR data during the Detail Design study and the 2014 DFO distribution mapping and in consultation with agency staff confirmed the presence of seven SAR mussels in the subject reaches of the Grand River. The five SAR mussels listed in **Exhibit 4-2** are protected under the *Endangered Species Act* and *Species at Risk Act* and have high potential to occur in the vicinity of the bridge.

Exhibit 4-2: SAR Mussels with High Potential to Occur in the Grand River at Caledonia

Common Name	Scientific Name	SARA	ESA
Mapleleaf	*Quadrula quadrula*	THR	THR
Rainbow	*Villosa iris*	END	THR
Round Pigtoe	*Pleurobema sintoxia*	END	END

Common Name	Scientific Name	SARA	ESA
Fawnsfoot	*Truncilla donaciformis*	END	END
Threehorn Wartyback	*Obliquaria reflexa*	THR	THR

The two SAR mussels listed in **Exhibit 4-3** are known to be present in the Grand River watershed but have a low potential of occurring within the study area.

Exhibit 4-3: SAR Mussels with Low Potential to Occur in the Grand River at Caledonia

Common Name	Scientific Name	SARA	ESA
Lilliput	*Toxolasma pavus*	END	THR
Wavy-rayed Lampmussel	*Lampsilis fasciola*	SC	THR

According to DFO during a December 2013 project meeting, Mapleleaf and Round Pigtoe are known to be present in the Grand River at Caledonia, and the reaches encompassing the project are delineated as Critical Habitat for these two species. Rainbow, Threehorn Wartyback and Wavy-rayed Lampmussel, which has the status of Special Concern (SC) may also be present, and the Critical Habitat would also apply to those species if present.

During field investigations on September 10, 2014, one weathered shell of Mapleleaf was found on the accumulated substrate material around pier 3. A large diversity of weathered shells of species not at risk were also collected; alphabetically they are: Black Sandshell (*Ligumia recta*); Elktoe (*Alasmidonta marginata*); Flutedshell (*Lasmigona costata*); Fragile Papershell (*Leptodea fragilis*); Giant Floater (*Pyganodon grandis*); Mucket (*Actinonaias ligamentina*); Pimpleback (*Quadrula pustulosa*); Spike (*Elliptio dilatata*); Threeridge (*Amblema plicata*); and Wabash Pigtoe (*Fusconaia flava*). Fawnsfoot was found subsequently by DFO just downstream of the bridge.

Impact Assessment

The pier footings for the existing bridge, which occupy approximately 230 m^2 of the riverbed, will be replaced with footings that are embedded below the invert of the river bed which will result in a smaller in-water footprint of approximately 62 m^2. The new bridge has also been designed such that rock protection is not needed.

The design for the replacement of the retaining wall along the south shoreline was designed such that the replacement retaining wall is located behind the existing wall to avoid an increase in the in-water footprint. However, localized encroachment into the edge of the river is required at the base of the bank upstream of the existing bridge encompassing an area of approximately 55 m^2.

The storm sewer connected to the north sewer outlet will be realigned to the centre of the new bridge and rock protection will be applied to the abutment slopes replacing the existing earth / rubble below the existing bridge. The eroded area around the existing outfall will be restored by filling it in with rock protection to re-create a shoreline profile that matches the shorelines upstream and downstream of the outfall. The infilled area to restore the bank configuration will result in impacts of approximately 100 m^2.

For the south sewer outlet, the outlet pipe will be adjusted, however, the outfall location will remain. The proposed design includes placement of rock protection at the outfall to halt further erosion of the banks in this area. The area of rock protection placement is approximately 10 m^2.

Localized removal of riparian vegetation, including several large willows within the vicinity of the bridge, is required for construction access. Riparian vegetation is very limited at the bridge presently and will be replaced and enhanced as part of the project.

Overall Benefit

As part of the permit obtained under the *Endangered Species Act* and *Species at Risk Act*, an overall-benefit plan was included in the design to provide a net benefit to SAR and offset impacts. The development of the offsetting and overall benefit measures to benefit the SAR affected by the project activities has been a comprehensive process involving extensive consultation with DFO and MNRF / MECP. Elements include:

- Habitat creation due to the decrease in the permanent footprint of the bridge
- Creation of favourable habitat conditions for mussel and fish using gravel and sand.
- Approximately 330 m of the river bank will be re-stabilized to stop or reduce erosion and the on-going sediment influx to the river.
- Educational and awareness signage will be developed and erected along the river.
- Research.

Temporary Impacts During Construction

A typical series of impacts associated with in-water construction (e.g., erosion and sediment generation) are also possible during construction but can be managed with mitigation measures.

The primary impact during construction results from the requirement for temporary access and work platforms across the river to enable construction of the new bridge and removal of the old bridge. This access has been designed as a series of five causeway pods, which are in-water work platforms composed of rock, connected by access bridges; the gaps between the pods are required to maintain flow and avoid the impediment of fish movement. Habitat for mussels and fish will be lost during the duration of the construction period (three years). Following the removal of the causeway pods, aquatic habitat will be re-instated and will be re-colonized over time such that permanent / long term effects on productivity of the local mussel and fish populations are not anticipated.

In general, fish will move away from the area of disturbance as the causeway pods are being constructed; death of fish is not anticipated but some localized stress during construction is possible. Mussels will be relocated from the work area to suitable habitat in the immediate vicinity of the project (Relocation Sites) prior to construction. All efforts to avoid mussel mortality during transport and relocation will be undertaken, however it is possible that some mortality will occur during or following mussel relocation.

Mitigation Measures

- All standard construction-related best management practices / mitigation measures will be implemented throughout the construction process to address the typical and generally predictable impacts of the in- and near-water work activities associated with this project that could potentially affect fish and fish habitat.
- A warmwater permissible in-water timing window will be implemented at the Grand River (i.e. in-water works permitted between July 1 and March 15). All in-water activities will be undertaken in isolation to avoid introducing deleterious substances into the watercourse.
- All appropriate temporary erosion and sediment control measures shall be installed prior to and maintained throughout construction.
- All temporary erosion and sediment control measures shall be maintained in an effective, functioning and stable condition. This will require routine inspections, including before and after storm events, and repairs as required.

- All exposed soil surfaces shall be re-stabilized and re-vegetated as soon as possible, using native seed mix appropriate to the area impacted.
- Regular and on-going monitoring will be undertaken throughout construction by Environmental Inspectors, who have specific experience working around water and in large river systems, supported by specialized biologists.
- The installation and removal of the causeway pods shall be completed such that the concrete blocks at the upstream ends of each pod will be in place to create still-water zones to minimize potential for mobilization of any substrates disturbed on the bed.
- A permit under the *Endangered Species Act* was obtained from MNRF / MECP and two *Species at Risk Act* compliant authorizations under the *Fisheries Act* will be obtained from DFO for the project. All mitigation and offsetting measures required under the permits will be implemented during construction, including the Overall Benefit Plan.
- Prior to start of construction, SAR mussels within the prescribed search area will be relocated up and down stream of the bridge. Oversight during the mussel relocation will be provided by experienced mussel biologists and completed in accordance with the *Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area* (Mussel Protocol, Mackie, Morris and Ming, 2008).
- In addition to the mussel relocation work (and fish rescues as required), the specialist biologists will complete regular site inspections. They will also be available for the Environmental Inspector throughout the duration of the in- and near-water construction activities, to provide input or direction in the event of any unforeseen or unusual events.
- In accordance with DFO's Mussel Protocol (Mackie et al 2008), monitoring of the relocated mussels will be undertaken one month, one year and two years following relocation. Findings will be documented in monitoring reports that will be submitted to DFO and MECP for their review and records.

