APPENDIX C

Public Information Centre #1
Display Panels

Wellington Road 109 Bridges
Municipal Class Environmental (EA) Study

From Highway 6 to Sideroad 7
Township of North Wellington

PUBLIC INFORMATION CENTRE #1
Online Package

Fall 2020

Welcome

Welcome to the **online Public Information Centre (PIC)** for the Wellington Road 109 Bridges Class EA Study. This is the **first of two Public Information Centres** planned for this study.

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There is an opportunity at any time during the EA process for interested persons to provide written input. However, we ask that comments on the PIC materials be provided by **January 29, 2021** so that the Project Team can consider the feedback in the next phase of the study.

Any comments received will be collected under the **Municipal Freedom of Information and Protection of Privacy Act** and, with the exception of personal information, will become part of the public record.

About this PIC

Purpose of This Package

- Introduce the Study and Municipal Class EA Process
- Review Existing Conditions, Problems and Opportunities
- Evaluate Alternative Planning Solutions
- Review Design Considerations
- Obtain Community Feedback and Identify Next Steps

How You Can Participate

Review this information package

Refer to **Frequently Asked Questions**

Complete the brief **Online Survey**

Contact us directly

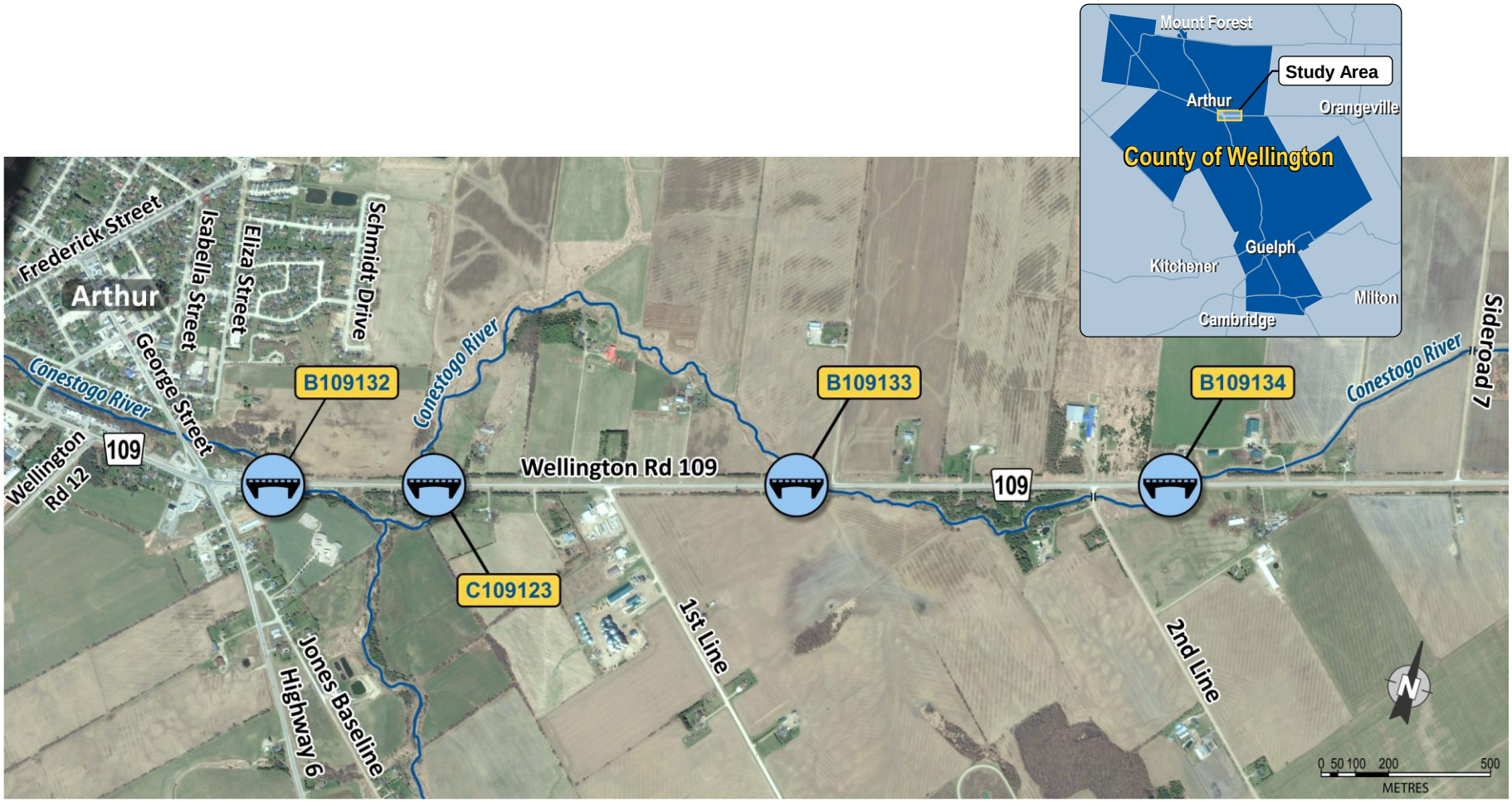
What is This Study About?

- Wellington Road 109 crosses the Conestogo River at four locations over a distance of about 3 km, just east of Arthur, between Highway 6 and Side Road 7.
- The structures* were constructed between 1930 and 1934 by the Department of Highways Ontario (DHO), now Ontario Ministry of Transportation (MTO). Wellington County took over ownership of the bridges when this section of the former Highway 9 was downloaded to the County in 1998.
- In accordance with Ontario Regulation 472/10 under the Public Transportation and Highway Improvement Act (Act), these structures have been inspected every two years under the direction of a professional engineer using the Ministry's Ontario Structure Inspection Manual (OSIM).
- Based on the findings of the OSIM inspections, the structures at all four crossings are in an advanced state of deterioration with some elements identified as not meeting current design standards.
- The County of Wellington has initiated a Municipal Class Environmental Assessment (Class EA) to consider potential solutions to address the poor conditions.
- Given the close proximity, the County is completing the planning and design of all four structures under one Class EA Study.

What is This Study About?

- The County recognizes that efforts to improve the all four structures will come with some challenges during construction for residents, business owners and travellers, since construction is likely to extend over multiple seasons.
- Therefore, in addition to rehabilitation and or replacements, the County will also consider the feasibility and cost of a localized permanent realignment of Wellington Road 109 that would eliminate or reduce the multiple crossings and the need for future works.
- In accordance with the requirements of the Schedule C Municipal Class EA process, the Study will define the problem, identify and evaluate alternative planning solutions and design concepts, recommend a design, assess potential impacts and identify mitigation measures associated with the preferred design.
- The study will consider numerous aspects including but not limited to: construction staging and traffic delays during construction, local residences, business activity, cultural heritage and Indigenous values and protection of the natural environment.
- Supporting technical components will inform the decision-making process and final Study recommendations, including:
  - Cultural Heritage
  - Archaeology
  - Geomorphology
  - Drainage and Hydrology
  - Natural Environment
  - Hydrogeology
  - Traffic
  - Structural Design

Study Area


Mount Forest
Study Area
Arthur
Orangeville
County of Wellington
Guelph
Kitchener
Milton
Cambridge
Frederick Street
Arthur
Isabella Street
Eliza Street
Schmidt Drive
George Street
Conestogo River
B109132
Conestogo River
B109133
B109134
Conestogo River
Sideroad 7
Wellington Rd 12
109
Wellington Rd 109
109
C109123
1st Line
2nd Line
Jones Baseline
Highway 6
N
0 50 100 200 500
METRES

Municipal Class EA Process

- This study is being conducted in accordance with the Ontario Environmental Assessment Act through the application of the **Municipal Class Environmental Assessment (MCEA).**
- The Class EA process enables the **planning and implementation of municipal infrastructure projects** taking into account the natural, cultural and socio-economic environmental setting, agency and public interests and unique project requirements.
- This study is following the MCEA **Schedule C process**, which involves four Phases and four formal public engagement milestones. This process is depicted on the next slide.
- Public feedback is not limited to formal engagement milestones, and is welcome at any time throughout the study process.

