

# ***Additional Trent River Crossing***

## ***Class Environmental Assessment***

### **Northumberland County Council Presentation**

October 21, 2009



**AECOM**



Come for a visit. Stay for a lifestyle.



## ***Additional Trent River Crossing***



# ***PROJECT TEAM***

Steering Committee comprising Municipal and County Staff, Mayor Hector MacMillan (Municipality of Trent Hills), Councillor Bill Thompson (Municipality of Trent Hills), Councillor Mark Lovshin (Northumberland County), and AECOM staff

### **Consultant Team**

- AECOM – EA process, transportation planning, traffic operations, road design, and structural
- Unterman McPhail Associates – culture and heritage
- Warne Engineering and Biological Services – natural environment
- Archeoworks Inc. – archaeological
- RWDI AIR Inc. Consulting Engineers and Scientists - noise



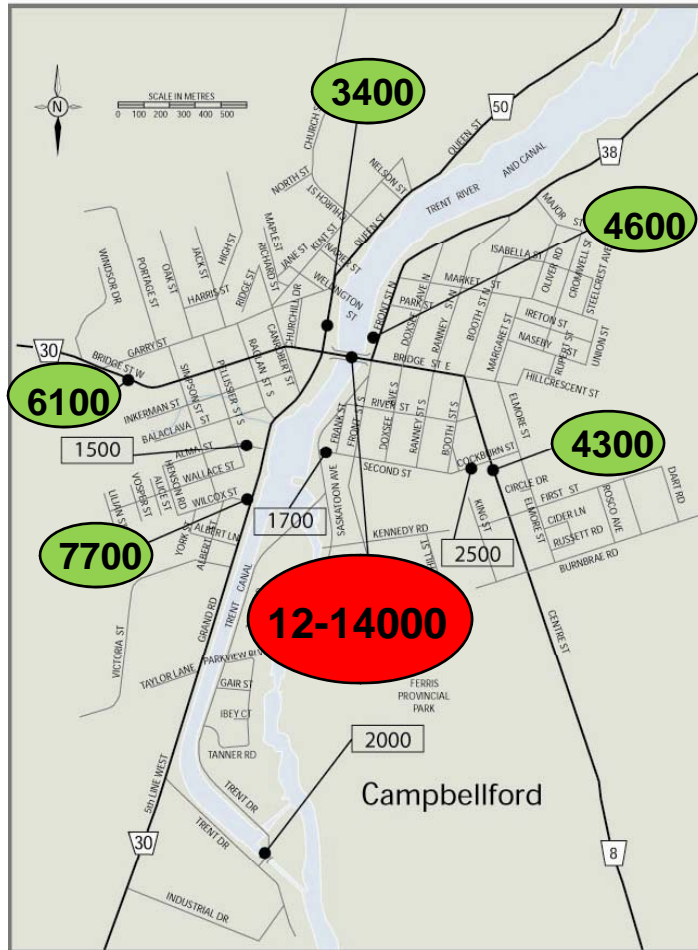
## Additional Trent River Crossing



# SCHEDULE 'C' CLASS ENVIRONMENTAL ASSESSMENT STUDY

PHASE	SUMMARY COMMENTS
Problem or Opportunity	River Crossing
Need and Justification	Transportation, Emergency, Bridge Replacement
Alternative Solutions	Within or South of Campbellford
Alternative Designs	Lanes, Intersections, Bridge Spans
Environmental Study Report (ESR)	<i>Interim Recommendation</i> – signal timing improvements for Bridge Street (County Road 50) <i>Ultimate Recommendation</i> – bridge within Campbellford, Alma Street to Second Street

## COUNTY ROAD NETWORK CHARACTERISTICS



### County Roads To/From Campbellford

- County Road 30 – two approaches
- County Road 50
- County Road 38
- County Road 8
- All function as two lane roads

### Daily Traffic Volumes

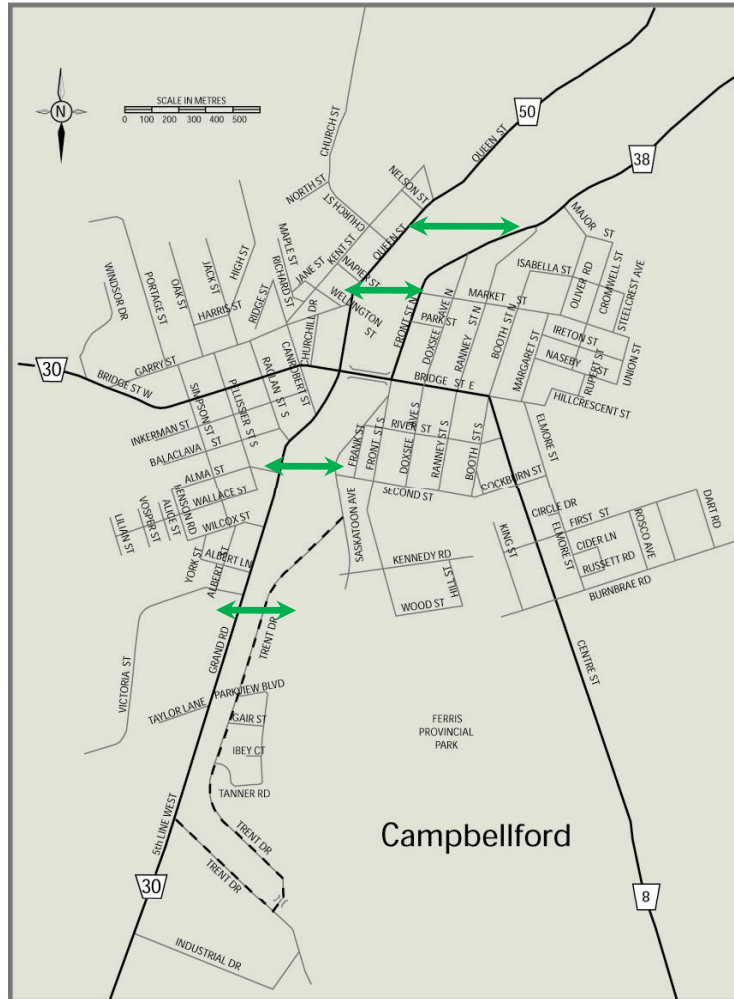
- Roads 3,000 to 8,000 vehicles per day (vpd)
- Concentration at the bridge 12-14,000 vpd
- As a rule-of-thumb, 2-lane roads are typically at capacity during peak periods when the daily traffic volumes reach 15,000 vpd
- Trent-Severn Waterway single lane swing bridge at 2,000 vpd