4.1.2 *VEGETATION*

No flora species of conservation concern (SCC) were recorded by WSP, reported by Draycott (2007), or identified by MNRF as occurring in the immediate vicinity of the bridge project area. Habitat conditions are highly modified and impacted by infrastructure, pedestrian trails and access, and the surrounding urban land use, limiting their suitability generally for use by SCC or other sensitive flora.

Vegetation and vegetation communities within the study area are typical for the area. Along the Grand River shoreline, habitat is highly cultural and heavily influenced through years of clearing for sightlines and river access. Portions of the river's shoreline are still being used for garden and yard waste dumping. None of the vegetation communities in the vicinity of the bridge are considered provincially rare. The vegetation communities observed are considered common for the area and include Deciduous Forest (FOD) and Cultural Meadow (CUM) communities which are described in **Exhibit 4-4** and shown in **Exhibit 4-1**.

Exhibit 4-4: Vegetation Communities

Vegetation Community	Description
Deciduous Forest (FOD)	Vegetation species present in this community include: Norway Maple (*Acer platanoides*), Black Walnut (*Juglans nigra*), Manitoba Maple (*Acer negundo*), American Elm (*Ulmus Americana*), Trembling Aspen (*Populus tremuloides*), White Birch (*Betula papyrifera*), Buckthorn (*Rhamnus cathartica*), Tartarian Honeysickle (*Lonicera tatarica*), Wild Mock-cucumber (*Echinocystis lobata*), Great Ragweed (*Ambrosia trifida*), Annual Ragweed (*Ambrosia artemisifolia*), Spotted Jewelweed (*Impatiens capensis*), Riverbank Grape (*Vitis riparia*) and Climbing Nightshade (*Solanu dulcamara*).
Cultural Meadow (CUM)	There are two areas of cultural meadow located along the riparian zone within the project area. These areas were likely created while clearing for sightlines or during servicing projects, such as sewers. Species present are common throughout the project area and in some cases are present along the edges and within the deciduous communities as many vegetation species are shared between the two communities. Species include: Common tansy (*Tanacetum vulgare*), Chicory (*Cichorium intybus*), Canada Goldenrod (*Solidago canadensis*), Creeping Wild Rye (*Elymus repens*), Reed Canary Grass (Phalaris arundinacea), Orchard Grass (*Dactylis glomerata*), Poison Ivy (*Toxicodendron rydbergii*), Common Milkweed (*Asclepias syriaca*), Butter-and-eggs (*Linaria vulgaris*), Colt's Foot (*Tussilago farfara*), Riverbank Grape (*Vitis riparia*), Bird's-foot Trefoil (*Lotus corniculatis*), Purple Loosestrife (*Lythrum salicaria*) and New England Aster (*Symphyotrichum novae-angliae*).

Impact Assessment

The impacts related to the replacement of the existing Argyle Street Bridge are anticipated to be limited to removal and disturbance of select trees, shrubs and cultural vegetation species. None of the impacted vegetation communities, associated species or habitat values are rare or limiting within the area. The vegetation removals will be nominal and will consist of species already heavily influenced by the existing roadway and the use of the adjacent trail and parkland. Other than minor encroachment into vegetated habitat to lengthen a retaining wall on the south upstream side, there is no anticipated permanent removal of habitat. Associated works also involve replacement of the existing north and south storm outfalls and the replacement of the failing retaining wall along the south shoreline.

A landscape planting plan has been developed consisting of native / riparian species to restore and enhance the impacted areas and enhance vegetation, and is discussed further in **Section 4.1.5**.

Mitigation Measures

- Clearly delineate vegetation clearing zones and vegetation retention zones on both the construction drawings and in the field with the Contractor prior to clearing and grading. Drawings and construction briefings should clearly indicate that equipment, materials and other construction activities are not permitted in vegetation retention zones.
- All vegetated cover not specified for removal shall be preserved in order to minimize erosion and sedimentation. The Contract Administrator will be notified in the event the Contractor needs to clear additional vegetation beyond the above limits (to be reviewed in the field).
- Vegetation removed for the construction activities will be replaced and enhanced. A landscape planting plan has been developed to restore the impacted areas and enhance vegetation along the shoreline in the vicinity of the bridge. Native tree and shrub species suitable for a riparian area will be utilized in the bank restoration work upstream of the bridge.

4.1.3 *WILDLIFE AND WILDLIFE HABITAT*

No wildlife species of conservation concern (SCC) were recorded by WSP, reported by Draycott (2007), or identified by MNRF as occurring in the immediate vicinity of the bridge project area. Habitat conditions are highly modified and impacted by infrastructure, pedestrian trails and access, and the surrounding urban land use, limiting their suitability generally for use by SCC or other sensitive wildlife.

No Significant Wildlife Habitat has been identified by MNRF nor were there any area sensitive wildlife species observed during WSP field investigations. Given the general cultural makeup of the vegetation and habitat features located at and within the general vicinity of the bridge, sensitive wildlife habitat is not expected.

Direct wildlife observations or observations of wildlife signs were limited during the site visit, in part due to timing of the site visit, but also related to the 'urban' location of the bridge and associated surrounding development. Species or signs observed included: Canada Goose (*Branta canadensis*), Mallard (*Anas platyrthynchos*), Belted Kingfisher (*Megaceryle alcyon*), Cliff Swallow (*Petrochelidon pyrrhonota*), Raccoon (*Procyon lotor*) and Ring-billed Gull (*Larus delawarensis*). Other urban-adapted species that use aquatic or riparian environments such as Grey Squirrel (*Sciurus carolinensis*), Woodchuck (*Marmota monax*), Eastern Cottontail (*Sylvilagus floridanus*), Virginia Opposum (*Didelphis virginiana*), Mink (*Mustela vision*) and Striped Skunk (*Mephitis mephitis*) can also be expected to use habitat along the river generally.

There are several areas of soft soil or sandy/gravely materials with south exposure along the Grand River that may provide potential nesting habitat for turtles. However, there was no evidence of amphibian or turtles nesting in any of these locations. Basking conditions are limited with little structure (fallen logs, exposed rocks) within the watercourse. The fast flow and shallowness of the river also make for unfavourable movement and foraging habitat.

Species of Conservation Concern

During a meeting with MNRF on December 2, 2013 regarding the potential for SAR in the project area, MNRF indicated that none of the species listed in Preliminary Design documents was of concern in the project area. This conclusion is consistent with the habitat conditions in the vicinity of the bridge.

A large colony of Cliff Swallow nests is present on the Argyle Street Bridge. During WSP's site investigations 65 nests were observed on the structure. The colony was documented in the 2009 TESR as being well known amongst local naturalists and is the largest in Haldimand County and possibly one of the largest in southern Ontario. The Cliff Swallow is a migratory bird protected under the *Migratory Birds Convention Act*. Therefore, no work is permitted to proceed that would result in the destruction of active nests (nests with eggs or young birds), or the wounding or killing of birds. The presence of nesting migratory birds on the bridge will require implementation of appropriate mitigation measures prior to / during construction.

Impact Assessment

Replacement of the Argyle Street Bridge will require the temporary relocation of the Cliff Swallow colony located under the existing bridge. No other sensitive wildlife is anticipated to be using the bridge area and the urban adapted animals in the area are expected to move away from the site during construction.

Relevant mitigation measures are identified below and in **Exhibit 5-1**.

Mitigation Measures

The application of standard and recommended mitigation measures will avoid or minimize impacts to vegetation and wildlife features during construction of the bridge replacement. The recommended standard mitigation measures include:

- Ensure that timing constraints are applied to avoid vegetation clearing and/or structure works during the breeding bird season (approximately April 1st to August 31st) without prior migratory bird exclusionary measures.
- Avoid destruction or any disturbance of active nests (nests with eggs or young birds) of protected migratory birds. If an active nest is encountered, any construction activities that could harm it shall cease and the Contractor Administrator shall be notified.
- Bridge removal is expected to start during the breeding bird season (approximately April 1st to August 31st) and exclusionary measures shall be implemented to prevent the Cliff Swallow or any other migratory birds from nesting on the bridge. These measures shall be implemented prior to April 1.
- Remove and dispose of all construction-related debris following construction in appropriately designated areas.

