

Smith, Neal

To: Smith, Neal
Subject: RE: CVC Commnets - Draft ESR - Mississauga Rd - Financial Rd to Queen St (CVC File No. EA 15/003)

Responses to CVC's comments

From: Kilis, Jakub
Sent: October 16, 2018 2:16 PM
To: Saddi, Asha
Subject: CVC Commnets - Draft ESR - Mississauga Rd - Financial Rd to Queen St (CVC File No. EA 15/003)

Hi Asha,

CVC staff has had a chance to review the Draft ESR and associated technical studies and provide the following comments for your consideration:

Fluvial Geomorphic Report:

1. The report identifies that the existing location of the piers deflect the flow away from the inner bank which produces stagnant backwater and coarse sediment disposition. The replacement of the structure is proposing to relocate the piers to the banks. Please discuss the impacts that the relocation of the piers may have on the geomorphic processes along the Credit River.

Response: Under existing conditions, the piers are approximately 16 m apart. This constricts flow between the piers, resulting in the Credit River over-widening on the downstream side to compensate. Additionally, a slight curve in the reach has caused scour along the length of the right abutment. At the crossing, backwater and ponding are located at either side of the bridge piers away from active flow, which suggest a lack of crossing capacity, and therefore was recommended that the replacement structure be wider to minimize any potential impacts on stream morphology. The proposed replacement structure has a total span of 103 m, and is sufficient to support the long-term form and function of the channel. The middle section has a span of 45 m, which accommodates the average bankfull width of 25 m, as well as the average 100-year migration rate of 12 m upstream. The middle section eliminates the constriction under existing conditions, and it is anticipated that this will alleviate the resulting impacts. (See attached letter also, this will be added to the Fluvial Geomorphic Report in the Appendix).

2. The recommendation for the Credit River bridge crossing from the geomorphic assessment prepared by Matrix is a 75m clear span structure set at an optimal skew to the meander axis and is applicable to the current channel alignment. The proposed bridge structure as submitted within the Draft ESR is a 3-span structure of 103m supported by 2 piers located 45m apart. This does not follow the recommendation by Matrix Solutions. Please update the geomorphic assessment to include a recommendation of the pier locations and how they will impact the geomorphic processes of the Credit River. The proposed solution must be determined and ultimately agreed upon by all disciplines involved.

Response: It is noted that the proposed structure is different than that recommended within the fluvial geomorphic assessment, which represents an optimal condition. It is recognized that due to

engineering and budgetary constraints, this optimal solution may not be achieved. However, the proposed structure accommodates the bankfull channel and the 100-year migration rate. This span eliminates the constriction present under existing conditions, and therefore it is anticipated that the over-widening on the downstream side of the bridge, as well as the backwatering effects on the upstream side, will be alleviated.

Ecology Comments

3. An assessment of the impacts of each alternative design concept for the widening of Mississauga Road was not provided. Typically an environmental impact assessment for each alternative design concept should be completed to inform review of preferred alternatives. Based on other criteria not related to our areas of interest and that the horizontal alignment or alternative design for this project result in similar limits of disturbance and impacts CVC will not pursue a request for additional impact assessments of the remaining preferred planning solution alternative designs.

Response: CVC is satisfied without a EIA, and understand that the natural sciences impacts are similar with each of the alternatives.

4. Please review and quantify the expected area of impact around the Credit River Bridge that will result from both structure removal and replacement and the proposed installation of the retaining wall. Disturbance is expected beyond the limit of the widening including as a result of removal of the existing piers and associated changes to river morphology. Are works proposed to reshape the Credit River banks after the existing bridge is removed? What are the impacts from a geomorphic perspective once the existing bridge is removed? What are the ecological impacts of bridge construction and retaining wall installation? These questions should be addressed at the EA stage.

Response: With regards to the impacts from a geomorphic perspective once the bridge is removed, we anticipate that the function will be improved. The current structure constricts flows between the piers, resulting in the watercourse over-widening on the downstream side. Additionally, at the crossing, backwater and ponding are located at either side of the bridge piers away from active flow, which suggest a lack of crossing capacity. The proposed span accommodates the channel and its banks, but also a portion of the floodplain. The 100-year migration rate is also accommodated. Therefore, this proposed structure eliminates the constriction under existing conditions.