## Additional Trent River Crossing



# COUNTY AND LOCAL TRANSPORTATION NETWORK ISSUE



- Removing the river as a barrier, it is clear to see that the grid road system serving Campbellford is incomplete
- In Towns without this type of barrier, several other east-west road connections would have been made to assist in dispersing traffic and facilitating travel by cycling and walking
- The limited east-west travel opportunities result in indirect and inefficient routing for County trips to and through Campbellford, and local trips within Campbellford, i.e.:
  - Longer travel distances
  - Increased fuel consumption
  - Increased emissions
  - Longer emergency response times



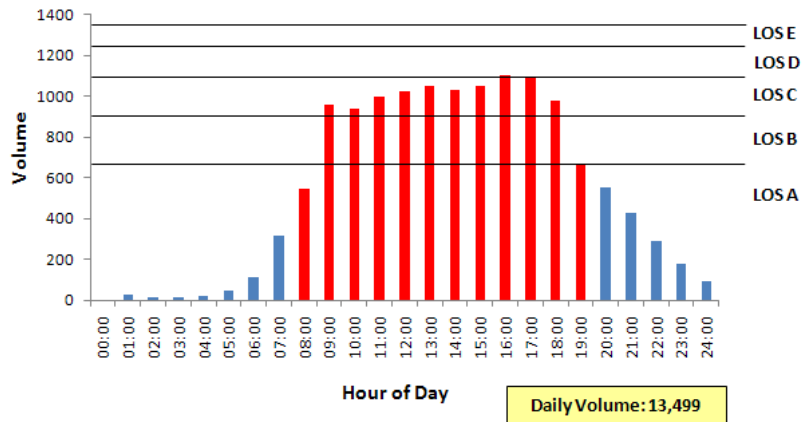
## Additional Trent River Crossing



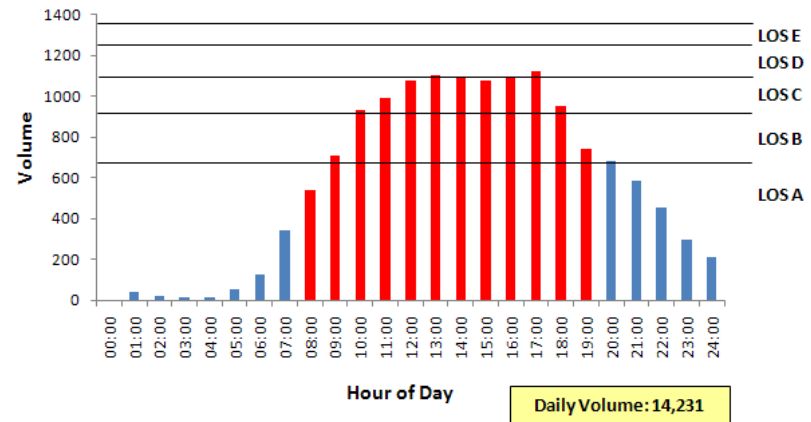
# BRIDGE CROSSING HOURLY TRAFFIC VOLUMES AND LEVEL OF SERVICE (WEEKDAYS)

- The quality of traffic operations is typically measured in terms of Level of Service on a scale from A (excellent) to E (capacity), and F (forced flow)
- For smaller towns, Level of Service C is typically considered acceptable

Thursday May 28, 2009



Friday July 10, 2009



- 8 of the 12 daytime hours are at Level of Service C, 2 are at D

- 5 of the 12 daytime hours are at Level of Service C, 4 are at D

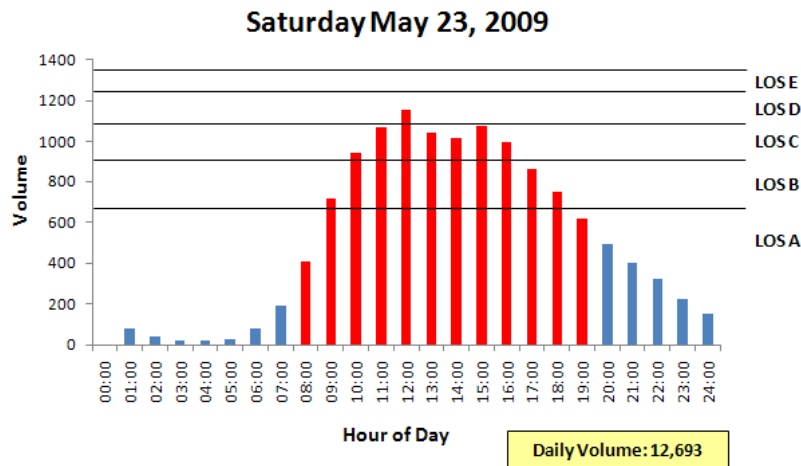
The existing bridge carries consistently high traffic volumes for many hours of the day on weekdays in both the non-summer and summer months



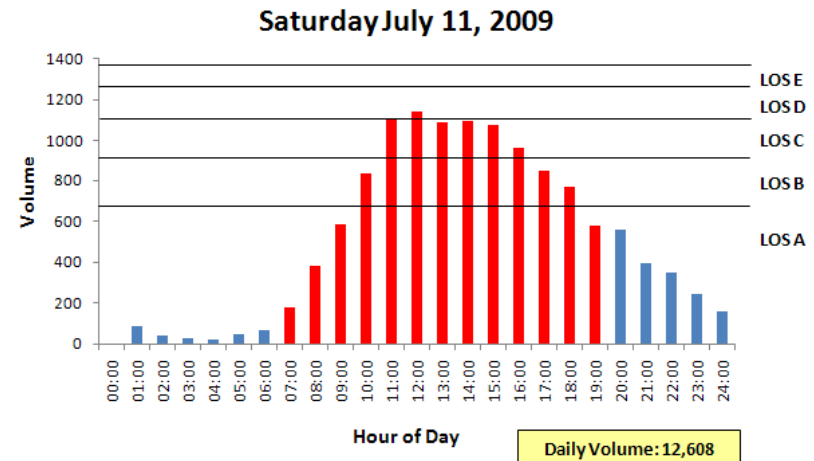
## Additional Trent River Crossing



# BRIDGE CROSSING HOURLY TRAFFIC VOLUMES AND LEVEL OF SERVICE (SATURDAYS)



- 5 of the 12 daytime hours are at Level of Service C, 2 are at D



- 4 of the 12 daytime hours are at Level of Service C, 2 are at D

The existing bridge carries consistently high traffic volumes for many hours of the day on Saturdays in both the non-summer and summer months