- Any wildlife incidentally encountered during construction will be protected and will not be knowingly harmed.
- In the event that wildlife encountered during construction does not move from the construction zone, the Contract Administrator will be notified.

4.1.4 GROUNDWATER AND SURFACE WATER RESOURCES

The Argyle Street Bridge lies within the physiographic region of Ontario referred to as the Haldimand Clay Plain, which is covered mostly by relatively flat lying stratified clay and silt sediments which were deposited when the area was submerged in a glacial lake. The soils are characterized by their heavy texture and poor drainage. To the north and southwest of Caledonia, a number of drumlins are scattered over the plain, whereby the tops of the drumlins, which are composed of glacial till, outcrop above the clay plain. The Grand River has cut a broad, incised valley into the clay and silt sediments in the vicinity of the bridge.

During construction, it is anticipated that the amount of perched water within the fill and the sand and silt interlayers will be limited at the bridge abutment locations. For excavations through the soils at these locations, groundwater control will likely be limited to diverting surface runoff and sump pumping. Groundwater flux into the embankment excavations may potentially be high if highly conductive soils/fills are encountered, which is possible given the variable composition of fill/alluvium materials. Furthermore, infiltration rates will also be related to water elevation on the Grand River, which is subject to change by extreme precipitation events, seasonal variation, and man-made controls.

Where sheetpiled cofferdams are used at the pier locations, the sheetpiles will act as a form of groundwater control. The depth of sheetpile penetration within the dolomitic shale may vary between locations. Water seepage along the base perimeter of the sheetpiles may be impeded by grouting with cementitious materials. Pumping inside the cofferdams will be required to maintain a dry excavation for construction.

At the pier locations within the river, excavation for caisson construction will require support systems such as sheetpiled cofferdams. Dewatering in the form of pumping from inside the cofferdams will be required to maintain a reasonably dry base. Dewatering may also be required to remove ponded rainwater which may be collected in the isolated work areas following storm events.

Impact Assessment

The demolition and re-construction of the Argyle Street Bridge may result in the entrainment or wash-off of residual material such as lime, cement, oil and grease, and asphalt into surface water runoff. Runoff can flow to the Grand River or nearby watercourses in adjacent areas where infiltration into the aquifer system may result in groundwater contamination if residuals are not appropriately managed.

The removal of trees and stumps, and other vegetation from the surrounding area may result in increased surface water runoff and a decrease in water infiltration into the subsurface which can affect groundwater quantity and quality.

Construction of embankments, foundations, footings, abutments, and piers for the Argyle Street Bridge may obstruct and/or intercept groundwater as base flows move to the Grand River which could potentially impact the shallow aquifer. Contaminants could be introduced into the groundwater and impact nearby wells by disturbance of contaminated soils or handling and management practices (e.g. spills of fuel, lubricants etc.). Construction activities also have the potential to physically impact water wells due to vibration and shock.

Caledonia is serviced by municipal water (from the Hamilton water distribution system). As a groundwater resource, few wells are completed in the upper bedrock aquifer as water quality is often poor.

Given the above, groundwater use is anticipated to be nominal within the study area, as evidenced by the few supply water well records. While many of the historical supply wells are confirmed to be decommissioned, there is a possibility that some supply wells may still be in use. As a result, although groundwater will have to be pumped during the bridge foundation excavations, the potential to disrupt nearby water supplies (if present), is considered minimal.

During construction, the quality of surface water and groundwater in the study area needs to be protected from loading of suspended solids into watercourses, potential fuel leaks or falling construction debris from construction activities. Protection of ground and surface water resources will be achieved through implementation of best management practices and development of a mitigation and monitoring program.

Permit to Take Water (PTTW)

The Ontario *Water Resources Act* states that the diversion of surface water or the extraction of groundwater in excess of 50,000 L/day requires a Permit to Take Water (PTTW) to be obtained from the MECP. A Category 3 PTTW has been obtained from MECP for the project. The Contractor shall ensure all mitigation measures, requirements, and monitoring outlined in the PTTW are completed.

4.1.5 *LANDSCAPING*

Detailed landscape plans have been incorporated into the Detail Design for the restoration of areas temporarily impacted during construction of the bridge replacement. A landscape planting plan consisting of native tree and shrub species has been developed to restore the impacted areas and enhance vegetation at the north and south approaches of the bridge and along the activity trail to the south.

Exhibit 4-5a-b illustrates the landscape planting plan proposed for the project.