Municipal Class EA Schedule C Process

Phase 1: Problem and Opportunity

- ✓ Identify problems and opportunities

Notice of Study Commencement
September 2020

Phase 2: Alternative Planning Solutions

- ✓ Inventory natural, social, economic and cultural environments
- ✓ Identify and evaluate the planning alternatives
- ✓ Identify a Recommended Planning Solution
- ✓ Consult agencies and the public and select Preferred Planning Solution

Public Information Package #1
December 2020

- ✓ Existing conditions
- ✓ Problems and Opportunities
- ✓ Alternative Planning Solutions
- ✓ Road Cross-Section Alternatives
- ✓ Design Considerations

We Are Here

Phase 3: Alternative Design Concepts

- Develop, assess and evaluate the design alternatives
- Identify a Preliminary Preferred Design
- Consult with agencies and the public
- Confirm the Preferred Design

Public Information Package #2
Late Winter 2021

- Design Alternatives
- Evaluation of Design Alternatives
- Preliminary Preferred Design

Phase 4: Environmental Study Report

- Complete the Environmental Study Report (ESR)
- 30 day public review and comment period

Notice of Study Completion
Late Spring 2021

Design, Permits/Approvals and Construction

Studies Completed to Date

A number of studies have been completed as part of the County's ongoing focus on WR109:

- **Cultural Heritage Evaluation Report** (2019) and Heritage Impact Assessment (2020)
- **Structural Inspections** (2019, 2017, 2015, 2013, 2011 etc.)
- Water Resources – Existing Conditions Assessment / Hydraulic Model (2018)
- **Natural environment field surveys** (2017/2018, 2020):
  - Aquatic habitat assessment
  - Vegetation community mapping (Ecological Land Classification - ELC) and botanical inventory
  - General wildlife inventory and Species at Risk habitat assessments (including snake emergence and turtle basking surveys) to assess habitat potential
  - Breeding Bird Surveys, completed in accordance with the Ontario Breeding Bird Atlas (OBBA) protocols
- Wellington Road 109 **Passing Lane Study** (2015)
- **Strategic Bridge Replacement Study** - development of concept designs for rapid replacement of B109132 and C109123 (2014)

Existing Conditions Overview

Existing Conditions - Transportation

- **Transportation**
  - WR109 is an important east-west transportation route serving local and regional traffic.
  - The average annual daily traffic (AADT) is 8060 vehicles per day (2018) and with assumed baseline growth is expected to increase to 8570 vehicles per day by 2025.
  - Truck traffic accounts for about 17% of the daily traffic volumes.
  - It is understood that large farm equipment and horse drawn carriage also rely on WR109 for access across the study area.
- **Active Transportation**
  - Walking and cycling activity occurs but is relatively limited within the study limits.
  - Three of the existing structures include a 1.5 m raised sidewalk on the north side.
  - The Wellington County Active Transportation Plan identifies proposed signed cycling routes within Arthur and a proposed spine off-road cycling route, north of WR109.
  - Cycling facilities have not been identified for WR109 since demand is low and the WR109 is primarily intended to move higher vehicular traffic volumes.

Existing Conditions – Community and Land Use

- Existing land use along the WR109 is a mix of rural residences, farm properties and farming operations, and commercial/industrial businesses with frontage and/or access on WR109.
- Highway commercial uses are present around the intersection of Highway 6 and WR109, in the west part of the study limits.
- The nearby Urban Centre of Arthur includes residential, highway commercial, central business district, industrial land use designations.

Existing Conditions - Heritage

A **Cultural Heritage Evaluation Report (CHER)** has been prepared to document listed/designated and potential heritage resources within the study area.

With respect to the WR109 structures:

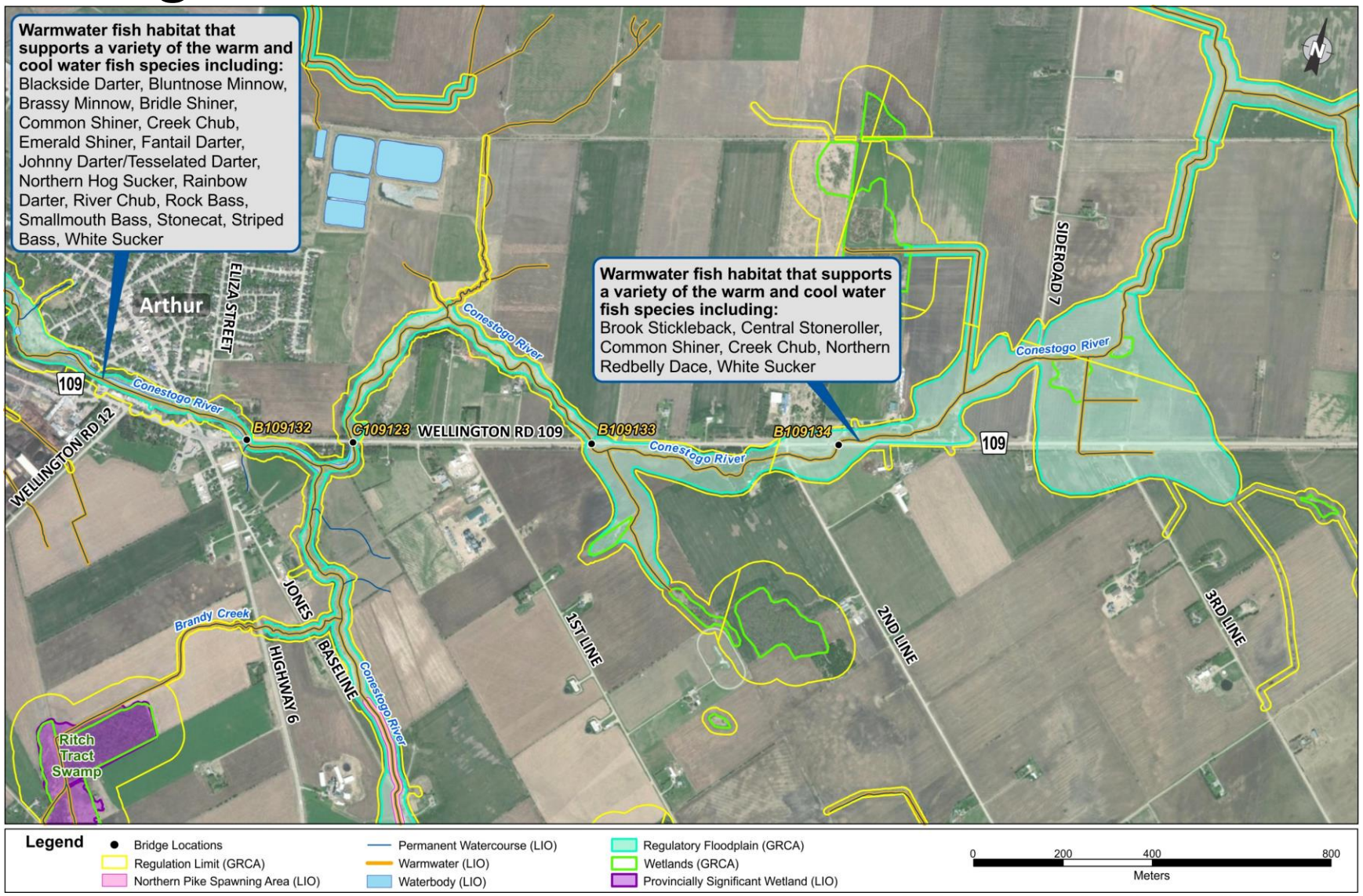
- **Current Heritage Status of the Structures**
  - None of the structures are currently listed on Municipal Heritage Registers or designated under the Ontario Heritage Act.
- **Potential Heritage Value**
  - All of the structures were identified as meeting one or more of the "Criteria for Determining Cultural Heritage Value or Interest" under Ontario Heritage Act Regulation 9/06.
- **Heritage Impact Assessment**
  - Given the heritage interest, a Heritage Impact Assessment was completed to develop recommendations, should any of the structures were to be replaced.
  - It is recommended that, for each structure that may be removed, documentation be prepared that includes thorough a photographic record and written description.