We anticipate instream works to be limited. The proposed span is more than sufficient to accommodate the meander geometry of the Credit River without bank protection and there is a low risk of significant lateral channel migration. Offset protection could be implemented to increase the level of erosion protection for the structure. This is installed between the channel and structure piers, and allows a minimum setback between the structure and the channel, should lateral channel migration occur. The installation of offset protection is not typically considered in-water works.

The removal of the existing structure may result in some disturbance to the natural environment, but any restoration activities would be limited to the areas of disturbance.

5. CVC notes that only limited discussion has been provided regarding potential impacts to fish and fish habitat resulting from the Credit River Bridge works. All potential impacts to fish and fish habitat must be addressed based on conceptual designs.
 - a. Will removal of the existing piers have any impact on downstream or upstream fish habitat (i.e. removal of an existing scour pool which may provide winter refuge, impacts to riparian vegetative cover, etc.).

Response: The construction activity required for the removal of the piers will result in temporary impacts, and will be mitigated through proper dewatering to allow work to be completed in the dry, following the inwater timing window (July 1 to March 31), and additional standard construction methods to be developed during detail design. The removal of the piers will result in flow pattern changes in the river, however, the removal of the piers will result in the channel returning to formal natural conditions. The removal of the piers will also expose a section of creek which has been previously been occupied by the piers. Specific design elements related to the pier removal can be determined during the detailed design process.

- b. Will the construction of the retaining wall result in permanent removal of riparian habitat? How will impacts to riparian and associated aquatic habitat be avoided, minimized, or mitigated?

Response: The roadway widening, and installation of a retaining wall will require permanent and temporary riparian removal. The temporary impacts will be associated with construction activity and will be restored upon completion of construction. The installation of a retaining wall will decrease the amount of riparian area that would be impacted by decreasing the side slopes of the roadway. A tree protection plan will be prepared prior to construction to ensure tree hoarding and to minimize the impact area. A vegetation planting plan will be completed during detail design and will apply CVC planting requirements which include the planting of only native species. The widening of the Credit River span would provide greater opportunity for limited vegetation growth under the structure.

6. Fish – Existing Conditions Report lists the unnamed tributary as not providing fish habitat, however, CVC has fish records upstream of the Mississauga Road corridor. This feature should be considered to provide fish habitat.

Response: CVC provided the following information regarding the fish collection records and thermal classification of the unnamed tributary. CVC fish collection records: Pumpkinseed and Brown Bullhead – Oct. 27 2004. Brown Bullhead and Pumpkinseed – Oct. 26 2004. Thermal regime: small warmwater community. Timing window during which in-water works is permitted: July 1 – March 31. The ESR has been updated to include this information.

7. Provincially Significant Wetland (PSW) - Please provide a discussion on how impacts to the PSW will be mitigated, including the potential use of steep slopes, retaining walls to minimize grading limits, refining of grading limits through other measures, avoidance of additional ditching, etc. Further,

mapping discrepancies exist between the consultant's wetland mapping (AMEC FW 2017) and that of NHIC for the PSW feature. This feature should be staked at detailed design so the area of impact can be quantified and minimized.

Response: To minimize the footprint of the roadway widening, retaining walls will be installed along the PSW to avoid roadway slopes. Retaining walls can be constructed from the road surface to avoid the use of heavy equipment in the PSW during construction. CVC has requested that the wetland boundaries should be staked during detail design such that the areas of impact can be quantified and minimized. A tree protection plan will be developed during detail design to define tree hoarding to minimize impacts to the wetland.

8. SWH – CVC notes that Significant Wildlife Habitat (SWH) was not addressed in the ESR natural heritage characterization reports, or the aquatic and terrestrial impact assessment. The proponent should determine if any confirmed or candidate SWH exists within or adjacent to the study area. The proponent should use both the *SWH Schedules for Ecoregion 7E* (MNRF 2015) and the criteria and schedules set out in the *Peel Caledon Significant Woodlands and Significant Wildlife Habitat Study* (North-South Environmental Inc., Dougan & Associates and Sorensen Gravely Lowes 2009), as both are applicable to lands within the Region of Peel.