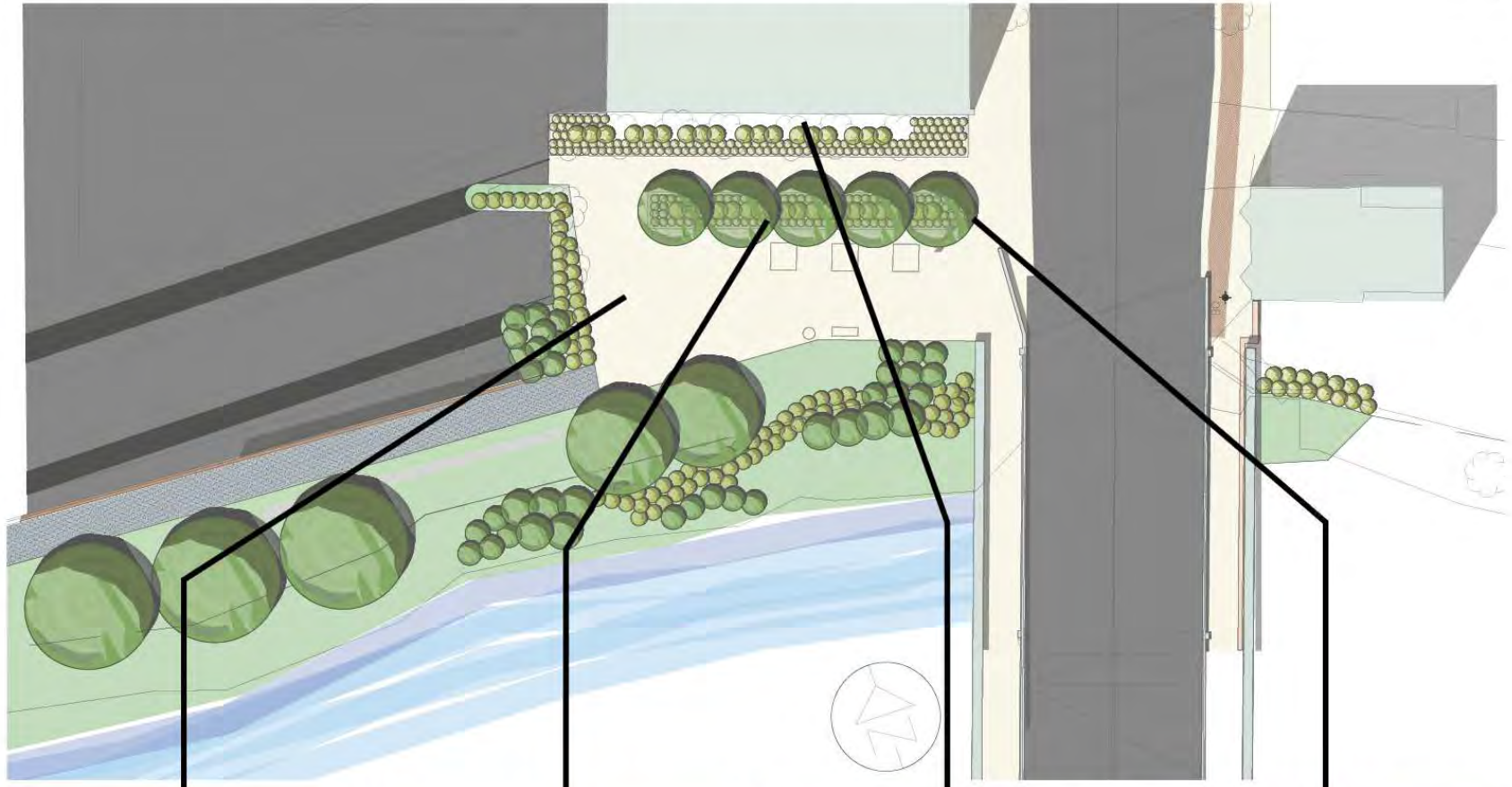
4.2 CULTURAL HERITAGE ENVIRONMENT

4.2.1 *ARCHAEOLOGY*

A Stage 1-2 Archaeological Assessment (AA) was completed as part of the Detail Design study in June 2017. The Stage 1 AA was completed for the entire study area while the Stage 2 AA was completed for the majority of the study area where permission to enter was granted. No archaeological resources were encountered during the assessment and the area assessed is considered to be free of archaeological potential and no further work is required. A Stage 2 AA is still required for the remainder of the study area.

As part of the Stage 2 AA, a combination of visual and test pit surveys was completed. The test pit survey revealed that the study area has been subject to deep and extensive land alterations throughout most of the project lands with only small pockets containing natural subsoil identified below disturbed topsoil contexts. As a result, there is the potential to recover deeply buried archaeological resources and archaeological monitoring is required during construction.

NORTH BRIDGE LANDING



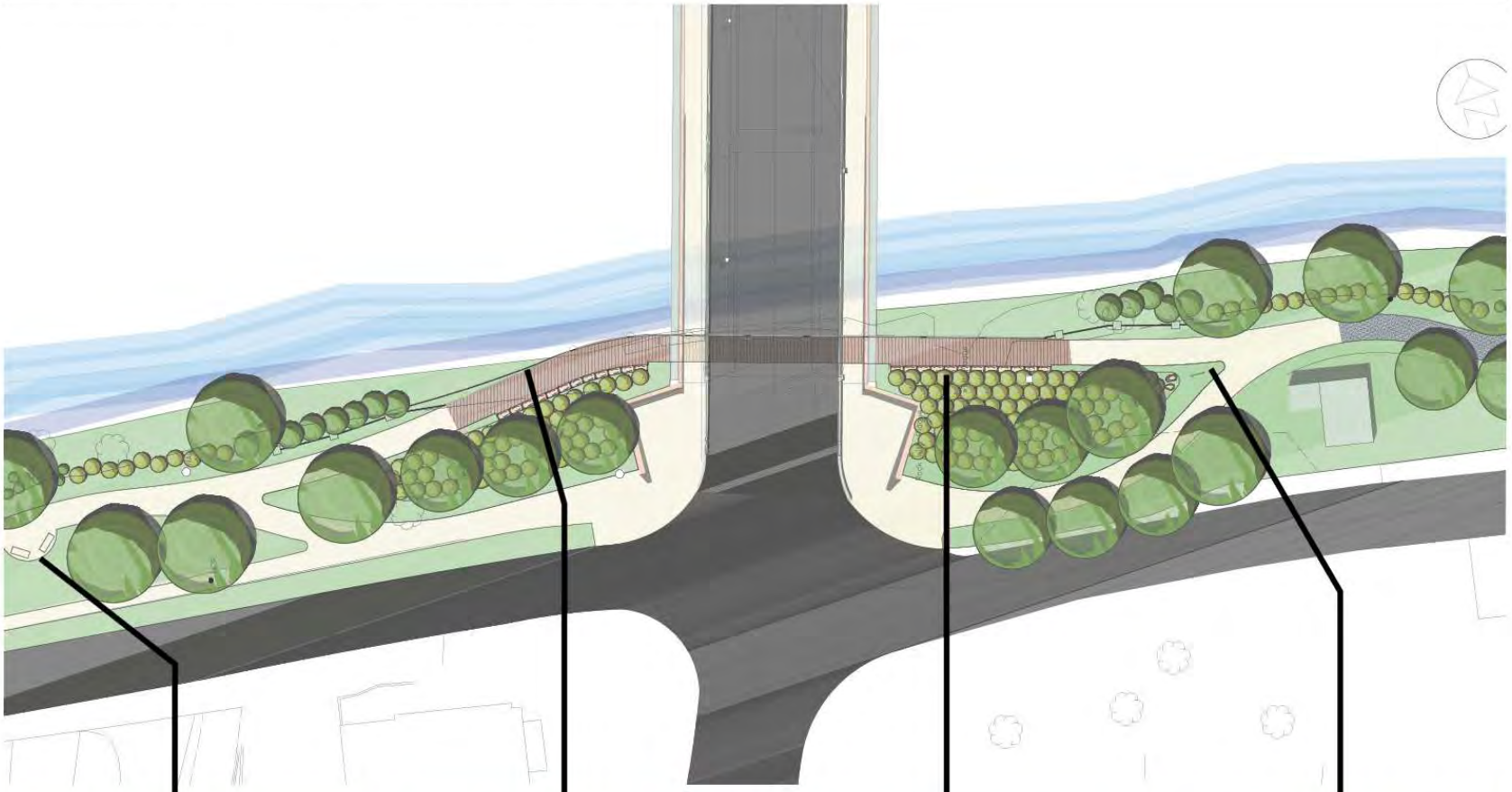
View of plaza on north side of Grand River.

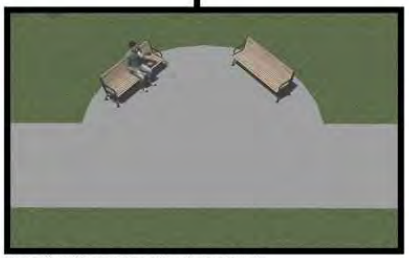
Raised planter with laser cut weathering steel panels.

View of plaza on north side of Grand River. (looking south)

Planted riverbank at Argyle Street Bridge landing

SOUTH BRIDGE LANDING





Seating in rest node along trail.

Pedestrial railing along edge of Grand River
(Aegis Plus Majestic By Ameristar)

Seat wall overlooking Grand River.

View of trail along south side of Grand River.

As noted above, additional Stage 2 AA is required at the toll keeper's house (4 Argyle Street) once access is permitted. Additional lands impacted by the bank restoration work associated with the overall-benefit plan required as a condition of the SAR permit under the *Endangered Species Act* were identified and will also require Stage 2 AA. The additional work will be completed in Spring 2020 and all AA's will be completed prior to the start of construction.

During construction there is the possibility of encountering deeply buried archaeological materials. In the event that materials are encountered during construction, the Contractor will follow the mitigation measures outlined in **Exhibit 5-1**.

4.2.2 CULTURAL HERITAGE

4.2.2.1 ARGYLE STREET BRIDGE

The Argyle Street Bridge is an important transportation infrastructure element within the community of Caledonia, connecting the historic downtown north of the Grand River with the residential developments located south of the Grand River. The bridge has been used as a set in a film production and its heritage value lies in its architectural significance, its historical associations, and its contextual value as an important community landmark.

The road and the Grand River bridge site may have been used as a crossing point by Indigenous peoples before the 18th century.

The first bridge over the Grand River in Caledonia was erected in 1843 to provide permanent and unimpeded passage on the plank road between Hamilton and Port Dover. Rising water and swift currents regularly washed the 1843 timber bridge crossing at Caledonia away. In 1875, a six-span iron bridge was constructed along with a gate and toll keeper's house at the north end of the bridge. The 1875 structure remained in place until August of 1925, when a truck carrying a load of stone caused one of the spans to collapse. Demolition of the iron bridge and completion of the present-day bridge was undertaken during the 1927 construction season.