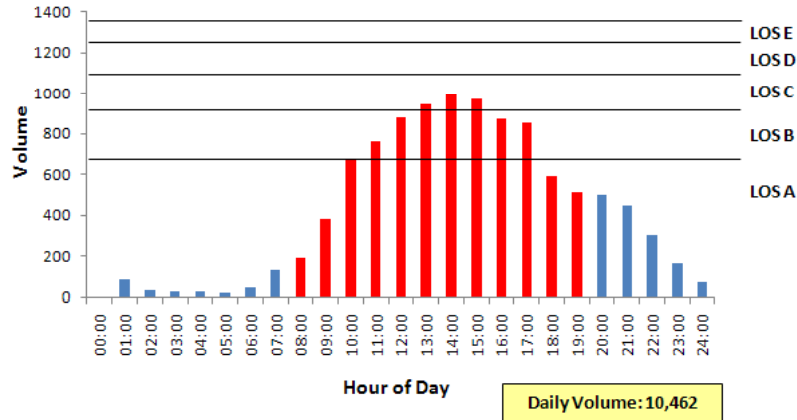


## Additional Trent River Crossing



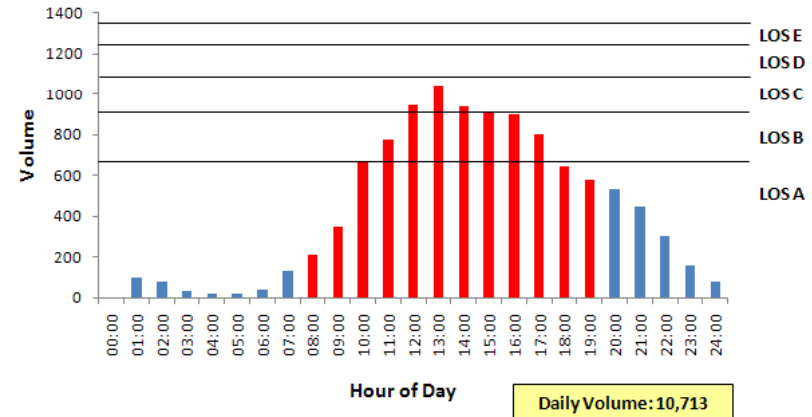
# BRIDGE CROSSING HOURLY TRAFFIC VOLUMES AND LEVEL OF SERVICE (SUNDAYS)

Sunday May 24, 2009



- 3 of the 12 daytime hours are at Level of Service C, none are at D

Sunday July 12, 2009



- 4 of the 12 daytime hours are at Level of Service C, none are at D



## ***Additional Trent River Crossing***



# ***FUTURE TRAFFIC GROWTH AND CONCLUSIONS***

### **Traffic Forecasts**

- Base year 2007, 20-year horizon year for forecasting 2027
- Estimated future weekday peak hour traffic volumes based on low and high growth scenarios (1% to 2% per year compound traffic growth)

### **Analysis – One Bridge Scenario (Two Lanes Crossing the River)**

- Bridge Street traffic operations indicated near capacity to capacity conditions for the low and high growth scenarios with one high level bridge
- Higher fuel consumption and emissions

### **Analysis – Two Bridge Scenario (Four Lanes Crossing the River)**

- With two high level bridges, acceptable operations can be maintained on the streets serving both bridges under either growth scenario
- Lower fuel consumption and emissions

### **Conclusion**

- Two high level bridges ensures capacity requirements for the foreseeable future



## **Additional Trent River Crossing**



# **EMERGENCY RESPONSE ISSUES**

### **Northumberland County EMS (ambulance)**

- 2008 data, 7 a.m. to 7 p.m., 1.2 Code 4 calls per day crossing the river
- 1996 90<sup>th</sup> percentile response time 16 minutes, currently 17 minutes

### **Trent Hills Fire Department (Campbellford/Seymour Station)**

- 2008 data, 7 a.m. to 7 p.m., 67 Code 4 calls on the west side of the river
- Fire Chief has repeatedly expressed his concerns in staff reports and has identified several incidents where traffic conditions on the bridge have delayed responses

### **Ontario Provincial Police (OPP)**

- Campbellford station, multiple crossings daily

### **Public Opinion?**

- Mixed – some concerned, while others cite the absence of a known tragic incident (e.g., fatality) as an indicator that the situation is acceptable



## **Additional Trent River Crossing**



# **BRIDGE STREET STRUCTURE**

Bridge Street structure has a post-tensioned concrete slab deck

- Selected as an economical way to provide a slender bridge deck and achieve clearance requirements over Trent River , while minimizing road grades on the bridge approaches

### **Service life of this type of bridge (and others)**

- Bridge service life is considered at the design stage (typical 75 years), and guides selection of materials as well as other details of the bridge design (e.g., anticipated traffic loading)
- The key factor affecting the service life of a bridge is the accumulation of damage induced by reinforcement corrosion, freeze-thaw cycles, and traffic loading
- When the benefits of a bridge are lower than its costs, and rehabilitation is not economically feasible, its service life has been reached
- With the increased traffic loading experienced on the Campbellford bridge, the future costs for rehabilitation are anticipated to increase such that its service life will be reached in 20 to 35 years – at that time, replacement would be recommended



## **Additional Trent River Crossing**



# **FUTURE OF BRIDGE STREET STRUCTURE**

### **Can the bridge be widened?**

- AECOM concluded that it is not economical to widen the existing structure due to the complexity of its structural design, its anticipated service life, and environmental impact

**The County initiated an independent "conceptual" study prepared by McCormick Rankin Corporation (MRC) consulting engineers**

- The bridge is operating near capacity under existing conditions
- \$4-6 million to widen to three-lane width, excluding property
- Twinning of bridge not feasible – significant building demolition, poor lane alignment, pedestrian access issues, and high cost (\$7-10 million, excluding property)
- MRC concluded that if any improvements were to be made (i.e., signal timing optimization and/or widening), they should be considered interim while planning for a new crossing to provide needed capacity