Response: A section has been inserted in to the report Section 3.2.5. Significant Wildlife Habitat.

The MNRF defines Significant Wildlife Habitat (SWH) as ecologically important in terms of features, functions, representation or amount and contributing to the quality and diversity of an identifiable geographic areas or Natural Heritage System (MNR 2000). SWH's are divided into four main categories: Seasonal Concentration Areas of Animals, Rare Vegetation Communities or Specialized Habitat for Wildlife, Habitat for Species of Conservation Concern (excluding Endangered or Threatened species) and Animal Movement Corridors. The SWH Criteria Schedules for Ecoregion 7E (MNRF 2015) and the Peel – Caledon Significant Woodlands and Significant Wildlife Habitat Study (SWSWH; North-South Environmental Inc. et. al. 2009) provide further information on determining the presence of SWH.

Candidate SWH which is determined to have the potential to occur within the study area is discussed below.

Seasonal Concentration Areas

Seasonal concentration areas are those habitats where large numbers of a single species or many species congregate at one (or several) times a year. The SWH Criterion Schedules for Ecoregion 7E outlines 14 wildlife habitats meeting the criteria for Seasonal Concentration Areas of Animals and an additional four are outlined in the Peel – Caledon SWSWH Study.

Based on a review of ecosites present and conditions observed during field investigations one Season Concentration Area is confirmed present and an additional four habitats could occur within the study area.

Field investigations confirmed Colonially Nesting Bird Breeding Habitat (Cliff and Bank) as 12 nests Cliff Swallow nests were observed under the Credit River Bridge during aquatic field investigations.

Bat Maternity Colonies, Deer Winter Congregation Areas, Reptile Hibernaculum and Turtle Wintering Areas were all considered to have a low potential to be present within the study area. Bat Maternity colonies could be present in tree cavities of snags or large diameter trees in any of the deciduous forest areas. Deer will congregate in large tracts of woodland in the winter, in areas where large woodlots are rare, criteria lists woodlots >50 ha as significant. The polygon classified as FOD7 near the centre (north) of the study area is connected to a large area (>50ha of forest) of woodland. It is possible deer would use this area as it is a significant amount of woodland, especially at a landscape scale. Reptile Hibernacula and Turtle Nesting Areas could occur within the limited natural wetlands within the study area including the areas of meadow marsh and the permanent and intermittent watercourses present within the study area. No snakes or turtles were observed during field investigations. In general, suitable ecosites are present, however the areas which are actually located within the study area are small and the anthropogenic nature of the surroundings could mean these natural areas are degraded unlikely to be used. As field investigations were undertaken from the ROW the suitability of these habitats could not be confirmed.

Rare Vegetation Communities or Specialized Habitat for Wildlife

The SWH Criteria Schedules for Ecoregion 7E outlines seven habitats meeting the criteria for Rare Vegetation Communities and an additional three are outlined in the Peel – Caledon SWSWH Study.

Based on a review of ecosites present and conditions observed during field investigations three Rare Vegetation Communities could occur within the study area.

Rare Vegetation Communities, Forests Providing a High Diversity of Habitats and Foraging Areas with Abundant Mast were all considered to have a high potential to be present within the study area. Based on field investigations a small area of Dry – Fresh Oak – Hickory Deciduous Forest Type (FOD2-2) is present within the study area. Only 0.2 ha of this ecosite is located within the study area boundaries, the minimum size criterion for rare vegetation communities is 0.5 ha. Field investigations were restricted to the ROW, and it is unclear whether this ecosite extends far enough outside the study area boundary to be meet this criterion. Foraging Areas with Abundant Mast share this rationale, FOD2-2 meets the ecosite criterion however a small area of 0.2 ha would not be considered SWH. The large area of FOD7 which was referenced above as potential Deer Winter Congregation Area could also qualify as a Forest providing a High Diversity of Habitats. The classification of this woodland as Fresh – Moist Lowland Deciduous Forest Ecosite indicates no tree species was noted as dominant, which generally means a varied species composition. This combined with the large size of this forest (the majority of which is outside the study area) imply a diverse ecosite, however due to the field investigations restricted to the ROW, this cannot be confirmed.