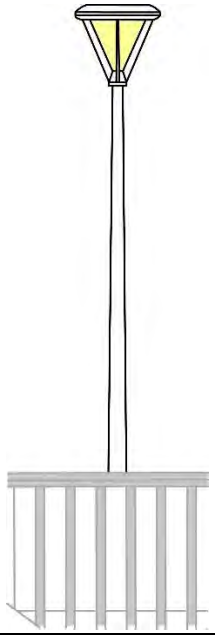
The Argyle Street Bridge is a provincially significant heritage bridge. During the Preliminary Design study, a Heritage Impact Assessment (HIA) for the Argyle Street Bridge was undertaken. The HIA Report recommended that the design of the new bridge structure should retain landmark qualities of the existing bridge.

A Cultural Heritage Documentation Report (CHDR) was prepared in July 2011 to provide a cultural heritage resource record of the site prior to the removal of the existing bridge. A copy of the CHDR was provided to the local library and museum.

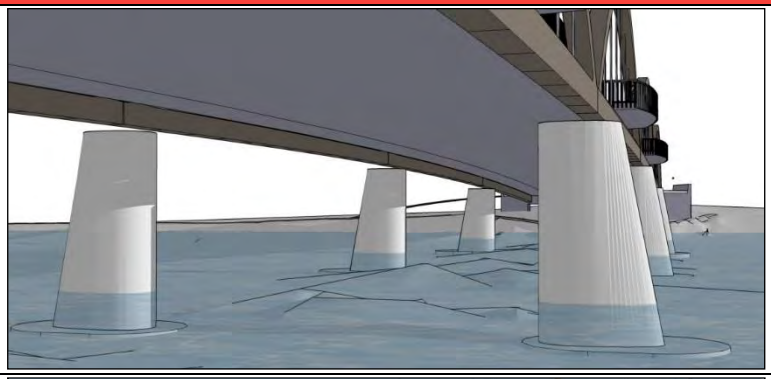
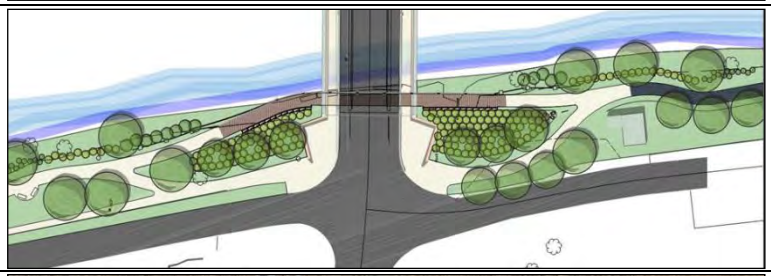
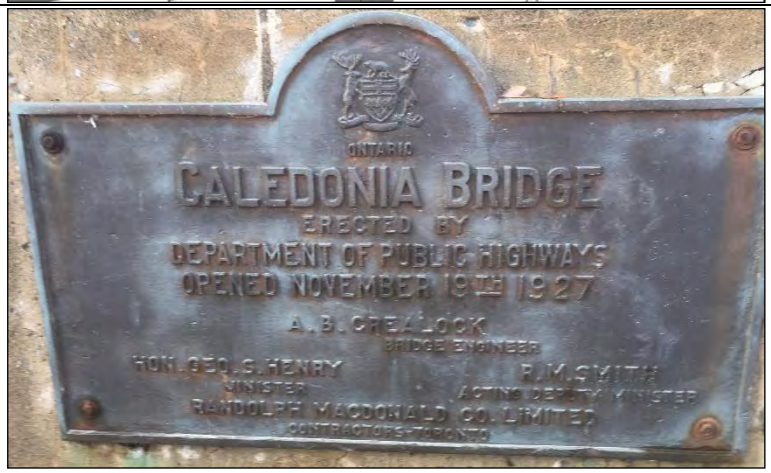
Consistent with the commitments made in the TESR, a Heritage Setting Enhancement Workshop (HSEW) was held during the Detail Design study. The intent of the workshop was to consider and select bridge heritage enhancements for the selected design (5-span steel arch bridge) that commemorate desirable elements of the existing bridge and enhance the appearance of the new bridge. Further details of the HSEW are provided in **Section 2.2** of this report.

Based on the discussions during the workshop, and the project team's assessment and evaluation of the feasibility of each option, the bridge heritage enhancements that are summarized and illustrated in **Exhibit 4-6** were incorporated into the design of the new bridge.

Exhibit 4-6: Argyle Street Bridge: Summary of Heritage Enhancements

Heritage Enhancement	Concept Illustration
Light fixtures that are sensitive to the heritage character of the setting.	

Heritage Enhancement	Concept Illustration
Accent lighting to illuminate the underside of the arches, hangers, and vertical face of the pier.	
Inner barrier wall with outer pedestrian railing	
Six look-out areas (3 bays on each side of the bridge)	
Sympathetic paint colour for arches, light posts, and railing posts	

Heritage Enhancement	Concept Illustration
Consideration of bridge pier shape	
The design of the northern bridge approach	
Landscaping along the southern bridge approach	
The four plaques on and off the existing Argyle Street Bridge will be salvaged and relocated.	

4.2.2.2 TOLL KEEPER'S HOUSE

The toll keeper's house is located at 4 Argyle Street North, adjacent to the northeast corner of the bridge and is designated under Part IV of the *Ontario Heritage Act*. The toll keeper's house was built in 1875 and was the residence for the toll keeper who collected tolls for crossing the bridge over the Grand River until approximately 1890. The house remains in its original location today and is a red buff brick Ontario Gothic revival structure with decorative elements including buff brick quoins and two substantial twin chimneys. The structure is a good example of Victorian Architecture of the period.

As a result of the proximity of the historic toll keeper's house and its lands and the need to undertake heritage conservation measures to protect the house as well as ensure the safety of the public, the Ministry determined that it was necessary to acquire ownership of the Toll House property.

A Cultural Heritage Evaluation was completed as part of the Detail Design study to determine if the toll keeper's house is of provincial heritage significance. The evaluation determined that the toll keeper's house qualifies as a Provincial Heritage Property of Provincial Significance based on the application of the "Criteria for Determining Cultural Heritage Value of Provincial Significance" as set out in O. Reg. 10/06 of the *OHA* for the toll keeper's house. A Heritage Impact Assessment (HIA), vibration assessment and strategic conservation plan (SCP) will be completed for the toll keeper's house prior to the start of construction. The HIA and vibration assessment will recommend measures to avoid or mitigate potential impacts to the structure during construction while the SCP will also be developed to outline short-term and long-term policies to manage the cultural heritage values and attributes for the toll keeper's house following construction.

The vibration assessment at the toll keeper's house will be completed in conjunction with the HIA to determine the potential indirect vibration impacts associated with construction for the bridge replacement. The vibration assessment will document existing conditions, as well as vibration monitoring during and following construction.

All mitigation measures and recommendations outlined in **Exhibit 5-1**, and from the HIA and SCP will be implemented prior to, during and following construction.

4.3 SOCIO-ECONOMIC ENVIRONMENT

4.3.1 *LAND USE FACTORS*

The study area falls within an area of the Grand River Notification Agreement (GRNA), the 1701 Fort Albany Treaty, and within the Haldimand Tract, an area of lands granted by the Haldimand Proclamation (1784). The study area also falls within the 1792 Between the Lakes Purchase (Upper Canada Treaty 3). As a result, lands within the study area are of significant interest to both Six Nations of the Grand River and Mississaugas of the Credit First Nation.

The existing trail under the bridge on the south bank and access to the Kinsmen Park will be closed for the duration of construction. The gateway to the trail will be re-opened following construction, however, the stairs leading down to the river on the north side will be permanently removed. The two memorial trees located in Kinsmen Park have been transplanted to a nearby location.