### **How would it be replaced in the same location?**

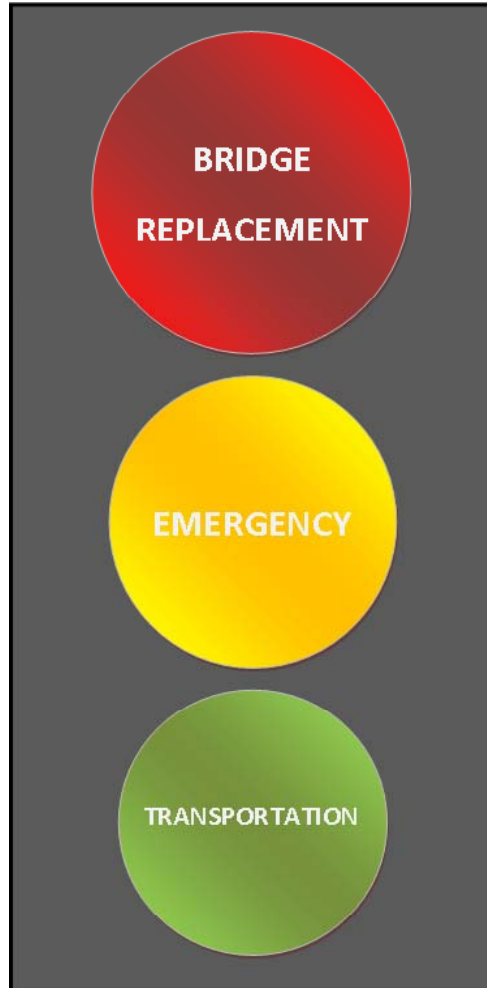
- Design decisions unknown at this time – bridge type, property constraints, etc.
- Replacement will involve full and partial closure of the crossing, traffic detours, and due to seasonal restrictions related to the waterway – a construction window of 18 to 24 months



## Additional Trent River Crossing



# NEED AND JUSTIFICATION – IS IT NEEDED?



BRIDGE REPLACEMENT has emerged as the most critical element from the perspective of minimizing the impact on the whole community at the time the bridge needs to be replaced. Advanced planning required.

### Municipal and County-wide Benefits

EMERGENCY – two bridges are required to provide the most direct routes and an alternative if one bridge is unavailable, which will ensure and reduce critical emergency response times.

### Municipal and County-wide Benefits

TRANSPORTATION – two bridges increase the efficiency of the road network for vehicles and other modes, provide capacity for future growth, and assist in reducing fuel consumption and emissions.

### Municipal and County-wide Benefits



## ***Additional Trent River Crossing***



# **RECOMMENDATION – INTERIM SOLUTION**

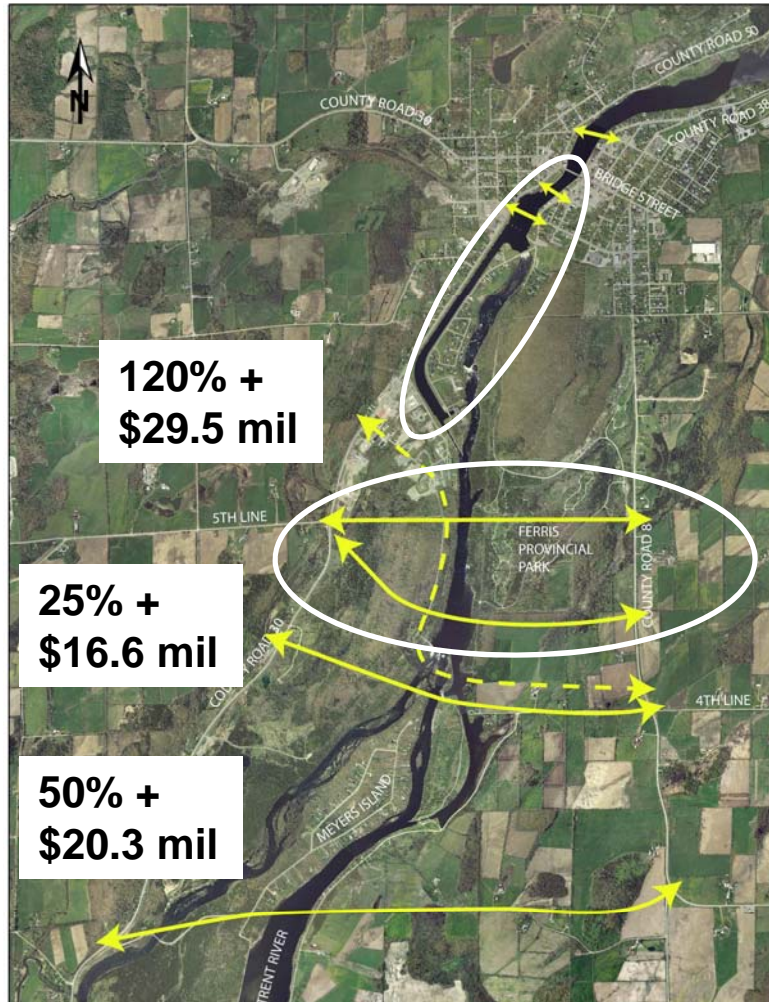
## **Improve Traffic Signal Operations on Bridge Street**

- Three closely spaced signalized intersections along Bridge Street (Grand-Queen, Front, and Doxsee)
- Initial improvements to signal timing plans have been made, as recommended by AECOM, and refinements ongoing by the County's consultant
- Anecdotal comments that traffic flow has improved

## **Interim Solution?**

- Intersection capacity is limited by the number of approach lanes, with future traffic growth eventually run out of options for signal timing improvements
- Does not address emergency access limitations
- Does not improve pedestrian and cycling modes
- Does not address future bridge replacement

# ALTERNATIVE SOLUTIONS – WHERE SHOULD IT GO?



### WITHIN THE COMMUNITY?

- Make use of existing transportation infrastructure
- Complete missing east-west road in the grid road network north or south of existing bridge

### SOUTH OF THE COMMUNITY?

- Construct new transportation infrastructure through “green fields” and future development areas
- Provide a by-pass route
- Minimize the impact on the cultural heritage aspect of Campbellford