Existing Conditions – Heritage continued…

Within the broader study area:

- There are no properties listed on a Municipal Heritage Register or designated under the Ontario Heritage Act
- There are 21 potential cultural heritage resources that were identified during the field review and based on historical mapping. Seven have been identified as potential cultural heritage landscapes and 14 have been identified as potential built heritage resources.
- A cluster of potential built heritage resources along Highway 6 and WR109 reflect that residential development has expanded beyond the villages limits.
- These features are documented for the purposes of the EA Study. It is not within the scope of the study to pursue any formal heritage listing / designation.

Existing Conditions – Natural Environment



Natural Environment Overview

- The Conestogo River and its riparian corridor is the most prominent natural feature in the study area.
- The river is classified by the Ministry of Natural Resources and Forestry (MNRF) as a permanent watercourse that supports a variety of warm and cool water fish species and does not contain any aquatic Species at Risk (SAR).
- The Conestogo River floodplain is regulated by the Grand River Conservation Authority (GRCA) under O.Reg. 150/06
- There are no Provincially Significant Wetlands (PSWs) or Environmentally Sensitive/Significant Areas (ESAs) within the study area. Within the broader area, remnant scattered 'Greenlands' (wooded areas and wetlands) are found in within the agricultural land setting. These areas are also regulated by GRCA.
- Terrestrial habitat along WR109 consisted primarily of hedgerows and disturbance tolerant vegetation communities (e.g. cultural meadow and cultural woodland) with riparian habitat along the river.
- Riparian vegetation communities in the vicinity of the bridges includes meadow marsh along the watercourses with coniferous or mixed swamp along riparian valley slopes.

Natural Environment – Species at Risk

- The Conestogo River provides suitable habitat for Snapping Turtle (Special Concern). Gravel shoulders, lawns and fields adjacent may be used by turtles for nesting. Pools within the watercourse provide potential hibernation areas.
- Eastern Meadowlark (Threatened), Bobolink (Threatened), Barn Swallow (Threatened) have all been observed around the structures and in adjacent fields. Eastern Wood Peewee (Special Concern) has been heard calling in area woodlands. Breeding habitat for these species is present across the broader study area.
- Monarch Butterfly (Special Concern) has been observed in roadside areas where Milkweed is present.
- Although not a Species at Risk, Cliff Swallow nests are abundant on three of the structures.
- Appropriate timing windows and protection measures will be identified to protect all wildlife and their habitat.

Snapping Turtle

Cliff Swallow Nests

Existing Conditions – Drainage

- A hydraulic assessment was undertaken to confirm if the existing WR109 structures meet the design criteria.
- The MTO design criteria were used since they incorporate the standards for watercourse crossings from the Canadian Highway Bridge Design Code.
- In accordance with MTO design criteria, a new structure with a span greater than 6.0 m on a Rural Arterial or Collector roadway should be designed to convey a minimum of the 50-year design storm.
- A hydraulic model was created based on field survey data. The topographic survey and watercourse survey were completed by WSP in November 2017.
- The results indicate that structures 109123 and 109132 meet all the criteria. Structure 109133 does not meet the minimum Soffit Clearance and structure 109134 does not meet the minimum Soffit Clearance and minimum Desired Top of Road Clearance.

Existing Conditions – Drainage

Hydraulic Performance Summary

Criteria	Criteria Storm Event	Description	Meets Criteria (Yes or No)			
			B109132	C109123	B109133	B109134
Top of Road Freeboard (Min.)	50-Year	>1.0 m (Design Flow Water Surface Elevation – top of road low point)	Yes	Yes	Yes	Yes
Top of Road Freeboard (Desired)	50-Year	>1.0 m (Design Flow Energy Grade Line Elevation – top of road low point)	Yes	Yes	Yes	No
Relief Flow (Max. Depth over roadway)	Regional	Max. depth over roadway should not exceed 0.3 m	Yes	Yes	Yes	Yes
Relief Flow (Velocity x Depth)	Regional	Velocity x Depth should not exceed 0.8 m^2/s	Yes	Yes	Yes	Yes
Soffit Clearance	50-Year	Design Flow Water Surface Elevation – Soffit Elevation ≥1.0 m	Yes	Yes	No	No

Existing Conditions – Structure Summary

Structure Number	Structure Type	Name	Year Built	Location	Clear Span (m)	Rehabilitation History**	Condition*
B109132	Rigid Frame	Conestogo River Bridge #6	1931	0.2 km east of Highway 6	17.1	1989 - Railing and sidewalk repairs; overlay, waterproof and pave deck; soffit repairs; substructure repairs	Poor
C109123	Concrete Barrel Arch	Conestogo River Bridge #5	1930	0.7 km east of Highway 6	13.7	Shotcrete repairs to fascia and barrel - date unknown but likely in 1989 under same contract as adjacent bridge rehabilitations	Poor
B109133	Rigid Frame	Conestogo River Bridge #4	1931	1.7 km east of Highway 6	13.7	1989 - Repairs to superstructure, railings and curbs; patch, waterproof and pave deck; repair soffit	Poor
B109134	Rigid Frame	Conestogo River Bridge #10	1934	1 km east of Wellington Road 45	12.2	1989 - Repair railings and curbs; overlay, waterproof and pave deck; deck soffit repairs 2007 - Repair scour along west abutment	Poor

*Condition based on 2019 Structural Inspection Report

**under MTO jurisdiction at that time

Existing Conditions – Structure Deficiencies

Structure Number	Name	Major Deficiencies	
B109132	Conestogo River Bridge #6	• Railings are in poor condition with severe deterioration and do not meet current standards • Severe scaling and disintegration at south corner of west abutment • Severe scaling/erosion at base of east abutment with exposed reinforcing steel • Wide vertical crack and two medium cracks in west abutment	• Collapse of southwest retaining wall • Erosion noted on northwest and southwest embankments • Scour along west abutment exposing up to 0.6 m of footing • Severe corrosion of deck drains • Wide crack and scaling along abutment and NW wingwall joint
C109123	Conestogo River Bridge #5	• Railings are in poor condition with severe deterioration and do not meet current standards. Temporary concrete barrier required due to railing condition – reducing roadway width • Severe spall at base of arch at the south east corner • The underside of the barrel has honeycombing, wet pattern cracks, several longitudinal cracks, some leaching with efflorescence and/or rust stains • Very severe scaling/disintegration in south coping	• Medium pattern cracking, leachate cracks, spalls and scaling on wingwalls • Severe scaling/disintegration along joint between the end of barrel and wingwall at northeast and southeast corners • Severe erosion of northwest bank • Numerous cracks and spalls on fascia • Mis-alignment in railing suggests rotation of retaining wall and potential stability concerns
B109133	Conestogo River Bridge #4	• Railings are in poor condition with severe deterioration and do not meet current standards • South fascia has several rust stains, cracks and scaling/ disintegration • Severe scaling at mid span of south fascia / soffit adjacent to patch	• Gabion wall at the south west corner appears to have shifted slightly into the river - possible undermining • Scour along west abutment exposing up to 0.7m of top of footing • Exposed corroded rebar on south curb
B109134	Conestogo River Bridge #10	• Railings are in poor condition with severe deterioration and do not meet current standards • Narrow cracks and two medium to wide vertical cracks on abutments and some leaching cracks at the northeast and southwest corners • severe scaling/disintegration at southeast corner • Mis-alignment in railing suggests rotation of retaining wall and potential stability concerns	• South fascia showing leaching cracks and concrete spalls throughout with severe scaling and disintegration • north fascia has cracks and spalls throughout • Medium pattern cracks on southwest wingwall • Scaling and spalls throughout and transverse cracks in sidewalk • History of settlement at bridge approach

Existing Conditions – Structure B109132

South Elevation

In-stream habitat consists of large pool at the bridge with riffles and flats up and downstream. Pools offer potential Snapping Turtle hibernation habitat.