The SWH Criteria Schedules for Ecoregion 7E outlines eight habitats meeting the criteria for Specialized Habitats for Wildlife and an additional two are outlined in the Peel – Caledon SWSWH Study.

Based on a review of ecosites present and conditions observed during field investigations four Specialized Habitats for Wildlife could occur within the study area.

9. The *Aquatic and Terrestrial Impact Assessment* (AMEC FW 2017) and the *Natural Heritage Existing Conditions Report* (AMEC FW 2017) indicate the wetland feature in the study area does not provide habitat for amphibians, reptiles or marsh breeding birds. CVC records indicate the presence of breeding birds, amphibians, tadpoles and reptiles within the wetland feature. Additionally, frogs were observed in the channel of the unnamed tributary immediately adjacent to Mississauga Rd. This feature should therefore be recognized as wildlife habitat – there are potential SWH, SAR and wildlife crossing implications associated with this.

Response: Added to Section 3.2.3.3 in the report.

Reptiles and Amphibians

A review of the ORAA map indicated five species of reptiles and eight species of amphibians have been observed within the natural heritage block which encompasses the study area (Ontario Nature 2016). No reptile or amphibian species were observed during Amec Foster Wheeler field investigations, however, CVC records report amphibians, tadpoles and reptiles in the wetland habitat. CVC has additionally reported "frogs" within the unnamed tributary and recognizes this tributary a providing wildlife habitat (CVC, 2018) A scarcity of fallen woody debris, wetlands and ponds within the study area indicate that there is limited potential habitat for feeding and nesting of reptiles and amphibians. This does not indicate that no reptiles or amphibians are present within the study area as field investigations were conducted from the ROW so evidence of species utilizing more natural areas within the study area could not be observed. The wetland feature (MAM) at the centre of the study area as well as the adjacent portion of deciduous lowland forest (FOD7) could both support a herpetile population. The woodland generally tracks the Credit River and contains some ponds outside the study area.

10. CVC notes that no consideration has been given to the addition of wildlife crossing structures other than the Credit River crossing structure, despite significant natural features existing on both side of Mississauga Road south of the Credit River bridge. The unnamed tributary crossing south of the Credit River provides a direct connection between the PSW features that exists on both sides of Mississauga Road. The *Aquatic and Terrestrial Impact Assessment* (AMEC FW 2017) indicates replacement of the unnamed tributary culvert should maintain or enhance passage for herptiles. To prevent the loss of biodiversity and protect the integrity of the landscape, CVC recommends the addition of a wildlife crossing structure (including appropriate fencing) at or near the unnamed tributary crossing to facilitate wildlife movement from wetland to wetland (i.e. amphibian and reptile passage), or incorporation of passage into the existing structure. It is unlikely that all animals (i.e. amphibians and reptiles) will travel

as far as the Credit River Bridge structure to pass. Several residential parcels with fencing exist between the PSW and the Credit River bridge, creating a barrier to wildlife movement. CVC recommends a designated eco-passage be installed in this area. An opportunity for an eco-passage should be identified at the EA stage and further consultation with CVC and MNRF regarding optimal location and design of the structure could occur at the detailed design stage. The proponent should consult the CVC *Fish Wildlife Crossing Guideline* (CVC 2017) for fish and wildlife crossing design recommendations. Material type (steel not preferred), ambient light and moisture conditions, water depth, openness ratio, clear lines of sight and cover at entrance/exits are important design considerations for the passage of reptiles and amphibians.

Response: A section has been inserted in to the Terrestrial Habitat, Existing Conditions Report 4.3 Factors of Wildlife Passage.

Wildlife passage through crossing structure is influenced by a wide variety of factors, including crossing structure height and width, light penetration under the structure, ground cover, availability of nearby habitat, ambient noise conditions, and the presence of watercourses (Donaldson 2005, Scott 2012, Foresman 2003, Jackson 2003, Reed et al. 1997, MTO 2006, MTO 2015). Different factors tend to affect some species more than others and some species may prefer conditions that deter passage by others. A crossing example designed for snakes may include grates which provide sunlight penetration (Jackson 2003), whereas specialized rodent and salamander crossings may consist of narrow pipes which provide darker more confined surroundings preferred by these species (Cavallaro et al. 2005).