## Additional Trent River Crossing

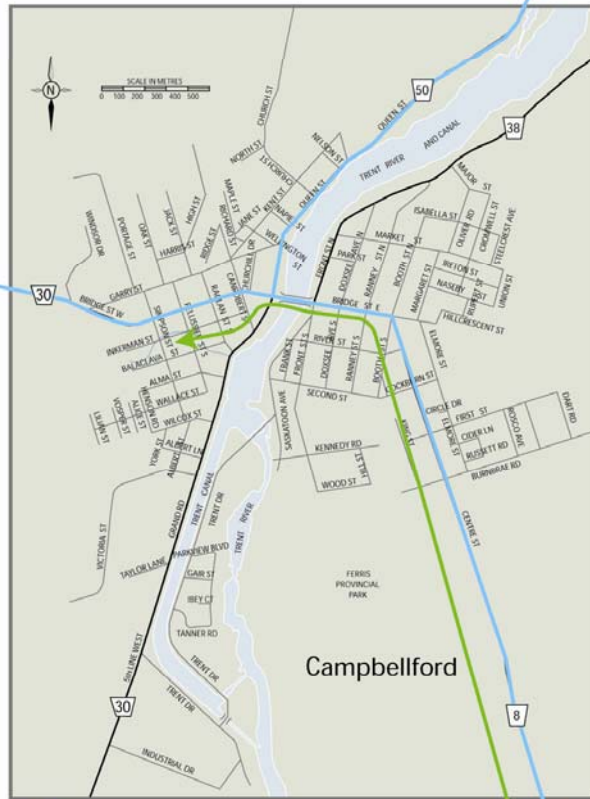


# REVIEW OF BY-PASS ISSUE

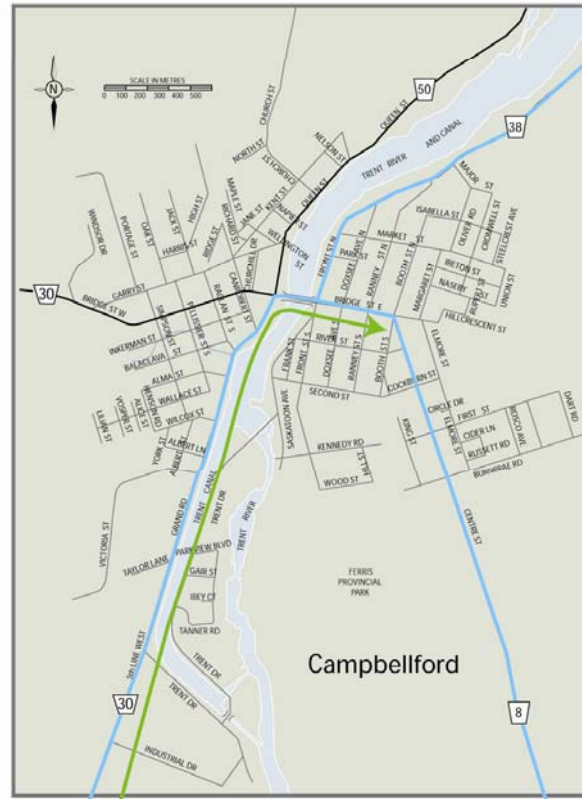


By-pass function of Campbellford for inter-city east-west travel is already provided by Highway 7 and Highway 401. In terms of travel time, no benefit in travelling through Campbellford for trips between Belleville and Peterborough.

## NEED FOR A BY-PASS ROUTE?



6%  
4%  
10% of River Crossing Traffic



7%  
3%  
10% of River Crossing Traffic

Based on the 1988 origin-destination studies, the percentage of traffic travelling through Campbellford on the bridge is very small.

The figures to the left show the potential for traffic to use a southerly by-pass route.

Total of 7% of bridge traffic with origins/destinations beyond Campbellford (blue lines above) would potentially use a southerly by-pass route, or 800 to 1,000 trips per day.