Large spall, severe scaling and disintegration of concrete throughout (worst at southwest)

Remains of collapsed retaining wall

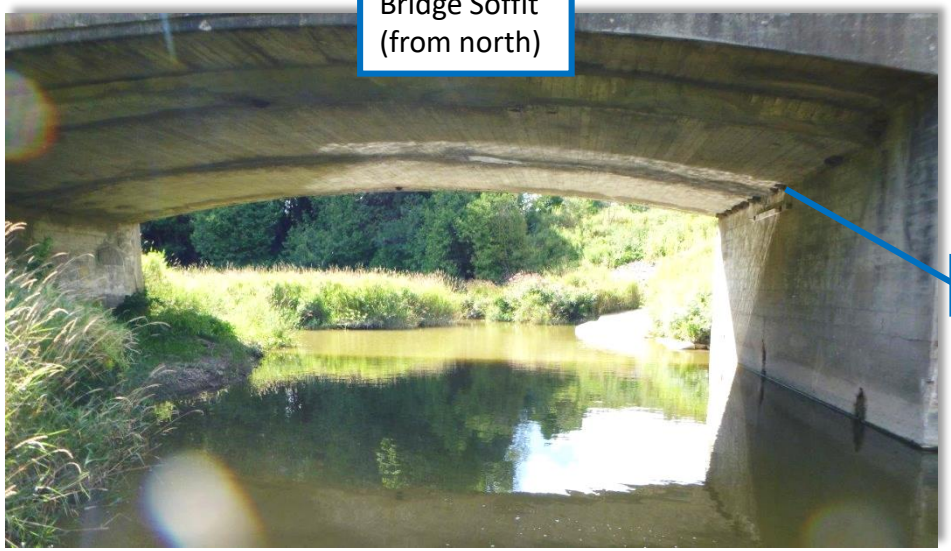
Proximity to Highway 6 Commercial Area

North Elevation

Gas Line on north side of bridge

Structure B109132 continued…

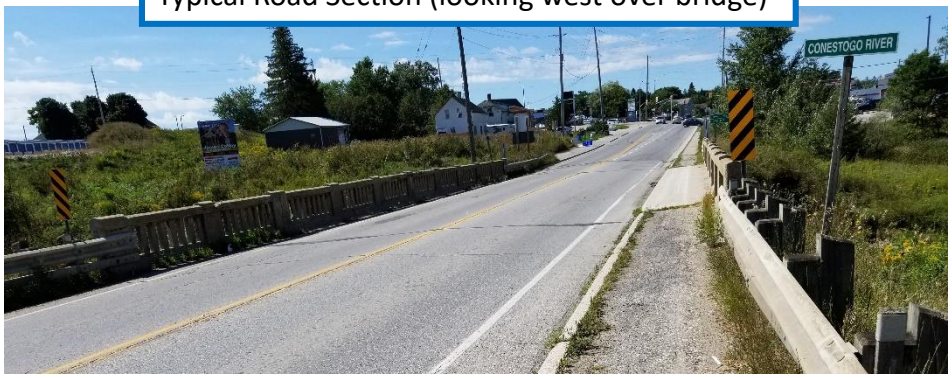
Bridge Soffit (from north)



Cliff Swallow Nests

Temporary wood shoring of road (due to scour/erosion of northwest embankment)

Typical Road Section (looking west over bridge)



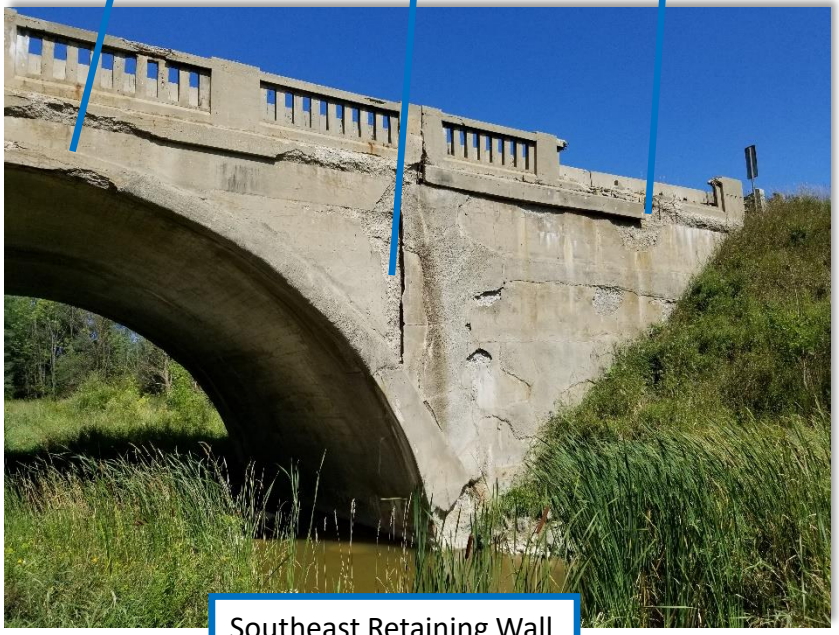
Bank stabilization measures have been put in place to address erosion on the outside meander bend on the south side of the bridge

Existing Conditions – Structure C109123

Large spall, severe scaling and disintegration of concrete

Concrete railing failure with temporary concrete barrier

Large delamination and wide crack



Southeast Retaining Wall

North Elevation

Spring flow conditions

Concrete deterioration throughout including spalled and delaminated concrete with wide cracks

South Elevation

Summer conditions

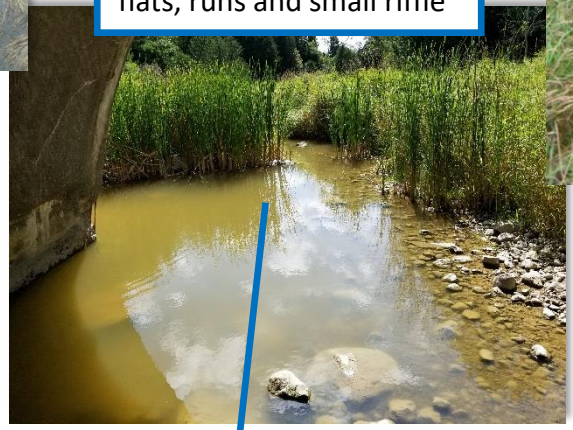
Existing Conditions – Structure C109123

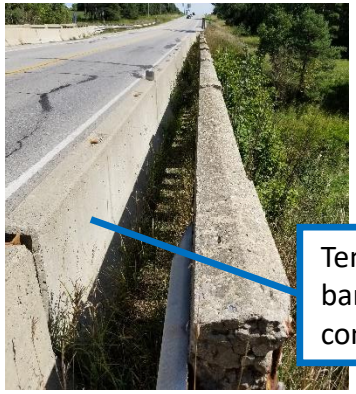
Bank erosion noted upstream, along outside of meander bend

No avian nests observed in culvert (2017 and 2020)

Typical channel substrate

In-stream habitat includes flats, runs and small riffle





Temporary concrete barrier adjacent to concrete railing

Upstream and downstream of the structure, the channel 'braids' through a Reed Canary Grass meadow marsh

Wet wide cracks, rust staining, efflorescence and delaminated patches throughout barrel

Existing Conditions – Structure B109133

South Elevation (upstream)

Gabion baskets installed for bank protection

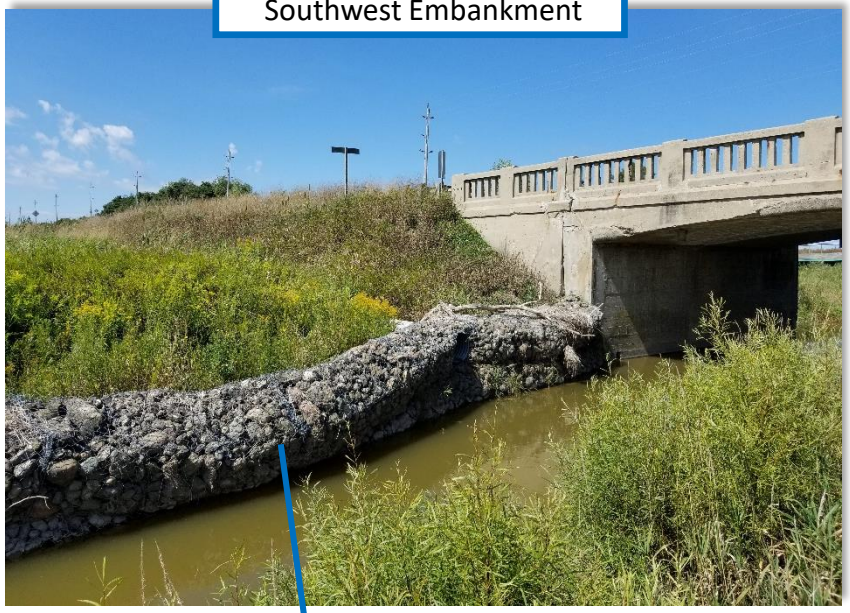
Concrete deterioration throughout south elevation including spalled and delaminated concrete with rust staining and wide cracks