4.3.2 *NOISE*

No permanent noise impacts are anticipated as the structure will be replaced in the same location.

Extended hours of operation will be required during construction and it is anticipated construction activities may take place 24/7 for some activities. The Contractor will be required to abide by the Ministry's standard mitigation measures for construction noise including minimizing idling of construction equipment and maintaining equipment in good working order to reduce noise from construction activities.

If complaints regarding construction noise arise during construction, they will be investigated according to the provisions of the existing "Noise Protocol" between the MTO and the Ministry of the Environment, Conservation and Parks. The Guide requires that any initial complaint from the public be investigated on-site to determine noise levels. The Contract Administrator shall also ensure that the general noise control measures agreed to are in effect. If not, the Contract Administrator will warn the Contractor of any problems and will take steps to enforce the contract provisions.

4.3.3 *WASTE MANAGEMENT AND CONTAMINATION*

Preliminary Site Screenings (PSS) were completed at the nine properties planned to be temporarily occupied to accommodate construction activities during the replacement of the bridge. The PSS included a visual inspection of the area and adjacent properties for any signs of potential environmental impacts. Based on the inspection results, the PSS concluded that there was no evidence of environmental impacts within any of the properties and no further environmental investigations were recommended to be completed at any of the properties.

Excess materials are anticipated to be generated during the grading and construction work which will require appropriate management/disposal. The proposed management plan for wastes anticipated during construction is provided below and **in Exhibit 5-1**.

- All construction equipment will be properly maintained to avoid spills/emissions and all potentially toxic materials will be properly handled and spill management best practices will be employed.
- All stockpiled materials, including but not limited to excavated overburden and topsoil, excess materials, construction debris and containers shall be stored and stabilized in a manner that prevents them from entering any waterbody.
- Equipment refueling and maintenance shall take place at locations as far away as practicable from a waterbody and in a manner that prevents any sediment and other deleterious substances from entering into a waterbody.
- Spills Prevention Plan and Response Plan will be developed by the Contractor and kept on site at all times, and an emergency spill kit shall be kept on site to address any fluid leaks or spills from equipment.

Exhibit 4-7: Anticipated Waste Generation and Proposed Management Plan

Description / Nature of Waste Generated	Management Plan
General Management of Excess Materials	Excess material will be managed in accordance with the Provincial Specification for Management and Disposal of Excess Material. Any excess fill, concrete, steel, rock, earth and pavement will be managed according to the Ministry's standard mitigation for contamination / waste management during construction. Ontario regulations regarding

Description / Nature of Waste Generated	Management Plan
	waste classification and disposal site selection will be followed. The main wastes anticipated are steel and concrete, both of which can be readily recycled.
Rubble resulting from the removal of the existing infrastructure (e.g. concrete, steel)	Any rubble generated as part of the work is to be contained, collected, and removed and disposed of in accordance with any applicable regulatory requirements for the disposal of such waste. Waste management will be completed in accordance with applicable legislation and the Ministry's standard mitigation for contamination / waste management during construction.
Cutwater (e.g. concrete cutwater from structural works)	Any cutwater generated will be contained, collected, removed and disposed of in accordance with applicable regulatory requirements for the disposal of such waste. Cutwater will be managed in accordance with the Ministry's standard mitigation for contamination / waste management during construction and supplemented by contract Special Provisions for environmental protection to ensure that cutwater does not enter any watercourses prior to filtration.
Dust	Dust is anticipated to be generated during some construction activities (e.g. earth excavation, roadway grading, placing of granular materials, etc.), as is typical of construction of projects of this type. While it is not practical to take steps to completely eliminate the generation of dust as part of the work, the amount of dust generated will be minimized by the Contractor in accordance with the Ministry's standard mitigation measures for construction.

4.3.4 *PROPERTY REQUIREMENTS*

As a result of the proximity of the historic toll keeper's house and its lands and the need to undertake heritage conservation measures to protect the house as well as ensure the safety of the public, the Ministry determined that it was necessary to acquire ownership of the toll house property at 4 Argyle Street North. Additional permanent partial acquisitions of property were required from municipal lands at the north east quadrant of Argyle Street North and the Grand River bridge and from a residential property at the south west quadrant of Argyle Street South and Forfar Street.

Temporary land leases (known as Temporary Limited Interests) were also required from several property owners to facilitate the bridge construction and the temporary realignment of Argyle Street, for the duration of the bridge replacement project.

The Ministry will continue to negotiate with affected property owners for fair compensation in accordance with the *Expropriations Act*.

4.4 TECHNICAL CONSIDERATIONS

4.4.1 *UTILITIES*

There are a number of existing utility conflicts as a result of the replacement of the Argyle Street Bridge. A summary of the conflicts and how the conflict will be addressed is summarized in **Exhibit 4-8**.

Exhibit 4-8: Summary of Utility Conflicts

Utility	Conflict
Haldimand County	Haldimand County has a watermain in conflict with the proposed storm sewer. The County will relocate the watermain prior to the reconstruction of the storm sewer.
Union Gas	Union Gas relocated local and transmission facilities that conflicted with the proposed work. Union Gas to relocate gas line at the northwest quadrant of the Argyle Street Bridge within the municipal parking lot.
Bell Canada	Bell Canada has telecommunication utilities located on the existing bridge structure that will be relocated.

Utility	Conflict
Rogers Cable	Rogers Cable has telecommunication utilities located on the existing bridge structure that will be relocated.
Eastlink Communications	Eastlink Communications has telecommunication utilities located on the existing bridge structure that will be relocated.
Hydro One (formerly Haldimand Hydro)	Hydro One has local distribution conflicts on both the south and north approaches to the bridge structure that will be relocated.

4.4.2 AGENCY NOTIFICATION

Emergency services and Haldimand County will be notified throughout construction at key milestones to ensure response times are maintained during construction. Local school and school boards, student transportation services will also be notified of bridge closures to ensure student transportation is re-routed appropriately.

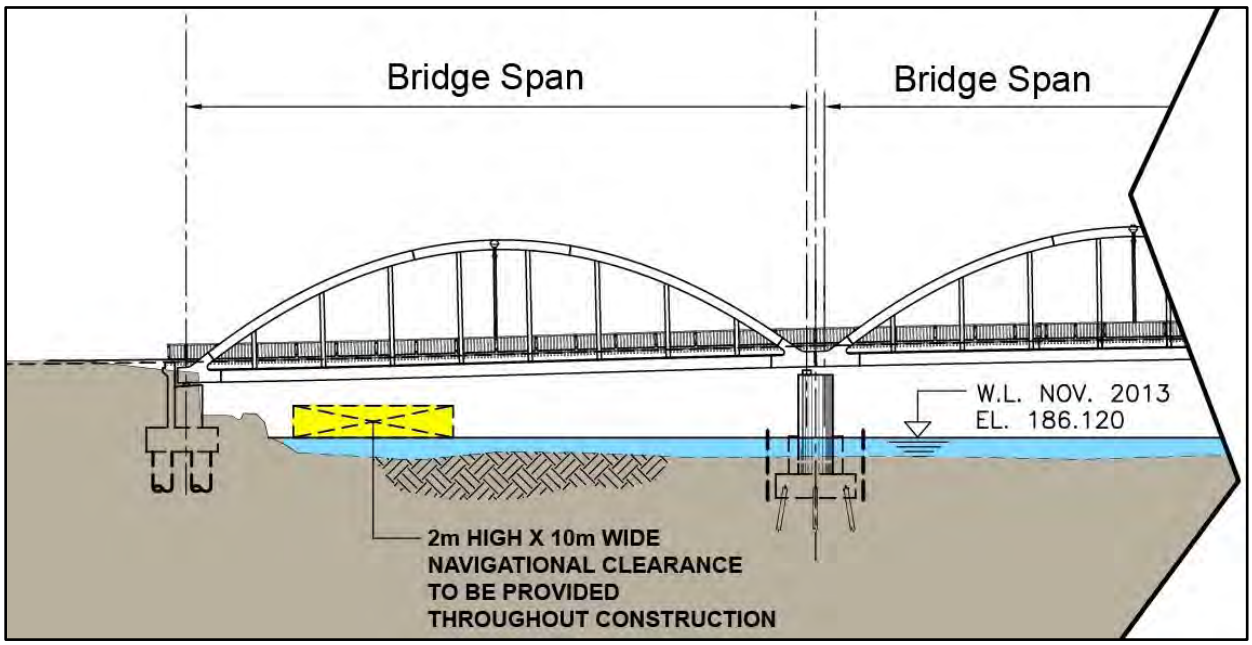
4.4.3 EMERGENCY SERVICE ACCESS

During construction, access across the bridge will be maintained for emergency service vehicles. During the two periods when the bridge will be closed, emergency service vehicles will be provided on both sides of the Grand River.