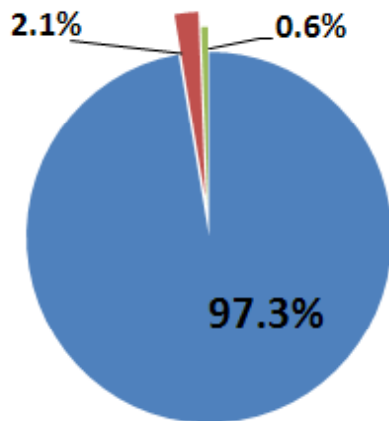
## Additional Trent River Crossing



# BY-PASS ROUTE FOR TRUCK TRAFFIC? (2)

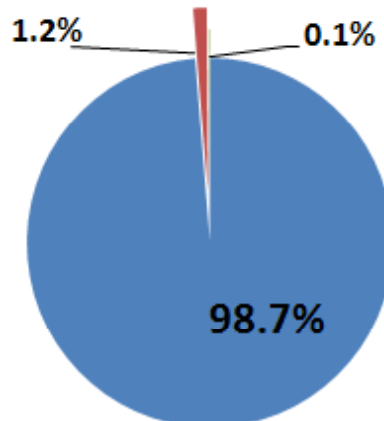
### COMPOSITION OF DAILY TRAFFIC VOLUMES ON THE BRIDGE STREET BRIDGE

#### Friday August 7, 2009



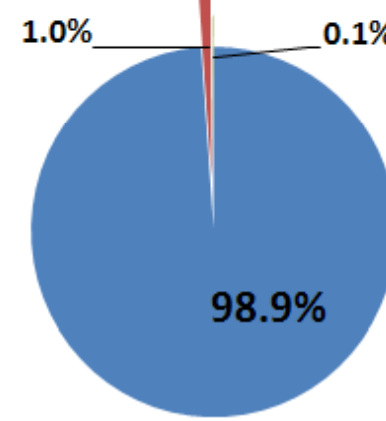
Volume: **14,280**  
**300**  
**90**

#### Saturday August 8, 2009






Volume: **12,555**  
**150**  
**15**

#### Sunday August 9, 2009



Volume: **10,930**  
**110**  
**10**

- Passenger Vehicle 
- Single Unit Truck 
- Tractor Trailer 



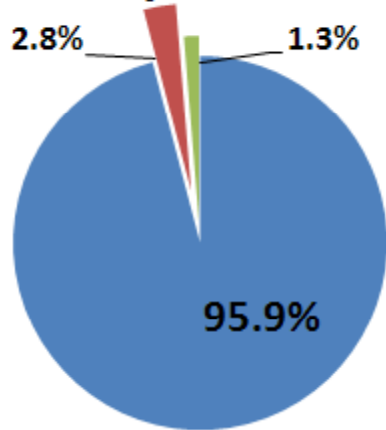
## Additional Trent River Crossing



# BY-PASS ROUTE FOR TRUCK TRAFFIC? (1)

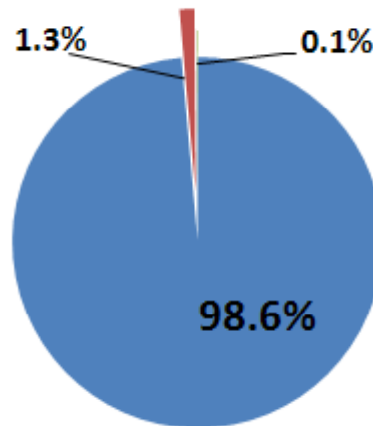
COMPOSITION OF DAILY TRAFFIC VOLUMES ON THE BRIDGE STREET BRIDGE

### Thursday June 4, 2009



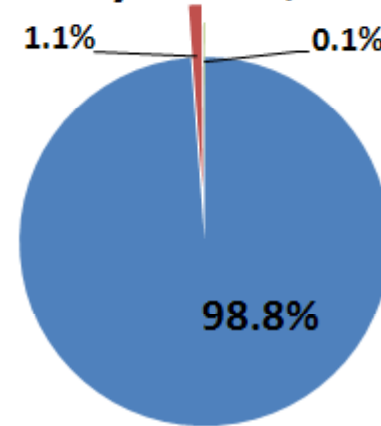
Volume: **12,305**  
**365**  
**160**

### Saturday June 6, 2009






Volume: **12,410**  
**160**  
**10**

### Sunday June 7, 2009



Volume: **9,845**  
**110**  
**15**

- Passenger Vehicle 
- Single Unit Truck 
- Tractor Trailer 



## ***Additional Trent River Crossing***



# **CONCLUSION – WHERE SHOULD IT GO?**

### **Within the Community is Preferred**

- Traffic crossing the bridge has predominantly local origins and/or destinations
- Allows for an approximate even split of river-crossing traffic, which will maximize the service life of the existing bridge
- Provides a needed east-west transportation facility for future traffic growth as well as cycling and pedestrian use
- Effective emergency route
- Effective alternative route when the existing bridge is under repair or replacement
- Cost-effective with respect to using existing transportation infrastructure

### **South of the Community is Not Preferred**

- Low traffic demands would not warrant the expense, existing bridge would continue to carry a high percentage of river crossing traffic
- Ineffective as alternative emergency or detour route
- Not a by-pass situation – relatively low volume of through and truck traffic as Campbellford is not along a major highway corridor. Compare to communities along provincial highways where by-passes have been planned or built (e.g., Highway 2, 11, 69, etc.)



## Additional Trent River Crossing



Come for a visit. Stay for a lifestyle.

# ALTERNATIVE CROSSINGS & PROPERTY IMPACTS

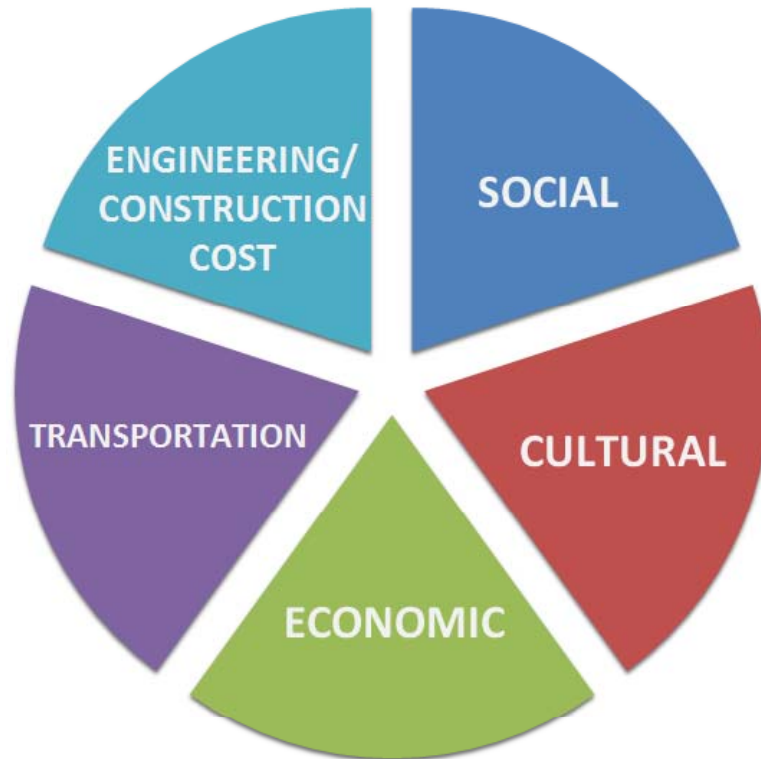
- Several alternative crossings were considered within Campbellford – all have social and cultural heritage impacts
- Alma Street to Second Street corridor has the least building demolition requirements





## **EVALUATION OF ALTERNATIVES**

For final set of alternatives within community, an evaluation was undertaken using five criteria as illustrated below:



Natural environment was not included in the evaluation since with mitigation, all alternatives would be considered equal

Each of the criteria was considered equal in the evaluation

The initial preferred alternative and the next most preferred alternative(s) were compared to confirm the decision

The final preferred alternative was a new bridge in the Alma Street to Second Street corridor