Rotation of northwest retaining wall and mis-alignment of railing

Spalled and delaminated concrete with wide cracks and efflorescence at northwest wingwall

Existing Conditions – Structure B109133

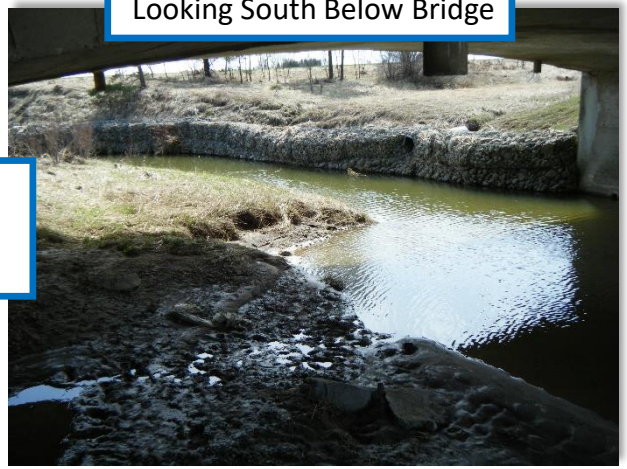
Southwest Embankment



Bank stabilization measures have been installed to control erosion however, the gabion shows signs of slumping

In-stream habitat consists of slow moving 'flats' through the bridge

Looking South Below Bridge



North Elevation

Cliff Swallow colony ~100 recent or active nests (2017 and 2020)

Existing Conditions – Structure B109134

Spalled and delaminated concrete with severe scaling and concrete disintegration and efflorescence at southwest abutment/wingwall

Concrete deterioration throughout south elevation

Full section loss noted in pickets of south railing

Existing Conditions – Structure B109134

North Elevation

In-stream habitat consists of a relatively deep, slow moving 'flat' with large pools. Pools offer potential Snapping Turtle hibernation habitat.

Northwest Bank

Bank stabilization measures have been installed along the meander bend on the north side of the bridge

Upstream View (north)

Problems and Opportunities

- The four WR109 structures are in **poor condition with major elements in an advanced state of deterioration**. In general, severe deterioration including delaminated and spalled concrete with rust staining and efflorescence are present throughout the wingwalls, abutments, deck soffit and fascia. In addition the concrete railings have significant deterioration including full section loss in areas and do not meet current standards.
- Several components on each structure are in need of maintenance, rehabilitation or replacement, as **all of the structures approach the end of their design life**.
- As the conditions worsen, the **structures may be subject to load restrictions or closures** which would be extremely disruptive given the important of WR109 as a local and regional east-west transportation and goods movement route.
- Two of the structures are undersized and **do not meet flood conveyance criteria**.
- With the number of bridges and the scope of works that will likely be needed, construction will extend over multiple years. **Multi-year construction and associated traffic disruption will come with challenges** for local residents, businesses and travellers.
- There is an opportunity to consider the feasibility and cost, for comparison purposes, of a localized permanent realignment of WR109 that would eliminate or reduce the multiple river crossings and the need for future works.

Alternative Planning Solutions

Alternative Planning Solution	Description
Do Nothing	No improvements would be made to the structures. Each structure would continue to be monitored / inspected. Through time, it is expected that load restrictions and eventually, bridge closures would occur as conditions worsen.
Rehabilitation	Rehabilitation includes local repairs to railings, curbs, sidewalks, soffit and substructure repairs, deck and superstructure repairs, repairs to erosion and scour at bridge abutments where necessary.
Replacement	Replacement involves removal of the existing structures and construction of new structures at or close to the existing locations. The proposed structure replacement type and construction / traffic staging methods would be determined in the next Phase of the EA process.
New Road Alignment	Realignment of WR109 to avoid or reduce the number of Conestogo River crossings. This solution may eliminate the need for ongoing and future maintenance, rehabilitation and replacements of the four structures, in the long term.

Factors Considered in Evaluating Alternative Solutions

Socio-Economic Environment

- Consistency with Official Plans and policies
- Potential property requirements
- Impacts to residents and business (operations and access)
- Impacts to agricultural lands and operations

Cultural Environment

- Archeological Resources
- Cultural Heritage Resources

Natural Environment

- Potential indirect and direct impacts to terrestrial and aquatic species and habitats
- Potential impacts to Species at Risk and their habitat

Surface Water and Groundwater

- Management of road runoff
- Protection of surface water features and watercourse crossings
- Flood conveyance
- Protection of groundwater resources

Technical

- Structural condition and deficiencies
- Design requirements and construction constraints / complexity

Transportation

- Consistency with transportation planning and policy documents
- Traffic operations and efficiency

Preliminary Cost Estimate

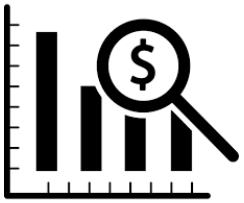
- Life Cycle Cost Analysis
- Capital costs estimate for high-level comparison purposes

Other Inputs to the Evaluation of Alternative Solutions

The next few slides review **key inputs to our understanding** of the potential benefits and impacts of the Alternative Planning Solutions:

- A **traffic analysis** that considers traffic delays during construction of the Replacement option

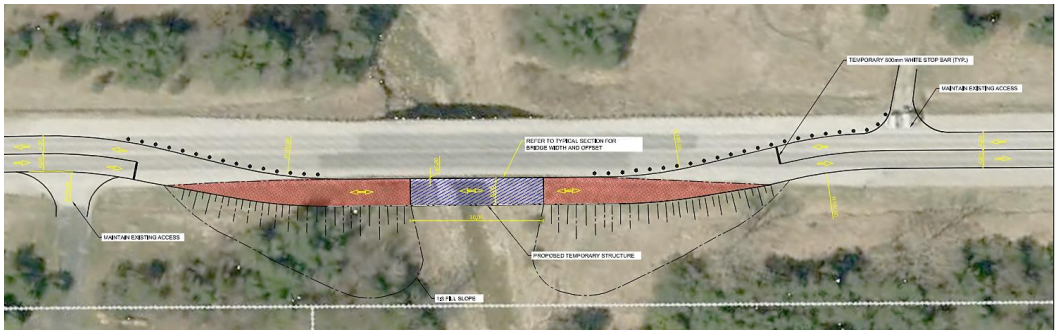
- The development of a **new road alignment concept** for evaluation purposes



- The completion of a **cost analysis** to better understand the initial capital costs and long-term (lifecycle) costs of the alternative solutions

How Long Could Traffic Delays Be?

- A preliminary traffic analysis looked at potential traffic delays associated with the bridge replacements.
- The analysis assumed a single-lane bypass at the work zone at C109123, located approximately 700 m east of Highway 6.
- Single lane would be controlled by a flag person or temporary traffic signal, with posted speed limit of 40km/h.
- The analysis considered afternoon peak hour traffic volumes and assumed lengths for work zone, queuing zone etc.
- A more detailed analysis will be prepared for each bridge location in the next phase of the study and presented at PIC #2.