Favorable vegetation structure and availability of cover are also known to contribute to crossing use by wildlife (USDOT 2011). McDonald and St. Clair (2004) reported that vegetation cover was significantly more important than the size of the structure in determining frequency of use by small mammals. Small mammals will use a variety of underpass designs as long as the vegetation and substrate cover are sufficient.

As the structure to be replaced and enhanced at the Credit River is a large multi-span bridge many of these factors become less significant than when deciding on a wildlife crossing design for culverts (e.g., openness ratio, crossing height).

11. The Credit River crossing structure is expected to provide adequate wildlife crossing opportunities, but no discussion on target species or specific wildlife crossing design incorporations has been provided. Please provide conceptual design details and a discussion of how this structure will function as a wildlife crossing structure at detailed design.

Response: Included in Section 4.3 Factors of Wildlife Passage noted above.

12. Vegetation removals – Estimated 6763 m² of natural/semi natural habitats expected to be impacted. A complete tree inventory, tree preservation plan, and landscaping plan will be required during the detailed design stage. As several significant features exist within and immediately adjacent to the study area including significant woodlands, Provincially Significant Wetlands (PSW), and significant valleylands. As such, the goal of restoration should be to replicate and enhance these features. Tree

replacement ratios can be further discussed with CVC at the detailed design stage, however, the following preliminary restoration recommendations are provided below.

- a. CVC requires that only common, native species be used in all restoration and stabilization works that occur within regulated and/or natural areas. CVC recommends the use of only common, native plants in restoration works outside of regulated or natural areas. The proponent should review the updated *CVC Plant Selection Guideline version 2.0* (CVC 2018) for recommendations on approved plant species, approved seed mixes and approved cover crops.
- b. If soils within natural or regulated areas are impacted please refer to the *CVC Healthy Soils Guideline* (CVC 2017) for soil management recommendations.

Response: Added to ESR Document, section 6.2.6 Natural Environment.

Vegetation Impacts

A total of 6,763 m² of natural and semi-natural habitats are expected to be impacted by the proposed works. The areas of impact are located immediately adjacent to the existing road and are currently influenced by roadway disturbance. The impact areas are concentrated in the central section of the roadway study area and located primarily east of the Credit River. Impact to natural woody vegetation will occur in several areas as well as impacts to planted trees in many other parts of the study area. A complete tree inventory, tree preservation plan, and landscaping plan will need to be completed during the detailed design stage. There are several significant features that exist within and immediately adjacent to the study area including significant woodlands, Provincially Significant Wetlands (PSW), and significant valleylands. As such, the goal of restoration should be to replicate and enhance these features. Tree replacement ratios can be further discussed with CVC at the detailed design stage, however, the following preliminary restoration recommendations are provided below:

- 1. CVC requires that only common, native species be used in all restoration and stabilization works that occur within regulated and/or natural areas. CVC recommends the use of only common, native plants in restoration works outside of regulated or natural areas. The proponent should review the updated CVC Plant Selection Guideline version 2.0 (CVC 2018) for recommendations on approved plant species, approved seed mixes and approved cover crops.***
- 2. If soils within natural or regulated areas are impacted, please refer to the CVC Healthy Soils Guideline (CVC 2017) for soil management recommendations.***

Please let me know if you have any questions about the above and do not hesitate to contact me should you have any questions,
Jakub

Jakub Kilis, RPP

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March 16, 2018

Matrix 22380-522

Mr. Jason Stahl, P.Eng.
AMEC FOSTER WHEELER
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**Subject: Assessment of the Mississauga Road Crossing Replacement over the Credit River,
Brampton, ON**

Dear Mr. Stahl:

1 INTRODUCTION

A Schedule 'C' Class Environmental Assessment (EA) is being completed for the widening of Mississauga Road, from Financial Drive to Queen Street West, within the City of Brampton, Ontario. Matrix Solutions Inc. was retained by AMEC Foster Wheeler to provide fluvial geomorphic input into the Class EA, in support of the replacement of crossings within the study area. A geomorphic assessment was completed in October 2017, which took a risk-based approach to provide recommendations for the replacement of the crossing over the Credit River.