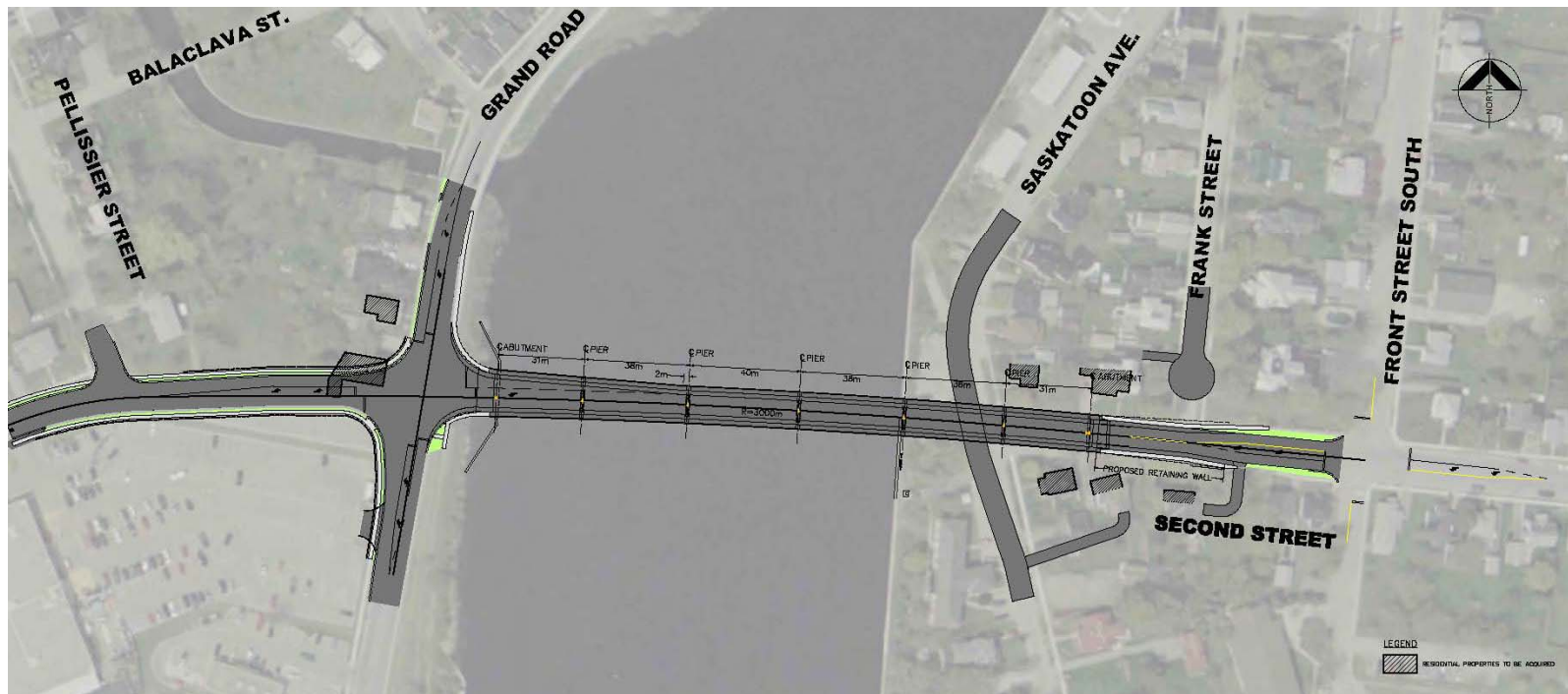


## Additional Trent River Crossing



# PREFERRED ALTERNATIVE

- Construction Cost: \$11.6 M bridge (steel girder) and \$1.9M roadways, total \$13.5M
- Includes a 25% allowance for engineering/contingencies, but excludes property acquisition and other compensation costs related to property impacts





## **Additional Trent River Crossing**



# **RECOMMENDATION – ULTIMATE SOLUTION**

### **New High Level Bridge Within Campbellford**

- Addresses all aspects of need and justification
- Represents a solution to the problems and opportunities that benefits the community at large

### **Recommended Location from Alma Street to Second Street – Why?**

- Best transportation solution:
  - effectively splits river crossing volume and maximizes the service life of the existing bridge
  - substantial reduction in delay, travel time, emissions, and road user costs
  - excellent emergency route
  - not a “by-pass” – good connections to the central business area
  - serves newer and planned commercial and residential development areas
  - excellent connectivity to the County Road arterial system
- Feasibility and Impacts:
  - allows for relatively economical bridge design (girder bridge)
  - acceptable road grades on bridge
  - Alma Street and Second Street provide necessary connecting roads and have a mix of residential and commercial land uses
  - Second Street has been upgraded east of Front Street
  - Alma Street has potential to be extended westerly along former rail right-of-way
  - minimal property impacts in terms of building demolition
  - recognized need to mitigate proximity impacts and compensate affected property owners



## ***Additional Trent River Crossing***



# **MITIGATIVE MEASURES AND MONITORING (1)**

### **Property Impacts**

- One demolition required – northwest corner of Grand Road and Alma Street
- Draft property compensation policy for other affected properties – to address land requirements, proximity impacts, and noise impacts

### **Cultural Heritage Impacts**

- Cultural Heritage Assessment report identified mitigation recommendations as required prior to and after detail design of the bridge project
- Measures include assessing buildings designated under the Ontario Heritage Act, and document and recording cultural heritage features

### **Natural Environment**

- Report identified required approvals and permits to be obtained
- For construction, mitigation measures identified as related to fisheries, vegetation, water quality, erosion and sedimentation, and air quality



## ***Additional Trent River Crossing***



# ***MITIGATIVE MEASURES AND MONITORING (2)***

### **Traffic Impacts**

- Traffic forecasts for Alma and Second Streets would be within typical thresholds for collector roadways with mixed land uses
- Second Street traffic forecasts would be approx. 5,000 vehicles per day (vpd) with no growth, approx. 6,000 vpd with 20-year low growth, and approx. 7,000 vpd with 20-year high growth
- Alma Street traffic forecasts would be approx. 3,000 vehicles per day (vpd) with no growth, approx. 4,000 vpd with 20-year low growth, and approx. 5,000 vpd with 20-year high growth
- Future traffic conditions would be similar to those experienced today on several streets with residential frontage both within Campbellford (e.g., Grand Road, Bridge Street, and Centre Street) and in other municipalities in Northumberland County
- Traffic conditions should continue to be monitored as part of the normal operations of the Municipality and County to address any future operational issue with the local road network



## Additional Trent River Crossing



# STREETS WITH SIMILAR CHARACTERISTICS (1)

Second Street East of Doxsee Street  
Facing East



Facing West



Bridge Street  
Campbellford



6100 vpd

King Street  
Cobourg



7700 vpd

University Avenue  
Cobourg



11,500 vpd



## Additional Trent River Crossing



# STREETS WITH SIMILAR CHARACTERISTICS (2)

Elizabeth Street, Brighton



**9600 vpd**

Young Street, Brighton



**5800 vpd**

Main Street, Brighton



**6400 vpd**

Percy Street, Colborne



**3400 vpd**

Centre Street, Campbellford



**4300 vpd**



## Additional Trent River Crossing



### **SIMILAR BRIDGE SITUATION**

With a proposed bridge connecting Alma Street and Second Street, Campbellford would have two bridges approximately 400 m apart, which is similar to Trenton (depicted below) where the bridges over the Trent River are approximately 500 m apart.