Results

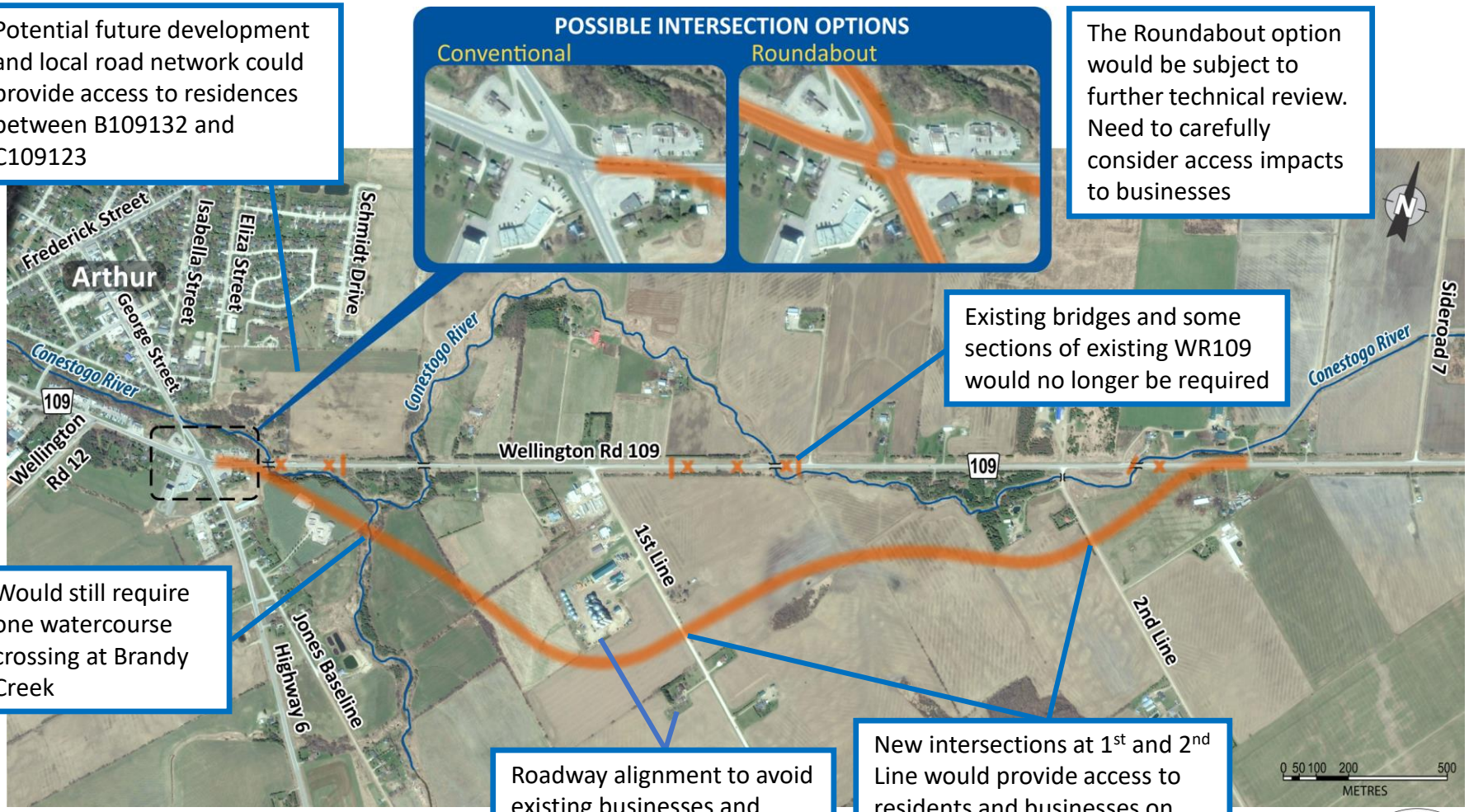
- Eastbound (EB) and Westbound (WB) traffic is expected to operate with an average delay of 56 and 58 seconds, respectively.
- The maximum queue lengths for the EB and WB directions are 163 m and 190 m, respectively.
- The EB max queue is not expected to extend to the first bridge east of Highway 6 and the WB maximum queue is not expected to extend to 1st Line.

New Road Alignment Concept

- Options to realign WR109 both north and south of the existing roadway were considered. The option to realign WR109 to the north was set aside because:
  - It would result in east-west traffic being diverted through Arthur, requiring traffic to navigate the local street network to reach Highway 6 and then back to WR109.
  - From a traffic operations perspective, the turning movements would overwhelm local intersections, creating long delays and conflict with local traffic.
  - This option would increase traffic volumes including truck traffic on Highway 6 through Arthur.
  - The necessary upgrades to local roads and intersections as well as Highway 6 would have substantial impacts throughout the community.
- The option to realign to the south would keep the WR109 ‘continuous’ from a transportation perspective and therefore this option was carried forward for a more detailed multi-factor comparison to other alternatives.
- The realigned WR109 would match into the existing Highway 6 intersection at Arthur, with some minor reconstruction for the east leg. An option for a roundabout at Highway 6 could be considered, in consultation with MTO.

New Road Alignment Concept

Potential future development and local road network could provide access to residences between B109132 and C109123



The Roundabout option would be subject to further technical review. Need to carefully consider access impacts to businesses

Existing bridges and some sections of existing WR109 would no longer be required

Would still require one watercourse crossing at Brandy Creek

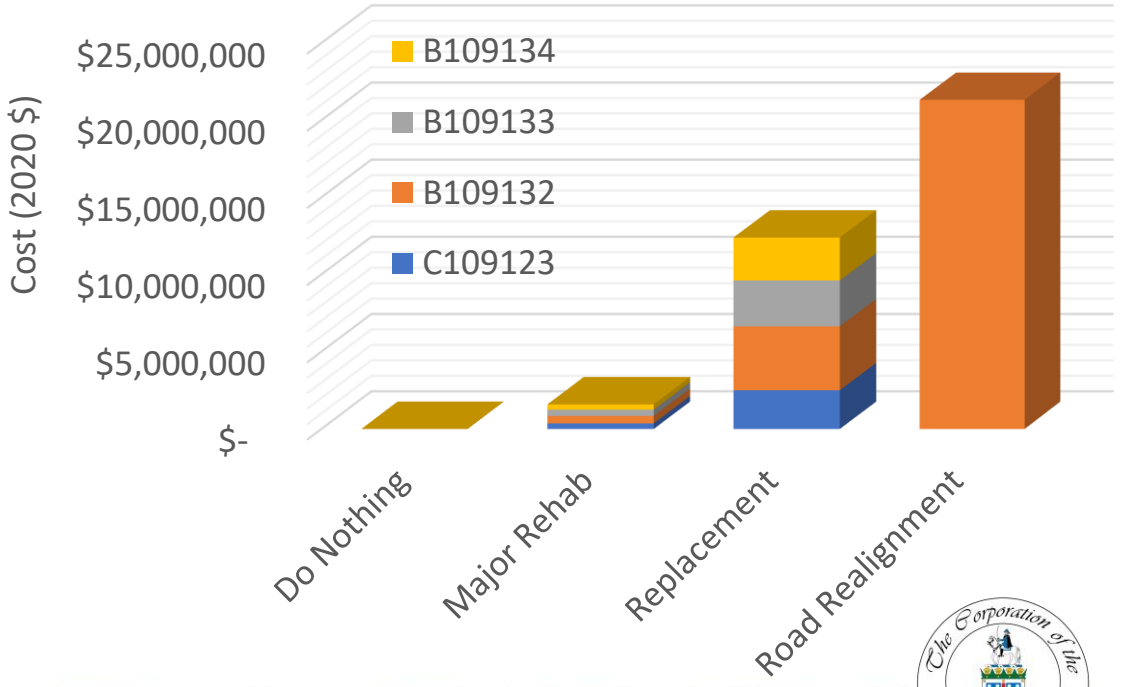
Roadway alignment to avoid existing businesses and residences

New intersections at 1st and 2nd Line would provide access to residents and businesses on WR109