4.4.4 NAVIGATION

The Grand River is a navigable water way and is protected under the *Canadian Navigable Waters Act* (formerly *Navigation Protection Act)* (*CNWA*). A navigation window of 2 m x 10 m will be provided between the south shore and the adjacent pier throughout construction, as shown in **Exhibit 4-9**.

Exhibit 4-9: Navigation Envelope



A permit under the *CNWA* was obtained from Transport Canada for construction. To replace the Argyle Street Bridge, rock platforms known as causeway pods will be constructed in the river to allow the contractor to access the bridge piers / foundations during construction. The causeway pods will not impact the navigability of the river to small boats such as kayaks and canoes.

The annual Two Row on the Grand event will also be accommodated to the extent possible during construction and organizers will be kept informed on any changes to navigability of the Grand River within the study area.

5 SUMMARY OF ENVIRONMENTAL CONCERNS, MITIGATION MEASURES, AND COMMITMENTS

Exhibit 5-1 summarizes the identified environmental concerns and mitigation measures and commitment, based on the identified environmental sensitivities and the detail design plans.

Exhibit 5-1: Summary of Environmental Concerns and Mitigation Measures

Legend:

DFO: Fisheries and Oceans Canada

ES: Emergency Services

MNRF: Ministry of Natural Resources and Forestry

MECP: Ministry of the Environment, Conservation and Parks

MHSTCI: Ministry of Heritage, Sport, Tourism and Culture Industries

MTO: Ministry of Transportation

TC: Transport Canada

ID #	Issues / Concerns Potential Effects	Concerned Agencies / Organizations	ID #	Mitigation Measures
1.0	**Erosion and Sediment Control**	MTO MECP DFO	1.1	▶ All appropriate temporary erosion and sediment control measures shall be installed prior to and maintained throughout construction.
			1.2	▶ All temporary erosion and sediment control measures shall be maintained in an effective, functioning and stable condition. This will require routine inspections, including before and after storm events, and repairs as required.
			1.3	▶ A qualified environmental inspector will be retained to monitor construction activities that could impact natural features and ensure that protection measures are implemented, maintained and repaired and remedial measures are initiated where warranted.
2.0	**Vegetation** Potential impacts to localized vegetation	MTO MNRF MECP	2.1	▶ Clearly delineate vegetation clearing zones and vegetation retention zones on both the construction drawings and in the field with the Contractor prior to clearing and grading. Drawings and construction briefings should clearly indicate that equipment, materials and other construction activities are not permitted in vegetation retention zones.
			2.2	▶ All vegetated cover not specified for removal shall be preserved in order to minimize erosion and sedimentation. The Contract Administrator will be

ID #	Issues / Concerns Potential Effects	Concerned Agencies / Organizations	ID #	Mitigation Measures
				notified in the event the Contractor needs to clear additional vegetation beyond the above limits (to be reviewed in the field).
			2.3	▶ Vegetation removed for the construction activities will be replaced and enhanced. A landscape planting plan has been developed to restore the impacted areas and enhance vegetation along the shoreline in the vicinity of the bridge. Native tree and shrub species suitable for a riparian area will be utilized in the bank restoration work upstream of the bridge.
3.0	**Wildlife and Species of Conservation Concern** General wildlife protection Potential impacts to migratory birds and their nests.	MTO MNRF MECP	3.1	▶ Ensure that timing constraints are applied to avoid vegetation clearing and/or structure works during the breeding bird season (approximately April 1st to August 31st) without prior migratory bird exclusionary measures.
			3.2	▶ Avoid destruction or any disturbance of active nests (nests with eggs or young birds) of protected migratory birds. If an active nest is encountered, any construction activities that could harm it shall cease and the Contractor Administrator shall be notified.
			3.3	▶ Bridge removal is expected to start during the breeding bird season (approximately April 1st to August 31st) and exclusionary measures shall be implemented to prevent the Cliff Swallow or any other migratory birds from nesting on the bridge. These measures shall be implemented prior to April 1.
			3.4	▶ Remove and dispose of all construction-related debris following construction in appropriately designated areas.
			3.5	▶ Any wildlife incidentally encountered during construction will be protected and will not be knowingly harmed.

ID #	Issues / Concerns Potential Effects	Concerned Agencies / Organizations	ID #	Mitigation Measures
			3.6	▶ In the event that wildlife encountered during construction does not move from the construction zone, the Contract Administrator will be notified.
4.0	**Fish and Fish Habitat**	MTO MNRF MECP	4.1	▶ All standard construction-related best management practices and mitigation measures will be implemented throughout the construction process to address the typical and generally predictable impacts of the in- and near-water work activities associated with this project that could potentially affect fish and fish habitat.
			4.2	▶ A warmwater permissible in-water timing window will be implemented at the Grand River (i.e. in-water works permitted between July 1 and March 15). All in-water activities will be undertaken in isolation to avoid introducing deleterious substances into the watercourse.
			4.3	▶ All appropriate temporary erosion and sediment control measures shall be installed prior to and maintained throughout construction.
			4.4	▶ All temporary erosion and sediment control measures shall be maintained in an effective, functioning and stable condition. This will require routine inspections, including before and after storm events, and repair as required.
			4.5	▶ All exposed soil surfaces shall be re-stabilized and re-vegetated as soon as possible, using native seed mix appropriate to the area impacted.
			4.6	▶ Regular and on-going monitoring will be undertaken throughout construction by Environmental Inspectors, who have specific experience working around water and in large river systems, supported by specialized biologists.
			4.7	▶ The installation and removal of the causeway pods shall be completed such that the concrete blocks at the upstream ends of each pod will be in place to

ID #	Issues / Concerns Potential Effects	Concerned Agencies / Organizations	ID #	Mitigation Measures
				create still-water zones to minimize potential for mobilization of any substrates disturbed on the bed.
			4.8	▶ A permit under the Endangered Species Act obtained from MNRF while two *Species at Risk Act* compliant authorization under the *Fisheries Act* were obtained from DFO for the project. All mitigation and offsetting measures required under the permits will be implemented during construction, including the Overall Benefit Plan.
			4.9	▶ Vegetation removed for the construction activities will be replaced and enhanced. A landscape planting plan has been developed to restore the impacted areas and enhance vegetation along the shoreline in the vicinity of the bridge. Native tree and shrub species suitable for a riparian area will be utilized in the bank restoration work upstream of the bridge.
			4.10	▶ Prior to start of construction, all mussels within the prescribed search area will be relocated up and down stream of the bridge. Oversight during the mussel relocation will be provided by experienced mussel biologists and completed in accordance with the Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (Mussel Protocol, Mackie, Morris and Ming, 2008).
			4.11	▶ In addition to the mussel relocation work (and fish rescues as required), the specialist biologists will complete regular site inspections. They will also be available for the Environmental Inspector throughout the duration of the in- and near-water construction activities, to provide input or direction in the event of any unforeseen or unusual events.