Trenton, Ontario (City of Quinte West)

Similar to the proposed Campbellford bridge

- Both are two-lane bridges
- Both are approx. 190 m in length
- Both are structural steel girder bridges

Each of the Trenton bridges is currently carrying 15-17,000 vehicles per day, and both have been identified as requiring twinning for level of service needs



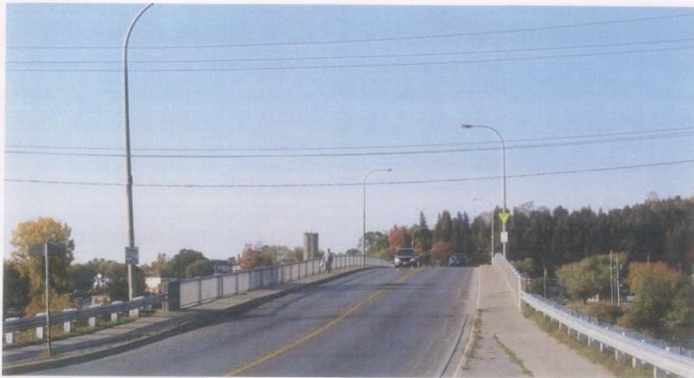
## Additional Trent River Crossing



# TRENTON STEEL GIRDER BRIDGES

D. James MacDonald Bridge  
(Dixon Drive)

LOOKING WEST AT BRIDGE



NORTH ELEVATION



Veterans Skyway  
(Dundas Street East)

LOOKING EAST AT BRIDGE



SOUTH ELEVATION





## **Additional Trent River Crossing**



# **COUNTY COUNCIL QUESTIONS (1)**

### **Alma Street to Second Street Bridge As A Four Lane Bridge?**

- This was raised to consider the possibility of not replacing the existing Bridge Street bridge in the future
- At the request of the County, AECOM assessed compared this possibility to a two-bridge scenario, and concluded:
  - less efficient road network (traffic, emergency, school bus, goods movement)
  - higher traffic infiltration in residential neighbourhoods
  - more complex traffic operations at each end of the bridge
  - increased auto dependency by making walking/cycling more difficult
  - potential negative impact on business in core area
- In summary, it would represent an impractical, inefficient, and inequitable transportation solution, and therefore, could not be technically supported or recommended
- In terms of construction costs, no benefit to the County as indicated in the following slides



## Additional Trent River Crossing



# FUTURE COST DISTRIBUTION SCENARIOS (1)

Scenario 1 – New 2-Lane Crossing at Second St./Alma St. & Replace Existing Bridge

Bridge Location	County Share	Trent Hills Share	Total
Second St./Alma St.	1 lane - \$5.8 M	1 lane - \$5.8 M	2 lanes - \$11.6 M
Existing Bridge	2 lanes - \$10.25 M	0 lanes - \$0.0 M	2 lanes - \$10.25 M
Total	3 lanes - \$16.05 M	1 lane - \$5.8 M	4 lanes - \$21.85 M

Scenario 2 – New 4-Lane Crossing at Second St./Alma St. & Demolish Existing Bridge

Bridge Location	County Share	Trent Hills Share	Total
Second St./Alma St.	4 lanes - \$16.6 M	0 lanes - \$0.0 M	4 lanes - \$16.6 M
Existing Bridge	0 lanes - \$1.0 M (dem.)	0 lanes - \$0.0 M	0 lanes - \$1.0 M
Total	4 lanes - \$17.6 M	0 lanes - \$0.0 M	4 lanes - \$17.6 M

Estimated costs including engineering and contingencies, excluding roads and property



## Additional Trent River Crossing



# FUTURE COST DISTRIBUTION SCENARIOS (2)

### Scenario 3 – Replace Existing Bridge & Twin at Bridge St. Corridor

Bridge Location	County Share	Trent Hills Share	Total
Existing Bridge	2 lanes - \$10.25 M	0 lanes - \$0.0 M	2 lanes - \$10.25 M
Twin Bridge	2 lanes - \$10.25 M	0 lanes - \$0.0 M	2 lanes - \$10.25 M
Total	4 lanes - \$20.5 M	0 lanes - \$0.0 M	4 lanes - \$20.5 M

### Summary

Scenario (Corridor)	County Share	Trent Hills Share	Total
1 (Exist. & A/S)	3 lanes - \$16.05 M	1 lane - \$5.8 M	4 lanes - \$21.85 M
2 (A/S)	4 lanes - \$17.6 M	0 lanes - \$0.0 M	4 lanes - \$17.6 M
3 (Existing)	4 lanes - \$20.5 M	0 lanes - \$0.0 M	4 lanes - \$20.5 M

Estimated costs including engineering and contingencies, excluding roads and property



## ***Additional Trent River Crossing***



# **COUNTY COUNCIL QUESTIONS (2)**

### **Alternative Southerly Bridge Crossing Through Ferris Park?**

- Addressed earlier in presentation
- Park impacts unacceptable to Ontario Parks
- Higher costs and by-pass not warranted

### **Without An Alternative Crossing, What Are The Business-Related Impacts With A Two-Year Construction Period For Replacing the Bridge Street Structure?**

- Loss of business from customers on opposite side of the river
- Negative effect on businesses relying on pass-by traffic
- Possible closures of businesses relying most heavily on pass-by traffic
- Freeze effect on commercial building development, sales, and leasing
- Loss of business goods movement operators, and/or higher prices passed on to consumers
- Potential claims of injurious affection against the County and Municipality



## ***Additional Trent River Crossing***



### ***NEXT STEPS***

**With approval from both the Municipal and County Councils:**

- File the Environmental Study Report (ESR) with the respective Clerks of the Municipality and County and make it publicly available
- Circulate the ESR to the Ministry of the Environment and other interested agencies
- Publish a Notice of Completion, which will signify the beginning of a minimum 30-day public and agency review period
- If during the review period, any party requests a Part II Order from the Ministry of the Environment, attempt to resolve any issues with respect to that request
- Once final approval of the project is received, either through no Part II Order requests or through Ministry denial of any Part II Order requests, finalize the preferred design
- Provide a project description to the Canadian Environmental Assessment Agency (CEAA), and proceed to complete the requirements of CEAA with respect to permits required from the responsible federal authorities