Cost Analysis

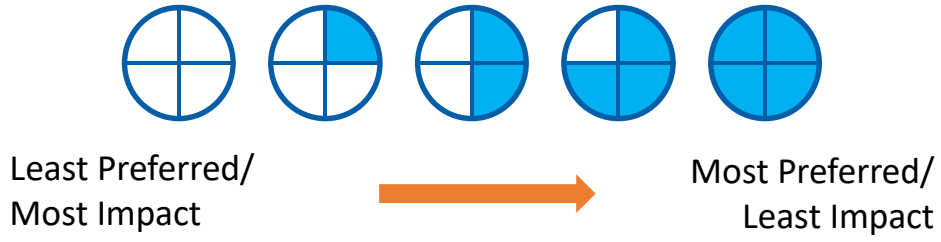
- A cost analysis considered both initial **capital costs** and **lifecycle costs** of each alternative solution.
- A lifecycle cost analysis (LCA) is the process of evaluating total costs over the life of the asset (e.g. bridge, roadway)
  - Total costs include initial costs and projected future costs such as maintenance, repair, rehabilitation and reconstruction (discounted to today's dollars)
  - A 100 year lifecycle was used in the analysis

	Initial Capital Cost (2020$)	Lifecycle Cost 100yr (2020$)
Do Nothing	0	n/a
Rehabilitation	1,600,000	12,400,000
Replacement	12,400,000	16,000,000
New Alignment	21,300,000	23,300,000



Assessment and Evaluation Process

- The multi-factor analysis has two basic steps:
  - **Assessment of Impacts -** The potential benefits and impacts of each alternative were assessed against comprehensive set of factors / criteria
  - **Evaluation of Alternatives -** A comparative examination of the relative advantages and disadvantages of the alternatives and a ranking of most preferred to least preferred is developed. Ultimately each factor is reviewed in the context of the overall project objectives and needs
- **The assessment and evaluation is presented in detail over the next few slides and followed by a summary of the key considerations**
- The evaluation utilizes the following system to indicate relative ranking or preference



Evaluation of Alternative Planning Solutions

Category	Do Nothing	Rehabilitation	Replacement	New Road Alignment
Socio-Economic	- No immediate changes to existing conditions however, as structural conditions decline, significant socio-economic impacts would arise from load restrictions and bridge closures.	- No impacts outside of existing right-of-way - Temporary alteration of travel/ commuter routes and impact to adjacent/alternative route(s) during construction - Temporary impact to local commercial, industrial and farm businesses during construction	- Potential minor impacts to adjacent properties during construction (e.g. construction easements) - Noise and dust and other associated inconveniencies during construction - Disruption to local businesses, farm operations and residences during construction – disruption during construction season over multiple years may be experienced	- Would require new property for the alignment - One new residence located near the Highway 6 intersection would be directly impacted - Alignment would bisect properties including farm parcels therefore impacting operations and operable land area - Existing highway commercial access and frontage on WR109 would be eliminated and access would be provided via sideroads - Existing access to rural residences would be changed – access would be provided via sideroads
				

Evaluation continued…

Category	Do Nothing	Rehabilitation	Replacement	New Road Alignment
Cultural Heritage	- No potential archaeological impacts - No impacts to potential heritage resources	- Limited potential archaeological impacts - Bridges are of heritage interest and while rehabilitation may maintain the bridges in the short-term, key features may change as a result of necessary rehabilitation works	- All four structures are of heritage interest - Mitigation includes documentation and photographic record prior to removal - Some potential to disturb archaeological resources during construction– appropriate assessments will be undertaken in advance of construction	- Several potential heritage resources, including built heritage and cultural heritage landscapes, would be impacted - New alignment would be subject to extensive archaeological assessment
				
Surface and Groundwater	- No changes to existing conditions - Flood conveyance deficiencies would not be addressed	- No changes to existing conditions - Flood conveyance deficiencies would not be addressed	- Ensures all structures will meet flood design criteria - Limited other changes to surface water/drainage and groundwater sensitivities	- May reduce overall roadway length within the floodplain - New bridge at Brandy Creek would be appropriately sized to meet current design criteria - Extensive new drainage design required for new roadway, including ditch outlets - Roadway would be closer to wellhead protection area - Potential impacts to private wells would need to be examined
				

Evaluation continued…

Category	Do Nothing	Rehabilitation	Replacement	New Road Alignment
Natural Environment	- No immediate changes to existing conditions	- Potential for indirect impacts (e.g., debris and sediment release with rehabilitation works) can be managed using appropriate mitigation measures (e.g., proper erosion and sediment controls, use of in-water work timing window). - No permanent impacts on the aquatic habitat of the Conestogo River	- Temporary in-stream works associated with removal of existing abutments and installation of new foundation and abutments – work zone can be isolated from river - Minor direct impacts to common roadside and riparian vegetation, and temporary bank alteration above the waterline – areas to be restored following construction - The minor direct impacts and potential indirect impacts (e.g., construction related debris and sediment release) can be managed using appropriate mitigation and restoration measures (e.g., proper erosion and sediment controls, use of timing window).	- New road alignment would involve a new crossing of Brandy Creek - Potential for direct and indirect impacts to Brandy Creek are similar to the bridge replacement option - however impacts would be associated with a new crossing rather than replacement of existing i.e. new impact in new area - Other woodlands/wetlands are largely avoided - Several hedgerows would be impacted
				

Evaluation continued…

Category	Do Nothing	Rehabilitation	Replacement	New Road Alignment
Technical	- Structural conditions would worsen until more drastic measures would have to be taken such as bridge load reduction or closure in order to manage risk to the public	- Provides short term solution to structural deficiencies however does not ultimately address the limited design life and does not address design deficiencies - Only defers but does not avoid eventual structure replacement - If the scope of rehabilitation were to be expanded to address design issues as well as structural deficiencies, the cost would become similar to the Replacement option	- Provides a long-term solution to addresses all structural and design deficiencies on WR109 - Opportunity to address localized erosion conditions - Construction will likely involve multiple construction seasons - Opportunity to carefully examine rapid replacement techniques and other means of optimizing construction to manage impacts	- Three existing WR109 bridges would be taken out of commission - One WR109 bridge to remain for residential access and one new bridge on Brandy Creek - means only a net reduction of two structures for long-term management - New road can be constructed offline with little disruption to traffic on WR109, except when tiering into Highway 6 intersection
				

Evaluation continued…

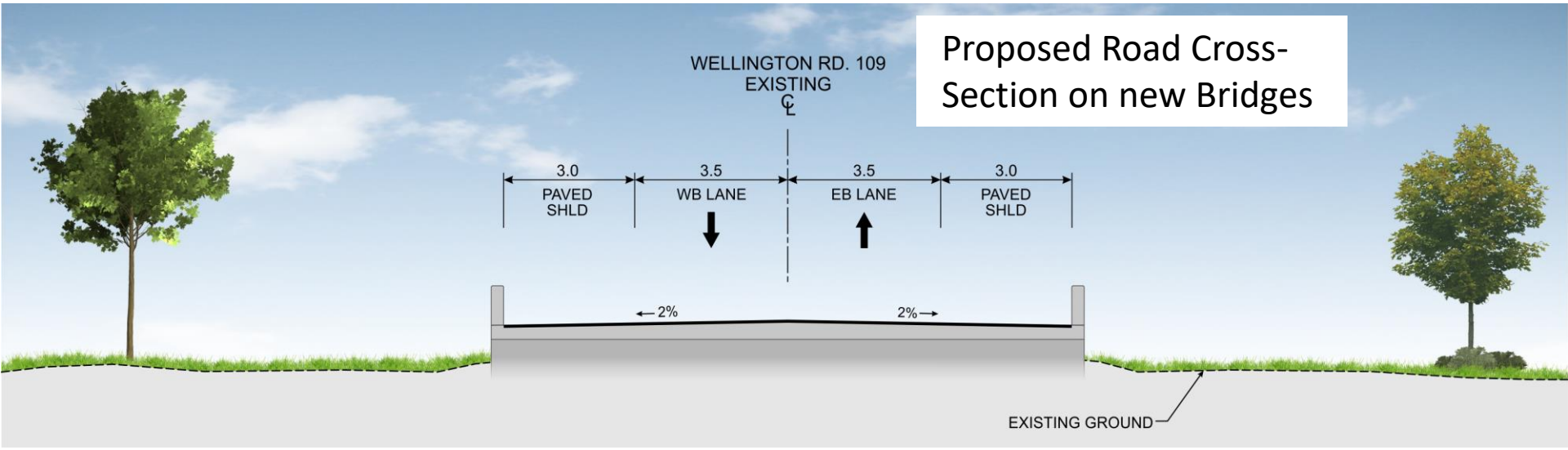
Category	Do Nothing	Rehabilitation	Replacement	New Road Alignment
Transportation	- No immediate changes - Long term impacts would arise as travel would become limited or close, in the long-term	- Some short-term traffic impacts during rehabilitation works (e.g. lane closures or temporary detours)	- Maintains WR109 in its current location in the long-term - Construction would involve traffic management for each bridge including possible lane restrictions, road closures and temporary detours - Local and regional traffic may experience delays during construction - Based on preliminary analysis, traffic delays are expected to be manageable	- Not reflected in County transportation plans/strategies – realignment in this area has not been previously considered or identified as a strategy - Results in slightly longer road length and therefore slightly longer travel time - Ties in to existing Highway 6 intersection
				