ID #	Issues / Concerns Potential Effects	Concerned Agencies / Organizations	ID #	Mitigation Measures
5.0	**Groundwater**	MTO MECP	5.1	▶ A draft Category 3 Permit to take Water (PTTW) has been obtained in support of water takings during construction activities for the project. The Contractor will be responsible for obtaining the finalized PTTW from the Ministry of the Environment, Conservation and Parks prior to dewatering activities, and implementing all conditions of the PTTW.
6.0	**Management of Excess Materials and Designated Substances** Management of excess material during and following construction Designated substances may be present in the project area	MTO MECP	6.1	▶ Remove and dispose of all construction-related debris in appropriately designated areas.
			6.2	▶ The Contractor shall manage and dispose of any excess materials in accordance with standard excess materials management during construction.
			6.3	▶ All activities, including equipment maintenance and refueling, shall be controlled to prevent entry of petroleum products or other deleterious substances, including any debris, waste, rubble or concrete material, into a waterbody. All potentially toxic construction materials will be properly handled, managed and contained.
			6.4	▶ Waste management including handling and disposal of excess materials and debris shall be completed in accordance with the Ministry's standard mitigation for waste management during construction.
			6.5	▶ A Spills Management Plan, including required response materials and direction, and agency notification information, will be developed and kept on site throughout construction and available to all personnel.
7.0	**Noise and Management of Dust**	MTO MECP	7.1	▶ Night construction is required to facilitate construction of the work. Should noise complaints arise, they will be investigated and resolved in accordance with MTO's *Environmental Noise Guide* (2006).

ID #	Issues / Concerns Potential Effects	Concerned Agencies / Organizations	ID #	Mitigation Measures
	Noise and dust associated with construction		7.2	▶ Dust from construction will be controlled such that the dust does not affect traffic, enter surface water, or escape beyond the right-of-way to cause a nuisance to residents, businesses, or utilities.
8.0	**Traffic During Construction** Traffic disruptions will occur during the proposed works	MTO ES	8.1	▶ Advanced signage will notify motorists of construction, closure of the bridge and the detour route. During the bridge closure, shuttle services will be provided for pedestrians in order to cross the bridge.
			8.2	▶ Prior to construction works commencing, the Contractor will notify local emergency services, school bus operators and local municipalities of the scheduled start of construction.
			8.3	▶ The conditions of the working area, roadways and detours shall be maintained in accordance with the Ministry's standard requirements.
			8.4	▶ All temporary roadway closures shall be completed in accordance with the Ministry's standard requirements.
9.0	**Cultural Heritage and Archaeological Resources** Potential impacts to areas with cultural heritage	MTO MHSTCI	9.1	▶ A licensed archaeologist will be present to monitor construction during any soil disturbance work.
			9.2	▶ Should previously unknown or unassessed deeply buried archaeological resources be uncovered during construction, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The contractor will stop work and report the finding.
			9.3	▶ If unmarked human remains are encountered, the provisions of the Ontario Cemeteries Act apply. The contractor will stop work and report the finding.
10.0	**Navigation**	MTO TC	10.1	▶ All requirements and conditions of the *Canadian Navigable Waters Act* permit obtained for the project shall be completed.

ID #	Issues / Concerns Potential Effects	Concerned Agencies / Organizations	ID #	Mitigation Measures
			10.2	► A navigation clearance window the waterway will be provided at all times during construction. Wayfinding signage will be provided along the river and flashing lights will be located at each end of the construction works.

6 MONITORING

The environmental protection measures outlined in this report have been incorporated into the construction contracts and on-site construction administration / inspection staff will ensure the contract provisions are adhered to.

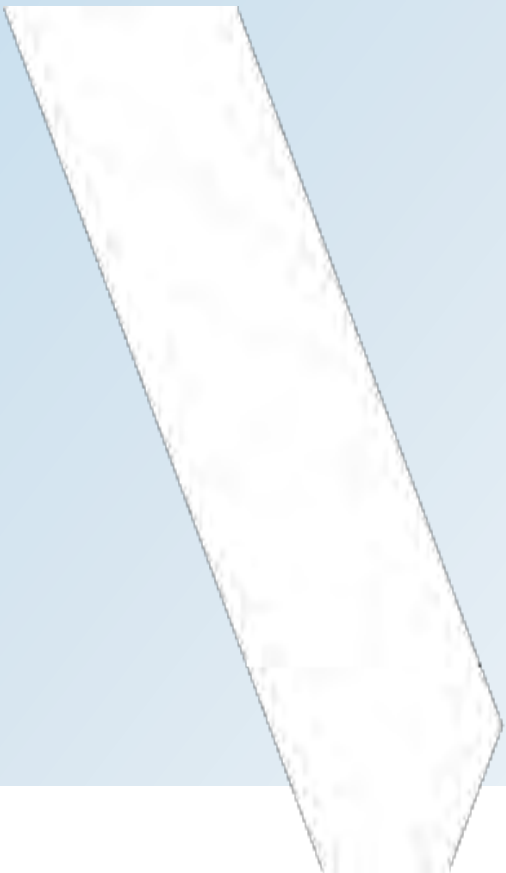
If the impacts of construction are different than anticipated, or if the method of construction is such that there are greater than anticipated impacts, the Contractor's methods of operation and mitigation measures will be evaluated to identify potential alternatives to reduce those impacts. During construction, the on-site Contract Administrator monitors that implementation of mitigating measures and key design features are consistent with the contract and the permits and approvals obtained for the project.

In addition, the effectiveness of the environmental mitigating measures will be assessed to ensure that:

- Mitigation measures are providing the necessary control and/or protection;
- Mitigation measures are maintained, and any necessary repairs are completed quickly; and
- Additional mitigation measures are provided, as required, for any unanticipated environmental problems that may develop during construction.

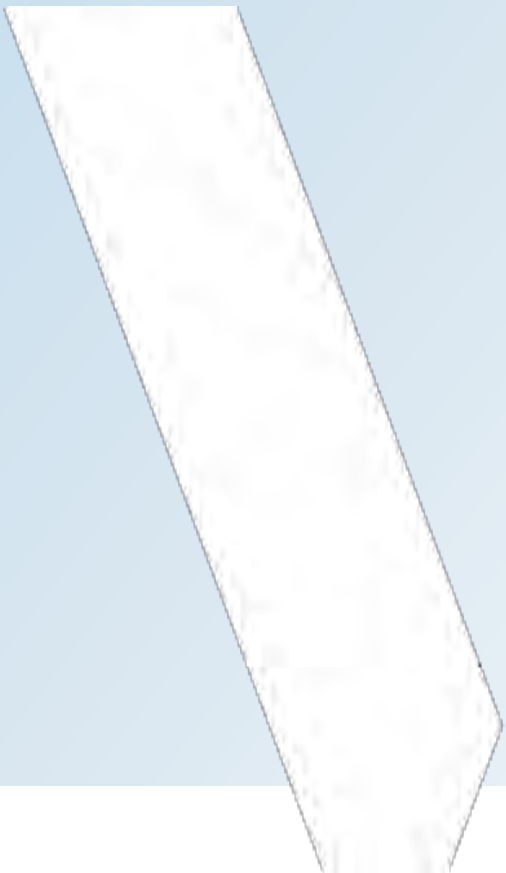
APPENDIX

A NOTIFICATION MATERIALS



APPENDIX

B RELEVANT AGENCY CORRESPONDENCE



APPENDIX

C COMMUNITY INFORMATION SESSION DISPLAY PANELS

APPENDIX

D GENERAL ARRANGEMENT DRAWING