The report noted that the existing structure crossing the Credit River is located along a generally straight section of the river, with a slight south-easterly curve. This bridge crossing is constructed with two piers spaced approximately 16 m apart and a total span of approximately 50 m. The slight curve in the reach has caused scour along the length of the right abutment (facing downstream). While there was no flow on either side of the piers, stagnant water was noted. The Credit River ranges from approximately 23 to 27 m wide in the vicinity of the crossing. To compensate for the constriction through the 16 m wide span between the piers, the river over-widens on the downstream side of the bridge.

As a result, the fluvial geomorphic assessment recommended that to reduce the possibility of increased channel widening on the downstream side of the crossing, as well as to limit additional bed scour, the existing piers be removed and the bridge be replaced with one that spans the width of the channel plus a factor of safety for future migration of the river.

It is understood that the proposed crossing design will consist of a wider structure than existing, with a total span of 103 m. Given the proposed crossing design, Credit Valley Conservation (CVC) has requested additional information be supplied regarding potential impacts on the Credit River as a result of the wider span, as well as an indication of whether instream work will "be required to ensure no significant changes after the bridge is reconstructed." This letter builds on the findings of the previous assessment to satisfy this requirement.

2 DISCUSSION

Based on the combined consideration of the 100-year migration rate and field observations of existing conditions, the site was deemed to be low risk from a lateral channel migration perspective. The average bankfull width was measured to be 25 m in the vicinity of the crossing, with an average 100-year migration rate of 12 m upstream. The *Credit Valley Conservation Fluvial Geomorphic Guidelines* (CVC 2015) defines a good crossing as one that spans the watercourse and its banks, does not impact channel velocity, has a natural stream bed, and creates no noticeable changes in the functions of the watercourse.

Under existing conditions, the piers are approximately 16 m apart. This constricts flow between the piers, resulting in the Credit River over-widening on the downstream side to compensate. Additionally, a slight curve in the reach has caused scour along the length of the right abutment. The proposed total span of 103 m is equivalent to four times the average bankfull width and is sufficient to support the long-term form and function of the channel. It is understood that the configuration of the structure consists of a 45 m middle clear span, and two 29 m end clear spans. The middle clear span structure accommodates the channel and its banks, but also a portion of the floodplain. The 100-year migration rate is accommodated within this structure. The middle clear span structure eliminates the constriction under existing conditions, and it is anticipated that this will alleviate the over-widening on the downstream side of the bridge.

In terms of in-water works to ensure no significant impacts to the Credit River, it is not anticipated that they will be required. The proposed span is more than sufficient to accommodate the meander geometry of the Credit River without bank protection and there is a low risk of significant lateral channel migration. To increase the level of erosion protection for the structure offset protection could be implemented, providing a minimum setback between the channel and structure piers should lateral channel migration occur. Offset protection consists of a buried wood or stone treatment, set at a specified distance away from the structure pier. Should lateral channel migration occur, this offset protection would limit the maximum lateral migration possible, thereby protecting the structure pier. It should be noted that the installation of the offset protection is not typically considered in-water works.

3 CLOSURE

We trust that this letter report suits your present requirements. If you have any questions or comments, please call either of the undersigned at 905.877.9531.

Yours truly,

MATRIX SOLUTIONS INC.



Ahmed Siddiqui, M.Sc., CAN-CISEC
Fluvial Geomorphology Specialist

Reviewed by



Sam Bellamy, P.Eng.
Principal Water Resources Engineer

AS/ap

4 REFERENCE

Credit Valley Conservation (CVC). 2015. *Credit Valley Conservation Fluvial Geomorphic Guidelines*. Mississauga, Ontario. April 2015.

DISCLAIMER

Matrix Solutions Inc. certifies that this report is accurate and complete and accords with the information available during the project. Information obtained during the project or provided by third parties is believed to be accurate but is not guaranteed. Matrix Solutions Inc. has exercised reasonable skill, care, and diligence in assessing the information obtained during the preparation of this report.

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