Cost Estimate	- No capital costs - minor costs for inspections	Capital Costs = $1,600,000	Capital Costs = $12,400,000	Capital Costs = $21,300,000
Conclusion	**Not Recommended**	**Not Recommended**	**Recommended**	**Not Recommended**

Alternative Planning Solutions Summary

Alternative Planning Solution	Assessment Summary	Conclusion
Do Nothing	• Not a reasonable alternative because significant structural deficiencies would not be addressed. • Would lead to load restrictions and eventually, road closure.	Does not address the problem and therefore is not considered an acceptable alternative. Therefore, this alternative is not recommended.
Rehabilitation	• Extensive and ongoing rehabilitation would be required. • Rehabilitation would have limited additional service life to the bridges. • Only defers/delays a longer-term solution.	Addresses some of the structural deficiencies but would not address design deficiencies or flood conveyance requirements. Therefore, this alternative is not recommended.
Replacement	• Existing bridge would be removed and new foundation / abutments would be installed. • All design criteria would be met. • Traffic delays will occur over multiple construction seasons. Construction staging and traffic management can ease disruption. • Rapid replacement to be considered in next study phase.	Addresses the structural and functional deficiencies and has fewer impacts to socio-economic , natural and cultural environments than the New Road Alignment option. Initial capital costs and lifecycle costs are lower than the New Road Alignment option. **Recommended**
New Road Alignment	• New road would be constructed 'off-line' and then opened to traffic once complete. • Substantial impacts to property, residences, business, agricultural operations compared to other options. • Not consistent with / does not align with existing land use or transportation plans and policies.	Potential benefits do not outweigh the socio-economic, cultural and natural environmental impacts. Both initial capital costs and lifecycle costs are substantially higher than the Replacement option. Therefore, this alternative is not recommended.

Road Cross-Section at the Bridges

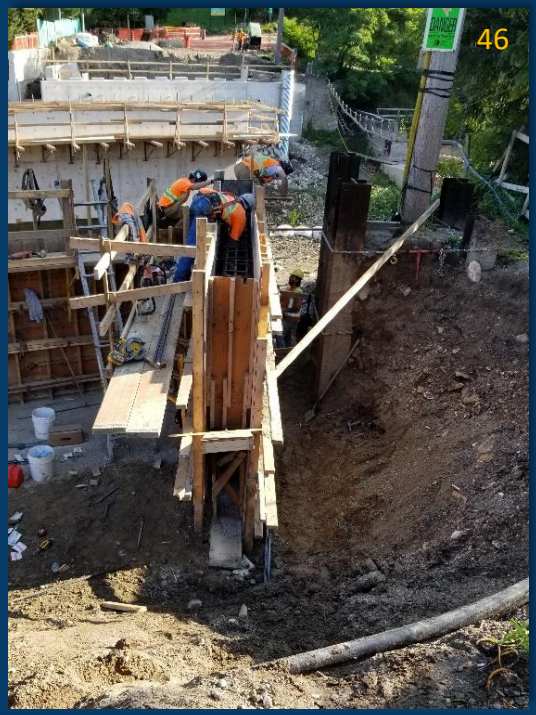
- The existing typical road cross-section over each of the bridges varies across the study limits.
- A future cross-section that accommodates 3.5 m travel lanes and 3 m shoulders on the bridges and at the approaches is being considered and will be confirmed in the next phase of the study.
- Travel lane and shoulder width recommendations are consistent with design standards based on the posted speed, design speed and the vehicle volumes and percentage of truck traffic.



Bridge Replacement Design Considerations

Many considerations go into the next phase of the Class EA study which will involve the development and evaluation of bridge design alternatives:

- Bridge size requirements, materials, construction methods
- Rapid Replacement techniques
- Construction staging (bridge removal and new construction) and traffic management including: use of temporary bridge, traffic signals and lane closures, detours
- Construction scheduling and duration, including timing windows to protect sensitive fish and wildlife habitat and life stages



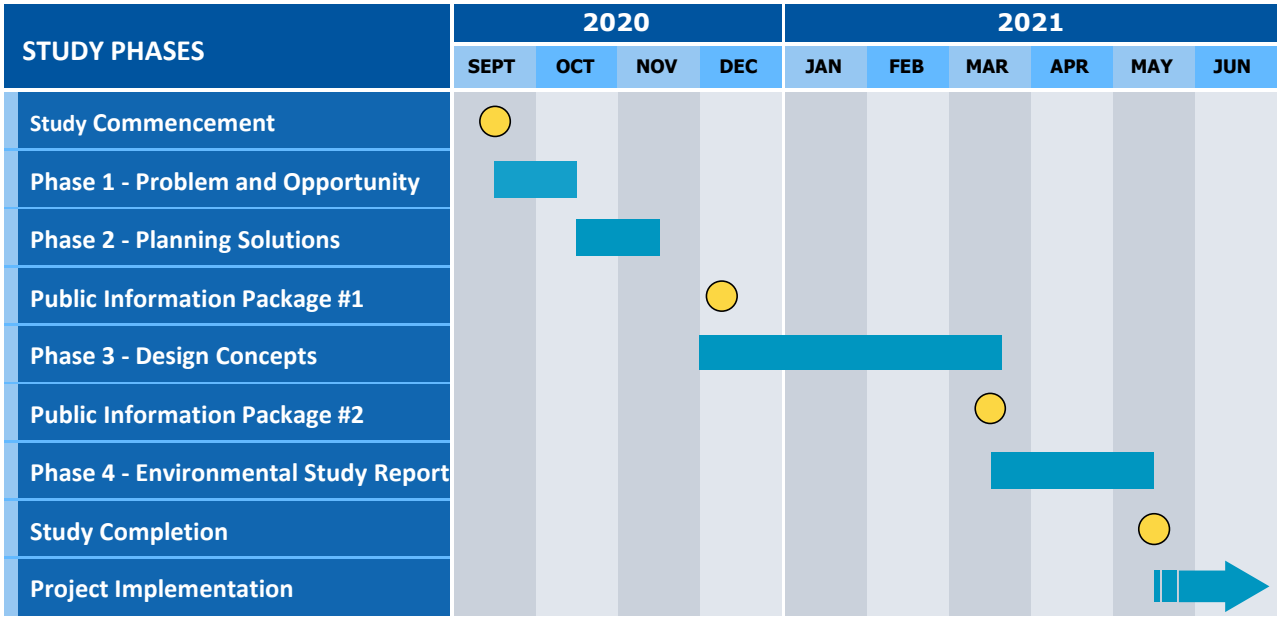
Design Considerations continued…

- Utilities and the need for temporary protection or relocations
- Opportunity for construction at multiple sites in one season
- Need for temporary work zones or construction easements on private property
- Utilities and the need for temporary relocations
- Proximity of private driveways, business entrances to work zone and ensuring safe access to these areas in all stages of construction
- Groundwater conditions, groundwater pumping permits/approvals and proximity to nearby private wells
- Soil conditions and bridge foundation needs

Next Steps

Following this Public Information Centre (PIC) we will:

- Collect all public comments and respond to questions, as appropriate
- Confirm the Preferred Solution
- Develop Bridge Design Alternatives (Phase 3) including preliminary construction staging and traffic management options
- Prepare Public Information Package 2 to inform and invite feedback on Phase 3 materials
- Finalize the preliminary bridge designs
- Prepare the Environmental Study Report



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Alternate formats available upon request